

GEOLOGICAL AND NATURAL HISTORY SURVEY OF CANADA.  
ALFRED R. C. SELWYN, C.M.G., LL.D., F.R.S., DIRECTOR.

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CHEMICAL CONTRIBUTIONS  
TO THE  
GEOLOGY OF CANADA,  
FROM THE  
LABORATORY OF THE SURVEY.

BY

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TO ALFRED R. C. SELWYN, C.M.G., LL.D., F.R.S.,

*Director of the Geological and Natural History Survey of Canada.*

SIR,—I beg to present, herewith, my report upon the work carried out in the Laboratory of this Survey during the interval comprised between the date of my last and December 31st, 1889. During that period, twelve hundred and thirty-seven specimens were received—brought or sent—either for identification, for information in regard to their economic value, or for analysis or assay. The results obtained were, in very many instances, of no special interest save to those immediately concerned, and have, in consequence, been excluded from the present report, in favor of such work as was deemed most likely to prove of general interest.

Of the work herein recorded—the analyses of the Natural Waters were conducted by Mr. Frank D. Adams, whilst the analyses of the Limestones and Dolomites, as likewise the Gold and Silver assays, were carried out by Mr. R. A. A. Johnston. These, as likewise some other analyses made by these gentlemen, have, in all instances, been duly credited to them—the work not otherwise particularized having been carried out by myself.

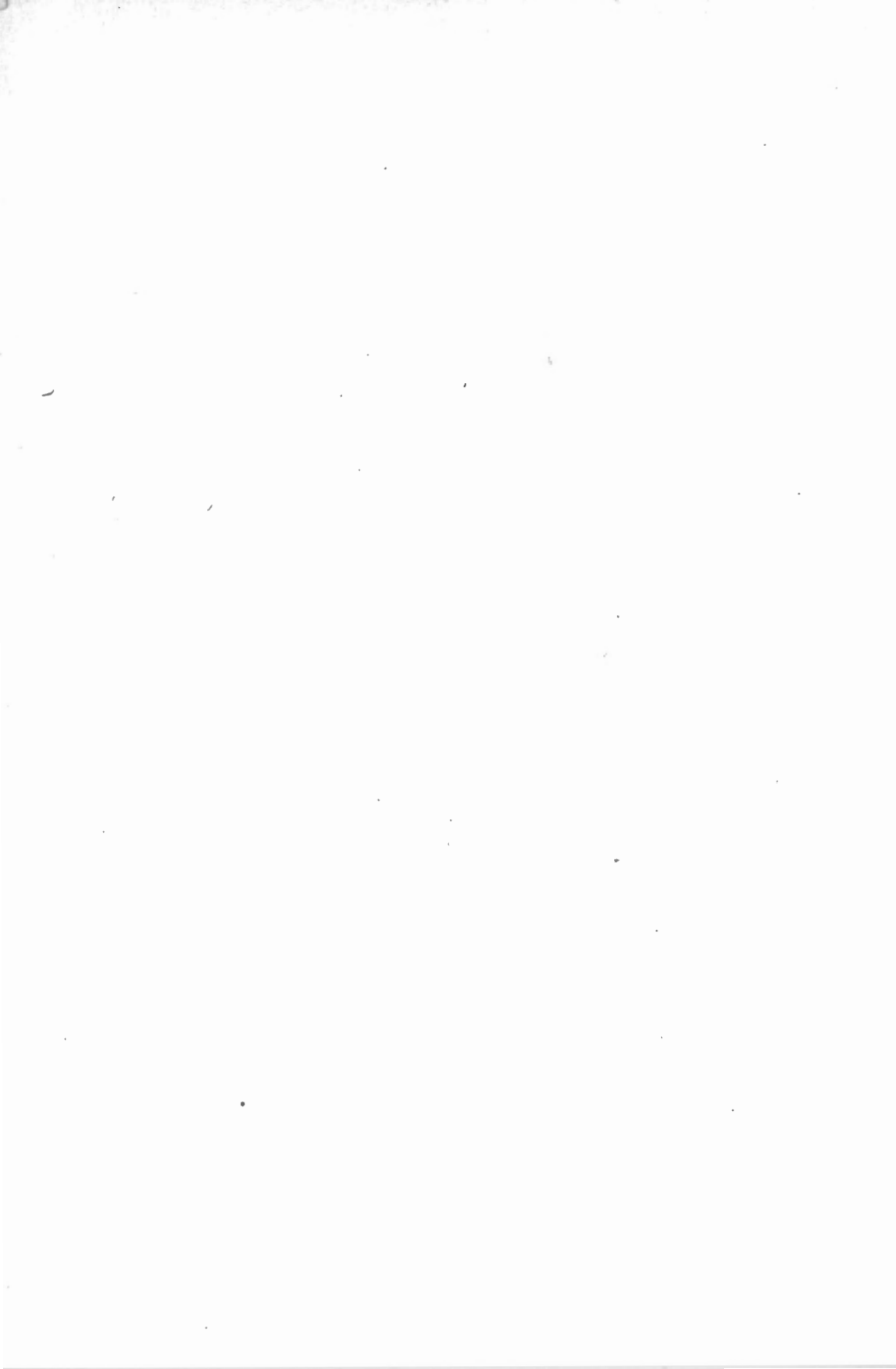
I have the honor to be,

Sir,

Your obedient servant,

G. CHRISTIAN HOFFMANN.

OTTAWA, September 30, 1890.



CHEMICAL CONTRIBUTIONS  
TO THE  
GEOLOGY OF CANADA,  
FROM THE  
LABORATORY OF THE SURVEY.

COALS AND LIGNITES.

[*In continuation of previous reports on this subject—Report of Progress, 1882-83-84, Part M.: Annual Report, 1885, Part M. and Annual Report, 1887-88, Part T.*]

72.—PEAT.—From St. Hubert, Chambly county, Province of Quebec. Peat from St. Hubert, Chambly county, P.Q.

Structure, somewhat dense; contained a rather large proportion of intermixed rootlets; color, clove-brown; dull; fracture, uneven; powder, brown; it communicates a deep brownish-red color to a boiling solution of caustic potash. This peat had been pulped, sticks and roots separated, and dried by exposure to the air. It had not been compressed. This specimen had been kept in the show-cases of the Museum for years, and may fairly be regarded as having been in a thoroughly air-dried condition.

Specific gravity, 0.7484 (temp. 15.5° C.)—weight of one solid cubic foot, calculated from the specific gravity, 46.77 pounds.

Analysis by fast coking gave:

Hygroscopic water.....	10.28
Volatile combustible matter.....	61.48
Fixed carbon.....	25.23
Ash.....	3.01
	100.00
Coke, per cent.....	28.24
Ratio of volatile combustible matter to fixed carbon	1 : 0.41

It yields a loosely fritted coke: the gases evolved during coking burnt with a pale yellow, slightly luminous, smokeless flame. The

ash has a pale brownish-yellow color,—it does not become agglutinated at a bright red heat, at a most intense red heat it forms a slaggy mass.

Lignitified wood from Swan River, Manitoba.

73.—LIGNITIFIED WOOD.—From Swan River, Manitoba, township 37, range 26, west of the principal meridian. Geological position—Cretaceous (Lower portion of Neobrara-Benton shales). Collected by Mr. J. B. Tyrrell.

Has a dense and wood-like structure; color black, with a faint brownish tinge; lustre dull, that of a freshly fractured surface resinous; fracture uneven, occasionally sub-conchoidal; hard and tough; does not soil the fingers; powder, brownish-black; it communicates a deep brownish-red color to a boiling solution of caustic potash; by exposure to the air becomes fissured.

Analysis by fast coking gave :

Hygroscopic water.....	9.66
Volatile combustible matter.....	43.16
Fixed carbon.....	43.61
Ash.....	3.57

100.00

Coke, per cent..... 47.18

Ratio of volatile combustible matter to fixed carbon 1:1.01

It yields a loosely fritted coke: the gases evolved during coking burnt with a yellowish, somewhat luminous, slightly smoky flame. The ash has a pale brownish-yellow color,—it is readily fusible at a bright red heat, running into a fluid slag.

Coal from head waters of Mill and Pincher Creeks, N.W.T.

74.—COAL.—From a seam near the head waters of Mill and Pincher Creeks, section 10, township 5, range 1, west of the fifth initial meridian, District of Alberta, North-west Territory. The seam—which was discovered by Andrew Christie in December 1887—has a thickness of about eight feet. Geological position,—Cretaceous. Received from Mr. N. F. M. Scobie.

Structure somewhat coarse lamellar—made up of layers of a greyish-black, somewhat dull, and jet black coal of brilliant lustre, with an occasional layer of mineral charcoal; shows slickensides; fracture irregular, that of the brighter layers not unfrequently conchoidal; hard and firm; powder brownish-black, almost black; it communicates a very pale brownish-yellow color to a boiling solution of caustic potash.

Analysis by fast coking gave :

Hygroscopic water....	1.99
Volatile combustible matter.....	20.88
Fixed carbon.....	61.87
Ash.....	15.26
	<hr/>
	100.00
	<hr/>

Coal from head  
waters of Mill  
and Pincher  
Creeks, N.W.T.,  
cont.

Coke, per cent..... 77.13  
Ratio of volatile combustible matter to fixed carbon 1 : 2.96

It yields a non-coherent coke: the gases evolved during coking burnt with a yellow, luminous, somewhat smoky flame. The ash, which is white, is infusible even at a most intense red heat.

75.—COAL.—From second crossing, Marten Creek, Crow Nest Pass, Rocky Mountains, British Columbia. There are said to be four seams of this particular material at this locality, having a thickness of respectively three, four, five and six feet. Geological position—Cretaceous, Kootanie series. Coal from Marten Creek, Rocky Mountains, B.C.

Structure compact—made up of more or less spherical or lenticular shaped nodular grains of pitch-black color and brilliant lustre, thickly disseminated through a matrix of dull, greyish-black, coaly matter. Does not soil the fingers; tough; sonorous; fracture, somewhat irregular, with a tendency to large conchoidal; powder brownish-black; it communicates a reddish-brown color to a boiling solution of caustic potash. Takes fire in a lamp flame, burning with a yellow, luminous flame which, however, dies out almost immediately after withdrawal from the source of heat. Resists exposure to the air. From a microscopic examination of thin slices of this coal it is inferred that the aforementioned nodular grains consist of an altered resinous matter.

Analyses by slow and fast coking gave:

	Slow coking.	Fast coking.
Hygroscopic water.....	2.10.....	2.10
Volatile combustible matter..	44.41.....	57.71
Fixed carbon.....	43.63.....	30.33
Ash.....	9.86.....	9.86
	<hr/>	<hr/>
	100.00	100.00
	<hr/>	<hr/>
Coke, per cent.....	53.49.....	40.19
Ratio of volatile combustible matter to fixed carbon.....	1:0.98.....	1:0.52

Coal from Mar-  
ten Creek, Roc-  
ky Mountains,  
B.C., cont.

It yields—by slow coking, a bulky, coherent, highly vesicular coke—by fast coking, a firm and lustrous coke in concentric layers, in which the form of the particles of coal from which it has been derived is entirely obliterated, and of about the same, or if anything less, bulk than the original coal. When heated in a covered crucible it produces a very large amount of gases which burn with a yellow, luminous, very smoky flame. Color of the ash, pale reddish-white—when exposed to a bright red heat it remains unaffected, at a most intense red heat it becomes slightly sintered.

This material constitutes an excellent gas-coal, not only by reason of the large amount of volatile combustible matter it is capable of affording—in which respect it is superior to a very large number of cannel coals which are employed for gas-making—but also from the fact that this would appear to be of superior quality for illuminating purposes.

Anthracite  
from Graham  
Island, Queen  
Charlotte  
Islands, B.C.

76.—ANTHRACITE.—From Hooper Creek or Nicholson's Tunnel, Cowgitz, on Skidegate Channel, southern end of Graham Island, Queen Charlotte Islands, British Columbia. Main seam. Geological position—Cretaceous.

Structure, compact; it is, here and there, intersected by films of calcite; color, velvet-black; lustre, bright; brittle; fracture, sub-conchoidal; does not soil the fingers; powder greyish-black, almost black; it communicates only a just perceptible yellowish tinge to a boiling solution of caustic potash; when suddenly heated, decrepitates slightly.

Specific gravity, 1.5027 (temp. 15.5° C.)—Weight of one solid cubic foot, calculated from the specific gravity, 93.92 pounds.

Analysis by fast coking gave :

Hygroscopic water.....	1.99
Volatile combustible matter.....	7.65
Fixed carbon.....	80.62
Ash.....	9.74
	100.00
Coke, per cent.....	90.36
Ratio of volatile combustible matter to fixed carbon	1:10.54

It yields a non-coherent coke. When heated in a covered crucible it evolves but a small amount of gases which burn with a slightly yellowish, smokeless flame of feeble luminosity. The ash, which has a reddish-white color, does not agglutinate even at a most intense red heat.



## ON THE HYGROSCOPICITY OF CERTAIN CANADIAN FOSSIL FUELS.

*Introductory.*—My paper on this subject, as published in the *Transactions of the Royal Society of Canada*—Vol. vii, (1889), sec. iii, p. 41,—is accompanied by an extended table giving locality of occurrence, a mineralogical description and results of proximate analyses of the various fuels experimented on. As this table is here unavoidably omitted, another has been substituted for it which, however, is limited to showing the percentage of water contained in the fuels at the time of experiment, their hygrosco-  
 picity of certain Canadian fossil fuels.  
 plicity and behaviour with potash solution.

Ultimate analyses of some of the lignites, lignitic coals and coals as also the calorific power—as determined by Thompson's calorimeter—of very many of them, together with generalizations on the physical and chemical characters and applications of the fuels in question, will be found in my report on the *Coals and Lignites of the North-West Territory*, which constitutes Part M. of *Report of Progress of the Geological and Natural History Survey of Canada*, 1882-83-84.

The experiments, in this connection, here recorded, and which were conducted upon material in all stages of alteration, ranging from surface peat to anthracite, were all carried out under precisely similar conditions.

The various fuels were all reduced to as near as possible the same state of mechanical division, having been ground just sufficiently fine to allow of their passing a sieve of ninety holes to the linear inch. The material—of which, in each case, one gram and a-half was employed—was placed in low, broad, flat-bottomed, straight-sided, very light glass bottles, provided with accurately ground glass stoppers. In the drying experiments, the specially constructed staging—which carried thirty of these bottles—supported by glass legs, stood over a glass dish (almost equal in area to the mouth of the bell jar) containing strong sulphuric acid; the whole being covered by a bell jar with ground rim resting upon an accurately ground plate. In the absorption experiments the glass dish containing the sulphuric acid, was replaced by one containing a shallow stratum of water, over which were heaped shreds of filtering paper, and the bell jar enclosing the experiments was in turn covered by another of much larger dimensions—an arrangement which effectually prevented the deposition of dew. The temperature of the room (which was artificially heated—the work having been carried out during the winter months) in which the experiments were conducted, ranged from 65° to 70° F. The experiments were all made in duplicate—the two experiments with the same fuel being carried out, as affording a better check, on separate occasions.

Hygroscopicity  
of certain Cana-  
dian fossil  
fuels, cont.

In some preliminary experiments, fifteen of the lignites, in duplicate, were exposed to an absolutely dry atmosphere for 48 hours, at the expiration of which time they were found to have parted with the greater part of their moisture. They were then further exposed for consecutive periods of 36, 44, 68, 68, 48, and 42 hours, during which periods they incurred an additional loss (in each case the mean of the thirty experiments) of respectively 1.25, 0.84, 0.73, 0.59, 0.29, and 0.15 per cent. of water (the loss—taking the mean of the two experiments with each of the fifteen fuels—ranging from 0.92 to 1.66, 0.71 to 0.97, 0.51 to 0.80, 0.36 to 0.75, and 0.19 to 0.37 per cent.) or a total loss of 3.85 per cent. for the additional 306 hours. A still further exposure for consecutive periods of 93, 120, 70, and 90 hours, was attended by a further loss (in each case the mean of the thirty experiments) of respectively 0.48, 0.45, 0.15, and 0.19 per cent., or an aggregate loss of 1.27 per cent. for the 373 hours (additional to the previous 354 hours) exposure. The peat, which had already been submitted to an exposure of 354 hours, was further exposed for consecutive periods of 93, 120, 70, 90, and 48 hours, which resulted in an additional loss of respectively 0.53, 0.53, 0.16, 0.16, and 0.05 per cent., or for the total period of 421 hours (additional to the preceding 354 hours) a combined loss of 1.43 per cent. In like manner a lignitic coal which had previously been submitted to an exposure of 354 hours, was also further exposed for consecutive periods of 93, 120, and 70 hours, and with the result that it incurred an additional loss of respectively 0.34, 0.32, and 0.08 per cent., or for the total period of 283 hours (additional to the former 354 hours) an aggregate loss of 0.74 per cent.

The period of exposure—both in a dry and moist atmosphere—finally adopted, in all cases, was 354 hours, weighing at intervals of 190, 94, and 70 hours; and it was found that, during the last 70 hours of this exposure—

In a dry atmosphere, the loss incurred by the—

Lignites . . . . .	ranged from 0.33 to 0.58 p.c.,	the average loss being 0.42 p.c.
Lignitic coals . . . . .	“ “ 0.13 to 0.26 “	“ “ “ 0.20 “
Coals . . . . .	“ “ 0.02 to 0.10 “	“ “ “ 0.05 “
Semi-anthracites. “ “	0.01 to 0.02 “	
Anthracite . . . . .	amounted to 0.05 p.c.	

In a moist atmosphere, the amount of water re-absorbed by the—

Lignites . . . . .	ranged from 0.26 to 0.85 p.c.,	the average gain being 0.55 p.c.
Lignitic coals . . . . .	“ “ 0.07 to 0.26 “	“ “ “ 0.19 “
Coals . . . . .	“ “ 0.02 to 0.12 “	“ “ “ 0.07 “
Semi-anthracites. “ “	0.02 to 0.04 “	“ “ “ 0.03 “
Anthracite . . . . .	amounted to 0.06 per cent.	

The peat and anthracitic coal comported themselves, in both above regards, in much the same manner as a lignite and coal respectively. Hygroscopicity  
of certain Cana-  
dian fossil  
fuels, cont.

It will be observed that there is a remarkably close agreement in the amounts of water lost and re-absorbed by each of the respective varieties of fuel during the last 70 of the 354 hours exposure, and that the amount of this loss and re-absorption is (apart from the anthracite) proportionate to the degree of alteration of the fuel—it being greatest in the lignites, and least in the semi-anthracites.

From the above results, coupled with those obtained in the preliminary experiments, it is evident, that beyond a certain point, the lignites and lignitic coals part with their water but very slowly, so that even after an exposure of 354 hours to an absolutely dry atmosphere, these yet retain a certain amount of water removable by a yet more protracted exposure. The coals and semi-anthracites, on the other hand, may fairly be regarded as dry after such period of exposure—indeed, it was found that, in many instances, the semi-anthracites and more altered coals had, during the last 70 hours, suffered no alteration in weight.

In the accompanying table the various fuels have been arranged in the order of their diminishing hygroscopicity. On referring to the same, it will be seen that the capacity for retaining, and with it that for re-absorbing, water varies with the degree of alteration which the fuel has undergone—it being most pronounced in the lignites, less so in the lignitic coals, and least in the coals. Thus, we find that the amount of water retained by the lignites<sup>1</sup> (and peat—which, in this regard, comports itself like a lignite) ranges from 2.50 to 5.00 (2.43 to 5.12) per cent., whilst that retained by the lignitic coals<sup>2</sup> ranges from 1.00 to 2.00 (1.10 to 2.09) per cent., and that retained by the coals<sup>3</sup> (together with the anthracitic coal, semi-anthracites, and anthracite, which, in this particular, behave like coals) from 0.10 to 1.00 (0.03 to 1.11) per cent., also—that the amount of water re-absorbed by the dry fuel, ranges, in the case of the lignites<sup>4</sup> (and peat, whose behaviour, in this regard, is precisely similar to that of a lignite,) from 10.00 to 14.50 (10.06 to 14.45) per cent., in that of the lignitic coals<sup>5</sup> from 6.50 to 9.00 (6.62 to 8.80) per cent., and in that of the coals (together with the

<sup>1</sup> Excluding No. 3, which stands out conspicuously from all the rest, in that it retained an exceptionally large amount of water.

<sup>2</sup> Omitting No. 33, which forms the connecting link between the lignites and lignitic coals, and retained a much larger percentage of water than any of the other fuels of the latter class.

<sup>3</sup> Disregarding No. 44, which forms a connecting link between the lignitic coals and coals, and retained a larger percentage of water than any of the other coals.

<sup>4</sup> Passing over No. 37, in which it was found to be exceptionally low.

<sup>5</sup> Omitting No. 42, which forms the connecting link between the lignitic coals and coals, and re-absorbed a somewhat smaller amount of water than any of the other lignitic coals.

Hygroscopicity of certain Canadian fossil fuels, cont.

anthracitic coal, semi-anthracites, and anthracite<sup>1</sup>) from 1.50 to 6.00 (1.66 to 6.19) per cent.; or briefly:—

Lignites . . . . . retain from 2.50 to 5.00, and re-absorb from 10.00 to 14.50 p.c. water  
 Lignitic coals. “ “ 1.00 to 2.00, “ “ 6.50 to 9.00 “ “  
 Coals . . . . . “ “ 0.10 to 1.00, “ “ 1.50 to 6.00 “ “

Comparing the results given in column 5, with those recorded in column 4, we find that the degree of alteration of the fuel as indicated by the potash reaction, is further evidenced by its relative hygroscopicity. Thus, we see that whereas—

The coloration imparted to a solution of caustic potash, by	The percentage of water re-absorbed ranges, in the case of
LIGNITES—is dark to intense brownish-red, and that by	LIGNITES . . . . . from 10.00 to 14.50
LIGNITIC COALS — most frequently brownish-yellow, but occasionally brownish-red, the	LIGNITIC COALS . . . . . “ 6.50 to 9.00
COALS—in many instances give no coloration, at other times a faint yellowish one, or one ranging between that and pale brownish-yellow.	COALS . . . . . “ 1.50 to 6.00

The considerations which led to the arrangement of the fuels, here treated of, under the headings mentioned, were alluded to in a previous paper (Report of Progress of the Geological and Natural History Survey of Canada, 1882-83-84, Part M, p. 5, et seq.). It was there shown that:—

1. Whereas the Lignites all have a greater or less tendency to disintegrate on exposure to the air; contain a large amount of water; communicate an intense coloration to a solution of caustic potash; yield (by fast coking) a non-coherent coke, and have a chemical composition very similar to that of many foreign lignites.

2. The Lignitic Coals show a greater disposition to resist<sup>2</sup> exposure to the air—being, on the whole, tolerably firm; contain much less water; do not impart so deep a coloration to a solution of caustic potash; show (by fast coking) a slight caking tendency, and in regard to chemical composition, occupy a position between true lignites and true bituminous coals.

<sup>1</sup>The anthracite, it will be observed, contrary to what might have been expected, re-absorbed far more water (the experiments were repeated, and with the same results) than any of the semi-anthracites or more altered coals, and in this regard, takes rank with some of the least altered of the latter; its capacity for retaining water is, however, as may be seen, very slight.

<sup>2</sup> Employed, throughout this paper, in the sense of “not breaking down.”



3. Whilst the Coals resist exposure to the air; are hard and firm; contain but a small proportion of water; communicate but a very slight, if any, coloration to a solution of caustic potash; yield (by fast coking), in the majority of instances, a good firm coke, and in respect to general appearance and chemical composition closely resemble some varieties of coal of the Carboniferous system.

#### NATURAL WATERS.

1.—Water from the so-called "potash" spring, Harrison Hot Springs, south end of Harrison Lake, British Columbia. Collected at the instance of Dr. A. R. C. Selwyn.

Natural waters.  
Water from  
'potash' spring,  
Harrison Hot  
Springs, B.C.

Temperature of the water at the spring, 120° F. An analysis of the same, by Mr. Frank D. Adams, afforded the undermentioned results:

At the time of examination it contained a small amount of suspended matter—this was removed by filtration; it consisted of a little organic and argillaceous matter, together with a little ferric hydrate and a trifling amount of very fine sand. The filtered water was perfectly colorless, even when viewed in a column two feet in length, and inodorous; taste, slightly saline: it exhibited a distinct alkaline reaction with reddened litmus paper, but did not affect the color of turmeric paper. The specific gravity of the water, at 15.5° C., was found to be 1001.00. 1000 parts, by weight, of the filtered water, at 15.5° C., contained:

Potassa.....	·0128
Soda.....	·3945
Lithia.....	undet.
Strontia.....	undet.
Lime.....	·1134
Magnesia.....	·0008
Alumina..	trace
Ferrous oxide (very small amount).....	undet.
Sulphuric acid.....	·3657
Carbonic acid.....	undet.
Silica.....	·0586
Chlorine.....	·2558
Organic matter.....	trace
	<hr/>
	1.2016
Less oxygen equivalent to chlorine.....	·0577
	<hr/>
	1.1439

The lithia and strontia were detected by means of the spectro-scope—strong and persistent lines being obtained in both instances. Iodine and bromine were also sought for, but not detected.

Water from  
'potash' spring,  
Harrison Hot  
Springs, B.C.,  
cont.

The foregoing acids and bases may reasonably be assumed to exist in the water in the following state of combination :

(The carbonate being calculated as mono-carbonate, and all the salts estimated as anhydrous.)

Chloride of potassium .....	·0202
"    sodium .....	·4059
"    lithium .....	undet.
Sulphate of soda .....	·4107
"    magnesia .....	·0024
"    lime .....	·2256
"    strontia .....	undet.
Carbonate of lime .....	·0366
"    iron (very small amount) .....	undet.
Alumina .....	trace
Silica .....	·0586
Organic matter .....	trace
	<hr/>
	1·1600

Total dissolved solid matter, by direct experiment,  
dried at 180° C. .... 1·1669

There was not enough of the water at the disposal of the operator to admit of the estimation of the lithia, strontia, iron and carbonic acid. The determination of these constituents would necessarily involve a trifling alteration in some of the above figures.

An imperial gallon of the water—at the aforementioned temperature—would contain :

(The carbonate being calculated as anhydrous bi-carbonate, and the salts without their water of crystallisation.)

	Grains.
Chloride of potassium .....	1·414
"    sodium .....	28·413
"    lithium .....	undet.
Sulphate of soda .....	28·749
"    magnesia .....	·168
"    lime .....	15·792
"    strontia .....	undet.
Bi-carbonate of lime .....	3·689
"    iron (very small amount) .....	undet.
Alumina .....	trace
Silica .....	4·102
Organic matter .....	trace
	<hr/>
	82·327

Water from  
'sulphur'  
spring, Harri-  
son Hot  
Springs, B.C.

2.—Water from the so-called "sulphur" spring, Harrison Hot Springs, south end of Harrison Lake, British Columbia. Collected at the instance of Dr. A. R. C. Selwyn.

Temperature of the water at the spring, 150° F. Mr. Frank D. Adams has made an analysis of this water, and with the following results:

Water from  
sulphur  
spring, Harri-  
son Hot  
Springs, B.C.,  
cont.

At the time of examination it contained a small amount of suspended matter, consisting of argillaceous matter, very fine sand, flocculent organic matter—apparently vegetable matter—and a little ferric hydrate: this was removed by filtration. The filtered water was colorless, even when viewed in a column two feet in length: taste faintly saline, somewhat flat: it reacted distinctly alkaline with red litmus paper, but did not affect the color of turmeric paper.

The specific gravity, at 15.5° C., was found to be 1001.13. 1000 parts, by weight, of the filtered water, at 15.5° C., contained:

Potassa .....	·0155
Soda.....	·4433
Lithia.....	undet.
Strontia .....	undet.
Lime.....	·1221
Magnesia.....	·0007
Alumina.....	trace
Sulphuric acid .....	·3922
Carbonic acid.....	undet.
Silica.....	·0662
Chlorine.....	·2829
	<hr/>
	1·3229
Less oxygen equivalent to chlorine.....	·0638
	<hr/>
	1·2591

The lithia and strontia were detected by means of the spectro-scope—the lines being, in both instances, very distinct. Iodine and bromine were also sought for, but not detected.

It may be reasonably assumed that the foregoing acids and bases exist in the water in the following state of combination:

(The carbonate being calculated as mono-carbonate, and all the salts estimated as anhydrous.)

Chloride of potassium.....	·0246
“ sodium.....	·4471
“ lithium.....	undet.
Sulphate of soda.....	·4723
“ magnesia.....	·0021
“ lime.....	·2120
“ strontia.....	undet.
Carbonate of lime.....	·0621
Alumina.....	trace
Silica.....	·0662
	<hr/>
	1·2864

Total dissolved solid matter, by direct experiment,  
dried at 180° C..... 1·3000



Water from sulphur spring, Harrison Hot Springs, B.C., cont.

The quantity of the water at the disposal of the operator was too limited to allow of his estimating the amounts of lithia, strontia and carbonic acid. The knowledge of their respective amounts would call for a slight alteration in some of the above figures.

An imperial gallon of the water, at 15.5° C., would contain :

(The carbonate being calculated as anhydrous bi-carbonate, and the salts without their water of crystallisation.)

	Grains.
Chloride of potassium .....	1.722
“ sodium .....	31.297
“ lithium.....	undet.
Sulphate of soda .....	33.061
“ magnesia. ....	.147
“ lime .....	14.840
“ strontia .....	undet.
Bi-carbonate of lime.....	6.259
Alumina.....	trace
Silica .....	4.634
	91.960

Water from a boring in the township of Otonabee, P.O

3.—Water from a boring on the west half of lot twenty-six, in the fourth range of Otonabee, Peterborough county, Ontario. It rises from the Trenton limestone.

The examination and analysis were conducted by Mr. Frank D. Adams.

On opening the bottles a slight, but decided, odor of petroleum was noticeable. The water contained a considerable amount of suspended matter. This was filtered off and examined—it consisted of argillaceous matter, very fine sand, partially decomposed fragments of wood, fragments of seed-cases and other vegetable matter, together with some carbonate of lime, small amounts of carbonates of magnesia and iron and a very small amount of sulphate of lime. The filtered water, when viewed in a column two feet in length, was found to have a faint brownish tinge. Taste, mildly saline. Lithia and strontia were detected by means of the spectroscope. Baryta was not sought for. The presence of iodine and bromine requires confirmation. The specific gravity of the water, at 15.5° C., was found to be 1003.91.

Its analysis gave as follows, for 1000 parts by weight:

Potassa .....	·0487
Soda ... ..	2·0364
Lime.....	·3492
Magnesia .....	·2022
Alumina.....	·0008
Ferrous oxide.....	·0031
Sulphuric acid.....	·0011
Carbonic acid (fixed) .....	·0931
"    (half-combined and free) .....	(*)
Silica .....	·0153
Chlorine .....	2·9858
Organic matter .....	trace
	<hr/>
	5·7357
Less oxygen equivalent to chlorine .....	·6736
	<hr/>
	5·0621

Water from a boring in the township of Otonabee, P.O., cont.

The foregoing acids and bases are most probably combined in the water as follows:

(Carbonates calculated as mono-carbonates, and all the salts estimated as anhydrous.)

Chloride of potassium.....	·0770
"    sodium .....	3·8403
"    calcium .....	·4088
"    magnesium .....	·4797
Sulphate of lime.....	·0019
Carbonate of lime.....	·2536
"    iron.....	·0050
Alumina.....	·0008
Silica .....	·0153
Organic matter.....	trace
	<hr/>
	5·0824
Total dissolved solid matter, by direct experiment, dried at 180° C. ....	5·0213

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\* The amount of total carbonic acid varied in different bottles—most probably due to faulty corking. In some bottles the amount found proved to be just about that required for the conversion of the mono-carbonates into bi-carbonates, whilst in others the amount found was appreciably in excess of that required for the formation of bi-carbonates.

Water from a boring in the township of Otonabee, P.O., cont.

An imperial gallon of the water would contain :

(Carbonates calculated as anhydrous bi-carbonates, and the salts without their water of crystallisation.)

	Grains.
Chloride of potassium .....	5.390
“ sodium .....	268.821
“ calcium .....	28.616
“ magnesium .....	33.579
Sulphate of lime.....	.133
Bi-carbonate of lime.....	25.564
“ iron.....	.483
Alumina.....	.056
Silica .....	1.071
Organic matter.....	trace
	363.713

Water from a boring at Maisonneuve, P.Q.

4.—Water from a boring on the property of Messrs. Viau & Frère at Maisonneuve, Hochelaga county, province of Quebec. The boring, which is in Cambro-Silurian strata, had, at the time of collection of the water, been carried to a depth of 1500 feet.

The examination and analysis were conducted by Mr. Frank D. Adams.

The sample of water sent for examination had, when received, a faint yet decided odor of sulphuretted hydrogen; it contained but a very trifling amount of sediment; color of the clear water, when viewed in a column two feet in length, light yellow; taste, mildly saline; reaction, faintly alkaline. The specific gravity, at 15.5° C., was found to be 1006.31. Total dissolved solid matter, by direct experiment, dried at 180° C., in 1000 parts, by weight, of the water—7.4129.

Its analysis gave as follows, for 1000 parts by weight :

Potassa .....	.0190
Soda .....	3.3899
Lithia .....	undet.
Lime .....	.0836
Strontia. ....	undet.
Magnesia .....	.1165
Ferrous oxide.....	undet.
Alumina .....	trace
Sulphuric acid.....	1.6636
Boric acid .....	undet.
Carbonic acid.....	.3819
Phosphoric acid .....	undet.
Chlorine .....	2.4623

Iodine .....	(*)
Bromine .....	undet.
Silica .....	·0135
Organic matter.....	undet.
	<u>8·1303</u>
Less oxygen equivalent to chlorine†.....	·5555
	<u>7·5748</u>
Sulphuretted hydrogen.....	·0098

Water from a  
boring at  
Maisonneuve,  
P.Q., cont.

In the absence of a knowledge of the respective amounts of the undetermined constituents, the remaining ones may be represented as being present in the following state of combination :

(Carbonates being calculated as mono-carbonates, and all the salts estimated as anhydrous.)

Chloride of potassium.....	·0301
“ sodium .....	4·0358
Sulphate of soda.....	2·8624
“ lime .....	·0867
Carbonate of lime .....	·0855
“ magnesia .....	·2447
Alumina.....	trace
Silica .....	·0135
	<u>7·3587</u>
Carbonic acid, half-combined.....	·1658
“ free.....	·0503
	<u>7·5748</u>

An imperial gallon of the water would contain :

(Carbonates calculated as anhydrous bi-carbonates, and all the salts without their water of crystallisation.)

	Grains.
Chloride of potassium.....	2·107
“ sodium .....	282·506
Sulphate of soda .....	200·368
“ lime .....	6·069
Bi-carbonate of lime.....	8·617
“ magnesia .....	26·103
Alumina .....	trace
Silica .....	·945
	<u>526·715</u>
Carbonic acid, free.....	3·521
	<u>530·236</u>

\* The iodine was subsequently estimated and found to equal 0·000027 parts per 1000.

† That equivalent to bromine and iodine, not ascertained.

Water from a pond in the parish of Pennfield, N.B.

5.—This, and the following water—the one from a pond, the other from a spring—are from the parish of Pennfield, Charlotte county, New Brunswick. They were examined for Mr. W. F. Todd.

Water from the pond. The sample received was clear and colorless. A qualitative analysis of the same afforded Mr. R. A. A. Johnston the following results:

Soda.....	very small quantity.
Lime.....	very small quantity.
Magnesia.....	very small quantity.
Ferrous oxide.....	trace.
Sulphuric acid.....	very small quantity.
Chlorine.....	small quantity.

The water was accompanied by a sample of material which is said to form a sediment, of from one to three feet and a-half in thickness, at the bottom of the pond. This on examination was found to consist of infusorial earth.

Water from a spring in the parish of Pennfield, N.B.

6.—Water from the spring on hill side. The water had a pale brownish yellow color. A qualitative analysis, by Mr. R. A. A. Johnston, showed it to contain:

Soda.....	trace.
Lime.....	trace.
Ferrous oxide.....	small quantity.
Sulphuric acid.....	trace.
Chlorine.....	trace.
Silica.....	small quantity.
Organic matter.....	small quantity.

The iron exists in this water in combination with an organic acid. The clear water by exposure to the air soon becomes turbid, and deposits a reddish-brown precipitate of ochre, and if the exposure is sufficiently protracted the iron separates so completely that no trace of the same can be detected in the water.

This water was accompanied by a sample of reddish-brown slime, which was stated to be deposited by the water in considerable quantity. This slime consisted of hydrated peroxide of iron, with a trace of manganese, a small amount of alumina, a very appreciable amount of organic matter and a trace of phosphoric acid.

## IRON ORES.

Iron ores.

- 1.—RED HEMATITE, from the property of Mr. Joseph L. McNeely, lot fourteen, range eleven, of the township of Beckwith, Lanark county, province of Ontario. Hematite from the township of Beckwith, P.O. Geological position—Calciferous.

Color, dark-greyish reddish-brown: in parts coated with a purplish to brownish-red unctuous powder: streak, cherry red: fracture, uneven and minutely crystalline: contains a little calcite and other minerals disseminated through it.

Its analysis afforded me the following results:

Ferric oxide .....	81.671
Manganous oxide.....	.081
Potassa .....	.020
Soda .....	.069
Lime .....	1.487
Magnesia .....	.046
Alumina .....	.913
Silica .....	13.853
Carbonic acid.....	.651
Phosphoric acid .....	.245
Sulphuric acid.....	.028
Titanic acid.....	none
Water, hygroscopic.....	.333
"    combined .....	.665
	<hr/>
	100.062
Metallic iron.....	57.170
Phosphorus.....	.107
Sulphur.....	.011

The sulphuric acid is, apparently, present as sulphate of lime.

- 2.—RED HEMATITE, from lot twenty-four, range eleven, of the township of Darling, Lanark county, province of Ontario. Examined for Mr. W. J. Morris. Hematite from the township of Darling, P.O.

A partial analysis, by Mr. Frank D. Adams, gave:

Ferric oxide.....	92.602 per cent.
Phosphoric acid .....	.538 "
Sulphuric acid.....	.010 "
	<hr/>
Metallic iron.....	64.821 "
Phosphorus.....	.235 "
Sulphur .....	.004 "

- 3.—RED HEMATITE. A compact red hematite from location 280 R., about three-quarters of a mile west of Loon Lake, district of Algoma, province of Ontario. Collected by Dr. A. C. Lawson. Hematite from near Loon Lake, P.O.

Iron Ores, cont.      Agreeably with the results of determinations made by Mr. R. A. A. Johnston, it contained :

Hematite from near Loon Lake, P.O., cont.

Metallic iron.....	57.25 per cent.
Insoluble matter.....	16.41   “
Titanic acid.....	none

Magnetite from the township of North Crosby, P.O. 4.—**MAGNETITE**, from the property of Mr. E. Quinn, lot twelve, range two, of the township of North Crosby, Leeds county, province of Ontario. Examined for Mr. J. H. Whelan.

Determinations by Mr. R. A. A. Johnston gave :

Metallic iron.....	58.77 per cent.
Insoluble matter.....	7.28   “
Titanic acid.....	none

Magnetite from vicinity of Kaministiquia station, P.O. 5.—**MAGNETITE**. A very fine crystalline magnetite from the vicinity of Kaministiquia station, on the line of the Canadian Pacific Railway, district of Thunder Bay, province of Ontario. Collected by Dr. A. R. C. Selwyn.

Mr. R. A. A. Johnston found it to contain :

Metallic iron.....	31.46 per cent.
Insoluble matter.....	45.42   “
Titanic acid.....	none

Magnetite from Gunflint Lake, P.O. 6.—**MAGNETITE**. A fine-grained, compact magnetite from McKinley's location, north shore of Gunflint Lake, about seventy miles southwest of Port Arthur, district of Algoma, province of Ontario. Collected by Dr. A. C. Lawson.

Determinations by Mr. R. A. A. Johnston gave :

Metallic iron.....	61.08 per cent.
Insoluble matter.....	19.65   “
Titanic acid.....	none.

Magnetite from 'Milner' mine, Clementsport, N.S. 7.—**MAGNETITE**. This, and the following specimen are from Clementsport, Annapolis county, province of Nova Scotia. The analyses were conducted by Mr. Frank D. Adams.

Sample of ore from the "Milner" mine. It consisted of an association of fine crystalline magnetite and a dark-grey shale. Analysis gave :

Metallic iron.....	32.189 per cent.
Phosphorus.....	.220   “
Sulphur.....	.168   “
Insoluble matter.....	33.300   “
Titanic acid.....	none.

- 8.—Sample of ore from the "Potter" mine. Consisted of an association of a fine crystalline magnetite and a dark-grey shale. It was found to contain:

Metallic iron .....	42.102	per cent.
Phosphorus.....	.716	"
Sulphur .....	.180	"
Insoluble matter.....	23.073	"
Titanic acid.....	none.	

Alluding to the above deposits, Mr. Edward Gilpin, the Inspector of Mines for the province, says (The Mines and Mineral Lands of Nova Scotia): "There are at Clementsport two beds of ore running nearly east and west. The highest of these, the 'Milner' bed, varies in thickness from two to four feet: it yields about thirty-three per cent. of metallic iron. The 'Potter' bed presents the following section where worked—ore, three feet; slate, two feet six inches; ore, three feet six inches. It is stated to yield fifteen per cent. more iron than the ore from the Milner bed." The statement in regard to percentage of iron is pretty well borne out by above analyses.

- 9.—SIDERITE. The deposit from which this sample was taken extends over mining locations Nos. 22, 23, 24, 25 and 26 of the township of McIntyre, district of Thunder Bay, province of Ontario.

The material composing the sample consisted of a fine-grained greyish siderite, often distinctly banded, the bands varying somewhat in color. Some of the fragments were highly quartzose.

A partial analysis, by Mr. Frank D. Adams, gave as follows:

Ferrous oxide.....	36.145	per cent.
Manganous oxide.....	.710	"
Lime .....	5.279	"
Magnesia .....	3.619	"
Phosphoric acid .....	.100	"
Sulphuric acid.....	.313	"
Insoluble matter.....	23.787	"
Metallic iron .....	28.113	"
Phosphorus.....	.044	"
Sulphur .....	.125	"

A previous sample of ore from this deposit was found by Mr. R. A. A. Johnston to contain 32.86 per cent. of metallic iron.



Limestones and dolomites.

LIMESTONES AND DOLOMITES.

The following analyses of limestones and dolomites are the first of a series, which it is proposed to carry out in connection with an enquiry into the individual merits of a number of these stones—from various localities—for structural purposes and suitability as a flux in smelting iron and lead ores or as a glass-making material. The analyses will, later on, be supplemented by determinations of their density, absorbitive power, crushing strength and elasticity, etc.

Limestone from Mallette's quarry, Pointe Claire, P.Q.

1.—LIMESTONE. From Mallette's quarry, Pointe Claire, Jacques Cartier county, province of Quebec. The beds of limestone quarried are from ten inches to four feet thick. Geological position—Birdseye and Black River formation, Cambro-Silurian.

Structure, compact; contains, in parts, a few inclusions of crystalline calcite; color, very dark brownish-grey.

An analysis, by Mr. R. A. A. Johnston, showed it to contain :

(After drying at 100° C.—Hygroscopic water=0.14 per cent.)

Carbonate of lime .....	95.89	
"    magnesia .....	0.68	
"    iron .....	0.26	
Alumina .....	0.02	} 2.83
Silica, soluble .....	0.04	
Insoluble matter .....	2.77	
Organic matter .....	0.16	

99.82

This stone was used in the construction of the piers of the western half of the Victoria Bridge at Montreal, the blocks obtained for this purpose weighing from four to seven tons each.

Limestone from the township of Ramsay, P.O.

2.—LIMESTONE. From lot twenty-four, range nine, of the township of Ramsay, Lanark county, province of Ontario. The quarry from which this stone was taken is situated close to the Indian River, where a great thickness of this limestone occurs. Geological position—Laurentian.

Structure, somewhat coarsely crystalline: color, faintly bluish-greyish-white. It contains, here and there, a minute grain of pale yellow chondrodite, and numerous small scales of graphite.

It was found—by Mr. R. A. A. Johnston—to have the following composition :

(After drying at 100° C.—Hygroscopic water=0.07 per cent.)

Carbonate of lime.....	91.63	
"    magnesia .....	6.61	
"    iron.....	0.41	
Alumina .....	0.14	} 1.32
Silica, soluble .....	0.05	
Insoluble matter .....	1.13	
		99.97

Limestones and dolomites, cont.

Limestone from the township of Ramsay, P.O., cont.

This stone has been extensively quarried for the manufacture of lime, and small quantities have been employed in Pakenham and Almonte for foundations and facings of buildings.

3.—LIMESTONE. Occurs on lots nine and ten of the sixth range of the township of Ramsay, Lanark county, province of Ontario. The same stone also occurs on lots nine and ten of the fourth and fifth ranges, and on lot sixteen of the second range, and many other places in this township. Geological position—Laurentian.

Limestone from the township of Ramsay, P.O.

Structure, coarsely crystalline: color, white but not pure white. It contains an occasional grain of pale yellow chondrodite, and, here and there, a scale of graphite.

Agreeably with the results of an analysis—conducted by Mr. R. A. A. Johnston—it contained:

(After drying at 100° C.—Hygroscopic water=0.09 per cent.)

Carbonate of lime .....	90.05	
"    magnesia .....	6.51	
"    iron .....	0.42	
Alumina .....	—	} 3.32
Silica, soluble .....	0.06	
Insoluble matter.....	3.26	
		100.30

This stone has been extensively used for the manufacture of lime.

4.—LIMESTONE. From the Bath Road quarry, Bath road, Kingston, Frontenac county, province of Ontario. Geological position—Birdseye and Black River formation, Cambro-Silurian.

Limestone from the Bath Road quarry, Kingston, P.O.

Structure, compact—containing, in parts, some small inclusions of crystalline calcite: color, somewhat dark bluish-grey.

Mr. R. A. A. Johnston has made an analysis of this stone, and with the following results:

Limestones and dolomites, cont.

(After drying at 100° C.—Hygroscopic water=0.16 per cent.)

Carbonate of lime .....	90.07	
“        magnesia .....	2.52	
“        iron.....	0.26	
Alumina.....	0.14	} 7.72
Silica, soluble.....	0.12	
Insoluble matter .....	7.46	
Organic matter.....	0.27	
		100.84

Limestone from the Bath Road quarry, Kingston, P.O., cont.

This stone is largely used in the city of Kingston for building purposes.

Limestone from the Wolfe Island quarry, Wolfe Island, P.O.

5.—LIMESTONE. From the Wolfe Island quarry, Wolfe Island, opposite Kingston Harbor, Frontenac county, province of Ontario. From the three-foot bed. Geological position—Birdseye and Black River formation, Cambro-Silurian.

Structure, compact—traversed by an occasional very thin seam of crystalline calcite: color, dark brownish-grey.

An analysis—conducted by Mr. R. A. A. Johnston—gave as follows:

(After drying at 100° C.—Hygroscopic water=0.12 per cent.)

Carbonate of lime .....	94.81	
“        magnesia.....	2.33	
“        iron .....	0.29	
Alumina.....	—	} 3.02
Silica, soluble .....	0.12	
Insoluble matter.....	2.90	
Organic matter.....	0.28	
		100.73

This stone has been used in several public works—viz., Fern’s Point lock; piers and abutments of Kingston Mills; Grand Trunk Railway bridges, and for heavy base courses in several public buildings—and these, after a lapse of some forty years, are said to be in as good a state of preservation as when first built.

Dolomite from the township of Aldfield, P.Q.

6.—DOLOMITE. From lot ten, range four, of the township of Aldfield, Pontiac county, province of Quebec. Geological position—Laurentian.

Structure, coarsely crystalline: color, white. It contains, here and there, a few grains of honey-yellow chondrodite.

An analysis—by Mr. R. A. A. Johnston—showed it to have the following composition:

(After drying at 100° C.—Hygroscopic water=0.05 per cent.)

Carbonate of lime .....	53.60	
“       magnesia.....	46.01	
“       iron .....	0.17	
“       manganese .....	0.14	
Alumina .....	0.11	} 0.32
Silica, soluble .....	—	
Insoluble matter ....	0.21	
		100.24

Dolomite from  
the township of  
Aldfield, P.Q.,  
cont.

7.—**DOLOMITE.** From lot twenty-seven, range nine, of the township of Dolomite from  
Barrie, Addington county, province of Ontario. Geological posi- the township of  
tion—Laurentian. Barrie, P.O.

Structure, very fine crystalline: color, pure white.

An analysis—by Mr. R. A. A. Johnston—gave the following results:

(After drying at 100° C.—Hygroscopic water=0.07 per cent.)

Carbonate of lime .....	54.02	
“       magnesia .....	42.63	
“       iron .....	0.64	
Alumina .....	—	} 2.52
Silica, soluble .....	—	
Insoluble matter.....	2.52	
		99.81

## MISCELLANEOUS MINERALS.

Miscellaneous  
minerals.

- 1.—**BOURNONITE.** Was identified by Mr. R. A. A. Johnston in samples Bournonite.  
of ore—sent to the Survey for assay—from the following localities  
in the province of Ontario, viz., lot 18, range 8, of the township of  
Marmora (Hastings Co.), the material consisting of bournonite, in  
association with small quantities of chalcopyrite and pyrite in a  
gangue of quartz,—from the east-half of lot 22, range 3, and west-  
half of lot 22, range 4, of the township of Darling (Lanark Co.),  
the material from the first of these two localities consisting of  
bournonite disseminated through a somewhat fine crystalline dolo-  
mite, while that from the last mentioned consisted of bournonite  
with some chalcopyrite in a gangue of white sub translucent  
quartz,—and from the “Moore” mine, lot 17, range 5, of the  
township of Madoc (Hastings Co.), the material consisting of  
bournonite in a gangue of somewhat coarse crystalline dolomite.
- 2.—**CYANITE.** This mineral—the occurrence of which, in Canada, was Cyanite.  
first noticed by Dr. A. R. C. Selwyn, it having been found by him

Miscellaneous minerals, cont.

on the North Thompson River, British Columbia (Anal., G. C. Hoffmann, Rep. Geol. Can., 1878-79, p. 1 H.)—has quite recently (August, 1890) been met with by Mr. A. E. Barlow, in a pegmatite vein cutting Laurentian gneiss, on lot 9, range 3, of the township of Dryden, district of Nipissing, province of Ontario.

Hyalite.

3.—HYALITE. Good specimens of this mineral were obtained by Mr. J. McEvoy, from cavities in a dark grey foliated basalt occurring near Hih-hūm Lake, south of Loon Lake, British Columbia.

Lepidomelane.

4.—LEPIDOMELANE. Was recognized by Mr. R. A. A. Johnston in a sample of ore from the township of Marmora, Hastings county, province of Ontario. The material consisted of a fine granular arsenopyrite, through which was disseminated a somewhat large amount of lepidomelane and a little white sub-translucent quartz.

Prase.

5.—PRASE. A breccia, consisting of angular fragments of prase, cemented together with white chalcedony, was found by Dr. G. M. Dawson, filling cavities in Tertiary basaltic rocks in mountains at head of Nicoamen River, British Columbia.

Gold and Silver assays.

GOLD AND SILVER ASSAYS.

*These were, without exception, all conducted by Mr. R. A. A. Johnston.*

Province of Nova Scotia.

PROVINCE OF NOVA SCOTIA.

1.—From Musquodoboit River, near Musquodoboit Harbor, Halifax county. Examined for Dr. W. H. Weeks.

Galena, together with a very trifling amount of copper pyrites in a gangue of white sub-translucent quartz. The gangue constituted but a very small proportion of the whole. Weight of sample, two ounces. Assays gave:

Gold..... trace.  
Silver..... 5.833 ounces to the ton of 2,000 lbs.

Province of New Brunswick.

PROVINCE OF NEW BRUNSWICK.

2.—From Fenton's Lake, six miles east of Mineral Vale, parish of Alma, Albert county. White sub-translucent quartz, carrying very appreciable quantities of galena and a small amount of copper pyrites. Weight of samples, twelve ounces. It contained:

Gold..... none.  
Silver..... 6.197 ounces to the ton of 2,000 lbs.

- 3.—From the parish of Waterford, Kings county. Examined for Mr. Gold and Silver assays, cont.  
E. A. Charters.

An association of quartz and a steatitic mineral with, here and Province of New Brunswick, cont.  
there, a little specular iron and a few grains of iron pyrites.  
Weight of sample, fourteen ounces.

It contained neither gold nor silver.

- 4.—From a vein between Mill Stream and Nigadoo River, parish of Beresford, Gloucester county. Sent by Mr. W. R. Payne.

A siliceous schistose rock carrying considerable quantities of iron pyrites and copper pyrites. Weight of sample, four ounces and a-half. It was found to contain :

Gold..... trace.  
Silver..... 0.466 of an ounce to the ton of 2,000 lbs.

PROVINCE OF QUEBEC.

Province of Quebec.

- 5.—This, and the following specimen are from the township of Courcelles, Berthier county. Examined for Mr. G. Beaucage.

Material from shaft, at a depth of four feet. A garnetiferous gneiss, through which was disseminated a few grains of iron pyrites. The sample, which consisted of twenty-five fragments, weighed twelve pounds thirteen ounces.

It contained neither gold nor silver.

- 6.—Material from shaft, at a depth of twenty-five feet. An association of gneiss, quartzite, calcite and a little barite—the first mentioned was traversed by bands of serpentine. This sample contained an appreciable amount of iron pyrites. The sample, which consisted of twenty-nine fragments, weighed sixteen pounds nine ounces.

It contained neither gold nor silver.

- 7.—From lot nineteen, range five, of the township of Buckingham, Ottawa county. Examined for Mr. L. P. Labouglie.

Consisted of iron pyrites, thickly coated with hydrated peroxide of iron. Weight of sample, one pound ten ounces. Assays gave:

Gold ..... trace.  
Silver ..... none.

For results of assay of a previous sample of material from this locality, see Annual Report Geol. Can., vol. iii, p. 29 t, 1887.

Gold and Silver assays, cont.  
Province of Quebec, cont.

8.—From lot ten, range four, of the township of Calumet, Pontiac county. Examined for Mr. W. A. Allan.

It consisted of a somewhat fine crystalline galena disseminated through a gangue of quartz and calcite. Weight of sample, three ounces and a-half. It was found to contain:

Gold..... trace.  
Silver..... 16.406 ounces to the ton of 2,000 lbs.

9.—From Wright's mine, block A and B of range one of the township of Duhamel (east shore of Lake Temiscamingue, nine miles and a-half north of Fort Temiscamingue), Pontiac county. Taken from a depth of about thirty feet.

A somewhat coarse crystalline galena, together with small quantities of iron pyrites, in a gangue which was for the most part felspathic, but also included a little dolomite. The sample, which consisted of several fragments, weighed ten ounces and a-half. Assays showed it to contain:

Gold..... none.  
Silver ..... 0.862 of an ounce to the ton of 2,000 lbs.

10.—From Little River, one mile up from Lake Temiscamingue, or three miles in a straight line south-east of Hudson Bay Company's Post, Pontiac county. Received from Dr. R. Bell.

A light to dark greyish, opaque quartz, carrying small quantities of iron pyrites. Weight of sample, two pounds ten ounces.

It contained neither gold nor silver.

Province of Ontario.

PROVINCE OF ONTARIO.

*Of the specimens from this province Nos. 13-42 inc., were collected by Mr. E. Coste: Nos. 46-51 inc., and 56-74 inc., were received from Dr. R. Bell: Nos. 52-55 inc. and 76-81 inc., were collected by Mr. A. E. Barlow, and 93-100 inc., were collected by Dr. A. C. Lawson.*

11.—From lot two, range fifteen, of the township of Monteagle, Hastings county. This, and the following specimen were examined for Mr. W. A. Allan.

Consisted of magnetic pyrites in association with a little hornblende. Weight of sample, five ounces.

It contained neither gold nor silver.

12.—From lot thirty-two, range two, of the township of Marmora, Hastings county.

It consisted of arsenical pyrites in a gangue of quartz. Weight of sample, five ounces. Assays gave:

Gold and Silver assays, cont.  
Province of Ontario, cont.

Gold..... trace.  
Silver ..... none.

13.—From lot six, range nine, of the township of Marmora, Hastings county. Vein east of creek.

A white sub-translucent quartz, carrying a somewhat large amount of iron pyrites. Weight of sample, one pound thirteen ounces.

It contained neither gold nor silver.

14.—From vein on Capt. O'Neill's property, lot seven, range eight, of the township of Marmora, Hastings county.

Arsenical pyrites in a gangue of greyish-white to white sub-translucent quartz. Weight of sample, two pounds seven ounces. Assays gave:

Gold..... 0.467 of an ounce to the ton of 2,000 lbs.  
Silver . ..... none.

15.—From the Severn mine, lot eight, range eight, of the township of Marmora, Hastings county.

Arsenical pyrites in a gangue of calcite and hornblende. Weight of sample, one pound eight ounces. It was found to contain:

Gold..... 0.175 of an ounce to the ton of 2,000 lbs.  
Silver ..... none.

16.—From the middle vein, O'Neill shaft, lot nine, range eight, of the township of Marmora, Hastings county.

Arsenical pyrites, together with a little iron pyrites, through which was disseminated a small quantity of a faintly greenish-white chloritic mineral, a little quartz and mica. It was, in parts, coated with hydrated peroxide of iron. Weight of sample, one pound eight ounces. Assays showed it to contain:

Gold..... 2.392 ounces to the ton of 2,000 lbs.  
Silver..... none.

17.—From the middle vein, shaft No. 2, lot nine, range eight, of the township of Marmora, Hastings county.

A slightly weathered fragment of arsenical pyrites. Weight of sample, six ounces. It was found to contain:

Gold..... 1.400 ounce to the ton of 2,000 lbs.  
Silver..... none.



Gold and Silver assays, cont. 18.—From the middle vein, shaft No. 3, lot nine, range eight, of the township of Marmora, Hastings county.

Province of Ontario, cont.

A coarse crystalline arsenical pyrites. Weight of sample, fourteen ounces. It contained :

Gold..... 1·633 ounce to the ton of 2,000 lbs.  
Silver..... none.

19.—From the middle vein, shaft No. 4, lot nine, range eight, of the township of Marmora, Hastings county.

An association of arsenical pyrites with a small amount of iron pyrites. The whole was more or less coated with hydrated peroxide of iron. Weight of sample, one pound seven ounces. It was found on assay to contain :

Gold..... 2·858 ounces to the ton of 2,000 lbs.  
Silver..... none.

20.—Slag from final treatment in extraction of gold, collected by Mr. E. Coste from in front of the Canada Consolidated Gold Mining Company's works at Deloro, township of Marmora, Hastings county.

The material consisted of a brownish-black scoriaceous slag, holding, here and there, more or less minute globules of metallic gold. Weight of sample, 93·35 grams. The whole of this material was employed for the estimation of the gold.

It was found to contain 0·5477 gram gold, which would be equivalent to 0·5867 per cent. Consequently the slag contained at the rate of 171·121 ounces to the ton of 2,000 lbs.—representing a money value of not less than \$3,535·36.

21.—From vein near creek, Canada Company's lot, lot five, range nine of the township of Marmora, Hastings county.

Arsenical pyrites in a gangue of greyish-white sub-translucent quartz. Weight of specimen, two pounds thirteen ounces. Assays gave :

Gold..... 0·058 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

22.—From the Bob Neill mine, lot fourteen, range ten, of the township of Marmora, Hastings county.

Fine granular arsenical pyrites, through which was disseminated a somewhat large amount of lepidomelane and a little white sub-translucent quartz. Weight of sample, five pounds three ounces. It contained :

Gold..... 0·117 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

23.—From the Toronto Company's mine, lot six, range ten, of the township of Marmora, Hastings county. Gold and Silver assays, cont.

Fine granular arsenical pyrites, through which was disseminated a little calcite. Weight of sample, two pounds three ounces. It was found to contain: Province of Ontario, cont.

Gold..... 0.117 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

24.—From the big hill, lot fourteen, range ten, of the township of Marmora, Hastings county.

A white sub-translucent quartz. Weight of sample, eleven ounces.

It contained neither gold nor silver.

25.—From Jones' property, lot six, range seven, of the township of Marmora, Hastings county.

The sample consisted of two fragments—the one a greyish-white opaque quartz, carrying a somewhat large amount of arsenical pyrites; the other, which was highly weathered, contained, here and there, a little undecomposed mispickel. Weight of sample, three pounds five ounces. Assays gave:

Gold ..... distinct trace.  
Silver ..... none.

26.—From an opening on lot eighteen, range eight, of the township of Marmora, Hastings county.

Consisted of bournonite in association with small quantities of copper pyrites and iron pyrites, in a gangue of white sub-translucent quartz; the latter, in parts, stained with hydrated peroxide of iron. Weight of sample, two pounds. It was found on assay to contain:

Gold..... 1.458 ounce to the ton of 2,000 lbs.  
Silver..... 4.375 ounces      "      "

27.—From an opening on the north-west quarter of lot sixteen, range nine, of the township of Marmora, Hastings county.

A white opaque to sub-translucent quartz, in parts stained and coated with hydrated peroxide of iron, carrying an appreciable amount of iron pyrites. Weight of sample, two pounds thirteen ounces.

It contained neither gold nor silver.

Gold and Silver assays, cont.  
Province of Ontario, cont.

28.—From the property of Pat Malone, lot eighteen, range one, of the township of Marmorora, Hastings county.

White sub-translucent quartz associated with a little hornblende. Weight of sample, two pounds one ounce.

It contained neither gold nor silver.

29.—From the Farrell mine, lot nine, range seven, of the township of Madoc, Hastings county.

Iron pyrites in a gangue of white, fine crystalline-granular quartz. Weight of sample, one pound. It contained:

Gold ..... trace.  
Silver ..... none.

30.—From the Moore mine, lot seventeen, range five, of the township of Madoc, Hastings county.

Bournonite in a gangue of somewhat coarse crystalline dolomite. Weight of sample, three ounces. It contained:

Gold ..... trace.  
Silver ..... 2·917 ounces to the ton of 2,000 lbs.

31.—From a vein a little east of Bannockburn, lot twenty-seven, range five, of the township of Madoc, Hastings county.

White sub-translucent quartz, in parts, stained with hydrated peroxide of iron, holding a few grains of iron pyrites. Weight of sample, one pound ten ounces. Assays showed it to contain:

Gold ..... trace.  
Silver ..... none.

32.—From the Richardson mine (north vein, vertical shaft), lot eighteen, range five, of the township of Madoc, Hastings county.

An association of a greyish-white to white sub-translucent quartz and brownish-yellow and reddish ankerite, together with a little mica, carrying a somewhat large amount of iron pyrites. Weight of sample, four pounds three ounces. It was found to contain:

Gold ..... 0·408 of an ounce to the ton of 2,000 lbs.  
Silver ..... none.

33.—From the Seymour mine, lot eleven, range five, of the township of Madoc, Hastings county.

Iron pyrites, through which was disseminated a trifling amount of dolomite. Weight of sample, twelve ounces. Assays showed it to contain:

Gold ..... trace.  
Silver ..... none.

34.—From an opening on lot seven, range five, of the township of Madoc, Hastings county. Gold and Silver  
assays, cont.

Consisted of more or less weathered iron pyrites. Weight of sample, one pound six ounces. It contained: Province of  
Ontario, cont.

Gold .....	trace.
Silver .....	none.

35.—From an opening on lot one, range five, of the township of Madoc, Hastings county.

Consisted of a partially weathered iron pyrites. Weight of sample, one pound four ounces.

It contained neither gold nor silver.

36.—From an opening on the north half of lot two, range five, of the township of Madoc, Hastings county.

A very much weathered specimen, containing, however, in parts, an appreciable amount of iron pyrites. Weight of sample, two pounds nine ounces.

It contained neither gold nor silver.

37.—From Liberty's property, near Presbyterian church, village of Madoc, township of Madoc, Hastings county.

Quartz carrying a little iron pyrites. The specimen was thickly coated with hydrated peroxide of iron. Weight of sample, thirteen ounces. Assays showed it to contain:

Gold .....	trace.
Silver .....	none.

38.—From vein in Bridgewater village, township of Elzevir, Hastings county.

An association of fine granular arsenical pyrites and white translucent quartz. Weight of sample, two pounds five ounces. It was found to contain:

Gold .....	0.058 of an ounce to the ton of 2,000 lbs.
Silver.....	none.

39.—From the west shore of Deer Lake, township of Belmont, Peterborough county.

White sub-translucent quartz, slightly stained with hydrated peroxide of iron. Weight of sample, eight ounces and a-half.

It contained neither gold nor silver.

Gold and Silver assays, cont.

Province of Ontario, cont.

40.—From Big Island, Belmont Lake, township of Belmont, Peterborough county.

White translucent quartz, in parts, slightly stained with hydrated peroxide of iron. Weight of sample, one pound seven ounces.

It contained neither gold nor silver.

41.—From Anderson's property, lot fourteen, range fourteen, of the township of Huntingdon, Hastings county.

Consisted of white sub-translucent quartz. Weight of sample, thirteen ounces.

It contained neither gold nor silver.

42.—From the Kaladar mine, lots twenty-four and twenty-five, range six, of the township of Kaladar, Addington county.

White sub-translucent quartz, more or less stained and coated with hydrated peroxide of iron, carrying a small quantity of iron pyrites. Weight of sample, one pound twelve ounces. It was found to contain :

Gold..... 0.700 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

43.—From lot twenty-four, range two, of Stafford, Renfrew county. This, and the following specimen were examined for the Rev. Father Marion.

The material, which was labelled "Company's collection," consisted, apart from some rock matter, of weathered iron pyrites. Weight of sample, two pounds fourteen ounces and a-half. Assays showed it to contain :

Gold..... trace.  
Silver..... none.

44.—From the same locality as the last.

The material, which was labelled "Private collection," consisted of more or less weathered iron pyrites in the form of small lumps and coarse to fine powder. Weight of sample, nine ounces. It was found to contain :

Gold..... 0.729 of an ounce to the ton of 2,000 lbs.  
Silver..... 9.567 ounces " "

45.—From lot five, range four, of the township of Darling, Lanark county.

Consisted of massive iron pyrites, apparently free from gangue. Weight of sample, one pound five ounces.

It contained neither gold nor silver.

46.—From Sheppard's mine, vein No. 1, Lake Wahnapiatae—district of Nipissing. Gold and Silver  
assays, cont.

White sub-translucent quartz carrying a small amount of arsenical pyrites and a few grains of iron pyrites. Weight of sample, one pound seven ounces. Assays gave:

Gold ..... 5.425 ounces to the ton of 2,000 lbs.  
Silver ..... 0.233 of an ounce " "

47.—From Sheppard's mine, vein No. 2, Lake Wahnapiatae—district of Nipissing.

White sub-translucent quartz. Weight of sample, one pound one ounce.

It contained neither gold nor silver.

48.—From Sheppard's mine, vein No. 3, Lake Wahnapiatae—district of Nipissing.

White sub-translucent quartz, in parts stained and coated with hydrated peroxide of iron, carrying a small quantity of copper pyrites. Weight of sample, one pound eight ounces. It contained:

Gold..... 0.058 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

49.—From a seven-foot vein on portage at outlet of Lower Lake, Maskinongé-wagaming—district of Nipissing.

A greyish-white sub-translucent quartz, in parts stained and coated with hydrated peroxide of iron, carrying a little iron pyrites. Weight of sample, one pound five ounces.

It contained neither gold nor silver.

50.—From a two-foot vein on portage at outlet of Lake Maskinongé-wagaming—district of Nipissing.

White sub-translucent quartz, in parts stained with hydrated peroxide of iron and in some places flecked with green carbonate of copper, carrying a trifling amount of iron pyrites. Weight of sample, one pound.

It contained neither gold nor silver.

51.—From vein on west side of South Bay, Lake Wahnapiatae—district of Nipissing.

White sub-translucent quartz carrying a small amount of copper pyrites. Weight of sample, twelve ounces. It was found to contain:

Gold ..... 0.058 of an ounce to the ton of 2,000 lbs.  
Silver ..... 0.175 " " "

Gold and Silver  
assays, cont.

52.—From Stephen Lafricain's claim, Vermillion Lake, north of east arm of Lake Temagami—district of Nipissing.

Province of  
Ontario, cont.

An association of a dark green chloritic schist and fine-grained quartzite, through which was disseminated a somewhat large amount of fine crystalline iron pyrites. Weight of sample, thirteen ounces.

It contained neither gold nor silver.

53.—From a ten-foot vein on Matthias Island, two miles north-east of Temagami Post—district of Nipissing.

An association of white sub-translucent quartz with a small amount of greyish-green serpentine. Some of the fragments were much honeycombed, the cavities holding hydrated peroxide of iron. Weight of sample, one pound seven ounces.

It contained neither gold nor silver.

54.—From a five-foot vein on Walter Cockburn's claim on island in Cross Lake, near its outlet—district of Nipissing.

An association of white sub-translucent quartz with a little dark greenish-grey chloritic schist, carrying small quantities of galena and copper pyrites. Weight of sample, one pound ten ounces. It was found to contain:

Gold..... trace.

Silver..... 0.175 of an ounce to the ton of 2,000 lbs.

55.—From a one-foot vein on shore of Lake Panache, one mile and a-half south-west of La Vase River—district of Nipissing.

A greyish-white sub-translucent quartz, more or less stained with hydrated peroxide of iron, carrying a very appreciable amount of iron pyrites. Weight of sample, nine ounces.

It contained neither gold nor silver.

56.—From Big Trout Lake, between Lake Abitibi and Blanche River—district of Nipissing.

Grey quartzite stained and coated with hydrated peroxide of iron and, in parts, with green carbonate of copper, carrying a trifling amount of iron pyrites and copper pyrites. Weight of sample, two pounds one ounce.

It contained neither gold nor silver.

57.—From Cross Lake on Temagami River—district of Nipissing.

Copper pyrites in a gangue of white sub-translucent quartz. Weight of sample, nine ounces. Assays showed it to contain:

Gold..... 0.058 of an ounce to the ton of 2,000 lbs.

Silver..... 0.058       "       "       "

58.—From the same locality as the last.

Galena in a gangue of white sub-translucent quartz. Weight of sample, three-quarters of an ounce. It was found to contain:

Gold and Silver assays, cont.

Province of Ontario, cont.

Gold..... trace.

Silver..... 23.333 ounces to the ton of 2,000 lbs.

59.—From a vein cutting diabase on the west side of outlet of Lady Evelyn Lake, near Montreal River—district of Nipissing.

A greyish sub-translucent quartz, with which was associated small quantities of a chloritic rock and a little calcite. It contained a little copper pyrites and was, in parts, stained and coated with hydrated peroxide of iron and green carbonate of copper. Weight of sample, one pound five ounces. Assays gave:

Gold..... trace.

Silver..... 2.040 ounces to the ton of 2,000 lbs.

60.—Mic-Mac lead vein on Haycock's location, east side of Lady Evelyn Lake, one mile and a-quarter south of outlet—district of Nipissing.

A coarse crystalline galena in association with a trifling amount of translucent quartz and calcite. It was, in parts, slightly coated with carbonate of lead. Weight of sample, six pounds twelve ounces. It contained:

Gold..... trace.

Silver..... 8.750 ounces to the ton of 2,000 lbs.

61.—North vein on Haycock's location, west side of Lady Evelyn Lake, one mile and a-half from the outlet—district of Nipissing.

A white sub-translucent quartz carrying small quantities of copper pyrites, galena and zinc blende. It was more or less stained with hydrated peroxide of iron and, in parts, with green carbonate of copper. The sample, which consisted of numerous fragments, weighed two pounds. Assays gave:

Gold..... none.

Silver..... 0.117 of an ounce to the ton of 2,000 lbs.

62.—South vein on Haycock's location, west side of Lady Evelyn Lake, one mile and a-half, southward, from outlet—district of Nipissing.

White sub-translucent quartz carrying a very appreciable amount of copper pyrites. The whole was more or less stained with hydrated peroxide of iron and, in parts, coated with blue and green carbonate of copper. Weight of sample, two pounds.

It contained neither gold nor silver.



Gold and Silver assays, cont.

Province of Ontario, cont.

63.—West vein on western side of outlet of Lady Evelyn Lake—district of Nipissing.

An association of white sub-translucent quartz, calcite, dolomite and fibrous serpentine, carrying small quantities of copper pyrites. It was, in parts, stained with hydrated peroxide of iron and blue and green carbonate of copper. Weight of sample, one pound twelve ounces.

It contained neither gold nor silver.

64.—From island at south end of narrows in Lady Evelyn Lake, about three miles southward of outlet—district of Nipissing.

A slightly greyish-white sub-translucent quartz, with which was associated small quantities of a dark green chloritic mineral. Weight of sample, thirteen ounces.

It contained neither gold nor silver.

65.—From islet opposite to, and three-quarters of a mile from, Hudson Bay Company's Post, Lake Temagami—district of Nipissing.

A milky-white quartz in association with small quantities of a dark green chloritic mineral and a trifling amount of dolomite. Weight of sample, one pound six ounces.

It contained neither gold nor silver.

66.—From vein on an island one mile and a-quarter north-east of Hudson Bay Company's Post, Lake Temagami—district of Nipissing.

A milky-white quartz, for the most part stained and, in parts, coated with hydrated peroxide of iron, holding small quantities of titaniferous iron ore. Weight of sample, one pound seven ounces. It was found to contain :

Gold .....	trace.
Silver .....	none.

67.—From a vein two miles north-west of Temagami Post, Lake Temagami—district of Nipissing.

Greyish-white to white sub-translucent quartz, in association with small quantities of a dark green chloritic mineral, with, here and there, a trifling amount of iron pyrites. Weight of sample, eight ounces and a-half.

It contained neither gold nor silver.

68.—From a vein on the western of the group of three islands in the south-west bay of Lake Temagami, being three miles north-east of the extreme south end of the lake—district of Nipissing.

An association of grey and white, opaque quartz, more or less stained and coated with hydrated peroxide of iron, carrying small quantities of iron pyrites. Weight of sample, one pound.

Gold and Silver assays, cont.  
Province of Ontario, cont.

It contained neither gold nor silver.

69.—From Ferguson's location A, Sandy Bay, northern end of Lake Temagami—district of Nipissing.

An association of greyish-white to white translucent to sub-translucent quartz with a grey-green chloritic rock, crystalline limestone and a little felspar, carrying small quantities of copper pyrites and iron pyrites. It was, in parts, stained with hydrated peroxide of iron and, here and there, with a little green carbonate of copper. Weight of sample, eleven pounds. It was found to contain :

Gold ..... trace.  
Silver ..... trace.

70.—From Ferguson's location B, near the eastern extremity of East Bay, Lake Temagami—district of Nipissing.

Finely disseminated iron pyrites in a gangue of quartz. Weight of sample, five pounds. Assays gave :

Gold ..... none.  
Silver ..... 0.233 of an ounce to the ton of 2,000 lbs.

71.—From Ferguson's location C, on an island in East Bay, Lake Temagami—district of Nipissing.

A light grey schistose rock, for the most part stained and coated with hydrated peroxide of iron, carrying iron pyrites. Weight of sample, fifteen ounces. It was shown to contain :

Gold ..... trace.  
Silver ..... 0.116 of an ounce to the ton of 2,000 lbs.

72.—From Lafricain and McKenzie's mine, north side of East Bay (about midway up bay), Lake Temagami—district of Nipissing.

A white translucent quartz in association with small quantities of a chloritic mineral, holding, in parts, a little copper pyrites. Weight of sample, one pound fourteen ounces. It contained :

Gold ..... trace.  
Silver ..... 0.290 of an ounce to the ton of 2,000 lbs.

73.—From a vein on the north shore of East Bay, three-quarters of a mile west of portage at its eastern extremity, Lake Temagami—district of Nipissing.

Gold and Silver  
assays, cont.

Province of  
Ontario, cont.

White sub-translucent quartz, with here and there a cavity lined with hydrated peroxide of iron and, in parts, slightly stained with green carbonate of copper. Weight of sample, one pound three ounces.

It contained neither gold nor silver.

74.—From Montreal River, near Fort Metatchewan—district of Nipissing.

An association of greyish sub-translucent quartz with small quantities of calcite, containing, in parts, a little specular iron. Weight of sample, one pound thirteen ounces.

It contained neither gold nor silver.

75.—From about six miles from the mouth of the Montreal River—district of Nipissing. Examined for Mr. P. T. Lawlor.

An association of red and white quartz and a dark green chloritic mineral, carrying small quantities of copper pyrites. Weight of sample, fourteen ounces. Assays showed it to contain :

Gold ..... distinct trace.  
Silver..... none.

76.—From a vein occurring at the northern end of Lake Temagami, about two miles south of Ferguson's location—district of Nipissing.

White crystalline limestone in association with small quantities of chlorite. It contained, in parts, a trifling amount of copper pyrites, and was, here and there, stained with green carbonate of copper. Weight of sample, one pound eleven ounces.

It contained neither gold nor silver.

77.—From a vein discovered by Malcolm McLean, sixteen miles north of Temagami Post, Bear Island, Lake Temagami—district of Nipissing.

An association of white sub-transparent quartz more or less stained with hydrated peroxide of iron, and a greyish-green rock, carrying iron pyrites. Weight of sample, four pounds three ounces. It contained :

Gold ..... trace.  
Silver..... trace.

78.—From the property of Mr. E. Haycock, Temagami Island, Lake Temagami—district of Nipissing.

An association of iron pyrites, copper pyrites and magnetite in a gangue of chlorite. Weight of sample, four pounds two ounces.

Gold and Silver  
assays. cont.

It contained neither gold nor silver.

Province of  
Ontario, cont.

79.—From Holditch's location, East Island, Lake Temagami—district of Nipissing.

White sub-translucent quartz in association with small quantities of chlorite and a little dolomite. Weight of sample, two pounds five ounces.

It contained neither gold nor silver.

80.—From a vein on Holditch's location on West Island, Lake Temagami—district of Nipissing.

An association of white translucent quartz with small quantities of a dark green chlorite, in parts stained with hydrated peroxide of iron, carrying a little copper pyrites and iron pyrites. Weight of sample, three pounds six ounces. Assays showed it to contain:

Gold .....	trace.
Silver .....	trace.

81.—From a vein at the south end of Portage Bay, Lake Temagami—district of Nipissing.

An association of white sub-translucent quartz with small quantities of a dark green chloritic schist and a little dolomite. Weight of sample, two pounds eleven ounces.

It contained neither gold nor silver.

82.—From a vein on a small island in Lake Nipissing—district of Nipissing. Examined for Mr. W. T. Newman.

An association of chloritic schist, mica schist, gneiss and calcite, carrying small quantities of magnetic and iron pyrites. Weight of sample, two ounces. Assays gave:

Gold .....	trace.
Silver .....	0.116 of an ounce to the ton of 2,000 lbs.

83.—From a vein crossing the river flowing into the west end of Lake Nipissing—district of Nipissing. Examined for Mr. W. T. Newman.

The sample consisted of two fragments, the one a highly rust stained rock holding a few scales of mica, the other white sub-translucent quartz stained and coated with hydrated peroxide of iron. Weight of sample, eight ounces.

It contained neither gold nor silver.

Gold and Silver assays, cont.

Province of Ontario, cont.

84.—From Great Manitou Island, Lake Nipissing—district of Nipissing. Examined for Mr. W. T. Newman.

It consisted of molybdenite, together with a few specks of iron pyrites in a gangue composed of a reddish colored felspar and a little quartz. The metallic sulphides formed but a small proportion of the whole. Weight of sample, one quarter of an ounce.

It contained neither gold nor silver.

85.—From the vicinity of Sudbury—district of Nipissing.

A greyish-white to white translucent to sub-transparent quartz. One fragment was slightly stained with hydrated peroxide of iron and contained a few specks of iron pyrites. The sample, which consisted of five fragments, weighed one pound nine ounces.

It contained neither gold nor silver.

86.—From two miles west-north-west of North Bay, Lake Nipissing—district of Nipissing. Examined for Mr. G. R. Lyon.

A reddish sub-translucent quartz, more or less coated with hydrated peroxide of iron, carrying, in parts, a very appreciable amount of iron pyrites. The sample, which consisted of numerous fragments, weighed four pounds and a quarter.

It contained neither gold nor silver.

87.—From the immediate neighbourhood of Mountain Lake (Round Lake), Montreal River—district of Nipissing. Examined for Mr. C. C. Farr.

The sample consisted of fragments of diorite, a reddish quartzite, white sub-translucent quartz and a dark green chloritic mineral. The greater number of the fragments were stained with hydrated peroxide of iron: some of them carried small quantities of iron pyrites, others, in addition, a trifling amount of copper pyrites. Weight of sample, one pound half an ounce. Assays showed it to contain:

Gold ..... trace.  
Silver ..... trace.

88.—From Perley and Klock's limits, Serpent River—district of Algoma. Examined for Mr. D. A. Chisholm.

An association of white sub-translucent quartz and greyish-green chloritic schist; the whole coated with hydrated peroxide of iron. Weight of sample, two pounds eight ounces.

It contained neither gold nor silver.

89.—From the vicinity of Sable Landing, township of Salter—district of Algoma. Examined for Mr. A. Spittal. Gold and Silver assays, cont.

Copper pyrites, together with a small quantity of bornite, in a gangue consisting of white translucent quartz and greenish-grey chloritic schist. Weight of sample, one pound seven ounces. It contained:

Gold..... 0.029 of an ounce to the ton of 2,000 lbs.  
 Silver..... none.

90.—From the south half of lot nine, range four, of the township of Graham—district of Algoma. This, and the following specimen were examined for Mr. W. A. Allan.

Dolomite in association with small quantities of a ferruginous schistose rock. Weight of sample, two ounces.

It contained neither gold nor silver.

91.—From the south half of lot eight, range four, of the township of Graham—district of Algoma.

A micaceous schist and ferruginous schistose rock in association with quartz, carrying small quantities of copper pyrites and, in parts, stained and coated with blue and green carbonate of copper. Weight of sample, two ounces and a-half. It contained:

Gold ..... trace.  
 Silver ..... none.

92.—From St. Joseph Island, Lake Huron—district of Algoma.

Sandstone, made up of rounded grains of translucent quartz, through which was disseminated a small quantity of iron pyrites. Weight of sample, one ounce and a-half. Assays gave:

Gold ..... trace.  
 Silver ..... none.

93.—From Pither's location, eastern end of Rainy Lake—district of Algoma.

A greyish-white sub-translucent quartz with which was associated a little reddish calcite and a dark green chloritic mineral. It carried a small quantity of iron pyrites. Weight of sample, nine ounces and a-half. Assays showed it to contain:

Gold..... 0.175 of an ounce to the ton of 2,000 lbs.  
 Silver..... none.

94.—From Moore's location (two miles and a-half south of Straight Lake Station, on the line of the Canadian Pacific Railway), shaft No. 1,

Gold and Silver  
assays, cont.

Province of  
Ontario, cont.

top of shaft. This, and the following six specimens are from mining locations in the vicinity of Straight Lake—district of Algoma.

Consisted of magnetic pyrites disseminated through a gangue of dark grey quartz. Weight of sample, one pound three ounces.

It contained neither gold nor silver.

95.—From Moore's location, shaft No. 1, bottom of shaft.

Dolomitic limestone impregnated with magnetic pyrites. On the exterior part of a portion of the specimen there occurred a thin band of white limestone, between which and the mass there was a slight layer of zinc blende. Weight of sample, three pounds eleven ounces.

It contained neither gold nor silver.

96.—From Moore's location, shaft No. 2. Vein fourteen feet wide.

A greenish-grey, in parts greyish and occasionally white, sub-translucent quartz, through which was disseminated a trifling amount of magnetic pyrites and zinc blende. Weight of sample, one pound eight ounces.

It contained neither gold nor silver.

97.—From Moore's location, No. 2 opening, a-quarter of a mile from the west end of the location.

Consisted of iron pyrites and magnetic pyrites in a gangue of quartz. Weight of sample, two pounds five ounces.

It contained neither gold nor silver.

98.—From Moore's location, opening No. 3.

Consisted of iron pyrites in a gangue of dark grey quartz. Weight of sample, three pounds thirteen ounces.

It contained neither gold nor silver.

99.—From Moore's location, extreme west end, near Spanish River.

A dark greyish colored quartz carrying iron pyrites. Weight of sample, one pound ten ounces.

It contained neither gold nor silver.

100.—From Moore's location G, about one mile and a-quarter east of Straight Lake Station on the line of the Canadian Pacific Railway—north side of the track.

A dark greenish-grey schistose rock carrying appreciable quantities of iron pyrites and magnetic pyrites. Weight of sample, thirteen ounces.

Gold and Silver  
assays, cont.

Province of  
Ontario, cont.

It contained neither gold nor silver.

101.—From lot seven, range five, of the township of Lybster—district of Thunder Bay. This, and the following specimen, were examined for Mr. J. C. Green.

White and grey quartz with cavities filled with hydrated peroxide of iron, and containing, here and there, a few specks of iron pyrites and galena. Weight of sample, one pound eight ounces.

It contained neither gold nor silver.

102.—From unsurveyed land south of the township of Lybster—district of Thunder Bay.

An association of white and amethystine quartz and a dark grey trap rock. The former held a few specks of iron pyrites. Weight of sample, one pound.

It contained neither gold nor silver.

103.—From the vicinity of Schreiber, on the line of the Canadian Pacific Railway—district of Thunder Bay, Lake Superior. Examined for Mr. T. Hay.

An association of dark grey quartz and iron pyrites. The sample weighed three pounds two ounces. It contained:

Gold .....	trace.
Silver .....	none.

104.—From Lake of the Woods, about thirty miles from Rat Portage—district of Rainy River. Examined for Mr. J. Anderson.

A greyish-white translucent quartz, more or less stained and, in parts, coated with hydrated peroxide of iron. Weight of sample, one pound eight ounces. It was found to contain:

Gold.....	trace.
Silver.....	1'050 ounce to the ton of 2,000 lbs.

105.—From an island in the Lake of the Woods—about six miles out from Rat Portage—district of Rainy River. Examined for Mr. M. W. Rublee.

An association of dark grey sub-translucent quartz with a small amount of grey chloritic schist. It contained, in parts, a small



Gold and Silver assays, cont.

quantity of iron pyrites. Weight of sample, two ounces and three-quarters.

Province of Ontario, cont.

It contained neither gold nor silver.

106.—This, and the following specimen are from Rat Portage, Lake of the Woods—district of Rainy River.

A white sub-translucent quartz, stained with hydrated peroxide of iron, carrying small quantities of iron pyrites and specular iron. Weight of sample, seven ounces. Assays gave:

Gold..... 0.467 of an ounce to the ton of 2,000 lbs.  
 Silver..... 0.408 " " "

107.—Consisted of magnetic pyrites, together with a little iron pyrites, disseminated through a dark grey quartzite. The gangue constituted but a small proportion of the whole. Weight of sample, six ounces. It was found to contain:

Gold..... distinct trace.  
 Silver..... 0.340 of an ounce to the ton of 2,000 lbs.

North-West Territory.

NORTH-WEST TERRITORY.

108.—From small veins on creek near outflow of Quiet Lake, at head of Big Salmon River, a tributary of the Lewes River—Yukon district. Received from Dr. G. M. Dawson.

A white sub-translucent quartz, seamed and, in parts, stained with hydrated peroxide of iron, carrying small quantities of iron pyrites. Weight of sample, half an ounce. It contained:

Gold..... distinct trace.  
 Silver..... trace.

109.—From an exposure on Forty Mile River, about three-quarters of a mile above its mouth—Yukon district. This, and the three following specimens were collected by Mr. W. Ogilvie.

An association of greyish-white calcite and greyish-green chloritic schist, carrying appreciable quantities of galena. Weight of sample, one pound fourteen ounces.

It contained neither gold nor silver.

110.—From Forty Mile River, about two miles and a-half above its mouth—Yukon district.

A somewhat fine crystalline galena, with some zinc blende and a little iron pyrites, in a dolomitic gangue. The latter consti-

tuted but a small proportion, by weight, of the whole. Weight of Gold and Silver sample, three pounds. Assays showed it to contain: assays, cont.

Gold..... distinct trace.  
Silver..... 38.646 ounces to the ton of 2,000 lbs.

North-West  
Territory, cont.

111.—From the north bank of the Yukon River, opposite to the mouth of Tatonduc River (Deer River of Schwatka), about five miles above Fort Reliance—Yukon district.

Weathered rock carrying small quantities of copper pyrites, bornite and galena. Weight of sample, fourteen ounces. It was found on assay to contain:

Gold..... trace.  
Silver..... 3.646 ounces to the ton of 2,000 lbs.

112.—From a point eight miles below Fort Reliance—Yukon district.

White sub-translucent quartz traversed by veins of a dark grey chloritic mineral. Weight of sample, eight ounces. Assays gave:

Gold..... trace.  
Silver..... 0.117 of an ounce to the ton of 2,000 lbs.

PROVINCE OF BRITISH COLUMBIA.

Province of  
British Colum-  
bia.

Of the following—

*Specimens Nos. 113-139 are from the East Kootanie district.*  
“ Nos. 140-152 “ “ *West Kootanie district.*  
“ Nos. 153-184 “ “ *Interior plateau region.*  
“ Nos. 185-197 “ “ *Coast Ranges and coast region*  
“ Nos. 198-199 “ “ *Cassiar district.*

*(Specimens Nos. 168-184 were collected by Dr. G. M. Dawson.)*

113.—From about three miles and a-half south-east of Windermere, Upper Columbia Lake—East Kootanie district. Examined for Mr. John McRae.

An association of copper glance with a somewhat large proportion of hematite, an appreciable amount of dolomite and a little quartz. It was, in parts, coated with green and blue carbonate of copper. Weight of sample, six ounces. It contained:

Gold..... none.  
Silver..... 0.233 of an ounce to the ton of 2,000 lbs.

114.—From Windermere. Upper Columbia Lake—East Kootanie district. This, and the two following specimens were examined for Mr. W. A. Baillie Grohman.

Gold and Silver assays, cont.

Province of British Columbia, cont.

Consisted of copper glance in association with appreciable quantities of hematite and quartz. Weight of sample, three ounces and a-half. Assays gave :

Gold..... none.  
Silver..... 2.917 ounces to the ton of 2,000 lbs.

- 115.—From a lead near Windermere, Upper Columbia Lake—East Kootanie district.

Consisted of copper glance with which was associated a small amount of white opaque quartz. It was, in parts, coated with green carbonate of copper. Weight of sample, three ounces and a half.

It contained neither gold nor silver.

- 116.—From Bull River trail claim, six miles south of Bull River Bridge—East Kootanie district.

A greyish-white sub-translucent quartz, in parts coated with hydrated peroxide of iron and containing, here and there, a few specks of iron pyrites. Weight of sample, one ounce and a-quarter. It was found to contain :

Gold..... trace.  
Silver..... none.

- 117.—From the "Great Western" claim, south fork of Horse Thief Creek about twenty miles from the Columbia River, into which the creek empties ninety miles south of Golden—East Kootanie district. Examined for Mr. G. A. Starke.

An association of quartz and dolomite, through which was disseminated a somewhat large amount of iron pyrites and a small amount of galena. Weight of sample, four ounces and a-half. Assays showed it to contain :

Gold..... none.  
Silver..... 1.925 of an ounce to the ton of 2,000 lbs.

- 118.—From the "Uncle Sam" claim, right bank of Horse Thief Creek, about twenty miles from the Columbia River, into which the creek empties ninety miles south of Golden—East Kootanie district. Examined for Mr. E. T. Johnston.

White sub-translucent quartz carrying an appreciable amount of galena and a little iron pyrites. Weight of sample, three ounces. It was found, on assay, to contain :

Gold..... none.  
Silver..... 3.646 ounces to the ton of 2,000 lbs.

- 119.—From the North Fork of Toby Creek, near Lower Columbia Lake, Columbia River—East Kootanie district. Examined for Mr. W. Rosamond.

Coarse crystalline galena in association with a small amount of white sub-translucent quartz. It was, in parts, coated with carbonate of lead. Weight of sample, two ounces and a-half. It contained:

Gold..... distinct trace.  
Silver..... 66.354 ounces to the ton of 2,000 lbs.

- 120.—From a lead on Toby Creek, near Lower Columbia Lake, Columbia River—East Kootanie district.

Consisted of galena in association with a somewhat large amount of white sub-translucent quartz. Weight of sample, ten ounces. Assays gave:

Gold..... none.  
Silver..... 38.646 ounces to the ton of 2,000 lbs.

- 121.—From a point about twelve miles up Toby Creek, near Lower Columbia Lake, Columbia River—East Kootanie district. Examined for Mr. H. McKinnon.

Copper pyrites in a gangue of white sub-translucent quartz. The latter constituted but a very small proportion, by weight, of the whole. Weight of sample, four ounces. It was found to contain:

Gold..... trace.  
Silver..... none.

- 122.—From No. 2 Creek, between Upper and Lower Columbia Lakes, and about eight miles from the Columbia River—East Kootanie district. Examined for Mr. G. McMillan.

Tetrahedrite together with a small quantity of iron pyrites in a gangue of white sub-translucent quartz. Weight of sample, three ounces and a-half. Assays showed it to contain:

Gold..... distinct trace.  
Silver..... 10.208 ounces to the ton of 2,000 lbs.

- 123.—From about one mile from Palliser Station on the line of the Canadian Pacific Railway, north side of the river, about a quarter of a mile from Kicking Horse (Hector) Pass—East Kootanie district. Examined for Mr. J. Barr.

An association of limonite and iron pyrites. Weight of sample, thirteen ounces. It contained:

Gold..... trace.  
Silver..... none.

Gold and Silver  
assays, cont.  
Province of  
British Colum-  
bia, cont.

Gold and Silver assays, cont.

Province of British Columbia, cont.

124.—From the "Golden Gate" claim on Carbonate Creek, about five miles south-east of McMurdo's claims—East Kootanie district. This, and the following specimen were examined for Mr. N. Morrison.

Consisted of tetrahedrite with some galena and a little iron pyrites, disseminated through a gangue of quartz. Weight of sample, four ounces. Assays gave:

Gold..... distinct trace.  
Silver..... 13·887 ounces to the ton of 2,000 lbs.

125.—From the "Lost Chieftain" claim, Copper Creek, a tributary of the Middle Fork of the Spilimichine River, about seven miles south-east of McMurdo's claims—East Kootanie district.

A fine to somewhat coarse crystalline galena together with some copper pyrites, in a gangue of white opaque to sub-translucent quartz with which was associated a small quantity of a greenish-grey chloritic schist. The whole was more or less stained and coated with hydrated peroxide of iron. Weight of sample, fourteen ounces and a-half. It was found to contain:

Gold..... none.  
Silver..... 37·917 ounces to the ton of 2,000 lbs.

126.—From the "Monitor" claim, Middle Fork, Spilimichine River—East Kootanie district.

A somewhat coarse crystalline galena, through which was disseminated a small quantity of calcite. The specimen was, in parts, coated with hydrated peroxide of iron and, here and there, with carbonate of lead. Weight of sample, two ounces. It was found to contain:

Gold..... distinct trace.  
Silver..... 37·537 ounces to the ton of 2,000 lbs.

127.—From about two miles from Field Station, on the line of the Canadian Pacific Railway—East Kootanie district. Examined for Mr. W. A. Baillie Grohman.

A white sub-translucent quartz in parts stained and coated with hydrated peroxide of iron, in association with a little chloritic schist. Weight of sample, eight ounces.

It contained neither gold nor silver.

128.—From the "Victory" claim, vicinity of Field Station on the line of the Canadian Pacific Railway—East Kootanie district. This, and the following specimen were examined for Mr. J. Barr.

A highly weathered rock, stained and, in parts, thickly coated with hydrated peroxide of iron, carrying some iron-pyrites. Weight of sample, three pounds ten ounces. Assays gave:

Gold..... trace.  
Silver..... none.

Gold and Silver  
assays, cont.

Province of  
British Colum-  
bia, cont.

129.—From the "Rose" claim, vicinity of Field Station on the line of the Canadian Pacific Railway—East Kootanie district.

A greyish-white rock, through which was disseminated a somewhat large amount of iron pyrites. Weight of sample, three pounds. It contained:

Gold..... trace.  
Silver..... none.

130.—From about thirty-five miles south-east of Golden, and about three miles from the Columbia River—East Kootanie district. Examined for Mr. P. Lambrich.

An association of quartz and dolomite, through which was disseminated a few specks of iron pyrites. It was, in parts, coated with hydrated peroxide of iron and, here and there, with blue and green carbonate of copper. Weight of sample, seven ounces and a-half.

It contained neither gold nor silver.

131.—From Cathedral Mountain—East Kootanie district. Examined for Mr. P. McCarthy.

A very fine crystalline galena disseminated through a quartzose gangue. The galena constituted, approximately, forty-one per cent., by weight, of the whole. Weight of sample, three ounces and a-half. It was found to contain:

Gold..... none.  
Silver..... 0.729 of an ounce to the ton of 2,000 lbs.

132.—From the "White" mine, one mile east of Grohman—East Kootanie district. Examined for Mr. W. A. Baillie Grohman.

An association of white sub-translucent to opaque quartz with a small amount of chloritic schist, carrying a very appreciable amount of galena. It was, in parts, coated with carbonate of lead. Weight of sample, eleven ounces. Assays showed it to contain:

Gold..... distinct trace.  
Silver..... 13.125 ounces to the ton of 2,000 lbs.

133.—This, and the following six specimens are from claims on Jubilee Mountain, situated on the west side of the Upper Columbia River,

Gold and Silver  
assays, cont.Province of  
British Colum-  
bia, cont.

about thirty miles south of Golden Station on the line of the Canadian Pacific Railway—East Kootanie district. They were examined for Mr. W. A. Baillie Grohman.

From "Grangers" claim, south end of Jubilee Mountain.

An association of dolomite with some calcite and small amounts of blue and green carbonate of copper. It was, in parts, coated with hydrated peroxide of iron. Weight of sample, three ounces and a-half. It contained :

Gold..... trace.  
Silver..... 0.408 of an ounce to the ton of 2,000 lbs.

134.—From "Grangers" new location, Jubilee Mountain.

An association of copper glance and blue and green carbonate of copper in a gangue of quartz and dolomite. The gangue constituted but a small proportion, by weight, of the whole. Weight of sample, four ounces. Assays gave :

Gold..... none.  
Silver..... 39.375 ounces to the ton of 2,000 lbs.

135.—From "Wells" old location, Jubilee Mountain.

An association of copper glance, blue and green carbonate of copper and brown hematite. It did not contain any readily discernible gangue. Weight of sample, four ounces. It was found to contain :

Gold..... none.  
Silver..... 22.571 ounces to the ton of 2,000 lbs.

136.—From "Wells" claim, Jubilee Mountain.

Consisted of a compact brown hematite. Weight of samples, six ounces.

It contained neither gold nor silver.

137.—From "Wells" claim—but from a different lead to that from which the immediately preceding specimen was taken—Jubilee Mountain.

A very fine crystalline galena together with a considerable amount of iron pyrites, in a gangue of quartz. Weight of sample, four ounces and a-half. It was found, on assay, to contain :

Gold..... none.  
Silver..... 5.104 ounces to the ton of 2,000 lbs.

138.—From Jubilee Mountain. Name of claim not stated.

An association of blue and green carbonate of copper and hydrated peroxide of iron, enclosing a trifling amount of unaltered

copper glance. Weight of sample, six ounces and a-half. It was found to contain :

Gold..... none.  
Silver..... 2·187 ounces to the ton of 2,000 lbs.

Province of  
British Colum-  
bia, cont.

139.—From Jubilee Mountain. Name of claim not stated.

An association of copper glance, blue and green carbonate of copper and dolomite. The latter constituted but a comparatively small proportion, by weight, of the whole. Weight of sample, seven ounces. Assays gave :

Gold..... none.  
Silver..... 11·667 ounces to the ton of 2,000 lbs.

140.—From the "International" claim, Selkirk Range, about fifty miles from Golden—West Kootanie district. Examined for Mr. A. McMurdo.

It consisted of galena in association with a somewhat large proportion of tetrahedrite and a little quartz. The whole was more or less coated with hydrated peroxide of iron and, in parts, with carbonate of lead. Weight of sample, four ounces. It contained :

Gold..... 2·187 ounces to the ton of 2,000 lbs.  
Silver..... 60·871 " " "

141.—From Toad Mountain Camp, twenty miles west of Kootanie Lake—West Kootanie district.

An association of a highly manganiferous limonite with some calcite and a little white translucent quartz, carrying a somewhat large amount of copper pyrites, a lesser amount of tetrahedrite, and small quantities of iron pyrites. It was, in parts, coated with hydrated peroxide of iron and, here and there, with blue and green carbonate of copper. Weight of sample, one pound twelve ounces. Assays showed it to contain :

Gold..... none.  
Silver..... 89·687 ounces to the ton of 2,000 lbs.

142.—From the McKinnon claim, about three miles up, and on the east side of, the North Fork of the Illecillewaet River—West Kootanie district. Examined for Dr. G. T. Orton.

A coarse crystalline galena with, here and there, a trifling amount of calcite and white translucent quartz. It was, in parts



Gold and Silver assays, cont.

Province of British Columbia, cont.

coated with hydrated peroxide of iron. Weight of sample, one pound six ounces. It was found to contain:

Gold..... none.  
Silver..... 80·937 ounces to the ton of 2,000 lbs.

143.—From about six miles up, and on the west side of, the North Fork of the Illecillewaet River—West Kootanie district.

A somewhat coarse crystalline galena together with a little copper pyrites, in a gangue of greyish-white translucent quartz. It was more or less coated with hydrated peroxide of iron as also with a little carbonate of lead. Weight of sample, five ounces and a-half. Assays gave:

Gold..... trace.  
Silver..... 30·988 ounces to the ton of 2,000 lbs.

144.—From the "Minnie F" claim, six miles up, and on the east side of, the North Fork of the Illecillewaet River—West Kootanie district.

An association of a somewhat fine crystalline galena with some tetrahedrite and small amounts of iron pyrites and copper pyrites, in a gangue of white sub-translucent quartz. It was, in parts, thickly coated with hydrated peroxide of iron and blue and green carbonate of copper, as also with some carbonate of lead. The gangue constituted but a very small proportion, by weight, of the whole. Weight of sample, eleven pounds six ounces. It was found, on assay, to contain:

Gold..... none.  
Silver..... 139·427 ounces to the ton of 2,000 lbs.

145.—From the "Edmond's" claim, two miles from the Illecillewaet Station, north side of the line of the Canadian Pacific Railway—West Kootanie district.

A somewhat fine to coarse crystalline galena in association with a little iron pyrites, in a gangue of white sub-translucent to translucent quartz. It was, in parts, stained and coated with hydrated peroxide of iron, as likewise with a little carbonate of lead and a trifling amount of green carbonate of copper. The gangue constituted but a comparatively small proportion, by weight, of the whole. Weight of sample, seven pounds seven ounces. Assays showed it to contain:

Gold..... none.  
Silver..... 116·302 ounces to the ton of 2,000 lbs.

- 146.—This, and the four following specimens are from the "Maple Leaf" claim, Illecillewaet River, about thirty-three miles east of Revelstoke, and within a mile of the line of the Canadian Pacific Railway—West Kootanie district. Gold and Silver assays, cont.  
Province of British Columbia, cont.

Highly weathered material containing a small quantity of galena. Weight of sample, seven ounces. It contained:

Gold..... trace.  
Silver..... 41·555 ounces to the ton of 2,000 lbs.

- 147.—Highly weathered ferruginous rock matter. Weight of sample, three ounces. Assays gave:

Gold..... distinct trace.  
Silver..... 3·645 ounces to the ton of 2,000 lbs.

- 148.—Highly weathered ferruginous rock matter containing very small quantities of galena. Weight of sample, three ounces. It was found to contain:

Gold..... distinct trace.  
Silver..... 8·750 ounces to the ton of 2,000 lbs.

- 149.—Decomposed mineral matter, consisting for the most part of carbonate of lead with a little hydrated peroxide of iron and a few specks of galena. Weight of sample, eight ounces. Assays showed it to contain:

Gold..... distinct trace.  
Silver..... 35·729 ounces to the ton of 2,000 lbs.

- 150.—Consisted of a coarse crystalline galena. Weight of sample, one pound. It contained:

Gold..... none.  
Silver..... 98·437 ounces to the ton of 2,000 lbs.

- 151.—From "No. 1" claim, Hot Springs Camp, Kootanie Lake—West Kootanie district. Examined for Mr. G. B. Wright.

Decomposed vein-stuff, consisting largely of hydrated peroxide of iron with a little dolomite, carrying some galena. Weight of sample, fourteen ounces. It was found, on assay, to contain:

Gold..... trace.  
Silver..... 214·637 ounces to the ton of 2,000 lbs.

- 152.—From the north bank of Fish River, about fifteen miles from its entry into Arrow Lake, Columbia River—West Kootanie district. Examined for Mr. T. W. Bayne.

Gold and Silver assays, cont.

Province of British Columbia, cont.

A coarsely crystalline galena through which was disseminated a little iron pyrites and a few grains of white sub-translucent quartz. It was, in parts, coated with hydrated peroxide of iron. Weight of sample, one pound three ounces. Assays gave:

Gold..... none.  
Silver..... 108.646 ounces to the ton of 2,000 lbs.

153.—From the “ Old England ” claim, Rock Creek—Interior plateau region. Examined for Mr. J. Crawford.

The material consisted of:

- a., from the hanging wall—iron pyrites and decomposition product of the same together with some quartz.
- b., from foot wall—material very similar in character to that from the hanging wall.
- c., from lower ledge—dark grey dolomite carrying small quantities of iron pyrites.
- d., wall rock from between upper and lower ledges—dark grey quartzite associated with a little dolomite, carrying a trifling amount of magnetic pyrites.

A carefully prepared average sample of the whole was found, on assay, to contain:

Gold..... trace.  
Silver..... none.

154.—From the “ Bonanza ” location, right bank of Cayoosh Creek, Lillooet, Fraser River—Interior plateau region.

Milky-white quartz, in association with a dark grey chloritic schist, more or less stained and coated with hydrated peroxide of iron. It contained, here and there, a few specks of iron pyrites. Weight of sample, seven pounds and a-half. Assays gave:

Gold..... 0.991 of an ounce to the ton of 2,000 lbs.  
Silver..... 0.058 “ “ “

155.—From the “ Crown Point ” ledge, left bank of Cayoosh Creek, Lillooet, Fraser River—Interior plateau region.

A white opaque quartz, with which was associated a little dark grey chloritic schist. This specimen, which was for the most part stained with hydrated peroxide of iron, contained readily discernible specks of native gold. Weight of sample, eight ounces. It contained:

Gold..... 0.992 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

156.—Also from the "Crown Point" ledge, but from a depth of twenty-five feet from the surface. Gold and Silver assays, cont.

A white opaque quartz in association with a somewhat bluish-grey shale, carrying small quantities of iron pyrites and containing, in parts, specks of native gold. Province of British Columbia, cont. Weight of sample, three pounds thirteen ounces. Assays showed it to contain :

Gold..... 0.722 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

157.—From near Foster's Bar, about twenty-three miles from Lytton, Fraser River—Interior plateau region.

Consisted of tetrahedrite in association with small quantities of ankerite. The tetrahedrite, freed from all gangue, was found to contain :

Gold..... trace.  
Silver..... 5.833 ounces to the ton of 2,000 lbs.

158.—From the same locality as the preceding specimen.

Consisted of stibnite almost free from gangue. It contained :

Gold..... trace.  
Silver..... 2.187 ounces to the ton of 2,000 lbs.

159.—From a ledge at Anderson Lake, west of Lillooet—Interior plateau region. This, and the following specimen were examined for Mr. C. Phair.

An association of milky-white quartz with small quantities of a dark grey chloritic mineral and carbonaceous shale, carrying small quantities of iron pyrites. Weight of sample, nine ounces.

Assays gave:

Gold..... trace.  
Silver..... none.

160.—From a ledge on the South Fork or tributary of Bridge River, west side of Fraser River, above Lillooet—Interior plateau region.

White sub-translucent quartz, in parts coated with hydrated peroxide of iron and a little blue and green carbonate of copper, carrying small quantities of a mineral composed of lead, copper, silver and sulphur (cuproplumbite?). Weight of sample, one pound four ounces. It was found to contain :

Gold.... distinct trace.  
Silver..... 20.883 ounces to the ton of 2,000 lbs.

161.—From a ledge near North Bend, on the line of the Canadian Pacific Railway, Fraser River—Interior plateau region. Examined for Mr. J. A. Walker

Gold and Silver assays, cont.

Province of British Columbia, cont.

Consisted of milky-white and dark grey quartz, carrying a small amount of iron pyrites. Weight of sample, twelve ounces. It contained :

Gold ..... traces.  
Silver..... none.

162.—This, and the three following specimens are from claims on Jamieson Creek, which runs into the North Thompson River from the west, eight miles above the mouth of Clearwater River—Interior plateau region. They were examined for Mr. D. H. McKenzie.

From the "Home Stake."

White sub-translucent quartz carrying small quantities of galena. The specimen was stained and, in parts, coated with hydrated peroxide of iron and a little carbonate of lead. Weight of sample, nine ounces. Assays gave :

Gold..... 1.108 ounce to the ton of 2,000 lbs.  
Silver..... 34.242 ounces " "

163.—From the "Silver King"—For locality see No. 162.

White sub-translucent quartz, stained and coated with hydrated peroxide of iron, carrying small quantities of galena and tetrahydrate. Weight of sample, seven ounces. It was found to contain :

Gold..... 0.583 of an ounce to the ton of 2,000 lbs.  
Silver..... 2.525 ounces " " "

164.—From the "Silver Queen"—for locality see No. 162.

White sub-translucent quartz, more or less stained and coated with hydrated peroxide of iron, carrying small quantities of galena. Weight of sample, ten ounces. It contained :

Gold..... 0.758 of an ounce to the ton of 2,000 lbs.  
Silver..... 28.992 ounces " " "

165.—From the "Kamloops"—for locality see No. 162.

White sub-translucent quartz, in parts stained and coated with hydrated peroxide of iron, carrying small quantities of galena and iron pyrites. It was found on assay, to contain :

Gold..... 0.700 of an ounce to the ton of 2,000 lbs.  
Silver..... 25.200 ounces " " "

166.—From "Carbonate" lode, Rock Creek, Kettle River, Okanagan district—Interior plateau region.

A somewhat coarse crystalline galena through which was disseminated a little calcite. It was thickly coated with a yellowish-white incrustation, which consisted almost exclusively of carbonate of lead. Weight of sample, five ounces. Assays gave:

Gold..... distinct trace.  
Silver..... 64.166 ounces to the ton of 2,000 lbs.

Gold and Silver  
assays, cont.  
Province of  
British Colum-  
bia, cont.

167.—From Scotch Creek, Shuswap Lake—Interior plateau region.  
Decomposed vein-stuff. Weight of sample, five ounces. Assays showed it to contain:

Gold..... 4.317 ounces to the ton of 2,000 lbs.  
Silver..... 21.350 “ “ “

168.—From Saw Mill Creek, three-quarters of a mile below Nicoamen, Thompson River—Interior plateau region.

Iron pyrites through which was disseminated small quantities of a dark green chloritic mineral and a little calcite. Weight of sample, one pound nine ounces.

It contained neither gold nor silver.

169.—This, and the following specimen are from Big Rock slide, opposite 89-mile stable, Thompson River, east side, eight miles above Spence's Bridge—Interior plateau region.

A highly weathered rock of a brownish-yellow to brownish-red color. Weight of sample, one pound twelve ounces. It contained:

Gold..... trace.  
Silver..... 0.175 of an ounce to the ton of 2,000 lbs.

170.—Quartz, stained and coated with hydrated peroxide of iron and some blue and green carbonate of copper. Weight of sample, one pound five ounces.

It contained neither gold nor silver.

171.—From the west side of the South Thompson River—Interior plateau region.

White sub-translucent quartz, thickly coated with hydrated peroxide of iron. Weight of sample, one pound. Assays gave:

Gold..... none.  
Silver..... 7.758 ounces to the ton of 2,000 lbs.

172.—From the north bank of the Thompson River, valley near Kamloops, about half way from North Thompson to Tranquille—Interior plateau region.

Gold and Silver  
assays, cont.

Province of  
British Colum-  
bia, cont.

An association of quartz and dolomite, stained and, in parts, coated with hydrated peroxide of iron. Weight of sample, two pounds. It was found to contain:

Gold..... trace.  
Silver..... none.

173.—From the north bank of Tulameen River, two miles east of Granite Creek—Interior plateau region.

A tertiary conglomerate, the cementing medium of which consisted very largely of hydrated peroxide of iron. Weight of sample, eight ounces and a-half.

It contained neither gold nor silver.

174.—From the "Stirling" claim, Tulameen River, near Rabbit's, seven miles above Granite Creek—Interior plateau region.

A greyish opaque quartz in association with a small amount of a light greenish-grey chloritic mineral, through which was disseminated a little fine crystalline iron pyrites. It was, in parts, coated with hydrated peroxide of iron. Weight of sample, thirteen ounces. Assays showed it to contain:

Gold..... trace.  
Silver..... trace.

175.—From the "Bonanza Queen" claim, Tulameen River, north bank, about nine miles above Granite Creek—Interior plateau region.

A white opaque to sub-translucent quartz more or less stained and coated with hydrated peroxide of iron and green carbonate of copper, carrying small quantities of copper pyrites with, here and there, a little melaconite. Weight of sample, four pounds ten ounces. It was found, on assay, to contain:

Gold..... 1.342 ounces to the ton of 2,000 lbs.  
Silver..... 5.133      "      "      "

176.—From Loadstone Mountain, nine miles south-westward, on old Brigade trail, from Forks of Otter and Tulameen Rivers—Interior plateau region.

A pale brownish-yellow, in parts greenish-grey and pinkish colored dolomitic rock. Weight of sample, twelve ounces and a-half.

It contained neither gold nor silver.

177.—From mouth of Boulder Creek, lower end of Otter Lake, near Tulameen valley—Interior plateau region.

A partially weathered, fine grained, granite containing, here and there, a few specks of iron pyrites. Weight of sample, ten ounces.

Gold and Silver  
assays, cont.

Province of  
British Colum-  
bia, cont.

It contained neither gold nor silver.

178.—From Barrière River, twelve miles up from North Thompson River—Interior plateau region.

White opaque to sub-translucent quartz in parts coated with hydrated peroxide of iron, in association with a little reddish-brown dolomite. Weight of sample, two pounds six ounces. Assays gave:

Gold..... trace.

Silver..... 0.175 of an ounce to the ton of 2,000 lbs.

179.—From a small creek running into Barrière River—Interior plateau region.

The sample consisted of two specimens—the one a greyish-white sub-translucent quartz in association with a greyish-green chloritic mineral, carrying a little iron pyrites—the other a white sub-translucent quartz, in parts honeycombed, the cavities being lined with hydrated peroxide of iron. Weight of sample, one pound two ounces.

It contained neither gold nor silver.

180.—From Copper Creek, north side of Kamloops Lake—Interior plateau region.

A more or less weathered rock coated with blue and green carbonate of copper, carrying a little bornite. Weight of sample, one pound four ounces. It contained:

Gold..... none.

Silver..... 1.458 ounce to the ton of 2,000 lbs.

181.—From about seven miles east of Louis Creek, Cin-max Valley—Interior plateau region.

White sub-translucent quartz, with which was associated small quantities of a pearl-grey colored chloritic mineral. It was, in parts, stained and coated with hydrated peroxide of iron. Weight of sample, one pound two ounces.

It contained neither gold nor silver.

182.—From Peterson's Creek, Kamloops—Interior plateau region.

A weathered rock of a brownish-yellow color. Weight of sample, one pound fifteen ounces.

It contained neither gold nor silver.



Gold and Silver assays, cont.

Province of British Columbia, cont.

183.—From east side of Nicola Lake, half a mile from head of lake—Interior plateau region.

A highly weathered rock of a white, yellowish-white, greenish-white and brownish-red color. Weight of sample, one pound seven ounces. It was found to contain :

Gold.....	trace.
Silver.....	trace.

184.—From Spioos Creek, fifteen miles south of Nicola River—Interior plateau region.

A weathered rock of a light reddish-brown color, through which was disseminated a few specks of iron pyrites, Weight of sample, one pound seven ounces.

It contained neither gold nor silver.

185.—From mountain at Hope, Fraser River—Coast Ranges and coast region. Examined for Mr: J. Wardle.

The specimen, which was made up of material taken from different parts of the ledge, consisted of a somewhat greyish-white opaque quartz seamed and, in parts, stained with hydrated peroxide of iron. Weight of sample, three pounds seven ounces.

It contained neither gold nor silver.

186.—From the "Argyle" mine, Howe Sound—Coast Ranges and coast region. Examined for Mr. M. A. MacLean.

Consisted of serpentine in association with a little calcite, carrying a trifling amount of iron pyrites. Weight of sample, twelve ounces and a-half.

It contained neither gold nor silver.

187.—From mountains north of Burrard Inlet—Coast Ranges and coast region. Examined for Mr. A. K. Howse.

Magnetite disseminated through a gangue of greyish-green serpentine. The latter constituted but a small proportion, by weight, of the whole. Weight of sample, thirteen ounces. It was found to contain :

Gold.....	none.
Silver.....	0.117 of an ounce to the ton of 2,000 lbs.

188.—From the "McBain" claim, south-west shore of Texada Island (about two miles north of the iron mine)—Coast Ranges and coast region.

An association of greyish-white to white sub-translucent quartz with small quantities of green chloritic schist and calcite, carrying somewhat appreciable quantities of iron pyrites. Weight of sample, two pounds eleven ounces. It contained :

Gold and Silver assays, cont.  
Province of British Columbia, cont.

Gold..... 0.175 of an ounce to the ton of 2,000 lbs.  
Silver..... none.

189.—From Texada Island ; precise locality not stated—Coast Ranges and coast region. Examined for Mr. G. C. Chambers.

White sub-translucent quartz carrying a somewhat large amount of copper pyrites and galena. Weight of sample, two ounces and three-quarters. Assays gave :

Gold..... trace.  
Silver..... 1.633 of an ounce to the ton of 2,000 lbs.

190.—This, and the following specimen are from the "Surprise" claim, about six or seven miles north of Gillis Bay, Texada Island—Coast Ranges and coast region. They were examined for Mr. A. Raper.

From the centre vein.

White sub-translucent quartz carrying some zinc blende and a little iron pyrites and copper pyrites. Weight of sample, eleven ounces and a-half. It contained :

Gold..... trace.  
Silver..... 0.350 of an ounce to the ton of 2,000 lbs.

191.—From the outer vein.

White sub-translucent quartz, in parts stained with hydrated peroxide of iron and green carbonate of copper, carrying small quantities of copper pyrites. Weight of sample, one pound four ounces. Assays showed it to contain :

Gold..... none.  
Silver..... 0.467 of an ounce to the ton of 2,000 lbs.

192.—From the "Little Gem" claim, about five miles north of Gillis Bay, Texada Island—Coast Ranges and coast region. Examined for Mr. A. Raper.

An association of hornblende, magnetite and copper pyrites. Weight of sample, four ounces and a-half. It was found to contain :

Gold..... distinct trace.  
Silver..... 2.100 ounces to the ton of 2,000 lbs.

Gold and Silver  
assays, cont.Province of  
British Colum-  
bia, cont.193.—This, and the two following specimens are from Bowen Island,  
Howe Sound—Coast Ranges and coast region.

Wall rock.

Grey syenitic gneiss, through which was disseminated small quantities of iron pyrites. Weight of sample, one ounce. Assays showed it to contain :

Gold..... trace.

Silver..... 2.100 ounces to the ton of 2,000 lbs.

194.—Ore from lode.

Banded quartzite, containing a few specks of iron pyrites. It was, more or less, stained and coated with hydrated peroxide of iron. Weight of sample, three ounces. Assays gave :

Gold..... none.

Silver..... 0.233 of an ounce to the ton of 2,000 lbs.

195.—Ore from spur.

Banded grey quartzite containing, in parts, a few specks of iron pyrites. It was for the most part stained and coated with hydrated peroxide of iron. Weight of sample, four ounces. It was found to contain :

Gold..... none.

Silver..... 0.117 of an ounce to the ton of 2,000 lbs.

196.—From Lillooet Lake—Coast Ranges and coast region. This, and  
and the following specimen were examined for Mr. T. Armstrong.

A rust stained gneiss carrying small quantities of iron pyrites and copper pyrites. Weight of sample, two pounds one ounce.

It contained neither gold nor silver.

197.—From above Port Haney, Lower Fraser River—Coast Ranges  
and coast region.

Bluish-grey quartz carrying small quantities of copper pyrites and iron pyrites. Weight of sample, fourteen ounces.

It contained neither gold nor silver.

198.—From the "Acadia" claim, South Fork of McDames Creek—  
Cassiar district. This, and the following specimen were received  
from Mr. J. McKay.

Galena in association with small quantities of iron pyrites, magnetic pyrites, copper pyrites, bornite and calcite. Weight of sample, four ounces. It was found, on assay, to contain :

Gold..... none.

Silver..... 74.772 ounces to the ton of 2,000 lbs.

- 199.—From the "Pioneer" claim, McDames Creek—Cassiar district. Gold and Silver assays, cont.  
 White translucent quartz, carrying a considerable quantity of iron pyrites. Province of British Columbia, cont. Weight of sample, fourteen ounces.  
 It contained neither gold nor silver.

MISCELLANEOUS EXAMINATIONS.

Miscellaneous examinations.

- 1.—CLAY. The deposit from which this material was taken is a very large one, extending in a straight line from Sault Ste. Marie to Gros Cap, district of Algoma, province of Ontario. Collected by Dr. A. R. C. Selwyn. Clay from vicinity of Sault Ste. Marie, P.O.

It has a banded structure, the bands varying in color from pale reddish-white to light brownish-red : is plastic : has a fine and close texture : contains no admixture of gritty matter : when burnt it assumes a pale reddish dull yellow color : if well burnt becomes strong, hard and sonorous : at a high temperature is somewhat readily fusible. Agreeably with results of experiments on a small scale, it is well suited for the manufacture of bricks and coarse pottery ware.

- 2.—COAL. From three miles north of Lytton, Fraser River, British Columbia. Examined for Mr. J. W. Mackay. Coal from vicinity of Lytton, B.C.

A very impure coal, containing not less than 36.80 per cent. of a reddish-brown colored ash. Notwithstanding the large amount of the latter, it yielded a slightly coherent coke.

- 3.—LIGNITIC COAL. From a seam on Hat Creek, about sixteen miles north of Ashcroft Station, on the line of the Canadian Pacific Railway, British Columbia. Taken from a depth of about sixty feet. Examined for Mr. H. Abbott. Lignitic coal from Hat Creek, B.C.

It gave, both by slow and fast coking a non-coherent coke. On incineration, it left 10.75 per cent. of a pale yellowish-white colored ash.

- 4.—COAL. From the rear of Big Pond, East Bay, Cape Breton county, province of Nova Scotia. Examined for Mr. M. A. McPherson, P.P. Coal from Big Pond, East Bay, N.S.

A proximate analysis, by fast coking, gave :

Volatile matter.....	41.79
Fixed carbon.....	44.98
Ash.....	13.23
	<hr/>
	100.00
Coke, per cent.....	58.21

Miscellaneous  
examinations,  
cont.

It yields a firm coherent coke. The gases evolved during coking burnt with a yellow, luminous, smoky flame. Color of ash, purplish-brown.

Manganese ore  
from near  
Edgett's Land-  
ing, Hillsbo-  
rough, N.B.

5.—MANGANESE ORE. From near Edgett's Landing, Hillsborough, Albert county, province of New Brunswick.

The material consisted of manganite and ferric hydrate disseminated through a siliceous gangue. A partial analysis gave:

Sesquioxide of manganese.....	18.37	per cent.
Sesquioxide of iron.....	1.31	"
Insoluble siliceous residue.....	71.85	"

equivalent to:

Manganese, metallic.....	12.79	"
Iron ....., " .....	.92	"