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VICTOR DOLMAGE
Consulting Geologist

June 26th, 1936.

Mr. C.P. Riel,
Manager Manitou Mining Co.Ltd.,
919 Stock Exchange Bldg.,
Vancouver, B.C.

Re MUD CREEK MERCURY DEPOSIT

Dear Sir:-

The deposit is covered by five claims named respectively Rose 1, 2, 3, 4 and 5. Four of the claims are staked along a line running north 25 degrees west, which follows the strike of the deposit. Rose number 5 claim lies east of Rose 1 and 2 claims and was staked primarily to protect a possible water power site on Mud Creek.

The claims are situated on Mud Creek about half a mile from its entrance into Tyaughton Creek, which is about 25 miles above the entrance of the latter creek into Bridge River. This junction is about ten miles below Minto on the Bridge River highway. The locality in which the claims are situated has never been mapped but will be mapped this summer by a field party of the Geological Survey now in the district. Advance copies of the map will be available next spring.

The property is reached by a trail 27 miles in length which leaves the Bridge River highway just below the Tyaughton bridge and which crosses the divide into Liza Lake valley which it follows to Mud Creek. This is an easy trail with a good grade and one which could be easily converted into a road. There is a probability that a road may be built this season from Tyaughton Lake into Taylor basin, which would follow up the west side of Tyaughton Creek as far as Taylor Creek. This would bring it within three or four miles of the Rose claims on Mud Creek and a connecting road could be easily built, but would require the construction of a bridge across Tyaughton Creek. However, the present pack-trail is adequate for bringing in supplies and tools for preliminary development work.

The only accommodation at present on the claims is a tent situated on the south side of Mud Creek opposite the showings. This is an excellent camp site and there is plenty of timber for building cabins, for mining purposes and for fuel.

There is a possibility of developing some hydro-electric power in Mud Creek by the construction of a dam half a mile above the showings. This creek, though not large, is fed by a number of large lakes and enters Tyaughton Creek through a narrow canyon.

GEOLOGY The deposit is situated on the north slope of Mud Creek and the showing extends from the creek level at elevation 4060 up to an elevation of 4475 where the steep 45 degree slope of the valley gains the flat surface of a high bench. The deposit is thus shown to have a vertical and horizontal extent of at least 400 feet. No attempt to trace it farther has yet been made and as the overburden is rather deep except on the steep north slope of the creek, it is advisable to confine exploration work to this section until more has been learned concerning the size, shape and attitude of the deposit.

The cinnabar, which is the only metallic mineral present in the deposit, occurs in a band of amygdaloidal greenstone which is strongly sheared in places

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PROPERTY FILE

and which lies in the Bridge River sediments. East of the greenstone lie large, thick lenses of ribbon cherts, while west of it are brownish argillites. In places the cinnabar is present in the argillites as well as the greenstone. The greenstone is irregular in width and strike. In the lowest showing it is about 15 feet wide; in the top showing it is about 10 feet wide. The strike is roughly parallel with the sediments, i.e. north 20 to 30 degrees west, but the various showings are not in line and it is not known whether this is due to variations in strike or to faulting or whether these are two or more bands of greenstone.

The greenstone is intensely sheared in some places while in others it is massive and amygdaloidal and cut by numerous calcite veins. Where sheared it closely resembles the Bridge River shales and the cinnabar occurs in the shear planes. Where it is unsheared the cinnabar appears to be nearly as abundant and is distributed in the calcite veins and in the amygdules.

WORKINGS Only four small cuts have as yet been made in the greenstone and, because of this, little positive information concerning the size and nature of the deposit can be obtained from an examination.

Showing number one is at the level of the creek. It consists of an open cut 20 feet in length leading from the water's edge in a north 55 degrees west direction to a small tunnel 15 feet in length. The cut has caved in and the tunnel almost completely closed. At the edge of the creek a small corner of the greenstone is exposed and though unsheared it is fractured, veined with calcite and contains much visible cinnabar. Owing to the smallness of the exposure and to the fact that it had recently been sampled by John Matheson, no samples were taken, but several specimens obtained from this showing. Above the caved open cut a small shear in the greenstone 12 inches wide is exposed, a channel sample from which assayed 0.18% mercury. A second sample across 6 feet of sheared greenstone extending west from this above the tunnel yielded on assay only a trace. This cut and tunnel extend across the greenstone and into the brownish shales which lie to the west. There is no cinnabar in the tunnel.

Showing number two is about 50 feet above and in a northerly direction from number one. It is small, partly caved and is in the quartzites instead of the greenstones. About 40 feet to the east of number two cut is a large felsite dyke. Only a few specks of cinnabar were seen in this cut and therefore no sample was taken. This cut appears to lie east of the greenstone and therefore not on the deposit.

Showing number three is at elevation 4330 and 270 feet higher than the creek. It is about 200 feet northwest of number two. There are two small cuts at this point, one about 8 feet higher and 4 feet to the east of the other. The upper, or easterly cut, is in greenstone at its contact with Bridge River quartzites. The contact is vertical and strikes north 25 degrees west. In the northwest corner of the cut greenstone is sheared over a width of 12 inches and impregnated with cinnabar. A sample across this 12 inches ran .95% mercury. In the lower cut this shearing continues over a width of 5 feet. A channel sample across this yielded 0.94% mercury which, with the above sample, indicates a width of 6 feet averaging .95% mercury.

Showing number four near the summit of the hill at elevation 4475 and therefore 415 feet higher than number one. It lies 500 feet north 20 degrees west of number one. This cut is 13 feet wide and exposes greenstone in contact with quartzite on the east side. In the east end of the cut is 5 feet of slightly sheared greenstone, west of this is 32 inches of more intensely sheared greenstone, west of this 6 feet of hard, massive basalt, and west of this brown shales of the Bridge River series. A sample from 4 to 5 inches along the greenstone - quartzite contact assayed 0.44% mercury. A channel across 5 feet of the partly sheared greenstone yielded .59% mercury and 38 inches of more intensely sheared greenstone west of this ran .39% mercury. The basalt west of this contains a few small seams of cinnabar but did not appear to warrant sampling. This cut therefore shows a width of 8 feet averaging 0.54% mercury.

The irregular distribution of the mercury makes this deposit a difficult one to sample and other channels taken above or below these might yield quite different results. In order to make an accurate test of these trenches it would be necessary to take samples weighing several hundred pounds from each cut.

CONCLUSIONS However, the large amounts of cinnabar seen, in relation to the limited amount of greenstone exposed, strongly suggest the possibility of there being a mercury deposit of economic importance. Further trenching on the steep hillside can be done very cheaply at strategic points, and stands a good chance of discovering large widths of medium grade mercury ore. The ore can be mined and smelted on the ground at a low cost per ton. In view of all these considerations I would recommend that a considerable amount of surface trenching be done between the four cuts described above. If this work shows a continuous band of mineralized greenstone extending from the bottom to the top showing, it would then be advisable to drive a tunnel in on the ore starting at a convenient height, say about 50 feet above the creek. As the rocks are fairly soft this tunnel could be quickly and cheaply driven by hand methods. It should be continued at least 400 feet which would be about directly under the highest showing. The cost should not be more than \$12.00 per foot and it might be done for \$10.00. The trenching should be done for about \$2,000.00 and altogether a sum of \$10,000.00 should be available for the examination and exploration of this property.

It should be noted also that owing to the brilliant color of the cinnabar the ore is particularly easy to hand sort. By this simple method run of mine ore averaging a half to one percent could be easily raised to two percent or better.

The following data regarding the Canadian market were received by wire today from the Department of Mines, Ottawa. Imports in 1934 amounted to 46,000 pounds, while imports in 1935 amounted to 121,000 pounds, and came from the following countries.

United Kingdom	20,000 pounds
United States	28,000 "
Italy	58,000 "
Spain	15,000 "

No mercury is produced in Canada.

VICTOR DOLMAGE,
1318 Marine Bldg.,
Vancouver, B.C.

J O H N D. G A L L O W A Y
CONSULTING MINING ENGINEER

920 Stock Exchange Bldg.,
Vancouver, B. C.,
August 11th, 1936.

C. P. Riel, Esq.
Managing Director,
Manitou Mining Co.

Dear Sir:-

I beg to advise you that I have made an examination of the Cinnabar property recently optioned by our company. Accompanied by yourself I was on the property on July 28th and 29th and again on August 3rd to 6th inclusive. As you were on the property continuously from July 28th to August 8th you are of course fully familiar with what has been done and tentative plans for the future. The following report, therefore, is brief and only summarizes the more important features.

PROPERTY The Company now has 34 claims, 5 of which are optioned and the
LOCATION, ETC. others held by location on Mud and Relay creeks. The actual
 deposits being explored are on a hogback between these creeks
near where they join Tyaughton creek. The property is now reached by a 14-mile
horse trail from the motor road at the south end of Tyaughton lake. A good route
is available for a road following the trail for 5 miles and then going up the
valley of Tyaughton creek; the construction would be easy and cost quite reason-
able.

At present a tent camp accommodates 20 men at Mud creek, but for
future operations an excellent camp site is available on Relay creek. Plenty
of timber and water are available on the property for all purposes and some
hydro-electric power could be developed on Mud and Relay creeks. Elevations on
the property range from 3700 to 4500 feet. Conditions are good for all the year
round mining and no difficulties will occur.

GEOLOGY A preliminary report on the property was made by Dr. Dolmage,
 which includes some information on the geology. Since then a
geological map has been started which contains all available information. The
area is underlain by rocks of the Bridge River series, consisting of interbedded
and intercalated bands of quartzite, shale, tuff's, purple andesite, basalt and
greenstone - the latter being important as it is the principal host rock of the
cinnabar ore. The general strike of the formation is $N 20^{\circ}$ to 45° W with var-
iable dips to the south-west. Granite porphyry and felsite dikes occur which
do not cut the formation but lie in between the contacts of the sedimentary
and volcanic bands with the general north-westerly strike.

The greenstone bands are from 2 to 24 feet wide and in places are
sheared and in others massive. The cinnabar occurs irregularly distributed
through the greenstone and in calcite stringers in the greenstone. Sheared
greenstone in places seems to be most favourable but in others cinnabar occurs
in the massive greenstone. No other sulphide occurs except occasional specks
of pyrite.

WORKINGS Four zones, numbered 1 to 4, have so far been recognized and prospected in a preliminary way with open cuts and short tunnels. Work is now being concentrated on Nos. 2 and 3. In all zones there are one or more greenstone bands carrying cinnabar. No. 2 Zone, first exposed in an open cut, is now being developed by a drift tunnel 190 feet lower in elevation, which shows a band of greenstone 18 to 20 feet wide. No. 3 zone, containing four bands of greenstone, with widths of 1.6, 2.5, 9 and 24 feet respectively, is being traced down the hill by open cuts. Owing to overburden much work is yet to do in locating and tracing the various greenstone bands occurring in the known favourable area.

SAMPLING AND VALUES Owing to the erratic distribution of the cinnabar in the greenstone, sampling is difficult and channel sampling is unsatisfactory. A number of channel samples, however, show values ranging from 0.1 to 1.0% mercury across widths of 2 to 9 feet. Muck sampling of the drift on No. 2 Zone is now being carried out and this will give a better idea of average values.

It is believed that quite low grade ore can be handled, as the nature of the ore lends itself to hand-sorting. The cinnabar varies in colour from orange-red to dark red powdery ore and also occurs as beautiful deep purple crystals. By crushing and washing it will be possible to pick out considerable waste from the product as mined. It is probable the grade of the ore can be materially improved in this way before treatment. It is not possible to say yet just what grade of ore can profitably be handled but probably the lower limit will be about 0.25%. The required retorting plant to treat the ore is low in initial cost and low in operating cost - less than ordinary concentrating plants for other ores.

CONCLUSIONS AND RECOMMENDATIONS This cinnabar property is a most interesting one and given adequate development, a profitable mine is a likely possibility. Conditions are good for a low grade operation, as much ore can be developed by tunnelling and the treatment process is inexpensive. I have therefore no hesitation in recommending energetic development of the property.

At present work is being carried out on No. 2 and No. 3 zones and this should be continued, leaving Nos. 1 and 4 zones in abeyance for the present. The tunnel on No. 2 zone should be driven ahead for 100 feet and, according to conditions encountered, crosscuts driven to both walls (contacts) of the greenstone band. When this is completed it may be advisable to start another tunnel 100 to 150 feet down the hill to trace the zone lower down. From the open cut above Tunnel No. 2, approximately 400 feet of depth can be obtained from a tunnel near the creek-level.

The No. 3 Zone should be exposed by open cutting as far down towards Relay creek as practicable and then a drift tunnel run on the most favourable greenstone band, with crosscuts to the other bands. Eventually the property, if ore conditions prove satisfactory, will probably be worked entirely by tunnel from the Relay creek side.

The present transportation and camp will only suffice for preliminary development, but later on further plans will be drawn up for permanent road and camps.

Yours very truly,
(Signed) JOHN D. GALLOWAY,
Consulting Engineer
Manitou Mining Company.

JDG:P

1936

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*This mineral deposit is
of national importance.
Can you help with
the roads.*

REWARD MINING COMPANY LIMITED

DEPT. OF MINES
Rec'd AUG 21 1936
Referred to _____
Ans'd _____

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36*

Vancouver, B.C.,
August 13th, 1936.

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Progress Report:

Enclosed herein is a copy of Dr. Victor Dolmage's report on the Reward operation on the east side of the Minto mine in Bridge River. When this property was purchased last spring, no mineral showings were in evidence near the Minto mine and vigorous prospecting was immediately started. Great credit is due to Alex J. Fraser who was in charge of this prospecting, for his foresight and ingenuity in utilizing the water from Pearsons ponds and bringing the water down a steep hill to a point where he thought ore might be found. At this point a heavy stand of fir timber stood on overburden twelve to twenty feet deep and here he attacked the area with ground sluicing. The rest of the story need not be told as Dr. Dolmage's report describes the discovery made by Mr. Fraser. Development work will be continued as recommended.

At Porcher Island, near Prince Rupert, 26 men have been continuously at work under the direction and able management of Alex Smith, geologist. Machinery and equipment was installed in June and a tide water level tunnel started, which will cut the four known veins on the property. At this date the tunnel is in about four hundred and fifty feet and a cross cut to one of the veins is in eighty feet. The objectives will be reached in October and by November we hope to be ready to build the mill.

At Barkerville, Reward owns six claims adjoining Island Mountain Mines on the extension of the mineral belt and during the past four months the claims were surveyed and small scale development carried on continuously. No news of importance comes from the Alberta oil field to affect Reward's holdings of 2480 acres, except the encouraging results at Mar Jon #3 well, adjoining which Reward has excellent acreage. Comments from shareholders will be appreciated by the management.

Respectfully yours,

REWARD MINING CO. LTD.,

C.P. RIEL,
Managing Director.

RECEIVED
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PROPERTY FILE

VICTOR DCLMAGE
Consulting Geologist

1318 Marine Bldg.,
Vancouver, B.C.,
August 12th, 1936.

C.P. Riel,
Managing Director,
Reward Mining Co.,
919 Stock Exchange Bldg.

Dear Sir:-

On August 9th I examined the recent workings on the Dauntless group of mineral claims owned by your company and situated immediately east of the Minto Mine in the Bridge River district. The workings are on the Dauntless Number 2 claim near its western boundary. A large oxidized mineral zone had been discovered at this point earlier in the summer and an attempt made to explore it by diamond drilling. The results of the drilling were indefinite and it was decided to drive a drift on the ore to test its values and persistence below the oxidized zone. This drift is now in 16 feet and the face is in good ore. Stibnite occurs sparingly in narrow streaks and disseminated crystals. Arsenopyrite occurs in minute crystals slightly more abundantly than the stibnite. A streak of stibnite $\frac{1}{2}$ to $1\frac{1}{2}$ inches wide and standing nearly vertically divides the face into two nearly equal sections, the southern one of which is more heavily mineralized than the other.

A channel sample, taken by the writer across the full face of the drift - 4 feet, 3 inches - assayed 0.26 ounces of gold per ton. A channel sample, taken by the writer across 14 inches on the southern half of the face, assayed 0.66 ounces of gold per ton. This rich mineralization does not stop at the south wall of the drift but continues into it for some unknown distance. The full width of the ore, therefore, is not known.

The character of the ore differs from that of the Minto Mine in having a much smaller proportion of metallic minerals in relation to the amount of gold present. The importance of this is that a higher recovery can be made and at a considerably lower cost.

Altogether this is an encouraging showing and one which warrants further development immediately. It is so situated with respect to the claim boundary that it can be drifted on a farther 180 feet to the southwest and in this distance the backs will increase from 10 feet to about 150 feet. To the northeast of the tunnel there is a deep ravine which prevents exploration in this direction except by sinking a shaft.

The most strategic plan of exploration is: (1) to crosscut to the southeast to determine the full width and true value of the ore; (2) to continue the drift southwest nearly to the claim boundary and (3) if the ore continues for this distance, to sink a shaft on the vein at some point near the portal. The crosscutting and drifting should be done for about 2000 dollars.

Yours truly,

(Signed) V. DCLMAGE.

FEDERAL GOLD MINES LIMITED

* * *

Vancouver, B.C.,
August 13th, 1936.

Progress Report:

Enclosed herein is a copy of Dr. Victor Dolmage's report which coupled with his last report to shareholders requires no comment. His recommendations are being carried out.

Since the last progress report your Directors decided to acquire full title to the Dominion Group of 17 mineral claims and after lengthy negotiations title was conveyed to Federal by payment of \$5000. cash and 100,000 shares of Federal stock. Development work was immediately stopped pending the outcome of the present diamond drilling. Crown Granting of the surface rights of the mineral claims surrounding Minto City on three sides is proceeding and when completed they will be subdivided into town lots. It is expected that about \$20,000.00 will be realized from the sale of these lots.

Early last spring Federal sold the claims it owned on the east side of Minto Mine to the Reward Mining Company and their prospecting and development has proved successful and copy of Dr. Dolmage's report to Reward shareholders is herein enclosed. Federal retained a twenty-five percent interest in this deal.

In July Federal took an option on 250,000 shares of Manitou Mining Co. Ltd., stock at 10¢ per share payable \$5000.00 cash and the balance payable on call by Manitou within 120 days. Manitou has a cinnabar mine about twenty miles north of Federal and Minto. A copy of Dr. Dolmage's report as well as one by John D. Galloway, M.E., recent Provincial Mineralogist, is enclosed, also the progress report to shareholders of Manitou which fully covers the deal and property. If the cinnabar property responds to development as expected and now indicated, Federal's interest should become very valuable. The Manager wishes all shareholders to write in and express their views.

Respectfully yours,

FEDERAL GOLD MINES LTD.,

C. P. RIEL,
Managing Director.

V I C T O R D O L M A G E
Consulting Geologist

1318 Marine Bldg.,
Vancouver, B. C.,
August 13th, 1936.

Directors,
Federal Gold Mines Ltd.,
919 Stock Exchange Bldg.,
Vancouver, B.C.

Dear Sirs:-

I have just reviewed the results of the recent diamond drilling on your Dominion Group of mineral claims which lies immediately west of the Minto Mine in Bridge River, B. C. A long hole was projected to test at a further depth of 800 feet the mineralized zone found in number 3 tunnel between a felspar porphyry and a felsite dyke. This is a strongly mineralized zone and in view of the improvement in values with depth found at the Minto Mine it was thought advisable to test this zone at a considerably greater depth.

At the time of the examination the hole was down only 320 feet and passing through a zone of highly altered rock which lies south of the felspar porphyry dyke. This rock is particularly difficult to drill and therefore progress has been slow. However the dyke will be reached in a further 200 feet, and as this is good, drilling progress will be much faster. The total length of the hole will be about 1000 Feet. It should be completed as soon as possible as other plans will depend on the conditions found in the hole.

Yours truly,

(Signed) V. DOLMAGE.

Vancouver, B.C.,
August 12th, 1936.PROGRESS REPORT:

On July 3rd you were advised that the company had acquired a cinnabar property in the Bridge River District and a copy of Dr. Victor Dolmage's report was enclosed. You were also advised that the company's Vice President, John D. Galloway, M.E. would examine the mine and his report be sent to you. We herewith enclose a copy of Mr. Galloway's report and also a progress report by the Managing Director. Mr. Galloway's encouraging and clear report requires no comment.

Active work was started on July 5th. A bridge was built over Tyaughton River and six miles of pack train trail built. Supplies, mining tools and every necessity had to be taken in 14 miles on horses. A camp of six tents, including an assay office with log bases was put up and mining started. On August 9th, the date your manager left the property the following work had been done: -

Two hundred and ten feet of tunnels, five by seven feet and timbered. Twelve hundred feet of roads and trails at the mine. Several major size open cuts. A complete survey of all mineral showings and topographical features and geological mapping. The acquiring by staking of 29 mineral claims adjoining and surrounding the original purchase of five claims. The average daily payroll during this period was slightly under twenty men. During this time your manager was absent six days when he went to San Francisco to interview H.W. Gould, who is one of the worlds leading authorities on cinnabar, mercury mining and marketing. He also manufactures the Gould rotary mercury furnace and supplies 93% of the worlds reduction plants. He assured your manager that the world market could absorb hundreds of times the present world production. He stated the greatest demand was for use in mercury boilers for driving engines to generate electric power for municipal power plants as well as for ships at sea. He expected the price of mercury to advance to at least three dollars per pound and as further proof of this he gave the names of five of the foremost technical and financial men in the United States who had in the previous month purchased the most important cinnabar mines in California.

Space will not permit of further remarks along this line except to state that Mr. Gould has offered to come and visit our property at his own expense any time we request him. This will likely be done within the next two weeks. He stated that he had just contracted with the Russian Government to build a six hundred ton plant for them and that their ore contains two pounds of mercury per ton of rock - the California mines run from one to six pounds of mercury per ton of sorted ore.

FINANCIAL SITUATION: The estimated cost of an eighty ton reduction plant with every known improvement and using crude oil for roasting the ore is \$30,000.00. Mining development and equipment estimated at \$25,000.00 and truck road and permanent camp buildings etc., at \$15,000.00, making a total of \$70,000.00.

Manitou is capitalized at 3,000,000 shares of .50¢ par value. There are issued to date 160,408 shares, all of which have been sold at ten cents per share nett to the treasury. All shareholders to date have been given option rights good to and including September first, 1936, to purchase an equal amount to their original purchase at ten cents per share. It is expected that nearly all shareholders will exercise their rights as no further shares will be sold at ten cents after September 1st.

In July Manitou Mining Co. gave an option to the Federal Gold Mines Limited on 250,000 shares at ten cents per share payable \$5000.00 cash and the balance subject to call by Manitou within 120 days. Manitou has no liabilities and sufficient cash on hand and coming in to carry out its present program. Every miner and worker at the mine has purchased from one thousand shares upward. Anyone wishing the names of these men and verification of the above statement may receive same by writing to the company office.

NOTICE is hereby given to all shareholders that their option rights will expire at midnight of September first. If they wish to exercise their rights they must ENDORSE ON THE BACK of their gold colored warrant certificate, have the signature witnessed and send this certificate together with CERTIFIED cheque or MONEY ORDER to the company office, 919 Stock Exchange Building or to the Prudential Trust Co. Ltd., Vancouver, B.C., and to arrive here not later than September first.

Progress reports will be mailed out at frequent intervals. From all information we have been able to gather we believe this cinnabar property is the only economic deposit in the British Empire and is therefore of more than ordinary national importance because of the use of mercury in ammunition, medicine, Neon sign lighting, electric power generation and hundreds of other uses. Comments from shareholders will be appreciated by the management.

Respectfully yours,

MANITOU MINING COMPANY LIMITED,

C. P. RIEL, Managing Director.

920/2W

920-23

J. S. Stevenson

Mercury

Empire (Monitou) Mining Co.

Bridge River, B.C.

(Examined August 1938)

Location

The cinneber claims of the Monitou (now Empire) Mining Company are located near the junction of Mud and Tysaughton Creeks. They can be reached by rough motor road about 17 miles north of Minto City in the Bridge River district, B.C.

Geology and Mineralization

Cinneber occurs at elevations between 3700 and 4100 feet in fairly steeply sloping, soil covered but open ground constituting a dome-shaped hill.

The rocks consist of sediments of quartzites, greenstones and argillites which are traversed by occasional andesite, diorite, and porphyry dykes. Bands of varying widths of quartzite striking approximately northeast-southwest parallel the greenstones. It is in the latter rock where the cinneber usually occurs and it is very seldom found in the harder quartzite. The ore is very pockety and at present no large concentrations have been discovered.

Cinneber is apparently the only metallic mineral present and is found either as thin flakes or splashes between the numerous joint planes and fractures of the sheared greenstone, or else in direct association with small calcite stringers. When in the greenstone, the cinneber is sometimes difficult to see on account of the masking of its colour by the dark greenish-grey rock. In the presence of calcite, the brilliant red shows up clearly and also the mineral is often more massive. It appears that the cinneber follows the calcite veinlets which are "leaders" for its distribution through the greenstone. Metallic mercury was observed in a few places in the underground workings, especially near the raise in No. 2 tunnel where globules, the size of a large pin's head are in evidence.

In spite of quite extensive development work in the way of tunnels and open cuts, no definite system of mineralization or trend of the ore zones had been ascertained up to the time of the writer's visit. Information in this respect might be obtained if the geological formations were inserted on the plan of the workings, giving careful details as to the exact positions of the type of rocks and faults, their strikes and dips. The formation strikes approximately 70° northeast with vertical to steep northerly dips. There seems to be a tendency for the cinneber to more or less concentrate along fault planes and also in the highly sheared greenstone near or in its contacts with the several quartzite bands, which are too hard for the solutions to penetrate. However, as previously indicated the ore is very erratic. In numerous instances, the conditions under which the best ore is known to occur - calcite stringers in the sheared greenstone - are barren of cinneber. On the other hand isolated very small zones or specs of the mineral are fairly frequent, but the great majority are far too small and low grade to be commercial.

The best zone of possible commercial size and grade so far discovered is in No. 2 tunnel where for a distance of about 35 feet the ore averaged 0.15% mercury, but in which some lengths

of 3 or 4 feet ran from 1 to 2.5 percent. Close to this place a raise of about 175 feet has been made to the surface, much of which is in ore of good grade. It was stated that for about 70 feet the ore averaged 1.0% mercury across the width of the raise. The next best zone, which is considerably smaller than the above, was discovered in No. 5 tunnel where some 2 to 3 foot samples ran over 2 percent mercury with an average over about 10 feet of 1.13 percent.

Workings

Ten tunnels and adits totalling about 2800 feet have been driven into the southerly slope of the hill covering a vertical distance of about 200 feet. No. 2 is the most extensive of these tunnels and cuts what is by far the largest ore zone at present discovered. From about the middle of this tunnel there is a raise 175 ft. to the surface. By means of a hydraulicking system several thousand feet of open cut stripping have also been done. Unfortunately however, on account of the depth of overburden, a considerable portion of this trenching did not reach bed rock.

The accompanying plan shows the tunnels and trenches at the time of the writer's visit (August 1938) and gives the location of the principal ore discoveries with some average assays.

Mine Buildings

These consist of the usual type of well constructed mine camp buildings, such as bunk and cook houses to accommodate 50 men, laboratory and few private houses. They are situated on the top of the hill on the east side of Mud creek, immediately opposite the hill containing the deposit and workings. A gravity tram has been constructed across Mud Creek from the camp to the portal of No. 1 tunnel.

Plant and Furnace

At the time of the writer's visit the erection of the plant (near the tram terminal at No. 1 tunnel) was almost completed.

"The Gould Improved furnace and condensing system" consists of the following equipment:- The ore will be crushed to $\frac{1}{8}$ inch and fed into a 10 ton brick lined, oil-fired furnace which will rotate at 1 to 1 $\frac{1}{2}$ R.P.M. to be driven by a 2 HP motor. High pressure oil burners will discharge an atomized spray of air and oil under pressure supplied from a small air compressor. The dust precipitator is of the Sirrocco type dependent on centrifugal force to separate the dust particles from the gas stream. The exhaustor is motor driven which also provides the draught for the furnace and the impetus for the dust precipitator. The condenser consists of a series of steel pipes connected at the tops by return bends provided with washout holes. There are a number of hoppers at the bottoms of the pipes which are open and immersed in water troughs where the mercury and soot is to be collected. At the end of the pipe system a large tank will take off any mercury that may not have condensed. The ore will be roasted at 1300 to 1500 F. The soot will be dried and agitated with lime to collect the mercury.

*Lamp cards
of Frank only run
up to 450 F*

Tests

Various experimental tests made on this ore by manufacturers of this type of Gould furnace, are said to have been satisfactory. The Department of Mines and Resources Ore Testing Division, Ottawa, also conducted tests during 1938, using concentration methods. Good concentrates from an 0.8 percent feed were made which would make an ideal material for retorting.

Ore Dump

There are several ore dumps on the property and the manager stated that about 5,000 tons are ready for treating. The grade was not estimated but it appeared as if it would average less than 0.5 percent mercury without resorting.

Summary

The cinnabar is very sparsely scattered through sheared greenstone and only in very few places concentrations or definite ore zones have been discovered to date. The tonnage of known commercial ore appears to be small, being mainly confined to a zone of not more than 50 feet in length in No. 2 tunnel and extending as an irregular lense, but of doubtful continuity for 175 feet to the surface. It has been regarded that commercial ore should run at least 0.5% mercury, but most of the assays taken are below this figure. It is possible that the small high grade zone in No. 5 tunnel may widen above or below the tunnel level and of course there is the possibility of the existence of other and better areas, but only a comparatively small portion of the general ore zone (which constitutes the whole hill) has been prospected.

The plant appears to be much too small to operate at profit for it is doubtful if the feed would average more than 0.5% which for a 10 ton furnace would be about 90 lbs. of mercury recovered a day or only about \$100. The ore would therefore have to be very carefully hand picked in order to very considerably increase the grade before being fed into the furnace. If the furnace is to be used merely as a pilot and testing plant, it would then probably be satisfactory.

This deposit itself is however appreciably better and more encouraging than any other mercury deposit examined by the writer in the Bridge River, Yaleton River and Kamloops areas.

V. L. Eardley-Wilmot

V. L. Eardley-Wilmot,
Mining Engineer.

Examined August 1938.

Additional Notes (Dec. 3, 1938)

Money for development of the above property, held by the Empire Mercury Mines, formerly known as the Haniton Mining Co., with C.P. Riel as President, has been provided by Nesbitt, Thomson Co. M. A. Thomson, Montreal, and H. F. Wardhaugh, Vancouver, are Directors with S. W. Taylor, Vancouver, as Secretary. Authorized capitalization is 3,000,000 shares. Alex Fraser is the Mine Manager and A.F. Brown of the H.W. Gould Co., California, is in charge of plant installation.

An 84 H.P. Diesel engine and a 360-foot compressor are now being installed.

Production first started on September 25, 1938, and early in November about 100 pounds of mercury were being produced daily. (For proposed future work, see Northern Miner, Nov. 10, 1938, p.21.)

920/2w
920-3
MAN 700

The general geology of the neighbouring area has been indicated in the foregoing *Astra* and *Cambria* report. The schistose greenstone and chloritic schists enclosing the *Blue Jack* deposits are members of the same northwesterly-striking Mesozoic formations, being separated from the *Astra-Cambria* greenstone by an area of slates and argillites. A wide, northerly-striking felsite dyke, probably the extension of one of the two westerly dykes on the *Astra* and *Cambria* property, is partly exposed in crosscuts on the lowest adit-level. The *Blue Jack* deposits are associated with shearing which is marked at underground points by well-defined fracturing, sometimes accompanied by gouge, strikes being northerly, with a westerly dip from 60 to 70 degrees. The wide shear-zone contains scattered lenses, disseminations, and streaks of pyrite, sphalerite, and galena, at widely separated points on the surface and underground, no continuity of specific showings being apparent. The mineralization is associated in places with minor amounts of quartz accompanied occasionally by calcite, but the prevailing gangue is rock showing little or no apparent silicification. In the lowest adit, felsite-dyke exposures, more or less decomposed, are mineralized in places with sphalerite and pyrite in disseminations and fine streaks or as films in cleavage-planes. The average gold content is low, the better values being present in the mixed sulphide material. Appreciable silver values are occasionally associated with sphalerite showing no lead content.

The assay and analysis of twenty-nine sacks of selected material shipped to the Tacoma smelter in 1934 was as follows: Gold, 0.36 oz. per ton; silver, 3.16 oz. per ton; lead, 4 per cent.; zinc, 4.1 per cent.; iron, 4.6 per cent.; silica, 56.6 per cent.; alumina, 4.5 per cent.; lime, 8.2 per cent.; sulphur, 5.4 per cent.

The claims constituting the property were staked in 1923 and the *Blue Jack Mines, Limited*, a private company incorporated in 1932, was converted into a public company in 1936. The property, mentioned at intervals in the Annual Reports of the Minister of Mines since the year 1924, was briefly described in this publication for 1934, page F 14, since when the lowest adit has been driven.

The surface workings are distributed over a length of 1,030 feet through a vertical range of 575 feet. At elevation 2,675 feet open-cuts and stripping on both sides of the little creek partially expose the zone for a width of 53 feet. At the eastern end, next to the bank, there are scattered sulphide streaks and disseminations over a width of 7.5 feet. This mineralization could not be traced for any appreciable length due in part to overburden. Forty-one feet west of this a sample across 15 inches, where sulphides are concentrated, assayed: Gold, 1.42 oz. per ton; silver, 6 oz. per ton; lead, trace; zinc, 5.8 per cent. The latter appears to be a lenticular occurrence as it is 7 inches wide 2 feet to the north, where it goes under overburden and is not in evidence in the rock exposed 10 feet to the south. Between and adjoining the two points there is some very sparse, indefinite sulphide mineralization. Trenches have been dug on both sides of the portal of the upper adit at 2,650 feet elevation. In the eastern showing there is scattered, light, sulphide mineralization between points 23 and 38 feet from the portal. A picked sample of the best material assayed: Gold, 0.70 oz. per ton; silver, 2 oz. per ton; lead, 1.8 per cent.; zinc, 12 per cent. Just west of the adit-portal there is a stringer of similar character.

At 2,450 feet elevation, below the point where the creek forks, a cut exposes a width of 2 feet of galena-sphalerite-pyrite mineralization associated with calcite, continuity along the strike not being apparent. At 2,100 feet elevation, on the edge of Brandywine Creek, 50 feet westerly from the mouth of Snow (Swede) Creek, a small cut exposes an indefinite 12-inch patch well mineralized with sulphides, from which a picked sample assayed: Gold 3.2 oz. per ton; silver, trace; lead, trace; zinc, 2.8 per cent. The upper adit, at elevation 2,650 feet, is driven 85.6 feet along a bearing of north 37 degrees east, to where crosscuts extend 15 feet to north 58 degrees west and 47 feet to south 63 degrees east. These branches are approximately below the surface showings at 2,675 feet elevation. In the central part of the westerly cross-cut there is width of 51 inches of sulphide mineralization in the floor against the southern wall. A sample across this width assayed: Gold, 0.30 oz. per ton; silver, 2.2 oz. per ton; lead, trace; zinc, 5 per cent. This does not show in the northern wall. In the easterly crosscut there is a 43-inch width of light sulphide mineralization in the southern wall at a point 21 feet from the main adit. In this case also the mineralization does not continue into the northern wall. The portal of the next adit is at 2,600 feet elevation, 115 feet south 22 degrees west from the upper adit-portal. This comprises 132 lineal feet of work, being driven north-east for 56 feet, then

northerly for 27 feet, then north-westerly for 31 feet, and finally northerly again for 18 feet to the face. At 25.5 feet in from the portal a shear is cut which strikes northerly, with westerly dip of 70 degrees. Adjoining this, there are streaks of sulphides associated with silicified rock. A well-defined fracture-plane of similar attitude, with gouge, is cut in the north-westerly course 36 feet back from the face. In the last 18-foot section there are sparsely-disseminated sulphides, over a width of from 1 to 2 feet, in the floor and roof along the western wall, and also, in places, streaks of sulphides on the eastern side of the drift. At a point 680 feet south 34 degrees 30 minutes west from the portal of the last-described working and at 2,200 feet elevation, the lowest adit comprises about 682 lineal feet of workings driven in 1935 and 1936.

Measuring from the portal, this main adit extends as follows: North 42 degrees east to 315.5 feet; north 14 degrees east for 23.75 feet to chainage 339.25; north 47 degrees east for 24 feet to chainage 363.25; north 30 degrees east for 76.5 feet to chainage 439.75; and finally north 35 degrees east for 130 feet to the face at 569.75 feet. Crosscuts have been driven as follows: (1) 36 feet to south 57 degrees east at chainage 135 feet; (2) 19 feet to south 68 degrees east at chainage 198 feet; (3) 14 feet to north 60 degrees west and (4) 6 feet to south 60 degrees east, both at chainage 285 feet; (5) 38 feet to north 60 degrees west at chainage 375 feet. The outer part of the main adit is largely in chloritic schist which grades imperceptibly into massive greenstone towards the inner extremity. In the No. 1 crosscut the chloritic schist is sheared along two fractures, one of which, adjoining the adit, strikes north 20 degrees east with 65-degree dip north-westerly, and the other, 25 feet easterly, strikes north with 60-degree dip to the west.

The No. 2 crosscut has caved in part since the time of the writer's first examination in 1935. In the face there was then observed a smooth well-defined wall marked with gouge, striking northerly and dipping westerly at 65 degrees. Between this shear and the main adit the rock is grey, soft, decomposed material, apparently a local patch of felsite dyke being along the general trend of the dyke cut in Nos. 3 and 5 crosscuts. In the No. 2 crosscut the crumbly gangue is comparatively well mineralized with disseminated fine streaks of sphalerite, and a sample taken by the writer in 1935 across 15.5 feet adjoining the adit assayed: Gold, 0.03 oz. per ton; silver, 20.6 oz. per ton; lead, trace; zinc, 2.2 per cent. The westerly 11-foot and 9-foot sections of the No. 3 and No. 5 crosscuts respectively cut the felsite dyke, the irregular eastern wall of which strikes from north to north 23 degrees east, the dip averaging 50 degrees westerly. In the more decomposed portions of both dyke-exposures in these crosscuts there are some very scattered streaks of pyrite and sphalerite. In the lowest adit-level no appreciable mineralization was observed in the greenstone or schist.

Surface prospecting, comparatively little of which has been done, might disclose more continuous showings, and in this connection the greenstone-schist area underlying the argillites to the north of the workings seems worthy of attention. Work had been suspended at the property when visited in October, 1936.

CINNABAR DEPOSITS.

MUD CREEK AREA.

Manitou Mining Co., Ltd. This company's Mud Creek cinnabar property, in the Lillooet Mining Division, consists of fifty-nine mineral claims held by location, including the original *Rose* group of five claims acquired under option. The precise location of the property cannot be described in terms of existing maps, which are inaccurate in regard to the position and course of Mud Creek, which is a southerly-flowing tributary of Tyaughton Creek. According to the new topographical map in preparation by R. C. McDonald, of the Bureau of Geology and Topography, Ottawa, the Manitou Camp is located at 51 degrees 03 minutes 26 seconds latitude and 122 degrees 46 minutes longitude. It is situated on a bench at 3,820 feet elevation just east of Mud Creek (3,700 feet elevation), and half a mile up-stream from its junction with Tyaughton Creek at about 3,590 feet elevation. All elevations given are relative only, being based on aneroid readings. The workings, at elevations of from 3,710 to 4,111 feet, are on medium- to steeply-sloping ground which is lightly wooded. The property, formerly reached by pack-trail, is now accessible by the recently-constructed tractor-road, over which a truck has been driven. This road, about 8.5 miles in length, connects with the *Goldside* road at Cinnabar Creek, making a total distance of 17 miles

by branch road from the highway at a point 32.5 miles from Bridge River Station on the Pacific Great Eastern Railway.

The geology of the area has not yet been mapped. The prospected area is largely underlain by sediments of the Bridge River series and included greenstones and volcanic flows. The sediments consist chiefly of cherty quartzites with some argillites and shales. There is generally much overburden on the slopes, but a general section of the rocks, which locally strike north-westerly, is visible along Mud Creek where it flows south-westerly. The above formation is exposed along the creek for a length of 1.75 miles from its mouth, in which distance, marking the limits of the writer's investigation, it flows through two narrow canyons. Numerous dykes, some of which are very wide, have a general northerly to north-westerly strike, types noted being composed of hornblende andesite, andesite porphyry, basalt, and quartz diorite. The last-mentioned dyke is at a point three-quarters of a mile up-stream from the nearest known cinnabar occurrence. Mineralization is found in greenstones, and to a lesser extent in quartzites adjoining the contact with greenstone. In the partially-explored area, roughly 2,600 feet measured from north-west to south-east and 600 feet from north-east to south-west, the greenstones have been found to occur in irregular small blocks or patches due, it is thought, to dislocation caused by faulting, folding, or both. The general structure has not yet been determined, the limited amount of development having been done at widely separated points.

Cinnabar, which is the only metallic mineral noted, is found in sheared greenstone or in massive, amygdaloidal greenstone, the latter phase being traversed by numerous stringers and streaks of calcite. In the first case the cinnabar occurs in the shear-planes and in the second case it is distributed through the calcite and in amygdales. The texture of the mineral varies from the brilliant vermilion-red crystalline variety to brownish-red incrustations. Minute globules of native quicksilver are reported to have been observed in some specimens. The deposits are difficult to sample owing to the erratic distribution of the mineralization and the irregular boundaries and attitudes of the greenstone bodies. The writer's samples, taken where mineralization appeared to be comparatively concentrated indicate a low average mercury content. Similar material, if developed in quantity, would require sorting before treatment or selective mining would be necessary.

The nucleus of the property, known as the *Rose* group, was held by Ben Cromer for some years before 1936, when an option was acquired by the Manitou Mining Company, Limited. Control of this company was recently taken over by Eastern interests, financial arrangements having been made to continue development. R. H. Stewart has been appointed as their consulting engineer.

The workings develop separate showings, no correlation of conditions being possible at the present stage of exploration. Their position is approximately described by measurements and bearings from the camp. Workings in "No. 3 area" are on the locally steep westerly slope towards Tyaughton Creek. The principal showings here, north 55 degrees west, 1,370 feet from the camp, are in a trench, 73 feet in length, extending south 15 degrees east along the 4,015-foot contour, above which the ground gradually flattens to a high bench at 4,125 feet elevation. The formation has a local strike of from north 70 degrees east to north 75 degrees east, dips being northerly at steep angles, or vertical. From the northern end, going southerly, the following section is exposed: 11 feet of sheared quartzite; 1.5 feet of greenstone with calcite-streaks but no apparent mineralization; (sample section A) 2.5 feet of similar material but well mineralized as per sample, which contained 0.45 per cent. mercury; 3.2 feet of greenstone with quartzite inclusions, the complex containing rare spots of cinnabar; (sample section B) 3.5 feet of greenstone with calcite-seams, well mineralized with cinnabar, which contained 0.4 per cent. mercury; 8.2 feet of sheared complex of shale, quartzite, and greenstone; 5-foot andesite dyke striking north 60 degrees east; 23 feet of (chiefly) greenstone with calcite-seams, containing very sparsely-distributed incrustations of cinnabar; 16 feet of quartzite including rare stringers of calcite, these being lightly mineralized with fine seams of cinnabar. Just east of sample section B and at 4,021 feet elevation an adit has been driven easterly for 28 feet. It is largely lagged to support the shattered sheared rock, the face being in quartzite. The first part of this working apparently followed a "tongue" of greenstone, from which a pile of about 10 tons at the portal was derived. A grab sample from this pile contained 0.2 per cent. mercury. At 3,977 feet elevation and 160 feet south 62 degrees 30 minutes west of this point

an adit was in 10 feet along a course of north 20 degrees east, the face being in crushed quartzite.

"No. 2 area" workings are on the steep southerly slope to Mud Creek, No. 1 cut, at 4,111 feet elevation, just below the summit of the hill, being 1,015 feet north 36 degrees west from the camp and across the creek from it. Here the formation strikes north 20 degrees west to north 25 degrees west, dips being from 85 degrees westerly to vertical. Going westerly along the contour, the following section is exposed: 4 feet of quartzite which apparently extend easterly for 130 feet or more; 4.3 feet of sheared greenstone containing sparsely-distributed cinnabar, a sample of which gave a *nil* return; 3 feet of similar material containing apparent mineralization in a central streak 8 to 10 inches wide, from which a sample across 3 feet gave a *nil* return; 4- to 6-foot dyke of hard massive basalt striking north 50 degrees west, with a south-westerly dip of 70 degrees, including along its south-western border a 12-inch width of sparingly-mineralized calcite, a sample of which contained a trace of mercury; and finally 6 feet of brown shales. At 4,075 feet elevation No. 2 cut is 40 feet south 36 degrees east from No. 1 cut. At this lower point the quartzite-greenstone contact strikes north 7 degrees west, with an easterly dip of 75 degrees, quartzite also lying to the east of the greenstone. A sample across the 6-foot exposure of weathered greenstone and included calcite-seams, containing apparent sparse mineralization, assayed a trace of mercury. This No. 2 cut had only just entered solid rock after penetrating 9 feet of overburden.

At 3,921 feet elevation, and 215 feet south 13 degrees east from the No. 2 cut, an adit had been driven for 70 feet (August 11th, 1936) along a bearing of north 12 degrees 30 minutes west. At 40 feet in from the portal a 24-foot branch extended north 28 degrees east. Chaining along the main course from the portal, conditions are as follows: From zero to 30 feet, soil and boulders; 30 to 39 feet, sediments; 39 to 47 feet, greenstone; 47 feet to face, chiefly sediments, with mineralized greenstone coming in along the eastern wall towards the face. The north-easterly branch is mostly in greenstone, with some included sediments which also show in the face. A sample, weighing about 60 lb., from an irregular block of mineralized greenstone, about 8 by 10 feet, at the intersection of the main adit and branch, returned a trace of mercury. A sample in the main adit, between chainages 39 and 43 feet from the portal, gave the same result, and a sample between chainages 43 and 47 feet gave a *nil* return.

The "No. 1 area" workings, comprising surface-stripping and two closely-spaced short adits, are easterly from the adit of "No. 2 area," the upper adit-portal being 225 feet north 73 degrees east from the previously described adit and at 3,920 feet elevation. In this vicinity there are two small cuts distant 21.5 and 10.5 feet respectively along a bearing of north 25 degrees west from the upper adit-portal and at elevations of 3,945 and 3,936 feet. These cuts are located along the vertical contact of the greenstone and sediments, the latter rocks lying to the east. In the westerly side of the upper cut there are scattered incrustations of cinnabar, over a narrow width, in sheared greenstone. In the lower cut sheared greenstone, with no apparent mineralization, is exposed. Immediately above the adit-portal there is a width of 8 feet of greenstone, amygdaloidal in part. Along the contour of the side-hill, 18 feet south-westerly from the adit-portal, beyond a section of quartzite 3 feet wide, there is a 7-foot width of sheared greenstone irregularly mineralized with spots of cinnabar. This local showing could not be traced uphill in stripping over a length of 16 feet. The upper adit follows a curving north-westerly course for 25 feet, and 13 feet in from the portal has a westerly branch 12 feet in length. The main part of the working is in sheared to massive greenstone, including quartzite lenses, its branch being all in quartzite. In the floor of the adit, at the forks, there is a lenticular streak of scattered cinnabar mineralization along the approximately vertical contact which strikes north 40 degrees west. A grab sample from two piles of mineralized greenstone, aggregating about 20 tons, at the portal contained 0.2 per cent. mercury. Sixty feet north-easterly from the adit there is a large body of hornblende andesite striking north 20 degrees west. The lower adit-portal is 60 feet south 20 degrees 30 minutes east from the upper adit and at 3,886 feet elevation. Driven west for 35 feet, it passes through a few feet of greenstone at the portal, beyond which it is all in sediments.

Near the toe of the slope just above the creek-level, and at 3,710 and 3,715 feet elevation, there are two adits, 15 and 10 feet long respectively, which are 55 feet apart along the contour of the slope. The easterly of the two adits is situated 475 feet north 47 degrees 30 minutes west from the camp. Between the portal and the creek there is an open-cut extending south-

easterly for 20 feet and largely filled with debris. The cut was apparently all in greenstone, which, adjacent to the creek, is 18 feet wide. There are sediments to the east of the greenstone, tuffs to the west, and quartzites in the adit to the north-west. A grab sample from a few tons of mineralized greenstone in the cut returned a trace in mercury. The westerly 10-foot adit is all in purple tuffs.

"No. 4 area" workings are on the steep north-westerly slope to the creek. These include a 10-foot adit, at 3,822 feet elevation, driven south-easterly. Adjoining the adit-portal a trench, crosscutting the north-westerly strike of the rocks, exposes the following section going south-westerly along the contour of the slope: 8 feet of quartzite; 2 feet of impure greenstone containing spots of cinnabar (opposite adit); 18 inches of quartzite; 2 feet of greenstone sparingly mineralized with cinnabar specks and incrustations; 20 feet of quartzite; 4 feet of mixed purple tuff and quartzite; 3 feet of greenstone containing sparse cinnabar-stain; 10 feet of shales; hornblende-andesite dyke, of which a width of 10 feet is exposed.

Summarizing the above notes, no substantial body of valuable material had been opened up at the time of the writer's examination in August, 1936, the work done being scattered over a comparatively large area. The widespread distribution of the low-grade mineralization, almost always present to some extent where greenstone is uncovered, indicates possibilities that, by sorting or selective mining, an appreciable aggregate tonnage of treatment grade may be derived from the known widely-separated greenstone bodies or from others which may be uncovered.

SPECIAL REPORTS.

A limited number of mimeographed copies of reports are available to those who specially request information on the following properties:—

LODE-GOLD DEPOSITS.

Bridge River Area.—Lucky Jem; Kelvin; B.R. Mountain Golds, Ltd.

P.G.E. Area North of Squamish.—Brandywine; Nani.

Coquihalla Area.—Brett Gold Mines, Ltd.

Vidette Lake Area.—Hamilton Mines, Ltd.; Telluric; Moon Group; Bull Moose.

Vancouver Island.—Regina Group.

Coast and Islands Area.—Blue Bells Gold Mining Syndicate; Enid-Julie; Douglas Pine.

PLACER DEPOSITS.

Wreck Bay, West Coast of Vancouver Island.

Some of these properties, described in former Annual Reports of the Minister of Mines, have had little development-work done on them in recent years, and others are not considered to have reached a stage of development or to be of sufficient interest to warrant inclusion of lengthy descriptions in the Annual Report.

PROGRESS NOTES.

LODE-GOLD DEPOSITS.

BY

THOS. R. JACKSON.

BRIDGE RIVER CAMP.

Pioneer Gold Mines of B.C., Ltd.—H. T. James, general manager; E. F. Emmons, mine manager; Paul Schultz, mill superintendent. This mine is situated at Pioneer and is a shaft operation, with Nos. 1, 2, and 3 shafts in use; No. 1 shaft is down to the ninth level, No. 2 shaft to the twenty-sixth level, and No. 3 shaft to the twenty-sixth level. Electric hoists are in use at each shaft.

During the year the deepening of No. 2 shaft from the fourteenth level to the twenty-sixth was completed and crosscuts driven from the shaft to the vein at the seventeenth, twentieth,

twenty-third, and twenty-sixth levels, and at the end of the year ventilation raise connections had been completed from the twentieth level upwards.

Development during the year consisted of 9,921 feet of drifting, 3,359 feet of crosscutting, 2,746 feet of raising, and 321 feet of diamond-drilling. One hundred and fifty-four thousand eight hundred and eighty-one tons of ore was mined and this yielded 69,407 oz. gold and 12,845 oz. silver.

There were 301 men employed.

Bralorne Gold Mines, Ltd.—Richard Bosustow, general manager; Fred Grey, general superintendent; E. J. Chenoweth, mine superintendent. During the year a total of 21,466 feet of exploration and development work was done in the *Bralorne* mine, including 1,145 feet of raises and 765 feet of shaft. The *King* No. 2 shaft was sunk to the 1,400 level and crosscuts driven on that level to the *King* and "C" veins, with several hundred feet of drifting on each.

The *Empire* level, connecting the *Bralorne* mines with the *Empire* mine (formerly called *Bradian*), was completed, thus allowing the transportation of the *Empire* ore underground to the *Bralorne* portal. Some bad curves were straightened out and a manually-operated block-light system installed. The *Empire* shaft was sunk to the 1,000 level, thus connecting up all the underground workings. Subsequent to this connection the *Coronation* shaft had only been used for ventilation. Motor-haulage was installed on the 600 level in the *Empire* mine and on the 1,000 level *Empire* mine.

Quite a number of stopes in the *Empire* and *Blackbird* mines have been changed from shrinkage to cut-and-fill on account of bad walls. A new underground powder-magazine was made, as was a new underground fuse-house. A raise was driven from the 800 level on the *Blackbird* vein to the 600 level; this permits transfer of *Blackbird* ore to the main haulage-level, as well as providing means for transportation of men and supplies from the main haulage-level to the 600 level of the *Blackbird* mine. The connection of the various working-places by the aforementioned drifts, shafts, and raises, as well as several other raises, has greatly helped the mine ventilation.

The tonnage mined during the year was 167,264 and this yielded 63,329 oz. gold and 20,478 oz. silver.

Wayside Consolidated Gold Mines, Ltd.—P. E. Ritchie, managing director; G. R. Bancroft, manager; E. H. Lovitt, mine manager. This mine is situated on the Bridge River Highway near Gold Bridge; there are seven adit-levels and four lower levels driven from a winze sunk from the lowest adit. The different levels are ventilated by natural means and ventilation in the lower levels is provided by a 10-horse-power electric-driven fan of 5,000 cubic feet capacity.

The mill, of 100-ton capacity, operated throughout the year and treated 37,535 tons of ore. The total development during the year consisted of 820 feet of raising, 415 feet of sinking, and 2,225 feet of drifting and crosscutting.

Pacific Eastern Gold Mines, Ltd.—Major Jas. R. Lower, president and general manager; R. H. Stewart, consulting engineer; Chas. R. Cox, mine superintendent. This property is situated in the Bridge River area adjoining the *Pioneer* gold mine to the east. The operation consists of a 600-foot adit driven on the north bank of Cadwallader Creek and a shaft 550 feet deep at the end of the adit. From the bottom of the shaft the main crosscut extends for a distance of 3,100 feet to the south and exploratory drifting to the extent of 2,543 feet has been done east of this crosscut. A winze was sunk to a depth of 230 feet, from which work is being done on the 690 level.

All power is electric, provided by the Bridge River Power Company, Limited, and all underground workings are electrically lighted. The mechanical plant consists of a 720-cubic-foot Gardner-Denver compressor driven by a 110-horse-power synchronous motor; the blacksmith-shop is equipped with an Ingersoll-Rand "C" sharpener, small electric grindstone, and other customary equipment. Hoisting is done by a double-drum Mead-Morrison hoist operating two 1-ton automatic dump-skips. Water is removed from the 72,000-gallon collecting-sump on the 370 level by a 500-gallon-per-minute Pomona pump.

Development during the year consisted of 2,543 feet of drifting, 2,244 feet of crosscutting, 230 feet of sinking, and 1,412 feet of diamond-drilling.

B.R.X. (1935) Consolidated Mines, Ltd.—E. R. Shepherd, general manager; Jack Wallace, mine manager. This mine has worked continuously with an average daily number of twenty-

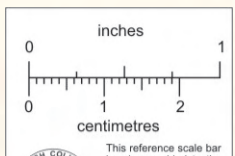
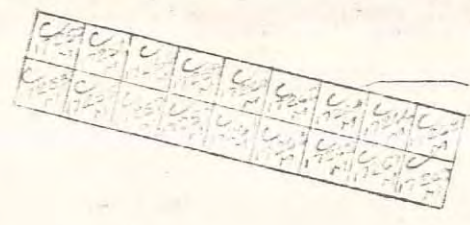
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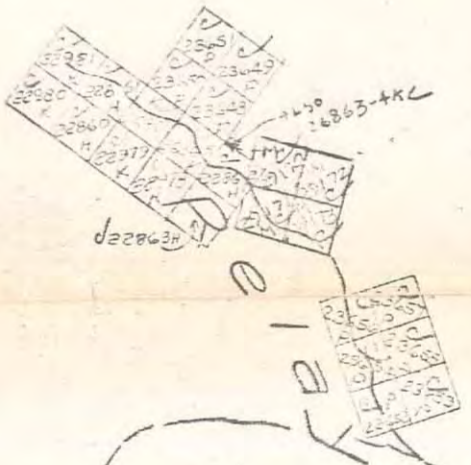
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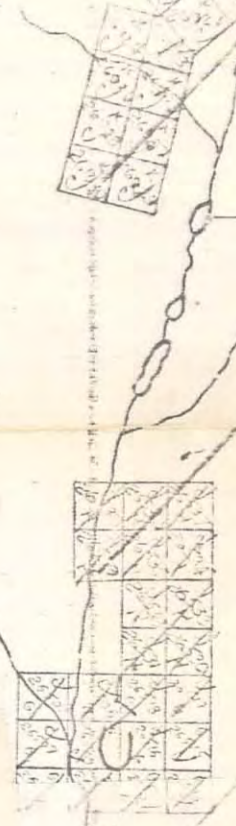
Nicodemus Cr.

CLINTON
LILLOOET

MINING DIVISION
MINING DIVISION



Handwritten note in a small box.



CASTLE PEAK



Tyughton

Handwritten labels: PML 949, PML 950

Spruce L.

Taylor Cr.