

BRITISH COLUMBIA DEPARTMENT OF MINES

HON. W. A. McKENZIE, *Minister*

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# Lode-gold Developments

in

## British Columbia during 1932

BULLETIN No. 3, 1932



Compiled by

JOHN D. GALLOWAY, *Provincial Mineralogist*  
BUREAU OF MINES

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## BUREAU OF MINES

Victoria, B. C.  
November, 1932.

To the Honourable W.A. McKenzie,  
Minister of Mines.

Sir:-

I beg to submit herewith a special bulletin, No. 3, 1932, entitled - "Lode-Gold Developments in British Columbia During 1932." The most important feature of the mining industry this year has been the renewed interest in gold-mining potentialities. Production has increased and much development and constructional work has afforded considerable employment.

This bulletin has been issued in order to present useful information in brief form with the objective of stimulating further gold-mining activity in the Province. Promising possibilities are outlined in the reports by the Resident Engineers on their respective districts.

I have the honour to be,  
Sir,  
Your obedient servant,

JOHN D. GALLOWAY,

Provincial Mineralogist.

# LODE-GOLD DEVELOPMENTS IN BRITISH COLUMBIA

During 1932

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By John D. Galloway, Provincial Mineralogist

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## INTRODUCTION

In the Summary and Review of the Mineral Industry of British Columbia for the six months ended June 30th, 1932, it was predicted that an expansion of gold output of the Province was likely to take place. The present bulletin is issued for the purpose of reviewing the results accomplished during the present year and to present for those interested information which may stimulate further development of gold properties. With the decline of exploration activity in the last two years in connection with silver and base-metal prospects, gold-mining, both lode and placer, has experienced a real revival. The potentially promising gold camps of the Province, including Bridge River, Nelson District, the Cariboo Gold Belt and others, have been energetically attacked and in the aggregate, much development is being carried on. Much encouragement is afforded by the actual results obtained and it is becoming more and more realized that important gold possibilities in British Columbia have been neglected or at least not intelligently appraised.

While production is increasing, the chief interest lies in the results of exploration and development which plainly indicate a still greater gold output in 1933 and succeeding years. Not the least important result of the gold activity this year has been the employment provided. This has been marked in certain areas. In the Cariboo, as the result of both lode and the placer gold activities, the district has experienced the busiest year in several and all indications point to more work in 1933. Gold-mining also produced much employment in the Bridge River district and in camps in the Nelson Mining Division.

This bulletin contains brief reports by the Resident Engineers on their respective districts, summarizing gold-mining activities therein.

## PRODUCTION

The output of lode gold in 1931 was \$3,018,894. In the first half of 1932 the value was \$1,811,000, an increase of approximately 25% as compared with the corresponding half-year in 1931. For the full year, 1932, a production of approximately \$3,800,000 is estimated. These figures are not impressive, compared to figures in recent years of the value of copper, lead and zinc outputs. However, it is significant that the trend is strongly upward and, with the large extent of mineralized area in British Columbia and the renewed interest in gold-mining, it is not unlikely that a few years will see this branch of mining of much greater importance than at the present time.

By-product gold, mainly from the mining of low-grade copper ore, has dwindled to small figures and increased output from this source does not appear promising in the immediate future. This year approximately 90% of the output will be from straight gold-mining. The greater output this year is due to a substantial increase from the Pioneer, the advent of the Bralorne to production, and the combined shipments of many small producers.

## PRESENT STATUS OF THE INDUSTRY

For the last five years the largest gold producer of the Province has been the Premier mine which has been responsible for about 60% of the annual output. This mine, although apparently approaching exhaustion, will probably continue productive for a few years yet - with gradual diminution of the yearly output. The adjoining B.C. Silver mine, which has never been brought into steady production and is now closed down, will sooner or later produce some gold to compensate for the decline of the Premier. Meantime, the Pioneer mine in the Bridge River district has steadily increased in importance. In 1933 it is expected to be the largest producer in the Province, with a gross output of from \$1,750,000 to \$2,000,000.

The Bralorne Company brought into production early this year the old Lorne mine situated near the Pioneer. The 100-ton mill has operated steadily on ore averaging about \$16 a ton. Mine development has been energetically carried on and has been successful in opening a new ore-body in the old 4th level. Continued profitable production is expected from this mine.



In 1931 a production of 9,698 ounces of gold was made from the Reno mine but the burning of the mill in February, 1932, virtually put this mine out of the list of shippers for the rest of the year. Reconstruction plans, including re-conditioning of the old Motherlode mill, (bought by the Reno Company) new hydro-electric plant and aerial tramway, are now well advanced and by the end of the year steady production will again commence. A substantially increased output from Reno will materialize in 1933. Mine development has steadily proceeded in 1932 with satisfactory results.

One disappointment of the year is the virtual exhaustion of the known ore-bodies at the Union mine, Grand Forks Division. In 1931 this mine produced 16,552 ounces of gold and about the same is estimated for 1932. The mill was closed in October but the company is prosecuting an energetic development campaign on the Union and also on the Homestake, lying 4,000 feet west of the Union, which was acquired this year. Present indications are that sufficient new ore will be developed to permit of the resumption of milling operations in the summer of 1933.

The most important lode-gold development of the year has been the success attending the development operations of the Cariboo Gold Quartz Company, Limited. Commencing development five years ago, the upper showings were partially developed until two years ago when a long, low-level crosscut tunnel was started. This tunnel is now in about half-way to the original objective but in this distance has crosscut 8 veins, most of which give promise of minable widths of good milling ore. In effect, this is a new mine as distinct from several promising veins lying some 1,500 feet ahead of the present face of the main tunnel. A 75-ton mill now being constructed is expected to be into production in December. While drifting and raising on the veins has not yet been carried out to block out any important tonnages of ore, all indications point to extensive ore reserves. In 1933 a substantial output of gold should come from this property.

Besides the larger gold mines already mentioned, production in 1932 has been made by many small properties. Steady shipments of low-grade gold ore are being made from the Yankee Girl at Ymir to the Trail smelter and development is reported to be satisfactory. Among small shippers are the I.X.L., Evening Star, Midnight, and others at Rossland, the Queen, Kootenay Belle, Vancouver, Arlington, Goodenough, Ymir-Wilcox, Perrier, Blackcock, and others in the Nelson Division, the Gold Drop, Jewel, Carmi, and Buther Boy in Greenwood Division, the Parvenue and other claims in the Osoyoos Division,

and the Dawson, near Hope.

#### DEVELOPMENT

While no shipments are reported from Vancouver island and the Southern Mainland coast, a number of gold properties are being developed. In No. 1 District prospecting for gold has been active and some development is reported. Recent development and careful appraisal of the Skidegate-Sunrise property on Graham island indicates that it is worthy of intensive investigation.

The old Nickel Plate mine at Hedley, a former large producer and dividend payer, is being carefully investigated with the hope of finding further minable ore-bodies.

The Sheep Creek camp, Nelson Mining Division, has attracted much attention during the last two years. The useful work by J.F. Walker of the Geological Survey of Canada in working out the general and economic geology of this area has stimulated renewed interest. The results of development work have shown that many possibilities of gold ore remain to be properly investigated. An important result of the year's work is the success attending the surface development of the Gold Belt group in the Nelson Division. This is described in the Resident Engineer's report on No. 5 District.

In the Bridge River district in addition to the two main productive mines, Pioneer and Bralorne, energetic development is being carried out by the Bridge River Exploration Company on the property of the Bridge River Consolidated and also on the California, on the Cadwallader Gold Mines property (Royal group), the Red Hawk, the Pioneer Extension and other properties. Some of this work is encouraging and one or more productive mines seem probable as a result.

In the Cariboo Division the results attained by the Cariboo Gold Quartz Company have caused a renewed interest in the many quartz veins of the district. Much has been written in the past sixty years on the Cariboo Gold Belt. Although this belt has been the greatest producer of placer gold in the Province, no very important lode-gold production has as yet been made from the area. Much information regarding surface showings can be found in past Dominion and Provincial reports. The most important geological report on the area is "Placer and Vein Gold Deposits of Cariboo, Barkerville District," by Johnston and Uglow. Johnston was responsible for the des-

criptions of the superficial deposits and of the placer-mining operations on the several creeks. Uglow was responsible for the descriptions of the bedrock geology and of the quartz vein deposits. It is becoming apparent that an excellent piece of work was done by the late Dr. Uglow in his appraisal of the quartz-vein systems of this area.

In brief, this area consists of a belt of schistose quartzite rocks of Pre-Cambrian age stretching for at least twenty miles in which large numbers of veins occur. The larger veins strike with the formation while the cross veins cutting the strike and dip of the formation are smaller and as a rule the outcrops are insignificant. The larger strike veins in many outcrops are barren but in places carry values particularly where intersected by cross veins.

The significance of recent development work on the belt is the demonstration that the cross veins are better defined at depths of 100 to 500 feet and carry a heavy primary iron sulphide mineralization containing commercial gold values over minable widths. The evidence now available warrants the statement that numerous places along this gold belt warrant careful investigation followed by systematic development.

The finding of gold mines is becoming more and more difficult and examining engineers should recognize that outcrop showings, while important, should not entirely determine the question of whether or not some development is warranted. A thorough realization that gold values are erratic, that certain horizons are barren of values or nearly so, and that the localization of bonanza placer concentrations in close proximity to known quartz veins is of decided importance, should induce, in certain cases, development of surface showings that in themselves may not be particularly attractive. Unquestionably, certain properties in the Cariboo Gold Belt, long dormant, justify intelligent investigation.

In order to stimulate interest in lode-gold mining in British Columbia, the Department of Mines issued in February of this year, Bulletin No. 1, 1932, "Lode-Gold Deposits of British Columbia." Field work in preparation for issuing this bulletin was carried out by the Resident Engineers in 1931 and the bulletin represents much compiled and condensed information regarding gold deposits and likely gold areas in the Province. Copies of this bulletin are available from the Department of Mines. In it will be found many recommendations of suitable areas for gold prospecting.

NORTH-WESTERN MINERAL SURVEY DISTRICT (NO. 1)

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Report by Joseph T. Mandy, Resident Mining Engineer.

(Headquarters, Prince Rupert)

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During the 1932 season the increased interest in lode-gold development and exploration in this district that was induced by the depressed condition of the base metal market has steadily grown. Prospecting for, sound exploration and development of lode-gold properties have been active and pronounced, and results have been decidedly encouraging. Although no outstanding discoveries have been made, the lode-gold potentialities of this district have steadily enlarged and the gradually unfolding promise for future production is stimulating. With the gradual penetration of the vast area of virgin territory in this district, the progressing study of geologically favourable sections and the direction of the attention of prospectors to these sections, an encouraging future looms in the offing. In the older areas intensification of search and development is also bringing tangible results and indicating dormant possibilities. In the following short synopsis of activities these features are apparent. The active employment of capital is, however, the present need of the district; this has fallen far behind the merit of exploratory results and the accomplishments of the prospector.

In the Queen Charlotte Mining Division exploration of the Skidegate-Sunrise, Graham island, by the Kitsault Eagle Silver Mines, Limited, has been energetically continued until the late fall. On the 100-foot level the main vein has been crosscut in several places and good widths exposed. One or two subsidiary smaller veins in the shear-zone have also been picked up. The work generally has established continuity to this level and much clarified the formerly obscure structure of this deposit. The property has been examined and sampled by an independent engineer with a view to further development and possible production.

On the west coast of Moresby island further prospecting of the Early Bird and Kootenay groups has disclosed possibilities that warrant extended exploration. On Shuttle island the owner has resumed work for the purpose of extracting gold for shipment. Prospecting in the Kootenay harbour - Moore



channel gold belt - has been in progress and although nothing new of importance has so far been discovered, intensive search in this area has a good chance of bringing results.

In the Skeena Mining Division work has been continued on the Hunter group in the Khutze Inlet area. At the Surf Point on Porcher island prospecting in the spring resulted in the discovery of additional gold-bearing pyrite veins and although no definite plans have yet materialized for bringing this property into the small-scale production it warrants, this will doubtless evolve in the near future. On the Eddy Pass, adjoining the Surf Point, stripping has disclosed additional high-grade ore-shoots and continuity indicating promise of small-scale production. On the adjoining Wren claim considerable stripping has uncovered several small veins and high-grade float from a larger vein which is being prospected for. On Pitt island five new cuts on the Rowe group have exposed exceptionally promising gold values in the shear-zone and markedly increased the promise of this property. Further detailed prospecting of the promising batholith sections of the coastal area indicated in Bulletin No. 1, 1932, offer a promising field for additional discoveries.

In the Nass River Mining Division the gold tendency of the west side of the upper Kitsault River valley stressed in Bulletin No. 1, 1932, has been reinforced by new discoveries. On the Lucky Strike a surface crosscut has exposed a good vein width with appreciable gold values and on the Vanguard group a discovery of what may be the extension of the 'Gold Vein' shows appreciable gold values across a width of about fifteen feet. General sampling of known ore-bodies in this area has added further confirmation to its gold potentiality and indicates that this aspect may accelerate the development of the very promising metal resources of the Alice Arm section. A small vein carrying about \$8.00 gold per ton has also been discovered on the Moose group on the east side of the valley. An extensive area of the west side of the upper Kitsault valley is still unprospected and offers a likely section for the discovery of ore-bodies of appreciable size with a tendency to appreciable gold values.

In the Portland Canal Mining Division work was resumed on the property of the Georgia River Gold Mines, Limited. The crosscut from the Bullion tunnel is reported to have intersected the South-west vein, with drifting on this level showing widths of 6 inches to 2 feet carrying good sulphide mineralization and gold values. The Premier Company has continued in active operation on the same basis of production as reported



in the Summary and Review to June 30th, 1932. Diamond-drilling exploration of the foot-wall of the north-east zone between No. 2 and No. 3 levels has continued and some smaller lateral structures have been picked up that will be explored by cross-cutting. Drilling on No. 6 level located a structure carrying commercial grade and crosscutting to the west to intersect this is proceeding. On the Big Missouri operations have not as yet been resumed. Active operations have continued throughout the season on the Unicorn group. Surface trenching on the east-west structures have exposed appreciable widths of silicification carrying values up to about \$4 in gold per ton, with specks of free gold showing in a few places. Cross-cutting to the west from No. 3 tunnel to explore these structures is proceeding. On the Salmon Gold some new discoveries carrying from \$2 to \$16 in gold per ton across widths of 4 to 8 feet have been made north and south of the original showings.

In the Bear River area new work has shown appreciable gold values accompanying the silver-lead-zinc mineralization of some ore-bodies which should materially aid in their development. On the Ben Bolt a new discovery of this type up to 18 inches in width assayed \$2.40 gold per ton and a shipment of 12 tons by lessees on the Sunbeam claim of the Dunwell property assayed \$5.32 gold per ton with high-grade silver values. On the Ben Ali claim of the Dunwell property lessors have shipped 8 tons of ore estimated to carry 1.75 ounces gold per ton and are preparing to continue operations during the winter. A sample of pyrrhotite and mispickel from an old cut in a pyrrhotite zone 9 feet wide on the Kenneth No. 3 claim of the Argentine Syndicate, assayed: 0.4 oz. gold per ton. A party of prospectors transported to the Unuk River area by aeroplane has discovered an extensive replacement zone which gave very encouraging gold assays from two places and will be further explored during the coming season.

In the Taku River section of the Atlin Mining Division the option on the Whitewater group by N.A. Timmins, Incorporated, has been dropped through failure of the owners to grant an extension of time. In the same area, however, the Alaska Juneau Gold Mining Company has continued surface exploration of contiguous claims with some encouraging results. On the Engineer property, Tagish lake, the outcome of preparations for some small-scale work is not yet available. Interest in the gold deposits of the Big Horn River area on the west side of Taku arm has been revived and active prospecting from which encouraging results are reported has been carried out. In the extreme north-westerly area of this Mining Division a

traverse of the virgin area between Rainy Hollow and Squaw creek on the Yukon boundary showed very favourable geology for the occurrence of lode-gold deposits in several sections, particularly about the headwaters of the Tatshenshini and Kelsall rivers, which should be closely prospected. Numerous quartz veins and wide pyritized quartzose zones occur in the Squaw Creek area in Carboniferous sediments contiguous to contacts of granitic bosses and stocks. Although grab samples from a few of these showed no gold content, they are worthy of detailed prospecting and the area in general offers good promise for the discovery of gold-bearing veins.

NORTH-EASTERN MINERAL SURVEY DISTRICT (No. 2)

Report by Douglas Lay, Resident Mining Engineer.

(Headquarters, Hazelton)

CARIBOO MINING DIVISION

An important event to chronicle is the continued success which has attended development of the property of the Cariboo Gold Quartz Mining Company, Limited, near Barkerville, which has now practically arrived at the production stage. This is not only a very gratifying event insofar as this particular property is concerned, but is likely to have a far-reaching effect in greatly stimulating the development of neighboring properties, and the investigation of lode-gold possibilities throughout all the placer sections of this Mineral Survey District. The activities of Cariboo Gold Quartz Mining Company, both underground and in the way of plant construction, naturally aroused much interest locally during the year, and a very large number of mineral claims were staked in the Barkerville area.

Cariboo Gold Quartz Mining Company\*

\*(Report by John D. Galloway, Provincial Mineralogist)

The property of the Cariboo Gold Quartz Mining Company has been reported on in several Annual Reports since 1922; also in Bulletin No. 1, 1932, "Lode-Gold Deposits of British Columbia." It is unnecessary to repeat the lengthy descriptions previously given of this property, but a general summary seems advisable, in view of public interest in this property.

The company commenced by acquiring the Pinkerton property, an old Crown-granted claim. Shortly after, the Rainbow group, (Sanders property) was acquired, and now the holdings of the company total about 2,000 acres. After some surface work a crosscut tunnel was started with the intention of penetrating the Rainbow showings. A promising vein averaging 9 feet in width and \$10.00 in gold values was exposed for 150 feet in this tunnel, and a crosscut exposes the Pinkerton vein.

The main drive was not completed to cut the Rainbow showings.

At this stage, two years ago, a long tunnel, now named No. 15 level, was started from a location just above Jack of Clubs lake. This was projected to go 3,000 feet to strike the Rainbow showings at a depth of approximately 750 feet, and other veins were expected to be encountered en route. This level is now in 1,400 feet and has cut 8 veins. Of these, only Nos. 1, 2, and 5 have been drifted on. As exposed, the 8 veins will average about 3 feet in width. The results of careful check sampling by the management show an average gold value of \$18.55 a ton and they expect that the grade of mill feed can be kept at about \$15.00. Sampling by the Resident Engineer and Provincial Mineralogist, although not nearly as extensive as that of the mine management, indicates that the values as stated are conservative and that \$15.00 mill grade should easily be maintained.

On No. 2 vein a raise from No. 15 level following the vein goes to the surface 64 feet in rock to the overlying surface gravels. On No. 5 vein another raise has been driven to the surface 380 feet on a 65 degree incline. This followed the vein for 50 feet to where it flattened slightly going into the footwall, the raise being continued on the same angle. From the top of the raise at the surface a new level No. 12 has been started and will be driven ahead to tap the upper showings. No. 13 and No. 14 levels from the raise have been commenced and the several veins will be opened up for stoping from these levels as well as No. 15. As at present developed, no large tonnage of ore is definitely blocked out but the mine is now in such shape that ore should be rapidly proven, when it is remembered that 8 veins exposed in No. 15 level are available for exploration. Some very interesting probabilities of important ore disclosures lie ahead of the present workings, when No. 12 level cuts the 9-foot vein of the upper workings and the expected downward extension of the Rainbow showings. The distance to drive is somewhere about 1,500 feet, giving a depth below the Rainbow surface showings of approximately 400 feet. Additional cross veins may be encountered in this drive.

The veins exposed in the underground workings of the Cariboo Gold Quartz Mining Company's property are all "B" veins (Uglov definition) or cross veins that cut the schistose formation on strike and dip. Two of them are called "diagonal veins" but still they all belong to the series of cross veins as distinguished from the "A" veins that strike with the formation. They are quartz-filled fissures which give every

evidence of permanence. They pinch and swell in short distances along the strike, ranging in width from a few inches up to 10 feet. In places the veins "stringer" with pyritized schist lying between the stringers. While irregular, the veins show a steady uniformity in the aggregate.

The principal mineralization is with massive pyrite. In places crystalline pyrite in masses of cubes occurs but this variety carries little or no gold values. In addition to pyrite a soft, grey-black sulphide mineral occurs sparingly, but apparently is widely distributed in all the veins. This mineral has been called "telluride" but many tests of specimens show definitely that it is a bismuth-lead sulphide mineral. It is accompanied by free gold and is an excellent indicator of high gold values. It seems likely that small amounts of this mineral with associated gold, occur throughout the veins in many places where it is not visible to the eye, thus accounting for many erratic high assays.

Throughout the veins the pyrite content ranges from 10 to 25% by weight. Practically no arsenopyrite is present and only rarely are grains of chalcopyrite noted. The gold does not occur "free" as commonly understood. Most of the pure white quartz carries no value, except that where the black sulphide occurs grains of free gold are frequently visible in the quartz. The gold is directly associated with the pyrite mineralization. In part, the gold in a fine state of division is free on the pyrite, but apparently most of it is directly associated with the sulphide.

The quartz is heavily sheared, the veins having been involved in regional metamorphism, which has made the quartzite formation in which they occur quite schistose. No particular evidence of banding is visible, the sulphides occurring irregularly throughout the quartz and apparently deposited simultaneously with the quartz. According to Uglow the quartzites (Richfield formation of the Cariboo series) are of Pre-Cambrian age and the mineralization is Pre-Mississippian and possibly Pre-Cambrian, being postulated as resulting from buried intrusives, only visible on the surface in the form of sills and dykes.

An ideal camp site has been cleared and substantial buildings erected near the portal of No. 15 level, overlooking Jack of Clubs lake. All power at the mine is generated by Ruston Hornsby Diesel engines. A 94 HP engine and 409-cubic foot compressor at present serves the mine but another 114 HP engine and 630-foot compressor are to be installed in the near



future. A 224 HP engine and generator are now being installed to provide electric power to run the mill. The camp is electrically lighted and first-class accommodation is available for the crew.

The new mill is sited just below the tunnel portal. It is a straight cyanide plant, designed by Van H. Smith, a prominent western metallurgical engineer, and follows the results of testing of the ore in the Ore Dressing Laboratories of the Mines Branch, Ottawa. It consists of a crusher, ore-bins, ball-mill, agitation and precipitation tanks, and necessary adjuncts for the cyanide process. The mill is expected to treat 75 tons a day and at small additional cost can be doubled in capacity when mine developments make this advisable. Testing of the ore by the Mines Branch shows it to be nearly ideal for cyanide treatment. By grinding to minus 48 mesh and agitation for 24 hours in cyanide solution, an extraction of 97.1% of the gold was made on ore assaying 1.04 oz. per ton.

Operations are in charge of a competent staff, consisting of N.H. Atkinson, mine superintendent; L.F. Fogle, mill superintendent, H. Talbot, mechanical superintendent, and J. Boulding, assayer and sampler. Fred Wells, who is responsible for much of the success of the company, is managing director. It is expected that the mill will be into production in December and a promising future for the mine is anticipated.

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REWARD MINING COMPANY. This company controls the Aurum group of 5 claims on Island mountain, under option from C.J. Seymour Baker and 8 more staked around the original five; the Proserpine group of 9 claims on Proserpine mountain under option from C.J. Seymour Baker; and 2 more recent locations adjoining; and 6 claims of the Hudson group, Cunningham mountain, by purchase from the Estate of E.I. Moore, and 6 claims adjoining recently located. The company retained V. Delmage this year to make a complete examination of these properties. Small-scale work has been carried on with a few men, but it is expected that when financing plans now under way are completed, that intensive development will be commenced.

Small-scale operations were commenced during the year on the Aurum group, attention focussing on the eastern portion of this property, where the mountain slopes steeply towards

Jack of Clubs lake, and where the vein system can be readily developed by adit drifts. In this region at an elevation of about 500 feet above the lake, two veins, varying in width up to 6 feet, outcrop strongly about 150 feet apart. The strike of the schisted rocks in this region varies from S 35°W (mag.) to S 70°W (mag.) and the dip varies from 30° to steeper to the north-west. Of the veins mentioned, the more westerly follows more or less the strike of the country rock, but dips steeply south-easterly across the planes of schistosity of the country rock; the more easterly vein, as far as can be judged by one exposure, follows the bedding planes of the country rock. The former is obviously of the greater promise, and has been traced down the hill by various old workings. At 400 feet above the lake, a tunnel is run a distance of 60 feet on a bearing of S 55°W (mag.), following this vein, which is well mineralized in this region, a width of 2 feet or so of quartz with much pyrite showing in the face. A sample of sulphides only taken from the face of this adit drift assayed: Gold, 0.90 oz. per ton; silver, 0.1 oz. per ton. About 70 feet vertically below this tunnel, an open-cut exposes apparently the same vein 2 feet in width.

At about 80 feet above the lake, a tunnel was run many years ago, which is now being cleared of a cave by the present operators. From the portal of this tunnel a surface tramway was constructed by the early operators to the old mill constructed at the foot of the lake. This tunnel appears to follow the above-described vein for a distance of 30 feet or so only and then swings to the left away from the indicated course of the vein. At any rate the advisability of breaking into the country rock on the right hand side of the tunnel at the point at which the tunnel left the vein, is very strongly indicated. At about 100 feet above this tunnel a recent open-cut exposes a bedded vein several feet in width.

On a fraction belonging to the Cariboo Gold Quartz Mining Company and adjoining this property towards Jack of Clubs lake, a vein that pans well has been exposed by open-cutting. The extension of this vein is expected on the Aurum group.

On the ground adjoining the Aurum group on the west, about 3,000 feet distant from the tunnel run at 80 feet above the lake, at an elevation of 750 feet above the lake, two large quartz veins outcrop strongly on the mountain-side about 50 feet apart. One vein appears to strike N 35°W (mag.) and to be a cross-vein. Further work on these exposures is well warranted. Detailed investigation of this property is

undoubtedly justified.

MYRTLE. On this group, owned by E.E. Armstrong of Barkerville, situated on Barkerville mountain, further prospecting was carried out by the owner during the year with gratifying results. The owner started last year to prospect the surface of the south-eastern portion of the ground, and it is in this portion that he has done further work this year.

It may be briefly stated that hitherto, work has been mainly confined to the north-western portion of the ground. This is fully described in the Annual Reports for 1924 and 1925. More recent prospecting by the owner has disclosed the fact that two veins, known as Nos. 1 and 2, approximately 300 feet apart, occur on the property. These strike north-west and south-east, parallel to the planes of schistosity of the enclosing country rock, and are apparently bedded veins, and have been traced on the surface for a considerable distance. These veins are crossed by smaller veins striking approximately north and south at frequent intervals. To date, Nos. 1 and 2 veins have been exposed by open-cuts at intervals over a length of about 500 feet. High surface values in these veins may be proved at several different points by either panning or assaying samples. These veins extend south-eastwards into the adjoining ground, the Morning Star claim, owned by F.J. Tregillus of Barkerville.

The following samples are indicative of the values disclosed on the surface: Martha claim: Gold, 1.64 oz. per ton; silver, 1.56 oz. per ton. Sample of seam of galena at this point assayed: Gold, 0.42 oz. to the ton; silver, 213 oz. to the ton; lead, 67.4%. Sample of manganiferous outcrop: Gold, 0.6 oz. to the ton; silver, 0.1 oz. to the ton. Sample from the Morning Star claim outcrop of No. 1 vein, across 3 feet: Gold, 2.2 oz. to the ton; silver, 0.84 oz. to the ton.

This property and the adjoining Morning Star group have been optioned by W.T. Hoover. They were recently examined by Mr. Simkins, representing the Newmont Mining Company. No decision has been made yet as to whether this company will take over Mr. Hoover's option.

BLUE JAY. This group is situated at the head of Stouts gulch and is owned by M. Anderson and associates. It is under option to A. G. Larson and associates, and prospecting of this ground has been commenced.

On the property of Quesnel Quartz Mining Company, Limited,

Hixon creek, under option to R.W. Alward, and J.H. Johnson of Prince George, intense local interest was aroused by the discovery of some small quartz veins showing spectacular amounts of free gold. The point of discovery is on a bench on the right bank of the creek, close to the old workings. An important feature in connection with the mineralization on this property, and that of the adjoining Cottonwood (owned by C.H. Colgrove of Hixon) and Cayenne groups (owned by E. Hann and J. Strbac of Hixon), is a belt of highly oxidized and altered schistose rocks which appears to be about  $\frac{1}{2}$  mile in width, and to extend in a north-west and south-east direction for some miles. Within this belt occur many quartz veins which vary in size from mere stringers to several feet in width. Apart altogether from the question of the commercial possibility of any vein or veins within this belt, there is some evidence suggesting that gold values may be distributed throughout this wide belt of country rock to a commercial extent. This has long exercised the minds of examining engineers, but the matter remains an open question, although investigation along these lines is undoubtedly justified. It is within this highly oxidized belt that the rich stringers occur that were discovered this year. While a pit sunk on these stringers to a depth of 15 feet did not show persistence of the high values found at and near the surface, a repetition of such within the zone of oxidation would seem a justifiable anticipation, likewise the possibility of there being more such veins in the vicinity. Further prospecting in the region should be carried out. The schistose rocks on Hixon and Terry creeks are intruded at numerous points by batholithic rocks, and to such the mineralization is attributed. It is understood that the recent discovery resulted from the placer operations carried on by B. Briscoe of Prince George, who has a placer lease covering this ground, and who started in May last to mine the gravels overlying the solid formation.

#### OMINECA MINING DIVISION

The firm of W.R. Wilson and Sons, has acquired an option on the Free Gold group, owned by Alex. Chisholm of Smithers, and situated on Dome mountain, 26 miles distant from Telkwa, and early in the year started preliminary development, with a small force of men under the direction of C.M. Campbell. Within a belt of country about 450 feet in width, prospecting has exposed a number of quartz veins, which vary in width from a few inches up to 5 feet. Values are stated to be good, running up to several ounces of gold per ton in some cases. The veins are typical high temperature veins, the

mineralization apart from quartz consisting mainly of pyrite and zinc blende with a small amount of galena. The country rock is andesite, and the veins occur in the near vicinity of an acid quartz-feldspar intrusive, the presence of which would seem to be of importance. The further development of this property is well merited. It is reported that a contract has now been let to drive a crosscut tunnel to cut the veins at depth.

Hudson Bay mountain, near Smithers, witnessed some activity, small-scale operations being carried on at the Jessie, by the newly-incorporated Jessie Gold Mines, Limited; at the neighbouring Snowshoe group by the owners of that property, and at the Silver Lake group by W.R. Wilson and Sons.

As is pointed out on page 43 of "Lode-Gold Deposits of British Columbia," there is marked evidence of the zonal distribution of minerals on Hudson Bay mountain. The elevation at which gold-bearing minerals begin to make their appearance is about 4,200 feet. Above this elevation, owing to erosion of the lower-temperature silver-lead-zinc zone, mineralization consists mainly of the arsenopyrite-zinc blende high temperature auriferous class. As the mountain is penetrated above the elevation mentioned, and the igneous core approached, it is therefore a justifiable expectation that gold values will increase, and such is the expectation, which has led to the activities mentioned, at a time when attention is centred on gold.

An account of the Jessie group will be found in the 1928 Annual Report. The registered office of Jessie Gold Mines, Limited, is Smithers; the manager is L.S. McGill; and the consulting engineer is W.G. Norrie-Loewenthal of Vancouver. Preliminary development consisted of about 120 feet of tunnelling, comprising cross-cutting to the No. 2 vein, following the latter for a short distance, and finally apparently following No. 3 vein. The mineralization at the surface consists of galena, zinc blende, arsenopyrite and some pyrite - a mingling of lower and higher temperature minerals. Most recently the manager stated that a promising mineralization had been encountered consisting of mainly arsenopyrite and quartz. The elevation of the present tunnel is 4,360 feet. Comparatively close to the tunnel is an intrusion of diorite, the presence of which favours the view that the zone of high temperature minerals is not far from the surface at this property.

The Snowshoe group, owned by P. Berg, R.W. Raymond, and



H.C. Wade of Smithers, is situated but a short distance south of the Jessie, and the workings are about 140 feet above those of the latter property. The replacement fractures on the Snowshoe have very similar dips and strikes to those of the Jessie, and there is the same mingling of lower and higher temperature minerals. Much intelligent prospecting was carried out by the owners during the year with distinctly encouraging results.

On the Rex and adjoining claims (formerly the Horseshoe group; see Annual Report for 1928, also Geological Survey Summary Report, Part A, 1929, page 93A), situated on Bob creek near Houston, the owners G.W. Smith and associates of Houston made an interesting new discovery, namely, that of free gold in the oxidized rock outcrops on the left bank of Bob creek about 1 mile upstream from the mouth. Whether gold is present to a commercial extent can only be determined by careful investigation, which the property merits.

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SOUTHERN MINERAL SURVEY DISTRICT (No. 4)

Report by Philip B. Freeland, Resident Mining Engineer  
(Headquarters, Penticton)

GRAND FORKS MINING DIVISION

The Union mine mill was closed down towards the end of October for the winter. Mine development is continuing with the expectation of finding further minable ore-bodies. The Homestake group of claims, 4000 feet west of the Union mine has been bonded by the McCarthy (Union) interests. The ground has been diamond-drilled and a shaft is being sunk on the vein. The ore and the country rocks surrounding the vein system are similar to those found in the Union.

On the Copper No. 2, owned by Pete Santure and situated across the Granby river from the old Franklin camp, some high-grade gold ore has been found, according to the owner.

GREENWOOD MINING DIVISION

The old Carmi mine, situated at Carmi, has been optioned by Vancouver interests under the management of J.E. Miller, 40 Williams Building, Vancouver. The old 150-foot shaft has been unwatered and at the present time the 150-foot level is being driven ahead by hand to the north-east, or towards the river. The shear zone in the mine varies from 5 feet to 15 feet in width and carries pyrite, galena and gold. The finding of better grade ore in the old shaft near the river and in the tunnel above the shaft, as well as in the lower levels of the main shaft, makes this an attractive prospect.

On the Butcher Boy claim, adjoining and included in the Carmi group, to the north-west, good ore has been found on the 80-foot level in the shaft, so that prospects in this direction are also hopeful. The mill structure is still standing and the old engine and compressor are being re-conditioned so that power may be provided for underground development. The country rocks are quartz-diorite and the shear-zone filling, quartz and graphitic quartz-diorite.

The old Brooklyn-Stemwinder claims, owned by R. Forshaw, Greenwood, and situated at Phoenix, have received a considerable amount of attention of late owing to the fact that some ore has been uncovered on the 80-foot level in the Brooklyn, carrying \$16 per ton in gold over a 6-foot width. In the Stemwinder "glory-hole" samples up to an ounce in gold have been taken. These values do not occur in the replaced limestone but are associated with pyrite and calcite in the brecciated volcanics. Further exploration of these properties is warranted.

On the Winner and adjoining claims lying south-west of Phoenix, free gold has been found in quartz veins varying from a few inches up to five feet in width.

#### OSOYOOS MINING DIVISION

The Hedley Gold Mining Company's property at Hedley has been optioned by J.W. Mercer of the Mercer Exploration Company, and development, possibly followed by diamond-drilling, is being pushed in the upper levels of the old mine. Paul Billingsley, Salt Lake City, is the consulting engineer and Wallace Knowles, the mine superintendent.

Other claims near Hedley are being explored, including the Cracker Jack, Lot 3278 and the Patsy group on Sterling creek. Work on the old Pollock group on Henry creek has, according to the owners, uncovered some high-grade gold ore.

Under the direction of M. St. Clair, Penticton, the Parvenue group situated on Oro Fino mountain has been producing in a small way during the year, and besides gold bullion from the mill, some crude ore has been shipped to the smelter.

Gold-bearing quartz from the Oro Fino and Independence has also been treated in the Parvenue mill with success. The latter claims are owned by W. Somerville, Penticton. The future possibilities for these mines appear to be bright.

#### Fairview Camp

This camp is receiving a good deal of attention and it seems probable that some small operations will result. The size and persistency of the gold-bearing quartz veins are worthy of exploration.

## YALE MINING DIVISION

### Dawson-Home Gold Groups

Several years ago, these groups of claims, situated near Jessica on the Coquihalla river, received a considerable amount of attention owing to spectacular pockets of gold ore being found. This year the Dawson mine has been developed by sinking a winze on the "hanging-wall" vein and several shipments of ore from this source have been made.

On the Home Gold group, a lower crosscut intersected the downward extension of the ore-zone and a sample across 6 feet assayed 0.80 oz. to the ton in gold. Should these values and widths persist, the future of the property appears to be bright. The quartz veins in this area are very persistent and can be traced for several hundred feet down the slope of the mountain. Some of the veins are low-grade or entirely barren as far as development has gone, whilst others contain attractive values in gold. The rakes of the ore-shoots do not appear to have received the attention they deserved until this year. This area is the most attractive one examined this season.

### Pierre River Section

Numerous outcrops of quartz veins varying from 6 inches to five feet, containing pyrite and arsenopyrite, have been found in the area adjoining the headwaters of the Pierre river. These veins occur both in the granite and on the contact of the peridotite and argillites, and can be traced for several miles. Very little work had been done at the time of examination and only a few samples taken which showed the presence of gold. It seems possible that these veins may be genetically connected with the Coquihalla system and the presence of peridotite accounts for the belt of serpentine found there. E. Rice and associates of Coalmont own the claims on which the veins are found. More development appears to be warranted.

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## EASTERN MINERAL SURVEY DISTRICT (No. 5)

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Report by B. T. O'Grady, Resident Mining Engineer

(Headquarters, Nelson)

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### INTRODUCTION

During the period under review lode-gold mining activities, involving development and production, have been confined to the West Kootenay district. These were largely in the vicinity of Nelson, Ymir, and Salmon, in the Nelson Mining Division, near Rossland in the Trail Creek Division, and to a lesser extent near Slocan City. Quite recently, a new development operation was initiated in the Lardeau Division by the Meridian Mining Company of Vancouver. Prospecting and investigation of lode-gold prospects was carried on actively throughout the areas of known occurrences in District No. 5 generally. The total gold output of the District will show a considerable decrease due to production from the Reno mine being in abeyance pending completion of the new mill and attendant construction programme which with other developments assures increased production in 1933. It is only intended here to review briefly important developments that have taken place and which promise to contribute to future gold production.

### NELSON MINING DIVISION

Exploratory work in the Sheep Creek camp indicates that this area has decided potentialities for a number of comparatively small producing mines. That this area warrants intensive prospecting on systematic lines, as suggested in Bulletin No. 1, 1932, pages 92 and 93, is exemplified by the very satisfactory results of the surface exploration carried on by Harold Lakes on the Gold Belt Mining Company's property as specified hereinafter. In this connection the geological investigation done by J.F. Walker, to be made available shortly in a special report of the Geological Survey of Canada, has been of considerable assistance, and it is hoped that further detailed geological field work will be done in this district by the same service. The general geology of



the Salmo-Sheep Creek area by the same author is described in the Geological Survey Summary Report of Canada, 1929, Part A. The northerly extension of the quartzites, favourable hosts to the gold deposits, has been essentially unprospected. These rocks pass easterly from the Ymir mining camp through an area formerly difficult to prospect but now largely denuded by forest fires. The same quartzites, through folding, also re-appear to the east of the Sheep Creek camp in an area known to contain east-west striking veins and fissures, to which little attention was paid in past years. The following notes briefly summarize developments in the Sheep Creek gold camp:-

GOLD BELT MINING CO. This new undertaking was initiated towards the end of June. Work done under the supervision of Harold Lakes includes some 3,000 lineal feet of trenching which gave very satisfactory results. Several veins of the Nugget-Motherlode vein system have been uncovered where they cut the "Reno" quartzite belt. The major discovery is the "C" vein in which an ore-body has been exposed about 230 feet long and 2 feet wide. The gold values will evidently average well judging from numerous samples taken by the management, which assayed from \$4.00 to \$112.00 to the ton, and from the native gold visible at numerous points in the quartz which, only slightly oxidized, is sparingly mineralized with pyrite, galena, and sphalerite. Preparations are under way for tunnelling operations to test the several veins at depth. The proposed tunnel, 1,300 feet in elevation above the new Reno mill and 3,200 feet north-westerly from it, will test the "Bruce," "C," and "B" veins at vertical depths of 432, 558, and 594 feet respectively below their outcrops at distances of 750, 1,125, and 1,225 feet in from the portal. This tunnel may be extended a further 600 feet to test the "A" vein at a depth of 743 feet. Tentative plans also include a possible adit crosscut tunnel situated in an intermediary position between the deep tunnel and the outcrop workings. At present writing, the new camp at the deep tunnel-site is nearing completion. This includes boarding and bunk-houses to accommodate 20 men, blacksmith shop and compressor room, water system for domestic and mine use. A transmission line, 3,000 feet long, is being constructed to connect with the Reno power line preparatory to installing electrically-driven compressor and machinery for carrying out the initial programme of development work planned. Arrangements have been made with the Reno Gold Mines, Limited, to mill ore on a customs basis if required.

RENO GOLD MINES, LTD. Production from this mine, in abeyance since the original cyanide mill burned

down early this year, is expected to be resumed in the immediate future on an increased tonnage basis. The large construction programme which includes rehabilitation and standardization of the Motherlode mill, construction of aerial tram, hydro-electric plant, transmission lines, etc. is nearing completion. The Motherlode 100-ton capacity mill has been adapted to treat sulphide ores and provision made for enlargement to take care of customs ores when necessary. Changes in the original flow-sheet of this mill (shown on page 131, Annual Report for 1920) involve:- Primary coarse-crushing to be done at the mine; replacement of the 10-stamp battery by a ball-mill with classifier for coarse product; fine grinding in original tube-mill; introduction of bowl classifier; cyaniding of the slimes and sands in four Pachuca tanks with enlarged capacity; concentration of sulphides with four Wilfley tables; treatment of cyanide solution by the Merrill-Crowe zinc dust precipitation process. Ample power facilities for present and future requirements of mine and mill have been provided. At the new power plant, situated on Sheep creek  $1\frac{1}{2}$  miles west of Deer creek, 800 HP effective at low water, is developed by a Nelson Iron Works impulse wheel consisting of two impulse runners in parallel, each runner actuated by two nozzles. Each nozzle is controlled by a deflector operated by a Lombard governor driving a General Electric generator direct connected at 450 r.p.m. The generator delivers current at 6,000 volts by a power line, about 8 miles long, to mill and mine. Water is delivered to the power-plant under a head of 440 feet by means of a 40 x 21 inch flume 16,000 feet long and a 24-inch continuous stave pipe 1,200 feet long. The power-plant is completely automatic and is arranged for distant control. The original Motherlode water-power installation has been overhauled for auxiliary use, if necessary, and the diesel engine, now at the mine, will be in reserve. The aerial tram, to deliver ore from No. 5 level to the new mill, with a daily capacity of 150 tons, is 12,600 feet long and the difference in elevation between terminals is 2,700 feet. Both tram and power-plant have been constructed by A.H. Green Company of Nelson. At the mine development has continued on a reduced scale compatible with limited power facilities available. The No. 5 level has been advanced and a raise from this working to No. 4 level will be completed shortly. Compressor equipment at the mine, to be electrically driven, will make available 2,500 cubic feet of air. Plans call for operation of the Nugget-Motherlode mine near spring. Over 100 men have been employed during the construction period and the full complement of men for the permanent operation will be about 75.

QUEEN: A crew of men, employed by C.E. Witter, of Moscow, Idaho, has been engaged in extracting ore from the Alexandra workings and from old stopes on the Queen vein west of the shaft. In this connection the mill was overhauled and operated intermittently.

COLUMBIA. From this prospect on the northern side of Sheep creek, opposite the Queen mill, J. Sapples and W. Devlin, both of Salmo, have just shipped a carload of ore. This small vein, paralleling the other easterly-striking veins of the camp, cuts "Reno" quartzite.

KOOTENAY BELLE. Under the supervision of Frank Phillips, a crew of men have been engaged in development and mining ore for shipment. This property, situated easterly from the Queen, is owned by F.M. Black of Vancouver, and associates. Reports are that installation of a mill has been under consideration.

VANCOUVER. This prospect, adjoining the Queen mine ground on Wolf creek, is being worked by five men under lease from the owner, Frank Unfried, of Nelson.

#### Ymir Camp

Like the Sheep Creek camp, this area warrants systematic exploration based on present knowledge of geologically favourable localities for ore-deposition. The geology of the Ymir gold camp, subject to revision in regard to the age of the Pend d'Oreille schists which are now attributed to the late Pre-Cambrian, is contained in Memoir 94, Geological Survey of Canada, by G.W. Drysdale. As in the Sheep Creek district the formation strikes northerly and the veins of the leading producers strike from easterly to north-east by east cutting the rocks at wide angles. In such deposits the ores consist essentially of auriferous galena and pyrite, with some zinc-blende, in a gangue of quartz, the values of importance being in gold, silver, and lead. The association of high gold values with galena and zinc-blende is characteristic of this camp. The ore-shoots, occurring in veins which are quartz-filled fault fissures, are chiefly of lenticular shape, individual lenses varying considerably in size. These brief notes do not permit of any detailed discussion of conditions but it may be emphasized that the practical application of geological factors governing the localization of ore-shoots, such as the local structures, changes in country rock formations, intersections of granitic dykes with the veins, should have an important bearing on future production and

lead to further exploration of abandoned barren veins. The present activities with crews of men are limited to the Yankee Girl, Goodenough, and Ymir-Wilcox. At the Yankee Girl substantial shipments of crude ore are being maintained by E.P. Crawford with a crew of 20 men. Stoping operations have chiefly been above the 800-foot level. Shipments reported to November 3rd total 3,874 tons.

At the Goodenough shipments of crude ore made by Harry Jackson and A. McDonald, with a crew of 6 men, amount to about 365 tons. The smelter returns are not yet to hand but gold values are understood to have been maintained as in former shipments. The total tonnage of ore shipped at intervals from 1926 to date exceeds 5,000 tons and of this the content of 4,660 tons previously shipped was 3,993 ounces gold, 30,283 ounces silver, and 431,091 pounds of lead. The gold content of this ore averages 0.856 ounces per ton. The property which, with adequate development, has decided potentialities for substantially increased production, is reported to have been bonded by Pacific Coast interests.

At the Ymir-Wilcox Dave Norcross, J.J. Cullinane and associates, comprising a crew of 9 men, are operating the 10-stamp mill from which some bullion has been recovered and concentrates shipped.

North of Ymir work has been started at the Tamarac by Colonel A.T. Powell, of Nelson, with a crew of 4 men. Trial shipments of the arsenical ore are to be made with a view to shipping crude ore if this is feasible. The desirability of mill, the ore is also being considered. Preliminary work includes trail improvements and provision of necessary camp facilities. Adjoining the Tamarac, D.T. Graney of Ymir, and associate, have driven 110 feet of crosscut tunnel to test a surface showing on the Pathfinder claim.

At the Boulder City group of the Clubine-Comstock Gold Mines, Limited, between Ymir and Salmo, work on a limited scale is being continued by L.R. Clubine who, during the year, has shipped about 144 tons from new upper workings including two drift tunnels spaced 45 feet apart, the lowest of which is approximately 155 feet higher than the lower tunnel adjoining the bed of Boulder creek. Work done includes completion of the road connecting the ore-bin with the main road, construction of blacksmith-shop, ore-bin, and several hundred feet of tunnelling besides surface work.

On Hall creek, in an area of Rossland Volcanics, minor



activities have been conducted by J. Fisher at the Gold King and by C. Peterson at the Rainbow and H.B.

### Nelson District

Near Nelson activities with small crews of men have included those at the Venus and Juno, Victoria and Jessie, Humming Bird, and Granite-Poorman. Work has been suspended at the Perrier.

VENUS AND JUNO. Situated on Toad mountain, south of Nelson, these adjoining and connected properties have been continuously worked by J.C. Allison, G. Allen and associates. References to the geology and general conditions are contained in Bulletin No. 1, 1932, "Lode-Gold Deposits of British Columbia." Shipments aggregating 123 tons have been made. Gold values were slightly in excess of \$10.00 per ton which, under the conditions of work by hand and existing transportation facilities, can only be expected to pay expenses. The thorough investigation of the old workings which has been done by these experienced miners, however, has made it possible to form more definite impressions of the potentialities of these and similar properties. The veins are on the small side but with a proper realization of conditions controlling ore-deposition, much dead work can be avoided and prospects of profitable small-scale production envisioned. From this point of view, with the ultimate provision of a small mill in mind, there are several definite objectives for developing ore with a limited amount of development. Of these, the first in apparent importance is the extension of the Juno vein in the Rossland Volcanics, south-westerly along its strike beyond a shallow stope worked in former years. From the outcrop adjoining this stope in the direction mentioned the present operators, who have a lease on both properties from R. Heddle, of Nelson, mined and shipped 50 tons of ore, averaging about \$10.00 per ton. In this area the ore occurs associated with a series of small folds which have a decided rake approximating 40° to the south-west. Beyond the new working south-westerly along the outcrop, where the rocks are visible, there is a similar structure of larger extent in the vicinity of which ore has been exposed in a shallow cut. The flat rake of the ore-body would account for the fact that the old drift tunnels below the old stope did not encounter the ore. In this connection the vein in the face of the No. 2 Juno tunnel, from which good assays have been obtained, appear to be close to the ore-shoot. The old No. 3 Juno drift, only driven a short distance, would have to be advanced approximately 280 feet to reach the expected ore-body at a depth of 290 feet



measured on the 60° dip of the vein.

The old Venus workings are comparatively extensive, consisting of 8 drift levels of which 6 are adit-tunnels. The present operators have opened up a new adit-tunnel 50 feet below the main Juno tunnel which is the highest working on the south-easterly striking Venus vein and which connects the two mines. From this new working 36 tons of \$10.00 ore was shipped. In the old workings the Venus vein has been pretty well exploited but blocks of "milling ore" remain in certain areas more particularly between the Nos. 8 and 7 tunnels. The No. 8 level is in granite for most of its length to where, towards the inner end, it enters schists of the Rossland Volcanic formation. The contact has an easterly strike and the granite plunges steeply to the south. It is evident from the stoped areas in these old workings that the concentrations of better ore occurred in the flatter sections of the vein and that this structural feature must not be neglected in planning future work. As good assays have been obtained from numerous samples taken along the floor of No. 8 tunnel below the stoped areas there is no obvious condition which would account for the lack of exploration below this horizon except that past operations were possibly not conducted along the most economical lines and, or, that milling losses made the undertaking unprofitable. The ground here is very easily worked by hand. Below the portal of No. 8 tunnel the slope of the hill-side is about 20 degrees. Preferably perhaps a consolidation of the Venus-Juno with the Athabasca property would be desirable to get the best results. Deep approach could then be made from the Athabasca workings in the granite in which formation the veins are normally found to be more regular and better adapted for mining.

HUMMING BIRD. At this prospect, situated at the head of Roaring creek, F.T. Harbour and associates of Nelson and Calgary, have a crew of men engaged on development work with the expectation of shipping ore in the immediate future. New camp buildings include bunk and cook-houses; the trail has been widened for a length of 4½ miles to where it connects with the road leading to Apex siding; and underground work done consists of a 75-foot crosscut tunnel with a drift 25 feet along the vein towards an ore-shoot exposed in old workings including a 10-foot shaft and trenches made by ground-sluicing. These superficial workings exposed high-grade paystreaks in the quartz vein at three points separated by areas 100 feet and 200 feet wide respectively in which the outcrop is covered with up to 18 feet of overburden. The vein strikes northerly, coinciding with the trend of the metamorphosed siliceous sedimentaries, probably corresponding to the

the northerly extension of the Pend d'Oreille schists of the Ymir camp. In the vicinity of the workings these rocks are intruded by granitic tongues from the neighbouring extensive exposures of the Nelson batholith. In the paystreaks the ore contains native gold associated with iron sulphides, galena and sphalerite. Several parallel veins are indicated in the immediate proximity, widths varying from 1 to 5 feet. A 2-drill portable compressor is to be installed.

At the Granite-Poorman, west of Nelson, development-work has been in progress, 4 men being employed by H.R. Smith of Seattle, representing the Livingstone Mining Company, an extra-provincial company with head office at Seattle. A carload of ore was shipped from the White tunnel workings and recently work was started on the Poorman vein workings.

Minor activities in the Nelson Division include work done on the Victoria claim on Toad mountain by Al. Holmquist and associates, where open-cutting partially exposed a wide zone of alternating schist with quartz stringers and lenses. The quartz is well mineralized with iron sulphides which also impregnate the intervening schists. The assay results of samples taken across 9 feet are not yet to hand. The old drift cut was also retimbered and extended a short distance. The mineralized zone, which apparently conforms to the stratification of the enclosing rocks, is probably wider than the limits of the present exposures.

#### TRAIL CREEK MINING DIVISION

Near Rossland work by groups of leasers continues at the O.K., I.X.L., Gold Drop, Snowdrop, Midnight, and other claims on O.K. mountain.

At the I.X.L. Ole Osing and associates are meeting with considerable success and some 69 tons of ore has been shipped from a new vein comparable in interest with the main or "A" vein from which such sensational results were obtained during the former lease by Rossland miners which terminated in 1926. Of the total amount shipped this year, 56.8 tons, for which smelter returns are available, netted \$11,210.70. Included in this some small lots were rich in coarse gold such as 768 $\frac{1}{2}$  pounds valued at \$2,187.58.

Of the remaining leasing activities in this area the Midnight shipped 197 tons of lower grade ore. Briefly re-

viewing the situation in regard to the O.K. mountain properties, the more continuous veins and shoots occur in a locally limited area of basic Rossland Volcanics and continuity of vein fractures and mineralization has not been found in general to extend west of the serpentine area which, dipping under the mineralized ground, has also terminated productivity at comparatively shallow depth. However, the exceptional richness of the ore-shoots, which rarely exceed 12 inches in width and are limited to short lengths, makes the area of decided interest. From the Evening Star, north of Rossland, 19 tons of were shipped by leasers, including C.E. Fraser and associates. The ore is auriferous arsenopyrite.

At the Velvet mine, adjacent to the Rossland-Cascade road, new activity was recently initiated by George Coryell, Jr., of Seattle. Preliminary work includes the renewing of the old water supply, road improvements, cleaning up, repairing buildings with a view to modernizing the mill and raising ore later. The ore is gold-copper. Fifteen men are employed.

#### SLOCAN CITY MINING DIVISION

At the Kilo on the North Fork of Lemon creek, Ted Anderson of Silverton has 6 men engaged on development work. A trial shipment of 5 tons was made. From the neighbouring Chapleau a trial shipment of gold quartz was also made by leasers including W. Greenwood, of Slocan City. From the Meteor R.J. Johnson, of Slocan City, and associates, have shipped 12 tons of silver-gold ore. At the Little Daisy on 8-Mile creek (see Bulletin No. 1, 1932, "Lode-Gold Deposits of British Columbia."), a new activity was recently initiated by T.S. Cleary of Trail, and associates. Improvements to the trail are under way preparatory to installing a portable 2-drill compressor.

#### LARDEAU MINING DIVISION.

In this Division a new undertaking has been initiated by the Meridian Mining Company of Vancouver, in connection with the consolidation of 35 claims, including the Eva and Cholla groups of the Imperial Development Syndicate of Nelson, the Oyster-Criterion group, and the Lucky Jack group. W.B. Pool of Nelson is managing director, and A.G. Langley is consulting engineer. Work is in progress connecting up the water supply to get the compressor working and start development. The

consolidation of these extensive holdings, with a view to one milling operation, holds out promising anticipations. A summary of published information regarding past operations is contained in Bulletin No. 1, 1932, "Lode-Gold Deposits of British Columbia."

On Gainer creek, near Ferguson, development-work was carried on during the season at the Ophir-Lade gold prospect by J. Flagel, of Ymir, and associates, 5 men being employed. The property is equipped with a portable stamp mill, and oil engine, which will be operated when sufficient ore has been developed. Work was suspended for the winter owing to the high elevation of the property and its distance from transportation.

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WESTERN MINERAL SURVEY DISTRICT (No. 6)

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Report by George A. Clothier, Resident Mining Engineer

Headquarters,

(Workmen's Compensation Building, Vancouver)

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This year has no doubt been one of the most important in the history of the Province so far as lode-gold mining is concerned. Intensive prospecting and investigation are showing that there are many areas containing gold-producing possibilities. The outstanding success of the Bridge River area has further corroborated the fact that the contact belt on the eastern flank of the Coast Range grano-diorite batholith, is one of the great potential mineral-bearing belts of Canada. Other sections of this belt may prove of equal importance to the Portland Canal section with its Premier and the Bridge River section with its Pioneer.

LILLOOET MINING DIVISION

The prominence accorded the Bridge River section by the success of the Pioneer and Bralorne has resulted in a year of great activity. Much prospecting and exploratory work has been done, a great deal of development has been accomplished, and production has been most satisfactory. Prospecting has extended the limits of the ~~diorite~~ diorite belt containing the gold-bearing quartz veins and consequently materially increased the area for prospecting. The whole section is very accessible from Shalalth on the Pacific Great Eastern Railway by an excellent motor-road, on which is maintained a very efficient service of stages and trucks. It is 55 miles to the Pioneer mine from Shalalth.

On Cadwallader creek a number of groups of claims have had exploration work this year. Ground sluicing has been adopted as the most efficient and economical method of removing the heavy overburden down to the diorite. On the Royal group, near the head of Cadwallader creek and about 8 miles south-easterly of the Pioneer, several hundred feet of sluicing across the diorite belt uncovered a vein of gold-bearing quartz which is reported to justify considerable development work.



The I.X.L. group on the west of the Royal group, owned by A. McGuire, has a fair-looking quartz vein exposed in a small gulch, that warrants some development work. Any quartz exposure in the diorite belt should be broken into for sampling, as surface values are characteristically low.

Surface prospecting and trenching on the adjoining Red Hawk group by the owners, Harry Kerr and Joe Marron, exposed promising outcrops of quartz carrying gold values.

On the Dan Tucker and Plutus groups, between the Red Hawk and the Pioneer Extension, there is an interesting belt of sheared diorite on the north side of the belt where it contacts with serpentine. This contains a number of small gold-bearing quartz veins and stringers across a width of possibly 30 to 40 feet. A shaft is being sunk in this, from which cross-cutting across the zone will prove whether the quartz veins are of sufficient number and value to be commercially valuable. The shear zone has been traced for a thousand feet or more and deserves opening up in a number of places. Hall Carpenter, one of the owners, has been in charge of the work.

The Pioneer Extension is a large group of mineral claims adjoining the Pioneer holdings on the south, covering the southerly extension of the main augite-diorite belt, in which the Pioneer gold-bearing quartz veins are found. The company is carrying out a very aggressive programme of exploratory work about a mile south of the Pioneer workings. This work, of necessity, consists of ground sluicing off the overburden in trenches to expose the underlying diorite formation in search of the quartz veins. In places these trenches are 30 feet deep and extend several hundred feet across the diorite from its contact with a wide belt of serpentine. The northerly strike of the veins is diagonally across the diorite toward its south side, and there is a marked enrichment as they approach the contact but outside the diorite they finger out and lose the values. Several thousand feet of trenches have been economically sluiced out this season by utilizing the water of a small creek, diverted at an elevation of about 7,000 feet, and carried along the side-hill by a small ditch from which diversions are made for cutting out the trenches. This work has been under the able guidance of W. Bosence. Interesting ground has thus been exposed which will later be explored at depth by underground work and diamond-drilling. The situation of the property fully justifies its very extensive exploration.

The Pioneer has had a very progressive and satisfactory year in every way. Notwithstanding the heavy outlay necessary to bring the property to its present standard, the company has paid regular dividends at the rate of 3 cents per share quarterly on 1,751,750 issued shares. Earlier development on the different levels and particularly on the lowest, or 1,000-foot level, where the vein has been proven for a length of 1,800 feet, averaging 3 feet of about \$20.00 ore, indicated that the possibilities of the mine were expanding as depth was reached. Greater facilities had therefore to be provided for increased production and milling capacity. Toward this end a new shaft was started by raising and sinking from the 900-foot level and is now completed to the 1,625-foot level and in operation. In raising, a promising vein was cut about 150 feet from the surface, and in sinking to the 1,625-foot level still another vein was cut at 1,560 feet. No work has been done on either of these veins as yet but their values where cut indicate that they will greatly add to the ore probabilities of the mine. The expansion of the 100-ton mill to 300 tons capacity has also been accomplished this year. The mill is now treating about 250 tons a day and will soon be tuned up to full capacity. To keep pace with the mine and mill expansion extensive surface construction was necessary and the property is now provided with adequate bunk-houses, mess-house, change building, store, and a number of residences are under construction.

Cross-cutting is now being carried out from the new shaft to the main vein from the levels below the 1,000-foot or 9th level. As soon as these levels are opened for development it is planned to continue sinking the main shaft. With the new mill in operation, proportionately increasing the gold output and dividends, the property will take its place as one of the most important gold producing properties of the Province. It is certainly a great credit to D. Sloan and his organization who have made it what it is.

Bralorne Mines, Limited, acquired the Lorne mine and commenced production early this year. Extensive development had been carried out by former operations, the lowest being the 8th level, a long adit tunnel which cut the three main veins of the property. Four levels were opened above this to the surface. This work had put in sight sufficient milling grade ore to decide the Bralorne management on milling operations. A 100-ton mill was therefore installed. It has been steadily operated at full capacity and the management states has produced \$327,000.00 in seven months operation. During that time the development work had increased the ore

reserves. Two levels have been opened below the 8th level. The 9th level drift exposed a good body of ore but the 10th was rather disappointing in the comparatively small amount of work done. However, further sinking and lateral work will be done. The extension of the old 4th level has opened a fine body of ore, which may call for the extension west of the 7th and 6th levels.

The milling practice has been greatly improved and the free gold recovery brought up to about 75%. Flotation concentration completes a very satisfactory total recovery. With R. Bosustow as mine manager and a good organization, the operations of the company are being efficiently handled and the future looks very promising.

The Bridge River Exploration Company has been exploring the three veins on its property during the year. On the Why Not, at the junction of the California and Why Not veins, some high values were found but subsequent work on the Why Not vein, while encountering encouraging values in places, has not developed an ore-body of importance. The Forty Thieves vein is exposed down the face of the cliffs for several hundred feet but did not respond very satisfactorily to exploration at depth. Drifting on the vein higher up, where value indications are better, might get better results. The work on the Arizona vein showed some values but not enough to warrant any extensive development.

Recently the company has installed a portable compressor plant and started work on the California vein at 3,700 feet elevation where there is a 40-foot tunnel. This is a strong, well-defined vein with a diorite footwall. It has been traced by open-cuts for 2,000 feet. The vein is a breccia of quartz and country rock, the quartz mineralized with pyrite. The gold values are very consistently distributed. The face of the 40-foot tunnel is stated to assay \$4.00 to \$5.00 gold per ton across its width of 6 feet at that point.

On the Veritas group on Little Gun lake, the owner, Matt Foster, has done about 1,000 feet of underground work in three tunnels. The vein is pyritized quartz in diorite, traced on the surface by open-cutting for over a thousand feet. The top tunnel on the vein its full length of 240 feet, shows values only in spots. Very rich ore is found in places on the surface. The lower tunnel has been started with the objective of obtaining greater depth on the vein to find out if values are more consistent.

The Gun Lake Gold Mines, Limited, has had some stripping done by ground sluicing but only a small portion of the ground has been prospected.

No work has been done on the Wayside and the reader is referred to the past Annual Reports for information.

On Truax creek, flowing into Bridge river from the south, Geo. Morrison has been doing some work on the Mary Mac group and reports encouraging gold values. These showings are in the Bridge River formation.

The Ample group on Cayoosh creek, about 9 miles from Lillooet, has been bonded by the Lillooet and Cariboo Gold-fields, Limited, a Victoria company. The property has been examined and it is expected that development will be under way shortly. Considerable work was done on the property many years ago and the equipment included a stamp mill, which was destroyed by fire.

#### VANCOUVER ISLAND AND MAINLAND COAST

On Vancouver island and the Mainland coast there has been considerable gold-mining activity in prospecting and development work. Work has been resumed on the El Capitan group, situated at the head of Cottonwood creek on the north side of Cowichan lake, on a working bond by Messrs. Lomas and Powell of Duncan. The consistent gold values make this an interesting property.

The W.W.W. group at the head of Franklin creek, about 10 miles east of Alberni canal, has been bonded by Vancouver interests. The old trail has been repaired, the camps renewed and work is now under way in the old workings under the supervision of Alex. Robinson. Some very high-grade gold ore was produced from this property thirty years ago.

On the west coast J.B. Woodworth of Vancouver has started operations on the You group up Bear river from the head of Bedwell sound. The showing is a pyritized quartz vein carrying gold values, a portion of which is free-milling. A 350-foot tunnel has been driven on the vein exposing some 200 feet of ore-body averaging 10 inches in width of \$40.00 gold ore. Mr. Woodworth has a small mill on the property, consisting of about 4 tons per day, run by water power.

The Leora group on Elk river, a couple of miles from the head of Kennedy lake, is again being developed by W. W. Gibson of San Francisco. Mr. Gibson operated this property 25 years ago by stoping from the surface but could not handle the water. He has now installed a compressor plant driven by water power and started a shaft to cut the vein at a depth of 150 feet. Drifts on the vein will then determine the future.

In the Zeballos River area, T. Marks is driving a cross-cut tunnel to intersect a quartz vein which on the surface carries in places very high gold values. Drifting on the vein from the tunnel will tell the story.

Lower down the river the owners of the Tagore group have mined and hand-sorted about 5 tons of ore from a small quartz vein carrying high gold values. A recent press item states that H. Gunning of the Geological Survey of Canada, who spent the season in that section, is very favourably impressed with the possibilities of finding high-grade gold-quartz veins in that area.

There have been no developments regarding the Alexandria since it was closed down early in the year, and little activity in that gold area around Phillips and Fredericks arms, Thurlow and Sonora islands.

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