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**HARTLEY SILVER MINES LTD.  
OTTER MOUNTAIN PROPERTY  
SKEENA MINING DIVISION**

**British Columbia  
56°00', 129°46'**

**NTS 104 A - 4W and 4E  
103 P - 13 E**

**September 1984**

**by: R.H. JANES P.Eng.**

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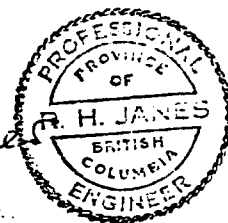
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## CERTIFICATE

I, Richard H. Janes of Vancouver, British Columbia, do hereby certify:

1. That I am an independent qualified geologist with an office at 907 - 675 West Hastings Street, Vancouver, B.C.
2. That I am a registered Professional Engineer in the Province of British Columbia.
3. That I have practiced my profession for 28 years.
4. That I have no direct, indirect or contingent interests in Hartley Silver Mines Ltd. or in the mineral claims described or in any mineral claim within sixteen kilometres of the boundaries of the mineral claims described.
5. That I visited the claims in September 1984.

*R.H. Janes*



R.H. JANES, P.Eng.

September 28, 1984

## INTRODUCTION, LOCATION AND ENVIRONMENT

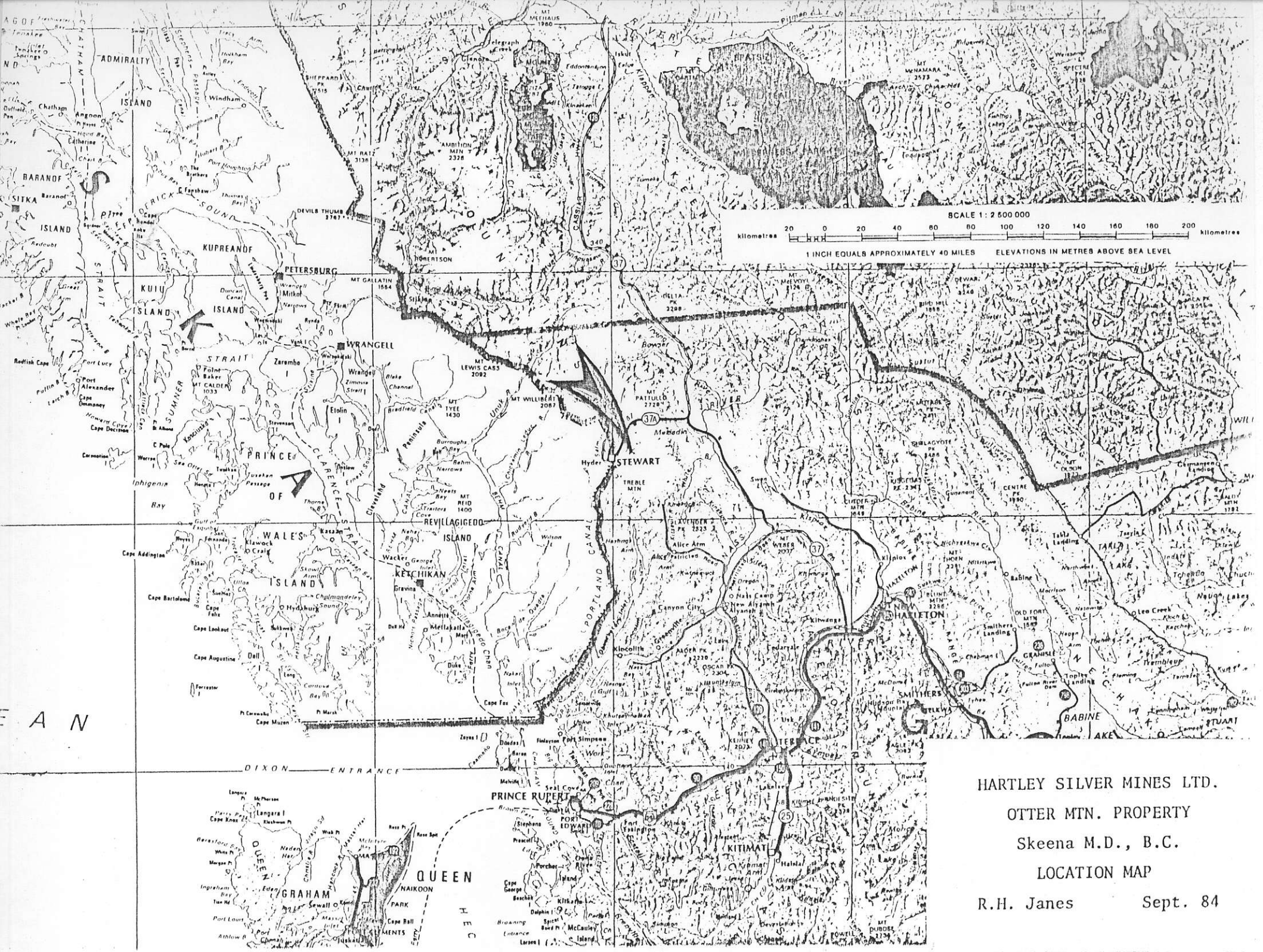
Mr. Westley Scott of Hartley Silver Mines Ltd. requested Janes to report on the geology and economic potential of the Montreal and Pam Mineral Claim groups located on Otter Mountain. Janes arrived on the claims at 1:45 pm September 6 and departed 5 pm September 7. Weather was good until early pm on the 7th. Stephen Fegan of Hartley Silver Mines Ltd. acted as guide.

Seven reverted crown grants, fourteen two-post mineral claims and four mineral claims together composing twenty-three units comprise the property. A detailed description of these and other claims makes up Appendix I.

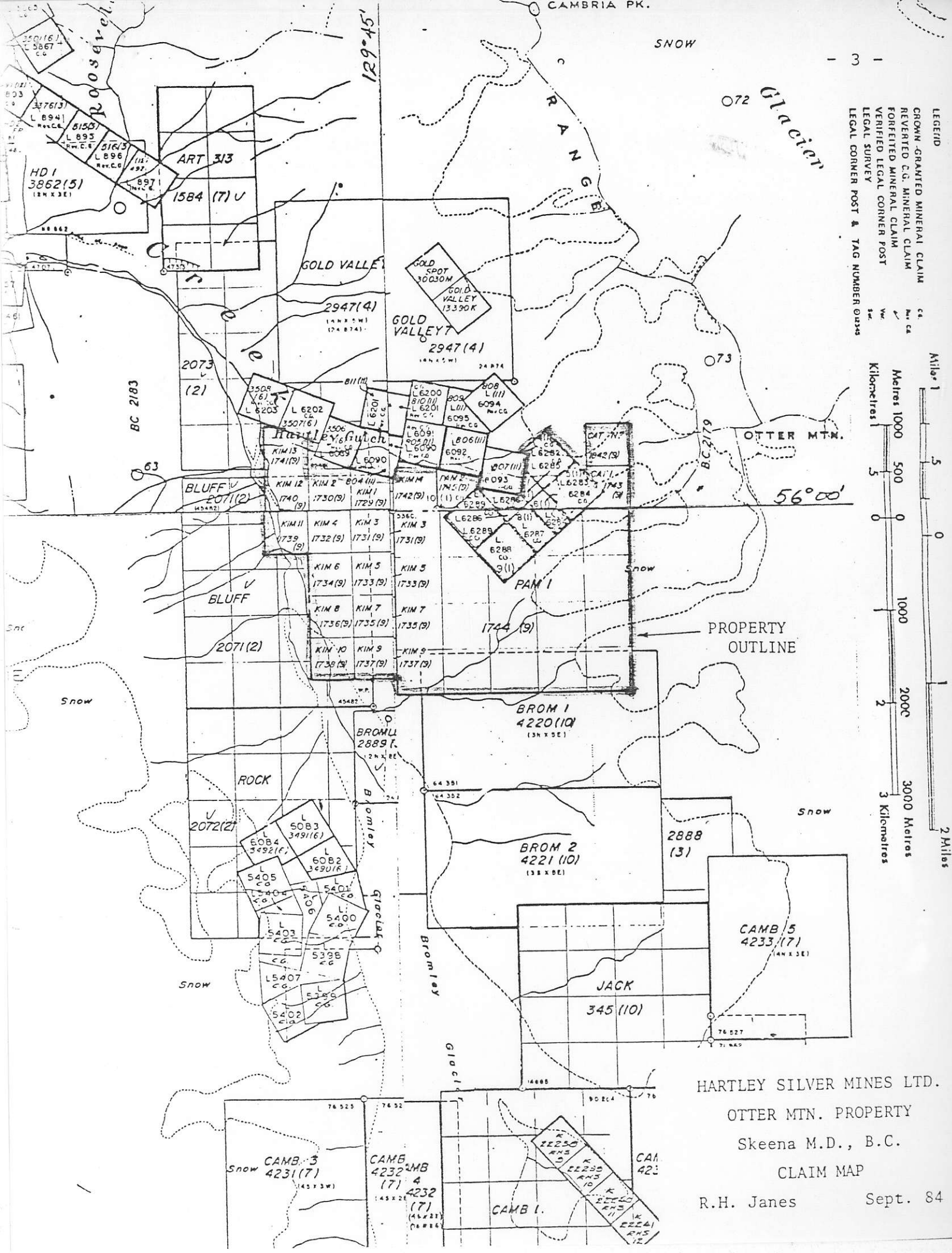
The property is located in the Cambria Range of the Coast Mountains. It straddles Hartley Gulch, situated on the western slope of Otter Mountain, and is between 16 and 19 kilometres east northeast of Stewart and between an elevation of 1100 and 6500 feet. Access is currently by helicopter from Stewart. A logging road in fair to poor condition branches off from highway 37A at Bitter Creek and follows this creek. It terminates at an elevation of about 1000 feet some three to four kilometres from the showings. Road distance from Stewart to road termination is approximately 22 kilometres.

Tree line at the property varies around 3300 feet, above this elevation vegetation is sparse. Snowfall is probably greater than 300 inches a year. Surrounding tongues of the Cambrai Glacier have a pronounced effect on the area.

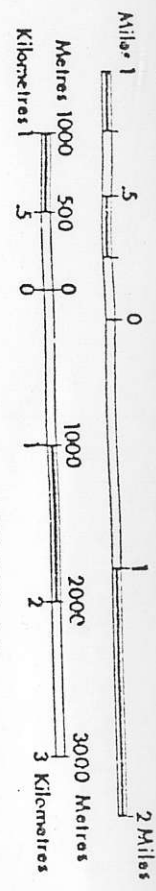
Stewart is predominantly a mining town. Population has varied between 600 and 1000 people according to mining activity. It has the usual facilities and is serviced by road, sea and air.



HARTLEY SILVER MINES LTD.  
OTTER MTN. PROPERTY  
Skeena M.D., B.C.  
LOCATION MAP  
R.H. Janes Sept. 84



LEGEND  
 CROWN-GRANTED MINERAL CLAIM  
 REVERSED C.G. MINERAL CLAIM  
 FORFEITED MINERAL CLAIM  
 VERIFIED LEGAL CORNER POST  
 LEGAL SURVEY  
 LEGAL CORNER POST & TAG NUMBER QUOTE

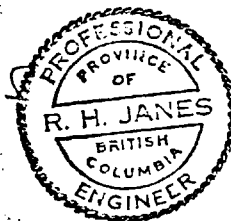


HARTLEY SILVER MINES LTD.  
 OTTER MTN. PROPERTY  
 Skeena M.D., B.C.  
 CLAIM MAP  
 R.H. Janes Sept. 84

## CONCLUSIONS AND RECOMMENDATIONS

1. Narrow, less than 0.3m east-west striking shears are filled with variable amounts of quartz, carbonate, less sphalerite, galena and tetrahedrite, var. freibergite. The sulphide content of the shears examined is not believed to be of sufficient quantity to support tunnelling or 'high-grading' if helicopter transport is used.
2. Disseminated sulphide mineralization was observed in vein wall rocks at a few locations. It is recommended that where the shears carry sulphides both wall rocks and the vein be sampled separately. Short drill holes employing the drill rig left on the property would be adequate. Three or four of the larger veins of the Main Showing should be tested with at least one hole. Up to a metre of wall rock on either side of the vein should be tested so required hole length is at least 5m. assuming setups are on outcrop. Core size should be the maximum practical.
3. For the Trench Showing a vertical hole to test the number of parallel veins present and associated mineralisation is recommended. Collar in the trench at either sample location 1 or 3. Hole depth dependent on what is found and capability of equipment.
4. At Showing No. 3 surface prospecting to locate the postulated adjacent shear is recommended.
5. At the Glacier Showing continuous chip sampling across the 'ladder vein' system is recommended. A drill hole through the shear and ladder veins is desirable but possibly beyond the capability of the drill available.
6. The area suggested as the former location of the Old Chum Group is recommended for prospecting plus any other areas of the claims not recently prospected.
7. The Bon Accord Group cover showings which are believed to be similar to those on the subject claims and both areas may be part of a mineralizing system in which the precious and base metals are zoned, with gold and copper occurring below silver, lead and zinc. Precious metal mineralization on the Bon Accord Group, according to published reports, merits further assessment.

*R. H. Janes*



### RECOMMENDED PROGRAM AND ESTIMATED COST

A program is recommended which might be enlarged if results so justify.

#### Drilling:

Main showing: 4 5m holes  
Trench showing: 1 15m holes  
Glacier showing: 1 30m holes

Above requires 5 days drilling, 4 days moving by hand, 9 hours helicopter time for long drill moves, 4 days for drill upgrading and maintenance. Total 16 days.

#### Other:

Prospecting and cutting trail to Bitter Creek road: 10 days  
Travel 4 days  
Weather and rest 6 days

Program Total 20 days  
36 days

Driller, 36 days @ \$150/d. plus 15% for W.C. etc. \$ 6,210  
Helper, 36 days @ \$100/d. plus 15% for W.C. etc. 4,140  
Food, camp supplies and helicopter servicing  
@ \$55/day per man 3,960  
Helicopter, 9 hours @ \$600/hour 5,400  
Drill parts and supplies 2,500  
Crew travel to and from Vancouver 1,000  
Assays 50 @ \$15 each 750  
Geologist to examine and sample cores, etc.,  
7 days @ \$400/day plus report and expenses 3,500

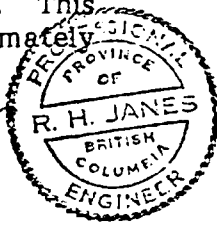
Total 27,460

Plus 10% 2,746

30,206

Say \$30,000

If initial drill results be encouraging then the drill program might be expanded 4 holes per vein at the Main Showing and 2 holes at the Trench Showing. This would extend the program 10 days and increase overall cost by approximately 00%.

*R. H. Janes*  




## HISTORY AND WORK DONE

According to Minister of Mines, B.C., Annual Reports Hartley Gulch has been the scene of prospecting since at least 1910 when Messrs. Lydden, Lade and Harkley staked the L.L. & H. and Old Chum Groups. These were located at an elevation between 3000 and 4000 feet. Underground work on the L.L.& H. commenced in 1911 and continued intermittently until 1940. In that time some 900 feet or more of tunnels were driven on two levels. The L.L.& H. Group was restaked as the Bon Accord Group in October 1944. Tenajohn Mines Ltd. optioned the claims in 1982 and put in a drill hole.

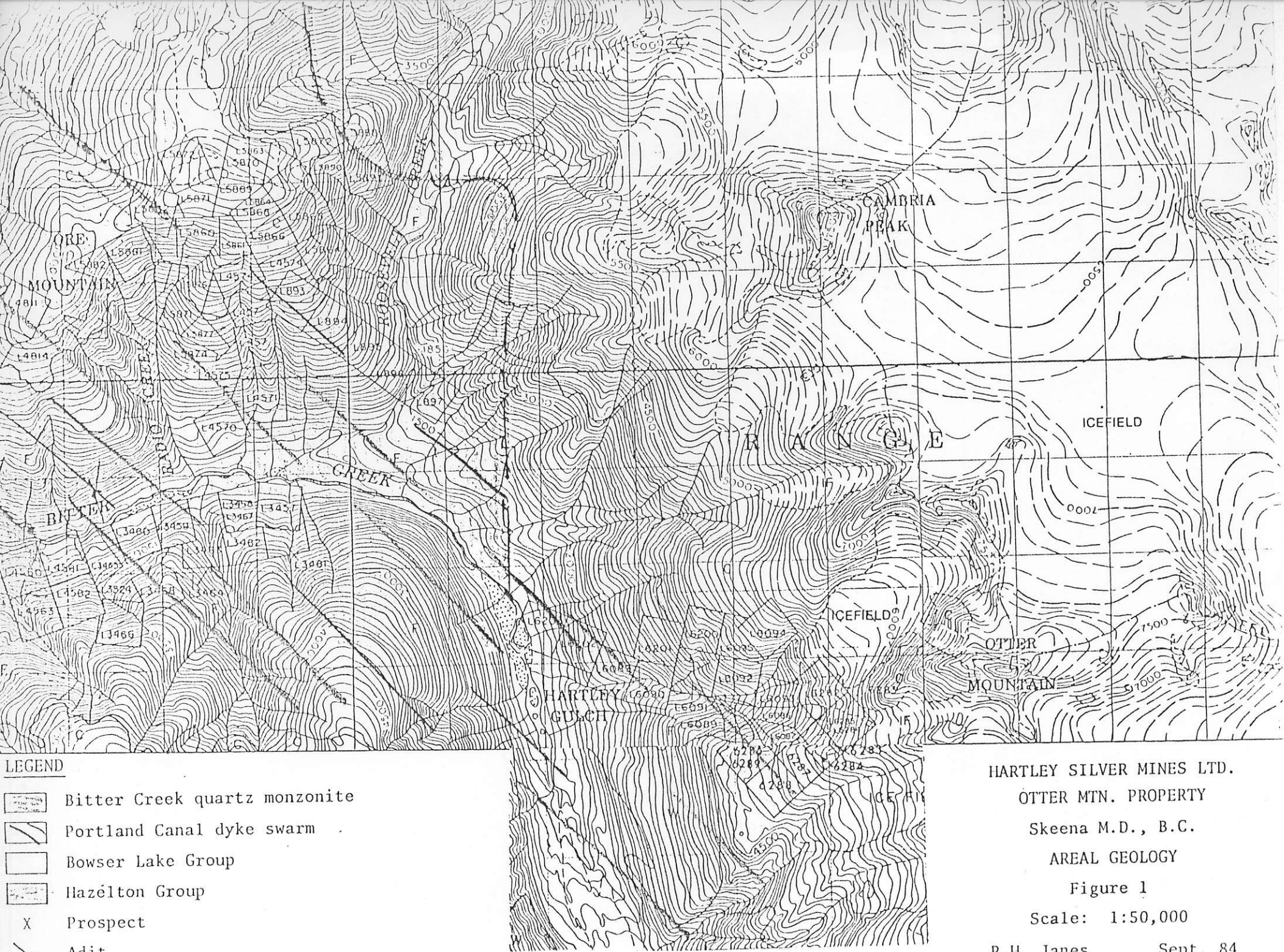
The Bon Accord claims adjoin the northern boundary of the Montreal claim group. The location of the Old Chum group is uncertain. The Montreal group which forms the core of the subject claims is mentioned only in the Minister of Mines, B.C., Annual Report, 1946. Trenching commenced in 1945 and the claims were surveyed in 1949. Messrs. Hepson and Fegan sent 4810 lbs of selected material from the property to Trail, B.C. in 1965. HSMI acquired the Montreal group in 1979. Since then Messrs. Fegan and Scott have prospected, trenched, drilled a few short holes using an X-ray drill and built a cabin near the north corner of Lot 6288 at elevation 5200 feet. J.T. Neelends, Du Pont of Canada Exploration Limited, examined and sampled the claims August 1982. Some of his results are quoted.

## REGIONAL GEOLOGY

The region is underlain by a north-northwest trending belt of folded volcanic rocks, correlative with Hazelton Group of Lower to Middle Jurassic age. This contains a later sedimentary sequence, correlative with Bowser Lake Group of Middle to Upper Jurassic age. These rocks are intruded by stocks and extensive dyke swarms, both chiefly composed of granitic rock. To the west the volcanic rocks abut against the stocks and batholiths of the Coast Plutonic Complex.

The volcanic rocks are composed principally of dark green andesitic tuffs. The sedimentary rocks are composed of interbedded tuffs and epiclastic sediments.

Numerous mineral deposits occur. Three or four were or are of major importance. The Silbak Premier deposits are high grade probable epithermal precious metal veins hosted either in networks of reticulate quartz veinlets or in silica-flooded zones both spatially associated with the "Premier porphyry." The Big Missouri deposits consists of many small precious metal-rich bodies in andesitic tuffs. These bodies are interpreted to be stratabound syngenetic quartz-carbonate lenses which host semi-massive pyrite with gold-silver values. The Prosperity/Porter Idaho and Silverado deposits consist predominantly of parallel shear zones variably mineralized. The strongly mineralized sections of the shear structures carry a complex of massive sulphides and quartz up to two metres wide. Most common sulphides are argentiferous galena and sphalerite, lesser quantities of various silver bearing minerals are present. Wall rock marginal to the massive sulphides is mineralized and may constitute ore for several metres either side of the vein.



## GEOLOGY AND MINERALIZATION IN AREA OF HARTLEY CREEK AND SUBJECT CLAIMS

The claims are underlain by andesitic volcanic rocks, chiefly tuffs, and volcanic epiclastics. Attitudes are northwesterly and northerly with easterly dips. These rocks may correlate with the Bowser Lake Group. A number of parallel granitic dykes, part of the Portland Canal dyke swarm, crop out on both sides of Bitter Creek (photo). Several of these dykes, a metre or less wide, traverse the claims. Attitudes tend to follow that of the host. Four showings were examined. These are Main or No. 1, Trench or No. 2, No. 3 and Glacier or No. 4. Approximate locations are shown (Fig.2). Notes on the Old Chum Group & Bon Accord claims are added.

### Main Showing, Figure 3.

A number of variably mineralized shears occupy an east-west trending zone which traverses a prominent rock knob situated just below and south of an ice tongue from the adjacent Cambria Icefield. The zone is here well exposed and at the foot of the knob has an estimated width of 90 metres (photos). Host is dark green massive volcanic, probably an epiclastic. Rounded fragments up to cobble size occur in a matrix dominant rock. Matrix is fine to medium grained, some possible felspar phenocrysts and weak disseminations of pyrite were observed.

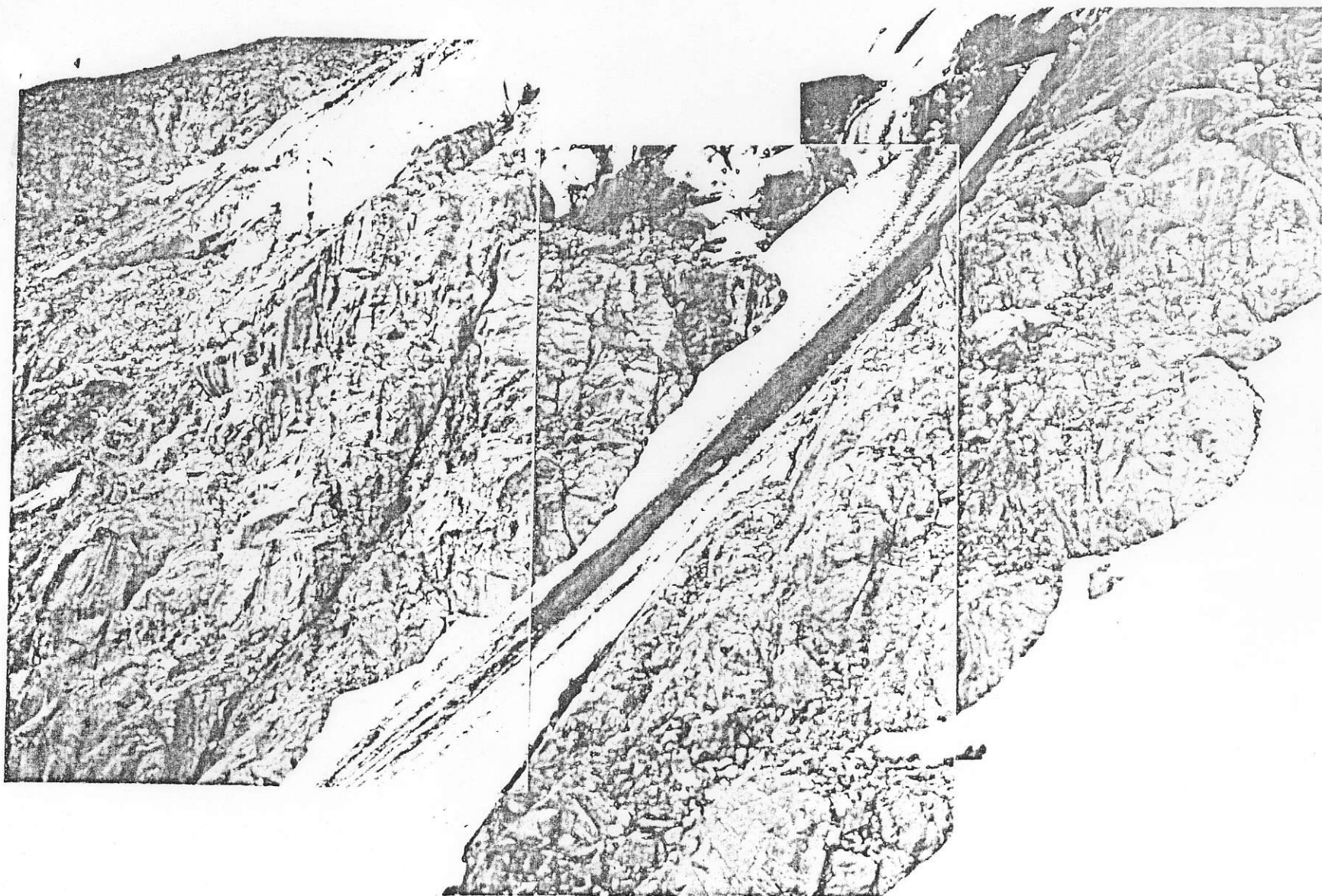
The shears are of variable attitude and width though the stronger shears tend to strike east-west and have steep dips. Subsidiary minor tension fractures are frequent. The shears are variably filled milky quartz, less carbonate and wall rock fragments, sometimes comminuted. Infrequent masses and disseminations of light brown sphalerite, argentiferous galena and less tetrahedrite are present. The largest mineralized shear as advised by S. Fegan occurs in the snow filed draw below the glacier and was not examined (photo).

The wall rocks and zone generally have a noticeable orange tint due, it is believed, to weathering of carbonate alteration products. An orange brown oxidation product, presumably limonite, coats vein carbonate. Sphalerite and galena were not noticed in the wall rocks. Rough chip samples, in five metre sections, were taken across the zone (photo) and vein material avoided. All samples returned low values (Table 1).

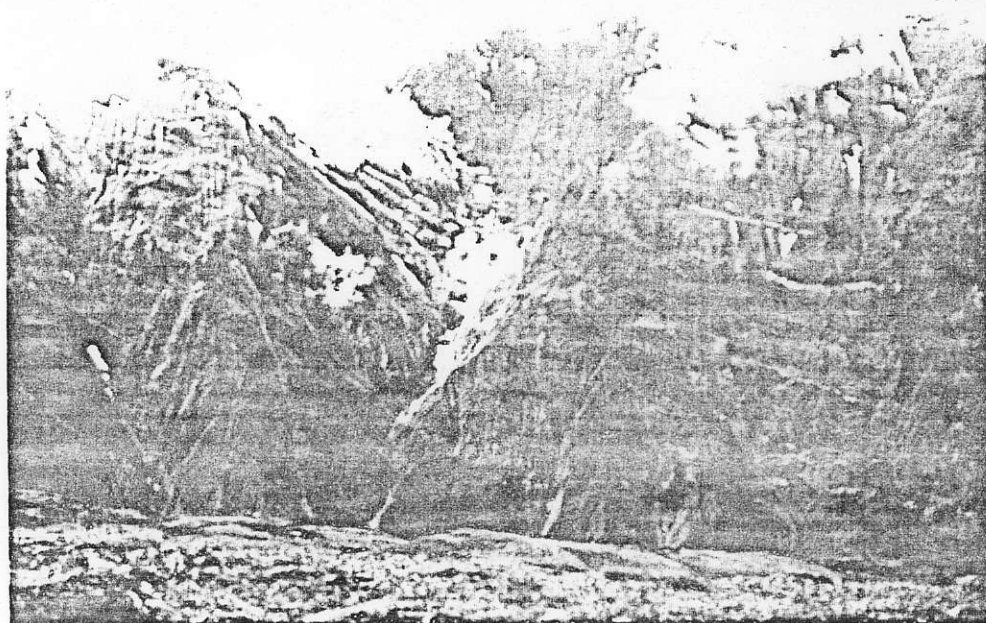
### Trench or No. 2 Showing, Figure 4

Two parallel mineralized shears are well exposed by an extensive "F" shaped trench (photo). Here the slope of the hillside conforms with the attitude of the shears. The shears are from 1.4 to 1.7 m apart, contained mineralization is similar to that at the Main Showing. Footwall of the lower shear shows strong carbonate alteration and carries disseminated tetrahedrite for some 30 cms. The hanging wall shows carbonate alteration for about 15 cms. above the shear. Subsidiary narrow (0-1 cm) quartz filled tension fractures occur.

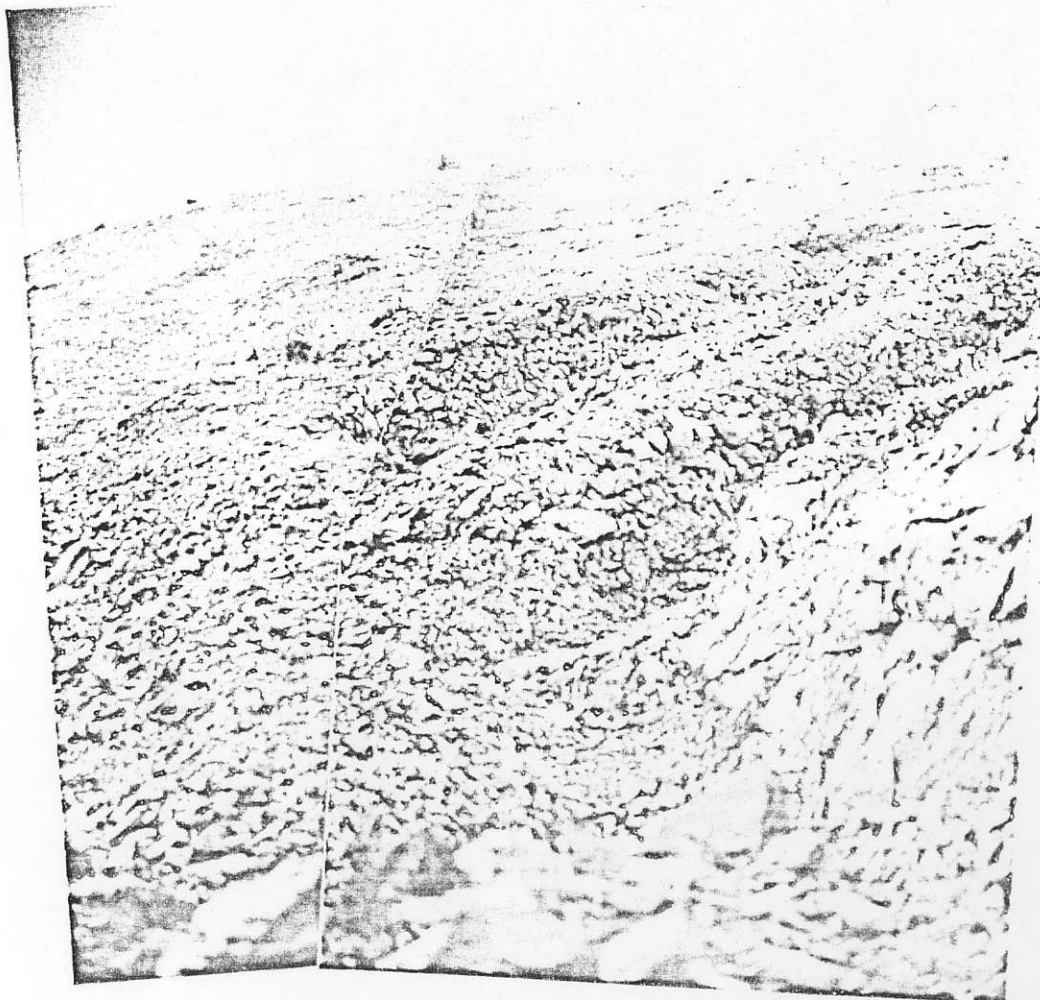




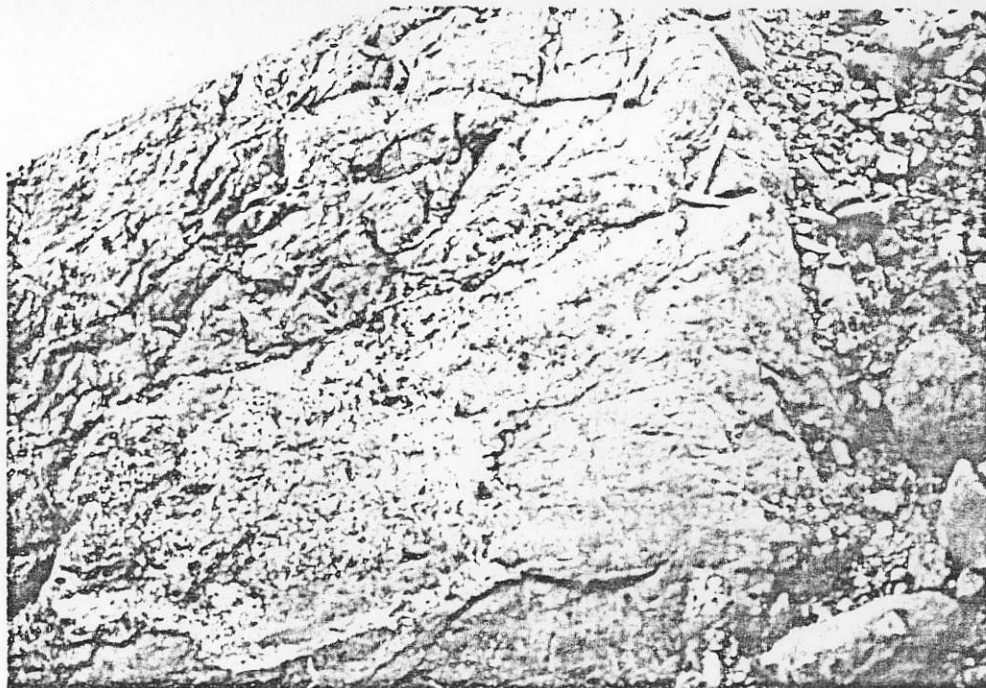
PART OF MAIN SHOWING LOOKING NORTHEAST. ONE OF THE LARGER VEINS CROPS OUT IN THE DRAW BUT IS NOW COVERED BY ICE AND SNOW. NOTE QUARTZ VEINS AND ORANGE DISCOLORATION DUE TO CARBONATE ALTERATION.



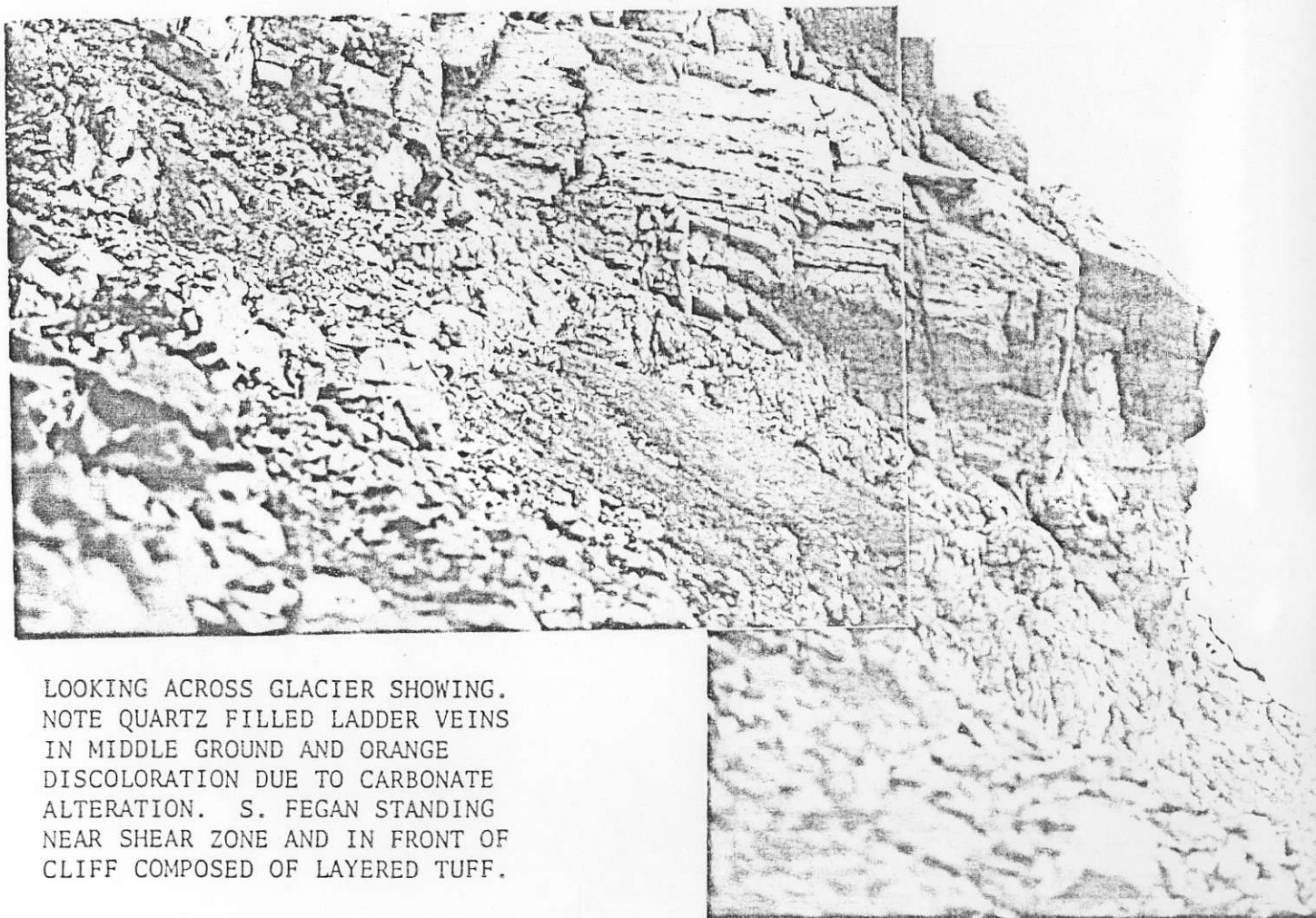
VIEW LOOKING WEST FROM CABIN. NOTE RIBBED APPEARANCE PRODUCED BY PARALLEL DYKES OF PORTLAND CANAL DYKE SWARM.



TRENCH SHOWING. MINERALISED SHEARS EXPOSED IN FLOOR OF TRENCH FOLLOW SLOPE OF HILLSIDE.

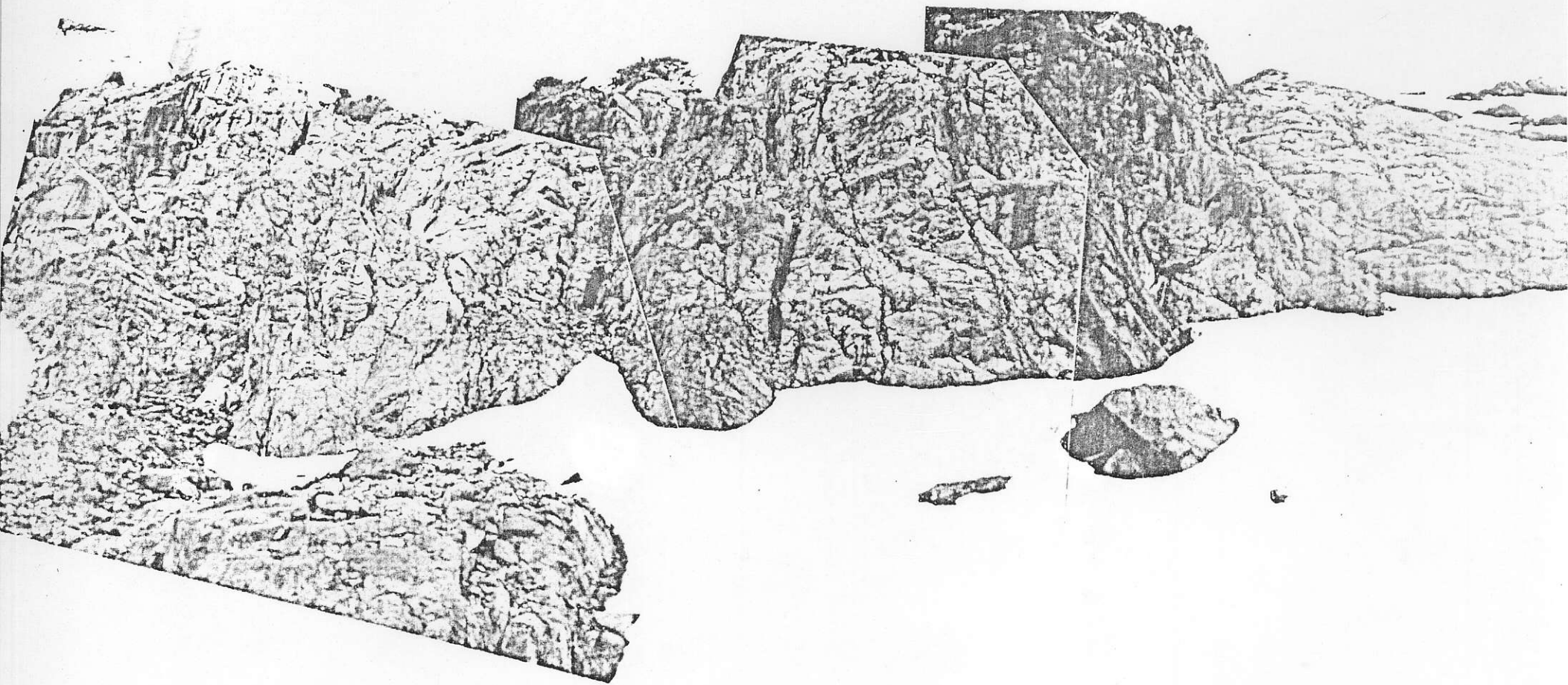


VEIN COMPOSED OF QUARTZ, WALL ROCK FRAGMENTS, CARBONATE AND TETRAHEDRITE. NOTE ORANGE OXIDATION ON VEIN CARBONATE. MAIN SHOWING.

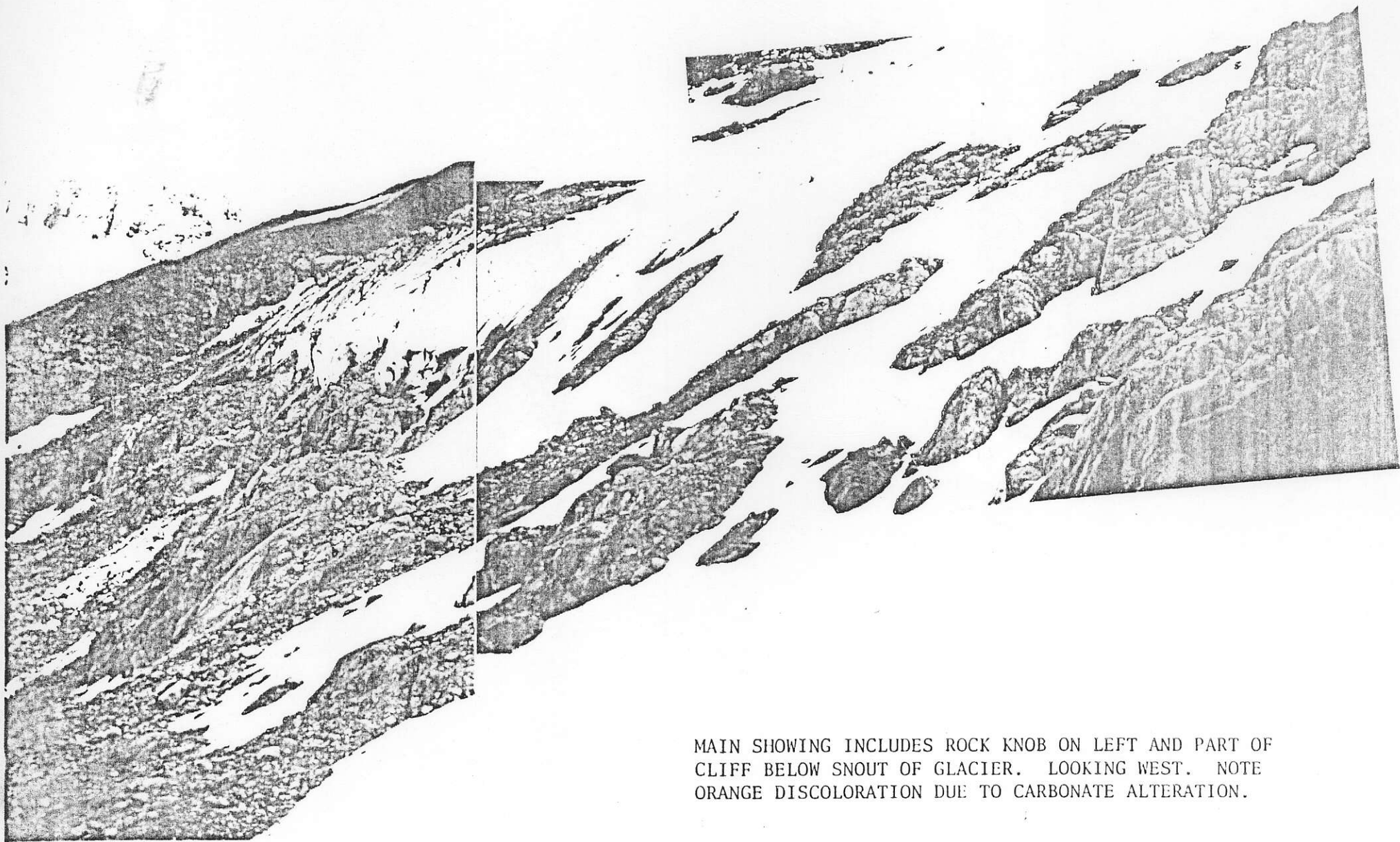


LOOKING ACROSS GLACIER SHOWING. NOTE QUARTZ FILLED LADDER VEINS IN MIDDLE GROUND AND ORANGE DISCOLORATION DUE TO CARBONATE ALTERATION. S. FEGAN STANDING NEAR SHEAR ZONE AND IN FRONT OF CLIFF COMPOSED OF LAYERED TUFF.



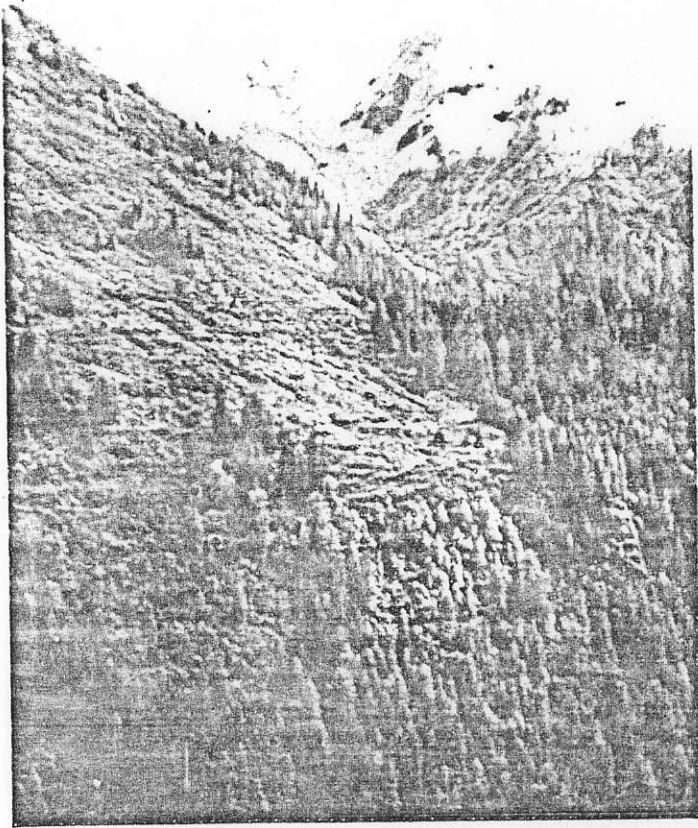


NORTH-SOUTH PANORAMA ACROSS MAIN SHOWING. SECTION  
SAMPLED IN 5M SECTIONS. NOTE WHITE QUARTZ VEINS AND  
VERTICAL CUTS ALONG VEINS. NOTE ORANGE DISCOLORATION  
DUE TO CARBONATE ALTERATION. NORTH SIDE TO LEFT.



MAIN SHOWING INCLUDES ROCK KNOB ON LEFT AND PART OF CLIFF BELOW SNOUT OF GLACIER. LOOKING WEST. NOTE ORANGE DISCOLORATION DUE TO CARBONATE ALTERATION.

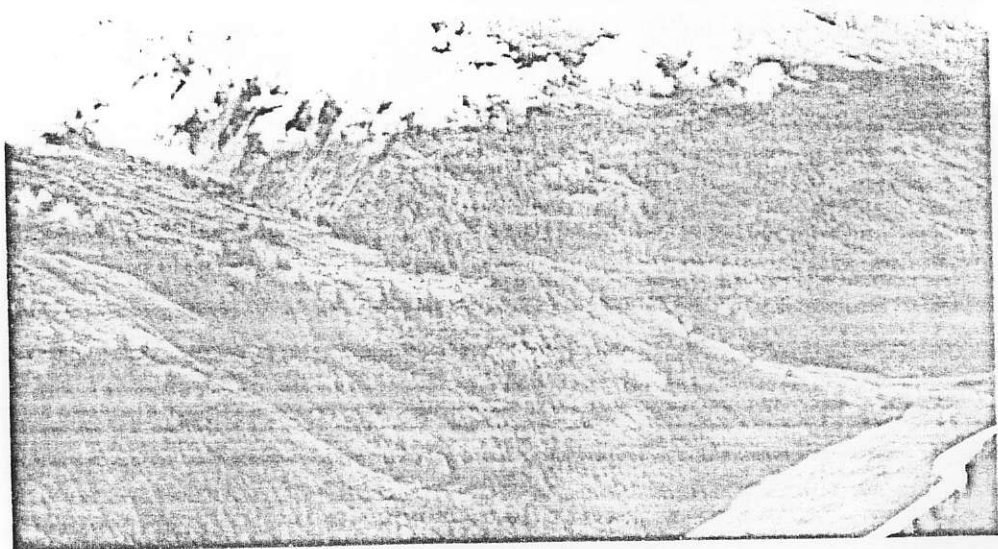




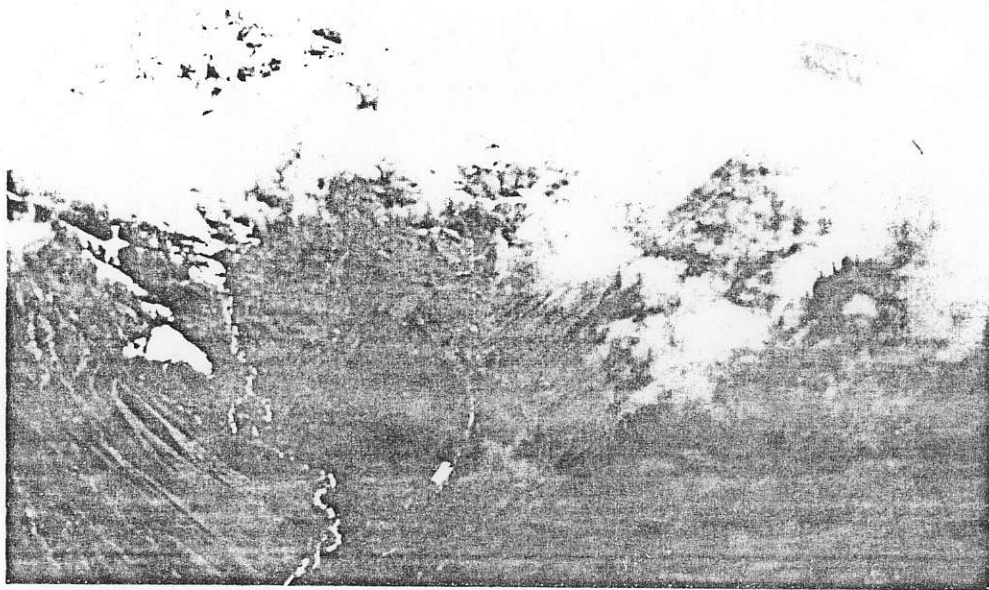
MID HARTLEY GULCH LOOKING SSE



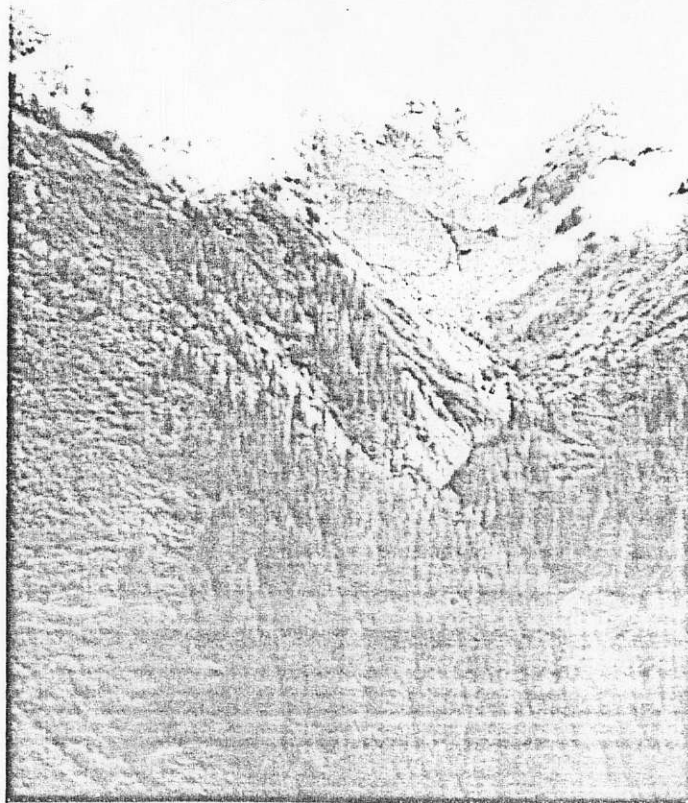
LOWER HARTLEY GULCH LOOKING SE



LOWER HARTLEY GULCH LOOKING SOUTHEAST



TOP OF HARTLEY GULCH. MAIN SHOWING IS AT HEAD OF  
RIGHT HAND BRANCH. LOOKING EAST. BON ACCORD  
CLAIMS COVER GOSSAN ON LEFT OF CREEK.



UPPER HARTLEY GULCH. LOOKING EAST.

HARTLEY GULCH, 103 P/13 and 104A/4

FROM RECORDS AT SUB-RECORDER, VANCOUVER ON 18 SEP. 84

<u>NAME</u>	<u>LOT</u>	<u>RECORD NO.</u>	<u>AREA</u>	<u>EXPIRY DATE</u>	<u>OWNERSHIP &amp; COMMENT</u>
<u>SUBJECT CLAIMS</u>					
Montreal 1	6282	4(1)	47.30 ac	27 Jan. 85	Hartley Silver Mines Ltd
Montreal 2	6283	5(1)	51.65 ac	27 Jan. 85	Hartley Silver Mines Ltd
Montreal 3	6284	6(1)	24.33 ac	27 Jan. 85	Hartley Silver Mines Ltd
Montreal 4 & 5	6285 & 6286	7(1)	28.64 ac	27 Jan. 85	Hartley Silver Mines Ltd
Montreal 6	6287	8(1)	31.62 ac	27 Jan. 85	Hartley Silver Mines Ltd
Montreal 7	6288	9(1)	51.65 ac	27 Jan. 85	Hartley Silver Mines Ltd
Montreal 8	6289	10(1)	51.65 ac	27 Jan. 85	Hartley Silver Mines Ltd
Kim 1 to 14	-	1729(9) to 1742(9)	50 ac each	26 Sept. 84	1 to 6 S. Fegan 7 to 14 W. Scott
Cat 1	-	1743(9)	50 ac	26 Sept. 84	S. Fegan
Cat 2	-	1842(9)	50 ac	26 Sept. 84	S. Fegan
Pam 1	-	1744(9)	20 units	26 Sept. 84	S. Fegan & W. Scott
Pam 2	-	1745(9)	50 ac	26 Sept. 84	S. Fegan & W. Scott

Grouping:

Pam Gp (37 units); Kim 1-14, Cat 1&2, Pam 1&2, 25 September 80  
 Montreal Gp (7 units); Montreal 1-8, 25 September 80

NOTE: Application for 2 years assessment work made on Pam Gp, 24 September 84.

BON ACCORD CLAIMS

Bon Accord 1	6090	804(11)	49.37 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 2	6091	805(11)	49.38 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 3	6092	806(11)	51.65 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 4	6093	807(11)	51.65 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 5	6094	808(11)	51.65 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 6	6905	809(11)	35.43 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 7	6200	810(11)	43.53 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 8	6201	811(11)	51.61 ac	2 Nov. 84	Ian McLeod, Stewart
Bon Accord 9	6202	3507( 6)	20.90 h	4 June? 84	Nor-con Exploration, survey pending
Bon Accord 10	6203	3508( 6)	20.90 h	4 June? 84	NEL, S.P.
Bon Accord	6089	3506( 6)	18.64 h	4 June? 84	NEL, S.P.

Grouping:

Bon Accord Gp (8 units); Bon Accord 1-8, 17 October 79.

**APPENDIX I**

**MINERAL CLAIM DETAIL**

**REFERENCES**

Alldrick, D.J. (1984). Geologic Setting of the Precious Metal Deposits in the Stewart Area. B.C. Ministry of Energy, Mines & Pet. Res., Geological Fieldwork, 1983, Paper 1984-1, pp. 149-195.

Alldrick, D.J. and Kenyon, J.M. (1984). The Prosperity/Porter Idaho Silver Deposits. B.C. Ministry of Energy, Mines & Pet. Res., Geological Fieldwork, 1983, Paper 1984-1, pp. 165-172.

Grove, E.W. (1971). Geology and Mineral Deposits of the Stewart Area, British Columbia, B.C. Mines and Pet. Res., Bull. No. 58.

Various Annual Reports by B.C. Minister of Mines.

GSC Map 217A, Bear River Sheet.