



LEECH RIVER AREA, VANCOUVER ISLAND

(92B/5g, 12 b-c)

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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 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 millimetre, 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 dragfolded; 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 dragfolds. These beds have a moderate schistosity parallel to the striping and bedding. Downstream, 680 metres above the haul road bridge, the beds are not dragfolded and are cleaved to slightly schistose. Southwest and west of Macdonald Lake mesoscopic dragfolds 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 on Figure 1. There is a coherent pattern west from Martins Gulch where dragfolds 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 degrees at Martins Gulch to 20 degrees 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 dragfolds, hence the average true dip of a bed is somewhat less where dragfolds 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 has 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 dragfolds can be understood if it is assumed that beds on the concave side of the flexure were initially

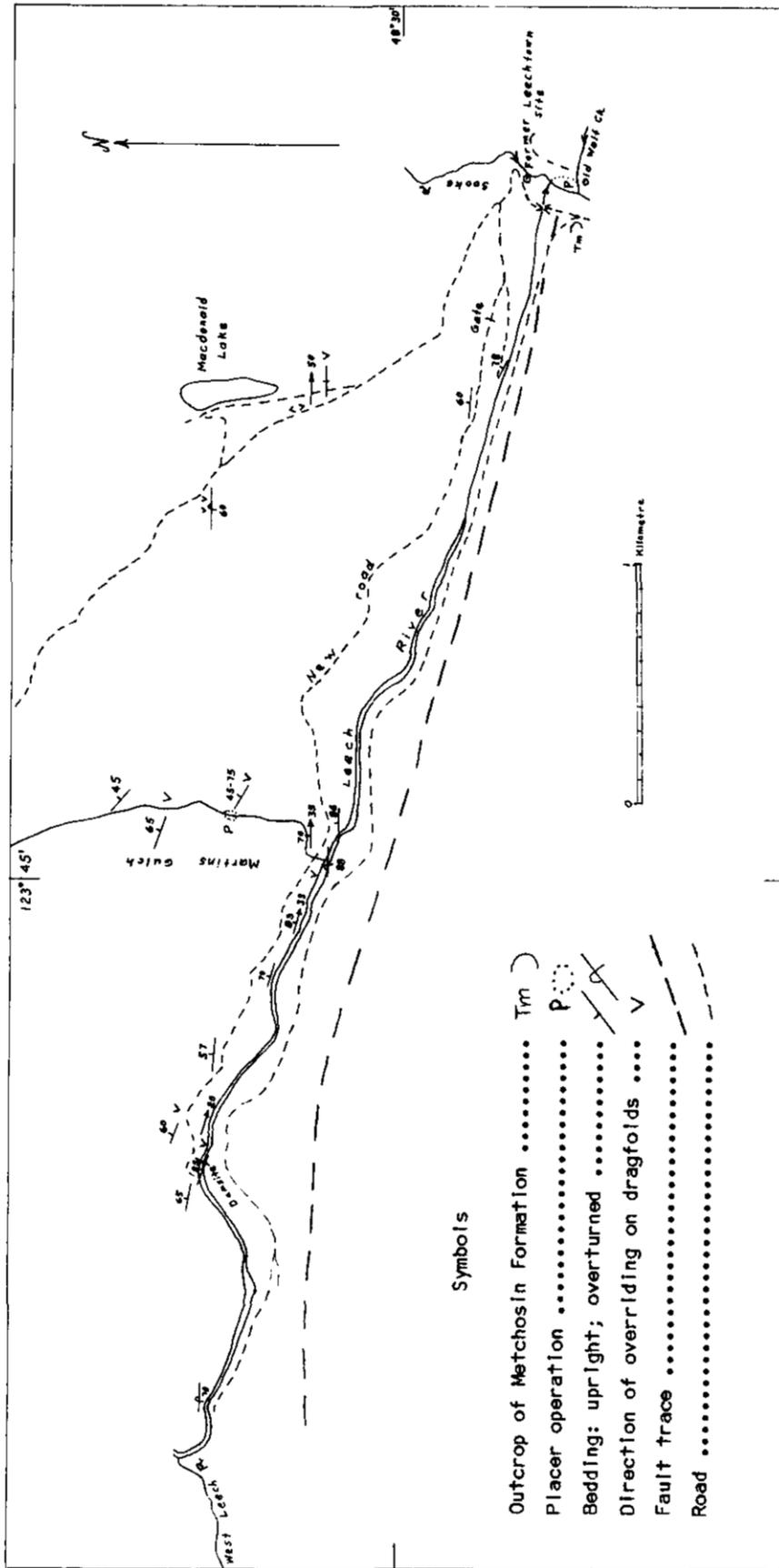


Figure 1. Leech River area.

under compression and responded by dragfolding 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 dragfolds 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 degrees north are curved through horizontal to a gentle south dip at the surface. At the second, beds overturned to 70 degrees 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 Inverek 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
A significant post-Nanaimo fault is indicated by the abrupt termination of the basal conglomerate and by a large notch in the river wall. A major component of the movement had to be south side up. Not enough work has been done to indicate its westward extension, and to the east it passes under extensive glacial cover.

The Nanaimo-Sicker contact has been offset 30 metres to the left on a tight vertical fracture which angles across the river bed. A possible thrust in the Nanaimo beds has been noted above. And because the basal grit is not repeated there may be a fault along the south side of the Sicker inlier in the Chemainus River.

ECONOMIC GEOLOGY

No significant mineralization was found. Pyrite occurs in the schist belt and in the mafic volcanic rocks. The shonkinites contain sporadic grains of chalcopyrite.

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