BRITISH COLUMBIA BUREAU OF MINES

BULLETIN No. 3, 1914

The Mineral and other Resources of the North Fork of the Kettle River In the Grand Forks Mining Division

BY

ANDREW G. LARSON, M.E.

ASSISTED BY

CLARENCE S. VERRILL, M.E.

SUBMITTED BY

WM. FLEET ROBERTSON, Provincial Mineralogist

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA.

PRINTED BY AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

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To the Honourable Sir Richard McBride, K.C.M.G.,
Minister of Mines.

SIR,—I have the honour to submit herewith a Report by A. G. Larson, M.E., assisted by C. S. Verrill, M.E., upon the mining and other possibilities of the North fork of the Kettle river, in the Grand Forks Mining Division of the Province.

This report was primarily prepared, by your instructions, to ascertain the need in this section for railway connection with existing lines and the probabilities of freight tonnage for such railway when built.

As the subject-matter of the report is chiefly in connection with the mineral probabilities of the district, you have instructed that it be published as a bulletin of the Bureau of Mines.

I have the honour to be,
Sir,
Your obedient servant,

WILLIAM FLEET ROBERTSON,
Provincial Mineralogist.

Bureau of Mines, Victoria, B.C.,
December 21st, 1914.

North Fork of Kettle River—between Lynch Creek and West Branch of North Fork.

Mineral and other Resources of the North Fork of the Kettle River.

Report by A. G. Larson, M.E.

THE undersigned made an examination of the country tributary to the North fork of Kettle river, including the Franklin mining camp, with special reference to the mining, timber, and agricultural resources, and the development of these resources by the construction of a railroad from the present terminus of the Kettle Valley Railway at Lynch creek up the East branch of the North fork to Franklin camp.

The following report is made as a result of this examination, and the conclusions have been arrived at after careful consideration of the future possibilities of the district as well as the present conditions.

GENERAL DESCRIPTION.

The country traversed by the North fork of Kettle river represents a valley about sixty miles long and about one mile wide, extending in a generally north-and-south direction, with Grand Forks at the lower terminus of the valley where the North fork forms its junction with the main stream.

The general character of the country is undulating, with hills rising on either side of the valley to a height of from 300 to 500 feet. The river has a comparatively gentle grade throughout its entire length; the altitude above sea-level being 1,700 feet at Grand Forks and 2,800 feet at Franklin camp, forty-five miles to the north, thus giving an average grade of less than one-half of one per cent.

The logical route of railroad-line would follow the river very closely, and would therefore obtain a very easy grade for transportation. (*See* Map No. 1.)

The land in the valley is fertile and well watered, and most of it should be suited for agricultural purposes, being similar in climate and soil to the land in the immediate vicinity of Grand Forks, which has proved so productive under cultivation, while the uplands above the valley are well adapted for grazing purposes.

In the country tributary to the main valley there are some very considerable areas of fine timber, including white pine, cedar, larch, hemlock, and spruce. (*See* Timber, page 19.)

There is a large amount of water-power available from the North fork, the East and West branches of the North Fork, and from several of the tributary streams, such as Franklin and Gloucester creeks.

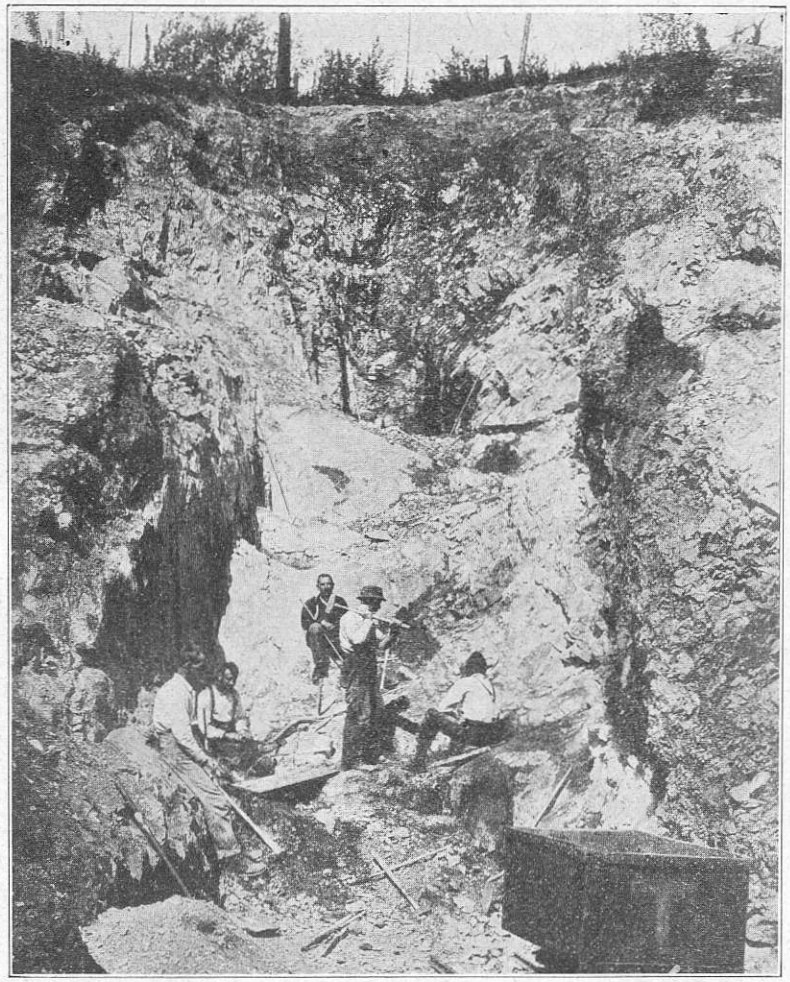
MINERAL RESOURCES.

In the general vicinity of Franklin camp there are a number of promising mining properties which would be well worth the serious consideration of capital for development into producing properties, if transportation facilities were provided for by the extension of the railroad from Lynch creek. Under present conditions the high cost of transportation is practically prohibitive to the development and working of the large mineral resources indicated in this district.

The Union.

One property known as the *Union* is actually producing, however, in spite of the adverse conditions of transportation, and as an instance of what these conditions are, the following facts are significant: This property is owned by two prospectors, Louis Johnson

and Patrick Maginnis, and the estate of a third, deceased. With no capital, these two men have opened up their property and are now shipping from 30 to 40 tons of ore a day to the Granby smelter at Grand Forks; notwithstanding that it costs them $13.50 a ton for wagon-haul from the mine to Lynch creek, $1.50 a ton railroad freight from Lynch creek to the Granby smelter, $6.75 a ton smelting charge, making $21.75 a ton, in addition to the cost of mining and loading into the wagons, which brings the total cost up to approximately $25 a ton.



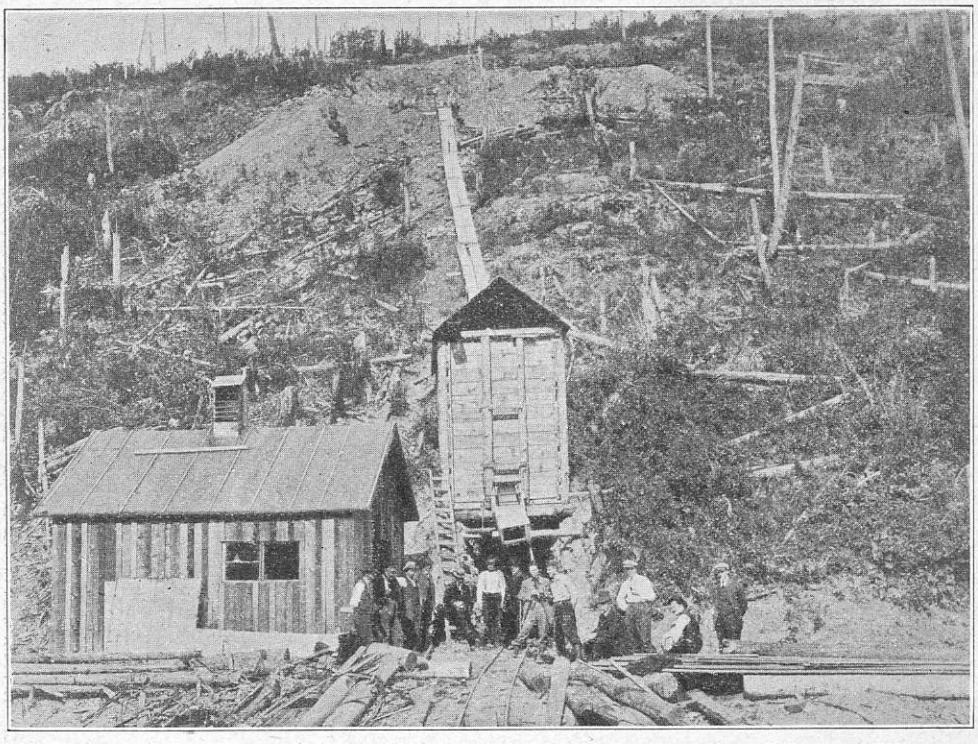
Glory-hole—Union Mine—High-grade Ore.

The smelter returns on this ore show an average grade of about $35 a ton, in gold and silver, for over 800 tons, the amount which had been shipped at the time of this examination. (*See* Table of smelter shipments and assays, page 17.)

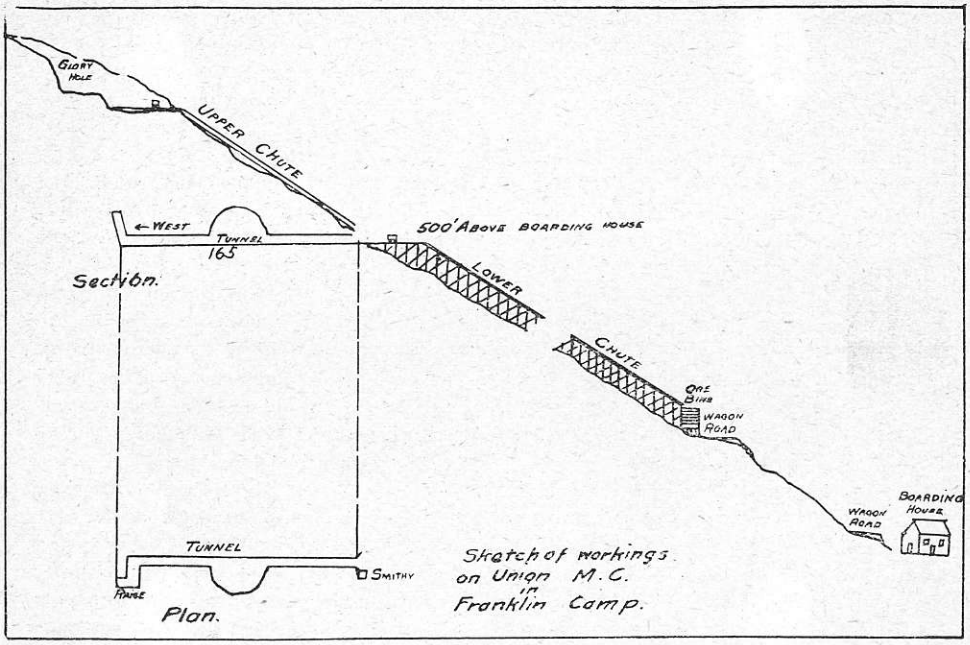
From this it will be observed that the property is now yielding a profit of approximately $10 a ton. Since the above shipments were made, however, the smelting charge has been reduced from $6.75 to $5.50 a ton, increasing the profit by $1.25 a ton and making the total $11.25 a ton on this grade of ore.

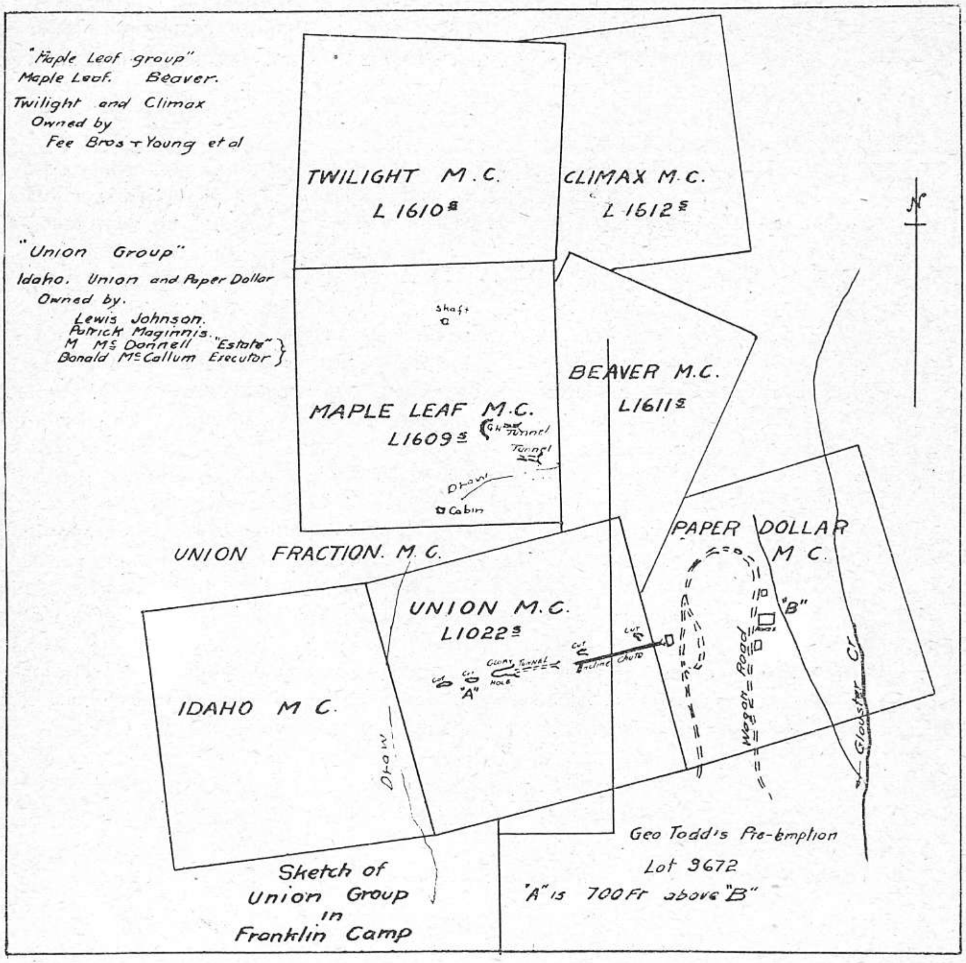
This ore is being mined in two different places on the property, part of it being quarried from the surface where the ore outcropped (*see* photograph) and part being stoped from a tunnel level about 100 feet below the outcrop.

General View—Union Mine—Franklin Camp.



Showing Tunnel, Union Mine, and Glory-hole above.


GLORY HOLE
UPPER CHUTE
← WEST
TUNNEL
165
Section.
500' ABOVE BOARDING HOUSE
LOWER
CHUTE
ORE BINS
WAGON ROAD
BOARDING HOUSE
WAGON ROAD
TUNNEL
SMITHY
RAISE
Plan.
Sketch of workings on Union M.C. in Franklin Camp.


"Maple Leaf group"
Maple Leaf. Beaver.
Twilight and Climax
Owned by
Fee Bros + Young et al
TWILIGHT M.C.
L 1610S
CLIMAX M.C.
L 1612S
"Union Group"
Idaho. Union and Paper Dollar
Owned by.
Lewis Johnson.
Patrick Maginnis.
M McDonnell "Estate"
Donald McCallum Executor
Shaft
BEAVER M.C.
L1611S
MAPLE LEAF M.C.
L1609S
Tunnel
Tunnel
Draw
Cabin
UNION FRACTION. M.C.
PAPER DOLLAR M.C.
UNION M.C.
L1022S
"B"
Cut
Incline Chute
Glory Hole
"A"
IDAHO M C.
Wagon Road
Gloucester Cr.
Draw
Geo Todd's Pre-emption
Lot 3672
"A" is 700 Ft above "B"
Sketch of Union Group in Franklin Camp

The actual width of the ore which is being mined is about 20 feet, but this only represents a portion of the full width of the ore-body owing to the fact that only the higher-grade portion will stand the high transportation charges. In the tunnel level, ore is exposed for a width of 40 feet, and average samples across this 40 feet gave values of $26.30 a ton in gold and silver. (*See* Description of samples, page 18.)

From this it can readily be seen that, while the entire body of ore could be mined at a good profit if it were not for the high cost of transportation, under the present conditions it is only possible to take out the very best of the ore, thus making the operation an extravagant one and preventing the development of the property to its best advantage.

The fact that the *Union* has been able to produce such a high grade of ore in commercial quantities is a very unusual condition, and cannot be expected to prevail for any great length of time. With a railroad to afford reasonable transportation facilities, however, the future of the property would promise exceedingly well, for, with an ore-body of this size, it is reasonable to assume that further development would make possible a steady production of ore of sufficient grade to pay a good profit under the more economical operating conditions.

Because this property was obliged, owing to lack of capital, to pay its own way from the start, and that to do this it has been necessary, as explained, to mine only the best of the ore, there has not been any systematic development of reserve ore, and it is therefore impossible to measure up "ore in sight." However, the unusually liberal width of the ore-bodies exposed and their high value indicate the probable development of a large tonnage, provided the transportation difficulties are overcome, so that the lower-grade portions of such ore-bodies can be profitably mined.

With the railroad extended from Lynch creek to Franklin camp and proper equipment installed for mining operations, the total cost of mining, freight, and smelting this ore should not exceed $10 a ton; and, judging from present conditions, there is every reason to believe that a large tonnage of ore would be developed which would yield a good margin of profit.

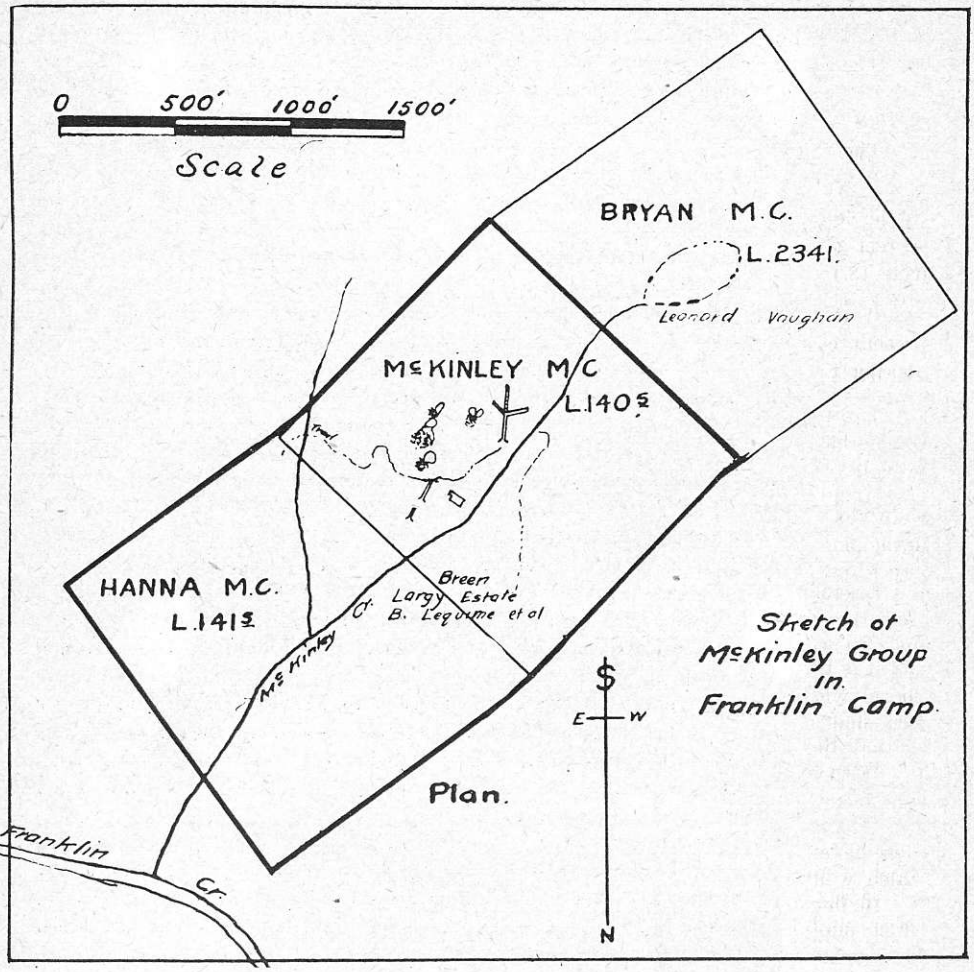
In the immediate vicinity of the *Union* there are several other properties upon which similar geological conditions exist, and upon which development-work might be reasonably expected to bring about similar results in opening up pay-ore in commercial quantities. But these other properties have not thus far developed sufficient high-grade ore on the surface to operate under the present conditions, and the low-grade ore cannot be profitably mined without railroad transportation; therefore there is comparatively little done on them in the way of development.

McKinley.

At the *McKinley*, located a mile and a half west of the crossing of Franklin creek by the wagon-road to Gloucester (*see* Map No. 2), the ore-bodies occur as sulphides and oxides of iron carrying copper and gold, but closely associated with the limestone. The surface exposures on the *McKinley* show bodies of pyrite-chalcopyrite ore of liberal size, and it is claimed that the results of diamond-drilling proved the persistency of this ore at depth, but the results of the diamond-drilling were not available for inspection. There are several tunnels on the *McKinley* which were apparently started with the intention of cutting the ore-bodies, but, while there is considerable low-grade ore exposed in this way, the indications are that these tunnels were run under the dip of the main ore-shoots.

This property is well worthy of further exploration and development-work, and capital would undoubtedly be forthcoming to undertake such work if transportation facilities were such as would make this grade of ore marketable.

The general character of the ore and its manner of occurrence are similar to the conditions prevailing at Phoenix and Deadwood, and there are good possibilities for the development of ore-bodies of this character once the transportation difficulties are overcome.



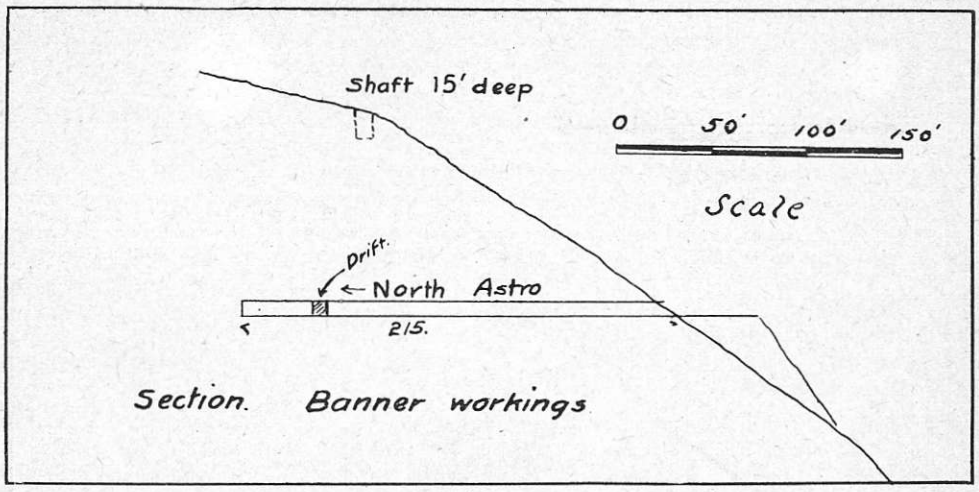
Banner.

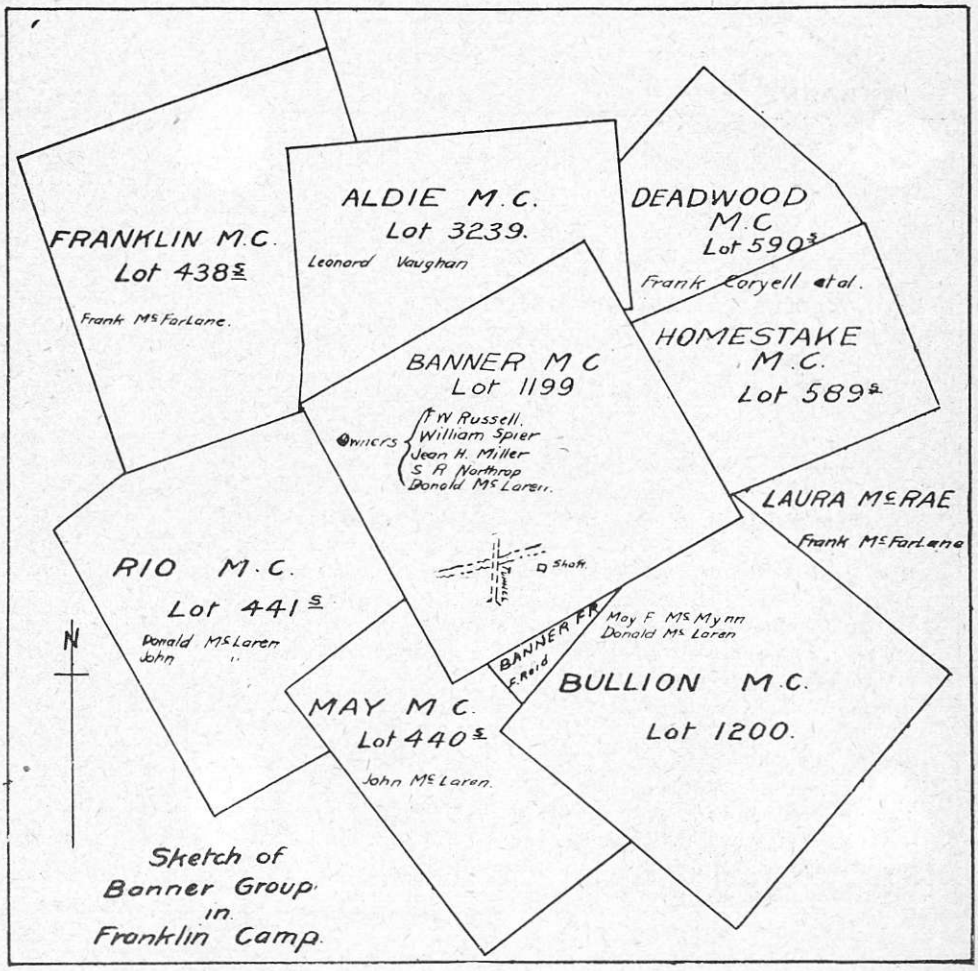
The *Banner* is one of the pioneer properties of the district. It is located on the east slope of Banner mountain, and includes the following claims, locally known as the *Banner* group: *Aldie, Deadwood, Franklin, Banner, Rio, Homestake, May, Banner Fraction,* and *Bullion.* (*See* Map No. 2 and accompanying sketch.)

On the *Banner* claim a tunnel has been driven into the hill for a distance of 215 feet, in a generally northerly direction, and has crosscut an ore-body which, at this point, is 30 feet wide, showing sulphides of copper, lead, and zinc in a quartz gangue. This is low-grade ore, but its liberal width and strong mineralization are very favourable indications for the development of large bodies of ore which could be profitably mined under economical conditions for transportation and operation.

On the surface, about 100 feet vertically above the tunnel, a shaft has been sunk 15 feet which is entirely in ore, and which is apparently part of the same ore-body that shows in the tunnel. A general sample from this shaft, representing the average of the ore thus exposed, gave assay results of $22.30 in gold, copper, silver, and lead, as follows:—

		Gross Value.
Copper	4.5 per cent.,	or $13.50
Silver	4.0 oz.,	,, 2.00
Gold	0.14 oz.,	,, 2.80
Lead	5 per cent.,	,, 4.00
Total value		$22.30





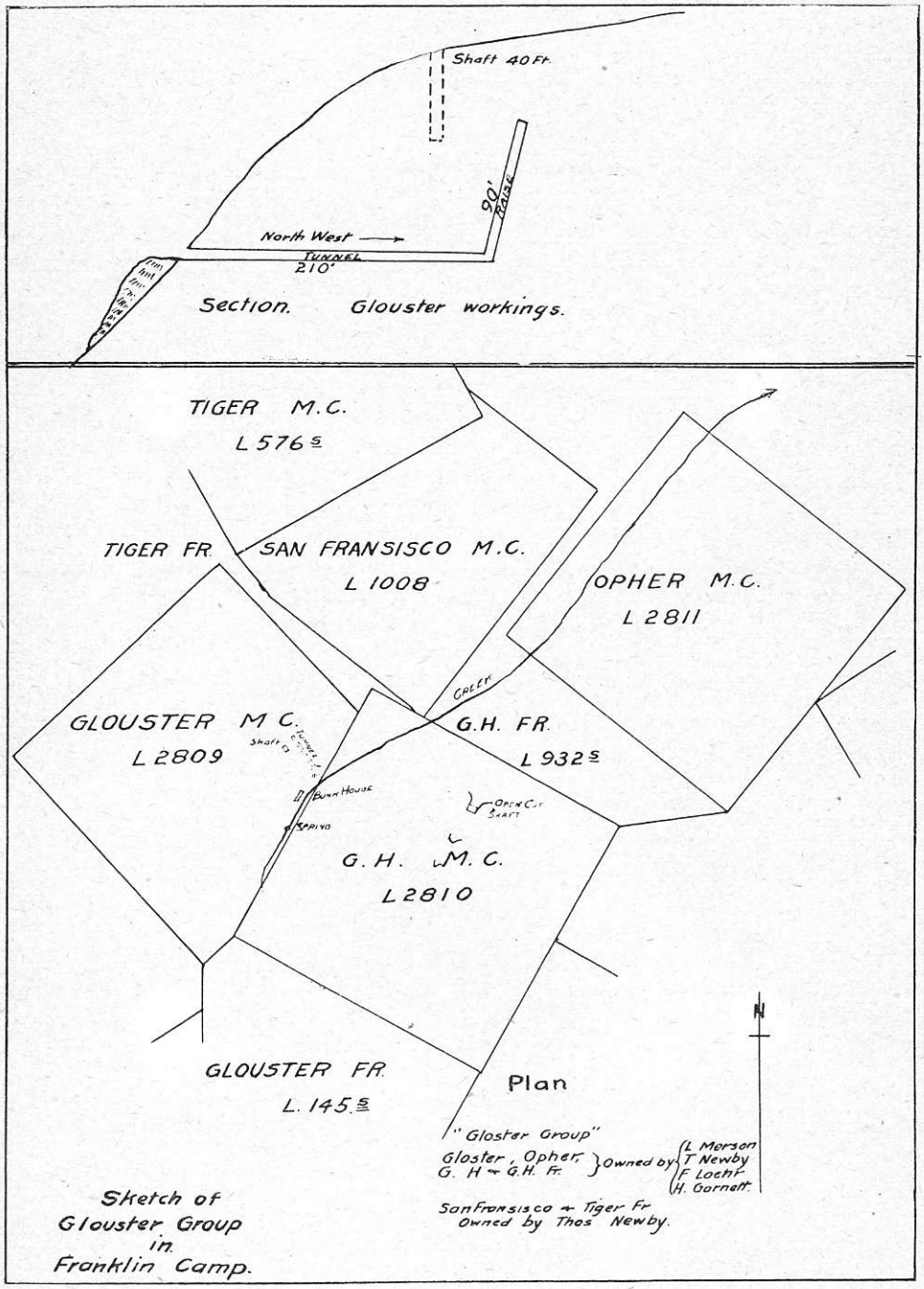
The value of this ore is very encouraging; and taken into consideration together with the large body of low-grade ore exposed in the tunnel, it is strong evidence toward the probable development of large ore-bodies of commercial value if transportation facilities were such as to permit of its economical treatment.

This property is well worthy of serious consideration for its further development and fully justifies such work.

Other Properties.

There are a number of other properties in the district which have very favourable indications for the development of a large tonnage of low-grade ore which would be marketable with railroad transportation.

The following sketches are brief descriptions of those examined, and show that the district is not limited to a few isolated properties, but that the mineralized



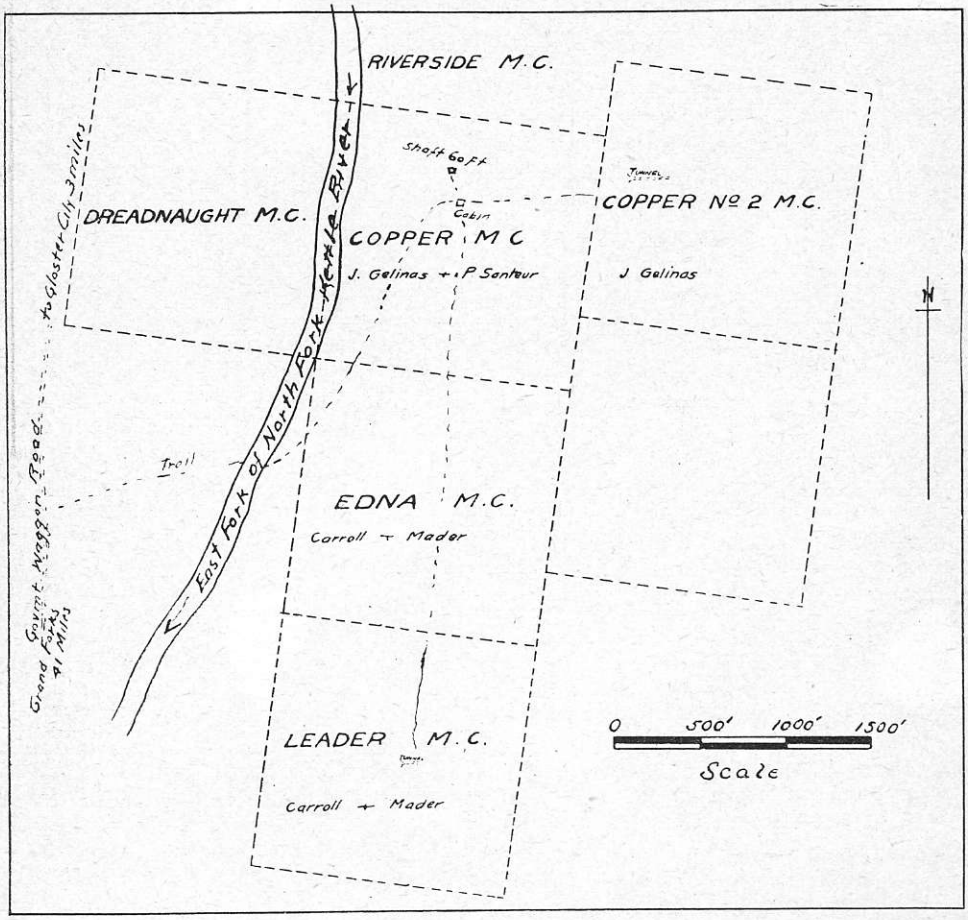
area is large and persistent, and that the possibilities of the district as a possible producer are most encouraging, considering the conditions under which their owners have been obliged to labour owing to lack of economical transportation.

Gloucester Group. As shown on the accompanying sketch, this property consists of the following claims: *Tiger, Tiger Fraction, San Francisco, Ophir, Gloucester, Gloucester Fraction, G.H.*, and *G.H. Fraction.* The property is situated on the Gloucester Creek slope of Franklin mountain. The ore is chiefly copper and iron sulphides occurring in the contact between silicified granodiorite and greenstone. Development-work consists of a 200-foot tunnel, with a 90-foot raise and a shaft of 40 feet deep, as shown on sketch.

While no large bodies of ore have so far been developed, there is evidence of strong mineralization, and the occurrence of chalcopyrite in the altered granodiorite is a favourable indication for the development of ore of commercial value.

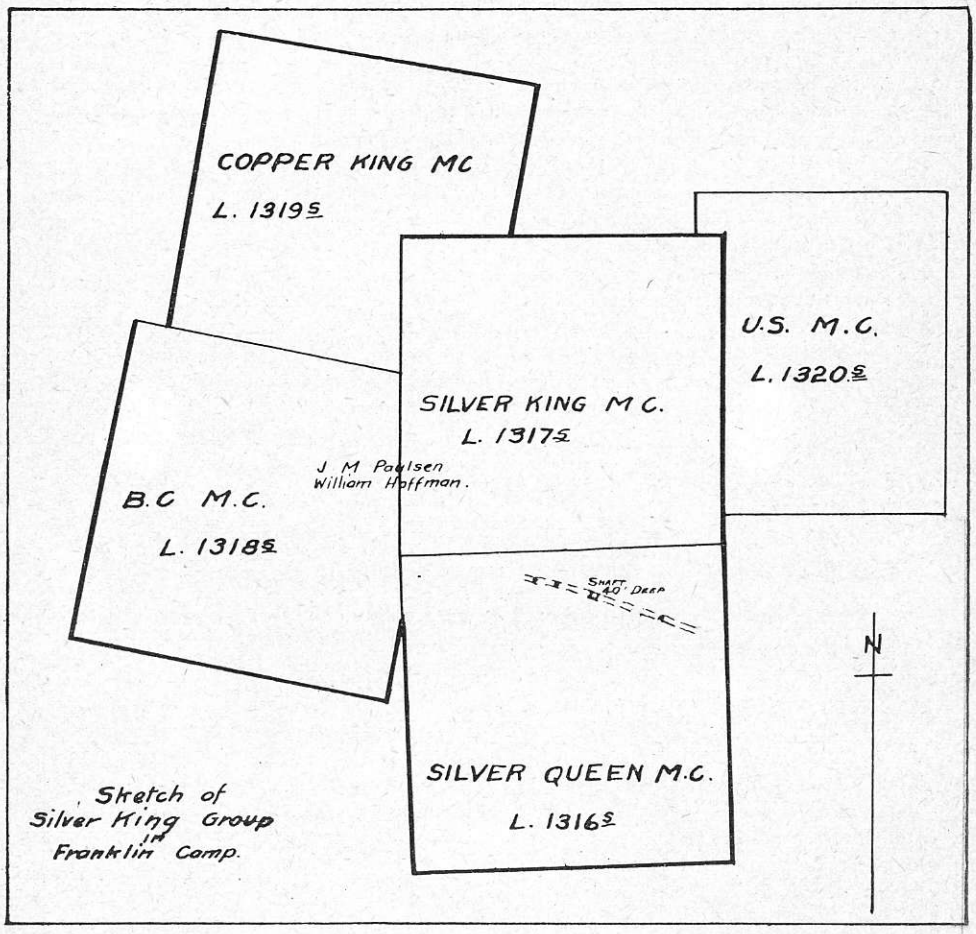
Copper Group. This includes the *Riverside, Copper No. 1, Copper No. 2, Dreadnaught, Edna*, and *Leader* claims, and is situated three miles south of Gloucester camp, on the east side of the East branch of the North fork of Kettle river, as shown on sketch. The character and manner of occurrence of the ore are very similar to the conditions found on the *Gloucester* group, the ore being pyrite and chalcopyrite scattered through quartz which occurs as a silicification of the granodiorite.

There is not sufficient work done on the property to form a conclusive opinion, but the geological conditions and general indications are favourable to the formation of ore and are encouraging for further development.



Silver Queen. This property is located well toward the southern end of the camp, about seven miles south of Gloucester camp and one mile north-west of the wagon-road from Grand Forks to Franklin camp, and in the locality locally referred to as "Morell's camp." There are five claims in the group, the *Silver Queen, Silver King, Copper King, B.C.*, and *U.S.*

On the *Silver Queen* claim a vein is exposed 5 feet in width, consisting of iron, copper, and lead sulphides in a quartz gangue. A shaft, said to be 75 feet deep, has been sunk on the vein, but was full of water at the time of examination.



A general sample of the dump from the shaft gave the following assay results:—

			Gross Value.
Silver	1.4 oz.,	or	$0.70
Copper	1.0 per cent.,	,,	3.00
Lead	0.5 per cent.,	,,	.40
Total value			$4.10

Other properties examined were the Morell claims, just to the south of the *Silver Queen;* the *Golden Zone*, situated on the east side of Gloucester creek and apparently on the same strike as the *Union;* the *United Verde*, on Banner mountain west of the *Union*, and similar in formation to the *Union* and *Golden Zone;* and the *Nelson* group, on the east side of the East branch of the North fork, about half a mile east of the *Union*.

These properties all have good indications for the possible development of ore in commercial quantities, but, at the time of examination, sufficient work had not been done on them to form any conclusive opinion as to their prospective value.

GEOLOGY.

The geology of the district is quite complex and would require a great deal of time to work out with any degree of accuracy, but the following table of the formations taken from Summary Report, 1911, Geological Survey of Canada, page 134, from the report by C. W. Drysdale, shows the general rock formations of the district, and this with reference to the two geological maps, also in Drysdale's report, will serve to give a fairly comprehensive idea of the general geology of the district:—

TABLE OF FORMATIONS.

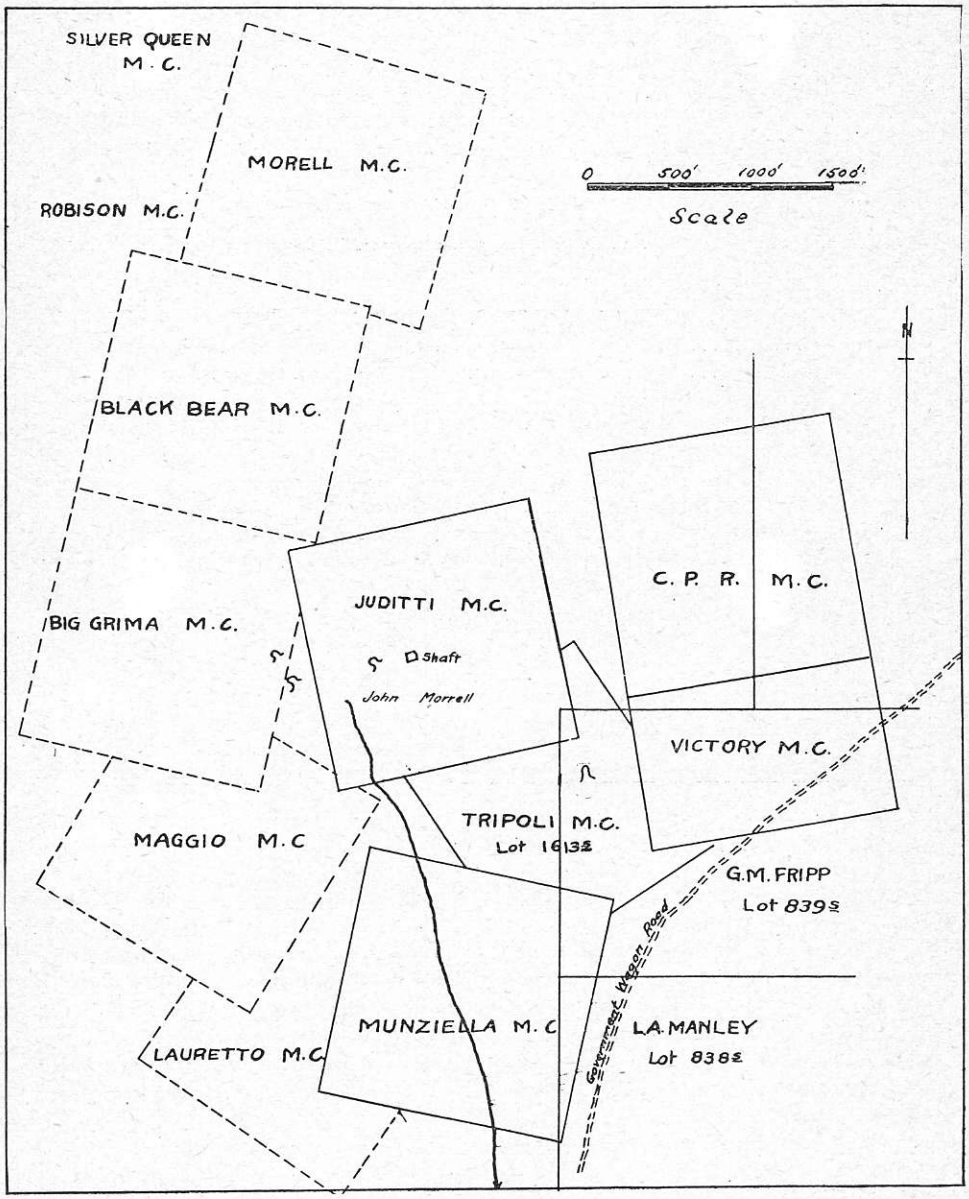
System.	Formation.	Lithological Character.
Quaternary	Superficial deposits ...	Gravel, sand, silt, boulder-clay.
Miocene (?)	Midway volcanic group.	Pinkish pulaskite porphyry, dark basic dyke rocks—lamprophyres; quartz porphyry, and lavas ranging from basalt to andesite and rhyolite.
	Syenite	Pyroxenites (local term "Black Lead")—syenite.
Oligocene (?)	Kettle River formation.	Conglomerate, grit, and tuff.
(?)	Monzonite.	
Post-Jurassic (?)	Granodiorite	Massive igneous rocks from granite to diorite and in places sheared to gneiss.
Palæozoic (Upper?) ..	Gloucester formation ..	Crystalline limestone.
	Franklin group	Greenstone, altered tuff, jasperoid, and silicified argillite.

The geological conditions under which the ore occurs vary according to the locality, but, in all cases observed, the ore occurs as a replacement of the limestone by siliceous solutions, as vein-matter deposited in fissures formed by intrusions of the volcanics, or by the mineralization of the rocks themselves as a direct result of the volcanic intrusions.

The mineralized area as represented by "showings" or exposures of ore covers about twenty square miles, extending for about seven miles in a generally north-and-south direction and being about three miles wide, including the territory bounded by the East branch of the North fork of Kettle river on the east, Mineral hill and Gloucester creek on the north, and Franklin creek on the west, with the old Franklin camp near the southern portion and Gloucester City as the general centre of operations.

On some of the properties the ore occurs as a replacement in the original formation which has been almost completely silicified. This condition seems to be the case on the *Union*, and, so far as could be judged from the exposures in the *Union* workings, there is no actual vein or walls to clearly define the ore-bodies, but, where the formation has been thoroughly silicified, ore occurs; the siliceous solutions apparently having been the agency by which the metallic values were carried in solution and deposited, particularly where fissuring has offered opportunity for such deposition. As a result of this condition it is often difficult for the eye to distinguish ore from waste rock, and a thorough and systematic sampling and assaying are necessary for successful mining operations.

By reference to the geological maps referred to it will be observed that the geology is exceedingly complex, representing a great variety of rock formations and covering different geological periods and movements which have brought about



the present conditions. This complexity of the geology is, however, favourable to the formation of ore; the various contacts and intrusions and resultant fissuring offering good opportunity for the deposition of metal-bearing solutions and gases.

Speaking generally, the geological conditions of the mineralized area are most favourable to the formation of ore in commercial quantities. The area is large and the mineralization has apparently been quite general and persistent. The indications point toward the development of ore-bodies similar to those of the Phoenix and Deadwood camps, with the additional advantage of occasional high-grade ore-bodies like those of the *Union*.

TONNAGE.

Reserve ore has not been "blocked out" on any of the properties in the district. It has not been practicable to do this owing to transportation difficulties, as previously explained, and it will not be possible to interest capital in the general development of the camp until this difficulty of transportation has been overcome.

Owing to this lack of the development of reserve ore it is impossible to make any positive or accurate statement as to the actual tonnage of available ore, but, so far as can be judged by present conditions, there are certainly very strong indications for the development of a large tonnage. Just what these possibilities are in actual figures no one can definitely state at the present time, but it would seem that, comparing the present conditions with those of similar camps such as Phoenix and Deadwood when they were in their first stages of development, the possibilities are good for the development of a similar production.

DATA ON UNION MINE, JUNE 26, 1914.

ORE SHIPPED TO TRAIL SMELTER.

Lot.	Au.	Ag.	Dry Weight.
	Oz.	Oz.	Lb.
1	0.88	20.2	57,542
2	0.96	32.8	72,864
3	0.62	32.7	48,800
4	0.48	29.9	60,570

ORE SHIPPED TO GRANBY SMELTER.

Lot.	Au.	Ag.	Dry Tons.
	Oz.	Oz.	
Received at Smelter.			
1	0.73	77.1	23.134
2	0.76	81.0	31.929
3	0.87	85.8	30.148
4	0.77	71.2	28.446
5	0.83	73.6	21.134
6	0.81	48.5	30.243
7	0.99	25.6	38.696
8	0.99	16.6	25.624
9	1.10	17.7	28.623
10	0.74	17.6	35.356
11	0.97	18.2	33.207
12	1.13	19.8	32.095
13	0.65	43.5	28.089
14	0.63	45.9	29.028
15	0.77	34.2	11.956
16	0.38	33.0	32.013
17	0.26	22.0	30.937
Six Cars in Transit.			Wet Tons.
18	0.6	22.0	40.750
19	1.01	16.3	37.850
20	0.88	31.1	35.400
21	1.12	25.3	34.650
22	1.38	31.6	30.100
23	1.02	31.1	31.850
Total	...	...	821.141

Average value, gold	.....	$16.50
„ „ silver	.....	18.60
„ „ total	.....	$35.10

ANALYSIS OF LOTS 1 TO 15.

Insol.	Fe.	CaO.	S.	Cu.	Au.	Ag.
76.0	4.7	4.5	1.2	Tr.	0.85	45.0

Freight-haul by wagons to Lynch creek, 25.2 miles	..	$13.50 a ton.
Lynch creek to Granby	.....	1.50 „
Treatment	.....	6.75 „
Total cost, not including mining	.....	$21.75 a ton.
Freight-haul in by returning wagons	.....	10.00 „

(Signed.) W. EATON,
Superintendent.

DESCRIPTION OF SAMPLES.

No.	Claim.	Contents.		
1	*Union* claim; 200 feet below working-tunnel	Gold,	0.02 oz.	$ 0 40
		Silver,	8.20 oz.	4 10
		Total value...		$4 50
2	*Union* claim; taken from side of tunnel under stope, across 20 feet continuous ore	Gold,	0.48 oz.	$ 9 60
		Silver,	65.8 oz.	32 90
		Total value...		$42 50
3	*Union* claim; taken from side of tunnel, across 20 feet continuous ore south of No. 2	Gold,	0.42 oz.	$ 8 40
		Silver,	3.6 oz.	1 80
		Total value...		$10 20
4	*Banner* claim; average of 15-foot shaft, all in ore	Gold,	0.14 oz.	$ 2 80
		Silver,	4.0 oz.	2 00
		Copper,	4.5 %	13 50
		Lead,	5.0 %	4 00
		Total value...		$22 30
5	*Silver Queen;* average of dump from 75-foot shaft	Gold,	trace.	
		Silver,	1.4 oz.	$ 0 70
		Copper,	1.0 %	3 00
		Lead,	0.5 %	40
		Total value...		$4 10
6	*United Verde;* bottom of 15-foot shaft, where sinking was in progress	0.2 oz. of silver, with traces of gold, copper, and lead.		
7, 8	Surface rock from *Mary Ann* claim...	Results—*Nil.*		
9	*United Verde;* taken 2 feet deeper in bottom of same shaft as No. 6	$3.20 in gold, with traces of copper and silver.		
10	*Golden Zone;* surface rock	Results—*Nil.*		

LIST OF OWNERS OF MINERAL CLAIMS IN FRANKLIN CAMP.

(GLOUCESTER CAMP INCLUDED.)

Hannah, McKinley Mines, Ltd.
Thuot, J. H. Graham *et al.*
McKinley, McKinley Mines, Ltd.
Bryan, L. Vaughan.
Last Chance, W. Minion.
Cottage, J. S. C. Fraser *et al.*
Bystander, J. M. Paulsen.
Standard.
Snowbird, P. Maginnis.
Royal Tinto, J. Holm.
Sunrise, P. H. Wright.
Manhattan, D. Whiteside *et al.*
Climax, H. W. Young *et al.*
Beaver.
Silver Horde Fraction, A. J. Fee.
Paper Dollar, Mike McDonnell *et al.*
Union Fraction, L. Johnson *et al.*
Idaho, L. Johnson *et al.*
River Elbow, J. Holm.
Evening Star, H. C. Kerman *et al.*
Last Chance, W. H. Hoffman.
Mary Ann, P. J. Byrne *et al.*
Homestake, A. McDonald *et al.*
Ida, J. Newby *et al.*
Rio, J. McLaren *et al.*
Banner Fraction, A. L. Whiteside *et al.*
Union, Lewis Johnson *et al.*
May, H. McLaren.
Bullion, P. Donaldson.
Grand Fraction, F. McFarlane.
Alto, F. M. Kerby.
Eganville, W. J. Prendergast *et al.*
Eclipse, B. LeQuime *et al.*
Athelstan, W. J. Prendergast *et al.*
Antelope Fraction, F. M. Kerby.
Nellie, W. J. Prendergast *et al.*
Ouray Fraction, P. Kelly *et al.*
Munster, D. Whiteside *et al.*
Waverley, G. E. Massie.
Ajax, B. LeQuime *et al.*
I.X.L., J. W. Graham *et al.*
Jumbo, D. Whiteside *et al.*
Wallace Fraction, D. Whiteside.
Shelby, A. Chisholm.
Nakusp, J. West *et al.*
Columbia, A. Chisholm *et al.*
Florence, A. Harkness.
Ottawa, J. West *et al.*
Evening Star, W. Minion.
Pinto, T. Newby.
Iron Hill Fraction, L. D. Wolford *et al.*
Buffalo, J. McDonald.
Blue Jay, J. Holm.
Tiger, H. B. Cannon *et al.*
Tiger Fraction, T. Newby.
Montezuma, H. S. Cayley.
Montana, S. Birch *et al.*
San Francisco, A. Dorais *et al.*
Ophir, G. A. McLeod *et al.*
Gloucester, ,,
G.H. Fraction, ,,
G.H., ,,
Iron Cap, ,,
Mountain Lion, H. Watlin *et al.*
Doris Fraction, H. C. Kerman.
Chrystal Copper, F. W. Russell *et al.*
White Bear, W. K. White *et al.*
Big Cub, H. C. Kerman.
Old Dominion Fraction, E. G. Cummings *et al.*
Mountain Lion, H. Watlin *et al.*
Omar, M. D. Schenk *et al.*
Gloucester Fraction, G. A. McLeod *et al.*
Alert, F. M. Kerby.
M.S., C. A. S. Atwood *et al.*
Little Cub Fraction, H. C. Kerman.
Lucky Jack, H. C. Kerman *et al.*
Golden Age, ,,
Newby Fraction, ,,
Henniken, B. W. Garrison *et al.*
Verde, C. N. Mardon *et al.*
Alpha, F. H. McLaren *et al.*
Buttercup, P. E. Nelson *et al.*
Twilight, H. W. Young *et al.*
Franklin, Mrs. Lindholm.
Aldie, L. Vaughan.
Viloet Fraction, B. W Garrison *et al.*
Hit or Miss, H. A. McLaren.
Deadwood, J. H. Hodson.
Maple Leaf, H. W. Young *et al.*
Banner, Jas McDonald.
Black Bear, H. C. Kerman.
Grand Forks Girl, P. J. Byrne *et al.*
Elsie, C. M. Tobiassen *et al.*
Royal Tinto, H. Eyre.
Blue Jay, C. E. Anderson.
Acacia Fraction, Donald McCallum.
Auto Fraction, ,,
Active, F. M. Kerby.
Last Chance, A. Anderson.
Laura McRea, F. McFarlane.

TIMBER.

In the valleys of the East and West branches of the North fork and the valleys of the tributary streams, such as Savage, Bluejoint, Meadow, McFarland creeks, etc., there is a large quantity of fine timber which would be made accessible by the extension of the railroad. The following estimate of the quantity, variety, and value of this timber was obtained from the Western Pine Lumber Company, of Grand Forks, and from the report of a professional timber-cruiser, B. Bainbridge:—

Location of Timber.	Estimated Quantity.
14 miles from Grand Forks	58,000,000 feet.
17 to 21 miles from Grand Forks	13,000,000 ,,
21 to 30 miles from Grand Forks	15,000,000 ,,
	86,000,000 ,,

The above represents practically all the timber for the first twenty-nine miles north of Grand Forks, except the cottonwood in the river-bottoms, suitable only for pulp-wood and which is roughly estimated at 110,000,000 feet.

West fork, north of C.P.R. B.K.	140,000,000 feet.
,, C.P.R. B.K.	40,000,000 ,,
,, last limit north	45,000,000 ,,
	225,000,000 ,,
East fork on Savage creek	20,000,000 ,,
,, on Bluejoint creek	40,000,000 ,,
,, on Meadow creek	20,000,000 ,,
,, on McFarland creek	80,000,000 ,,
,, on north of McFarland creek	30,000,000 ,,
	415,000,000 ,,
	86,000,000 ,,
	501,000,000 ,,

The average varieties of this timber are estimated as follows:—

White pine	5 % or	25,000,000 feet.
Cedar	25 % or	125,000,000 ,,
Larch	25 % or	125,000,000 ,,
Fir	15 % or	75,000,000 ,,
Hemlock	15 % or	75,000,000 ,,
Spruce	15 % or	75,000,000 ,,
	100 % or	500,000,000 ,,

The value of this timber a thousand, as standing timber, may be taken as about $2, which would mean that there is about $1,000,000 worth of standing timber in the district which would be made available by the construction of the railroad as contemplated.

By referring to Map No. 1, showing the location of the timber and the principal mining properties, as well as the location survey of the projected railroad, one may get a general idea of their relative positions.

AGRICULTURE.

The valley of the North fork of Kettle river and the tributary valleys of the East and West branches of the North fork contain a large amount of land which is adapted to agricultural purposes, and which should prove largely productive under cultivation if transportation facilities were available for the economical marketing of such produce.

In the valley of the North fork, between Grand Forks and Franklin camp, there are some 20,000 acres, taking the average width of the valley as three-quarters of a mile and the length as forty miles, with the addition of probably 10,000 acres in the tributary valleys of the West fork, and streams like Meadow, Bluejoint, Franklin, and Savage creeks, making a total of approximately 30,000 acres of fertile, well-watered land.

The conditions of soil and climate are very similar to those prevailing in the country in the immediate vicinity of Grand Forks, which has proved so productive under cultivation. Between Grand Forks, B.C., and Danville, Wash., there are approximately 2,200 acres of land under cultivation at the present time. The average annual yield of crops from this land at the present time is about $35 an acre, while in ten years the maturity of the young orchards should increase this to about 5,000 acres, with a total average production of about $80 an acre. The climatic conditions of the valley of the North fork and its tributaries would be somewhat more severe than those prevailing in the immediate vicinity of Grand Forks, but the difference is not as marked as would at first seem to be the case. The altitude above sea-level at Grand Forks is 1,700 feet, while the altitude at Franklin camp, forty-five miles up the valley of the North fork, is only 2,800 feet, or 1,100 feet higher, so that the general average for the valley between Grand Forks and Franklin would be approximately 2,250 feet, which, in this section of the Province, is very favourable to the cultivation of average crops of grain, fruit, and vegetables. Figuring the average future yield at $50 an acre as against $80 for the Grand Forks land, which is certainly conservative, we would have an annual production of $1,500,000 from the agricultural resources of this district alone; and it does not seem at all unreasonable that these figures might easily be surpassed, as this does not take into consideration any additional production which might be caused by intensive farming.

There are also large areas of uplands on the rolling hills on both sides of these valleys which should make ideal land for grazing purposes, and there is no doubt that there would be a very considerable production from the development of cattle- and sheep-raising industries if transportation conditions were practicable for such.

RAILROAD CONSTRUCTION.

The distance of approximately twenty-five miles from the present terminus of the Kettle Valley line at Lynch creek to Franklin, following the general course of the North fork and the East branch of the North fork (*see* Map No. 1), would afford an easy grade of only about one-half of one per cent. The cost of construction of such a road should not be more than the average cost of railroad in British Columbia. There are no serious engineering difficulties to overcome, and there is less bridge-construction and rock-work than is usually found necessary in a line of this length in the average mountain road of the Province.

In comparison with the benefits to be derived from the development of the agricultural, mining, and timber resources of the district, the cost of such a road is almost insignificant.

Without the road, the development of the district is practically impossible, for the reason that people with capital will not invest in the development of resources where the market for their product, be it lumber, grain, or ore, is shut off by transportation costs which eliminate the possibility of profit.

GENERAL CONCLUSION.

After thorough observation of the various conditions indicative of the future possibilities for the development of the natural resources of the district examined, and after careful consideration of the facts derived from this examination, as herein stated, it is our opinion that the development of the agricultural, timber, and mineral resources is impracticable under the present conditions of transportation; but that with transportation facilities provided for by the extension of the railroad from Lynch creek such development would be entirely practicable, and in all probability of inestimable value to the Province.

NOTES.

The figures upon which the estimates of timber are based were supplied by Mark DeCow, vice-president of the Western Pine Lumber Company, and by B. Bainbridge, a professional timber-cruiser of Grand Forks, B.C.

The assaying of samples taken by the undersigned was done at the Provincial Laboratory, Victoria, B.C., and by J. O'Sullivan, of Vancouver, B.C. All other assays considered are from the Granby smelter at Grand Forks, and are on shipments of 20- to 30-ton lots of ore from the *Union* mine.

The maps accompanying this report are made from data kindly supplied by Forbes M. Kerby, B.C.L.S., of Grand Forks, and from the maps published by the British Columbia Land Office, Department of Mines, and Geological Survey.

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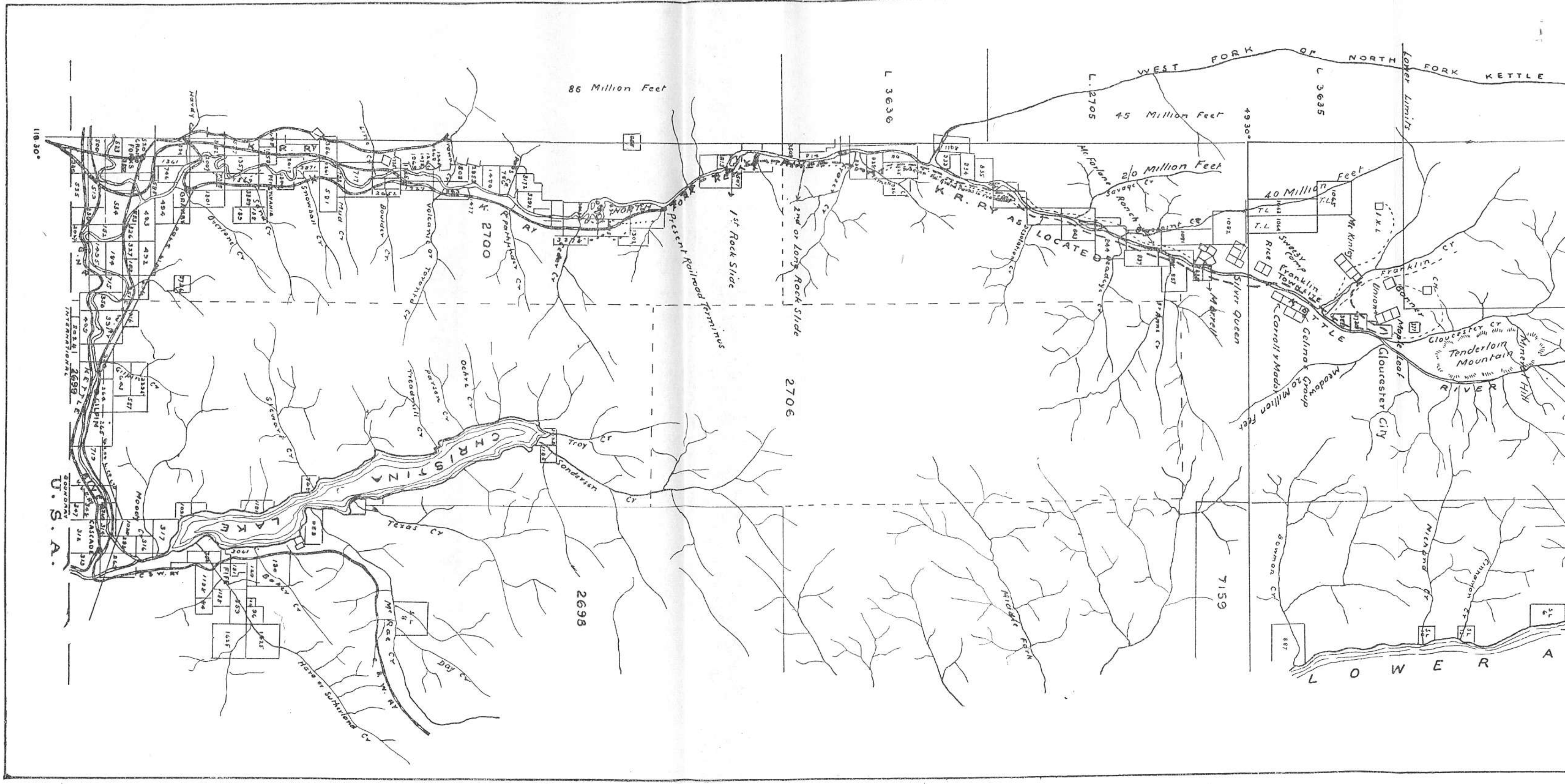
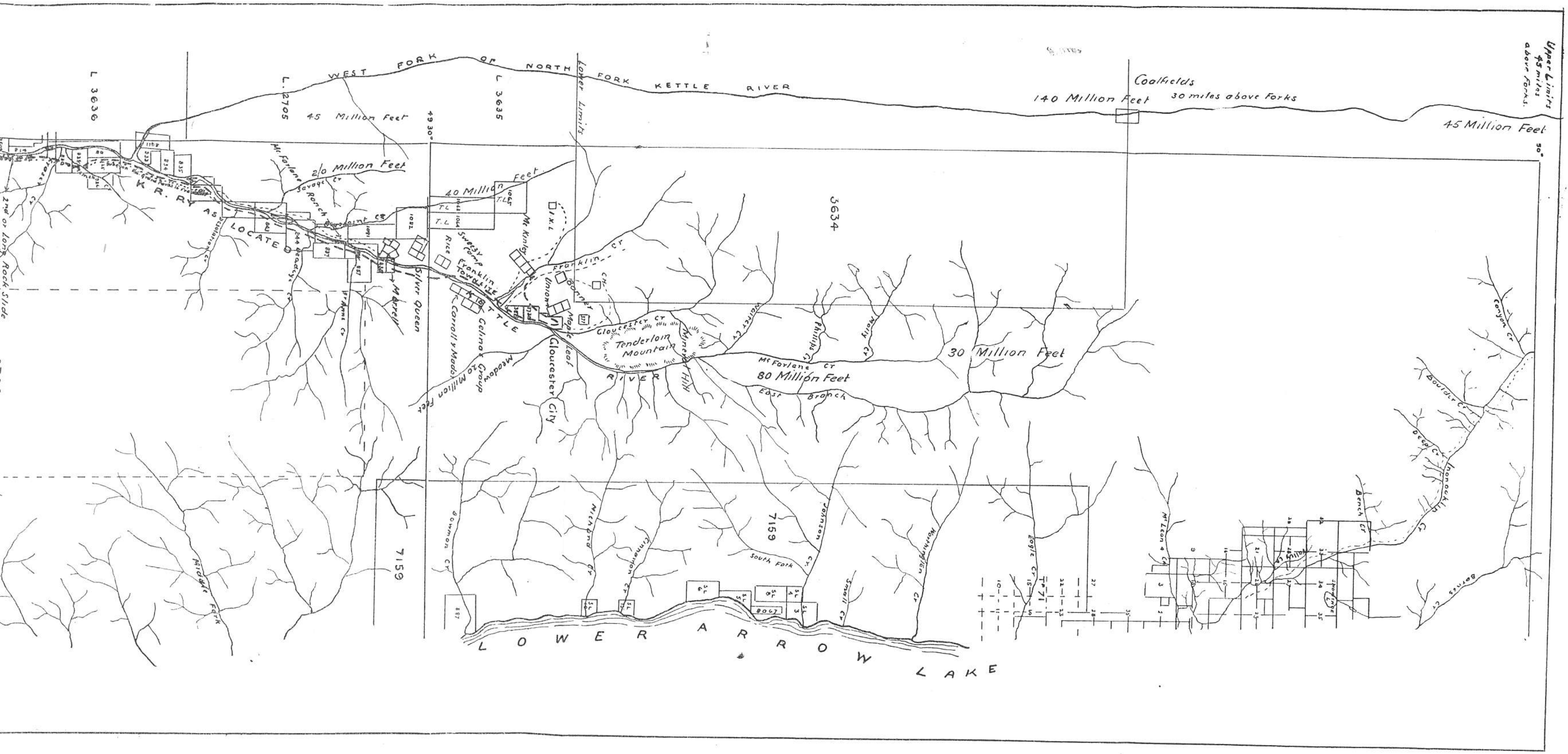
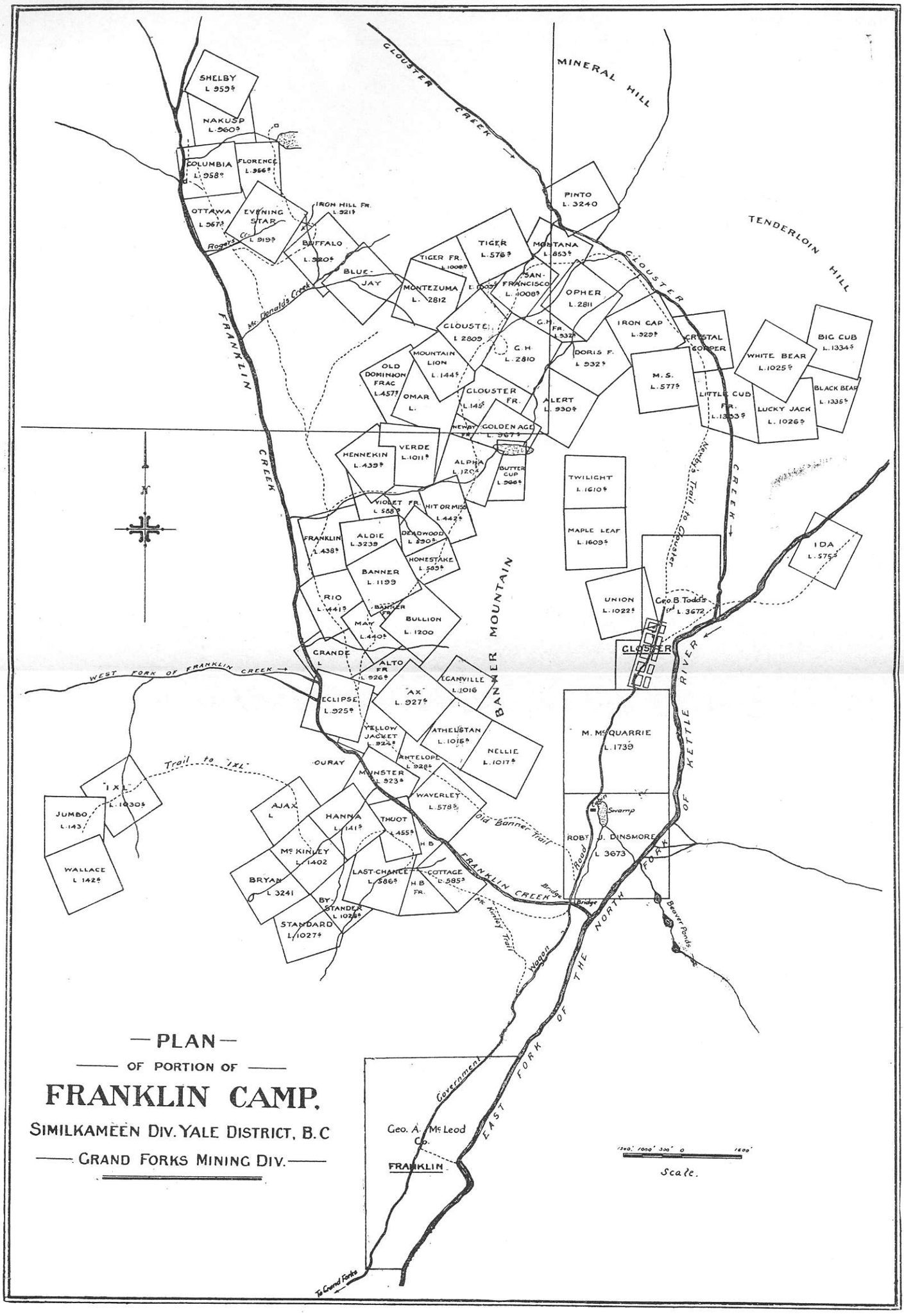

86 Million Feet
45 Million Feet
20 Million Feet
40 Million Feet
20 Million Feet
WEST FORK OF NORTH FORK KETTLE
Lower Limits
L 3636
L 2705
L 3635
49 30°
118 30°
K. R. RY
K. R. RY AS LOCATED
NORTH FORK
RY
Present Railroad Terminus
1st Rock Slide
2nd or Long Rock Slide
2700
2706
2698
7159
2699
CHRISTINA LAKE
Troy Cr
Sanderson Cr
Texas Cr
Mc Rae Cr
Day Cr
C. & W. RY
Moody Cr
Gilpin
KETTLE RIVER
U. S. A.
Snowball Cr
Mud Cr
Boulder Cr
Volcanic or Toronto Cr
Porphyry Cr
Meadowvill Cr
Parson Cr
Ochre Cr
Silver Queen
Morrell
Mc Farlane
Savage Cr
Ranch Cr
Franklin Cr
Franklin Townsite
Mc Kinley
Gloucester City
Gloucester Cr
Tenderloin Mountain
Maple Leaf
Union
Bonnet
Rice
Sweezy
Carroll's Mead
Gelinot Group
Meadow
Mineral Hill
RIVER
Midget Fork
Bowman Cr
Michigan Cr
LOWER A


WEST FORK OF NORTH FORK KETTLE RIVER
Lower Limits
Coalfields
140 Million Feet
30 miles above Forks
Upper Limits 45 miles above Forks.
45 Million Feet
45 Million Feet
20 Million Feet
40 Million Feet
L 3636
L 2705
L 3635
3634
K.R. RY AS LOCATED
Franklin Townsite
Franklin Cr
Tenderloin Mountain
Gloucester Cr
Gloucester City
KETTLE RIVER
McFarlane Cr
80 Million Feet
30 Million Feet
East Branch
20 Million Feet
Silver Queen
7159
7159
Bowman Cr
South Fork
Johnson Cr
Small Cr
LOWER ARROW LAKE
Boulder Cr
Canyon Cr
Bench Cr



— PLAN —

— OF PORTION OF —

FRANKLIN CAMP.

SIMILKAMEEN DIV. YALE DISTRICT, B.C

— GRAND FORKS MINING DIV. —