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JEWEL LAKE CAMP

M.S. HEDLEY - 1941

PROPERTY FILE

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maps to accompany

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GEOLOGY OF JEWEL LAKE CAMP

(Eastern Part)

and of the

DENTONIA MINE

Boundary District

by

M.S. HEDLEY

1941

CONTENTS

SUMMARY AND CONCLUSIONS.

(1) Jewel Lake Camp was discovered in 1895 and gold ore was shipped from it as early as 1900.

(2) Production from the camp, from 1900 to 1940, amounts to 128,383 tons, from which 37,992 ounces of gold and 219,429 ounces of silver have been recovered.

(3) The rock formations of the camp consist of quartzitic sediments, greenstone, granodiorite and many dykes. The relationship between the quartzite and greenstone is obscure. Both quartzites and greenstone are intruded by granodiorite which, in turn, is cut by pre-mineral dykes, quartz veins and post-mineral dykes. The post-mineral dykes are Tertiary in age.

(4) Four northerly-striking veins are known and one northwesterly striking vein, all of which have received some development. Almost all of the production from the camp (98%) has come from what is now known as the Dentonia vein.

(5) The North Star-Gold Drop vein is highly irregular, and ranges in width from a stringer to 4 feet. The occurrence of tellurides accounts for local high values. From local, well-mineralized sections shipments of sorted ore have been made, but the average grade has proved too low for mining. Large float boulders containing high values point to a southerly continuation so far undiscovered.

(6) The Lakeside Fraction vein, as exposed, is sparsely mineralized with sulphides but contains as much as one ounce of gold per ton over widths of a foot or less.

(7) The Dentonia vein has been traced from the Jewel to the Robert Emmet, a distance of one mile. It has been developed by shaft on the Jewel and by adit on the Enterprise, Anchor and Ethiopia. In granodiorite at the southern end, it crosses the belt of greenstone and is in quartzites at the northern end.

(8) The Dentonia vein structure is an irregular fracture-zone that dips eastward to south-eastward at 30 to 60 degrees. The western side has moved northward about 30 feet in relation to the eastern side. Variable in strike and dip, there is variation also in the amount of shearing and in the width and apparent strength of the zone and of its component parts. The vein structure contains quartz locally, in widths as great as 16 feet.

(9) Of 6,700 feet of drifting examined, 23 per cent. has developed stoping ground ~~and that~~ in sections of wide quartz. Values appear to have occurred in well-mineralized shoots within the large bodies of quartz, although in some sections such bodies have been mined out and the record is lost.

(10) Speaking generally, wide quartz tends to occur in the vein structure where the strike is north-easterly and where, at the time of vein-formation there was present a tensional component of stress. All that can be said of ore-shoots is that they tend to occur in flatter rather than steeper sections of the vein structure.

(11) A large part of the ore mined from the Dentonia vein has come from one large ore-body in the Enterprise section, and it is instructive to analyse the conditions that produced this ore-body. The great width of quartz is directly related to a bend in the vein structure with a north-easterly strike and also to a split in the structure. On 200 and 300 levels these two features are closely ~~related~~ together, but on 500 level, beneath the ore-body, the bend has ~~migrated~~ moved northward from the split and has largely straightened out.

(12) Virtually all ore has been mined from the explored ~~portions~~ parts of the vein, and future exploration, other than small shipments, must look to extensions and possible splits. Splitting of the vein structure is known at the southern end, between the Jewel and Enterprise sections of the mine. There is neither strong nor positive evidence of splitting on the dip in the Enterprise section, but the greater apparent weakness on the 500 level, in contrast with the levels above, might, in view of the known persistence of the vein structure for one mile, indicate that such a split has occurred and that a hanging-wall-branch exists on the 500 level. This possibility could be tested by diamond-drilling. Extension to the south will be in granodiorite, rock in which ore has been mined in the Jewel section, but there is no evidence that ore-bodies will or will not be ~~encountered~~ found farther to the south. Drifting to the north should, from study of the behaviour of the vein at surface, strike a section with a north-easterly and consequently a favourable strike.

(13) In view of the known length of the vein structure, the discovery of nothing but insignificant amounts of quartz to appear on 500 level is not expected to indicate a "bottoming" of the mine. If there is a split in the vein structure on the dip quartz may be found on the hanging wall-branch, but if there is no split then there is at least a barren section of considerable magnitude.

INTRODUCTION.

Jewel Lake camp is in the Greenwood Mining Division, 6 miles north-~~west~~ east of the city of Greenwood in southern British Columbia. The camp is on the flank of Pelley Mountain, on the south-eastern shore of Jewel Lake. It is reached by a branch road 6½ miles in length that leaves the highway 1½ miles out of Greenwood. This branch road continues past the camp to Eholt, a further distance of 4 miles, where it rejoins the highway. Both Greenwood and Eholt are on the Canadian Pacific Railway (Kettle Valley branch).

Pelley Mountain, elevation 5,204 feet, slopes steeply to the shore of Jewel Lake, elevation 3,710 feet, but the southern and south-eastern slopes are neither steep nor rugged; a broad, plateau-like area south of the road lies at an elevation of about 3,800 feet. The region is, for the most part, quite heavily wooded. The only stream besides Jewel Creek is Gold Drop Creek, which flows intermittently during the summer months, and water is to be found only in springs during the driest part of the season.

A branch line of the West Kootenay Power and Light Company Limited extends to the North Star, with a sub-station located on the Perservance at the Dentonia Mines, Limited mill.

This report is based on two months examination during 1939 and two weeks in the spring of 1940 when the upper two levels of the Jewel shaft were dewatered. Level plans supplied

by Dentonia Mines, Limited and by Greenbridge Gold Mines, Limited were used, with some additions, as bases on which to plot geology. The general map was compiled from claim surveys.

GENERAL GEOLOGY.

The rock formations of Pelley Mountain consist of a great thickness of sediments, one broad band of greenstone, a large body of intrusive granodiorite, and many younger dykes. The structure has a north-westerly trend.

The sediments are dominantly quartzite. There is little pure quartzite and little true schist but there are many intergradational types that consist essentially of quartz and biotite. They are thinly bedded and represent a great accumulation of fine, silty sediments, now highly metamorphosed. A small amount of limestone occurs on the road west of Bolduc Lake.

The typical sedimentary rock is a fine-grained, finely streaked rock composed of quartz and biotite in variable proportions. It is light to dark grey or brownish in colour, has a blocky fracture and is rudely schistose when the content of biotite is high. The biotite is commonly well oriented, but of too small a grain size for cleavage to have been developed. Bedding is not prominent, but fine, streaky banding is an original structure. This banding, sometimes of microscopic thickness, is discontinuous and is locally contorted in such

a manner as to suggest an origin due to slumping or to flowage of fine, unconsolidated sediments. A few of these rocks are finely fragmental, due, it is thought, both to original cataclastic deposition and to later brecciation.

A few sediments contain chlorite and a few contain hornblende. Some green, highly quartzose rocks on the Dentonia Mines, Limited property may be quartzites or may be silicified greenstone, but in general there seems to be little gradation between the sedimentary and greenstone series.

Greenstone occurs as a broad band between the granodiorite and the Enterprise, as a narrow, isolated band (not mapped) on the Ethiopia, and in an area on the road west of Bolduc Lake. The main band next to the granodiorite is a fine-grained, crystalline green rock composed of hornblende, feldspar and a very little quartz; under the microscope it is seen to be fresh, with only incipient alteration to chlorite, and no schistosity. It is slightly variable in grain size and appearance, but there is no observable banding. Flow structure in this rock on the western part of the Laura proves part at least to be of volcanic origin. The narrow band on the Ethiopia may be sedimentary, although it is very similar to the main band.

The greenstone west of Bolduc Lake ~~was imperfectly exposed, but it~~ may be the equivalent of that to the north-west. Some of it is porphyritic (termed porphyrite in early reports) and is much altered by hydrothermal action. Just below the road

bands of greenstone alternate with limestone and some of the latter is altered to garnetite.

Granodiorite intrudes the greenstone along a north-westerly trending line across the south-western part of the camp but the actual contact is only seen for a short distance. It is part of a large body that extends two miles southward and several miles westward. It is a fresh, grey rock of moderate to rather coarse grain size, and is more greenish and of the composition of quartz-diorite near the contact.

Dykes are abundant in the camp. A few are related to the granodiorite body, but the remainder are distinctly younger and cut both that rock and the quartz veins.

Dykes related to the granodiorite are of similar appearance and composition. They are not abundant, and some isolated outcrops north-east of the main contact may represent dykes or small bosses of dioritic rock. Several peculiar dykes found in the Dentonia Mine workings probably belong in this group. They are dense, pale greenish rocks that closely resemble silicified greenstone, and in hand specimen the only clue to their identity is an occasional tiny bleb of quartz or an even more rare cleavage face of feldspar. Under the microscope they are seen to consist of a fine aggregate of feldspar and quartz, a few large grains of muscovite and some vague, dusty material. None of the feldspar is twinned, but it appears to have a refractive index about that of oligoclase. These dykes are aplite of an abnormal character.

A few dark, lamprophyre dykes occur in some of the mine workings. These are small in size and quite unimportant.

Most of the dykes are porphyries that are younger than all other rocks, except possibly the lamprophyres. They are Tertiary in age. They range in appearance from feldspar, dense dark-coloured biotite porphyries, with prominent phenocrysts in a ~~basaltic~~ base, to fine-grained diorites~~rocks~~, and others with phenocrysts of feldspar and/or augite that closely resemble many Tertiary flow rocks in the district. In composition they range from alkalic syenites and their fine-grained equivalents to fine augite-diorites. In spite of the range in appearance and composition, it is believed that all of these rocks are closely associated, since there appears to be every gradation in type represented. They range in width from a foot to one hundred feet or more. They are intruded in no recognizable pattern and, at least in a few proven cases, produce little or no offset. Many are very irregular in shape.

One prominent type, found on Dentonia Mines, Limited ground and in the mine workings, is a rock containing many prominent feldspar phenocrysts in a dense, dark-coloured ~~basaltic~~ base that is further speckled with plates of biotite. This is an alkalic syenite (pulaskite in older reports) containing phenocrysts of andesine and orthoclase and biotite in an undeterminable feldspar-biotite groundmass. Other dykes with prominent biotite contain phenocrysts of oligoclase in a feldspathic groundmass, the refractive index of which is equal to or below that of

Canada balsam.

Many dykes in the northern and eastern sections of the camp, and about the summit of Pelley Mountain, resemble Tertiary lavas and weather characteristically in sheets. They are light grey in colour, possess a fine dioritic base, and show phenocrysts of augite as well as feldspar. Microscopic study shows these rocks to contain some biotite, a little muscovite and rarely hornblende in addition to the augite. The feldspar phenocrysts consist of oligoclase and the fine feldspar of the groundmass has a low refractive index.

All of these dykes contain some magnetite and most are weakly magnetic; none contain more than a trace of quartz. Biotite is almost universally present. Phenocrysts include oligoclase, andesine and rarely orthoclase; the feldspar of the groundmass is indeterminable but in some thin sections studied there is a suggestion of a feldspathic intergrowth of low refractive index. There is an alkalic tendency in all of these rocks, although there are as many diorites as syenites.

STRUCTURE AND METAMORPHISM.

The structure is imperfectly understood. ~~The attitude~~ The sediments, at least between the Enterprise and Silent Friend, ~~appears to be monoclinal, with~~ have a north-westerly strike and steep dips to the north-east, ranging from 60 to 85 degrees. Departures from this attitude are rare, but there is

some minor contortion. Farther towards the north-east the strike appears to be more westerly (north 60 to 70 degrees west).

It is impossible to determine in the older rocks any effect produced by the abundant dykes which were intruded following a widespread, irregular fracturing and possibly some foundering of the older rocks.

The granodiorite has produced little effect on the greenstone with which it is in contact except that the greenstone contains local patches that are coarser in grain than common and with considerable prominent feldspar. There is little or no evidence of hydrothermal alteration. The porphyritic greenstone west of Bolduc Lake is strongly altered, and associated limestone is altered to garnetite.

The quartz-biotite sediments show neither very strong alteration nor more than local contortion. These rocks are completely recrystallized but minute primary structures have not been destroyed. Biotite, although abundant in some bands, is not sufficiently coarse to produce cleavage, and there is no true schist.

Although undoubted flow structures are seen in the greenstone, the origin of this rock is in doubt, some appears to be definitely a flow rock; but the relation with the quartzite, both on the surface and underground, is obscure. In the neighbourhood of the Enterprise shaft and Anchor stope

contacts may be traced for several hundred feet, but the actual line of contact is in many places very indefinite. There is an irregular interpenetration of the two rocks, locally resembling intrusion by greenstone, and locally either an interfolding on a minute scale or else silicification. No satisfactory conclusions ~~may be~~ were drawn, either from examination in the field or from microscopic study.

In the Pentonia mine workings the amount of quartzite encountered is far less than on the surface, and there is very little on 500 level. Correlation between levels was not found possible, nor even correlation between adjacent walls of the vein. The only two explanations are that the greenstone is intrusive or that it and the quartzite are complexly interfolded, with quartzite uppermost and infolds of that rock failing to persist at depth. The freshness of the greenstone suggests an intrusive origin, but flow structures on the surface strongly indicate a flow rock. *This is ropy structure, not to be confused with microscopic alignment of minerals.*

JEWEL LAKE CAMP HISTORY.

Jewel Lake Camp, or Long Lake Camp, as it was first known, was discovered in 1895 and drew immediate attention. Serious work commenced in the ensuing year on the Jewel, North Star and other claims, and the first steam plant in the district was installed on the Jewel early in 1897.

From the first the Jewel received most attention on

account of the substantial widths of quartz exposed and the fact that good values in gold were obtainable locally. The vein was seen to cross into the Denero Grande but the extension through the Enterprise, Anchor and Ethiopia was apparently not at first clearly recognized. Local, high values were found on other claims and the occurrence of tellurides was reported at an early date.

The Jewel was staked by Louis Bosshart and was early acquired by the British Columbia Prospecting Syndicate. In 1898 it passed into the hands of the Jewel Development Syndicate which was reorganized to the Jewel Gold Mines Limited of London, England, which company shipped 2,000 tons of ore to the Granby smelter at Grand Forks. A further reorganization took place in 1905 and considerable metallurgical testing was done, but it was not until 1909 that the Jewel-Denero Mines Company of Edinburgh commenced the erection of a 15-stamp mill, designed to save part of the values by concentration and the remainder by cyanidation. The mill was completed in 1912 but was found to be unsatisfactory, so the flow-sheet was changed to an all-sliming cyanide treatment in June, 1913; 3,855 tons of ore was milled in the latter half of that year. In 1914, 16,526 tons and in 1915, 6,724 tons of ore was milled when operations ceased. All early production came from the Jewel shaft.

The property lay idle for 10 years until, in 1926 and ensuing years, George White and others of Greenwood made some small shipments and investigated the possibilities of the

ground. In 1931 Dentonia Mines, Limited was formed. Serious work by this company commenced in 1933 through the old upper adit, and drifting connected the Rowe, White and Enterprise shafts of former years; this work encountered wide ore of better grade than was formerly anticipated, and work was started on a 100-ton concentrator at the old mill-site and with utilization of the old buildings. In 1934 the lower long cross-cut was driven and milling commenced at 90 tons per day in the plant with a rated capacity of 140 tons daily. The old Jewel shaft was dewatered, and considerable development work was done in the newer or Enterprise section of the mine. Milling proceded on about a 100-ton basis during 1935 but in 1936 the tonnage ~~dropped to~~ was only 11,612. Development at depth proved disappointing, and work was suspended at the end of 1936.

Before closing, a cyanide plant was installed to treat the tailings, but this operation did not prove to be very satisfactory without regrinding and the plant was shut down in September, 1938. In 1938 the Enterprise section of the mine was leased by Robert Lee, John Hallstrom and Eric Sojberg of Greenwood who, employing one or two men, have worked to the present day by hand methods and have shipped a considerable tonnage of siliceous ore to the Trail Smelter.

At the time of earliest activity and until about 1903, work was done on numbers of claims other than the Jewel and Denero Grande. From the latter date there was a long period of idleness until 1925, when some work was done on the Gold

Drop. In 1931 and 1932, R. L. Clothier and associates explored the Gold Drop and the North Star and made several shipments. The North Star was next worked by W. E. McArthur of Greenwood, in 1933, and the next year Superior Mines Limited did some additional exploratory work. In 1934 Greenbridge Gold Mines Limited acquired and staked a large group of claims and sank a shaft on the Waterloo Fraction; this company later optioned the North Star and other claims from W. E. McArthur and brought their total holdings in 1936 to 31 claims, in which year they shipped some ore. Work continued until the winter of 1939 at the North Star, from which small shipments were made from time to time.

Lessees in 1939 and 1940 did a little work on the Ethiopia, ~~and~~ Gold Drop and Lakeside.

The camp has produced 128,383 tons of ore from which 37,992 ounces of gold and 219,429 ounces of silver were recovered. This tonnage represents all ore milled or shipped direct to the smelter from the properties described in this report.

DESCRIPTION OF PROPERTIES

WATERLOO FRACTION.

This claim is owned by Greenbridge Gold Mines, Limited, who brought in electric power and sunk a shaft in 1934.

The shaft, elevation about 4,400 feet, was filled with water at the time of examination and nothing could be learned except from study of the dump. It is sunk at 75 degrees in an easterly direction. The rock is sedimentary, and consists

of streaky, biotitic quartzites. A considerable proportion of the dump consists of feldspar-porphyry dyke rock.

Between 2 and 3 tons of quartz on the dump is in part coarsely crystalline and in part banded with green, chloritic material, the latter being the better mineralized. Sulphides include chalcopyrite, pyrite, galena and sphalerite.

North-east of the shaft are two old workings, one a combined open-cut and 10-foot adit and another a 60-foot adit, started as an open-cut, with the face only a short distance below the surface. These are apparently on the same vein as that on which the shaft was sunk. The average strike of the vein is north 20 degrees east and the dip is 70 to 75 degrees eastward. It attains a maximum width of 10 inches of commonly strongly crystalline quartz in which there is a small amount of pyrite and galena.

A sample of finely crystalline quartz from the upper open-cut assayed: Gold, nil. A sample of crystalline quartz from the shaft dump assayed: Gold, 0.10; silver 0.5. A sample of the best selected material from the shaft dump assayed: Gold, 1.22 oz. per ton; silver, 5.4 oz. per ton.

NORTH STAR.

This claim is owned by W. E. McArthur and Henry Fritz of Greenwood and was, until the end of 1939 when operations ceased, bonded by Greenbridge Gold Mines Limited. It is reached by a motor road 1¼ miles long that leaves the Jewel

Lake-Eholt road at the Jewel claim. A small camp on Gold Drop Creek is 1,200 feet from the workings. A branch line of the West Kootenay Power and Light Company Limited furnished power in ~~the~~ latter years. A quartz vein, striking on the average a few degrees east of north and dipping eastward, cuts fine quartzitic sediments at a large angle. This is the same vein as that on the Gold Drop, and is exposed at frequent intervals from the Gold Drop shaft to the Cairngorm Fraction. On the North Star it outcrops strongly to a maximum width of 4 feet. The outcrops contain little mineralization and at the northern end of the exposures the quartz is barren and coarsely ~~strongly~~ crystalline. At the southern end of the exposures ~~there is~~ is indicated a bend in the vein and possibly a branching condition.

Mineralization includes pyrite, galena, chalcopyrite, sphalerite and telluride. Ore-shoots are not continuous and are localized principally at abrupt changes in attitude of the vein. At some of these changes the vein increases in size, but at others it dwindles and splits. Underground, widths of quartz range from a stringer to about 3 feet.

The accompanying map (Fig. 2) is reproduced from the Annual Report of the Minister of Mines for 1936, with additions up to date as of August 29th, 1939. It is based on transit surveys, to which have been added compass surveys of the uppermost and lowermost workings.

A considerable amount of dyke rock is found in the workings. This is of two types; the most prominent is a

biotite syenite, brownish in colour and commonly porphyritic when of medium grain, but grey in colour when fine-grained. The other is a fine-grained grey andesite that closely resembles finer phases of the first, and it is believed that the two are closely associated. The dykes are very irregular in outline, and correlation or projection over any but short distances is impossible. They produce little or no offset of the vein.

Study of the map shows the great irregularity of the vein and its local obliteration by dykes. Stoping ground has not been found to persist between levels. The uppermost levels, driven from raises, ultimately reached the surface where the vein outcrops strongly, but down the dip a bend develops that was the site of heavy mineralization and provided stoping ground above and below No. 1 adit level.

The northernmost drift on No. 1 level follows a small, poorly mineralized section of the vein. Twenty-five feet from the face the vein is cut by a 1-foot andesite dyke, and for the remainder of the distance is in the eastern wall. No. 3 level is driven from a winze sunk 48 feet at 50 degrees beneath a dyke and is, on the northern end, beneath dyke rock that is cut by No. 2 level. Two car-loads of ore were shipped from the east-west section of the vein, but this section is erratically mineralized and no great tonnage is indicated above the level. The southern section of the vein on this level is not strongly mineralized.

Shipments from this property in the 20 years from 1919 to 1939 total 1,545 tons, from which 617 ounces of gold and 3,894 ounces of silver were recovered.

GOLD DROP.

This property, comprising three Crown-granted claims, Gold Drop, Gold Drop Fraction and Anchor Fraction, is owned by Louis Bosshart, Greenwood. It is at an elevation of about 4,450 feet on the southern slope of a local ridge summit. The ground is heavily wooded and outcrops, except near the North Star claim, are not abundant. A branch road leads to the main or upper adit.

The rocks are members of the sedimentary series and are for the most part dark grey to brownish biotite-bearing rocks possessing a blocky fracture. They are fine-grained and finely bedded and contain minute partings and wisps of dark argillaceous matter. Bedding is only locally evident; where observed, the strike is north-west and the dip is from 65 [illegible] degrees north-east to vertical. Two quartz veins are known, one striking north-easterly and the other north-westerly.

The principle workings are on the north-easterly striking vein that is the same as the North Star vein. A series of open-cuts and shallow workings traces this vein from the shaft nearly to the North Star boundary line. The shaft is reported to be 60 feet deep but is inaccessible, and one open-cut, 30 feet south-westerly, marks the south-western

limit to which the vein has been traced.

The upper adit is about 430 feet in total length. Seventy feet north-easterly from the point where first ~~encountered~~ exposed the vein branches, and one branch, strike north 75 degrees east, is drifted on for 80 feet ~~when~~ until it swings to north 33 degrees east and is followed in this direction for 180 feet. Fifty feet north-easterly from this inner bend, the western branch joins the eastern branch. The vein is a complex fissure with a dominant north-easterly strike and with subsidiary easterly-striking branches. The dip is from 40 to 60 degrees south-eastward or southward. A little stoping has been done and in four places raises were driven to surface, about 35 feet up the dip.

The vein is from 1 to 18 inches wide, with local enlargements to 20 or 30 inches. There is neither shearing nor alteration of the walls. The better mineralized quartz, and that characteristic of the vein, is dense and white, but there is some that is strongly crystalline and some that has been brecciated and recemented. Sulphides include pyrite, a little galena and small amounts of chalcopyrite. Telluride and free gold have been reported. A sample chipped across 8 inches of well-mineralized quartz near the inner bend assayed: Gold, 0.66 oz. per ton; Silver, 4.0 oz. per ton. A grab sample of the best sorted ore on the dump assayed: Gold, 1.24 oz. per ton; Silver, 4.6 oz. per ton.

A second adit, 40 feet lower in elevation than the upper adit, is 275 feet ~~southerly~~ south-westerly from it. It is driven north-westward about 200 feet as a crosscut (see Fig. 3) but has failed to encounter the vein. The fact that it has not done so is probably due to faulting.

The second vein (see Fig. 1) is exposed by open-cuts for a length of 800 feet. It strikes north-west and dips 65 degrees north-east and is apparently parallel with the sedimentary bedding. A 15-foot shaft is sunk on the best section of the vein seen near the south-eastern end of the line of open-cuts. The vein in this shaft is 6 to 18 inches wide and is sparsely mineralized; some quartz on the dump contains galena and chalcopyrite. Open-cuts north-west of the shaft show a steeply-dipping shear-zone containing small amounts of quartz locally.

Shipments from this property from 1900 to 1940 total 213 tons, from which 139 ounces of gold and 827 ounces of silver were recovered.

Large boulders of mineralized quartz have been found below the road south-east of the Gold Drop and Laura, and a great deal of stripping has been done in this section by other interests in an effort to locate the vein from which they came. The stripping was even extended down to the point where Gold Drop Creek crosses the Eholt road, but without success, as no quartz was found in place. It is reasonable to suppose that the float comes from the Gold Drop vein, and if so it must be wider and stronger to the south-west than where

explored. A sample of well mineralized quartz from one boulder assayed: Gold, 2.06 oz. per ton; silver, 9.1 oz. per ton and another sample assayed: Gold, 0.14 oz. per ton; silver, 0.9 oz. per ton.

LAKESIDE FRACTION.

This Crown-granted claim, owned by Mrs. Jennie Duhamel of Greenwood, is on the steep, heavily-wooded slope immediately above Jewel Lake. There is one old adit on this claim, elevation 3,790 feet, about 450 feet from the lake and 200 feet in elevation above it; it is reached by a trail 1,800 feet in length from the Dentonia cyanide plant.

The adit consists of a crosscut 50 feet long, south 54 degrees east, and a drift extending 7 feet south-westerly and 33 feet north-easterly (August, 1939). A winze is sunk 28 feet on the vein which dips 68 degrees south-eastward. The vein strikes north 70 degrees east in the drift, but, as imperfectly exposed in open-cuts, it strikes north 35 degrees east for 100 feet north-easterly from the adit.

The vein is as much as 36 inches wide, as exposed in open-cuts, but in the drift it ranges from 8 inches to 18 inches. In the winze it is a shear-zone from 2½ to 4 feet wide, containing stringers of quartz, and is distinctly stronger on the north-east side. In the drift the vein has an average width of between 10 and 12 inches of quartz between slightly sheeted walls. Mineralization is not strong and consists of pyrite and small amounts of galena and chalcopyrite.

The following samples were taken.

(1.) 5 feet from south-east face of drift, 10 inches of quartz; Gold, 1.24 oz. per ton; silver, 9.2 oz. per ton.

(2.) 10 feet from face, 9 inches wide: Gold, 0.70 oz. per ton; silver, 6.0 oz. per ton.

(3.) 17 feet from face, 16 inches wide: Gold, 0.39 oz. per ton; silver, 2.6 oz. per ton.

(4.) 26 feet from face, 11 inches wide: Gold, 0.70 oz. per ton; silver, 5.6 oz. per ton.

(5.) 30 feet from face, 12 inches wide: Gold, 0.86 oz. per ton; silver, 5.4 oz. per ton.

A pile of sorted material near the portal, lying on and beneath a collapsed platform, amounted to about 6 tons. A grab sample of this material assayed: Gold, 1.22 oz. per ton; silver, 8.2 oz. per ton.

In 1939 and 1940, 105 tons ~~were~~ was shipped by lessees, from which 48 ounces of gold and 427 ounces of silver were recovered.

DENTONIA MINES, LIMITED.

The office of this company is at 850 Hastings Street West, Vancouver, B. C. Prior to his death in March, 1941, Nelson S. Smith was president: G. T. Vaux was vice-president. Capital: 2,500,000 shares, no par value; issued, 1,645,000. The property consists of 8 Crown-granted claims, the Jewel, Massachusetts, Imperial, Gem Fraction, Perseverance, Enterprise, Anchor and Ethiopia. When the company was operating it held,

in addition, the Denero Grande, Gold Drop, Gold Drop Fraction and Anchor Fraction, as well as 12 located claims, a total of 24 claims and fractions.

SURFACE WORKINGS/ The Dentonia vein

~~The Jewel vein~~ is exposed at frequent intervals by stripping and open-cuts from Jewel shaft to Ethiopia adit, a distance of 3,650 feet. It can be followed an additional 1,500 feet to the north-east by a series of very old, shallow open-cuts at infrequent intervals. The vein passes beneath drift to the south-west and has not been located, although considerable stripping was done by Dentonia Mines, Limited in granodiorite about 2,500 feet south-west of Jewel shaft.

North-east of Anchor stope, which was mined to surface, no serious attempt was ever made to develop the vein except in one adit on the Ethiopia. For the greater part the vein at the surface is poorly mineralized, and one or two sections carrying galena, elsewhere considered a good indication of gold, contain only low values. Widths range from a few inches to 4 feet or more, the wider quartz being ~~very~~ weakly mineralized with pyrite only.

The vein structure splits into 3 quartz-bearing fractures at a distance of ~~perhaps~~ about 400 feet south-west of the Ethiopia adit; at the adit these are spaced over 160 feet measured across the strike. A series of open-cuts and shallow pits here expose the two westernmost branches in a number of places. The width of quartz ranges from 4 to 20 inches, and

the dips from 35 to 45 degrees south-eastward. Mineralization is erratic, and although high values have been reported, of 6 samples taken the highest assayed: Gold, 0.20 oz. per ton; silver, 1.8 oz. per ton.

The Ethiopia adit, elevation 3,974 feet, is 250 feet long, driven as a cross-cut south 50 degrees east. The westernmost branch of the vein structure was cut 45 feet from the portal and was drifted on at south 10 degrees west for 51 feet. The vein structure is irregular, branching and discontinuous, and widths of quartz range up to 18 inches locally. The central branch was cut 205 feet from the portal and drifted on for 20 feet south-westerly. This is a shattered zone, as much as 18 inches wide, containing irregular strands of quartz. A short raise was driven on the structure but ~~the~~ ~~geology~~ is obscured by a post-mineral dyke.

North-east of the adit a series of ~~very~~ old open-cuts at wide intervals shows presence of a vein structure. Most of these open-cuts are caved, ~~but~~ and the small amount of quartz on the dumps does not indicate more than a few inches of quartz in any one of them.

Three diamond-drill holes were put down by Dentonia Mines, Limited from the surface to strike the vein about 300 feet south-west of the Jewel workings. Two of these holes were abandoned in a thick cover of drift. One is reported to have cut 2 feet of quartz at a depth of 47 feet beneath the bedrock surface; this section of the core is reported to have assayed gold, 0.27 oz. per ton.

Mine Workings

The vein is developed to a maximum depth below surface of 490 feet and for a total length of 2,400 feet. That part mined in early days and developed by shaft is referred to as the Jewel section, and that part developed by Dentonia Mines, Limited from the old adit beneath Rowe, White and Enterprise shafts is referred to as the Enterprise section.

Total level development in the Jewel and Enterprise sections aggregates 11,800 feet of drifting and crosscutting. Of this a total of 8,200 feet was examined, embracing the Enterprise section and the upper two levels of the Jewel section. The winze in the Enterprise section was filled with water.

In the examined section, of 6,700 feet of drifting on the vein or vein structure, 1,560 feet or 23% was later stoped; in the Jewel section 700 feet of stoping ground constitutes 39% of total drifting and in the Enterprise section 860 feet of stoping ground constitutes only 17½% of the total drifting.

There is an adit crosscut 1,340 feet long on the 500 level of the Enterprise section but there is very little exploratory crosscutting. Crosscuts were driven in the Jewel section to examine ground lateral to the vein and also to explore a split condition of the vein. These latter workings, at least the parts now accessible, do not throw a great deal of light on the geology, and the few small exploratory crosscuts in the Enterprise section tell little.

Stopes in the Jewel section were not examined. Some were filled and some were dangerous, moreover the ground has caved to surface in two sections, north and south of the shaft. The shaft collar, retimbered in 1934, was in good condition. The 200 and 300 level workings, made accessible early in 1940, were in quite good condition; many timbered sections might not be safe for long if dewatered, but these are largely north of the shaft. The northern section, above 300 level at least, seems to be worked out, both on a footwall and a hangingwall-branch of the vein. The footwall-branch was not developed below a sub-level above 100 level and crosscuts on 200 level failed to prove its downward continuation.

The workings in the Enterprise section were in good condition. Part of 300 level in the large stope was destroyed but the remainder of the levels were intact. Most of the stoped ground was open and accessible and some parts below 300 level were filled. The big stope was beginning to get heavy in May of 1940 and, while not at that time dangerous, would certainly tend to become so. The ground does not require much timbering and a few random stulls and small pillars are sufficient in most sections to keep open stopes in a safe condition.

Further details of the mine workings can be gained from Figures 4 and 5. This is actually one map, printed in two sections for convenience; it is suggested that those interested may paste the two sections together to facilitate viewing the workings and geology as a whole.

Mine Geology

The granodiorite contact is almost vertical down to the 300 level in the Jewel section and, judging from the old mine plan, so continues down to the 500 level, a vertical range of 340 feet. The greater part of the rock north of the granodiorite is greenstone, a fine-grained, green andesite. Less quartzite occurs on the strike of the vein underground than on the surface, and the largest body is on the north end of 200 level in the Enterprise section of the mine. Pre-mineral aplite dykes are fairly numerous in the northern part of the workings and post-mineral dykes, ranging from biotite-syenite porphyry to diorite and lamprophyre, occur in many places.

The granodiorite contact is clean-cut but small bodies of the same rock are found as far north as the long adit cross-cut. Apart from small granitized patches near the granodiorite the greenstone is uniform in character and has undergone very little alteration. The relationship between greenstone and quartzite is obscure but the contact at one or two places suggests interfolding; most irregularities in the contact cannot be explained. If the two rocks are interfolded, then quartzite overlies greenstone, and greenstone may be expected in the northern continuation of 500 and possibly the higher levels, for several hundred feet. The appearance of small sections of quartzite on the vein walls at several places is anomalous, and would be explained if the greenstone were intrusive.

Dykes, both pre- and post-mineral, are intruded along

highly irregular fissures. The aplite dykes in some cases do not show clear-cut contacts but merge into greenstone. Post-mineral dykes are in many cases nearly flat, but roll, pinch and swell so that width and attitude is only of local significance; in no case do they offset the vein in plan more than a few inches.

The vein structure has been explored for a length of 5,000 feet on the surface and 2,400 feet underground. Underground the average strike is north 19 degrees east, with variations from north 10 degrees west to north 50 degrees east: the dip ranges from 30 degrees to 60 degrees southeastward, with an average of about 40 degrees. By vein structure is meant the main zone of fracturing, and the word vein is used to denote sections that contain quartz either in small amounts or large.

The vein structure is a fracture-zone that is quite irregular in attitude and pattern along both strike and dip. It is plotted in detail in Figures 4 and 5. It locally passes into a shear-zone and in places consists of a single, clean break; in some places it comprises a system of multiple or branching slips. In spite of its known mile length it appears to be a "weak" structure, as opposed to a single, strongly marked and uniform zone. Quartz occurs within it in widths from a few inches to about 16 feet, and the wider quartz is the more continuous; quartz occurs in any section of the vein structure, but tends to form preferentially in

those sections where the strike is more north-easterly than northerly. The greater widths and larger amounts are in the upper levels.

The vein structure is believed to have been formed as the result of regional shearing stresses. The direction of maximum shearing is northerly and the direction along which tensional fractures occur is north-easterly. The western wall of the vein structure moved relatively northward about 30 feet and the north-easterly-striking sections of the structure tended to open; there was consequently in such zones of tensional strain a better opportunity for an influx of quartz. This rule is not general, however, as study of the maps will show. The vein structure strikes north-easterly between the two productive sections of the mine and, although an ore-body was formed at the granodiorite contact in this section of favourable strike, a great deal of it is unmineralized.

The absolute relative movement of the walls of the vein structure is not known, but is believed to have been largely horizontal. This is deduced from the fact that the quartz bodies are without rake and are localized seemingly by horizontal deflections rather than by rolls on the dip.

Deposition of quartz took place by both fissure-filling and replacement. Throughout the mine in general there is very little alteration or silification of the vein walls, but in sections containing sheeted structures and trains of inclusions there are indications of both replacement and filling.

Mineralization includes pyrite, galena, chalcopyrite, sphalerite, telluride and gold. Little can now be seen of the distribution of these minerals except that they occur in bands and masses within the quartz, much of which is poorly mineralized. In some sections, at the borders of stopes and in other parts where the vein was too low grade to mine, quartz several feet in width is barren of sulphides or contains only an erratic sprinkling of pyrite. Values in strongly mineralized quartz are reported in some instances to have ranged as high as several ounces in gold per ton.

Post-mineral faults are not numerous, and none have displaced the vein more than a few feet as measured on the plane of the fault.

Discussion of the Vein Structure

The following is a summary and analysis of the most prominent features of the vein structure. The numbers refer to points similarly numbered on Figures 4 and 5.

(1) At the northern end of stoped ground the vein swings north-eastward, splits, and tends to make a large kidney; this condition does not follow down to the 200 level, although there is a discontinuity in vein structure.

(2) Marks the northern end of good widths on a section of vein that strikes north-eastward close to the granodiorite contact. The vein is here faulted a few feet and from this point to the face there is very little quartz in a weak slip.

(3/) The structure here, on the same bend at the granodiorite contact, is complex. It is in detail even more complex than mapped, but includes two quartz-bearing slips, both of which have been stoped. This appears to mark the bottom limit of a productive section, although the same flexure is indicated on the 300 and 500 levels below.

(4/) An abrupt change in strike of the structure involves a steeply dipping, strong clay slip. This appears to be continuous with the vein/structure, although the attitude suggests a post-mineral fault.

(5/) The appearance of quartzite at (4) and (5) is hard to explain, but flatly-dipping contacts suggest that the quartzite irregularly underlies greenstone, with perhaps an interfolded relationship.

(6/) A north-easterly trending section, throughout which there is no more than a trace of quartz, continues beyond the face of the drift. Here there is a stringer of quartz from 2 to 6 inches wide in the foot-wall of the slip. The structure unquestionably corresponds with the hanging-wall-branch (7) on 500 level of the Enterprise section but, with a difference in elevation of only 38 feet and indicated dips of 55 degrees, there is a suspicion that the survey is inaccurate. There does not appear to be a counterpart of the footwall-branch (8) on the 200 level (Jewel) although it may be represented in one of the several insignificant stringers of quartz in the crosscut to the west. This section of the mine is unpromising.

(7) The only quartz-bearing sections of a weak hangingwall-branch of the structure was raised on for 105 feet to a sub-level (400) about 70 feet vertically above 500 level. A crosscut extends at this level to the footwall-branch, which was raised on to the adit level near (9). Minable quartz was not seen in these raises.

(8) Rather steeply dipping quartz occurs in a weak structure. The quartz is from 3 to 24 inches wide and neither width nor attitude are consistent. This footwall-branch is not promising, but quartz was apparently raised on from 700 level below, and it is reported that before the lower workings filled with water lessees took out a small tonnage of selected material.

(9) The adit terminates at a flatly-dipping porphyry dyke. There is narrow quartz between tight walls in this section, and a small stope was started from 200 level above the dyke.

(10) Between (9) and (10) the vein is small and irregular, and is broken by numerous small faults. A split in the vein structure is indicated between this point and the crosscut through a porphyry dyke, but the relation is obscure. The hangingwall-branch of this split bears quartz only near the adit portal and has been stoped from the Jewel workings below in this section.

(11) This point furnishes one of the chief clues to a physical explanation of the structure. For some distance to the south the structure is a broad, unmineralized shear-zone that strikes northerly. Here small lenses of quartz strike

north-easterly across the shear-zone and plainly represent filling of tensional openings, associated with the shearing. Immediately to the north the structure swings north-eastward to open out abruptly and make a great width of quartz at (12).

(12½) The vein here widens abruptly from a mere thread to 16 feet of almost solid quartz. The wide quartz dies out somewhere in the small pillar on the south end. The vein structure to the south-west consists of a narrow, weak shear-zone and the wide quartz is considered to be produced by a combination of the north-easterly strike of the structure (in which a tensional component of stress is operative) and the fact that there is an intersection of slips in this particular section.

The mapping of the quartz is schematic, since it is now mined out, but there is an interlayering with bands of rock. It is believed that the structure represents a sheeted zone filled with quartz and that some of the sheets of rock have been partly or wholly replaced by the quartz.

(13½) The big ore-body, the largest in the mine, rapidly decreases in size and locally pinches out at this point (see also 18). This is due primarily to the change in strike of the vein and secondarily to an intersection of multiple slips. Partial silification of the walls is mapped schematically. If silicification had been complete it would have greatly increased the width of vein a short distance to the south of this point.

(14) The complex vein structure is cut off by a steeply dipping fault that nearly coincides in strike with the vein. The foot-wall of this fault dropped relatively downward about 7 feet, so the vein shows in the back of the drift at (15) and in the bottom at (16). The fault is not a simple break, and this fact, combined with the fact that the drift follows it, makes the study of the geology difficult in this section.

(15) At this point and northward quartz is as much as 5 feet wide but is largely unmineralized, and short raises failed, apparently, to find values. It will be noted that the geology does not match on either side of the drift throughout the whole of this ~~whole~~ northern section.

(16) Here, north of the Anchor stope which extends to surface and is reported to have been of good grade, the quartz attains a maximum width of 2½ feet in the foot-wall of the fault, but it is not continuous and the structure is weak.

(17) There is here a bend in the structure that greatly increases the size of the vein. The quartz is barren and is seen largely to be the result of replacement rather than of fissure filling. The replacement is not complete and parts of the vein consist of intensely silicified greenstone which merges into quartz. This quartz has a somewhat watery appearance, different from that in other parts of the vein, which latter is supposedly for the most part the result of fissure filling. It seems impossible throughout the mine, however, to separate the two classes of quartz by appearance alone without other criteria such as are here present.

The structure here is fairly strong, and the clay slip that extends to the face of the level is several inches wide. There appears to have been considerable initial shearing which, in addition to opening on the bend due to tension, allowed silicification to extend over a broad zone. The bend in the vein structure does not extend to the levels above and below, although wide quartz occurs on 200 level, and in the Anchor stope.

(18) At the southern end of the section of wide quartz the structure converges from a system of slips to a single slip which is unmineralized. The width of quartz is maintained up the dip beyond 200 level but not downward as far as 400 level.

(19) Between here and (18) the structure is weak and irregular. The only quartzite seen on 300 level occurs in this section, and the two small patches cannot be correlated with one another or with the large amount of the same rock on 200 level. South of a post-mineral dyke there is a northeasterly striking, wide section of vein that, on the level, is a zone of weak shearing containing small quartz stringers and masses. This is similar in many respects to the section at (17), but there is here little direct evidence of replacement. The section is obscured on the level by a flat-lying dyke, above which it has been stoped to surface.

(20) The vein pinches to a stringer of quartz. This is a more pronounced structure than at (13) above, because the vein and structure both pinch. South of here, to (21), the wide and irregular vein appears to have included a greater amount of rock lenses and sheets than on 200 level above.

(21) The vein pinches to the south less abruptly than at (12). The complex structure, as well as some wide and poorly mineralized quartz, extends at least as far as (22), down the dip from (12), but is complicated by a post-mineral fault. The branching of the structure is indicated but the roll is less marked.

(23) On 500 level the vein structure splits to form the two branches at (7) and (8). The structure consists of a weak unmineralized slip, and the footwall-branch is a barely distinguishable fracture. There is very little quartz at the intersection. It is important to note that the general strike of the vein structure here coincides with that of the footwall-branch, and not the hangingwall-branch as on 200 and 300 levels.

(24) Here the irregular vein structure is almost completely obliterated by an irregular porphyry dyke. Whatever the precise nature of the structure, the ore-body extending from surface to below 300 level does not persist to 500 level. The main raise, started below the ore-body on the weakly mineralized branching structure, struck ore in the short sub-levels in the form of a tongue extending down the dip, but the main ore-body bottoms along an essentially horizontal line.

(25) The vein structure consists of strong clay slips and one associated mass of quartz. There is a discontinuity produced by a fault, and the actual amount of offset and the correlation of slips cannot be determined. There are, in this section, several irregular masses of aplite which do not show dyke form and might be mistaken for masses of chert,

but microscopic identification as aplite is positive.

(26) The structure, or that part drifted on, progressively weakens to a thin, dry slip. It is not followed throughout by the drift, and when next discovered past the bend in the level it is stronger, and contains a few small lenses of quartz.

(27) The structure tends to fray ~~out~~ here, and was not followed by the level. The main slip was raised on to 400 level and the bottom of an ore-body was found just below that level. Although the quartz is wide in the stope above 400 the grade is low; mineralization is scanty in the body of the quartz and values are reported to be low also in a few well mineralized remnants.

The structure splits and is very weak where last seen; it has not been picked up beyond the post-mineral dykes.

Discussion of Ore-bodies

The greater part of production in the Enterprise section came from the large ore-body, and an analysis of the conditions that produced it is consequently valuable, in that it might provide a clue to further exploration (~~whose~~ the success of which must lie in the finding of other ore-bodies of greater than average size.

The great width of quartz formed as a result of a favourable set of conditions within the vein structure. The rock is homogeneous greenstone throughout, so much so that it

certainly reacted in a uniform manner to regional stresses at the time of initiation of the vein structure. Although no positive evidence is forthcoming it is strongly to be inferred that there was some replacement of the wall rocks, as well as fissure filling by vein-quartz, but there is no evidence whatever that any chemical differences within the greenstone so affected the deposition of quartz that a large ore-body formed here and not elsewhere. It is related simply to the fracture pattern produced by regional stresses.

The wide quartz formed as the result of two factors, first the change in strike from northerly to north-easterly and, second, splitting of the vein structure. The north-easterly striking fissures are tensional rather than shear fractures, and along this direction the fissures open more easily to permit introduction of quartz. This is borne out in many other sections of the mine, to name specifically (1), (2), (3), (11) and (17). In many places also, the intersection of branches of the vein structure are mineralized. In the southern end of the big ore-body both factors are closely related on 200 and 300 levels, while at the northern end of the ore-body the structure swings abruptly to a northerly strike. The failure of the ore-body to persist to 500 level is due to a change in strike of the vein structure with depth. The split condition continues down the dip, but the roll in strike straightens out, whereas on 200 and 300 levels the general strike coincides with that of the hangingwall-branch, on 500 level it coincides with the footwall-branch and at the junction both branches are weak, particularly the foot-

wall-branch.

The foregoing explanation, based entirely on the pattern of the vein structure and on stress relations in a homogeneous body of rock, is believed to be true, but there is one other structural possibility that may have had an additional influence. The matter is impossible to prove because relations between the quartzite and greenstone are not known, but if, as supposed, they are interbedded sediments and flows, irregularly folded, the following condition may have obtained. There may have been quartzite overlying greenstone above the big ore-body, which erosion has since removed, and a site beneath such a hypothetical contact may have been a favourable one for ore deposition. One difficulty with such a hypothesis is the fact that if such a site were favourable then there should be more ore on the north ends of 300 and 500 levels (beneath the quartzite on 200 level); that this is not so is due in part to the unfavourable strike of the vein structure.

Unfortunately, the relative behaviours to fissuring of quartzite and greenstone are poorly understood because the only major section drifted on in the former rock, on 200 level, coincides with a post-mineral fault. The walls of stopes and raises cannot be well enough studied to provide an answer to this question. All that may be said perhaps is that the more brittle rock is less apt to become sheared along a fissure, and the quartzite is less amenable to replacement

by quartz than is greenstone. The fact that most of the quartz on the northern end of 200 level between walls of quartzite did not prove to be minable may indicate that the quartzite is a less favourable host rock for ore, although quartz does occur in widths up to several feet. The factors governing localization of ore shoots within the quartz are not understood.

The study of ore shoots is difficult in an abandoned mine because the distribution of values cannot usually be inferred from study of the old mined stopes. The generalities which may be enumerated are these: (1) Sections of the vein assaying many times the average are known to have been mined out within a general ore-body. (2) Values are found in wide sections of the vein, and, so far as known, the higher grades of mineralization occur in parts of wide sections and not in narrow sections of the vein. (3) Values, like widths of quartz follow down the dip, and there is no rake to ore-shoots. (4) Wide quartz occurs on both steep and flat sections of the vein, but it is perhaps significant that nearly all poorly mineralized wide quartz dips steeply. The inference is that ore shoots follow flatter sections of the vein. (5) The question of whether the ore-shoots are an integral part of the vein or whether they represent a secondary period of mineralization cannot be answered.

Future of the Mine

In the Jewel section only the two top levels were open to examination and not all of the ground above them was accessible. Former operations mined two branches of the vein, but crosscuts on 200 level failed to prove the downward continuation of interesting mineralization on the footwall-branch. Some stoping was done on the three bottom levels, but details are not known. It may be that the branches reunite to the south, but examination of the upper stopes would be necessary to prove this point. There is a further splitting between the 200 level adit portal and the Rowe shaft, and consequently there may be additional quartz farther in the foot-wall in the Jewel section.

Any further exploration must consist of drifting to the south in granodiorite. Ore has been mined in this rock, as well as in greenstone near the contact, but it is impossible to say what the vein may be like farther within the granodiorite. A diamond-drill hole, put down by Dentonia Mines, Limited from surface about 300 feet south of the Jewel workings, is reported to have cut 2 feet of quartz, assaying: gold, 0.27 ounces per ton, but in view of the erratic nature of the vein structure and of mineralization, positive results could only be expected from a number of holes. There is little question that the vein structure will persist in the granodiorite for several hundred feet or more, but no guess can be hazarded as to the occurrence of ore-bodies.

In the Enterprise section further sinking is unwise unless extensions of ore are found on existing levels. There

is a possibility that ore might be found in the hanging-wall on 500 level and the northern termination of ore in the mine has not been proved.

Although there is little evidence of a split in the vein on the dip, beyond a footwall ~~strand~~ branch a few feet in the foot-wall and a few sheeted sections where a sheet might be missed in mining, there are only two short crosscuts in the hanging-wall on 500 level ~~and~~ and very little information ~~is given~~ can be ~~from these.~~ ~~by these.~~ The structure and quartz are both so much weaker on 500 level than on the upper levels that the continuity as well as the possibility of further downward continuation might be doubted, but persistance to considerably greater depths is to be expected from a structure a mile in known length. There is a quartz-bearing hangingwall-branch at the face of the adit crosscut which has never been explored, and the structure has not been strictly followed throughout the northern end of 500 level. It is possible that the structure branches on the dip, and while there is no positive evidence of this the hanging-wall could be tested by diamond-drilling in a few places to a depth of no greater than 100 feet. An ore-bearing (flatter) split is more likely to occur in the hanging-wall. A few holes in the foot-wall would discover a steeper branch if it lies there.

Continuation of the vein structure to the north is proved on the surface far beyond the mine workings. On the surface values are low ~~in the~~ between walls of quartzite ~~wall rock~~ and it was inferred by early workers that values would not be found in

that rock. However, this is not entirely sound reasoning because ~~and~~ between greenstone walls, either were values ~~were not~~ found ~~either~~ on the surface above the big stope or in the three old shafts. Projection of the surface geology indicates that greenstone might be encountered for several hundred feet in advance of 500 level, but with the proved irregularity of the distribution of quartzite underground the contact might be many hundreds of feet to the north.

Any further development of the mine should include first, testing of the walls on 500 level and second, ~~then~~ drifting to the north. It will be seen from the strike of the vein on surface that a swing to a north-easterly strike is to be expected at no great distance ahead of the faces of the levels, and if this bend does not bring in ore then further drifting would be unattractive. Exploration by sinking is not warranted unless further level development should prove satisfactory. The vein structure is weak and irregular as a whole, and it appears to be a fact that quartz and values over minable widths occur only in a few favourable sections, where the character of the fracture has permitted an influx of quartz and of mineralization.

PRODUCT	PROVINCE OR TERRITORY	N.T.S. AREA	REF.
GOLD	British Columbia	82 E/2	AU 2

NAME OF PROPERTY: JEWEL (DENTONIA)

LOCATION - Jewel shaft.

Uncertainty - 150 metres. Lat. 49°09'40" Long. 118°36'50"

Mining Division: Greenwood District: Similkameen

County: Township or Parish:

Lot: Concession or Range:

Sec. Tp. R.

OWNER OR OPERATOR AND ADDRESS

DESCRIPTION OF DEPOSIT

The property is situated on the contact between highly altered quartzites and greenstones of the Anarchist group (Permian ?) and granodiorite of the Nelson Intrusives. The greenstones, occurring chiefly in one broad band, are intruded along a northwesterly-trending line by the granodiorite.

The Jewel vein cuts granodiorite in the south, quartzites in the north, and the intervening band of greenstones in the middle. Underground it strikes about north 20 degrees east on the average, and dips 30 to 60 degrees south-eastward. It has been traced on the surface for more than a mile and has been developed underground for a length of about 2,400 feet and to a maximum depth of 500 feet. The vein was about 3 feet wide in many mined sections. One stope had a maximum width of 16 feet, but 9-foot widths of quartz found in other parts of the vein were barren. On the average the vein was a little stronger in the granodiorite than in the greenstone. The ore appears to occur in shoots which pitch directly down the dip of the vein and tend to occur in its flatter sections. The shoots vary in size but are of the order of 200

see Card 2 ....

Associated minerals or products of value - Silver, lead, zinc.

HISTORY OF EXPLORATION AND DEVELOPMENT

The property is located ½ mile east of the south end of Jewel Lake, some 5 miles north-northeast of Greenwood.

The Jewel (Lot 850) and Denero Grande (Lot 851) claims were staked in 1895 and optioned to Leslie Hill on behalf of The Prospecting Syndicate of British Columbia, Limited Liability. Exploration and development work began in shaft sinking and lateral development. The claims were Crown-granted in 1898 to the company and Mary McArthur. Adjacent claims to the north along the strike of the vein were reported held by The Greenwood Mines, Limited (Enterprise & Anchor claims), and Canadian Gold Fields, Limited (Ethiopia claim).

The Jewel Development Syndicate, Limited, was organized in England in 1898 to acquire the property; the Syndicate was reorganized the following year under the name Jewel Gold Mines, Limited. Exploration and development work continued into 1902. The workings at that time comprised two shafts, the Main and Rowe's, 340 and 160 feet deep, respectively, and some 3,700 feet of drifts, crosscuts, and raises on 4 main levels. Ore was shipped to Rossland and Phoenix. Other workings included some 300 feet of crosscut and drifts in an adit on the Ethiopia claim.

No further activity was reported until the Jewel Syndicate, Limited, acquired the property in about 1907. A 15 stamp mill and cyanide plant was built and milling began in August 1910, and although modifications were made, the plant failed to operate satisfactorily; the mill operated a total of 26 months and processed some 31,000 tons of ore.

Jewel-Denero Mines, Limited, was organized in Edinburg, Scotland, in 1913 to acquire the Jewel claim and a half interest in the Denero Grande claim, the other half interest being owned by C.J. McArthur, of Greenwood. Further alterations to the mill resulted in a satisfactory recovery. Operations continued until August 1915. During this period the main shaft was sunk to 540 feet and 2 new levels established. Practically no work was done on the Denero Grande as the other ½ interest couldn't be obtained on terms satisfactory to the company. Lessees carried out intermittent mining operations on the Jewel, Enterprise, Anchor, and Ethiopia claims, during the 1920's.

In 1930 a Calgary syndicate optioned 24 claims and fractions for Dentonia Mines Limited. Development work began in 1933 and a 100 ton per day mill was put into operation in 1934.

see Card 2 ....

511626 *

HISTORY OF PRODUCTION

Production for the period 1900-1948, recorded under the names "Jewel-Denero" and "Dentonia", totals 133,094 tons. From this ore 38,391 ounces of gold, 225,598 ounces of silver, 344,856 pounds of lead, and 1,054 pounds of zinc were recovered.

In 1974, 726 tons of ore were shipped from this property. From this ore 223 ounces of gold, 1,437 ounces of silver, 4,450 pounds of lead, and 1,584 pounds of zinc were recovered.

During 1975, 1,859 tonnes of ore were shipped. From this ore 17.698 KG of gold, 108.643 KG of silver, 4,912 KG of lead, and 2,122 KG of zinc were recovered.

MAP REFERENCES

Map 6-1957, Kettle River, (Geol.), Sc. 1":4 miles.

*Map 82 E/2, Greenwood, (Topo.), Sc. 1:50,000.

Claim Map, Sc. 1":1,000 ft.; Report of Minister of Mines, British Columbia, 1933, p. 159.

#Geology of the Denero Grande, Jewel mine, Jewel Lake area, Sc. 1":600 ft. (approx.), Fig. 6, Geology, Exploration and Mining, 1974, p. 40, British Columbia Dept. of Mines.

Map 8497 G, Greenwood, (Aeromag.), Sc. 1":1 mile.

REMARKS

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BCI 82 E/SE - 55

JULY 1973
JAN 1976
SEPT 1978
DMacR-FEB 1982

NAME OF PROPERTY JEWEL (DENTONIA)

DESCRIPTION OF DEPOSIT (continued)

feet long, 150 feet deep, and 3 to 4 feet wide. The vein filling is quartz with minor amounts of carbonate, sericitic and chloritic material. The mineralization consists of pyrite, chalcopyrite, galena, tetrahedrite, and native gold. The gold appears to be related to a late period of mineralization, occurring as veinlets in pyrite, usually in close proximity to galena or chalcopyrite.

A large part of the ore from the Jewel vein came from a section within greenstones where a great width of quartz may have been related both to a bend to the northeast and to a split in the vein structure.

HISTORY OF EXPLORATION AND DEVELOPMENT (continued)

Mining operations were suspended in November 1936 but the mill continued to operate into 1937, treating the tailings dump. Lessees carried out intermittent mining operations until June 1945 when the company resumed work on the property. Diamond drilling and development work were begun and a 50 ton per day flotation mill was put into operation in October 1947. Operations were suspended in March 1948 as the grade of ore proved to be uneconomic; the company was declared bankrupt.

Colt Resources Ltd. in April 1973 optioned the property from W.E. McArthur and Henry Fritz of Greenwood. Surface diamond drilling totalling 3,000 feet in 11 holes indicated the Dentonia vein extended at least 1,000 feet south from the old workings. A new shaft was sunk to 290 feet on the Denero Grande claim. Development work included 309 feet of crosscutting, 372 feet of drifting, 385 feet of subdrifting, 669 feet of raising, mainly on the 195 and 250 levels. Underground diamond drilling totalled 544 feet in 6 holes. Production was mainly from a stope located northeast of the crosscut between the 195 and 250 levels. Direct ore shipments to the Trail smelter commenced in March 1974.

Reserves were reported as semi-proven, 100,000 tons averaging 0.32 oz gold and 2.0 ozs silver per ton, and probable 100,000 tons of the same grade (Northern Miner, May 29, 1975, p. 3).

Ore shipments were suspended in December 1975. A small amount of percussion drilling was done in 1977 to confirm the extension of the main vein to the southeast. The company name was changed in 1978 to TransColt Resources Corporation; the April 1973 option agreement was abandoned as of June 30, 1978.

Dentonia Resources Ltd. purchased the property from W.E. McArthur by an agreement dated August 9, 1979. Reserves were reported as non-existant. Work during 1980-81 included 1,295' of diamond drilling in 8 holes, deepening the Denero Grande shaft to 510' and drifting from the 475' level..