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12 ALASKA GEN.

REPORT ON

PRINCE WILLIAM SOUND

By

Earl R. Pilgrim

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(Continued on back of sheet)

Prince William Sound

Introduction

It is desired in this report to describe briefly a portion of the mineral resources of Prince William Sound, especially certain of the newer developments which are not described in previous publications. Data for this report were obtained from examinations made during a part of the summer of 1930.

Explorations and Surveys.

Many visits have been made by explorers to Prince William Sound since its discovery by Capt. James Cook in 1778. The first settlement, about 1793, was by Russians on Hinchinbrook Island. In 1898 Mendenhall and Schrader visited seperate portions of the area and prepared the first geological maps and reports. In 1899 the Harriman Expedition explored much of the area and named many of the glaciers. Schrader and Spencer visited in detail parts of the sound in 1900. In. 1905 Grant and Page, and in 1908 and 1909 Grant and Higgins[a] made geological reconnaissances on the sound. In 1913, Port Wells which covers the northwestern portion of Prince William Sound, was investigated by Johnson.[b] In 1914 Johnson investigated the Port Valdez district.[c] In 1923 Moffit spent some time studying the general geologic conditions affecting the copper deposits of Prince William Sound.[d]

[a] Grant U. S. and Higgins D. F; Reconnaissance of the geology and mineral resources of Prince William Sound, Alaska: U. S. Geol. Survey Bull. 443,. 1910.

[b] Johnson B. L., The Port Wells gold lode district; U. S. Geol. Survey Bull. 592, pp. 195-243,.1913.

[c] Johnson B. L., The gold and copper deposits of the Port Valdez district, Alaska: U. S. Geol. Survey Bull. 622, pp. 131-188.

[d] Moffit Fred, H., The occurrence of copper on Prince William Sound; U. S. Geol. Survey Bull. 773, pp. 141-158, 1923.

Geography

Prince William Sound lies between the Copper River Delta on the east, and Cook Inlet on the west, and extends deeply into the Chugach Mountains on the north. It is a deep embayment, north of the Gulf of Alaska, containing a great many islands. It is shielded from the open ocean by Montague and Hinchenbrook islands. Its rugged shore is indented with many deep fiords, bays, and inlets, the larger of which extend for a considerable distance back into the higher mountains. Mountains border the shore line rising abruptlyfrom the deep, protected waters. Many of these mountains are ice and snow covered. The heads of most of the larger fiords are occupied by glaciers which extend into the ocean waters. Most of the higher valleys back from the shores contain small hanging glaciers.

The region exhibits evidence of intense glaciation with its lower mountains rounded and smoothed; its higher mountains and peaks protruding through the snow-fields, are sharp and serrated from frost action. The valleys are deeply carved, U shaped with steep gradients. The streams short and swift, are confined between narrow walls.

Climate.

The climate of Prince William Sound is temperate with a heavy precipitation. It lies within the North Temperate Zone. Weather records kept at Valdez and Latouche show the following;

Valdez annual precipitation average 1909-1921 incl.	52.23 inches.
Latouche annual precipitation average 1917-1921 incl.	146.71 inches.
Valdez annual snow fall average 1917-1921 incl.	273.9 inches.
Valdez annual mean temperature 1909-1921 incl.	34.4° F.
Valdez highest temperature	84.0° F.
Valdez lowest temperature	- 24.0° F.
Latouche highest temperature	82° F.
Latouche lowest temperature	1° F.

Temperatures and precipitation for the region will probably range between the above figures as Valdez and Latouche represent extremes.

Timber and Vegetation.

Trees found in the region are spruce, cottonwood, birch, alder and willow. Timber line ranges from sea level at the upper end of College Fiord, Harriman Fiord, and Columbia Bay to 1,200 feet on Miners River near the head of Unakwik Inlet and to 1,500 feet on Low River near Valdez. Good stands of spruce timber suitable for saw timber are found on Low River, Unakwik Inlet, Esther Island, lower Port Wells and Sawmill Bay. Some of these trees are found to reach a diameter of 5 feet at the base. Most of this region is within the Chugach National Forest and the use of timber is subject to the Forest Service regulations, United States Department of Agriculture. Generally lumber is shipped in from Seattle.

Grasses, ferns, salmon berries, and blueberries are more than abundant along the lower slopes. Devil's clubs are profusely troublesome to the traveler.

Animal Life

Mountain goats, black bears, and whistlers constitute the only game animals within this region. Several varieties of ducks are found in sheltered bays and in fresh water lakes. Salmon, cod, trout, and herring are caught in the nearby waters.

Transportation

All points in the Prince William Sound region are reached by water from Valdez or direct by boats from Seattle. The main fiords and bays are navigable for large boats. Small gasoline boats can be landed almost anywhere along the shores. The important passages are well charted. A monthly freight and mail service is available from Valdez to points along the islands and mainland of the sound.

Valdez id the commercial center and supply point of the re-

gion. A bank and merchandise stores are available. Valdez is the headquarters for the third judicial district and the recording office for the Valdez recording district. Freight charges from Seattle to Valdez are here listed;

Machinery per ton of 2,000 pounds	$ 13.50
Groceries per ton of 2,000 pounds	13.50
Lumber per 1,000 board feet	15.00
Over 100,000 board feet	12.50
Coal per 2,000 Nanimo or Seattle to Valdez	5.00

Power Available

There are many streams in this region with sufficient volume and head available for power in connection with mine operation. These water powers are generallynot available during a portion of the winter months, but can be utilized for about 8 months of the year. A few of the larger streams furnish water the year around. A few of these; are Mineral Creek, Avery River, Miners River, and a number which feed from lakes.

Geology

The predominant rocks of Prince William Sound are sedimentary and have been divided by previous investigators into two groups designated the Valdez series and Orca series. Some attempt has been made to seperate these rocks stratigraphically but the evidence so far uncovered is not sufficiently conclusive. For purposes of description our explanation of these rocks will be limited to accepted explanations of previous writers.

Orca Group.

The Orca group as described by Grant and Higgins " consists of graywackes, slates, and greenstones, with subordinate amounts of conglomerates and limestones. The rocks here termed graywackes vary fromtrue graywackes to arkoses and to sandstones and quartzites, but the general similarity of these rocks and the angular nature of

their constituent grains,which are embedded in a sparse cement or matrix, show that they are all closely allied and can be grouped for convenience of description under one name."

These slate and graywacke beds are found interbedded with each other and with the conglomerate beds. For no considerable sequence are the slate beds or the graywacke beds continuous, but grade from one into the other and back again. The beds range in thickness from an inch to over 100 feet. Commonly they are less than 50 feet in thickness. The slates appear to predominate over the graywackes in areas examined by the writer.

Limestones occur in a few localities as thin beds, as a cement to some coarse grained fragmental rocks at the base of the Orca group, and as fine grained siliceous limestones.

The conglomerates are found in a number of places and appear to be rather widespread in their distribution through the Orca group. These conglomerates range in thickness from a few inches to over 20 feet, probably having a greater thickness in some localities. The fragments vary from fine sand to coarse boulders over a foot in diameter and are both angular and rounded. The rounded pebbles are probably more common than the angular fragments. They consist of slate, graywacke, greenstone, diabase, basic amygdaloids,quartz, and granite rocks. The matrix varies from dark fine grained slate to coarse graywacke.

The greenstones include a variety of altered igneous rocks; lava flows, tuffs, and agglomerates, and intrusives. The greenstones range in color from gray to green and greenish black. They vary in composition from andesite to gabbro, diabase and peridotite. The age of these greenstones is not known definitely but they are shown by Grant and Higgins as interbedded with the sedimentaried of this region and so are probably of a similar age. Moffit states" The stratigraphic and structural relations of the Valdez and Orca groups are still undetermined, yet there is evidence to support the revers-

al of the relative ages assumed by Schrader and the assignment of at least a part of the Orca group to the Paleozoic era and of the Valdez group to the Mesozoic era."

Valdez Group.

The Valdez group consists of slates and graywackes, narrow bedded and commonly considerably altered. The slates and graywackes are often found in thin alternating bands. Generally however the bands have a thickness of several feet. Both rocks are dark colored. The graywackes range from gray to almost black and are slightly schistose in appearance. The slates are nearly black ranging from hard slaty varieties to softer gougy varieties.

Both the Orca and Valdez series have been greatly folded and faulted and locally are intruded by light colored acidic rocks. These intrusives occur as bosses and dikes of hornblende and biotite granites, and a few dikes of aplite, diabase and diorite.

Mineral Resources

In 1896 gold is said to have been found in the gravels of Passage Canal. The first copper claims in this area were located on Virgin Bay in 1898. This became the Ellamar mine. The Bonanza mine on Latouche Island was located the same year. The Cliff mine was located on the shore of Port Valdez in 1906. As a result a considerable number of veins were found in the vicinity of Valdez. A number of these veins proved bodies of good ore and plants were installed. In 1911 gold bearing quartz was discovered on Port Wells near the present site of Golden. This discovery incited a considerable activity in that locality and a number of discoveries were made including several on the west shore of Port Wells. Among these was the vein which became the Granite mine. Since that time there has been a modest production from a number of these properties and the Granite mine has developed into the second largest gold pro-

ducer of the district. During the years since the war a few gold properties have operated intermittantly and a few new discoveries have been made. The properties of the Kennecott Copper Corporation on Latouche Island have been steady producers of copper until late in 1930 when the mine was closed. In 1930 work was done on several gold lode properties with a few thousand dollars produced.

Character of Deposits.

The gold lodes are found in both the Valdez and Orca groups. They are also found cutting the intrusive granites. So far as observed by the writer the gold lodes of Prince William Sound can be segregated into two general types. They occur as fissures cutting the formation and as collections of lenticular veins occupying zones of considerable width in the slates and thinly banded graywackes.

The fissures are generally sharp and regular with steep dips. They vary in thickness from a few inches to over 4 feet. They often have a considerable horizontal range while several have been followed to depths of over 300 feet. The lenticular deposits occupy zones in the slates and schists and consist of a number of lenses following along the cleavage of the rock. These lenses vary greatly in width and are non-persistant along both the strike and the dip. Where one lens plays out in these zones a turn to either side is apt to encounter other lenses within a few inches or a few feet. They are found in widths up to 3 or 4 feet. The zones containing these lenses occupy widths of from 15 feet to over 100 feet . The fissures sometimes, if their strike is close to that of the cleavage of the schists and slates, will turn and follow along the cleavage at the same time breaking up into a number of smaller veins and lenses becoming lenticular deposits.

Postmineral faulting and movement is shown in many of the gold lodes of the region. This is evidenced by slickensided walls and gouge along the veins and lenses, by small step faults offsetting the veins, and by shattered quartz in the veins.

Quartz is the dominant gangue mineral with lesser amounts of calcite. Metallic sulphides present are pyrite, chalcopyrite, galena, sphalerite, stibnite, pyrrhotite, and arsenopyrite occurring generally in relative amounts as listed. The gold and silver values contained occur in the native state. Some of the ores contain sufficient gold and silver held with the sulphides to pay to concentrate the tailings after amalgamation. This concentrate contains principally pyrite and is shipped to smelters in the states.

Oxidation has extended generally to only a few feet of depth. The surface outcrops in this slight oxidized zone often are higher grade in free-milling values than the unoxidized ores below.

Copper Lodes.

Moffit[a] describes the form of the sulphide bodies constituting the copper ores of this district as follows: " They consist of copper and iron sulphides, notably chalcopyrite, pyrite and pyrrhotite, deposited from mineralized solutions along fault planes or fracture planes in fault zones, or of the same sulphides disseminated through the country rock adjacent to such planes. Ordinary veins of sulphides and disseminated sulphides are associated together in the same deposits. The vein deposits are of tabular or lenticular form. The disseminated ore bodies, on the other hand, are irregular in form and variable in copper content." The metallic minerals present in the copper ores are chalcopyrite, pyrrhotite, chalmersite, sphalerite, galena, gold, and silver. Nickel is reported as occurring in a number of the copper deposits of this region. The gangue minerals are quartz, siderite and the country rock enclosing the deposits. Moffit describes the occurrence of chalcocite accompanied by native copper in a few prospects near Cordova.

[a] Moffit, Fred, H. The occurrence of copper on Prince William Sound, U. S. Geol. Survey Bull. 773, 1923, pp.141-158.

Gold Lode Properties

The following described mines and prospects were examined by the writer during the summer of 1930. Several of these have been described in previous reports of the U. S. Geological Survey, but additional work has been done on them which is herein brought to date. There is one newly discovered lead, zinc prospect, and a copper prospect which is one of the older discoveries but has not been previously described.

~~Valdez District.~~

Ramsey Rutherford Mine.

~~This mine about 8 miles northeast of Valdez~~ is reached by travelling along Valdez Glacier about 4 miles from the foot to a point on its east side where it is possible to land at an elevation of about 1,500 feet. ~~A trail~~ From there a trail leads up the steep mountain slope by a number of switchbacks to the mine at an elevation of 3,500 feet. The mine is about 7 miles from the road at the foot of Valdez Glacier and about 11 miles by road from Valdez. Supplies have been freighted to the mine in winter by going about a mile farther up the glacier and then climbing the mountain to the mine by an easier grade. The glacier is said to be decaying so rapidly that each year it is becoming increasingly difficult to utilize this route. It is believed that a trail could be constructed by following along the east bank of the glacier from its foot to a point about 2 miles up and thence up a long draw and around the crest of the mountain. The mine is over 1,500 feet above timber line and over 10 miles from the nearest timber. Its location in the elbow between Valdez Glacier and the large tributary from the east, gives it a slightly cooler climate than nearby mines. The property consists of the Lost Hope Nos. 1, ~~No.~~ 2, and ~~No.~~ 4 claims.

The active ~~development consists of~~ workings include a long crosscut tunnel driven in a southwest direction, which ~~encounters~~ intersects the first or north vein 680 feet from the portal. The second or south vein is ~~encountered~~ intersected

at a point 770 feet ~~in~~ from the portal and at a depth of 290 feet below the surface. The No. 2 vein has been stoped from the surface down to a depth of over 100 feet. On the south vein drifts have been driven east for over 150 feet and west for over 300 feet from the adit tunnel ~~on the south vein~~. Some ore has been mined immediately above these drifts but there still remains a considerable portion of the vein above this level and below the unmined surface stopes. ~~The vein shows~~ In the east drift the vein contains and consists ~~to be~~ from 6 inches to well over 3 feet in width of white quartz containing few ~~little~~ sulphides. ~~A winze sunk~~ at a point 120 feet east of the tunnel a winze sunk to a depth of 15 feet shows about 14 inches of quartz which is said to carry very good values. ~~The vein~~ along the east drift the vein has a strike of N. 51° W. and dips 85° NE. The west drift shows about 60 inches of quartz near the adit tunnel. At a point about 100 feet in from the adit the direction of the cleavage of the graywacke or schist walls in the west drift bends from a strike of N. 40° W. to N. 84° W. and the vein apparently bends with it and breaks up into a number of veinlets or lenses following the schist cleavage. The drift has been driven for some distance straight ahead across the cleavage but finally turns and follows probably beyond the best mineralization. It ~~might~~ may be possible that the vein will again consolidate into one strong fissure as it straightens out on its new course.

The north vein has been developed by short drifts driven along it easterly and westerly from the adit tunnel. ~~The north vein shows in short drifts turned off from the tunnel to have a strike of N. 44° W. east of the tunnel and a dip of 88° NE.~~ This drift extends for about 40 feet, with a raise from a point close to the tunnel, up 70 feet on the vein. The vein shows a width of 9 inches of white quartz. The west drift extends for 50 feet. The vein there shows a strike of N. 66° W. and is bending to the south as the south vein did west of the shaft. The north vein probably intersects the west drift on the south vein at a point about 170 feet west of the tunnel.

The upper workings of this mine are inaccessible. Johnson describes the vein in the upper workings as ranging in width "from

1 inch to 72 inches , in strike from S. 1° E. to S. 25° E., and in dip from 82° E. to 70° W. On the 100 - level the strike is S. 35°-45° E., the dip is 82° E., and a maximum width of 6 feet of quartz is exposed. The vein here varies in width from 1½ feet to 3 feet. The lead is stripped for over 50 feet on the surface where it strikes S. 30°-40° E. and dips 80° E. In some places the vein is solid quartz; in others it contains considerable brecciated country rock." Pyrrhotite is the principal sulphide present in these ores. The concentrates are said to amount to a rather low proportion.

The plant consists of a 7 by 9 inch Blake-type crusher, a 5-stamp Joshua A. Hendy mill driven by gasoline engines; a 14 by 9½ by 14 inch NSO straight line direct connected Chicago Pneumatic, fuel-oil driven air compressor, a small electric generator, a bunk house, mess house, and assay office. A blacksmith shop is located at the portal of the tunnel. The whole plant is well built and in a good location protected from snowslides.

Sufficient water power is available from at least 2 streams close by, to operate this plant for several months of the year.

Mineral Creek Claims

Little Giant Group

The Little Giant group of claims, property of William Quitsche and associates, is reached by a 7¾ mile wagon road up Mineral Creek from the beach at a point about 3 miles west of Valdez, to the junction of Brevier Creek. Here in the basin formed at the mouth of Brevier and Glacier creeks, at an elevation of 650 feet, is situated the mill and buildings of the old Mountain King property. A switch-back trail from here leads up the mountain east of Mineral Creek to the Little Giant , Eldorado, and Rose mines. The upper camp consists of a small Ellis mill, capacity of 4 tons per 24 hours, driven by an overshot water wheel, a blacksmith shop at the portal of the Lower tunnel on the Rose Claim, and a small residence. The

upper camp is above timber line.

The property consists of the Little Giant, Little Giant No. 1 and No. 2, Rose, Independant, and Missing Link claims in one group extending from Mineral Creek eastward along Glacier Creek, and the Eldorado, Star No. 1, No. 2, No. 3, No. 4, and No. 5 claims in a second group extending along the strike of the Eldorado vein southeast to the glacier at the head of Glacier Creek.

The Little Giant mine workings consist of a short open-cut at an elevation of 2,750 feet on a mineralized zone of lenticular quartz veins, in slate. The slate cleavage, and the quartz lenses strike N. 82° W. and dip 66° NE. The lenses followed by the open-cut shows 1 inch of quartz at the surface and 12 inches at a point in 30 feet. Considerable pyrite is present in the white quartz. Small quantities of pyrite, pyrrhotite, sphalerite, and galena are found in the ores. In the open-cut, picked pieces showed free gold visible.

At a point 100 feet higher in elevation, a crosscut tunnel extends north from a rocky bluff on the north side of Glacier Creek. This tunnel crosscuts the mineralization followed in the cut below. A drift turns to the east from 40 feet in, and follows along angling slightly across the cleavage and the quartz stringers. The slate shows clearly the lenticular structure of the quartz mineralization. On a rocky bench 40 feet above this tunnel and alongside a water fall, a pile of ore mined from the surface outcrops, shows visible free gold. The width of this lenticular deposit is probably over 40 feet. The lenses vary in thickness from less than an inch to over 3 feet. The quartz shows pyrite as the principal sulphide with small amounts of galena, chalcopyrite, and sphalerite . The mineralization extends under Glacier Creek and on under the the overhanging glacier which decends to an elevation of 2,900 feet.

About 2,500 feet west of these workings described above, and at an elevation of 1,790 feet, a tunnel has been driven in a

northeasterly direction for 187 feet. The tunnel then turns to almost due east for about 100 feet to the face. It is driven in on a black slate which appears to be the same beds which enclose the the upper mineralization of the Little Giant. For the first 150 feet the tunnel shows no mineralization. At this point about 16 inches of quartz is encountered on the south side of the tunnel. The quartz is then followed by the tunnel to the face where it shows an inch in width. A crosscut to the south from a point 136 feet in, crosses the quartz which has a width of 2 feet. The quarts stands vertical. The quartz is a white milky rock containing a small amount of pyrite. It is apparantly too low grade to mine.

About 1,180 feet west of the portal of this tunnel and at an elevation of 926 feet a tunnel has been driven in an easterly direction for 220 feet. This tunnel follows a similar black soft slate. The cleavage is vertical, striking in a general east-west direction. It contains many small quartz stringers and lenses following along the cleavage. Near the portal of the tunnel a number of quartz veinlets are occupying cross joint planes in the slate. These veinlets are soft sugary quartz which crumbels easily. At the portal of the tunnel there is a lense of quartz 3 feet thick which pinches out within a few feet. The slate shows considerable movement along the cleavage which has developed slickensides.

The Rose vein lies about 750 feet south of the Little Giant on the south side of Glacier Creek. It is a fissure vein cutting nearly parallel with the cleavage of the graywacke wall rock. The walls are smooth, hard and show little gouge on either wall. The graywacke is schisty in structure. The surface outcrop is exposed for several hundred feet along the steep mountain side, clearly indicated by a shallow trench-like gulch. It was noticed that a number of the quartz veins in this district are similarly indicated along their surface outcrops. This is not due to the veins being softer than the surrounding rocks but probably is because

the veins are more porous permitting moisture to penetrate them and a gradual comminution by frost action takes place. The wall rocks although softer are less porous.

The Rose vein has a strike on the surface of N. 85° E. and dips 73° north. The vein is developed by a lower tunnel at an elevation of 2,518 feet crosscutting in a direction of S. 5° E. which intersects the vein 178 feet in. A drift extends 100 feet east along the vein and another west for 40 feet. The vein has been stoped up for about 30 feet above this level on the east drift. The vein here shows a strike of N. 78° E. and dips 76° NW., The ~~vein~~ has a width of from 6 inches to 18 inches. The quartz is crystalline, porous, and considerably iron stained. Pyrite is present with small amounts of galena. Other sulphides were not noted. A small home-made aerial, jig-back, tram connects the portal of the tunnel with the mill across Glacier Creek.

A second tunnel 208 feet higher in elevation has been driven in for 48 feet. This tunnel has a direction of S. 5° E. It lacked a few feet of striking the vein. A third tunnel 273 feet above the lower tunnel driven in for 42 feet strikes the vein 27 feet below the surface. The ore here carries good values. A considerable portion of ore examined here shows free visible gold. The vein shows from 6 to 18 inches of quartz.

K+86-103 The Eldorado vein lies about 2,000 feet north of the Little Giant vein on the south side of the mountain. This is the old Mountain King property which has been relocated. It is opened up by four crosscut tunnels with drifts and several hundred tons of ore mined; most of which was lowered to the mill on Mineral Creek by sleds and hoist. An upper tunnel at an elevation of 3,070 feet intersects the vein at a distance of 10 feet. The vein strikes N. 80° W. and dips steeply to the northeast. The vein where mined appears to have had a width of from 12 to 18 inches. The wall rock is sheared graywacke.

A second tunnel 37 feet lower in elevation, driven in a direction of N.50° E., intersects the vein 72 feet in. The vein is opened by a drift to the east 80 feet in length and one to the west 40 feet in length. It here shows a strike of E. 80° W. and is bending slightly to the north in the west drift. The vein where stoped appears to have been over 24 inches in width. It has been stoped from this level to the upper level.

A third crosscut tunnel about 40 feet lower driven north intersects the vein 98 feet in. A drift to the east for 33 feet shows a strike of N. 88° E. for the vein. A westerly drift for 133 feet bends a few degrees to the north with a strike of N. 82° E. The vein on this level shows several small lenses of white quartz. In the north drift the stringers have a strike of N. 25° W.

A fourth crosscut tunnel 115 feet below the third tunnel is driven in a direction of N. 27° E. for 218 feet. At 89 feet several narrow quartz stringers are crossed. The remainder of the tunnel shows platy graywacke. It is very likely that neither the third nor fourth tunnels have been driven far enough to reach the vein shown in the two upper tunnels.

The Home Group

The Home group, property of William Quitsch and John Cook, is located northwest of the mouth of Brevier Creek. The Moon vein located on the Moon claim outcrops at an elevation of 5,100 feet on a ridge at the head of one of the northern spurs of Bravier Glacier. It is reached by a switch back pack trail following up the ridge between Mineral and Bravier creeks. The vein shows outcropping along the surface for 200 feet with a strike of N. 78° W. and a dip of 60° NE. It has a width of from 1 to 4 feet with an average of 3 feet. The quartz is coarsely crystalline, porus, and iron stained. It shows a considerable amount of pyrite scattered through the quartz in individual crystals and in small bunches. Visible free gold can be seen in picked hand specimens from this outcrop. The vein is in a banded graywacke and slightly

diagonally with the cleavage. The vein narrows considerably each time it crosses from one band to another, giving it a stepped effect. The graywacke showing exposed on the surface north of the vein contains a number of parallel quartz stringers following the cleavage. None of them show over 3 or 4 inches in width.

A crosscut tunnel at an elevation of 5,074 feet intersects the vein at 58 feet in. The vein here shows from a few inches to 3 feet in width with an average of 30 inches. The strike here is N. 65° W. and dip is 52° NE. A drift driven to the east has left the vein and wandered into the hanging wall for 40 feet. A drift to the northwest follows the vein for 48 feet. About 140 tons of ore has been mined from this tunnel and lowered by means of a sled and hoist over a mile to the mill which is at an elevation of 3,900 feet. The gold has a value of about $16.~~00~~ per ounce.

The Home vein on the Home claim is about a mile southeast from the Moon claim. A tunnel driven in a direction of N. 70° W. from an elevation of 3,81~~4~~ feet follows a quartz lead for 40 feet to where it is cut off by a fault. The tunnel turns at this point a few degrees towards the south, crosscutting diagonally the cleavage of the slate for 116 feet. A considerable number of lenses of quartz are encountered in the last 35 feet of this tunnel. A crosscut to the northeast for 15 feet shows a continuation of the lenses. Another crosscut or branch from the tunnel, driven N.22° E. for 58 feet, shows crosscutting the slate a very few lensed of quartz.

A small Gibson mill is installed close to the portal of this tunnel. The building around the mill has been removed, leaving the machinery standing. The mill is driven by a pelton wheel from a pipe line. Water is available for milling from June ~~1st~~. to November ~~1st~~. A bunk house is situated about 300 feet from the mill at an elevation of 3,840 feet, anchored to the mountain by a cable as protection from snowslides.

Venus Claim

The Venus claim, property of Ted Johnson, lies about 1 mile northwest of the mouth of Brevier Creek. The mine development consists of an upper crosscut tunnel 50 feet in length driven N. 10° W. at an elevation of 3,400 feet. A west drift on the vein 90 feet in length shows a strike of N. 85° W. and dips steeply to the north. In an easterly drift about 50 feet in length the vein shows a strike of S. 85° W. A winze has been sunk for about 18 feet below this drift. The vein shows a width of about 12 inches of quartz in the drifts, pinching down in both ends. For about 40 feet along the western drift the vein has been stoped up to a height of 15 feet. The south wall of the vein shows massive graywacke. The north wall is more slaty and sheared. The vein follows along the cleavage of the graywacke and slate.

A second tunnel 130 feet lower, driven in for 260 feet in a direction of N. 34° W., ~~is~~ crosscutting the graywacke. The tunnel then bends in a direction of N. 75° W., following a lense of quartz. For the last 100 feet of the tunnel the graywacke is dark, more slaty and sheared; and contains many lenses and stringers of quartz striking in direction of N. 80°W. A short drift has been driven from near the end of the tunnel and a raise for about 40 feet. About 300 tons of ore from this property was milled in a 5 stamp Straub mill situated near the portal of the lower tunnel. The mill is driven by a pelton wheel from a pipe line and short ditch with a head of over 100 feet.

McMishko Prospect.

This property, which is located 4¼ miles from the mouth of, and ½ mile east of Mineral Creek, was not visited by the writer. ~~This property is reported as a~~ mineralized zone of lenticular quartz, is reported as occurring on the property in thinly banded slate and graywacke. The quartz lenses are distributed across a width of over 100 feet, the whole of which is said to carry low grade values in gold.

KK86-104

Devinney and Dolan Prospect.

About 1 mile west of the mouth of Mineral Creek on the mountain slope facing Port Valdez, a vein was discovered in 1929 by T.J. Devinney and W. H. Dolan. An upper tunnel driven in for 35 feet at an elevation of about 1,200 feet on a vein averaging 16 inches in width has opened up a shoot of very good ore. The vein strikes from N. 26° W. - 35° W. dipping about 75° NE. A second tunnel 250 feet lower in elevation has been driven 238 feet, following along the vein for the whole distance. The vein here shows a similar strike and dips about 81° NE. The quartz filling ranges from a few inches to over 2 feet in width. The shoot of high grade ore is believed to rake about 33° to the north. The quartz contains pyrite, galena, and sphalerite. The quartz is white, crystalline, porous, and only slightly stained. The wall rocks are dark colored slates which are considerably sheared. Some calcite is found along the cleavage of the slate in thin coatings.

The property has an excellent location for cheap operation. It extends directly back from the beach with sufficient elevation to assure a long period of operation without the necessity of hoisting ores or pumping water.

Other prospects

Several other properties in the Valdez district upon which only assessment work were being done, were not visited by the writer.

Unakwik Inlet

Unakwik Inlet, a fiord about 20 miles in length, on the north side of Prince William Sound, extends in a north-south direction roughly parallelling Port Wells and College Fiord. Miners River empties into the inlet, about 14 miles from its mouth and from the east side. Miners River is about 72 miles from Valdez by water. Ordinary sound boats can traverse the inlet to the mouth of Miners River but a gravel reef prevents large sea going vessels from delivering freight within several miles.

A. D. Thompson's Lead-Zinc Property

Northeast of the mouth of Miners River, 3¾ miles, and 2 miles northeast of Miners Lake, Two lead-zinc veins were located in 1929 by A. D. Thompson. The property is reached by a traversing portage of 100 yards, leading from the small bay into which Miners River empties to Miners Lake at an elevation of 50 feet, then 1¾ miles across the lake to the northeast corner of the lake and thence by 2 miles of trail, ~~from the lake,~~ to the camp. A road could be easily constructed from the beach to the property, a distance of ~~about~~ 4 miles, ~~in length~~. There is a heavy growth of spruce timber along the shore of the lake and along the sides of the valley for several miles above the lake.

The property consists of 8 claims; the Eureka No. 1, to Eureka No. 8. On the Eureka No. 5 claim at an elevation of 895 feet, No. 1 vein outcrops along a small gulley. The watercourse follows along the outcrop for several hundred feet. The vein strikes N. 50° E. dipping 60° SE. In a cut close to the southwest end of Eureka No. 5 claim, the vein occupies a fracture plane containing much brecciated mineralized graywacke. Both walls are graywacke. The hanging wall is a softer, darker variety. The mineralization consists of sphalerite, galena, pyrite, and quartz with a greater proportion of the sphalerite and galena occurring towards the hanging wall side. Sphalerite predominates over the galena by at least 2 to 1. The pyrite appears to be rather thoroughly distributed throughout the vein, especially in the matrix surrounding the breccia. The hanging wall shows about 4 inches of gray-colored gouge containing small fragments of graywacke. The breccia filling the vein ranges from sand to pieces 3 inches in diameter. Along the foot wall side is about 16 inches of lighter colored graywacke with a 2-inch stringer of quartz parallelling the vein. The cleavage of the graywacke strikes northeast and stands vertical where observed about 3,000 feet northeast of this outcrop. The mineralization along the vein is confined between the walls. A small bluff

40 feet east of the cut described above, is composed of conglomerate with graywacke breccia, and what appears to be a fine grained graywacke matrix. A grab sample taken from picked pieces of good grade material in the cut gave;

Gold oz.	Silver oz.	Copper %	Lead %	Zinc %	Iron %
0.19	3.60	0.05	4.45	28.88	12.95

Assays furnished by Mr. Thompson of sample taken from this vein are here listed;

		Gold oz.	Silver oz.	Lead %	Zinc %
No. 301	Across 5½ feet of vein	0.02	2.85	4.2	15.5
No. 302	Across 2 feet of highgrade	0.04	5.40	6.3	31.5
No. 2	No. 6 claim	0.80	48.0	27.0	15.96
No. 3	No. 6 claim	2.00	34.95	57.26	29.16

About 400 feet southeast from vein No. 1, vein No. 2 is found outcropping similarly in a narrow gully. The vein occupies a fissure striking N. 40° E. and dipping 70° SE. About 500 feet southwest of the northeast end line of Eureka No. 2 claim, a cut shows the vein well exposed in the gully, ranging from a few inches to 18 inches in width. The fissure contains a very small amount of breccia. The foot wall appears solid. A branch shoot shows extending off into the hanging wall at an angle of 30° from the vein. This offshoot shows 8 feet of mineralization in the form of a number of parallel stringers. The vein itself is mineralized with galena, sphalerite and with lesser amounts of pyrite, calcite and quartz. The ~~greater amount of~~ sulphides occur predominantly on ~~are found closer to~~ the hanging wall side of the vein. Farther south along the outcrop the vein is exposed ~~shows~~ for several hundred feet and it ranges ~~ranging~~ in width from a few inches to over 12 inches. with the mineralization occurring in a number of closely parallel stringers.

A grab sample taken from several picked pieces assayed;

Gold oz.	Silver oz.	Copper %	Lead %	Zinc %	Iron %
0.08	28.80	trace	17.78	12.29	5.23

Assays furnished by Mr. Thompson of samples from this vein are here listed;

		Gold oz.	Silver oz.	Lead %	Zinc %
No. 1.	No. 2 claim	1.60	18.0	50.24	25.92
No. 303.	Across 2 feet of high grade vein No. 2	0.05	31.50	33.1	23.6
No. 304	Across 4½ feet	0.06	34.00	25.3	13.7
	Grab sample iron sulphides	0.03	1.90	1.1	13.0

Four In One Copper Prospect

K185-114

The Four-in-One group of claims ~~are~~ (15) located at the head of Miners River, near Munson Glacier, about 8 miles northeast of the mouth of Miners River. Two copper bearing veins were discovered on this property a number of years ago and some work was done on one of them. The claims were then allowed to lapse and have been relocated a number of times. They are now held by Charles C. Elwood of Valdez and associates. The group ~~consists of~~ comprises 6 claims, ~~consisting of;~~ including the Copper Mountain No. 1 to Copper Mountain No. 6 claims.

On the east side of the foot of Munson Glacier at an elevation of 1,840 feet, No. 1 vein ~~is outcropping~~ outcrops on the smooth, bare rock surface for over 1,000 feet. This outcrop is about 500 feet above timber line. The vein has a strike of North and a dip of 60° W. It is a strongly defined vein showing a width of from 5 to 20 feet following along a well defined fissure and extending into both walls, but especially into the hanging wall. The graywacke wall rock has been considerably silicified along the fissure. There is no evidence of later movement in the vein. The surface outcrop shows few copper stains as they are washed away as soon as formed. Freshly broken material from the vein shows only a superficial coating of iron oxide covering the unaltered sulphides. The Copper Mountain No. 1 to Copper Mountain No. 4 claims ~~are covering~~ cover the outcrop of this vein. No work has been done towards developing ~~this~~ the vein other than the breaking of a few hundred pounds ~~broken~~ of ore from the outcrop. Samples from this vein are said to carry fair values in copper with some

gold and silver.

About 700 feet west of this vein is another ~~vein~~ called the " Red Vein", which outcropping on a ridge above a spur of Munson Glacier. This vein was not visited by the writer as the retreat of the glacier has rendered difficult the approach to the vein. It is reported as striking a few degrees more westerly than the first vein, it is said to average 12 feet in width, and to carry better values in copper, gold and silver than the other vein. A crosscut tunnel that has been driven in about 60 feet ~~but~~ is now inaccessable due to the lowering of the ice front at the portal of the tunnel. Copper Mountain No. 5 and No. 6 claims are on this vein.

Avery River

Avery River enters Port Wells from the east at a point close to the mouth of College Fiord. It is about 79 miles by water from Valdez. Small launches drawing only 3 or 4 feet of water can enter the river's mouth and anchor in a small lagoon protected from the open channel. It is necessary for larger boats to anchor off-shore and lighter freight to the beach. Avery River is a short glacier-fed stream which carries a considerable volume of water during the warmer months and during the rainy season. It has an excellent falls a few hundred feet from tidewater, well situated for power development. Daily discharge records for this stream taken in 1913 are given in U. S. Geol. Survey Bull. 592; Mineral resources of Alaska 1913 pp. 176 and 179.

The first discovery of gold lodes in the vicinity was in 1911. Since that time a number of discoveries have been made and some work has been done on them. A small 1-stamp mill was installed at one property in 1914 that operated for a short period. For the past several years there has been only a slight amount of prospecting done in the vicinity.

Beauty Bird Claims

A group of 4 claims the Beauty Bird No. 1 to Beauty Bird No. 4, owned by property

Julius Rowning, is located about 2 miles southeast from the mouth of Avery River and about ½ mile north of the river. The camp, at an elevation of 545 feet, is in a well timbered area, timber line being several hundred feet higher. Development work consists of a tunnel 108 feet inlength at an elevation of 530 feet, which starts on a lenticular group of quartz stringers in slate, striking N. 54° E. and dipping 83° NW. The tunnel swings away from this quartz mineralization after a few feet , crosscutting it diagonally to the face. The quartz is compact, non-crystalline, and unstained. The black slate shows considerable fracturing and strike movement. Three surface cuts are located 170 feet southeast of the tunnel on the same slate zone of mineralization. The middle cut, which has a length of 8 feet, exposes 5 feet of quartz stringers. The widest of these is 4 inches. The slate here strikes N. 40° E. and dips 70° NW. A shaft 50 feet in depth on the Beauty Bird No. 4 claim, not visited by the writer, is reported as being on a vein 3 fect in width which assays $ 50.per ton in gold.

Harriman Fiord.

Harriman Fiord extending in a northeasternly direction empties into Barry Arm about 5 miles north of Port Wells. The fiord, which is about 12 miles in length, is recipient of the flow from glaciers that nearly surround it. Land exposed areas on both the north and south sides of the fiord have been closely prospected, resulting in the discovery of several veins. Two small mills were erected in the vicinity and were operated for short periods. During the past several years little work has been done in this area.

W.B. 95-187
95-189

The Alaska Homestake Mine.

The Alaska Homestake mine was located in 1913, close to the beach, on the north side of Harriman Fiord, a short distance east of the foot of Serpentine Glacier. In 1917 a small Lane Chilean mill was installed.

The mine development consists of an upper tunnel at an elevation of 70 feet, along a vein striking N. 2° W. and dipping 80° east. The tunnel follows the vein for 260 feet, and until a fault is encountered. ~~The fault was followed~~ It then follows the fault a distance of for 15 feet easterly ~~to~~, where the vein was picked up and drifted on for a distance of 24 feet. The vein is stoped above this tunnel to the surface and below the tunnel to a lower tunnel. In the upper tunnel the vein is in light colored granite. From there on the walls are graywacke whose cleavage strikes N. 70° E. and dips 50° NW. The vein, where visible, shows a width of from 1 inch to 4 inches, but appears to have been over 2 feet in width for most of the distance where stoped. The entrance to the lower tunnel is caved. This tunnel is about 50 feet lower then the upper tunnel.

The plant consists of a 7-foot Lane Chilean mill driven by a gasoline engine, an air compressor driven by a deisel engine, and several buildings.

Bettles Bay.

Bettles Bay is a deep, safe harbor about 3 miles in length on the west side of Port Wells, across from Esther Island. It is approximately 82 miles from Valdez by water route. A number of quartz veins have been discovered in the hills surrounding the bay.

K+95128

The R. J. Merrill Mine.

About ½ mile southeast of the head of Bettles Bay, the Mineral King property is being operated by R. J. Merrill. This is the old Herman & Eaton mine. Development consists of a shaft 100 feet deep, the collar of which is at ~~starting from~~ an elevation of 590 feet; a drift on the vein at the bottom of the shaft; a tunnel at an elevation of 400 feet, which is 750 feet in length, ~~with a raise from a point over 700 feet in, connecting~~ from a point 700 feet in from the portal of the latter tunnel a raise connects with the upper drift. A considerable portion of the vein has been stoped out above the 100 foot level. The vein is a fissure striking N. 23° W. and dipping 52° SE. The quartz above the 100-foot level varies in width from 2 feet to 6 feet, ~~with~~ and has an average of about 3 feet. The walls are dark graywacke. Below the 100-foot level the vein is somewhat ~~more~~ scattered into lenses and stringers following along the cleavage of the

wall rock. On the tunnel level some slate is interbedded with the graywacke. The slate there strikes N. 56° E. Granite shows along the last 140 feet of the tunnel. Where the vein followed by the tunnel is from 1 inch to 12 inches in width and varies considerably in direction where the granite is encountered. There are a number of parallel stringers and lenses of quartz, especially on the hanging wall side of the tunnel, extending east from the tunnel at a point 75 feet from the face, passes through the granite and into graywacke at 15 feet in from the tunnel.

The ore is a white crystalline quartz containing considerable brecciated country rock. Sulphides contained are pyrite, sphalerite, and galena in appreciable amounts, and minor amounts of chalcopyrite, pyrrhotite, and arsenopyrite. Some calcite was observed filling narrow fractures in the graywacke breccia in the vein. Much of the gold is contained in the sulphides, which are concentrated in the mill and shipped to smelters in the state. Samples taken from the concentrating table by Mr. Merrill assayed as follows:

	Gold oz	Silver oz	Value $	Iron %	Sulphur %
Concentrate A	6.58	49.30	151.32	35.12	33.78
Concentrate B.	7.18	50.80	163.92	31.97	30.73
Tailings	0.08	0.20	1.68	2.63	2.06

The plant consists of a jaw crusher; two 1,350-pound stamps; a wilfley concentrating table; and an Ingersol- Rand 9 x 8 air compressor driven by pelton wheels. The water is taken from Eaton Creek and is delivered under a head of over 200 feet. Ore is brought to the mill by a jig-back tram about 1,000 feet in length from the portal of the tunnel. A small 7 x 6-inch compressor driven by a gas engine is situated at the tunnel for use when water is not available for the pelton driven compressor.

Respectfully Submitted,

Earl R. Pilgrim

Alaska Agricultural College and School of Mines

In Cooperation with College, Alaska

U. S. Bureau of Mines, Department of Commerce

REPORT OF ASSAY Dec. 2, 1930.

On samples received from Mr. E. R. Pilgrim, Territorial Mining Engineer, Fairbanks.

Assay No.	Mark on Sample	OUNCES PER TON		Value Per Ton	PERCENTAGE OF			
		Gold	Silver		Iron	Sulphur		
	R. J. Merrill, Bettles Bay.							
01151	Concentrate A	6.58	49.30	$151.32	35.12	33.78		
01152	Concentrate B	7.18	50.80	163.92	31.97	30.73		
01153	Tailing C	0.08	0.20	1.66	2.63	2.05		

Assayed by.

Paul Hopkins

Paul Hopkins,
Associate Anal. Chemist,
U. S. Bureau of Mines.

Total charges for above assays..... Official

Amount received from sender.....

Copy

Alaska Agricultural College and School of Mines

In Cooperation with

U. S. Bureau of Mines, Department of Commerce

College, Alaska

Dec. 2, 1930.

REPORT OF ASSAY

On samples received from Mr. E. R. Pilgrim, Territorial Mining Engineer, Fairbanks.

Assay No.	Mark on Sample	OUNCES PER TON		Value Per Ton	PERCENTAGE OF	
		Gold	Silver		Iron Sulphur	
	R. J. Merrill, Bettles Bay.					
01151	Concentrate A	6.58	49.30	$151.32	35.12	33.78
01152	Concentrate B	7.18	50.80	163.92	31.97	30.73
01153	Tailing C	0.08	0.20	1.68	2.63	2.06

K+45-30

Assayed by,

Paul Hopkins

Paul Hopkins,
Associate Anal. Chemist,
U. S. Bureau of Mines.

Total charges for above assays.....Official

Amount received from sender.....

Alaska Agricultural College and School of Mines

In Cooperation with

U. S. Bureau of Mines, Department of Commerce

College, Alaska, JUNEAU, ALASKA. January 16, 1930.

REPORT OF ASSAY

On samples received from Mr. E. R. Pilgrim, Territorial Mining Engineer, Fairbanks.

Assay No.	Mark on Sample	OUNCES PER TON		Value Per Ton	PERCENTAGE OF			
		Gold	Silver		Copper	Lead	Zinc	Iron
01106	A. D. Thompson, vein #1	0.18	3.60		0.05	4.45	28.88	12.95
01107	" " " " #2	0.08	25.20		Trace	17.78	12.29	5.23
01108	Merrill, Bettles Bay concentrate	5.20	28.80			5.00 (SiO_2 23.20 %)	1.79 (CaO 1.45%)	29.75
01109	Whitham, rocker tails	37.81	71.50			2.11		13.89

Assayed by,

Paul Hopkins

Paul Hopkins,
Associate Anal. Chemist,
U. S. Bureau of Mines.

Total charges for above assays..... Official.

Amount received from sender.....

Reproduce — Pilgrim IR — Anchorage 85 511.80
NOTED 3 Seward 95
FEB 2 1932 Valdez 86
B. D. STEWART

Prince William Sound, 1931.

Hamilton, Irving Prospect on Port Wells. Seward

About 1 mile from the beach on the west shore of Port. Wells and directly west of the Granite Mine is located the property of A. J. Hamilton and Jack Irving. The property consists of 3 claims, the Snow Ball No. 1 and No. 2 and the Mountain View. These claims are directly in the line of and undoubtedly cover the extension of the Granite Vein.

At an elevation of 860 feet a vein shows outcropping on the contact between graywacke and granite. The west wall is graywacke and the east wall is granite. A short tunnel has been driven in for a distance of 20 feet. This tunnel is now caved. At the mouth of the tunnel a shaft 27 feet in depth is also caved. The vein in the tunnel and shaft is said to have shown a width of about 12 inches of very good ore. The granite wall close to the vein is said to also carry good values.

Seward 95

Along the hillside below the tunnel and shaft the vein shows for over 100 feet with a strike of N. 50° W. dipping 85° E. The vein varies from 3 to over 12 inches in width of white crystalline quartz containing small amounts of pyrite and some free visible gold. Many angular fragments of graywacke and slate are noted in the quartz.

A lower tunnel crosscutting diagonally towards the vein was in 220 feet when visited by the writer in August, 1931. This tunnel is at an elevation of 715 feet and is driven in a direction of S. 61° E. for 164 feet and for the remaining 56 feet of its length in a direction of S. 88° E. The tunnel is driven in granite and is not crosscutting at right angle for the vein so that there will be a considerable distance to go to strike the vein. At a point 160 feet in the tunnel a fractured zone crosses the tunnel which has a direction of N. 10° E. and dips 65° W. This fault or vein shows a width of about 3 feet of crushed granite with some quartz. A sample of the crushed materialassayed gold 0.02 Oz., silver 0.10

oz per ton. A sample across about 10 inches of the vein on the outcrop a short distance below the upper tunnel assayed gold 2.54 oz., silver 0.80 oz. per ton.

John Keller Property, on Port Wells.

A group of 2 claims are being held by John Keller on the west side of Port Wells, about 5 miles north of the Granite Mine and a mile west of the beach, at an elevation of over 1,000 feet. The vein is said to be in the form of a series of parallel stringers varying in thickness up to 14 inches. The vein strikes northwesterly and dips about 80° S. The mine is developed by a tunnel 75 feet in length, a shaft 10 feet in depth and several shallow pits. A small 2 stamp mill was installed on the property late in 1930, and a small production resulted. The property was not in operation in 1931.

Bettles Bay.

Merrill Mining Company.

In the fall of 1930 the Merrill Mining Company, operating the Mineral King Mine at the head of Bettles Bay, mined and treated several hundred tons of ore with very satisfactory results. This ore was extracted from the second stope north of the shaft and above the 100 foot level. In the spring of 1931 work was renewed with a small crew. The plant was in operation when visited by the writer August, 17, 1931 with 8 men employed. The mill was being worked 24 hour shifts. Ore was being mined from the same stope as during the previous year. The vein north of this stope on the 100 foot level appears to pinch down into a number of parallel stringers carrying slight values. A few feet past this point a fault cuts across in in a direction of N. 61° E. Whether this is a fault cutting the vein and offsetting it or merely a cross fracture at a point where the vein has pinched down is problematical; but probably the latter has occurred. Other similar splitting up and pinching out of veins have been noted in the veins of Prince William Sound especially in the slate. A crosscut was driven about 25 feet along the fault into

the hanging wall which failed to pick up the vein.

An intermediate drift was being driven from the raise below the 100 foot level to intersect the ore which appears to be raking to the north and shows in the floor of the drift and which the tunnel has not reached.

A frame blacksmith shop was constructed at the portal of the tunnel in 1931 and a drill sharpener installed.

Unakwik Inlet.

The A. D. Thompson Lead-Zinc Property. Anchorage 85

The property owned by the Norris Lead & Zinc Mines Corporation, better known as the A. D. Thompson property on Miners River above the head of Miners Lake, was being developed in a small way during 1931. Two men working on the property had cleared a tractor road, from the head of Miners Lake to the claims, about 2 miles in length. A skiff with outboard motor was used for travel on the lake. A cabin was constructed and a small amount of work done on the 2 veins opened up in 1929. It was planned to drive a tunnel on the No. 1 vein from a point near the east end line of the Eureka No. 5 claim during the winter of 1931-1932.

Port Valdez.

KH66-104 Devinney and Dolan Property. Valdez 86

Exploratory work was done in a small way throughout 1931. This work was confined to the lower or main tunnel which was driven ahead about 100 feet to a point where the quartz had pinched down. A raise was being driven from this point up on the vein at an angle of about 45°. The vein in the lower tunnel has split into two branches, an east branch which strikes N. 12° W. and a west branch which strikes N. 60° W. The upper tunnel is on the east branch and is in 38 feet at an elevation of 1,158 feet. The vein here shows a width of from 4 to 24 inches of white crumbled quartz containing much brecciated countryrock, a considerable amount of pyrite, some galena, and some free visible gold. Some of this ore appears to

be very high grade. The west branch of the vein shows from 2 to 8 inches in width, along the bluff west of the upper tunnel, for over 100 feet. The two branches of the vein are cutting the cleavage of the slaty graywacke which strikes from N. 65° to 80° E. and dips from 45° to 60° N.

Mineral Creek.

Nick Mischko Prospect. Valdez

A group of claims is being held by Nick Mischko east of Mineral Creek, about 5½ miles from the beach. The property is reached by travelling along the Mineral Creek road for about 4½ miles; Mineral Creek is then crossed by wading or by a cable tram, none too safe, and a steep switch-back trail which climbs to 1,500 feet elevation from about 250 feet at Mineral Creek. A trail about ½ mile in length along the ridge then reaches the property.

(1) On the north side of the steep ridge about 600 feet south of Wood Creek, at an elevation of about 2,140 feet, a quartz stringer from ½ to 3 inches thick outcrops. This stringer has a strike of S. 25° E. and a dip of 78° N. The walls are platy graywacke striking N. 67° E. and dipping 67° S. A cut has opened this vein to a depth of 10 feet.

Valdez 96

(2) About 860 feet north from the above cut a vein of white quartz shows on the smooth bench. The vein has a width of about 6 feet wide where it outcrops through the moss for over 100 feet along the surface The quartz is white and crystalline, containing no visible sulphides.

(3) At a point about 700 feet southeast from (1), a system of quartz stringers lying in the cleavage of the schisty graywacke shows about 20 feet in width. This outcrop is at an an elevation of 2,430 feet. The stringers are from ½ to 2 inches in thickness of white crystalline quartz striking N. 68° E. and dipping vertical.

(4) A white crystalline quartz vein about 30 inches in width

shows outcropping on a bluff about 300 feet southeast from (3) and at an elevation of 2,475 feet. This vein strikes N. 43° W. and dips 45° E. The quartz is coarsely crystalline with considerable iron stain. The outcrop shows for several hundred feet along the surface. About 125 feet southeast from this outcrop and at an elevation of 2,433 feet a shaft has been sunk on the vein to a depth of about 60 feet. A considerable pile of the vein quartz around the shaft shows pyrite and is said to carry low values. A sample by Mischko from the bottom of the shaft assayed gold 1.60 oz., silver 0.70 oz. per ton.

(5) About 270 feet southeast from the shaft a vein outcrops along the edge of a rocky bluff at an elevation of 2,432 feet. The vein shows about 5 feet in width of iron-stained quartz containing a considerable amount of pyrite. This vein probably is the extension of (4) with an offset of about 50 feet between the two points. It is said to carry low grade values. One pit 5 feet in depth has been sunk on the vein.

(6) A vein outcrops on a bluff about 100 feet south of (5) at an elevation of 2,545 feet. This vein has a width of 24 inches of white crystalline quartz striking N. 55° W. and dipping 85°N. This vein outcrops at several points for about 800 feet along the outcrop with a regular strike. The walls are schisty graywacke containing numerous small quartz stringers striking N. 60° E. and dipping steeply to the southeast. The graywacke cleavage strikes N. 68° E.

(7) 50 feet southeast from (6) the vein has bent to a direction of N. 48° W. and a dip of 70° N. It here shows 30 inches in width containing some graywacke fragments. The hangingwall is well defined but the footwall is irregular.

These veins have been held for a number of years. Little underground work has been done towards developing them. A small

frame residence is located on the property and a larger frame house is situated on Mineral Creek directly below the Mischko claims. Sufficient water is available from Wood Creek, which crosses the north side of the property, for power requirements during summer months.

Charles Wetzler Prospect. Valdez

On the east side of Mineral Creek a short distance above the mouth of a narrow canyon and about 5 miles from the beach, a tunnel has been driven into the east wall of the canyon just above the water's edge. This tunnel has a direction of from S. 58° to 24° E. and is in 45 feet. A dark gray slaty graywacke is said to carry low grade gold values contained in an intense quartz stringer mineralization lying in the cleavage of the graywacke. These stringers are multitudinous in this slaty rock for a considerable distance along the canyon walls and in the side gulches cleaving through the canyon walls. The slate cleavage strikes N. 83° to 87° E. and dips about 70° N. These stringers vary in thickness from minute to 1½ inches. A sample taken by the writer of the full crossection represented by the 45 foot tunnel assayed a trace of gold and silver.

Valdez 56

K+869 Little Giant and Rose Veins. Valdez

The Little Giant and Rose veins grouped with the Eldorado Mine east of Brevier Creek was operated during 1930 and 1931 in a small way. William Quitsche with one miner mined and milled 30 tons in 1930 of which 10 tons was from the Rose and 20 tons from the Little Giant properties. In 1931 to August 21, Quitsche had milled 40 tons from the Rose Vein and expected to get considerable more through before winter. The tunnel on the Little Giant was carried ahead 20 feet. The ore from the Rose Vein Was obtained from Just below the outcrop above the upper tunnel. The ore milled is said to have milled up $ 30.00 per ton.

Valdez Glacier.

K+86-43 Valdez Mining Company. (See photos of area)

The claims of the Valdez Mining Co. have been previously

described in government publications and therefore later work done on them will be incorporated in this description.

This property is reached by travelling from Valdez to the foot of Valdez Glacier by automobile about 5 miles, then by foot for 4½ miles along the glacier. The camp is situated on a steep ridge west of the glacier at an elevation of about 2,435 feet. or about 870 feet above the surface of the glacier near the point where a switchback trail starts up the mountain.

A lower tunnel, driven into the rocky bluff at the edge of a steep gulch running down to the glacier, starts at an elevation of 2,430 feet. The tunnel starts in a blocky graywacke and follows along a vein of white quartz, which shows on the face of the bluff above the tunnel, about 10 inches wide but has pinched out at the elevation of the tunnel. The quartz appears also to play out higher up on the rock face. At the outcrop the vein strikes N. 45° W. and dips 68° N.E. It is a vitreous white quartz containing considerable graywacke breccia. The tunnel follows the fissure in a general westerly direction for about 420 feet then turns to the north for 108 feet to the face. The vein shows a small amount of quartz in the form of lenses, not continuous and along most of its length it shows only a seam of gouge. At a point 53 feet back from the face of the tunnel a crosscut has been driven west for about 100 feet. This crosscut is now filled with muck broken from the tunnel.

An upper tunnel at an elevation of 2,720 feet has been driven under a large quartz outcrop which stands boldly out on the steep mountainside. This outcrop is about 20 feet across at the top and about 6 feet at the bottom. It is a white crystalline quartz striking N. 74° W. and dipping 75° S. At a point 60 feet in the tunnel the vein is encountered and shows about 5 feet in width. A winze has been sunk below the tunnel at this point for 50 feet and a drift at the bottom 40 feet in length. These workings below the tunnel are full of water. The tunnel follows along the footwall of the vein

for about 100 feet with 3 crosscuts into the vein. These crosscuts show the vein to have a width of from 5 to over 15 feet with possibly greater widths in places. The quartz is soft, crushed, and stained in many places; other places it is hard and massive, Small amounts of galena and pyrite were noted occurring in the quartz. The quartz is said to show fair values. Several tons of ore had been sacked for shipment but it is now scattered down the hillside. Only sufficient work to cover the annual requirements has been done on this property in the last few years.

Valdez Cl

No other work was done in the Prince William Sound region in 1931 except assessment work on the following properties:

Ramsey Rutherford Mine	Valdez Glacier.
Ethel Mine	Mineral Creek
The Home Group	" "
The Venus Claim	" "
Three and One Mine	Port Valdez.
The Cliff Mine	" "
Mayfield Mine	Shoup Glacier.
Cameron and Johnson	" "
Gold King Mine	Columbia Glacier.
Beauty Bird Claims	Avery River
Granite Mine	Port Wells.

Very Respectfully Yours,

Earl R. Pilgrim

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Associate Territorial Mining Engineer.

Fairbanks, Alaska.
Feb. 6, 1932.