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REPORT ON THE  
NORTH LEDUC COPPER-LEAD PROPERTY  
BRITISH COLUMBIA, CANADA

BY

HOWARD M. FOWLER

November 24, 1953

INTRODUCTION

The North Leduc Copper-Lead Property was examined during June, 1952, and June, 1953, by Howard M. Fowler, Mining Engineer.

The examination was conducted for the purpose of determining if lead and copper bearing structures on the property were of possible size and grade to warrant exploration and development.

LOCATION

The North Leduc Copper-Lead Property is located in British Columbia, Canada, on the north fork of the Leduc Glacier at latitude 56° 16' N., longitude 130° 20' W. The glacier lies in the Coast Range Mountains at the head of the Leduc River and the south fork of the Unuk River. The deposits are about six miles from the Alaska-Canada Boundary and about 45 miles from tidewater by way of the Leduc River and 70 miles from tidewater by way of the Unuk River.

OWNERSHIP

The property consists at present of sixteen unpatented mining claims. Ownership is divided under a partnership agreement with a 45 percent interest held by Mr. Wendell Dawson, Seattle, Washington; 45 percent held by Mr. Howard M. Fowler, Tacoma, Washington; and 10 percent held by Mrs. Julia I. Fowler, Tacoma, Washington. Stakings have not, as yet, been completed.

PHYSICAL FEATURES AND CLIMATE

The area in which the North Leduc Copper-Lead Deposits occur is one of extreme relief. The mountain peaks rise about 5,000 feet above the valley floors with the highest reaching elevations of over 8,000 feet above sea level. Several large glaciers are in the area, and ice caps and snow fields are present on many of the mountain tops. Snowfields on some of the glaciers are of such size and smoothness to make safe landing areas for aircraft.

Now 32  
claims as  
shown on  
map. REL

Two large streams, the Leduc River, and the south fork of the Unuk River have cut deep valleys into the area, thus making road access in the region practical.

Large areas suitable for camp and mill construction are present at an elevation of about 2500 feet above sea level.

Timber supplies and water resources are adequate for all mine and camp purposes. However, sufficient water for generation of electrical power will probably be available for only about seven months a year.

Although the headwaters of the Leduc River and south fork of the Unuk River lie within the Pacific Coast climatic province, where there is generally abundant rain and snowfall, with relatively moderate temperatures, the evidence indicates that winter weather conditions are not severe. The timber shows little sign of heavy snow loads, and no twisting or leaning from strong winds. Apparently, the bulk of heavy precipitation generally received along the Coast is cut off from the area by the surrounding Coast Range Mountains. This condition is also borne out by the remarkably rapid recession of glaciers in the area.

#### ACCESSIBILITY

The mining properties at the head of the Leduc and south fork of the Unuk Rivers are at present rather inaccessible by land routes because of the lack of access roads. However, during the fall of 1951, an unimproved foot trail was extended up the south fork of the Unuk River by Howard M. Fowler, Mining Engineer. During the summer of 1953, Granby Consolidated Mining, Smelting and Power Co. Ltd., of Canada, maintained a trail crew between Boundary Lake on the Unuk River and the head of the south fork. Cable crossings on the rivers were strengthened and foot access from Boundary Lake, 30 miles distant, was much improved.

It has been reliably reported that Granby is presently conducting negotiations with Alaskan and Provincial officials for assistance for a road construction program into the area from Burroughs Bay, at the mouth of the Unuk River. This will entail an approximate 70 mile road construction program. With ore reserves being rapidly proven at the adjacent Granduc Property, it is possible that road surveys and construction will commence in 1954. This will make the North Leduc Copper-Lead Property closely adjacent to the road terminus.

The North Leduc Copper-Lead Property is now immediately accessible by aircraft. An ideal landing area of at least two miles in length, and several hundred yards in width exists on the glacier directly in front of the property outcrops.

Numerous landings have been made within 150 yards of the property with a 4 place Aeronca Sedan equipped with floats. Landings can be made safely as long as a smooth snowfield exists on the glacier. This condition is present from about January 1st to July 1st. Landings have been made as late as July 12th.

From February, 1953, to May, 1953, Granby Consolidated Mining, Smelting and Power Co. Ltd. of Canada, had over 250 tons of freight flown in and landed on the glacier with pontoon planes, preparatory to a drilling program on the adjacent Granduc property.

With proper radio communication to the pilot, giving local weather conditions, it is the opinion of local airlines that planes can be safely flown into the area at least 60 percent of the available daylight time.

#### GEOLOGY AND MINERAL DEPOSITS

No complete study has been made of the geology of the Leduc River mineral deposits. However, it can be stated that the mineralization is directly related to the Coast Range batholithic intrusives. The intrusives are largely diorites that have contacted inland sediments and lava flows that have been steeply tilted and metamorphosed into slates, schists, argillites, and greenstones.

The principal known mineral deposits of the area consist of an extremely major shear zone containing important copper mineralization and several quartz fissure veins containing an appreciable lead content.

The copper bearing shear zone has been traced an estimated 3,500 feet down a nearly vertical dip and for an estimated five miles along the strike. The Northern end of the shear is offset an estimated one mile to the west by a fault along the north fork of the Leduc Glacier. Within the shear, and lying along the plane of schistosity are large irregular lenses or zones containing appreciable amounts of chalcopyrite, some bornite, and malachite.

It is extremely important to note that copper mineralization is found in every area in which the shear zone is exposed. Investigations by Granduc Mines Ltd. on the south fork of the Leduc Glacier are reported to have indicated at least four ore zones, one of which averages 2 percent copper, has been proven for at least 900 feet in length, with a 27 foot average width, and an undetermined depth. A second ore zone is reported to be somewhat better in both grade and width. It has been proven for at least 400 feet along the strike but no limits have been reached. Other exposures in the area have yet to be proven.

A close surface examination of the exposures now being investigated by Granduc was made by the writer in 1951-52 because part of those showings were included in ground originally staked by the writer. The character of the mineralization on these showings was determined to be similar to that found along the continuation of the shear on the North Leduc Copper-Lead Property. On both properties, the widths of the ore zones are about the same, and the mineral content is comparable.

No careful sampling was possible on the outcrops of the North Leduc Copper-Lead Property, because of the ruggedness of the terrain. However, material below the outcrops was sampled in an attempt to obtain as representative samples as possible of the ore zone. These samples were assayed by Bennett's Chemical Laboratory, Inc., of Tacoma, Washington, with the following results.

<u>Sample No.</u>	<u>Gold</u>	<u>Silver</u>	<u>Copper</u>
North Leduc #1	0.01	1.37	4.23%
North Leduc #2	0.01	1.09	2.64%
North Leduc #3	0.01	1.69	3.91%

Associated with the copper bearing shear zone are several flat quartz veins from 4 to 6 feet in width that carry appreciable amounts of galena. The veins are exposed on the cliff face for an estimated 2,000 feet along the dip. Proper sampling was not possible on the cliff face, but a composite sample of mineralized quartz found at the base of the cliff, and assayed by Bennett's Chemical Laboratory, Inc., of Tacoma, Washington, gave the following results:

<u>Sample No.</u>	<u>Gold</u>	<u>Silver</u>	<u>Lead</u> <u>Copper</u>
North Leduc #4	0.01	7.33	21.04%

It should be pointed out that sample No. 4 was not necessarily representative of the vein material and probably contained too high a percentage of lead.

Because of the ruggedness of the terrain, no complete examination of either the copper or lead bearing structures has yet been made.

#### CONCLUSIONS

Preliminary examination of the mineralized structures herein described on the North Leduc Copper-Lead Property indicate the presence of extremely large tonnage mineral bodies of mineable grade. Because of the size of these bodies, the problems of access for operation cannot be considered a severe handicap. Immediate access for exploration and initial development work can be done safely and cheaply by use of pontoon type landing gear at the property site.

With construction of a road from tidewater by Granduc Mines, year round truck transportation will be possible.

The property can be considered a completely favorable mining investment, and with proper financing and development, can result in an extremely attractive mining operation.

Respectfully submitted,

"Howard M. Fowler"  
Mining Engineer

# REPORT ON THE LEDUC GLACIER

COPPER - LEAD PROSPECTS,

BRITISH COLUMBIA, CANADA

by

Howard M. Fowler

September 5, 1952

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## Locations

The Leduc Glacier copper and lead prospects are located on the north and south forks of the Leduc Glacier in British Columbia, Canada. The glacier lies in the Coast Range Mountains at the head of the Leduc River, a tributary of the Chickamin River, which empties into Behm Canal, southeast Alaska. The deposits are some 45 miles from tidewater and about 4 miles from the Alaska-Canada Boundary.

## Ownership

Sixteen unpatented claims have been located on the structures containing the lead and copper by Howard M. Fowler and Wendell L. Dawson. Due to the ruggedness of part of the terrain, several of the claims have been staked by Witness Monument.

## Physical Features & Geology

The deposits herein described outcrop on the mountain-side above the north and south forks of the Leduc Glacier and approximately one mile from the eastern contacts of the Coast Range Diorites. Much of the terrain is extremely rugged, making sampling difficult. On the north branch of the glacier, three parallel quartz fissure veins of nearly vertical dip outcrop about 600 feet apart. These occur in series of greenstones and altered sediments. Veins vary in width from about 4 to 25 feet in width, and while not practical to sample, float on the glacier indicates an appreciable lead content. Several flat cross veins of nearly 5 feet in width lie between the quartz fissure veins and also were determined to carry an appreciable amount of galena. The galena appears to occur in irregular lenses within the quartz.

These galena bearing structures are traceable for about 3 miles along the strike and are exposed for nearly 4,000 feet along the dip. No estimate of grade or tonnage is presently possible because of difficulties in sampling. One sample across a 5 foot width was obtained with the following results:

<u>Sple. width</u>	<u>Oz. Au.</u>	<u>Oz. Ag.</u>	<u>% Pb.</u>
5.0'	trace	1.48	9.32

Mineable from the same development headings, a major shear zone with nearly vertical dip can be traced for an estimated 4 miles. This zone is exposed for about 4,000 feet along the dip. Within the zone, and lying along the planes of schistosity are large irregular lenses containing appreciable amounts of Chalcopyrite. The lenses examined indicate widths of about 40 feet, lengths of about 300 feet and depths of about 300 feet. A succession of lenses is indicated along the approximate 4,000 foot dip and for the estimated 4 miles along the strike. Four samples were obtained on two of the lenses, with the following results:

<u>Sple. No.</u>	<u>Sple. width</u>	<u>Oz. Au.</u>	<u>Oz. Ag.</u>	<u>% Cu.</u>
1	36'	nil	nil	2.13
2	14'	0.01	trace	5.03
3	14'	0.03	1.47	1.86
4	14'	trace	1.80	4.37

Samples 2, 3, and 4 should be combined to give a total lens width of 42' @ 3.75 % Cu.

#### Development

A preliminary examination of these deposits can best be made in the fall of the year, and will necessitate a several day pack trip into the area. However, more detailed exploration can be readily accomplished by transporting men and supplies to the immediate property area by aircraft. Landings can be made safely on the glacier in the spring and early summer with planes equipped with ski-wheel landing gear. Planes as large as a DC-6 can be used. Several landings on the glacier with an Aeronca Sedan equipped with pontoons have already been made by the writer. Flights can be made from Annette Island airfield in about one hour.

For property operation road building costs for the 4.5 miles from tide water will not be excessive. A natural road grade to the property area from tidewater is available up the Leduc River. Estimated costs for a suitable one-way truck road up the Leduc River are about \$10,000 a mile.

From the terminus of the road, a tunnel about 2.5 miles in length will be necessary to tap both the lead and copper

bearing structures. Water and timber are in plentiful supply.

Conclusions

In view of the fact that these structures herein described are of major dimensions and appear to carry large tonnages of mineable grade ore, the problems of access and operation should not be considered a severe handicap.

The problems of access for initial exploration are not great inasmuch as aircraft servicing of the exploration party can be done safely and cheaply by use of combination ski-wheel landing gear at the property site.

If exploration verifies the present indications of large ore tonnage, year round operations of the property will be practical.

Respectfully submitted;

*Howard M. Fowler*

Howard M. Fowler  
Mining Engineer



BC

REC'D OCT 10 1954  
Action Date

**R. E. LEGG**  
*Consulting Mining Engineer*  
311-850 WEST HASTINGS STREET  
VANCOUVER 1, B.C.

A C		
E J	A	10-11
H K		
L W	I	10-18

A = Action C = Comment  
I = Information

REPORT ON NORTH LEDUC COPPER PROPERTY

SKEENA MINING DIVISION, BRITISH COLUMBIA

The North Leduc copper property adjoins the Granduc mine north of Stewart, British Columbia, which is currently under development by Granby and Newmont. In view of the excellent results being obtained at the Granduc property, it was decided to make an examination of the North Leduc claims, particularly since these claims were submitted to Cyprus by Howard Fowler, mining engineer of Tacoma, Washington, who has played a prominent part in the brief history of this new mining camp.

LOCATION & TRANSPORTATION

The claims lie approximately 25 miles north west of the village of Stewart at the head of the Portland Canal and in the Skeena Mining Division of British Columbia. This is a remote mountainous area in which there are no roads. In flying over this area it is easy to appreciate why it has been neglected by prospectors even though there has been much mining activity adjacent to Stewart for the past forty-five years. The mountains are rugged and the ice fields are numerous. Glaciers fill the upper parts of the valleys. Until very recently the area was only accessible on foot, and those few prospectors who penetrated the region suffered hardships and privations. Within the past three years small aircraft have learned that it was safe to land during the winter months on the snow covered glaciers, but this is not possible during the best prospecting months from June to September as the snow covering had melted from the glaciers filling the valleys and the bare ice filled with cracks made landing impossible. During the past year a small air strip has been levelled off along the bank of Leduc river below the Leduc glacier, a distance of approximately three miles from the Granduc property, and light aircraft can land on this strip during the summer months. Due to the courtesy of Mr. Postle, president of Granduc Mines Ltd., permission was given to the writer and Mr. Fowler to use the Granduc plane, and this made the examination possible. No other suitable aircraft were immediately available.

CLAIMS

The North Leduc property consists of 32 claims held by location. In submitting the property to Cyprus early in 1954, Mr. Fowler presented a claims map showing the locations of various claims. It is the

*Fowler staked southern  
16 claims were  
first of these staked  
by him - E.T.*

considered opinion of the writer that the ground covered by these claims has not even been roughly examined by the various stakers. It would seem that the main idea of the stakers was to cover an area contiguous to the Granduc property, and then try and make a deal with some mining company. The claims were staked in an unusual manner, which subsequently has been approved by the B.C. Department of Mines and claim records have been issued. A mineral claim in British Columbia is 1500 feet square and normally two claim posts are erected 1500 feet apart. The line between these two posts is called the location line, and the claim can either be thrown to the right or left of the location line for 1500 feet or else a portion to the right and a portion to the left as long as the two portions do not exceed 1500 feet in width. The stakers took the view that the North Leduc mountain was inaccessible and therefore they put in several witness posts at the bottom of the mountain and they deposited staking notices and claim tags at these witness posts. The writer saw one witness post in which 16 notices and 16 claim tags had been deposited. This fact alone suggests that the claims have never been thoroughly examined for mineral possibilities. The writer agrees that certain portions of the mountain are inaccessible and it can be seen that other large areas are permanently covered with snow and ice. Nevertheless, much of the ground could be covered by experienced men during the summer months, but since the staking was done during the winter months, it would seem that the main idea was to cover a large block of ground with the minimum of effort.

Although the property was brought to the attention of Cyprus early in 1954, it was on the understanding that Kennecott Copper was to have a prior look. A representative of Kennecott did examine the property early in September and Fowler was subsequently advised that they (Kennecott) were not interested. This accounts for the fact that our examination was made at a time when winter conditions were close at hand. To do a thorough job of examination would necessitate setting up a camp and spending several weeks in the area.

#### GEOLOGY

The area in which the Granduc and North Leduc claims occur can be described as lying along the Eastern flank of the Coast Range mountains. It has long been recognized that this area is favourable for the occurrence of mineral deposits, and numerous examples of important deposits can be cited. Most of this eastern contact is still inaccessible, but nature fortunately provided the Portland Canal which penetrates the mountains from the sea and thus makes the area adjacent to Stewart reasonably accessible.

While a detailed geological map of the Granduc area is not available, yet sufficient information is available to show the existence of favourable ore bearing formations close to the irregular contacts of the Coast Range granodiorite batholith. The same condition applies to the North Leduc claims on which both sedimentary formations and bodies of granodiorite occur.

MINERALIZATION ON NORTH LEDUC CLAIMS

On the claims map which Fowler submitted, he showed four mineralized zones which he considered to be an extension of the Granduc ore bodies, although offset to the west by a fault. After having seen both the North Leduc and Granduc properties, I do not believe this to be the case. I am of the opinion that eventually numerous mineralized zones will be found in the vicinity which will not necessarily follow one particular fault zone. I think that local structural conditions will be more important, and that such structural conditions must occur in the favourable sedimentary formations at no great distance from the intrusives. I have formed this opinion from what I have seen and also from a study of the limited geological mapping done on the Granduc claims by the B.C. Department of Mines who published this information within the past week in the Annual Report of the Minister of Mines for the year 1953.

On arriving at the North Leduc claims Fowler and I set up a camp on the hillside, and on the following day we made a close examination of the rock formations at the bottom of North Leduc mountain and adjacent to the North Leduc glacier. This covered a distance of around two miles.

I only saw one mineralized zone. From the edge of the glacier we could see the green stain of malachite on the cliff face, and with the aid of binoculars we could follow this up for a distance of approximately 250 feet and for a maximum width of around 30 feet. The extent of the colouring was not such as to suggest a large ore zone. It was very patchy. The adjoining rock was not oxidized to any degree. I am attaching a sketch view of what this mineralization looked like from the distance. I climbed up and was able to reach one point where this carbonate occurred. I found evidence that someone had preceded me - probably Barr of Kennecott. Fowler said he had never climbed up. I took two samples of carbonate mineralization which assayed as follows:-

#NL 1	5.9% Cu.	0.02 oz. Au.	1.2 oz. Ag.
#NL 2	3.70% "	0.015 " "	0.25 " "

These samples have little meaning as they were picked samples. I could see no indications of continuous mineralization across the 30-foot width where the carbonate stain irregularly occurred. I am not too sure what the formation is in which this mineralization occurs. Probably an altered sedimentary rock. There is some evidence of banding. There is possibly a zone of shearing at this point as a number of quartz filled cross fractures could be seen. These also occur on the Granduc surface showings. The steepness of the rock bluffs prevented me from following up the zone of mineralization. A large granodiorite intrusion occurs about three hundred feet to the east of this mineralization which intrusive may be the source of the mineralizing solutions.

Before we left Vancouver we received a telegram from Wendell Dawson, an associate of Howard Fowler, advising us to examine a snow filled ravine a quarter of a mile west of the original discovery, which I have described, and 2000 feet above the glacier. Dawson described this as a strong structure but made no mention of mineralization. I was not able to get up to a place like this and made no attempt to do so.

#### ECONOMICS OF NORTH LEDUC CLAIMS

Even assuming the known mineralized zone on the North Leduc property to have ore comparable to that at Granduc, the economics of such a deposit are most difficult. The only practical approach would be a low level tunnel starting about a mile and a half away on which would probably be 800 to 1000 feet lower in elevation. Certainly no operations could be carried on from the surface where the showings occur. It would be impossible to build a road to the showings. I could not see how the deposit could be diamond drilled from the surface to the extent necessary to prove tonnage to warrant the low level development.

#### CONCLUSION IN RESPECT TO NORTH LEDUC

There is not sufficient evidence available to warrant taking an option on the North Leduc property and making the initial \$15,000 payment which the owners are asking. However, after having seen the surface outcrops of the Granduc orebody and how these responded to underground exploration, a case can be made out for general prospecting in the area, and by this I mean an area covering a length of 20 to 30 miles along the eastern contact of the batholith, which area could be covered in close detail in one season. Fowler, who has prospected in this region for several seasons, states that iron stained oxidized zones are fairly common in many localities. I saw a number of these myself on various mountain sides during my brief visit. They are not always easily accessible and Fowler says he has seen many in the distance but not close at hand while in other cases he has been able to make a close examination. Much of the oxidation is only skin deep and is due to limited contents of pyrite and pyrrhotite. In 1951 Fowler was examining the valley in which Granduc lies. Seeing no float anywhere he stopped short by about a mile, otherwise he would probably have come across the actual outcrops. He did find float on the other side of Granduc mountain which led him to stake claims which were eventually incorporated in the Granduc holdings and for which he received 75,000 shares of Granduc stock.

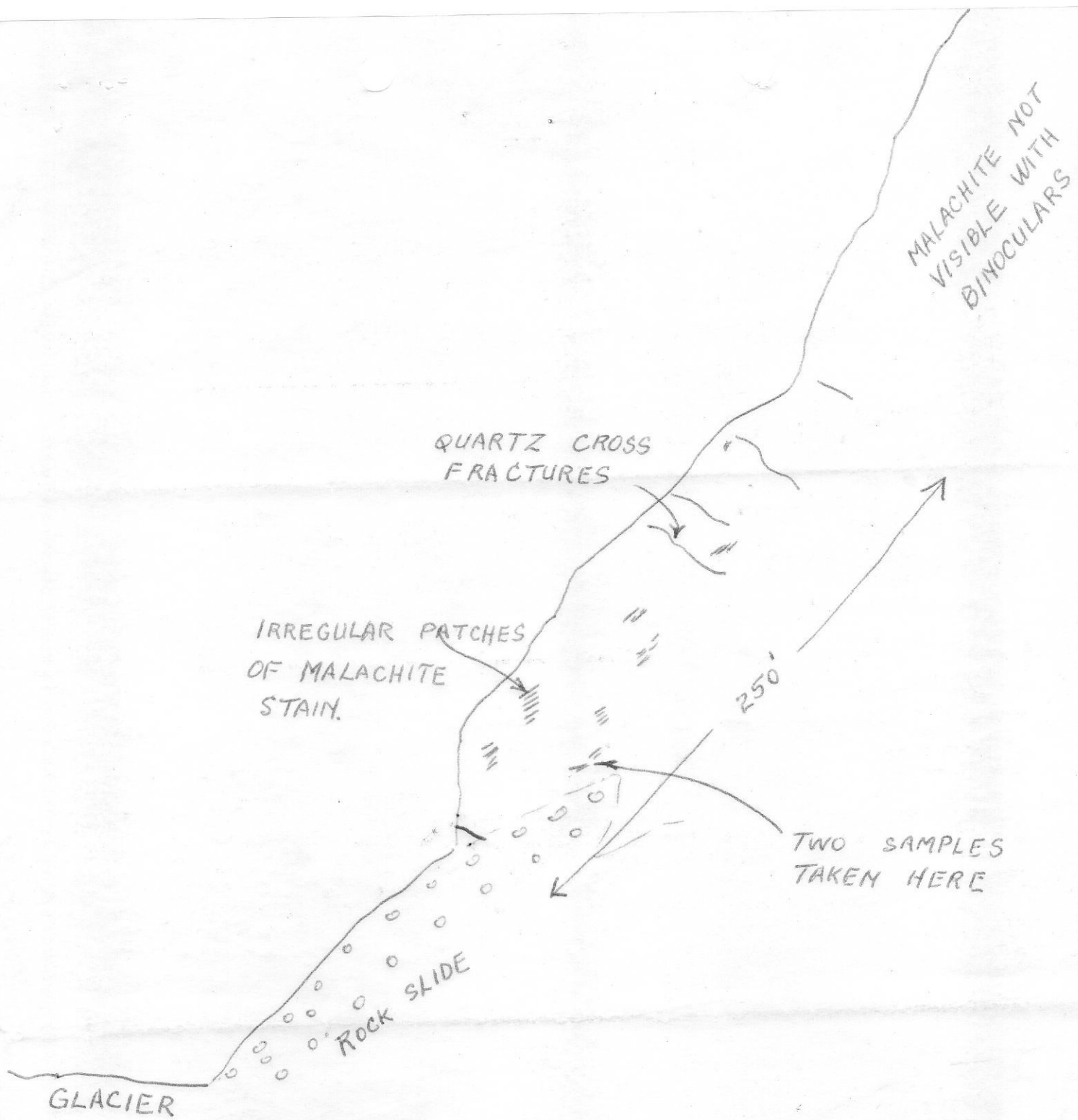
In the knowledge that better transportation facilities will be available in this area within the next few years due to the construction of the highway connecting Stewart and the Cassiar Asbestos property, I do not hesitate to recommend that an active prospecting campaign be carried out. It seems more logical to spend money in prospecting such a favourable area than making initial payments for the privilege of testing a prospect found by someone else.

*R. E. Legg*

R. E. Legg  
October 8, 1954.

REL:FE

c.c. To C.H.E. Stewart



SKETCH OF MINERALIZED ZONE  
NORTH LEDUC PROPERTY

R. E. LEGG  
SEPT. 1954