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- SUMMARY -

The holdings of the "Cariboo Syndicate" comprise seven placer leases on the Tertiary Fraser River Channel, 37 miles by road north of Quesnel, in the Cariboo Mining District of British Columbia.

1500 feet of the Channel has been mined at Cottonwood Canyon, with the recovery of over \$40,000 in a section of country practically devoid of gold-bearing veins. This Channel of cemented gravels, 800 feet wide, has been traced 30 miles northerly from those workings thru the Hixon Creek country, which is known to be well mineralized. The Syndicate holdings are located in this section.

Testing done this year on this area, at Canyon Creek, proved the existence of the Channel at that point and showed that the upper strata of the Channel had been shifted westward, over a considerable area, but without the destruction of the bedrock gravels.

To fully prove the value of the deposit, it is recommended that a cross-section of from three to five holes be drilled at Canyon Creek, at an estimated cost of under \$10,000.

The possibilities of these holdings are shown thru an assumption, based on a yield of like deposits, and taking an average value of the bedrock gravels as \$7.50 per ton and a paystreak width of 100 feet, both of which are conservative. Such an assumption gives a gross value thru the holdings of \$5,500,000, with a net profit of \$4,400,000 on a capital expenditure of \$100,000.

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PROPERTY FILE

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TERTIARY CHANNEL
of
CARIBOO, B.C.

LOCATION

The "Tertiary Channel", as shown on Plate 1, lying between Quesnel and Prince George, B.C., has been traced northward across the Fraser River in the Cottonwood Canyon, across Canyon Creek and past Hixon Creek, a distance of over 30 miles. The holdings of the "Cariboo Syndicate" cover a segment of the Channel, over three miles long, extending from one-half mile south of Canyon Creek northward towards Hixon Creek. The exploration work done this year by the Syndicate was on Canyon Creek near the NW corner of Lot 3175.

ACCESSIBILITY

The camp of the "Cariboo Syndicate", near their shaft, lies one-half mile to the east of the Pacific Highway, 37 miles north of Quesnel and 44 miles south of Prince George. This highway is a comparatively new road but is rapidly being put into first class shape. The grade of the Pacific Great Eastern Railway crosses the property at Canyon Creek, within a few hundred feet of the camp. Steel has been laid on this grade 20 mile north of Quesnel and 20 miles south from Prince George. Considerable interest has recently been shown in the road, so that there is some likelihood of its completion in the near future.

PROPERTY and TITLE

The property of the "Cariboo Syndicate" comprises of six bench leases and one creek lease, granted by the Gold Commissioner under the "Placer Mining Act". The bench leases are 1500 feet at right angles to the course of the Channel and 2323 feet lengthwise. The creek lease is 2640 feet square. These leases were issued to various parties and have been transferred to the Syndicate.

GEOLOGY

General

A concentration of placer gold is gradually built up thru the erosion, by a stream, of the weathered gold-bearing rocks along its rims. The grinding action of the stream finally liberates the gold from the boulders washing away the light rock minerals, and freed gold, being very heavy, will remain close to its point of liberation, adding to the already existing supply.

To build up a high concentration of gold, it is necessary that conditions on the earth's surface remain stable over a long period of time. That is, there must be no major volcanic action nor tilting or raising of the country. Under such conditions the deepening of the channel valleys and the meandering of the streams in the valleys, wear away enormous quantities of the surrounding rocks, with the consequent liberation of much gold.

Other factors being equal, the richer the rocks are on the rim of the channel, the richer will be the resultant placer deposit.

Tertiary Age

Such stable conditions existed thru many thousand centuries in the Tertiary Age, a geological division of time existing up to the Glacial Period. It was during this period of time that the main known placer fields were formed. The lapse of time since the Glacial Period is comparatively short, so that the recent streams have eroded very little country and as a consequence, are poor in gold, except where they have cut thru the older Tertiary valleys and reconcentrated the gold into their deeper valleys.

"Tertiary Channel"

The so-called "Tertiary Channel" is a segment of the Tertiary Fraser River. From its discovery in the Cottonwood Canyon, I have traced it northerly for some 20 miles, across Canyon and Hixon Creeks. The present Fraser River has cut thru the Channel at the Cottonwood Canyon, showing a channel of cemented gravels 800 feet wide. Directly over the bedrock is a stratum of heavy gravel, averaging three feet thick, which carries the major portion of the gold. The gold is coarse, with 25¢ and 50¢ nuggets common and occasional nuggets up to \$27.00.

The bedrock at the Canyon and in general along the channel course, is schist, varying from hard to quite soft. Granitic rock has been intruded into these schists in the Cottonwood Canyon, one mile west of the Channel, south of Whites Landing, at Canyon and Hixon Creeks. Altho these intrusions would indicate the possibility of gold-bearing veins in the vicinity, none are known to exist near the Cottonwood Canyon.

It was not until 1926, that sufficient work had been done on the Channel to make possible the tracing of the Channel course northerly. The exposures of the Channel gravels at the Cottonwood Canyon, together with exposures 20 miles northerly, in the Canyon Creek valley, are the only known points where these gravels are not burried deeply by glacial debris.

The course of the Channel was then traced northerly by a surface depression, lying directly over the valley, which is flanked by rock rims. This feature is traceable over 10 miles northerly, where the east rim is lost under a plateau of glacial drift but the west rim is intact as far as Whites Landing. Taking the general line of the Channel, the gravels were found exposed on Canyon Creek but no rims are in evidence. Continuing the line northerly, the point of its crossing Hixon Creek was easily found between two rock rims, one mile apart.

While there is but a small quantity of gold known in the rock south of Canyon Creek, the rock north from Canyon Creek and past Hixon Creek is in a well-known mineral zone, which crosses the course of the Channel at Hixon Creek. According to the present owners of the ground on Hixon Creek, considerable assaying has shown that there is a zone over 2200 feet wide, which averages \$1.80 in gold. In the 80's several shafts were sunk in the rock about 2000 feet up Hixon Creek from the eastern rim of the Channel. One shaft was 200 feet deep and from all the shafts considerable drifting was done. In 1886, Bowman, reported on the district for the Geological Survey. From the records he had, he reported that assays ran from \$4.00 to \$558.00 a ton in gold, with an average value of over \$20.00 for all quartz hoisted. While the veins were rich, lack of continuity caused the work to stop.

Other Fraser River Channels

At the end of the long period in which the "Tertiary Channel" was formed, earth movements took place, which caused large amounts of sediments to be carried into the Channel, filling the valley 400 feet above bedrock. Subsequent elevation of the country again caused the river to cut a new bed to a depth of over 150 feet below the older valley. At Hixon Creek, this channel lies to the west of the older channel and the two are separated by rock rims. Flowing southerly this newer channel, called Dawson's Channel, turned easterly and cut thru the Tertiary Channel, passing into the valley of the Lower Cottonwood River and thence down the present Fraser valley. Immediately before glacial times, the country carrying the watershed of this channel was elevated, causing a large amount of gravel to be carried into this deep valley and this channel was then filled higher than the filling of the older valley. The drainage during the glacial period then flowed over the gravels of the "Tertiary Channel" at Hixon Creek but, as it reached Canyon Creek, it encountered this newer channel filling and cut deeply into it, which left the western side of the "Tertiary Channel" gravels exposed over some length, explaining the absence of the west rim of the Channel at Canyon Creek.

The lack of an eastern rim at Canyon Creek can only be satisfactorily explained by a tributary to the "Tertiary Channel" entering that Channel from the east and there is certain evidence to substantiate it. Such a tributary would result in low rock relief between the two streams.

Glacial gravels now shown to the east of the Channel, indicate the existence of a glacier at that point. It is due to thrust from this glacier that the gravels in Canyon Creek have been moved westward, with the resultant tilting of the formation into the valley to the west. Such a thrust was applied over a considerable length of Channel and over some height, which sheared the formation some distance above bedrock and moved the upper gravels "en bloc" westward to a point of balance, when they tilted into the newly cut valley. This valley was later filled with glacial deposits, now seen on the surface at both Hixon and Canyon Creeks.

Present Fraser River Valley

At the end of the glacial period the river again began to cut thru the overlying sediments and, in the cross-sections at Canyon and Hixon Creeks, cut down directly west of the Dawson Channel. As it flows southerly, it turns to west, where the Dawson Channel turns eastward, cutting a long course thru rock, intersecting the "Tertiary Channel" at the Cottonwood Canyon and entering the Dawson Channel valley near the mouth of the Cottonwood River. In elevation, this channel lies between the Dawson and the earlier "Tertiary Channel".

Relation to Barkerville Channels

These three channel systems have their counterparts in the well-known Barkerville area, where they are particularly exemplified on Upper Lightning Creek. There the original channel valley lies some 60 feet above the present creek bed and is analogous to the "Tertiary Channel". The second channel level now lies about 60 feet below the present creek bed and is of the same geological age as the Dawson Channel. The segments of the high channel, which were not cut away by the formation of the deep valley, were left as benches of the newer valley. These benches were rich; one of them being the famous Butcher Bench, from which the recovery is variously given, up to \$450,000 ~~wherever the second~~ deeper channel cut away

Wherever the second deeper channel cut away the older channel, its bedrock was rich but, when the upper channel was not cut away, the deeper channel carried very little gold, showing emphatically that the early Tertiary channel system to be the rich one.

EXPLORATION WORK

At Cottonwood Canyon

This channel was first worked many years ago in the Cottonwood Canyon. The cemented gravels necessitated underground work and blasting, which freed the gold, so that the values are recoverable by ordinary sluicing. While the gravels gave a good yield, mining by hand methods

was so slow that little was accomplished until after 1917, when a Chicago company took over the ground. They put on machine drills and carried on an active campaign of operation. The full nature of the deposit was not understood at that time and the company failed thru lack of systematic development. The plant was then taken over by a partnership, which successfully mined the ground until they were stopped by bad ground caused by the proximity to the Fraser River.

The result of this work showed appreciable amount of gold in the Channel, gave much data on the character of the deposit and indicated the direction of the channel, making possible the tracing of the course north.

At Canyon Creek

This year the "Cariboo Syndicate" was formed to investigate the gravel exposures at Canyon Creek. A shaft was sunk 85 feet, from which a hole was drilled to a depth of 175 feet, getting bedrock at 160 feet. The results of this work definitely established these gravels as belonging to the "Tertiary Channel". Sufficient data was secured thru this work and a thoro reconnaissance on the surface to enable additional exploratory work to be carried on intelligently.

PRODUCTION

At Cottonwood Canyon

The production of the workings at the Cottonwood Canyon amounts to some \$40,000 and perhaps a little more. This gold was recovered from the gutter of 1500 feet of the Channel. An estimation of the total gold in the bedrock gravels of the Channel at this point, based on extensive underground workings and surface testing, is \$200.00 to the lineal foot. Due to bedrock formation and the consequent heavy gradient, the recovery possible was but a small percentage of the total.

At Hixon Creek

The placer production of Hixon Creek and vicinity is variously estimated at \$1,000,000 or more. This gold was rough and coarse and occurred in the bed of the present creek, either on bedrock or on a false bedrock of clay. This gold was the concentration of post-glacial times, which period has, almost without exception, built up a far smaller concentration than did the channels of the Tertiary age, indicating the great possible richness of the "Tertiary Channel" at that point.

Other Placer Production

The placer production of the Cariboo District is variously estimated from \$45,000,000 to \$75,000,000, the bulk of which has been derived either directly from the Tertiary channels or else from the reconcentration of the gold in those channels. Williams and Lightning Creeks gave a yield of \$1000 to the lineal foot of channel.

The yield of the Tertiary channels of California is estimated at \$300,000,000, yielding from \$70 to \$500 to the lineal foot of channel.

At Nome Alaska, the principal creeks are valued at \$100 a foot.

The White Channel in the Klondyke at \$380 a foot and the Berry drift mines of Victoria, Australia, the yield ran from \$440 to \$1293 a foot.

RECOMMENDATIONS

Since the work done this year on Canyon Creek by the "Cariboo Syndicate" definitely established the existence of the Tertiary Channel at that point and found, thru their borehole, that the upper gravels of the Channel had moved westward from their original location, additional testing should be done easterly from the hole drilled. Since the bedrock of the Channel lies at some depth below the surface, the testing should be done by a churn drill. As the width of the Channel is over 600 feet, drill holes can be spaced at intervals of 500 feet or more, without danger of passing over the bedrock gravels. At least three holes should be drilled and probably five holes will be required to locate the paystreak.

Under normal conditions an average of \$4.00 per foot of hole is a fair allowance for this work. From the 160 feet depth to bedrock realized in the first hole it would not be safe to estimate on an average depth of less than 200 feet. To cover all contingencies, \$10,000 should be available for this campaign.

It is the intention of the Syndicate to secure ground on Hixon Creek, as it offers the only other economical point of entry to the Channel. The bedrock at Hixon Creek lies at some 200 feet greater depth below the surface than at Canyon Creek. After testing the Canyon Creek Valley, Hixon Creek is the next logical point for testing.

CONCLUSIONS

Tenor of Bedrock Gravels in Holdings of Cariboo Syndicate

While no actual tests of the bedrock gravels have been made on the holdings of the Cariboo Syndicate, the data available definitely points out the possibilities. As mentioned, the total amount of gold in the Channel at the Cottonwood Canyon is estimated at \$200 to the lineal foot and the rock exposures in the vicinity and for some distance up the Channel give no appreciable gold values. The connection between these two facts can be interpreted in two ways, either of which bring the same conclusions, as referred to the Syndicate holdings. First, it may be considered that the gold near the Cottonwood Canyon was derived from local rock and the extreme long life of the Channel built up a very appreciable concentration at that point. This interpretation, when considered for the Syndicate holdings, would point to a very rich placer concentration there, due to the far larger quantity of gold in the rocks there. On the other hand, the gold at the Cottonwood Canyon may be considered to have mainly come from some source towards Hixon, travelling downstream in boulders and finally freed. If such were the case, I would not hesitate to say that but a small per-

cent of the gold entering the Channel would be so transported, indicating a much larger gold content per foot of Channel in the upper section.

The fact that gold does not travel far along the channel from its point of entry, has been borne out in all placer work. It is well illustrated in Upper Lightning Creek of this District. Practically the full production of Lightning Creek, estimated from \$8,000,000 to \$13,000,000, was made from a two and one-half mile stretch where it encircled the foot of Burns Mountain, which carried many rich gold-bearing veins. Below this stretch the value per foot of channel decreased rapidly and only fine gold was found.

Economic Possibilities of the Syndicate's Holdings

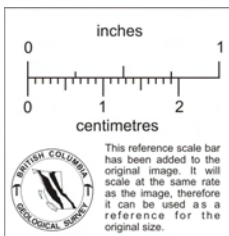
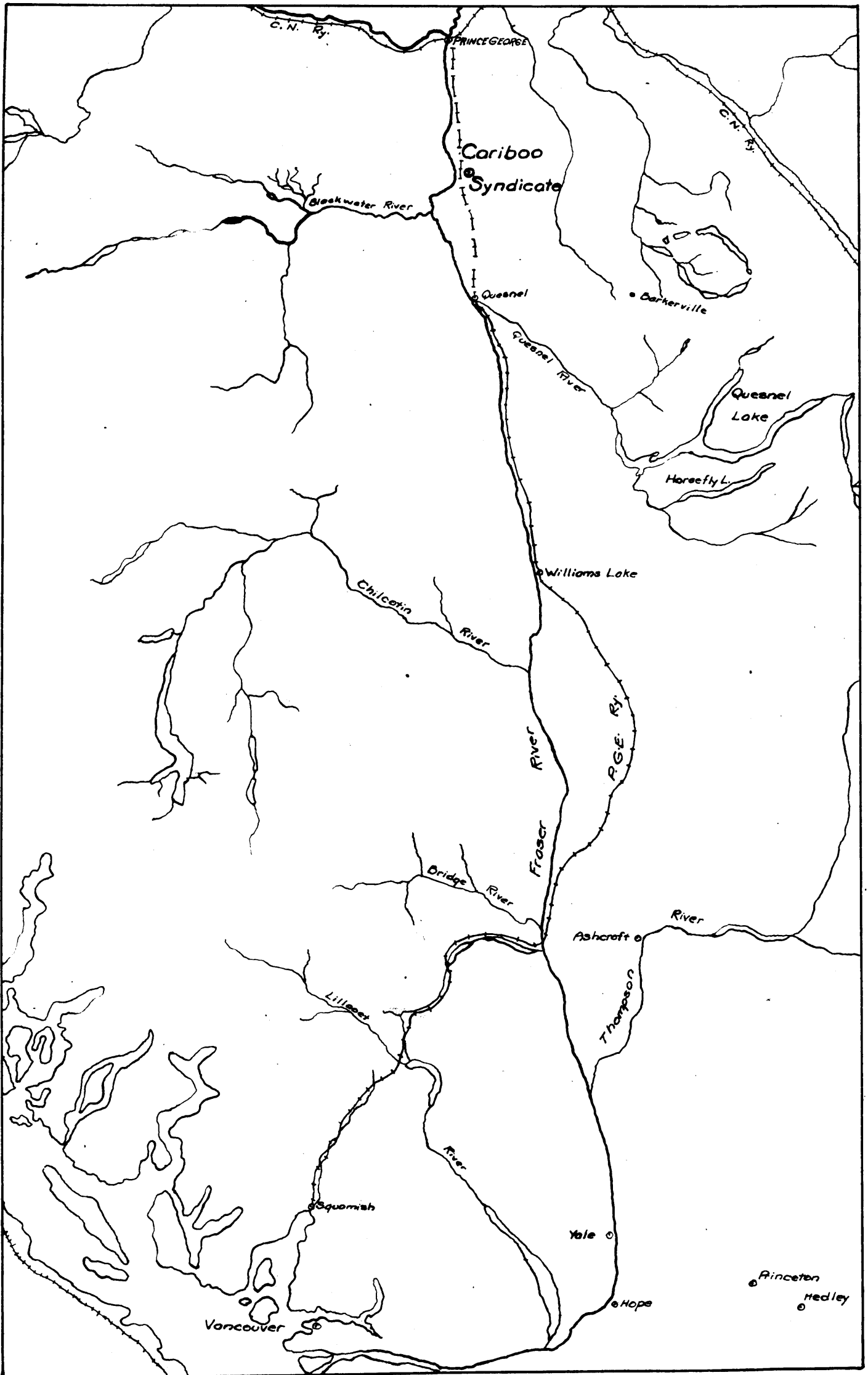
As no definite estimation can be made regarding the probable values of the Holdings, a hypothetical case is here given, based on possibilities.

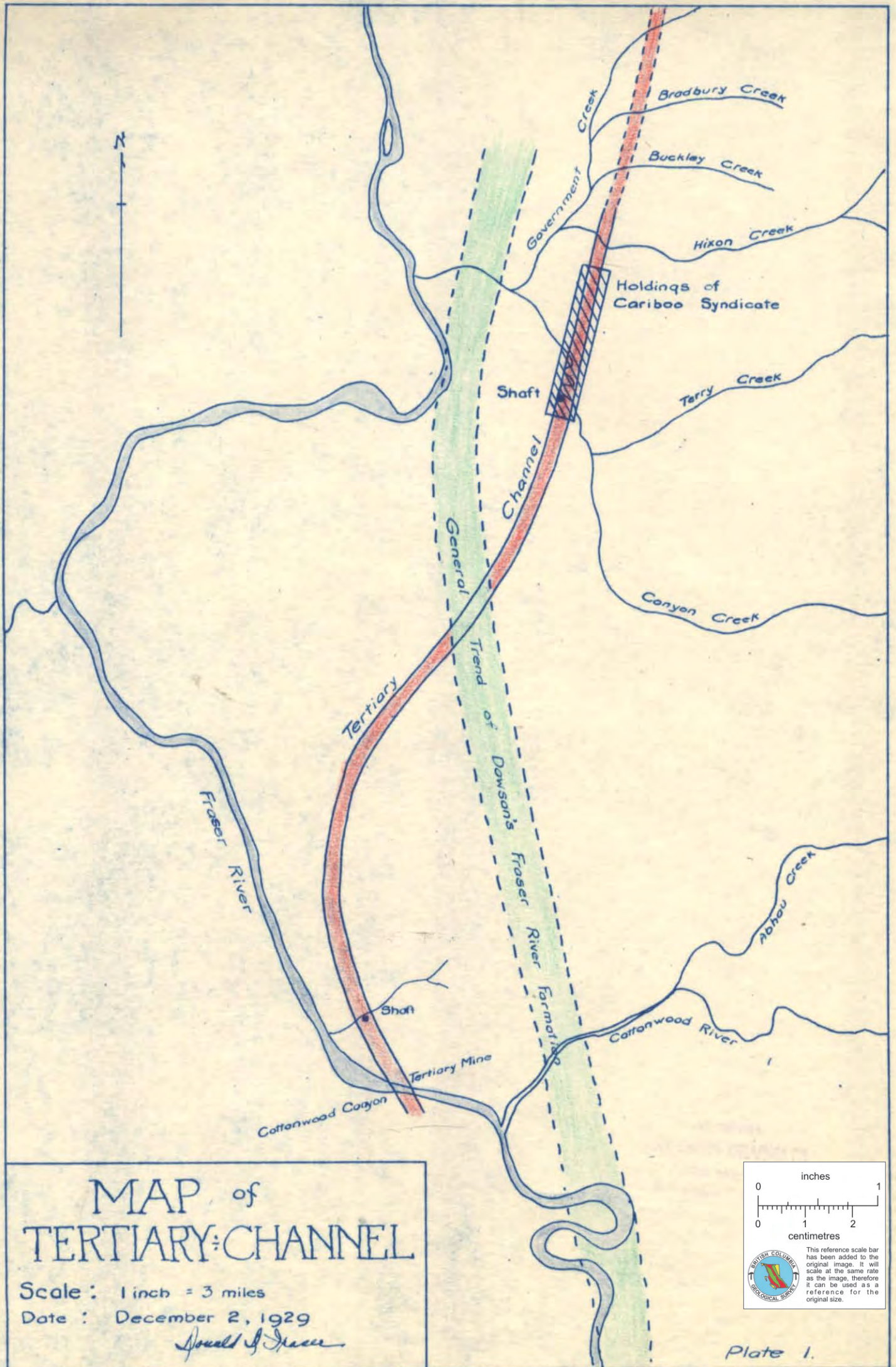
From previous placer work done thru similar territories, both in Cariboo and in California, a fair expectation is that the bedrock gravels will run from \$5.00 to \$10.00 a ton in gold. Furthermore, the expectation of a paystreak width of 100 feet would be conservative. A paystreak then 100 feet wide thru the length of the Syndicate holdings would require the mining of 730,000 tons of gravel, which, at the average figure of \$7.50 a ton, would give a gross yield of \$5,500,000. The cost of extracting and treating the gravel in a 200-ton plant should not run over \$1.50, leaving a gross profit of \$4,400,000. The capital required for a plant of that size would not be over \$100,000, so that the returns from the enterprise would be very handsome.

I do not hesitate in the least to say that, taking into consideration all data gathered, the possibilities for large returns from the area covered by the Syndicate holdings are exceedingly favorable. The physical characteristics of this area resemble so closely the areas in other parts of the district, as well as other placer fields, where bonanza placer workings have been discovered that no other conclusion can be drawn.

Dated: December 15, 1929

Signed: *Arnold J. Hansen*, B.S., E.M.





MAP of TERTIARY CHANNEL

Scale : 1 inch = 3 miles

Date : December 2, 1929

Donald J. Maclean

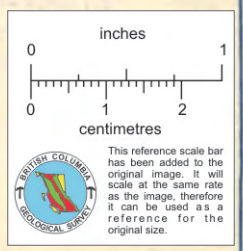
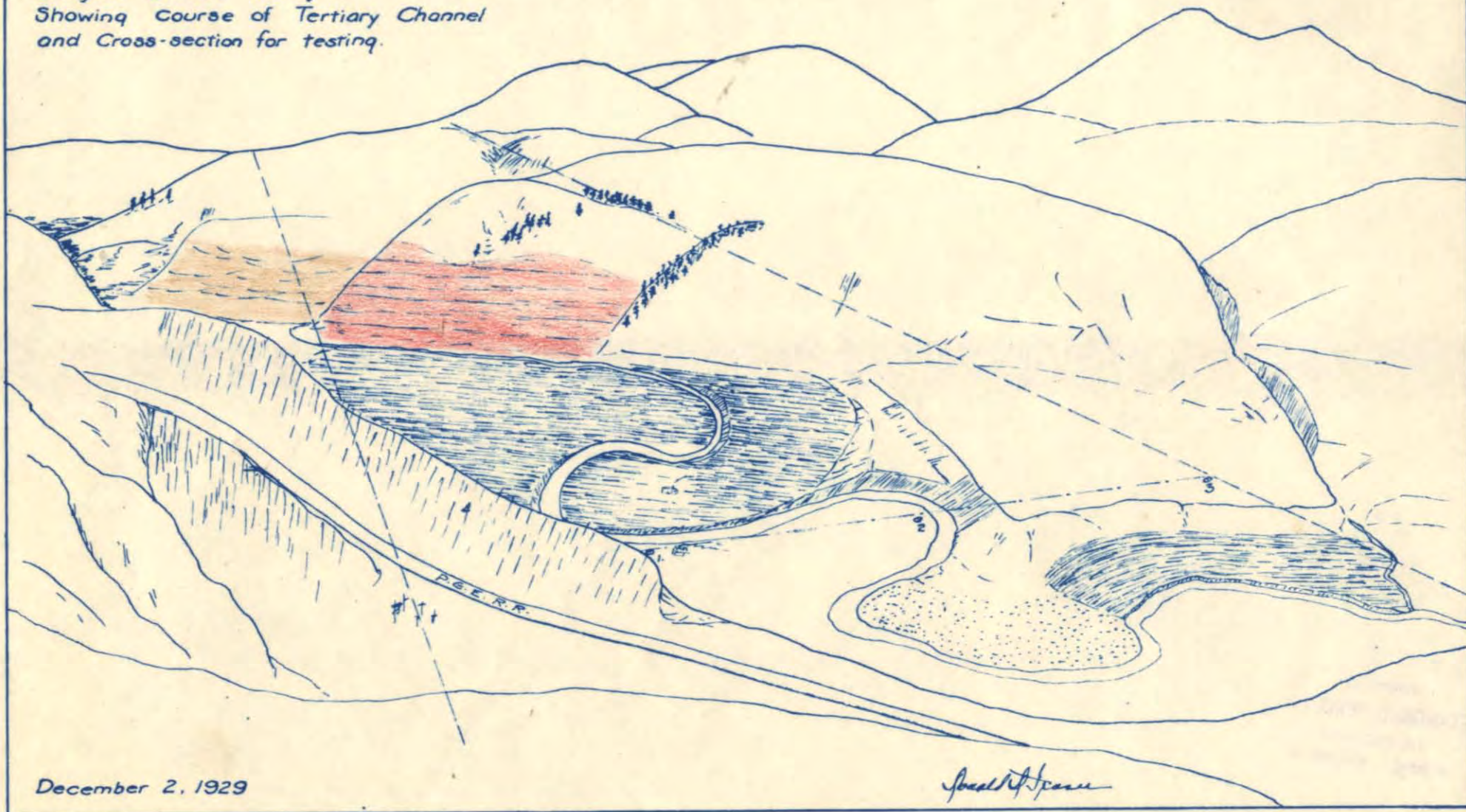


Plate 1.

Looking Northeasterly Across
Canyon Creek Valley
Showing Course of Tertiary Channel
and Cross-section for testing.

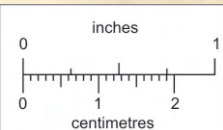


December 2, 1929

Fred H. Jones

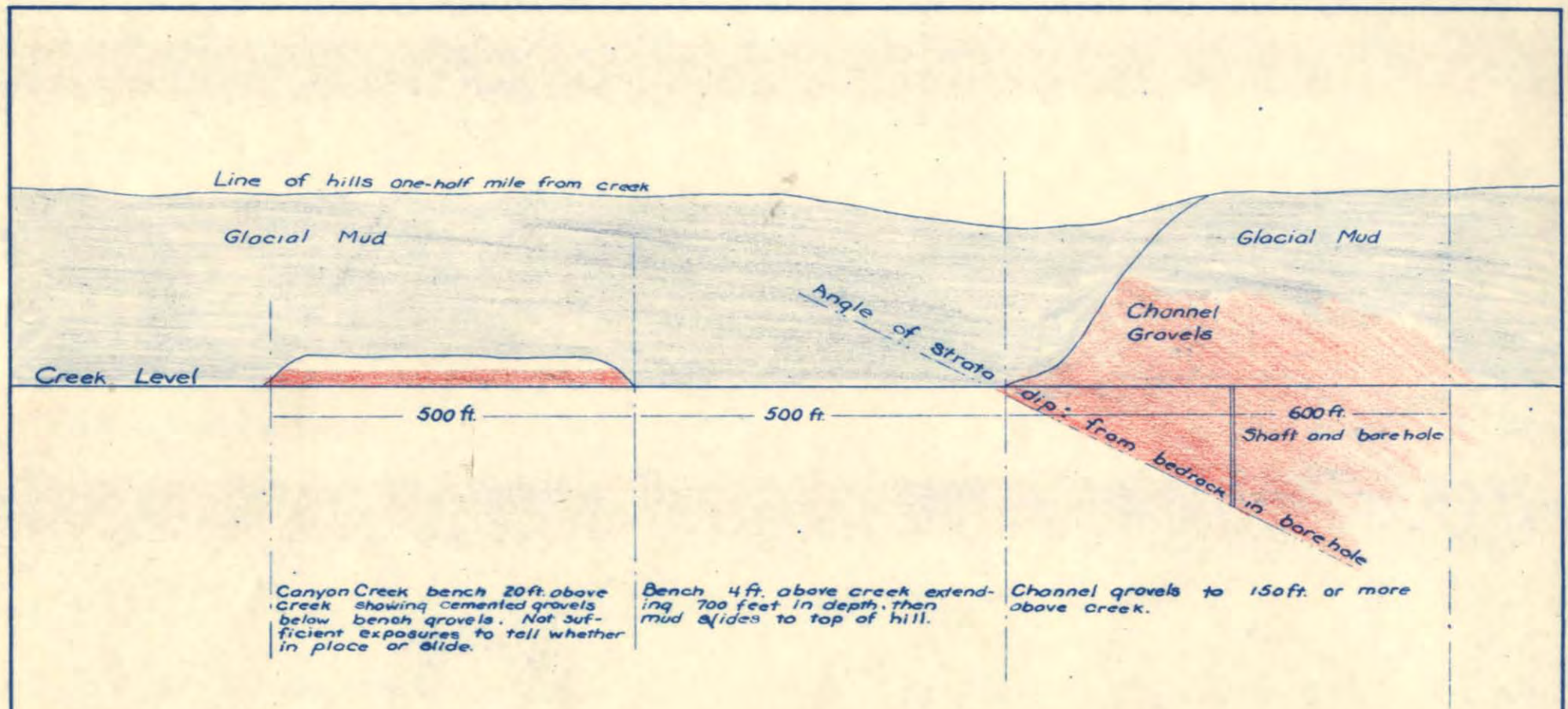
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Plate 2.



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Canyon Creek bench 20 ft. above Creek showing cemented gravels below bench gravels. Not sufficient exposures to tell whether in place or slide.

Bench 4 ft. above creek extending 700 feet in depth, then mud slides to top of hill.

Channel gravels to 150 ft. or more above creek.

Diagrammatic Cross-Section Looking South in Canyon Creek Valley

Scale: 1 inch = 200 feet

Date: December 2, 1929

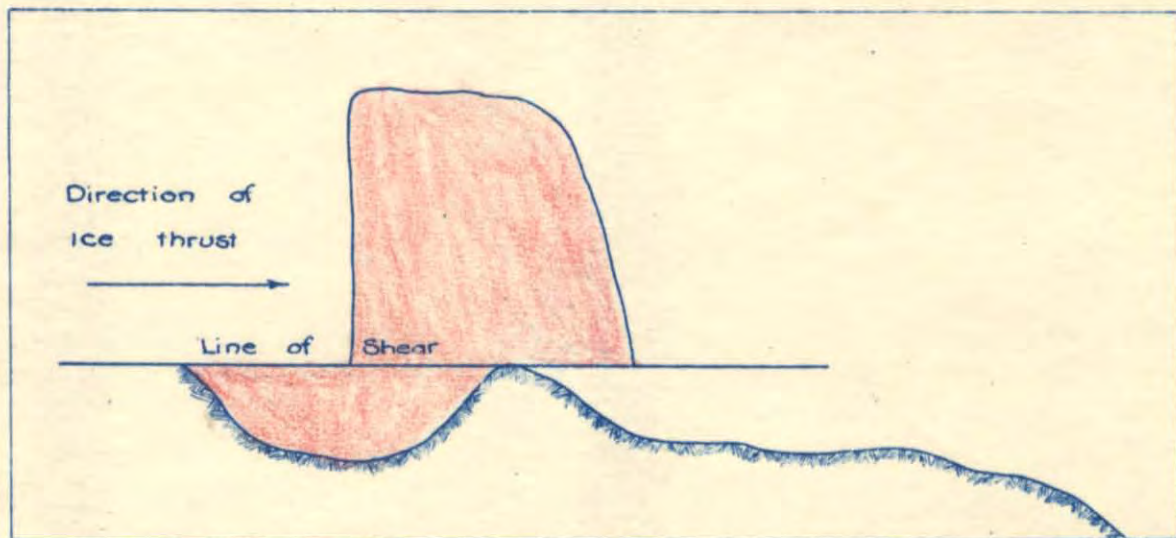
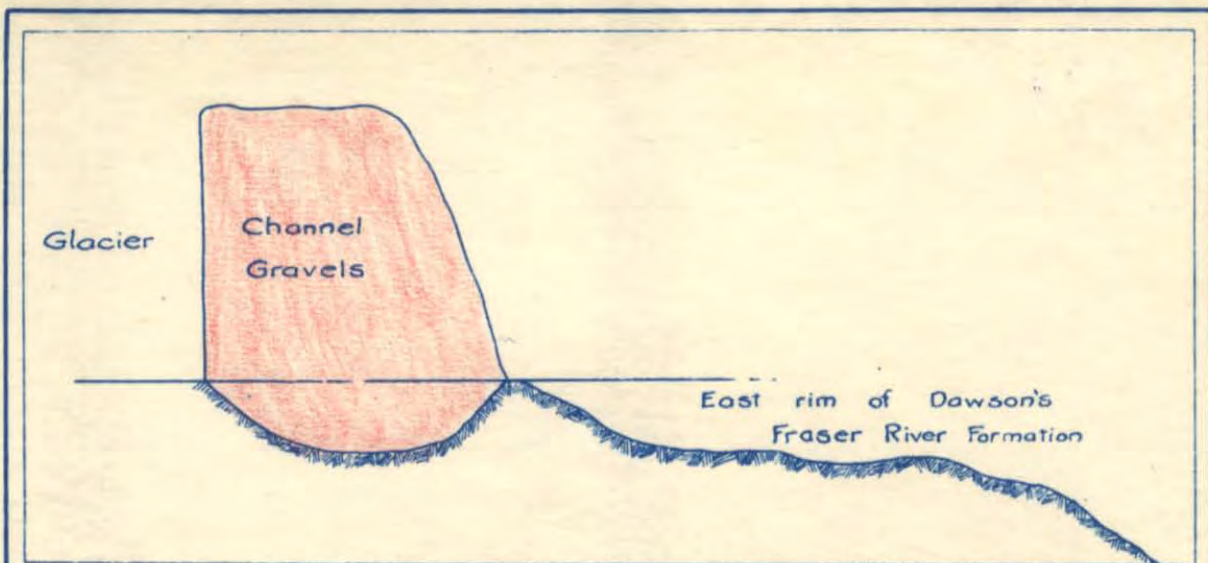
Donald J. Isaac

Plate 3.

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Showing three steps of the tilting of the strata at Canyon Creek. Looking South.
Based on theory of ice thrust.

December 2, 1929

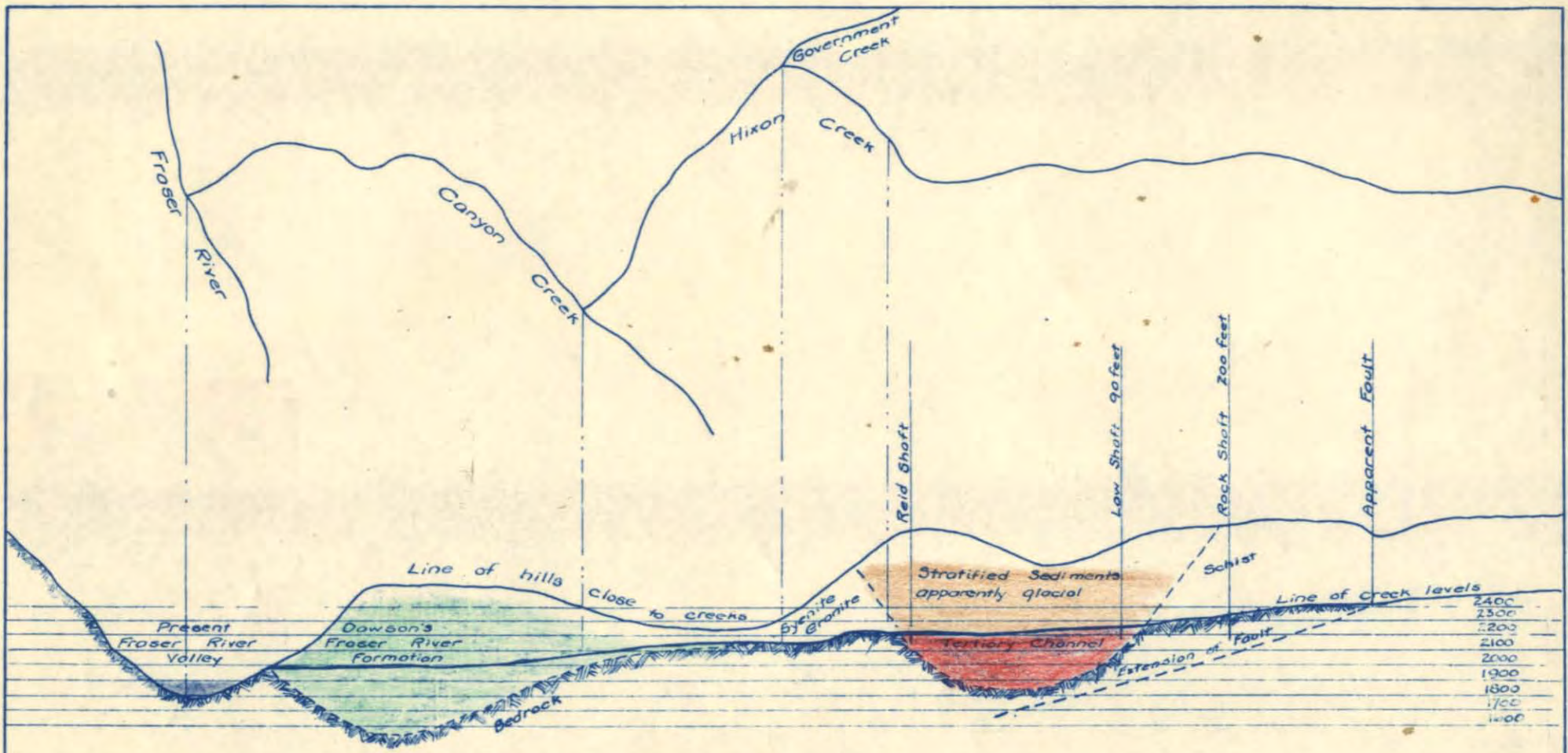
James D. Hill

Plate 4.

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Cross-Section from Fraser River
Up Hixon Creek

December 2, 1929

Handwritten signature

Plate 5

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