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REPORT ON VAN ISLE PLACERS.

This property consists of fifteen leases, each of which is approximately one-half mile long and one-quarter mile wide. It is situated on the Leech River in the Victoria Mining Division of Vancouver Island, being about 36 miles north-westerly from the city of Victoria. The leases extend from the confluence of the Leech and Sooke Rivers, a distance of approximately five miles up-stream and straddle the Leech River and some of its tributaries as shown on sketch attached hereto. The grade of the stream averages about three percent.

ACCESSIBILITY

The property is easily accessible from Victoria by a reasonably good motor road and is a regular point of call for the stage which gives a tri-weekly mail, express and passenger service from that city.

GEOLOGICAL AND PHYSICAL FEATURES

The Leech River flows southerly in its upper reaches, changing its course to an easterly direction about three miles up-stream from its confluence with the Sooke River.

Throughout the length of the property the stream flows on schistose bed-rock having completely eroded its actual water course of any covering whatsoever. A quartzite formation was noticed crossing the schists near Martin's Gulch. The bedding planes dip at from sixty degrees to vertical and the schists contain very many conformable quartz and calcite stringers and veinlets which are probably responsible for much of the enrichment in the lower gravels.

The present water course is the most recent having been eroded to a lower horizon than any other part of the valley floor. This is clearly evidenced by the escarped rims on each side of the stream which rise gently at right angles to the direction of flow. The valley has been glaciated but the presence of several pot holes in the benches indicates that the glacier was stopped by the main and much larger ice-field in the Sooke Valley so that it receded and eventually died. It is therefore doubtful if the lower gravels in the Valley were much distrubed by ice action.

The old course of the channel meandered much more than the present one as is shown by accompanying plan which was loaned to the writer by Mr. Nordlund, who is resident Engineer on the

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property. This plan accurately shows the old channel in which a great mass of moranial material was laid down and which has been planated and in some places terraced by subsequent water action. Where the gravels are terraced the stream has eroded them to a depth of about twenty feet above the Bed Rock. It is therefore probable that the two upper strata have been merged to one stratum over those areas.

GRAVELS

The gravels overlying the valley floor have been laid in three distinct strata, the lower stratum lying directly on the bed-rock while the two upper strata each overlie a hard clay stratum varying in thickness from two to four feet. The whole deposit varies in depth from twenty to sixty feet. The lower gravels have been subject to much resortation while the upper two strata are definitely moranial deposit and although shingled they have been only slightly resorted.

The wash varies in size from boulders of three to five feet in cubic dimension to cobbles, pebbles, pea gravel and sand, the whole being intermixed with a fine silty clay which is an excellent trap for gold. The clay is not very plastic and readily disintegrates in the pan so that it does not menace the saving of fine values. The deposit contains very many angular quartz fragments and a number of large boulders were noticed lying directly on bed-rock or just above it in the lower stratum.

ENRICHMENT

The gravels are well enriched with gold ranging in size from small nuggets to dust and fine flakes. The flakes and finer gold has sufficient body for its specific gravity to overcome the action of the sluice water. The coarsest gold appears to be associated with the large boulders in the lowest stratum which is very heavily oxidized and contains much clay -- in fact it looks to the writer very much like a pre-glacial deposit.

The two upper strata are distinctly post-glacial and appear to be naturally salted throughout with finer gold. Where the deposit become s shallower as mentioned in a former paragraph under heading "Geological and Physical Features", it is almost certain that the one upper stratum so formed will contain a greater enrichment per cubic yard because the subsequent period of erosion would have taken the gravels but would have resorted the coarser gold into the lower gravels which have been left.

TESTING AND SAMPLING

An area comprising approximately 2,300,000 cubic yards has been conservatively tested by channel sampling by Mr. Nordlund. The writer inspected all points where samples were taken and checked by taking panning samples from virgin ground near the same points.

The following is a Tabular Record of Mr. Nordlund's sampling:--

No. 1	channel sample 6' high face of bench	$ .25 per cu. yd.
No. 2	" " 9' " oxidized gravels on rim	.80 " " "
No. 3	" " 7' 5" high oxidized gravels on rim	1.60 " " "
No. 4	" " 10' high (front of old tunnel now caved. Note Richmond estimated tunnel @ $14.00 per sq. yd. of B. R.)	1.20 " " "
No. 5	Tunnel driven and sampled by Mr. Nordlund dimensions 7' x 8' x 50' - about 2' above Bed Rock	.50 " " "
	Also channel sample down face of bench from top to bottom height about 20 to 30'	.25 " " "
No. 6	Rocker test from 1 sq. yd. Bed rock near portal of tunnel	4.00 " " "
No. 7	Ogilvie Pit - Ogilvie reported recovery or $80.00 from 10 cu. yds. on Bed rock- Nordlund took channel sample up bank 50' high	.65 " " "
No. 8	Channel samples in 3 sections up 60' bank	.41 " " "
No. 9	Channel sample in test hole 6' deep	.25 " " "
No.10	Starling Pit channel sample 6' oxidized gravels from Bed-rock	5.00 " " "
	+ 10' clay and gravels	.30 " " "
	+ 12' surface wash	.25 " " "
No. 11	Channel sample - 4' from B. R.	1.15 " " "
	+ 8' wash mixed with clay	.40 " " "
	+ 15' surface gravels	.10 " " "
No.12	hole 6' deep 75' back from Crest of bench	.10 " " "
No.13	channel sample + 8' face of bank	.55 " " "
No.14	channel sample + 7.5' face of bank	.45 " " "

NOTE: All channels cut about two feet wide and one foot deep. Mr. Nordlund's estimate of 32¢ per cubic yard over all excluded the $5.00 sample at No. 10, also the $4.00 sample at No. 6.

The writer took panning samples at nearly all test points and would point out that such tests in gravels giving values up to 50¢ per cubic yard only serve to show the presence of gold. At each point the writer got positive results which in his opinion would confirm the previous sampling, his weighable panning samples were as follows:--

Starling Pit No. 10

No. 1 - 6' above bed-rock heavily oxidized wash	78.81 mgs.	$11.85 per cu.yd.	
No. 2 - 5' above bed-rock heavily oxidized wash	16.70 mgs.	2.55 " "	
No. 3 - 7' above bed-rock heavily oxidized wash	7.36 mgs.	1.11 " "	
No. r - 4 pans on B. R. near portal of Tunnel No. 5 M.	138.4 mgs.		
- 8 pans in oxidized gravels taken from 2' to 8' above B. R.		1.73 " "	
No. 5 - B. R. Sample 20' from Nos. 4 and 5 Tunnel	48.83 mgs.	3.97 " "	B.R.
No. 6 - No. 8 Bulk test surface gravels 1 pan	5.91 mgs.	.88 per cu. yd.	
No. 7 - panning sample 2½ pans up 6' of face surface gravels at 18' from No. 14 Bulk test and 60' from stream	20.32 mgs.	1.22 " "	

Many more pannings were made by the writer at different places practically all of which indicate that the gravels throughout carry gold in commercial quantity.

OLD WORKINGS

On the accompanying Blue Print the writer has outlined in red, areas which were mined by the early miners. These old workings were mined by hand as is evidenced by the masoned rock piles. They indicate beyond doubt that the early miners were actually producing gold rather than in quest of it. Their operations of course being confined to the shallow gravels adjacent to the

stream as they were unable to handle heavy overburden or to transport water far enough to sluice the gravels remote from the stream. They also indicate yardage of commercial gravels far in excess of the 2,000,000 cubic yards already mentioned.

DELTA AREA

This area is formed by the confluence of the Leech and Sooke Rivers.

It contains approximately 8,000,000 cubic yards of gravels, some of which were mined in the early days. It is probable that the remainder are enriched but they have not been extensively tested so that it is not known whether they contain commercial values for modern operation. However, this is a matter to be dealth with at a later time.

TIMBER

There is a fairly dense growth of fir, cedar and hemlock on the property. The fir and cedar range from six inches to four feet in diameter; the hemlock from four inches to two and one half feet. This constitutes a clearing problem of about three to four cents per square yard of surface. Some of this cost will be returned because much of the timber can be used for mining purposes. There is sufficient to supply all future needs at low cost.

OPERATION

The gravels can be readily mined by modern Hydraulic Practice at a cost which should not exceed eight cents per cubic yard. The Company is now building the foundation of a flume to carry seventy-five cubic feet of water per second. The length of the flume will be about 7,200 feet and its dimensions five feet by three. About 4,000 feet of the foundation is now completed and was inspected by the writer. It is quite capable of carrying double the quantity of water now intended. The dam at the intake of the flume ia also completed. It is a crib structure being 12 feet high at the centre. It appears to be well built and the spillway is large enough to take any ordinary freshet. The writer recommends that the flume design be changed to include 2 inch sides instead of inch and a half, as is now the intention, and that the side posts be made of 6" x 6" timbers instead of 4" x 6" , and that they be made sufficiently high to allow the sides to be raised to four and one half or five feet in height which would take care of future expansion of operation for a long time. Also that a caterpillar tractor with bulldozer be included in the estimates because it will very much increase the efficiency and lessen the cost of operation.

BUILDINGS

The camp at present consists of five buildings, being a small cookhouse, two small bunk houses and two dwelling houses, one of which is uncompleted. The foundation for an additional bunk house is built and when these buildings are completed they should be adequate to the needs of the camp.

CONCLUSION

In the opinion of the writer the property has very much merit and the testing done to date warrants the installation of plant and equipment in accordance with plans outlined by the Resident Engineer. Such a plant should mine a minimum of approximately 90,000 cubic yards per month which should return the invested capital together with a handsome profit.

The climatic conditions are favourable to year round operation except for about two months during the summer when the stream flow drops below the amount of water necessary for full operation. This period could be profitably employed in doing the dead work attendant on all Hydraulic operations.

Respectfully submitted,

"H. McN. Fraser"

H. McN. Fraser
Engineer of Placers,
October 20th, 1938.

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checked Dec 20/81

(On map)

LEECH RIVER AREA, VANCOUVER ISLAND
(92B/5g, 12 b-c)

By G.E.P. Eastwood

INTRODUCTION

Placer gold was mined from the Leech River in quantity in 1864 and has been the object of intermittent prospecting and small-scale mining since then. The river name has been used for the metasedimentary bedrock formation on which the placer deposits rest and for a major fault which juxtaposes the Leech River Formation against the Eocene Metchosin basalt to the south. The Leech River Formation has not been dated, and suggestions as to its age have ranged from Carboniferous to Early Cretaceous. The formation contains numerous small quartz veins carrying trace amounts of gold, and Clapp (1917) concluded that the placer gold was derived from them.

A prospector, Marvin Richter, did not believe this and in 1980 claimed to have found nugget gold in shear zones in the Leech River Formation. He speculated that these were localized along fold limbs. There were thus stratigraphic, structural, and economic reasons for taking another look at the Leech River area. In 1981 the writer spent 7 days on a reconnaissance of a strip between the mouth of the West Leech and Sooke Rivers. It was then learned that the Greater Victoria Water District plans to build a 20-metre dam across the Leech River at the end of the new road on the north side and to drive a 4-kilometre tunnel from a point immediately above northeast to Deception Gulch, near Sooke Lake.

This area may be reached on weekends via a Pacific Logging main haul road from Sooke, or at any time from the Shawnigan Lake Road via the

Sooke Lake Road and a succession of secondary roads that lead to the old Leechtown site. The former bridge over the upper Sooke River is gone, so it is necessary to ford the river immediately above its junction with the Leech River. The passable roads and main streams are shown on Figure (E2) 1. A gate across the new road on the north side of the Leech River is kept locked, and a key was borrowed from the Greater Victoria Water District. The north slope and lower part of the south slope of the Leech River valley are moderate, whereas the upper part of the south slope is bluffy. The river is slightly incised over most of its length. Martins Gulch is actually a V-shaped creek valley with a moderate gradient. Bedrock is well exposed along the beds of the Leech River and Martins Gulch, moderately so in road cuts at lower elevations, and not at all on the upper part of the north slope.

GENERAL GEOLOGY

In this area exposures of the Leech River Formation consist of interbedded black phyllite, light to dark grey siltite, and white to light grey fine-grained quartzite. The siltite constitutes about half the rock and phyllite is least abundant. Most of the beds are thin: phyllite commonly 0.5-1.0 millimetres, siltite 1-5 millimetres, and quartzite 1-3 centimetres. A few quartzite beds are metre-thick, and at one place several beds coalesced to form a unit 10 metres wide. Along the Leech River between Martins Gulch and the end of the new road, these thin-bedded rocks have been closely drag folded; most of the limbs have been stretched and pinched off, producing a striped and roddy rock. All gradations can be seen between perfectly cylindrical rods, which resemble

stretched pebbles, and flanged rods which are clearly the thickened axial parts of drag folds. These beds have a moderate schistosity parallel to the striping and bedding. Downstream, 680 metres above the haul road bridge, the beds are not drag folded and are cleaved to slightly schistose. Southwest and west of Macdonald Lake mesoscopic drag folds are scattered and the beds are only locally schistose. Such folds are abundant up Martins Gulch but not sheared out; the rocks are cleaved to somewhat schistose.

No definite stratigraphic units could be distinguished. Two quartzite units exposed in the Leech River might be traceable but because exposure is largely restricted to the river, the likelihood is not promising.

Thin sheets of slightly gneissic granitic rock intrude the phyllite and siltite in a road cut on the north side of the river about 800 metres west of the haul road bridge.

STRUCTURAL GEOLOGY

Observations of the structural elements are shown in Figure 1. There is a coherent pattern west from Martins Gulch where drag folds consistently indicate overriding (vergence) toward the south. They have one long upright limb and one short overturned limb. Viewed along the east plunging fold axis, the folds resemble a staircase with narrow treads and high risers. The easterly plunge of the folds decreases westward from 35° at Martins Gulch to 20° at the end of the new road. Furthermore, the bedding generally steepens southward, to near vertical at the mouth of Martins Gulch and is overturned at the west end of the area. Dips of

bedding were necessarily measured on the long limbs of the drag folds, hence the average true dip of a bed is somewhat less where drag folds were not dismembered. In areas with sheared out folds, the average dip differs little from the true dip.

The Leech River fault was not observed; its trace has been taken from a line of change in topography seen on airphotos. If it were vertical or north-dipping the river would presumably have eroded down along it. Since the trace is part-way up the south slope the fault zone must dip south and have been partially protected from erosion by overhanging erosion-resistant Metchosin basalt. A south dip is also consistent with steepening and overturning of the Leech River beds toward the fault. The fold pattern is consistent with a large flexure in beds that have been downfaulted. The pattern of disrupted drag folds can be understood if it is assumed that beds on the concave side of the flexure were initially under compression and responded by drag folding with relative movement of the upper bed up toward the fault, and subsequently were under tension and stretched as subsidence of the package continued. Thus, on the section of the fault between points opposite the mouths of the West Leech and Martins Gulch the Metchosin Formation has been thrust over the Leech River Formation. The plunge of the drag folds would indicate an eastward component of movement.

In the eastern part of the area the structural pattern is less clear. Near the Sooke River the fault trace approaches Leech River and the fault may be close to vertical. The vertical and overturned dips south and west of Macdonald Lake appear anomalous and may be unrelated to the faulting. The steep plunge is also difficult to account for.

Farther east, near Goldstream, Clapp found that the Leech River fault dips north.

The thin Leech River beds are particularly susceptible to downhill creep. Spectacular examples occur at the end of the road along the north side of the river and at the end of the lower road on the south side. At the first, beds dipping 65° north are curved through horizontal to a gentle south dip at the surface. At the second, beds overturned to 70° south in the river bank are bent over to a gentle south dip (upside-down) in the bluff above. Shallow cuts on hillsides cannot be expected to show true dips.

ECONOMIC GEOLOGY

The source of the placer gold remains undetermined. In 1864 the main placer accumulations were found at the mouth of Martins Gulch and at the junction of the Leech and Sooke Rivers. A weekend placer prospector told the writer he had traced gold by panning up the Leech River and Cragg Creek as far as the middle of Survey Mountain, but had found no lode gold on the mountain. The writer's assistant panned a few grains of gold from mid-channel gravel patches opposite the mouth of Martins Gulch, but could find no gold in Leech River gravels immediately above this. The gold grains were well-rounded, almond shaped and possibly laminated; they could have formed either by deformation of individual nuggets or by pounding together of a number of small flakes. The Razzos had a small placer operation in Martins Gulch but declined to report results. These observations hint at a zone or zones of gold mineralization passing through Survey Mountain and the upper part of Martins Gulch.

Several shear zones were seen about the middle of Martins Gulch but they appeared barren. A 1922 report on the Invereck talc deposit on Deception Creek notes that trace gold was found in the talc, and a 1924 report notes that colours of gold can be panned from the gouge between the talc and the enclosing Leech River beds. Quartz veins in Leech River beds are so weakly mineralized that they appear barren. It is possible that they are a source of some or most of the placer gold, but more likely because the ice sheet swept residual and colluvial products of Tertiary weathering into the stream valleys, than from erosion of the veins in post-glacial time.

Marvin Richter had had a placer operation in the gravels immediately below the confluence of the Sooke and Leech Rivers, and seemed satisfied with results. However, he abandoned it early in 1981 and left the area.

ENGINEERING GEOLOGY

Beds exposed in the Leech River at the proposed dam site appear hard and reasonably competent and should provide adequate footing. The trace of the Leech River fault is well above the proposed water storage level. West of the map-area, the Leech River fault is offset by a north-south cross fault that is evident on the airphotos. This offset also occurs above the proposed water level. However, there may be cross-fractures parallel to this offset closer to the dam site, too small to show on the airphotos but big enough to leak water into the fault.

REFERENCES

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Holland, S.S. (1950): Placer Gold Production of British Columbia, B.C. Ministry of Energy, Mines and Pet. Res., Bull. 28, pp. 15-16.

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SYMBOLS

Outcrop of Metchosin Formation

Placer operation

Bedding: upright, overturned

Direction of overriding on drag folds

Fault trace

Road