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REPORT
ON

LYNN CREEK ZINC MINES

VANCOUVER

MINING DIVISION

C. M. CAMPBELL -
and others.

MINING ENGINEER

R E P O R T S

ON

LYNN CREEK ZINC MINES LIMITED.

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Vancouver, B. C.
February 1944.

REPORTS

ON

LYNN CREEK ZINC MINES LIMITED

VANCOUVER MINING DIVISION
BRITISH COLUMBIA

SUMMARY:

The property of the Lynn Creek Zinc Mines Limited, is almost in sight of Vancouver. It is located at the back of Crown Mountain, the dominant feature of the North Shore range of mountains as viewed from that city. Further details are shown in the location map and photo following.

Though the area is precipitous there is no danger in this section from snow or rock slides. It is well timbered and there is plenty of water except during the dry seasons, and it is believed that this problem can be solved by the erection of some dams. Some waterpower is reported and the lines of the B. C. Power Company are only a few miles distant.

Reports on the property go back to 1890 and they are numerous. To make them more easily understood the second map has been prepared from a map attributed to Paul Billingsley. These reports are in general agreement on one main point and that is that the area calls for, and warrants, further development. A summary of some of the opinions that warrant attention follows:

1911: Henry G. A. Lee

Lee was field engineer for American Smelting and Refining. His report supplies general information and refers to

the probability of a large tonnage with development.

1912: Newton W. Emmons:

Emmons was in charge of the development work done during that year and he outlines the work done. He refers to two diamond drill holes in regard to which only the general location is marked on the map. One of these holes encountered 12 feet of ore running half an ounce in silver and 10% zinc while a second hole passed through 16 feet of milling ore and 20 feet of leached ore. In general the work strengthened his previous favorable opinion.

1914 John D. Galloway:

Galloway was then assistant mineralogist for the British Columbia Department of Mines. He states that no large tonnage of ore was then developed and considers tonnage estimates difficult as "the ore comes in and goes out quite abruptly." He refers to the favorable fact that the ore is essentially straight zinc blende and gangue and the concentration should be simple. His report in regard to the diamond drilling does not check with that of Emmons, and as the latter did the work his statement is doubtless the correct one.

1919: Paul Billingsley:

Billingsley is a highly regarded American Engineer and geologist. It was his study of the geology of the Nickel Plate mine that resulted in giving that mine another lease of life. In his report on Lynn Creek he refers to the rocks of Crown Mountain as chiefly limestones showing extreme metamorphism. Epidote is the most highly developed, garnet is next and is fol-

lowed by chlorite, sericite, and tremolite. There has been little silicification.

Details are given in regard to the occurrences and the grade and these are tabulated, in the main, on the second map. A plan of development is outlined in which he draws attention to the occurrences of good tunnel sites, water, and some water power. He favors an option being taken and \$2,500 being spent on preliminary improvements followed by a year's work with a small crew.

1929: Paul Billingsley:

In this second report the mineralization is referred to as deposition in beds which are intersected by fissures and faults which localize the ore. The ore lies in pipes (sausages) along the fissures and faults.

Lower Workings: The surface dimensions of the largest deposit are 100 by 10 to 15 feet with a grade of 15 to 18% zinc. Other scattered pods with grade up to 30% over a width of 10 feet are found for several hundred feet northward when the member passes into the deep soil of the Evening Star Claim.

Upper Workings: The principal bed can be traced for 600 feet and is heavily mineralized to a width of a 6 to 12 feet with an average grade of about 20% zinc.

He considers Lynn Zinc as "distinctly meritorious" and recommends a drilling program at a cost of the order of \$50,000. This would, presumably, be additional to the program of surface improvements such as a camp etc., and trenching recommended in the 1919 report.

1942: Metallurgical Test:

The report of the Ore Dressing and Metallurgical

Laboratories at Ottawa is to the effect that six samples were submitted and a composite prepared which assayed 15.79% zinc, no lead, and a trace of gold (10 cents per ton). As a result of the tests it reported: "No trouble is anticipated in the treatment of this ore and a zinc grade of 53 to 55% zinc, with a recovery of 90 to 95% should readily be obtained." The ratio of concentration is 3.6 into 1.

In 1929 the writer spent a day on this property and his conclusions are, in general, along the lines of those submitted. At that time, however, financial terms were not favorable and nothing was done.

The property has recently been acquired by St. Eugene Mining Corporation Limited on a very favorable basis, which fully justified carrying the project for exploratory development when funds are conveniently available after the war and the general outlook for zinc warrants proceeding.

Respectfully submitted,

G. M. Campbell.
Mining Engineer.

Vancouver, B. C.

February, 1944.

LOCATION MAP AND PHOTO:

The property is located about ten miles by road and trail from Burrard Inlet at North Vancouver. The map shows the claims comprising the group outlined in red and lying on one of the precipitous slopes of Crown Mountain.

The photo is a view, looking eastward and shows Crown and Grouse mountains in profile. The notch between the two mountains indicates the location of Kennedy Lake and Creek. The zinc showings are on the far side of the mountain and near the summit. Lynn Creek lies on the far side of Crown and Grouse mountains.

LOCATION MAP
LYNN CREEK ZINC MINES, LTD.

NORTH VANCOUVER, B.C.

SCALE: 2 IN. = 1 MILE

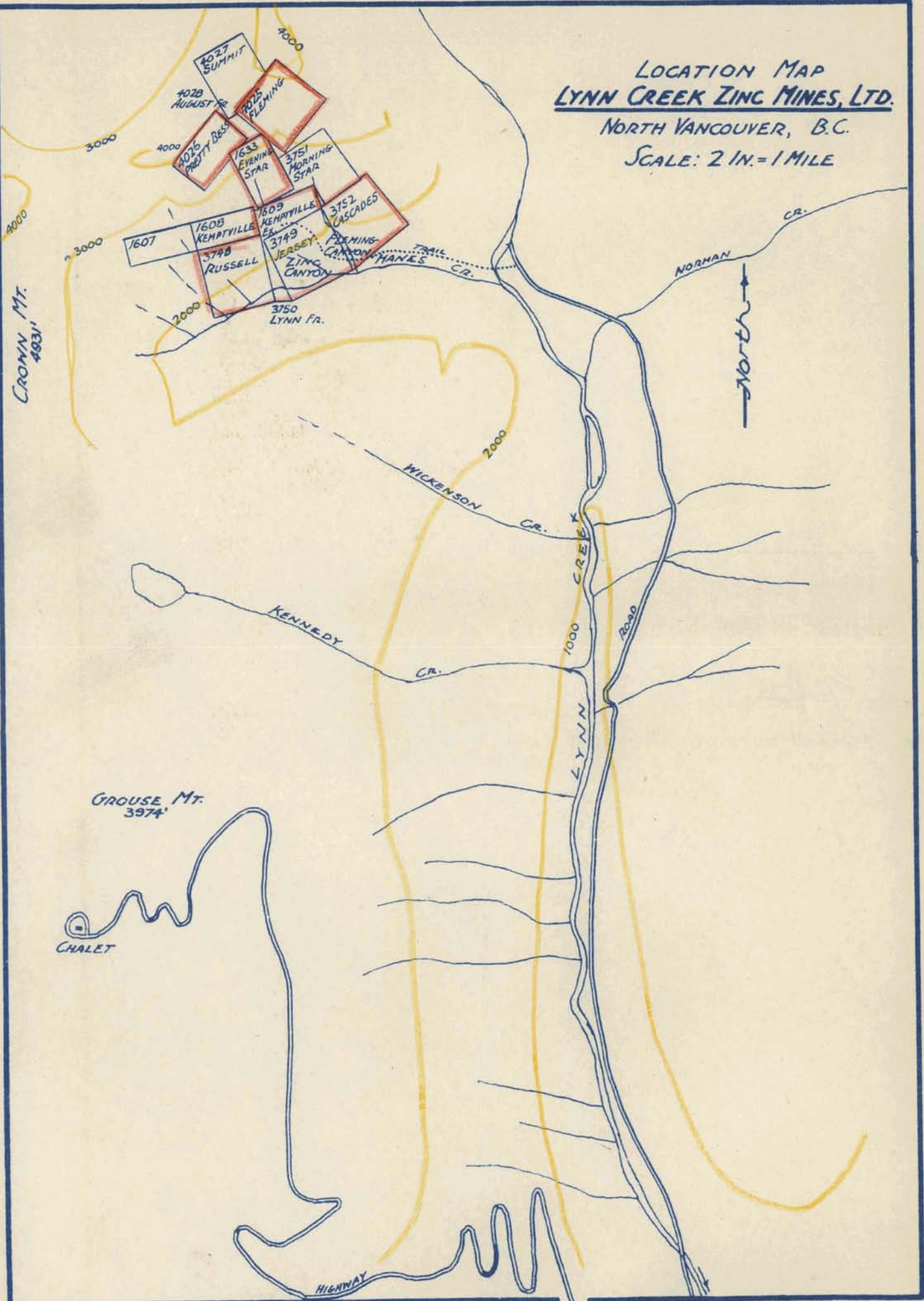
CROWN MT.
4931'

GROUSE MT.
3974'

CHALET

HIGHWAY

3 1/2 MILES TO BURRARD INLET



PLAN OF MINE WORKINGS:

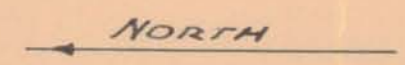
This map is a reproduction of one of the maps submitted and can be taken as approximately correct only.

According to Billingsley the dip of the ore in the Upper Workings is to the north-west, i.e., towards the August Fraction Claim. The need for this additional ground is, therefore, indicated. Emmons refers to a westerly dip in the lower workings making the acquisition of the Lucky Star and Kemptville Claims desirable.

It is quite likely that The Evening Star Claim was staked under the old law that permitted extralateral rights. Even so it seems desirable that these additional claims be acquired if they are available at reasonable terms.

MINE WORKINGS
 LYNN CREEK ZINC MINES, LTD.

NORTH VANCOUVER, B.C.
 Scale: 1" = 100'



No	WIDTH FEET	ZINC %
14	8	25.9
15	3	29.7
16	6	31.9
17	6	15.6
18	5	19.9
19	5	26.1
20	5	12.9
21	3	16.6
22	3	14.2
23	3	8.0
24	8	9.5
25	3	26.2
26	3	37.0
27	6	8.1
28	3	8.0

EVENING STAR

+ SURFACE EXPOSURE ZINC ORE

ZONE TO BE PROSPECTED BY DRILLING

- ORE BEARING BEDS
- ORE
- GRANITE

No.	WIDTH FEET	ZINC %
1	8	15.0
2	4	16.3
3	5.5	22.7
4	3	18.9
5	3	16.4
6	8	4.8 HM
7	11	13.6
8	6	13.6
9	4	33.2
10	5	30.9
11	3	31.1
12	6	15.0
13	8	20.0 PB. 20.0

LOWER WORKINGS 2250'

KEMPTVILLE

LEAD FLOAT

PEARSON TUNNEL 2250'

KEMPTVILLE EXT'N

ZINC CANYON

LUCKY STAR

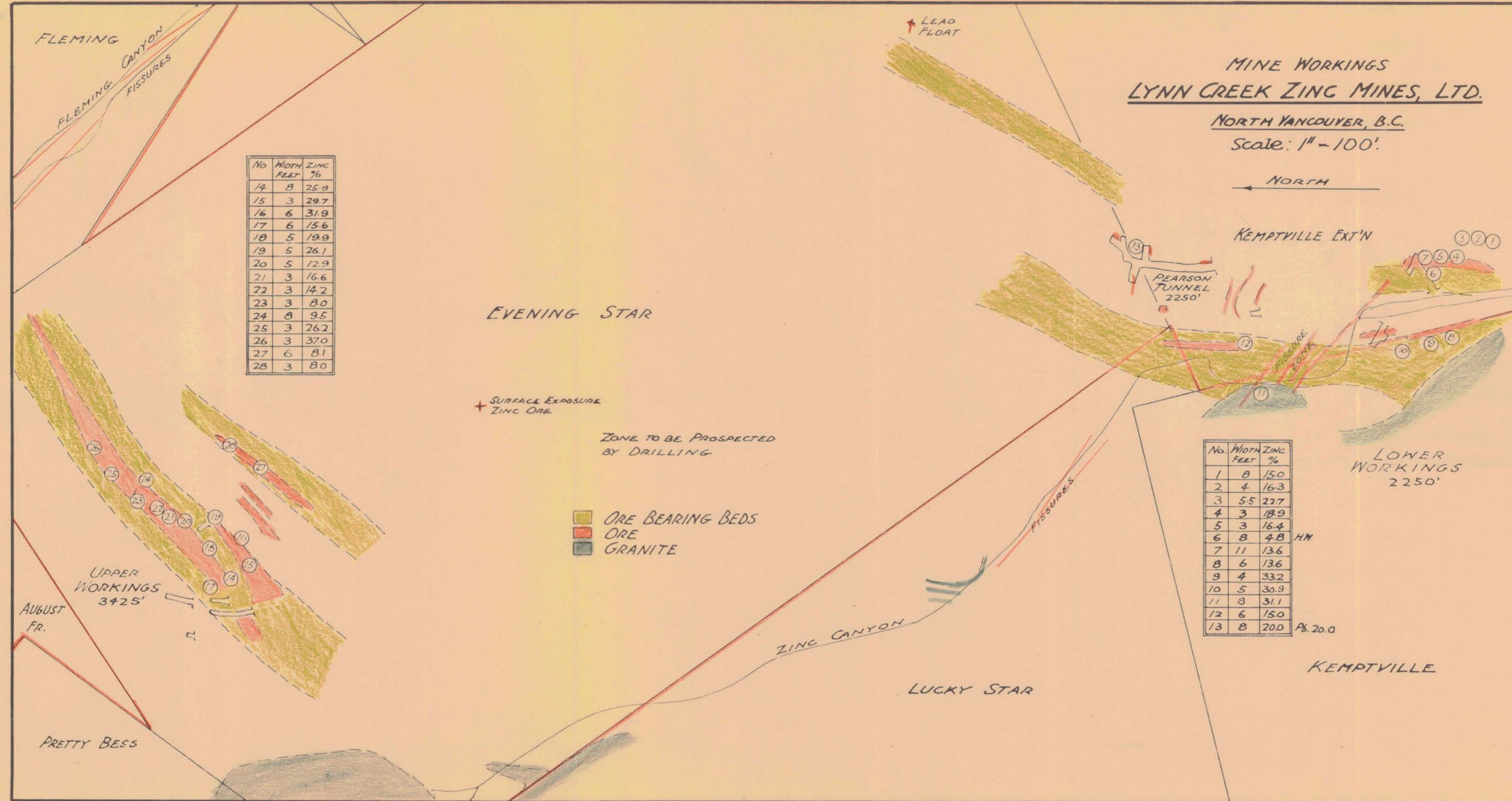
FLEMING CANYON
 FLEMING FISSURES

FISSURES

UPPER WORKINGS 3425'

AUGUST FR.

PRETTY BESS



R E P O R T

OR

ZINC DEPOSITS

ON THE

KEMPTVILLE EXTENSION AND EVENING STAR CLAIMS

LYNN CREEK, NEAR VANCOUVER, B. C.

by

H. G. A. LEE

1 9 1 1

REPORT OF THE ZINC DEPOSITS
OF THE
KEMPTVILLE EXTENSION & EVENING STAR CLAIMS
ON
LYNN CREEK, NEAR VANCOUVER, B. C.
BY
H. G. A. LEE, M.E.

AUGUST 24th, 1911

LOCATION:

The claims are located on Lynn Creek, about 12 miles from its mouth, and 7 miles from the present terminus of the B. C. Electric car line.

CLAIMS:

There are two in number, named the KEMPTVILLE EXTENSION and the EVENING STAR, the former of these is staked under the old mining law of British Columbia, which permits of the following of the ledge whose apex is continued within two boundaries of the said claim, the dimensions of the claim being 600' x 1500'. The Evening Star claim is staked under new law, limiting the right of the mining to the ground immediately and vertically under the boundaries of the claim. The Evening Star covers deposits not controlled by the Kemptville Extension.

ORE DEPOSITS:-

GEOLOGY:

The country rocks are siliceous, chloritic, epidote and hornblende, schists, occurring within and surrounded by the coast granites and syenites. The ore bodies are irregular in shape, and occur along the fractures zones of the schists. The strike of the ore bodies is slightly east of north, and the dip is nearly vertical. There are two main ore bodies, each of a width of about 60'. The lower of these bodies is exposed by a creek tributary to the western fork of Lynn Creek. This creek cuts the ore body somewhat diagonally, so that all measurements are longer than they would be if the exposed face were square to the strike of the ore. The upper orebody, which is on the Evening Star Claim, is exposed at its lower end by the same creek, while further up the hill it angles away to the east of the creek, but can be traced for some 2000' by the outcrop up the mountain. The capping seems to be about 20' in thickness. The lower showing, on the KEMPTVILLE EXTENSION, is about 60' width. Of this there is five feet of quartz shot with stringers of very pure large grained zinc blend from 1" to 6" in width. After a five foot of quartz and epidote-chist comes four feet of quartz with a net work of stringers of the same size as below, then 15'

of solid ore is exposed. North of this 30', chiefly covered with capping; a short tunnel has been driven in here, exposing a white limestone, showing one 6" stringer. At the extreme end of this showing is a massive pyrrhotite, below which the zinc comes in again, though to what extent could not be determined without shooting. Some 200' north is a 6' vein of solid pyrrhotite, 100' north of this, following up the bed of the creek, is a 60' wide ore body striking up the mountain. This is referred to above as the upper ore body, where examined by me in the creek. The capping had not been removed but this in many places where eroded by the spring freshets were shot with stringers of a very good grade of ore. From the lower end of this showing I was able to follow the trend of the ore body up the hill for some hundreds of feet. It was impossible to get further up the creek than the north boundary of the Kemptville Extension, owing to the precipitous nature of the country. I was therefore unable to see the exposed ore on the Evening Star, which I am informed is a favourable showing as that above described.

GENERAL:

It is impossible at this time to give a definite idea of the amount of ore on these two claims. There is at present no "ore in sight" as none of the ore body has been blocked out, and only one side of the same is exposed. It is indeed very probable that the whole mountainside is mineralized by great zones of zinc blend, but until a great deal of exploratory work has been done estimates will have to be confined to a minimum, represented by the ore bodies intersected by the creek.

MINERALOGY:

The grade of ore is very good. Samples were taken across the 13' of solid ore in the lower showing, giving the following values:-

ZINC	-	24.64%
Iron	-	7.22%
Lead	-	0.63%
Copper	-	0.50%

The fact of the lowness of lead and copper percentages is very attractive. The iron occurs partly as pyrites, the balance being intimately mixed with the blend, which is of a dark brown color. The Gangue matter is silicia and calcite, with some epidote.

TIMBER:

This consists of FIR, HEMLOCK and CEDAR, the latter being especially fine, being up to 10' in diameter.

WATER SUPPLY:

At present there is not much water in the creek gully. During the winter and spring there is ample water for all purposes, and it would later be necessary to put a dam in the creek for storage for the summer. Such a dam can be readily and easily constructed, the sides of the creek being almost precipitous, and any head can be taken. For a large power, as will be needed in the future for extensive operations, the west fork of Lynn Creek can be utilized.

TRANSPORTATION:

The B. C. Electric is now within some 7 miles of the property. A further survey has been made to a point some two miles or less from the property. This projected line could be extended another mile and one half along Lynn Creek, and a gravity tram from the mine put in. The latter would be between 1500 and 2000' long. From the present car terminus the grade is easy for construction and running, the major part of the line would be along the flats along the side of the river.

CONCENTRATION:

The necessary plant for the same would be a crusher, trommel for sliding, two gigs, and one or two tables. This concentration would be on nearly a three to one ratio, bringing the ore to the highest possible grade preparatory for shipment. This concentration plant would be located right at the mine and save all costs of transportation charges.

SMELTER:

This is a matter for the future. If a smelter be erected here, it should be on Burrard Inlet, where all supplies can be cheaply landed, and where there are all the facilities for shipping and marketing.

CONCLUSIONS:

It is understood this report is only preliminary, that time and opportunity did not allow any more than a short trip to the property and therefore this report will be liable to modifications and also be greatly supplemented by any future reports on the property. At the same time work will be necessary in order to determine the extent of the lower orebody in particular, and to block out the same, giving an absolute asset to the mine in the shape of ore in sight, whose values can be readily determined.

H. G. A. LEE, M.E.

AUGUST 24th, 1911.

R E P O R T

ON THE

L Y N N C R E E K Z I N C M I N E S

VANCOUVER MINING DIVISION

OF

BRITISH COLUMBIA

by

NEWTON W. EMMENS

Mining Engineer

1 9 1 2.

The property covered by this report consists of the following mineral claims:

Kemptville Extension
Evening Star
Russell
Jersey
The Cascades
Fleming
Pretty Bess
Lynn Fraction

containing four hundred acres, more or less.

Of the above claims the Kemptville Extension is held by Crown Grant under the old law which grants extralateral rights on all veins apexing within the boundary of the claim; that is to say, that the owner of such a claim has the right to follow any vein which apexes on the claim, on all its dips, spurs and angles, even though by doing so the side lines of the claim be crossed in depth.

The Evening Star claim is held by Crown Grant under the new law, which grants all mineral lying within the vertical projection of the bounding lines.

The Russell, Jersey, the Cascades, Morning Star, Fleming, Pretty Bess and Lynn Fraction claims are held by location.

All the requirements of the Mineral Act of British Columbia with respect to the above claims have been complied with, and the titles are therefore perfect.

A C C E S S I B I L I T Y

The claims are situated on a spur from Crown Mountain on the North side of the West fork of Lynn Creek, in the Vancouver (late New Westminster) Mining Division of British Columbia, about ten miles North of the City of Vancouver, and are reached by ferry to North Vancouver, thence by electric tram to the end of the Lynn Valley line, and then by trail, seven miles to the property. The claims are so located that they cover the slope of the mountain from the level of the Creek up to, and across, the summit, the elevation being approximately from 1500 to 4000 feet above sea level.

T O P O G R A P H Y

The district in which the property is situated lies within the great granite batholith composing the Coast Range of mountains, which are of comparatively recent geologic

origin, having precipitous sides, deeply scored by mountain torrents which flow into the main creeks forming the principal drainage system of the range. The northern slopes are well timbered with cedar, hemlock and spruce, while in the larger valleys are found groves of poplar and birch. The undergrowth is dense in the majority of places, making prospecting and travelling off the trails an exceedingly difficult and arduous matter. The southern slopes are, to a large extent, destitute of timber and are in many places so steep that it is impossible to climb them. Along the main valleys flow streams of water which are of sufficient size, during the major part of the year, for the generation of power by the installation of water wheels of the impulse type, as, owing to the steep gradient of their beds, a head of 100 to 200 feet can be obtained with a comparatively short ditch and flume line.

On the West Fork of Lynn Creek the slope of Goat Mountain, forming its south boundary, is composed largely of bare rock in a very unstable condition and is subject to rock slides in the spring, summer and fall, and to snow slides in the Winter. The spur from Crown Mountain, on which the property is situated, forming the north boundary of the creek, is well timbered from the creek to the summit, is much less precipitous and is not subject to rock or snow slides.

G E O L O G Y

The rocks occurring on the claims under discussion consist of impure limestones, sandstones and shales which formed the roof through which the Coast Range batholith of granite was thrust and which have been altered by the heat and pressure of the uplift (metamorphosed) into marble, dolomite, quartzite, garnertite, epidote, schist and other allied metamorphic minerals. The uplift of this hugh mass of granite not only altered the overlying rocks but crushed and shattered them, especially along the lines of contact of dissimilar rocks, affording avenues for the circulation of waters which accompany or follow these geological disturbances.

Subsequent to the thrusting up of the granite a second disturbance took place which resulted in a faulting of the rocks, in a general easterly and westerly direction, probably caused by the cooling and shrinking of the batholith, and it is subsequent or contemporaneous to this second disturbance that the mineralization took place, because it is found that not only does the mineral occur along the crushed zones between the rocks, along their strike, but also along some of the larger faults.

CHARACTER OF ORE DEPOSITS

The ore deposits on this property occur along the crushed zones of contact between the altered sedimentary rocks and along some of the larger faults. They belong to the replacement

type of ore deposit in which the enclosing rocks have been removed and replaced by ore through the medium of hot circulating mineral-bearing solutions. This is proved by the finding of partially altered included fragments of country rock in the ore, and from the fact that in places there is no well defined line of demarcation between the ore and the wall rocks, but the former gradually fades away into the latter. At the intersection of the faults with the crushed zones there is a marked widening of the ore body and a more complete replacement of the crushed rock by ore. The strike of the ore follows closely that of the enclosing rocks, which is N. 20 deg. W. (Mag.) with a westerly dip at a steep angle.

D E V E L O P M E N T

KEMPTVILLE EXTENSION: On this claim, in a canyon along the West boundary of the claim, two parallel ore bodies have been opened up, known as the "East" and "West" ore deposit. The East ore deposit is exposed in the side of the canyon and lies between limestone and quartzite, the former being the hanging and the latter the foot wall. This ore body consists of a zinc blende (sphalerite) in a gangue of epidotized schist with some quartz and calcite, with a course of N. 20 deg. W. (Mag.) and a steep westerly dip. An open cut has been driven through this outcrop, showing the ore to be 11 feet wide, the bulk of which is solid zinc blende. Samples from this place assayed from 19.2% to 45% zinc.

Seventy feet north of this cut a crosscut has been run. This crosscut intersected the vein 5 feet in from the portal and passed through 20 feet of ore before encountering the footwall quartzite. Much of this ore is solid zinc blende and the balance of it is a good concentrating material, assaying from 8.26% to 16.72% zinc. Where the ore encounters the footwall quartzite a drive has been made north along the course of the ore for a distance of 15 feet, carrying the quartzite at the foot or east side of the drive. This drive is in ore all the way, but it is of a better grade in the floor of the drive than in the roof, due largely to the leaching action of the surface water, as the drive is not far below the surface. In the face of the drive the good ore shows about half way up.

Two hundred and twenty-five feet north (in a straight line) a diamond drill hole has been put down from the canyon which lies west of the course of the ore. In the No. 1 hole the continuation of the ore body was encountered at a depth of 132 feet and continued in it to a depth of 145 feet. An average sample of the core contained while drilling through the ore assayed 0.5 ounces silver and 10% in zinc. At the point where the drill intersected the ore it is 18 feet vertically above the crosscut and drive previously spoken of, and 225 feet north.

A second drill hole is now being made from the same place, but at a steeper angle, so as to intersect the ore body at

75 feet greater depth. This hole is now 129 feet deep, and has been in epidotized schist carrying a little zinc blende for the past 5 feet, which is a good indication, inasmuch as it is not expected that the main ore body will be encountered before the depth of 160 feet is reached.

WEST ORE BODY: This is a parallel ore deposit and outcrops near the foot of the bluff forming the west side of the canyon and on the west side of the lime which forms the hanging wall of the east ore body. It has been opened up by a series of open cuts and surface stripping for a distance of 400 feet along its strike. In width it varies from 8 inches to 4 feet carrying zinc blende, copper and iron pyrites, and pyrrhotite. Two hundred and twenty five feet north of southwest corner post of the claim the ore is opened up by a cut at its contact with the granite, and here shows a little copper-iron pyrites which assays 1.5% copper. The zinc ore comes in a few feet further north, where it has been opened up by stripping and an open cut, known as No. 1 W.

Commencing close to the granite contact the zinc ore extends north for a distance of 150 feet, following the line which forms the footwall of the mineral bearing formation of this side of the canyon. For the next 125 feet pyrrhotite carrying a little copper and zinc is the chief mineral in the ore deposit, after which zinc again comes in and is continuous as far as exploration work extends, a distance of 150 feet. In the No. 1 w. cut, previously spoken of, the zinc blende ore is five feet wide, an average sample of which assayed 28.8% zinc.

Eighty-five feet north of the No. 1 w., open cut a crosscut was run in from the floor of the canyon for a distance of 48 feet, passing through the ore deposit at 18 to 24 feet from the portal. At this point the contents of the ore deposit is chiefly pyrrhotite assaying 1% copper and 2.75% zinc. It was known that this crosscut was a little too far north to intersect the zinc ore shoot, as a drive was commenced in a southerly direction along the strike of the ore to come under the zinc "showing" which appears at surface. This drive has been driven a distance 7.6 feet and more zinc is coming in as the drive progresses. It was decided, however, that it would be more expeditious to explore the ore formation by means of diamond drilling, so mining work has been suspended for the time being, till the location and size of the zinc ore shoots have been definitely ascertained by means of the drill.

One hundred and thirty feet north of the crosscut above mentioned is a well defined fault having a source of N. 70 deg. W. (mag.) and extending from the west ore channel to the canyon, a distance of 125 feet, where it is probably cut off by the granite, as it cannot be traced beyond this point. This fault is occupied by high grade zinc ore which widens out near the western end of the fissure. Aside from surface stripping, no work has been done along this fault, but it is intended to ascertain the extent of the ore here outcropping by means of the diamond drill, where opened up by

surface work the ore varies from 2 feet wide at the eastern end of the fault to 10 feet at the western.

EVENING STAR: This claim adjoins the Kemptville Extension on the north, and extends in a north-westerly direction for a distance of 1,500 feet, nearly to the summit of the mountain. In the canyon a short distance north of the Kemptville Extension is an outcrop of ore carrying zinc, copper and iron sulphides, which is supposed to be a continuation of the "West Ore Body" but which has as yet not definitely been proved. This outcrop occurs close to one of the eastwesterly faults previously referred to, and further exploration may show it to be a branch off the main or east ore body. A short crosscut was driven from close to the bed of the creek, under this outcrop, but failed to show any amount of ore, owing to its being commenced too far on the foot wall side, the bulk of the ore above the level of the canyon floor having been eroded away by the stream.

Thirteen hundred feet north-westerly from this outcrop and at an approximate elevation of 1,500 feet above it, is an outcrop of zinc blende ore. This outcrop occurs at the head of a rock slide falling into Flening Canyon. An open cut has been made along this outcrop, showing the ore body to be 12 feet wide of a banded structure, with a strike of N.20 deg.W. (Mag.). In this ore body occurs streaks of solid zinc blende from 2 to 12 inches wide, samples from which may assay 0.5 ounces silver and 37% zinc. Samples from the less mineralized portion of the ore body assay 0.4 ounces silver and 21.5% zinc.

A hundred feet further northwesterly this ore again outcrops in the side of a second rock slide where there is 8 feet of it exposed, but how much wider it is cannot be stated, as the foot wall is not visible owing to its being covered. In climbing out of this slide, the writer cut foot and hand holds in the slide, and in every instance struck zinc ore on getting through the overburden. From the nature of the ore, the sequence of the rocks associated with it and its course, it is believed that this is a continuation of the east ore body which has been exposed in the canyon on the Kemptville Extension claim.

JERSEY CLAIM: This claim lies to the south and adjoining the Kemptville Extension, extending down the mountain side to the valley of the West Fork of Lynn Creek. No work has as yet been done on this claim, nor is the existence of any body of mineral known thereon, its chief value being for the timber and as a site for reduction works and dwellings.

RUSSELL CLAIM: Is an extension and adjoins the Jersey Claim on the west, and like that claim its present known value is for the timber and building sites. There are two deep canyons on this claim, down which flow small streams of water which may be of considerable benefit later on for milling purposes.

FLWMING: This claim is an extension of the Morning Star in a North-westerly direction and extends to the summit of

the mountain, side-lining the Evening Star for a portion of its length. On this claim, near the head of Fleming Canyon, on its south side, is an exposure of galens ore about 2 feet in width having an approximate course of N.50 deg.(Mag). This galens occurs along the line of contact, which is particularly well defined, between lime and quartzite, and has practically a vertical dip. No work has been done on this showing, but average samples obtained by the writer assayed 0.02 ounces gold, 25 ounces silver and 9% lead.

PRETTY BESS: This claim is an extension of the Evening Star on the North, and side-lines the Fleming on its western side for a portion of its length, covering the summit of the mountain and down its northern (Capilano) slope about 500 ft. The writer was informed that there is an outcrop of zinc blende about 400 feet down the Capilano slope, but has not yet seen it. From the description and location given of this outcrop, it is probably an extension of the ore deposit already described, which outcrops on the Evening Star near its North boundary.

THE CASCADES: Is an extension of the Kemptville Extension to the east, covering the mountain side almost to the North Fork of Lynn Creek.

MINING FACILITIES

The several properties above mentioned are excellently located for the economic mining of their ores, covering as they do the sides of a steep mountain, enabling the orebodies to be mined by means of crosscuts and drives at a minimum cost, thus avoiding expensive shaft sinking and the hoisting of water and rock. There is ample timber on the ground for all purposes, and water can be secured in abundance. A railroad can be built up Lynn Creek and its West Fork to the foot of the mountain on which the properties are situated and the product of the mines brought to tidewater at North Vancouver, at a minimum cost.

The close proximity of the property to the City of Vancouver enables all supplies to be bought at lowest market quotations and with proper transportation facilities from North Vancouver can be laid down on the ground at small expense.

C O N C L U S I O N

From the foregoing it will be seen that there are four known ore deposits having a general northwesterly strike, two of which occur on the Kemptville Extension and Evening Star claims, and one each on the Morning Star and Fleming claims, the latter being the galena. From the exploration work already done a large amount of high grade zinc ore has been opened up and the

work now being carried on will, it is believed, prove the existence of this ore both along the strike of the deposit and in depth, in quantities sufficient to warrant the erection of a milling and reduction plant for its treatment, at a handsome profit.

It is the opinion of the writer that in the claims spoken of in this report there is the making of a very large, paying mine, which, having regard to its close proximity of the City of Vancouver, should result in making its operation one of the most profitable enterprises in the Province of British Columbia.

Respectfully submitted,

NEWTON W. EMMENS.

Vancouver, B. C.
August 5th, 1912.

LATER REPORT

1656 Georgia Street
Vancouver, B. C.
Nov. 1st, 1912.

The Lynn Creek Zinc Mines, Limited,
Vancouver, B. C.

Gentlemen:

Since my report dated August 5th, 1912, on your Lynn Creek properties, the following work has been done:

The second drill hole has been completed with satisfactory results, it having passed through 16 feet of milling ore, and 20 feet of leached ore which gives promise of making an ore body below the zone of oxidation.

A new ore shoot, on the course of the "West Vein" has been opened close to the north boundary of the Kemptville Extension claim, by an open cut and adit 30 feet long. This ore, now known as the "Pearson" shoot, has been proved to be over 6 feet wide (its full width will be ascertained by crosscutting when the adit is further in the Hill) and samples taken therefrom assay gold 0.025 ounces, silver 5 ounces, lead 35% and zinc 30% to the ton.

At the North end of the Evening Star ground, where the

big outcrop occurs, the vein has been traced in both a northerly and southerly direction by a series of open cuts, along its strike for a distance of over 400 feet. These cuts all show ore varying in width from 10 to over 30 feet, the bulk of which is high grade, with the face of several of the cuts still in ore, The most northerly cut, which is in the "Pretty Bess" claim, shows splendid ore and there is every reason to believe that it will continue in a northerly direction for a long distance yet. Further work at this point has been suspended for the season owing to the advent of snow.

In Fleming Canyon an open cut has been made in the ore which outcrops near the line of the Kemptville Extension and Morning Star claims, and over 1,800 ft. northerly another cut has been made in an ore outcrop on the east side of the canyon, on the Fleming claim. These outcrops are apparently on the same vein as it is exposed in the bed of the canyon at several points between. Sufficient work has not as yet been done to ascertain the full width of this ore body, but it will probably be in excess of 10 feet. Samples of the ore from these cuts assayed gold 0.02 to 0.05 ounces, silver 20 to 25 ounces, and zinc 12% to 22%.

From the work done since August 5th, the writer's favourable opinion of the property has been further strengthened and the opening of an exceedingly large tonnage of ore is only a matter of proper development work.

Respectfully yours,

NEWTON W. EMMENS

Mining Engineer.

R E P O R T

on

LYNN CREEK ZINC MINES, LIMITED

by

JOHN D. GALLOWAY

MINISTER OF MINES' REPORT

1 9 1 4

C O P Y

Enclosure #4
Ref. Exhibit B
Paragraph A

REPORT OF THE MINISTER OF MINES, 1914, PAGES K307, K308 & K309.

LYNN CREEK ZINC MINES LTD.

Notes by J. D. Galloway, Assistant Mineralogist.

In accordance with instructions from the Provincial Mineralogist, the writer made an examination of the property of the Lynn Creek Zinc Mines, Limited, leaving Victoria on August 30th.

This property consists of the following claims: - Kemptville Extension, Evening Star, Russel, Jersey, The Cascades, Fleming, Pretty Bess, and Lucky Star, containing 400 acres more or less; the first two being Crown-granted and the others held by assessment. They are situated on the West fork of Lynn Creek, about fifteen miles from North Vancouver, and are reached by a very indifferent pack-trail. Most of these claims have been staked for many years, but it was not until the last three years under the present control that any serious development work has been carried out. The property is owned by the Lynn Creek Zinc Mines, Limited, with head offices in Vancouver; Mr. Prentice is President, and Newton W. Emmens is Manager.

Topography: The country for the most part is very precipitous and rough, being situated on the fringe of the Coast Range. The mountains are steep and rugged, with narrow canyons and rapid streams. The northern and eastern slopes and valleys are heavily wooded with fir, cedar, poplar, spruce, etc., and the underbrush is generally dense, while the southern slopes are steep and often impossible to climb. It is a difficult country to travel in, and in some places difficult to prospect on account of the thickness of wash. These claims are situated on a long spur running out from Crown mountain, and are fortunately free from any danger of snowslides or rockslides. Sufficient water-power is available on the branches of Lynn Creek to run a compressor, concentrator, and for any other requirements. Mining timber is plentiful.

Geology: The rocks in which the orebodies occur are a series of sedimentaries (probably Palaeozoic) which have been completely metamorphosed by the intrusion of the Coast Range granitic batholith, into quartzites, lime-silicates, and altered limestone. On the Kemptville Extension the contact between the granite and altered sediments can be seen. Black lamprophyre dykes, probably of recent age, cut across the other formations. During or after the granitic intrusion the sediments were fractured along north and south lines, and in these fractures mineralization has taken place, probably representing the last phase of batholithic activity.

Ore Bodies: Two main orebodies, the east and west, occur on either side of Zinc Canyon, roughly parallel and about 150 feet apart. Between these orebodies lies a body of limestone forming the hanging-wall of both. The footwall of the east orebody is quartzite, and of the west one is granite. The ore consists of zinc-blende, galena, iron-pyrite, chalcopyrite, and pyrrhotite, in a siliceous gangue. Developments of garnet, epidote, actinolite, and other lime-silicate minerals are common. The gangue rock shows all variations of silica and lime from quartzite to unaltered lime. Zinc-blende and galens are the only minerals of economic importance, and the latter only occurs to an appreciable extent in one working (Pearson drive). Silver values in the zinc and galena are very low, running from 0.5 to 2 oz. to the ton.

The east orebody has been opened up by an opencut showing 8 feet of ore. One hundred and fifty feet north of this a crosscut tunnel has been run which crosscuts the ore 12 feet from the entrance; the crosscut then passes through 15 feet of ore, and continues for 20 feet farther into the quartzite footwall. From the eastern boundary of the ore the A drive has been driven along the orebody, with quartzite on the east and ore on the west side. The face of this drive shows about 3 feet of ore, with probably more continuing into the hangingwall. Five hundred feet north of this and 275 feet higher, the Pearson tunnel has been driven 130 feet on what is supposed to be an extension of the east orebody. The face of this tunnel is not in ore, but Mr. Emmens, Engineer in charge, thinks that the orebody can be picked up by crosscutting to the east. The ore from this working is a mixture of galens and zinc-blende, and the Manager estimates that one-third of the rock extracted in driving the tunnel was ore. About 20 tons of first-class ore and about 25 tons of second class ore has been saved and is piled up on the dump.

A possible extension of the eastern orebody crops out on the Evening Star claim at an elevation of 3.448 feet. This showing has been developed by several open-cuts, which show from 2 to 14 feet of ore. Sample No.8 was taken from a cut at this showing across 4 feet. Sample No.9 was taken from the largest outcrop showing across 14 feet.

The western orebody is developed by an open-cut right at the contact between the granite and the limestone. Against the granite there is a small development of chalcopyrite, and about 4 feet from the granite there is 3 feet of solid zinc-blende. A short distance north of this another open-cut shows low-grade zinc-blende. Immediately below this and to the east a crosscut tunnel has been started to strike the orebody. Twenty feet from the mouth a small body of pyrrhotite was encountered, which, however, has no commercial value. The tunnel continues 10 feet further, but has not yet reached the contact nor any ore. The western orebody has been traced on the surface about 400 feet, and has a width varying from 2 to 6 feet. Sample No.4 was taken

across 4 feet from a surface cropping north of the cross-cut tunnel.

A cross-fissure with a strike of S. 83° E. cuts the two orebodies a short distance north of the main workings in Zinc Canyon. This fissure is mineralized across from 2 to 4 feet. Sample No. 5 was taken at this point. Another small mineralized cross-seam occurs farther north, but is of slight importance.

Diamond-drill Holes: A small diamond-drill outfit was packed in over the seven mile trail at considerable expense. Three holes were put down, all in the same vertical plane - No. 1, horizontal; No. 2 187 feet deep at an angle of 32°; No. 3 205 feet deep at an angle of 53° 25'. The holes were started at a point a little west of the strike of the western orebody, and were intended to cut the junction of the cross-fissure with the western orebody. The course of all the holes is the same - namely N. 46° E. No ore was struck in holes Nos. 1 and 2. In No. 3 hole zinc-bearing material was encountered from 125 to 160 feet. Mr. Emmens says that this 35 feet of ore averaged 10 per cent, zinc and 0.5 oz. silver.

A small showing of galena-zinc ore has been uncovered in Fleming Canyon on the Morning Star claim, but with the present development is as yet of only slight importance.

V A L U E S

Sample No.	Description	Zinc Per Ct.	Lead Per Ct.	Silver Counces
1	No. 1 E. working (15 ft.)	8.3	...	Trace
2	W. side A drive (20 ft.)	10.8	...	"
3	Face of A drive (3 ft.)	5.3	...	"
4	Open-cut W orebody (4 ft.)	3.2	...	"
5	Cross-fissure (3 ft.)	8.1	...	"
6	First Class ore, Pearson Drive	18.4	35.0	1.4
7	Second Class " "	10.3	14.4	2.8
8	Open-cut Evening Star (4 ft.)	13.7	...	Trace
9	" " " (14 ft.)	8.4	...	"
Average		9.4

With the present development it cannot be said that any very large tonnage of ore has been proven. On the eastern orebody in Zinc Canyon the Manager estimates a block of ore 20 x 50 x 100 feet, which, while quite possibly correct, cannot be said as yet to be "in sight" while the "possible ore" may be very much greater. Samples Nos. 1, 2 and 3 give an idea of the value of this block of ore, the average of these being 8.1 per cent of

zinc and a trace of silver. It is very hard to estimate a tonnage at any of the other showings from the open-cuts, especially with a deposit of this nature, wherein the ore comes in and goes out quite abruptly. On the Evening Star claim there is probably a good big orebody, as on the surface it is from 2 to 14 feet wide and ore can be traced on the surface for several hundred feet; but more development work is needed.

It will be noted that the average values are approximately 10 per cent, zinc, with silver values negligible. The showing of galena in the Pearson Drive is limited in extent and is not to be considered as being as important as the zinc showings. With such values in zinc it would be necessary to have, first, large orebodies; second, cheap mining facilities; third, an efficient concentrating plant making a high extraction and a concentrate running about 50 per cent, zinc, before the property could be operated at a profit. One very favourable feature at this place is the occurrence, in the main showings, of practically straight zinc-blende and gangue with no other interfering minerals, such as galena, iron pyrites, pyrrhotite, etc. For this reason it should be easy to concentrate the ore by straight water-concentration.

At the present time it costs 5 cents a pound to pack in supplies to the mine, which is much too high. The construction of a wagon-road would materially assist the Company in opening up and developing the property. The property is not at present being worked, but if a good road was put in to the mine the company intends to resume development and later erect a concentrating-mill.

R E P O R T

ON

LYNN CREEK ZINC MINES LIMITED

BY

PAUL BILLINGSLEY

1 9 1 9

PROPERTY OF THE
LYNN CREEK ZINC MINES, LTD.

near

NORTH VANCOUVER, B. C.

OWNERSHIP:

The mining property incorporated as the Lynn Creek Zinc Mines, Ltd., consists of the following claims:

<u>Crown Granted:</u>	<u>Lot No.</u>	<u>Area</u>	
Kemptonville Extension	1609	20.66	acres
Evening Star	1633	31.48	"
Russell	3748	50.73	"
Jersey	3749	51.53	"
The Cascades	3752	50.81	"
Lynn Fraction	3750	5.40	"
Fleming	4025	50.19	"
Pretty Bess	4026	32.88	"
Total		293.68	"
 <u>To be Re-located:</u>			
Morning Star	about	40.00	"
Lucky Star	"	30.00	"
Summit	"	38.00	"

To these can be added by agreement with their owners, the Kemptonville (20 acres), August Fraction (3.77 acres), and Prentice Fraction (about 6 acres). It is desirable that these should be included, to cover certain portions of the mineralized zones and to eliminate the irregular gaps in the group.

The details of title to the ground, and of the organization of the company, are presented in Appendix 1.

LOCATION:

The property is situated about 9 miles in an air line

north of the City of Vancouver, B.C. (See Index Map). It is reached from that point by ferry to North Vancouver, whence a good road, together with a branch of the B.C. Electric car line, goes about five miles into the valley of Lynn Creek. A private logging road, planked, extends three or four miles further, and the final four mile interval to the prospect is covered by pack-trail.

There are a number of peculiar points concerning these communications which require mention. These are presented in Appendix 2. In general it may be stated here that the mine can be reached with light supplies for exploratory work with little difficulty, but that considerable road work must be done before machinery can be taken in or ore taken out.

TOPOGRAPHY:

Lynn Creek occupies a typical steep-walled narrow Coast Range Valley. The gradient for the first eight miles is relatively gentle, but above this point the stream becomes broken up into many forks, whose profiles steepen rapidly until the headwaters are reached. The two chief forks enter from the north and from the west, enclosing between their narrow valleys a mountain mass known as Crown Mt. The Lynn Creek Zinc claims lie on the southern slopes of this mountain, extending from the base, on the west fork of Lynn Creek, up to and slightly over the summit.

Although the slope of Crown Mt. is exceedingly steep, averaging 37° from Creek to summit, it is still somewhat less abrupt than the other mountainsides of the vicinity. It is thus more deeply covered with soil, and more heavily timbered, and is less susceptible to snowslides. The lower portions support a growth of cedar exceptional for size and quality even among Coast Range timber.

Two small streams carry the water off the southern slope of Crown Mt. With their extremely steep gradients, aided by the rotten and disintegrated character of the bed-rock, they have been able to trench deep, narrow canyons into the mountainside. In places these canyons are two or three hundred feet deep, while not that wide across the top. Their beds are deeply filled with boulders and slide rock from the walls. As is seen on the claim map, the property is roughly divided into three parts by these gulches -- one-third lying east of Fleming Canyon, one-third between Fleming and Zinc Canyons, and one-third west of the latter. All, both Canyons and intervening shoulders, conform to the steep slope of the mountain from the summit on the north down to Lynn Creek.

GEOLOGY:

The general mass of the mountains north of Burrard Inlet is composed of the Coast Range granodiorite. Many fragments of

sedimentary capping remain, however, notably of course the "Britannia Belt."

Crown Mt. consists of such a sedimentary belt remaining within the granite mass. The rocks are predominately limestones, a thick-bedded underlying a thin-bedded series. Their strike is north to northeast, and they dip to the west and northwest. The southern limit of the belt is the west fork of Lynn Creek; the western is Zinc Canyon. To the northeast the sediments extend at least as far as Seymour Creek, where a number of prospects have developed magnetite outcrops on the belt.

In the area covered by the claims of the Lynn Creek Zinc Mines, Ltd., the limestones show extreme contact metamorphism. The most frequent phase is an impregnation with epidote, which follows the complex fracture systems of the shattered belt. Garnet is the next contact mineral in abundance, followed by chlorite, sericite, and tremolite. There has been very little silicification.

The orebodies, which consist in the main of clean sphalerite ("resin jack"), with small amounts locally of pyrrhotite, pyrite, chalcopyrite, and galens, are closely associated with the contact-metamorphic areas. The sphalerite and epidote are in particularly close contiguity. Like so many contact-metamorphic deposits, these are localized along bedding planes and fissures, and the largest lenses are found where the fissure zones intersect the strata most susceptible to mineralization. Such a favorable stratum follows the lower course of Zinc Canyon, and extends northward on to the ridge between this and Fleming Canyon. The chief fissure zones have a northwest strike. One important zone intersects the above mentioned bed of limestone near the west end line of the Kemptville Extension claim; a second zone follows the general line of Fleming Canyon; a third zone, of northeast strike, can be seen between these two, near the north end of the Evening Star Claim. The latter zone at this point traverses a belt of mineralized limestone which may be identical with that in Zinc Canyon. These general relations are best grasped by a study of the geological surface map. (Plate 3).

DEVELOPMENTS:

While considerable money has been expended in past years on development work on the Lynn Creek Zinc claims, very little of this work has been of any real value in determining the extent of the orebodies. The following are the chief workings:

1. Surface trenches and cuts on northern orebody, near north side of Evening Star.
2. Surface cuts and short tunnels on either side of Zinc Canyon, where the main outcrops are found.

3. Pearson Tunnel, in hillside above and north of main outcrops.
4. Kent Tunnel, in hillside below and south of main outcrops.
5. Miscellaneous shallow cuts in Fleming Canyon, on small bunches of ore now for the most part covered by recent slide-rock.

These will be described in order.

1. The Northern Orebody: lies at an elevation of 3425 feet on the ridge midway between the upper portions of Zinc and Fleming Canyons. It is about 150 feet south of the north side line of the Evening Star claim. High grade sphalerite outcrops over an area about 300 feet long by 100 feet wide, within which limits numerous cuts have been made. These are merely shallow excavations through the soil, exposing bands of ore for widths of five to twenty feet. They are entirely inadequate to determine the extent or average grade of the orebody, as they in no case give a complete cross-section. It will be necessary to undertake systematic trenching to find out these essential points.

The work done shows two parallel fissures about 100 feet apart. Their strike is about N.40° E., their dip 55° to 65° to the northwest. Between these fissures, which are heavily mineralized with sphalerite, the limestone beds are in part replaced by ore. The bedding here runs about N.80° E., dipping 65° to the north. Some bands of 8 feet or more in width are a good grade of ore, as is witnessed by the following samples of the mineralized bedding:

<u>Location:</u>	<u>Width</u>	<u>Oz. Gold</u>	<u>Oz. Silver</u>	<u>%Zinc</u>	<u>Remarks</u>
Western cuts	6'	Trace	.16	15.6	My sample
	8'	"	.32	25.9	"
	5'	"	.30	26.1	"
Eastern cuts	14'	"	Trace	8.4	Galloway's samples
	4'	"	"	13.7	"

Little work has been done on these outcrops because of the difficulty of carrying steel and water up to them. In view of the extent and good grade of ore now exposed, however, it will be advisable to do enough trenching to determine its boundaries and average value.

2. The workings in the lower part of Zinc Canyon are on the chief area of mineralization within the property. Their position is shown on the large scale map of this vicinity. (Plate 4.) The elevations range from 2250 to 2500 feet, or from 900 to 1200 feet lower than the Evening Star outcrops.

Two main belts of mineralization are developed, one on either side of the canyon below the lowest falls. In this region the limestone, highly epidotized, runs about north and south, parallel to the gulch, and dips steeply to the west. The ore bodies conform essentially to this structure, and presumably represent two mineralized beds about 80 feet apart. Many steep northwest fissures cross these beds, and displace the ore, the north side being offset to the west. Above the falls these fissures become very abundant, and nearly as much mineralization is found along their courses as in the intervening northerly trending limestone. Apparently the fissures were formed at an early stage of the metamorphism of the limestone, as they are frequently filled with solid masses of epidote or with epidote and garnet. The offsets of the limestone thus took place previous to its mineralization, and the present irregular course of the orebodies is due to subsequent replacement of the faulted beds by the ore-minerals. It follows that mineralization is not cut off by the fissures, but swings along them until the reappearance of the favorable strata permits its return to a normal course.

The eastern vein is developed by two open cuts and a short tunnel. (See Plate 4) The total length exposed is about 90 feet. To the south it passes under the wash of the gulch, and to the north it runs into the cliff and is concealed by slide rock and soil. The average width and grade is best seen from the following samples, taken across the three openings:

Southermost cut:

Hanging wall	8 feet	- 15.0% Zinc	-.16 oz. Silver	- Trace Gold.
Foot Wall	4 "	- 16.3% "	-.38 " "	" "

Middle Cut (South end)

Main streak	5½ feet	- 22.7% Zinc	.22 oz. Silver	- .005 oz. Gold
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Middle Cut (North end)

Hanging wall	3 feet	- 16.4% Zinc	.14 oz. Silver	- Trace Gold
Foot Wall	3 "	- 18.9% "	.14 " "	" "

Total width not exposed in this cut.

Northern Cut and Tunnel

Hanging Wall	8 feet	- completely oxidized
Center	8 "	- 4.8% Zinc
Foot Wall	11 "	- 13.6% " - .22 oz. Silver - Trace Gold.

From these assays it appears that this portion of the east vein has about 12 feet of ore carrying from 12% to 15% Zinc (c.f. the estimates of J. D. Galloway, assistant B.C. Mineralogist --15 to 20 feet of 8.1% Zinc. I sampled narrower widths in the better ore). Because of partial oxidation, particularly along the hanging wall (west side) this width and value may be slightly increased when solid primary ore is reached.

Two hundred forty feet north of the northern cut and tunnel, at about the same elevation, the supposed extension of this east vein was penetrated by a diamond-drill hole. The core showed 13 feet of ore assaying 10% zinc and .5 oz. Silver. A second hole, cutting the vein 70 feet lower, is reported as having passed through "sixteen feet of milling ore and twenty feet of leached ore." The data received as to the diamond-drill results are somewhat contradictory, however, one version (Galloway's) crediting this second hole with 35 feet of 10% zinc ore.

The Western Vein: is developed by three cuts and a tunnel below the falls, and by a cut on the bluff above the falls. The vein is also exposed on bare rock surfaces practically without interruption throughout a distance of about 300 feet. In the southern one-hundred and twenty feet of this distance the vein shows as a narrow band of high-grade zinc ore. It was sampled in the three cuts, which are about 50 feet apart, with the following results:

Southern Cut

6 feet - 13.6% Zinc - .24 oz. silver - trace Gold
 best 4 " - 28.8% "

Middle Cut

best 4 feet - 33.2% Zinc - .82 oz. silver - trace Gold.

Northern Cut

best 4 feet - 30.9% Zinc - .38 oz. silver - trace Gold

To the north of this stretch of 125 feet, the vein matter shows increased pyrrhotite and decreased sphalerite. The tunnel driven from near the base of the falls cuts this portion of the vein, showing only about 3% Zinc.

North of the falls the outcrop climbs over a steep bluff, on which it shows as a strong oxidized vein about ten feet wide, frequently displaced to the west by cross-fissures. These are also mineralized. The diamond-drill holes were driven through this portion of the vein, and while records are missing it is altogether likely that little or no zinc was found by them. Immediately north of the drill-site, however, the vein descends again to the stream, and it here shows a very rich body of zinc ore--clean resin-jack in a gangue of epidote. A representative sample

of this outcrop gave this result:

8 feet - 31.1% Zinc - .34 oz. silver - trace Gold.

This does not cover the full width of the ore, which, because of its position under stream boulders, etc., cannot at present be sampled. The sample was taken across a strongly mineralized fissure which cuts the bedding at this point.

The last showing of ore as one goes up Zinc Canyon is found about 100 feet north of the above orebody. Here a strong north-west cross fissure has resulted in a lens of mineralization which may be along the projected course of the east vein. This lens has a strong iron capping which covers the point of a small promontory, but a tunnel driven into the base of this bluff shows no ore. There is, however, some sphalerite in the stream bed west of the mouth of this tunnel, so that the latter may start too far in the east - or foot - wall to encounter much of the ore.

To sum up, these workings in Zinc Canyon have disclosed:

- (a) East Vein, shoot 90 feet long, 12 feet wide, 12-15% zinc.
- (b) East Vein, cut by drill-holes 240 feet north of above shoot - 13 feet of 10% zinc.
- (c) West vein, southern shoot 120 feet long, 4 feet wide, 30% zinc.
- (d) West vein, northern shoot dimensions unknown, considerable body, 30% zinc.

The possibility of developing a considerable tonnage of milling ore is best in the cases of (a) and (d). (c) should furnish a good deal of high-grade ore, but the width is relatively small.

3. The Pearson Tunnel is located up the hillside along the apparent course of the East Vein above described. Its elevation is about 2530 feet. Actually the east vein cannot be traced along its strike to this tunnel, because of slide rock and soil, and it is altogether probable that it lies to the west, being faulted over by the fissures as in the west Vein. (See Plate 4). However, the Pearson tunnel was started upon a small bunch of ore, which was cut off at 25 feet in. In the remaining 100 feet of its course the tunnel shows nothing but a few small north-west fissures in rotted buff limestone. As development work it is valueless.

4. The Kent Tunnel can be dismissed with even fewer words. It was started at an elevation of 2128 feet, to cut the orebodies of Zinc Canyon in 500 feet at a depth of about 150 feet

Only 200 feet has been driven which is entirely in morainal matter. The shoulder west of Zinc Creek into which the tunnel extends is evidently the lateral moraine of a former glacier which occupied the valley of the west fork of Lynn Creek.

5. The Cuts in Fleming Canyon are with but one exception now buried under debris. So far as can be determined from descriptions they showed only small bunches of sphalerite, without evidence of large orebodies. Enough of the bedrock in the canyon can indeed be seen at present to eliminate the possibility of big deposits occurring along its course. A strong fissure zone is seen at several points, and intense epidotization prevails, but sphalerite is generally absent.

SUGGESTED DEVELOPMENT:

The widespread occurrence of big outcrops indicates the possibility of that several large lenses of zinc ore of 12% grade or better may exist within the metamorphic belt running northerly from lower Zinc Canyon across the ridge to the head of Fleming Canyon. Neither the presence nor the absence of such lenses has been proved by past work. Favorable indications are the many large cappings and the wide vertical range (1200 feet) of the characteristic clean sphalerite mineralization.

From present showings the following development is suggested:

1. A series of trenches crosscutting the northern orebody from wall to wall at intervals of not over 50 feet.
2. A drift on the East Vein from its lowest point in Zinc Canyon with frequent crosscuts from wall to wall; such drift to extend into and through the strong fissure zone north of the falls -- total length about 300 feet, exclusive of crosscutting.
3. A similar drift on the West Vein.
4. Subsequent development dependent on the results of the above.

To do this suggested work required:

First: That the trail be made possible for horses, which will cost about \$1,000.

Second: That cabins for a crew of six or eight men be built.

Third: That equipment such as tools, drill-steel, blacksmith shop, etc. be provided. Practically nothing of this sort remains on the property.

OPERATING CONDITIONS:

If maximum possibilities were to be realized a large tonnage of milling ore would be developed by this work. It is therefore necessary to briefly indicate the conditions under which mining and milling would be carried on.

1. All mining could be done from tunnel levels by shrinkage stopes, over widths of 4 to at least 12 feet.
2. Such timber as would be required for all purposes is at hand.
3. There are good mill sites on the property and abundant water for milling.
4. A limited amount of waterpower could be developed.
5. The ore being for the most part sphalerite, epidote, and limestone, should offer no difficulties to concentrating to a grade of 45% - 50% zinc.
6. Haulage of concentrates to tidewater could be by motor trucks, over 11 or 12 miles of planked road and surfaced road, with no heavy grades.
7. Initial expenses in putting the mine on a producing basis would be heavy, notably:
 - (a) opening of levels for mining.
 - (b) erection of mill
 - (c) completion of road (see Appendix 2)
 - (d) construction of power plant.

Of course none of these expenses need be incurred until exploratory development has proved the existence of an adequate supply of ore.

CONCLUSIONS:

The Lynn Creek Zinc property is to all intents an undeveloped prospect. It bears some indications of containing a number of large lenses of zinc ore along a mineralized belt which could be developed and operated as a unit. This zinc ore is free from pyrite and other undesirable constituents, and should average 10% or 20% zinc.

To prove the value of the property, it is necessary

that certain suggested development work be done. This need not be expensive. Twenty-five hundred dollars spent on preliminary improvements, together with a year's work by a small crew, should determine the point. I believe the surface showings justify this amount of investigation by any one to whom the possibility of developing a large low grade zinc property would appeal.

As the property can now be obtained for such an investigation at terms which seem reasonable (See Appendix 3), I recommend that appropriate steps be taken to secure the option and carry out the suggested work.

Respectfully submitted,

Paul Billingsley.

R E P O R T

by

PAUL BILLINGSLEY

May 18th, 1929

PROSPECTING POSSIBILITIES OF THE
LYNN CREEK ZINC COMPANY, LTD. PROPERTY
LYNN CREEK, NORTH VANCOUVER, B.C.

For many years the outcrops of zinc ore in the upper part of Lynn Creek Valley have been well known. Descriptions appear in many of the Annual Reports of the British Columbia Minister of Mines and Reports are extant by the engineers of many important mining companies.

I saw the Lynn Creek zinc prospect first in 1919, and was impressed by the widespread intensity of the mineralization and alteration. At that time, however, there was no possibility of marketing such an ore in that locality. I returned to Lynn Creek in 1927, when Belgian buyers entered the Northwest zinc market, and did some development work on the property, principally surface trenching. I discontinued this in 1928 as the result of a decline in world zinc prices which greatly reduced the economic value of the Lynn Creek material. Also, the Belgian outlet for Pacific Coast ore was no longer available.

The property of the Lynn Creek Zinc Mines, Ltd., derives its value principally from two outcrops of zinc sulphide ore, on the Kemptville Extension and Evening Star claims. One of these outcrops is found at an elevation of about 3400 feet on the ridge north and east of Zinc Canyon. The occurrences are about 1,500 feet apart.

The formations of this area consist of altered and metamorphosed sediments intruded by granite. The contact with the granite lies just to the west of the above mentioned claims, so that the mineralized areas are entirely within the sedimentary rocks.

The details of the occurrences of ore are of a familiar type. The heaviest ore depositions conforms to certain series of beds, which are intersected by mineralizing fissures. Premineral faults of flat dip also localize the orebodies. In all probability, therefore, the ore will prove, when developed, to lie in pipes elongated along the course of fissure-bedding and fault-bedding intersections.

The Lower Showings, in Zinc Canyon, consist of bedding replacement focussed at fissure intersections. Being close to the granite contact, metamorphism is intense and much pyrrhotite is present. The largest single ore "sausage", developed in the Lower Workings, has surface dimensions of 100 feet by 10 to 15 feet, and a grade, over the entire width, of 15 to 18% zinc. (See samples on map). It conforms in dip to the bedding, here 70° west, and will no doubt have a rake, within the bed, determined by the fissure intersections. Other scattered "pods" of ore, of grade up to 30% over widths of 10 feet, are found for several hundred feet northward of the lower workings in that

portion of the orebearing formation which is exposed in Zinc Canyon. Shortly after entering the Evening Star claim this member passes under the deep soil of the side hill.

The Pearson Tunnel was run in an attempt to trace the ore zone underground from this point. Unfortunately it is within a zone of intense cross faulting, so that the recovery of the proper bed is a matter of some difficulty. My own work developed some high grade bunches and drag blocks in this tunnel, but the main orebearing bed was not identified.

The "upper showings" are larger, more continuous and higher in grade than the lower. They occur in sedimentary beds identical in character and sequence with those which carry the lower ore, although the structure necessitates much intervening faulting if the beds are in fact the same ones. There is less intense metamorphism in the upper showings, but stronger hydrothermal alteration and mineralization.

The principal ore bed can be identified in a series of faulted blocks which we have traced by trenching to an aggregate length of 600 feet, and throughout this length it is heavily mineralized to a width of 6 to 12 feet, with grade of 10 to 37 per cent zinc. Probably it will average at least 20%. At the fault intersections there is a great spreading out of the mineralization with no diminution in grade. The geometry of the beds, faults and fissures suggests that these "shoots" rake downward to the north at a rather flat angle.

The general impression I have gained from a careful inspection of all these outcrops is as follows:

1. The mineralized area is of geologic type which can readily result in important ore deposits; that is, it consists of a series of varied sedimentary beds, tilted to a steep dip and abutting against an intrusive granite contact.
2. Intense contact activity is evidenced by the widespread epidotization of the contact zone, both in the sediments and the granite. Associated directly with this alteration is mineralization with pyrrhotite, sphalerite, and galens; and this mineralization is abundant over a large area.
3. Of the bedrock exposures, which are confined to the bottom of Zinc Canyon and the crest of the ridge to the northeast, a very high proportion indeed show either or both epidotization and sphalerite mineralization. There is relatively more epidotization around the lower showings, close to the granite and more sphalerite around the upper showings, which is in accord with expectations.
4. My experience in directing exploration work in many mining districts has convinced me that at the present day results can only be obtained by giving considerable weight to

purely geological criteria. Blocked-out ore can seldom be found and in many cases no actual ore at all is in sight at the commencement of operations. In such cases the advisability of undertaking development depends upon three factors:

- (a) The general geological picture -- Is it a well altered, well mineralized area with the "earmarks" of a real focus of ore deposition?
- (b) The cost of proving or disproving the case.
- (c) The ratio of possible returns if successful to this cost.

In short, work is usually justified if an area of good general appearance can be tested economically, with a great reward if success results from the effort.

From this point of view I regard the Lynn Zinc as distinctly meritorious. One line of drill holes to the northeast of the upper showings, and a second line along the zone, between the upper and lower showings, will test the ore beds for a distance of 2,000 feet. These holes should give, at a cost of less than \$50,000.00, enough information to show whether these ore-bearing beds, so liberally mineralized at the haphazard exposures now visible, contain enough ore throughout the distance tested to support a mining operation.

Respectfully submitted,

Paul Billingsley

May 18, 1929.

O T T A W A

September 10, 1942.

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES

Investigation No. 1295

Concentration of a Zinc Ore
from Haynes Fork of Lynn Creek,
British Columbia.

(Copy No. 4)

CANADA
Department of Mines and Resources
Mines and Geology Branch

O T T A W A

September 10th, 1942

R E P O R T

of the

ORE DRESSING AND METALLURGICAL LABORATORIES

Investigation No. 1295

Concentration of a Zinc Ore
from Haynes Fork of Lynn Creek
British Columbia.

Shipment:

Two sacks of ore, net weight 130 pounds, were received on July 15th, 1942, from Palisades Zinc Mines Limited, 1489 McRae Avenue, Vancouver, B. C.

The two sacks, as received, each contained a bulk sample plus two canvas sacks. Channel samples Nos. 1 and 2 were together in one sack, and Channel Samples Nos. 3 and 4 were in the other sack. The channel samples were identified by their number and the bulk samples by the markers of the channel samples in the sack in which they were found.

Location of Property:

The property of the Palisades Zinc Mines Limited, from which the present shipment was received, is located about seven miles up Lynn Creek from the Diversion Dam of the North Vancouver water supply system.

Sampling and Analysis:

All six samples were crushed, sampled, and assayed by standard methods. The samples were then combined, and the composite was resampled and used for test purposes. The analyses of the samples are as follows:

	Zn Per Cent	Pb. Per Cent	Au oz./ton	Au. oz./ton
Channel Sample #1 -	6.45	None det'd	Trace	0.13
" " #2 -	6.83	"	"	0.21
" " #3 -	4.18	"	"	0.06
" " #4 -	23.46	"	"	0.05
Bulk Sample (1 & 2 sacks) -	16.22	"	"	0.07
Bulk Sample (3 & 4 sacks) -	17.51	"	"	0.12
Composite Sample from 114 pounds -	15.79	"	"	0.10

Characteristics of Ore:

Six polished sections were prepared and examined microscopically for the purpose of determining the character of the ore.

Gangue:

In the polished sections, gangue material consists of moderately hard, mottled, light green rock which bears a few local, light-brown stains of iron oxides.

Metallic Minerals -

In their order of abundance the metallic minerals visible in the sections are: sphalerite, chalcopyrite and pyrite.

Sphalerite predominates as small masses and coarse to very fine irregular grains in gangue. It contains numerous inclusions of gangue and medium to small grains of chalcopyrite and pyrite. The latter are locally abundant but only a small percentage of the copper and iron sulphides occur in this way.

Minor quantities of chalcopyrite and pyrite are present in the ore, largely as medium to fine irregular grains disseminated through gangue, but, as already mentioned, small amounts occur in sphalerite also. The chalcopyrite encloses inclusions of gangue and grains of the other sulphides; in one of the polished surfaces pyrite veins both chalcopyrite and sphalerite.

Conclusion from Microscopic Examination -

To make an acceptable zinc concentrate from this ore should present no great difficulty.

Summary of Investigation:

No trouble is anticipated in the treatment of this ore and a zinc grade of 53 to 55% zinc, with a recovery of 90 to 95%,

Summary of Investigation contd. -

should readily be obtained as demonstrated in the following metallurgical balance:

<u>Products</u>	<u>Weight per cent</u>	<u>Assays per cent</u>		<u>Distribution per cent</u>	
		<u>Zn.</u>	<u>Fe</u>	<u>Zn.</u>	<u>Fe</u>
Feed	100.00	15.79	6.50	100.00	100.00
Zinc conc.	26.95	54.75	9.50	93.38	39.38
Tailing	73.05	1.42	5.39	6.62	60.62
<hr/>					
Products	100.00	15.79	6.50	100.00	100.00

Grind 91.9% - 200 Mesh

Ration of Concentration = 3.6 to 1

Reagents -

CA (OH)		<u>Lb./ton</u>
2	-	6
CuSO		
4	-	1
Potassium ethyl xanthate	-	0.20
Cresylic acid		

The samples as submitted showed considerable evidence of oxidation, requiring 6 to 9 pounds of lime per ton of ore to maintain adequate alkalinity. This should be reduced considerably if treating fresh ore.

Details of Investigation:

No difficulty was experienced in the treatment of this ore, consequently three tests only were run. Details of these were as follows:

Summary of Investigation contd -

Test No. 1

Products	Weight per cent	Assays per cent		Distribution per cent	
		Zn	Fe	Zn	Fe
Zinc cleaner conc.	16.56	53.83	9.71	53.9	24.15
" " tailing	16.30	38.73	11.00	38.1	26.93
" middling	2.72	9.64	12.00	1.5	4.89
Final Tailing	64.42	1.66	4.55	6.5	44.03
Products	100.00	16.56	6.66	100.0	100.00

Grind 91.9% - 200 Mesh

Reagents -

	<u>Lb./Ton Ore</u>
Ca (OH) ₂	6
Potassium ethyl xanthate	0.22
CuSO ₄	1
Cresylic Acid.	

Zinc float cleaned once - no reagents.

Test No. 2

Products	Weight per cent	Assays per cent		Distribution per cent	
		Zn	Fe	Zn.	Fe
Zinc recleaner Conc.	11.13	53.35	9.94	35.61	15.30
" " cleaner tailing	14.81	51.81	11.04	44.34	22.67
" cleaner tailing	6.84	37.34	12.80	14.74	12.24
" middling	2.84	9.41	13.90	1.56	5.42
Final tailing	64.38	1.01	4.96	3.75	44.37
Products	100.00	17.30	7.19	100.00	100.00

Grind 87.6% - 200 Mesh

Reagents -

	<u>Lb./ton Ore</u>
Ca(OH) ₂	8 (pH 9.2)
Potassium ethyl xanthate	0.10
Amyl xanthate	0.04 (to mid- dling)
CuSO ₄	1
Cresylic acid	

Zinc float cleaned twice with 1 lb Ca(OH)₂ per ton.

Details of Investigation contd. -

Test No. 3.

Products	Weight per cent	Assays per cent		Distribution per cent	
		Zn	Fe	Zn	Fe
Zinc recleaner Conc.	18.91	54.75	9.50	65.19	27.77
" " tailing	8.29	44.22	9.50	22.89	12.18
" cleaner tailing	3.22	15.79	13.15	3.19	6.54
" middling	3.75	19.78	13.35	4.61	7.73
Final Tailing	65.83	1.01	4.50	4.12	45.78
Products	100.00	16.03	6.45	100.00	100.00

Grind 85.7% - 200 Mesh

Reagents -

	<u>Lb./ton ore</u>
Ca(OH) ₂	- 9
Potassium ethyl xanthate	- 13
CuSO ₄	- 1
Cresylic acid	-

Zinc float cleaned twice with 1 lb. Ca(OH)₂
per ton
