Presentation 35/35
Matter 18/25

Testing Operations on the Fleury Lease by the United Mining and Dredging Company

Report submitted in partial fulfilment
of the course in Applied Science,
Third Year Geological Engineering, at the
University of British Columbia.

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University of British Columbia

November 15, 1948.

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ILLUSTRATIONS

CANADA

DEPARTMENT OF MINES AND RESOURCES

HON. T.A. CRERAR, MINISTER; CHARLES CAMSELL, DEPUTY MINISTER

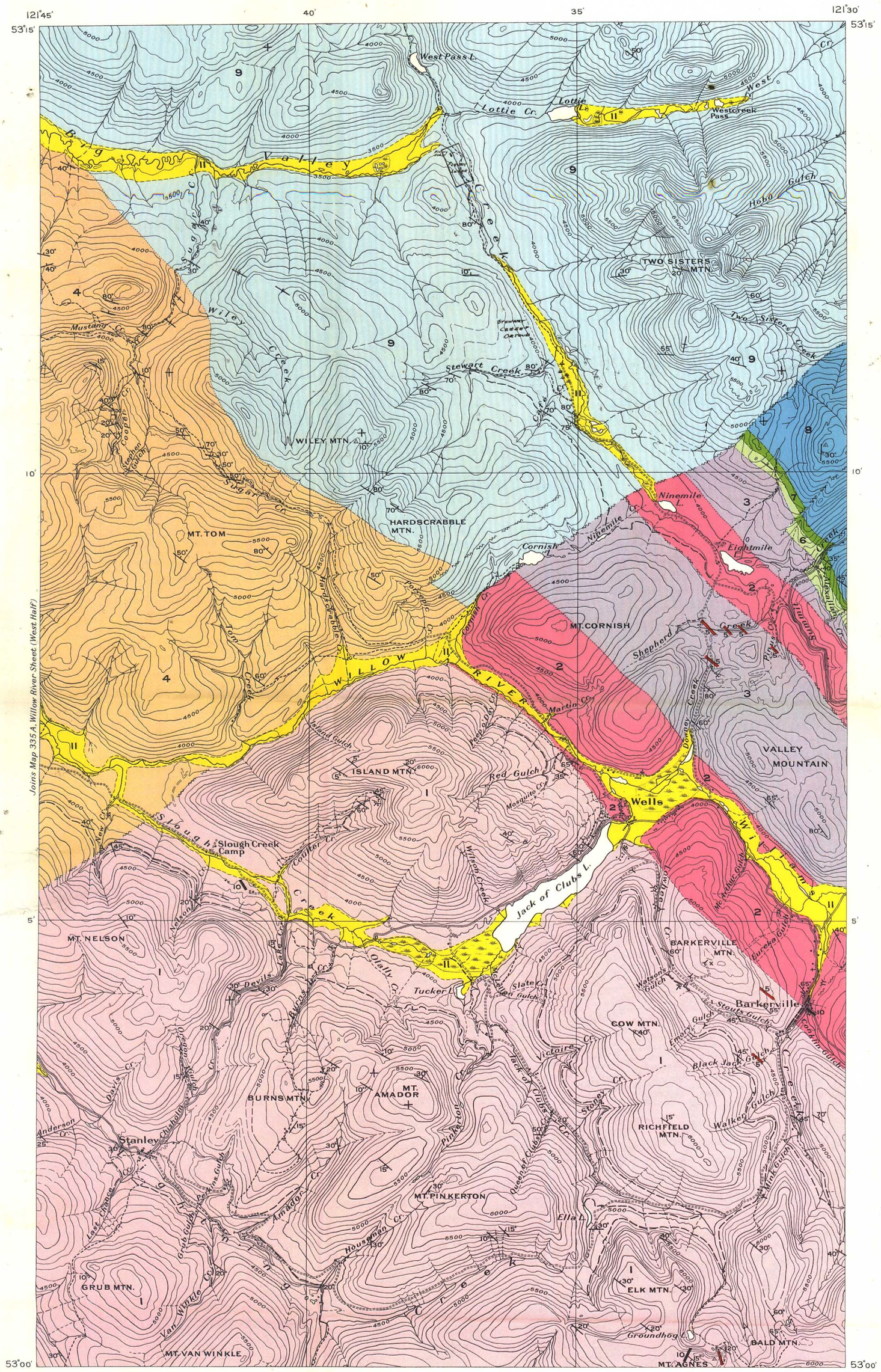
MINES AND GEOLOGY BRANCH

JOHN McLEISH, DIRECTOR

BUREAU OF GEOLOGY AND TOPOGRAPHY

F.C.C. LYNCH, CHIEF

ISSUED 1938



Joins Map 335A, Willow River Sheet (West Half)

LEGEND

CENOZOIC — MODERN RECENT

- II — *Sand, silt, gravel*

MESOZOIC

- 10 — *MOUNT MURRAY INTRUSIVES: diabase, gabbro, diorite*

PALAEOZOIC — CARBONIFEROUS MISSISSIPPIAN

- 8 — *ANTLER FORMATION: chert, shale, argillite*
- 7 — *GREENBERRY FORMATION: crinoidal limestone*
- 6 — *GUYET FORMATION: conglomerate, grit*

SLIDE MOUNTAIN SERIES

- 9 — *SLIDE MOUNTAIN SERIES: (undivided) Minor bodies of Mount Murray intrusives*

PRECAMBRIAN OR PALAEOZOIC

- 5 — *PROSERPINE INTRUSIVES: quartz porphyry*

PRECAMBRIAN

- 3 — *PLEASANT VALLEY FORMATION: slate, sericite schist, argillite, quartzite*
- 2 — *BARKERVILLE FORMATION: limestone, argillite, quartzite, sericite schist*
- 1 — *RICHFIELD FORMATION: quartzite, sericite schist, argillite, limestone*

CARIBOO SERIES

- 4 — *CARIBOO SERIES: (undivided)*

Symbols

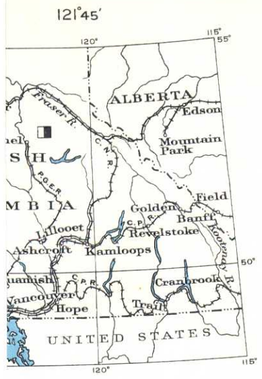
- *Geological boundary (defined)*
- *Geological boundary (approximate)*
- *Geological boundary (assumed)*
- *Fault (approximate)*
- *Fault (assumed)*
- *Bedding (inclined, horizontal, vertical)*

Sources of Information

Surveyed and reproduced by the Bureau of Geology and Topography. Geology by G. Hanson, 1933 and 1934.

TRUE NORTH — 27°30' — MAGNETIC NORTH

Approximate magnetic declination, 27°30' East



...ch to 200 Miles

inches 0 1 — 0 1 2 — centimetres

This reference scale bar has been added to the original image. It will scale at the same rate as the image, therefore it can be used as a reference for the original size.

MAP 336A

WILLOW RIVER SHEET

(EAST HALF)

CARIBOO DISTRICT

BRITISH COLUMBIA

Scale, 1/63,360 or 1 Inch to 1 Mile

Miles 0 1 2 3

Kilometres 0 1 2 3 4 5

Contour interval 100 feet

Legend

- *Road and buildings*
- *Road not well travelled, trail*
- *Post office*
- *Mine tunnel*
- *Prospect*
- *Shaft*
- *Triangulation station*
- *Dam*
- *Pipe line; ditch*
- *Sand bar*
- *Intermittent stream*
- *Marsh*
- *Contours* — 5000
- *Contours (position approximate)* — 5000
- *Proposed Roadway Improvements (New Construction)*

Preface

Permission was not obtained to report the results of testing on the Fleury lease. Therefore this essay is much more general than the writer would wish it to be.

Historical notes on the period before 1925 have been extracted from Memoir 149, No. 130 of the Geological Series, "Placer and Vein Gold Deposits of Barkerville, Cariboo District, British Columbia", by W. A. Johnston and W. L. Uglow. Information on the period from 1925 to 1947 was obtained from Mr. W. A. Fleury.

Testing Operations on the Fleury Lease by the United Mining and Dredging Company

Geographical Position of the Lease

The Fleury lease is situated at approximately 54°14'N 127°37'W. It extends 2640 feet upstream from the point where Valley Creek turns westward to join Willow River (See Fig. 1). The property is reached by following a road, known locally as the Eight Mile Lake Road, through Downey Pass. The road is impassible to cars beyond Nine Mile Lake, but power-wagons, jeeps, or "half-tracks" can negotiate the route to a point 12.5 miles from Wells. There the road makes a steep climb to reach an irregular bench which provides the only feasible route past Valley Creek Canyon, and is passable by

by horse-wagon only thereafter. The wagon road terminates at Canyon Creek; from there back packing and pack horses provide the only transportation.

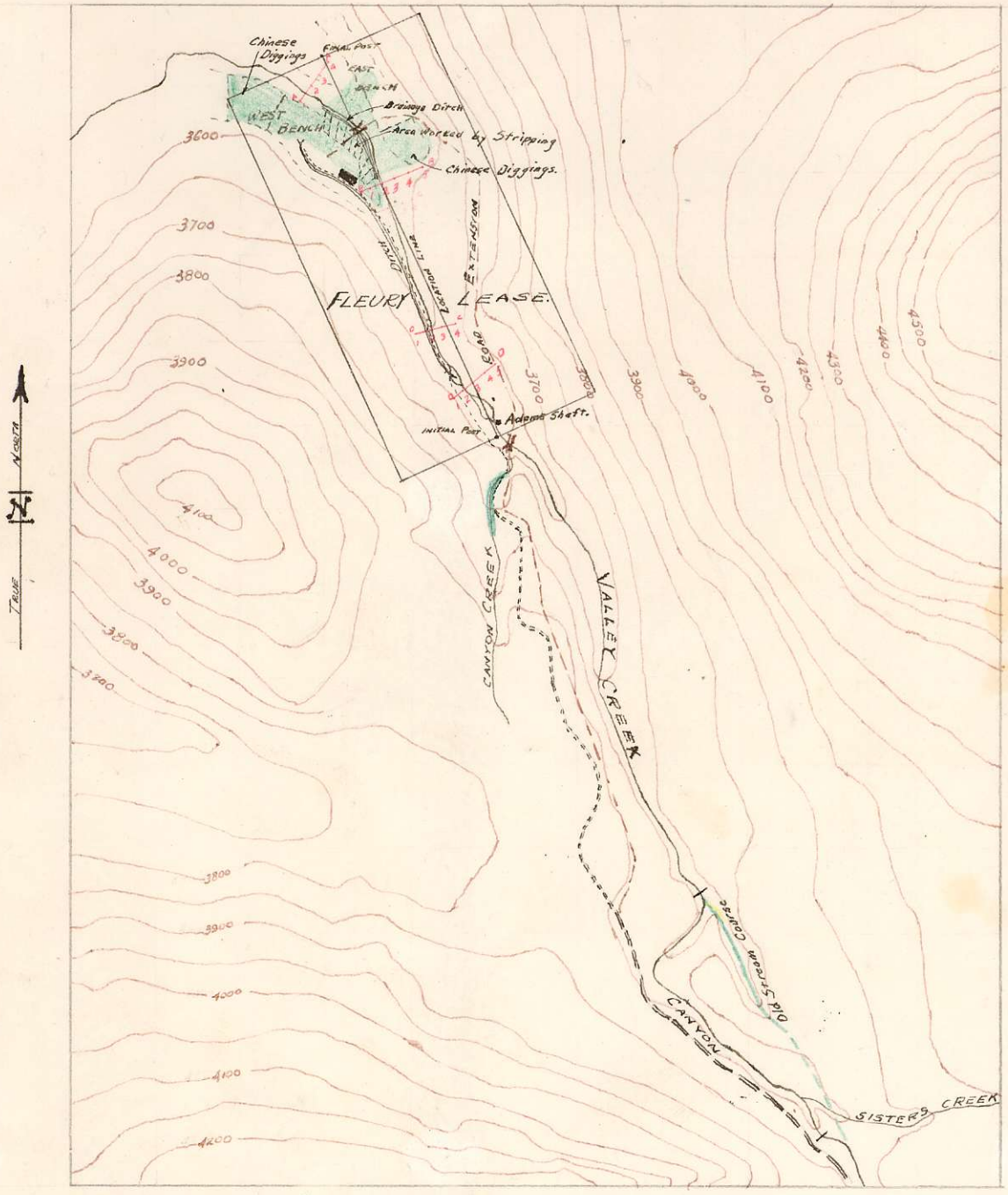
Historical Notes

As a source of placer gold, Valley Creek received little attention during the Barkerville gold rush, in comparison with such heavily worked creeks as Antler, Williams, and Cunningham creeks in the same area. The reason was purely economic. High costs of transportation to Barkerville before motor transportation was available resulted in high costs of living in the area. Old reports indicate that returns of $25 per day (1½ ozs in gold) were required during the period May 15 to October 15 to sustain a single man throughout the year. Returns from hand mining in Valley Creek over the five month period have never exceeded an average of 0.6 ozs of gold per man day. Hydraulicking has provided good profits in many of the leaner placers in the Barkerville area since 1880, but is practical only where a gold bearing channel is buried in a hillside or in a steeply sloping valley, where a natural dump for tailings is provided.

In 1895 a company headed by Major C. T. Dupont of Victoria, with W. Adam as field manager, sank a shaft

FIG. 2

MAP OF FLEURY LEASE



SCALE - 5 inch to 1 mile.

Legend

Road passable by motor vehicle

Road passable by wagon

Pack trail

Ditches & Drains

Old Stream Course

Section-lines & Hole Sites

Mined out area

Proposed New Road Const.

approximately 5000 feet downstream from the lower end of Valley Creek canyon, in an attempt to mine the bedrock below Valley Creek by the deep lead method. A depth of 37 feet was attained, and a crossut was run normal to the direction of the creek. A drift was then run upstream, keeping a minimum drainage grade, apparently in the hope of intersecting the slope of the bedrock. A Cornish pump, powered by a water wheel, was used to keep the shaft dry. Seepage water eventually became too great to pump, and the operation was abandoned in 1897 without reaching the bottom of the channel. Gold values were reported as eratic, no quantitative values being given, by Johnston and Uglow.

In 1895, 58 oz. of gold were recovered by Chinese miners from low benches on both sides of Valley Creek, on what is now the Fleury lease.

The most recent workings on Valley Creek have been by W. A. Fleury and his partner, Wilfred Chapman. The Fleury lease was staked in 1934. A ditch was dug on the west side of the creek which carried water from above the old shaft site onto the West bench. (See Fig. 2) Ground sluicing was used to work portions of the bench left by the Chinese miners. Mr. Fleury states that the bench ground mined in 1934 averaged $1 per yard in gold.

In 1935 the creek was diverted against the bench to provide a sluice for removing tailings. At one point the creek cut a new channel to a clay hardpan about 4 feet

below the surface. Test panning in the new channel produced values as high as $1.75 to the pan in undisturbed gravel. The partners decided to mine the gravel lying above the clay hardpan. A large drainage ditch was dug, starting below the bend of the creek, and following the slope of the clay hardpan upstream for about 700 feet. (See Fig. 2). Strips were then worked out as shown in Fig. 2, by shovelling into a sluice box placed from 6 feet to 8 feet above the hardpan, and emptying into the creek. A cribbing of rocks, brush, and timber prevented the creek from overflowing into the drain at high water. Mr. Fleury reports that the property yielded $35,000 from approximately 10,000 yards of gravel during the period 1935 to 1947, the return averaging $14 per man day worked.

Testing Operations

Approximately 1840 feet of the creek bed on the Fleury lease remained unworked when the United Mining and Dredging Company obtained an option on the property in July 1948. Equipment for hand-testing was hauled by power-wagon to within 1½ miles of the lease, and then back-packed to Fleury's cabin. On August 1, a crew of four men under Mr. John MacGowan commenced testing.

Four section lines were laid out normal to the trend of the valley. Holes sites were marked out on the

FIG. 3 LONG-TOM, Set up ready for use.

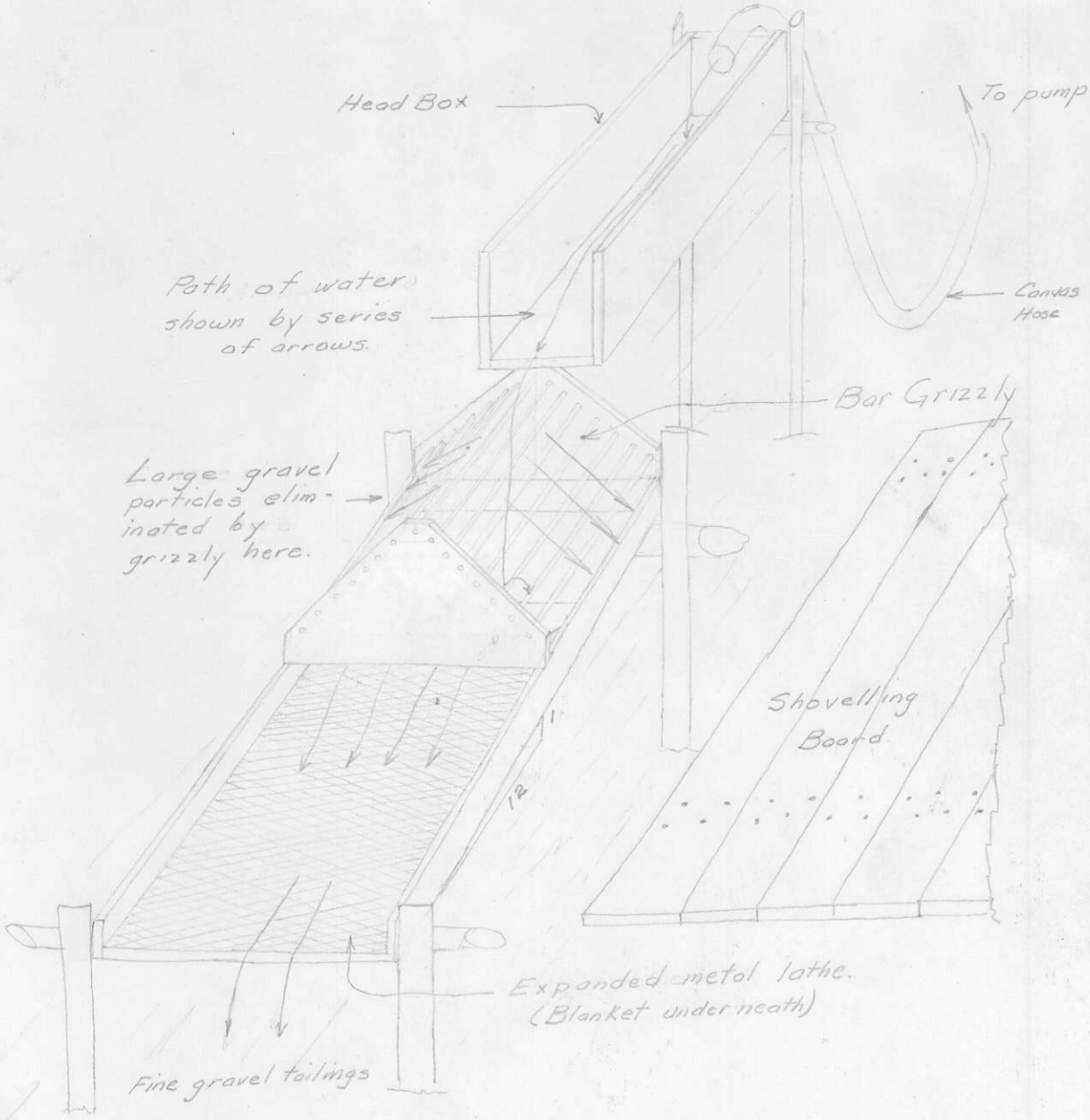
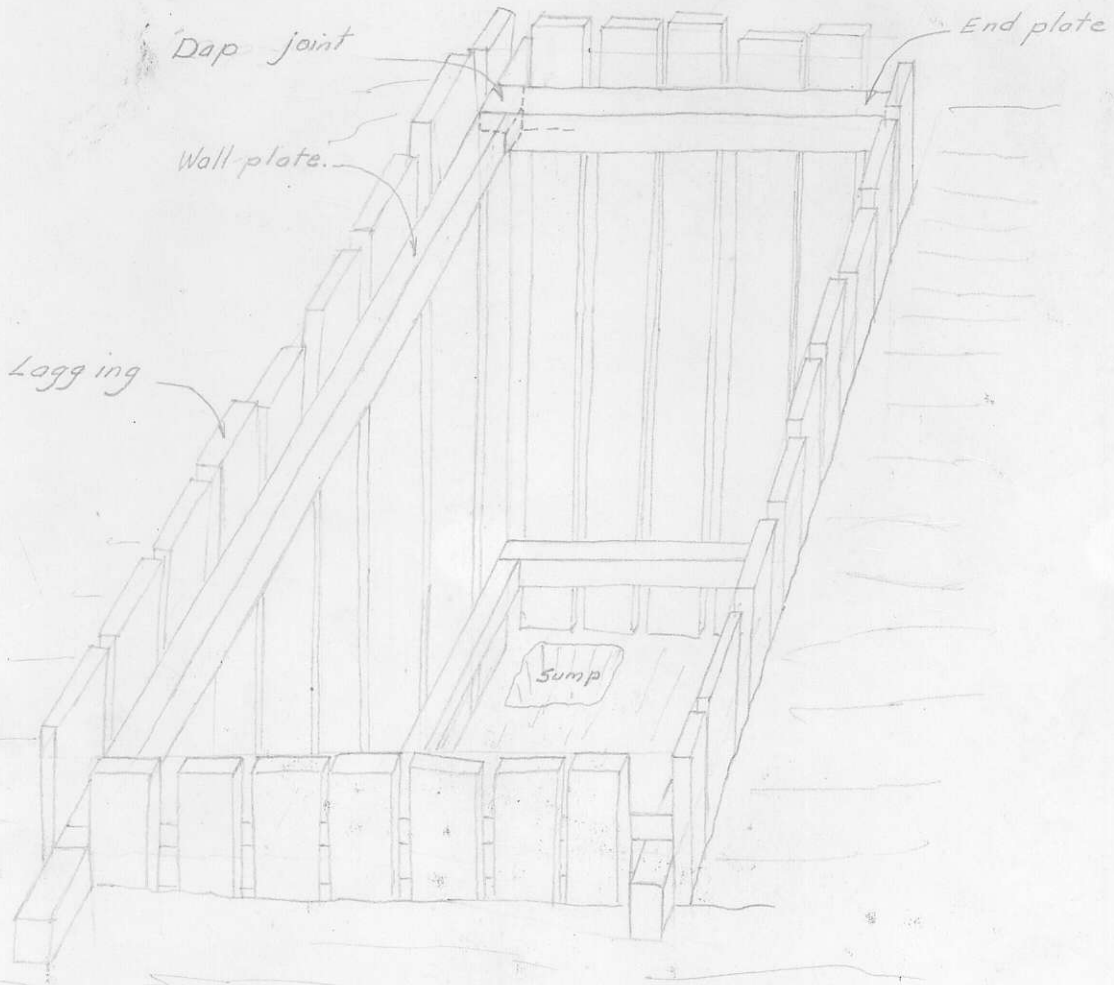


FIG. 4 - SKETCH OF LAGGING IN PLACE IN TEST HOLE



lines at roughly 75 foot intervals, allowance being made for placing the holes where natural clearings occurred. The crew was divided into two teams of two men each. Each team was supplied with the equipment listed below.

> ¾ hp portable air-cooled Lauson gasoline pump, with a capacity of 75 gal. per min. at a 15 ft. head
>
> 2-50 ft. lengths of canvas hose
> 1 long-tom, fitted with a bar grizzly (See Fig. 3).
>
> Miscellaneous tools, including picks, shovels, axes, sledge hammers, etc.

The entire surface area of the lease was to be tested by sinking test-holes 3 feet by 6 feet to the layer of clay hardpan which formed a false bedrock under the area worked by Fleury and Chapman. Sluffing of the walls of the holes was anticipated; therefore each crew hewed a set of spruce lagging 6 feet long, and two sets of end and wall plates. (See Fig. 4). A shovelling board 6 feet by 3 feet was placed beside the hole site, and the long-tom set up beside it. The pump was placed near the main creek with the suction hose in the water, and the canvas hose lead to the head of the long-tom. The gravel removed from the hole was shovelled onto the board and then into the long-tom. The hole was sunk until sub-surface water level was reached and seepage commenced. Sub-surface water level was usually reached 6 in. to 12 in. above the boulder

layer; clayey gravel between the boulders made the boulder layer impervious.

At that point, the lagging was placed in the hole as shown in Fig. 3,to sustain the walls of the hole. A small sump was dug in one corner of the hole. The pump was moved near the hole, and the suction hose placed in the sump. It was hoped that the holes could be sunk to the clay hardpan by alternate pumping and digging, but in all holes seepage increased with depth until constant pumping was necessary. Chips of wood and bark, and small pebbles, fouling the check value of the pump, prevented constant pumping. A fine screen was prepared to enclose the head of the suction hose, but was quickly plugged by fine roots and moss. Continuous operation of the pump was never attained. Sinking through the boulder layer was carried out under 10 to 12 in. of muddy water. Removal of large boulders, some weighing over 150 lb., caused more difficulty than was anticipated, because all digging was done by feel.

Fleury and Chapman had found that the hardpan must be drained in order to clean the gold from its surface. Proper cleaning of the hardpan was impossible under water, leaving the accuracy of the tests in doubt. As each hole was completed, one piece of lagging was removed, and panfuls of gravel taken from the wall at 2 foot intervals. The gold recovered from each pan was weighed, and the total

recovery from the wall test obtained. The recovery from each 2 foot interval was calculated as a percentage of the total, the tabulated results giving a good picture of the vertical distribution of gold values. The appearance of gravels in the walls of the hole were logged at the same time. Before the hole was abandoned, the lagging was removed for further use.

The final step in completing the test was the removal of the concentrate from the long-tom. The expanded metal lathe was removed, and the blanket washed in a small tub. The concentrate was panned in a large tub, and the tailings repanned to check against losses. The gold recovered was placed in a sample bottle marked with the hole number.

Below is a typical log sheet for one test hole.

Cross-section A Hole No. 1 Hole Commenced 7/3/48
Hole Completed 7/6/48

Interval	Remarks
0 - 1'6"	Sandy top soil
2'8"	Loose pea gravel
4'6"	Coarse grey gravel - well washed
6'0"	Boulders with clayey gravel
6'0" to unknown depth	Clay hardpan (glacial)

% Distribution of Values
0-2' - 0%
2'-4' - 5%
4'-6' - 95%

Depth of Hole 6'
Volume of Hole 4 yd.
Total recovery - mg.
Recovery per yd.- mg.

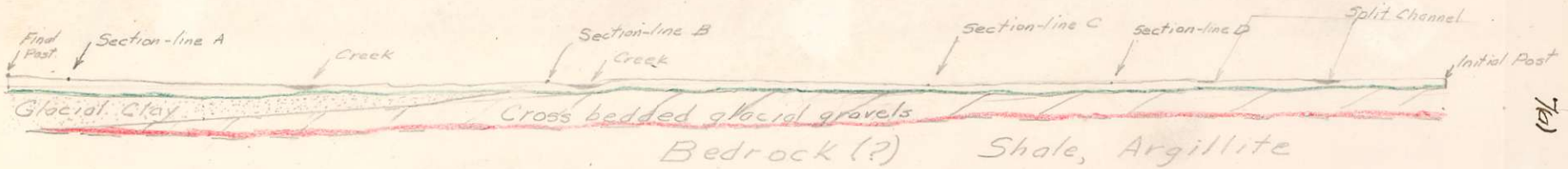
Panner - D. Bates

Remarks - Seepage of water prevented proper cleaning of hardpan. Test pan from bottom of hole gave 3 colours.

- Maximum size of boulders - approx. 160 lb.
- Concentrate: Hematite (pea sized pebbles, some scheelite, magnetite, ilmenite)

FIG. 5

LONGITUDINAL SECTION OF FLEURY LEASE.



Legend

Gold-bearing boulder layer

Possible gold-bearing layer on bed-rock

Scale 1" to 600'

A further difficulty in obtaining an accurate test was encountered in testing section-line B. The clay hardpan was found to discontinue somewhere between the A and B lines. (See Fig. 5). The boulder pay layer lay on loose glacial gravel. Test panning showed that when the boulder layer had been penetrated, heavy colours could be recovered from the bottom of the hole, indicating that the gold was being "chased" downward into the loose gravel below the boulders.

A variation in the testing method was used at section-line C. The hole was sunk 6 feet by 3 feet as before until seepage began. A sump was dug in one corner of the hole, through the boulder layer, and lined with expanded metal lathe. No fine screen was used on the suction head. Fouling of the pump was prevented by the lining in the sump hole, and pumping was fairly continuous. It was then possible to work on a dry bottom, extending the hole into a trench 12 feet by 3 feet. The bottom of the extension was carefully skimmed off, using a square shovel. Test panning showed that no gold had been lost into the underlying gravel. Gold values recovered from the extension of the hole only were considered in computing the value per yard of the gravel at each point.

Recovery of gold values averaged 35% higher at line C than at line B. It was believed that low recovery

under water accounted for the difference. Mr. MacGowan decided to use the trench system in testing line D.

The average cost in labour and supplies for each hole completed was $42.00. The holes averaged 6.2 feet in depth; therefore the cost per foot was almost $7.00. It was decided that because deep drilling would be done at a later date, providing a test of the surface gravels as well as the deeper ground, further expenditure on hand-testing was not warranted. Hand-testing was abandoned on completion of the C line, and the crew was diverted to cutting road right-of-way to expedite arrival of the drill.

Roadway Improvement Plans

Plans were prepared for improving the road to the Fleury lease, providing for expenditure of $5000, the cost to be divided equally between the Department of Public Works and the United Mining and Dredging Company. The road will be widened to 16 feet, permitting passing of vehicles at any point along the route. In August 1948 the writer located the detour shown in Fig. 1, and the proposed extension onto the Fleury lease. Bridges at Williams, Shepherd, Nine Mile, Stewart and Valley creeks will be designed to carry a load of 32 tons. Gravel for surfacing the road is available in old tailings dumps at Mugfit gulch, Eight Mile Lake, Café Creek and Stewart Creek.

Surface Geology of Big Valley

The surface features of Big Valley were formed during the latest period of glaciation in the Barkerville area, which Johnston and Uglow place in late Pliestocene time. The valley from Eight Mile Lake to Valley Creek Canyon is straight and U-shaped, indicating erosion by a valley glacier. A kame terrace on the hillside sloping northeasterly to Eight Mile Lake places the elevation of the glacier's surface at least 225 feet above the present lake level. Keystone drill tests made in past years show that aqueoglacial deposits 75 feet to 125 feet in depth overlie the bedrock in the middle of the valley. Any Tertiary gravel which may have covered the valley floor before the valley glacier have been gouged out and transported northward. Ground moraine, considerably reworked by stream action, covers the surface area except for the last 800 feet before reaching the canyon, which is covered by an end moraine heavily pock-marked by ice kettles. This appears to mark the northward limit of the valley glacier. The old stream course, (See Fig. 2) now blocked by the end moraine, is deep and narrow, showing no effects of the valley glacier. Glacial features occur north of the canyon but are probably the result of earlier extensive ice sheets which covered all but the highest mountain tops. The old stream course is cut

deeply into the aqueoglacial drift - which filled the valley after recession of the ice sheets. The creek had cut to its present level by the time the valley glacier blocked the old stream course, which does not hang with respect to the present stream course.

The latest phase was the cutting of Valley Creek Canyon. The creek found its way through the moraine about 800 feet west of its old course, joining the old course by making an abrupt turn to the north-east after paralleling it for about 2000 feet. The placer gold on the Fleury lease was probably deposited contemporaneously with the canyon cutting. Gravels gouged from the upper valley and dumped at the moraine were carried downstream, the gold in the gravel being deposited below the canyon, particularly where the creek turns westward to join Willow River. The gold from the Fleury lease is smooth and flat, evidence of its origin in a previous placer deposit. Gold released recently from its parent rock would be rough and irregular.

Conclusions from Testing and Observations

Two points merit attention in considering the Fleury lease as a dredging property. Firstly, the placer worked by Fleury and Chapman appears to be localized between the westward turn of Valley Creek and the lower end of Valley Creek Canyon. There is not sufficient pay gravel in this surface deposit to warrant installation of a dredge. A small dragline would be sufficient to mine the surface deposit alone.

Secondly, there is a good possibility that, before the period of glaciation by ice sheets, a deep channel existed, probably conforming in plan with the present stream course to the canyon, and following the old stream course from there. Keystone drilling will prove or disprove the existence of a deep channel. Deep channels in Williams and Lightning Creeks were extremely rich in gold; Valley Creek has not been gouged by a valley glacier, and may well prove to be comparable in gold values. If a deep gold bearing channel is discovered, a bucket-line dredge can be used to mine both deep and surface deposits simultaneously. The possibility should be investigated before money is invested to mine the surface deposit alone.