

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

CHEMICAL CONTRIBUTIONS

TO THE

GEOLOGY OF CANADA

FROM THE

LABORATORY OF THE SURVEY

BY

G. CHRISTIAN HOFFMANN, F. Inst. Chem., F.R.S.C.,
Chemist and Mineralogist to the Survey.

ASSISTANTS

F. G. WAIT, M.A., F.C.S.,
R. A. A. JOHNSTON.



OTTAWA

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To

ALFRED R. C. SELWYN, C.M.G., LL.D., F.R.S.,
Director of the Geological Survey of Canada.

SIR,—I beg to present, herewith, my report for the interval comprised between the date of my last and December 31st, 1893. It embraces only such portion of the work carried out in the Laboratory of this Survey, as has been considered likely to prove of general interest.

Some of the minerals referred to in the following pages, constitute important, and in some instances, valuable ores, whilst others are of more or less economic importance by reason of their meeting with application in the Arts and Manufactures. Seven of these had not previously been identified, and another although recognized not hitherto recorded, as occurring in Canada.

Of the work herein formulated, the analyses carried out by my assistants have been duly credited to them in the body of the report, those not otherwise designated having been made by myself.

I have the honour to be,

Sir,

Your obedient servant,

G. CHRISTIAN HOFFMANN.

OTTAWA, 29th November, 1894.

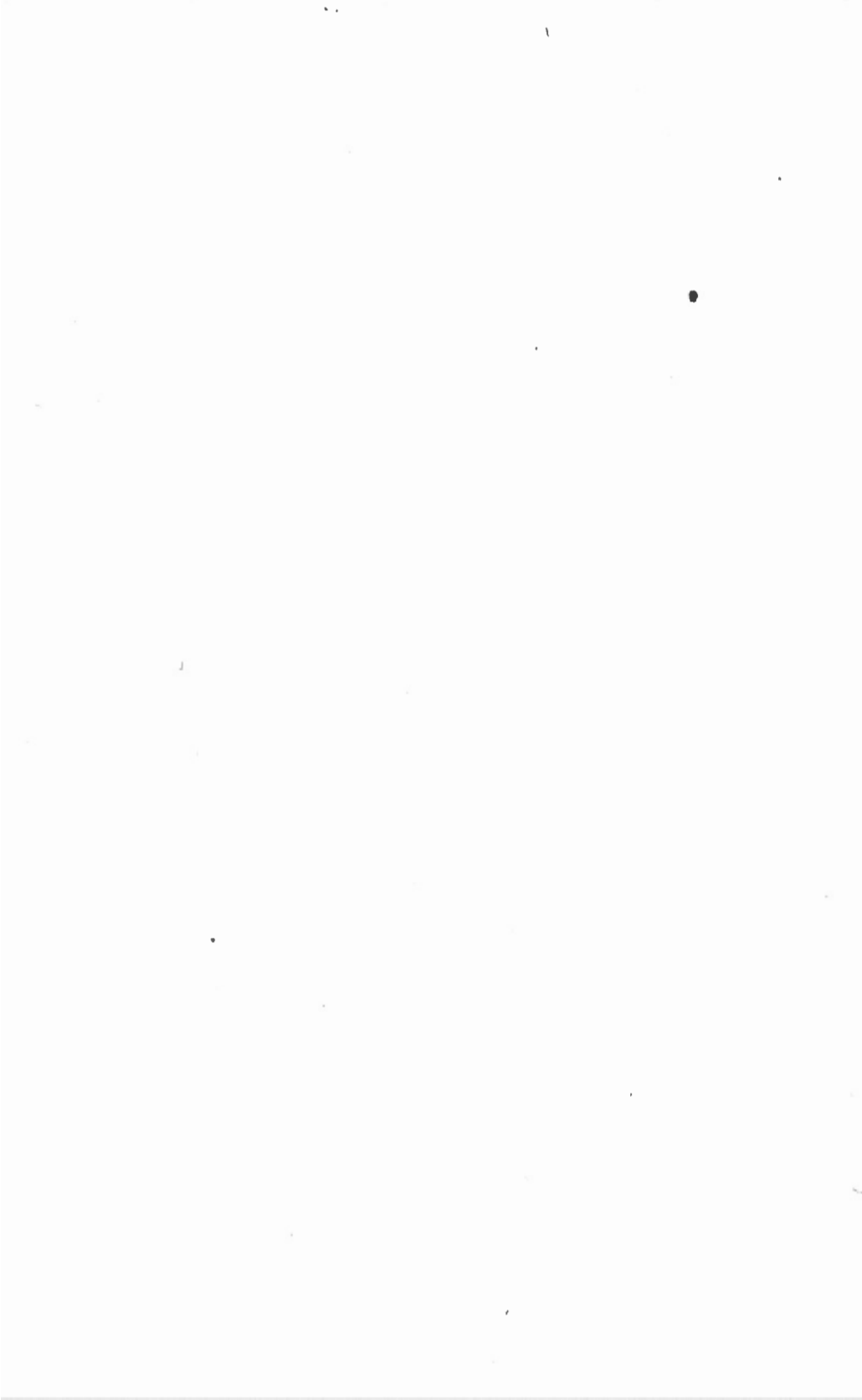


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CHEMICAL CONTRIBUTIONS

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; Annual Report, 1887-88, Part T, and Annual Report, 1888-89, Part R.]

77.—LIGNITE.—From drift in river bed at "The Red Cliff," about seven miles below Prince Albert, North Saskatchewan River, district of Alberta, North-west Territory. Collected by Mr. J. B. Tyrrell.

Lignite from drift in river bed, at the Red Cliff, North Saskatchewan River, N. W. T.

The material was in a more or less finely comminuted condition; about fifty per cent, by weight, of the same passing a mesh of sixteen holes to the linear inch, the remainder consisting of very variously sized, irregularly shaped, more or less rounded fragments, the largest of which, a rounded flattened nodule, measured an inch and a quarter across.

Analysis by fast coking gave:

| | |
|--|----------|
| Hygroscopic water..... | 10·12 |
| Volatile combustible matter..... | 35·98 |
| Fixed carbon..... | 47·27 |
| Ash..... | 6·63 |
| | <hr/> |
| | 100·00 |
| | <hr/> |
| Coke, per cent..... | 53·90 |
| Ratio of volatile combustible matter to fixed carbon | 1 : 1·31 |

It yields a non-coherent coke. Colour of the ash, brownish-yellow.

Coals and lignites, *cont.* 78.—COAL.—From the Similkameen River, six or eight miles south of Vermilion Forks, Yale district, province of British Columbia.

Coal from the Similkameen River, B. C. Examined for Mr. J. M. Buxton.

Analysis by fast coking gave :

| | |
|----------------------|--------|
| Volatile matter..... | 50.13 |
| Fixed carbon..... | 42.67 |
| Ash..... | 7.20 |
| | <hr/> |
| | 100.00 |
| | <hr/> |
| Coke, per cent..... | 49.87 |

It yields a firm coherent coke. Colour of the ash, brownish-yellow. The finely powdered fuel imparted a brownish-yellow colouration to a boiling solution of caustic potash.

Coal from Elk River, B. C. 79.—COAL.—From the fifteen-foot seam on Elk River, Crow Nest Pass, Rocky Mountains, province of British Columbia.

Analysis by fast coking gave :

| | |
|----------------------|--------|
| Volatile matter..... | 21.76 |
| Fixed carbon..... | 68.20 |
| Ash..... | 10.04 |
| | <hr/> |
| | 100.00 |
| | <hr/> |
| Coke, per cent..... | 78.24 |

It yields a non-coherent coke. The gases evolved during coking burnt with a yellowish, slightly luminous, smokeless flame. Colour of the ash, white.

Coal and semi-anthracite from Panther or Little Red Deer River, N. W. T. 80.—COAL AND SEMI-ANTHRACITE.—From Panther or Little Red Deer River, foot-hills at base of main limestone range of Rocky Mountains, district of Alberta, North-west Territory. Seam eleven feet thick, but much folded and broken. Collected by Mr. W. B. M. Davidson.

The material of the sample examined varied considerably in character, and was in this regard separable into two distinct portions. Of these, the one had a compact, highly contorted, structure; showed slickensides in an eminent degree; was made up of layers of a grayish-black, somewhat dull, and jet-black coal of brilliant lustre, and by fast coking gave a firm compact coke—whereas the other portion had a crumpled, foliated structure; was much slickensided; colour, grayish-black, somewhat dull, and by fast coking gave a non-coherent coke.

Analysis, by fast coking, of a fair average sample of the foregoing material, gave :

| | |
|-----------------------------------|--------|
| Hygroscopic water..... | 1·87 |
| Volatile combustible matter | 13·74 |
| Fixed carbon..... | 79·55 |
| Ash..... | 4·84 |
| | <hr/> |
| | 100·00 |

Coke, per cent 84·39
Ratio of volatile combustible matter to fixed carbon 1 : 5·79

Coals and lignites, *cont.*
Coal and semi-anthracite from Panther or Little Red Deer River, N. W. T., *cont.*

It yields a firm coherent coke. The gases evolved during coking burnt with a yellow, luminous, somewhat smoky flame. Colour of the ash, white, with a faint reddish tinge—it does not agglutinate at a bright red heat, but at a most intense red heat it becomes fritted.

81.—SEMI-ANTHRACITE.—From foot-hills, first branch of Panther or Little Red Deer River, to east of base of main Rocky Mountain Range, one mile above confluence with Panther or Little Red Deer River, district of Alberta, North-west Territory. Seam four feet thick, and horizontal. Collected by Mr. W. B. M. Davidson.

Semi-anthracite from Panther or Little Red Deer River, N. W. T.

Structure lamellar, made up of irregularly alternating layers of a grayish-black, somewhat bright, and dense, jet-black coal of brilliant lustre—compact; brittle; fracture, uneven; hard and firm; when suddenly heated decrepitates, but not very considerably.

Analysis by fast coking gave :

| | |
|-----------------------------------|--------|
| Hygroscopic water..... | 1·52 |
| Volatile combustible matter | 11·65 |
| Fixed carbon..... | 81·16 |
| Ash..... | 5·67 |
| | <hr/> |
| | 100·00 |

Coke, per cent 86·83
Ratio of volatile combustible matter to fixed carbon 1 : 6·97

It yields a non-coherent coke. The gases evolved during coking burnt with a yellowish, somewhat luminous, all but smokeless flame. The ash, which is almost pure white, does not agglutinate at a bright red heat, but at a most intense red heat becomes fritted.

This fuel is very similar in composition to the semi-anthracite—of which an analysis is given in the Annual Report of this Survey for 1885, p. 10 M—from a seam on the right bank of the Bow River, one mile and a half from Canmore station, C. P. R., section 29, township 24, range 10, west of the fifth initial meridian, district of Alberta, North-west Territory.

Coals and lignites, *cont.*
 Coal from Camp Robertson, Graham Island, B. C. 82.—COAL.—From Camp Robertson, about six miles and a half north of Skidegate Inlet, and two miles and three-quarters west of Yakoun Lake, section 20, township 5, Graham Island, Queen Charlotte Islands, province of British Columbia. Geological position—Cretaceous.

Structure compact; colour, grayish black; lustre, resinous; fracture irregular; hard and firm; powder, brownish-black; it communicates only a just perceptible yellowish tinge to a boiling solution of caustic potash.

Analysis by fast coking gave:

| | |
|--|----------|
| Hygroscopic water..... | 0·80 |
| Volatile combustible matter..... | 23·27 |
| Fixed carbon..... | 51·39 |
| Ash..... | 24·54 |
| | <hr/> |
| | 100·00 |
| Coke, per cent..... | 75·93 |
| Ratio of volatile combustible matter to fixed carbon | 1 : 2·21 |

It yields, by fast coking, a firm coherent coke. The gases evolved during coking burnt with a yellow, luminous, very smoky flame. Colour of the ash, pale dull reddish-brown.

Coal from Camp Wilson, Graham Island, B. C. 83.—COAL.—From Camp Wilson, about fifteen miles north of Skidegate Inlet, section 36, township 9, Graham Island, Queen Charlotte Islands, province of British Columbia. Geological position—Cretaceous.

Structure, compact; colour, grayish-black; lustre, resinous to sub-vitreous; fracture, irregular; hard and firm; powder dark brown inclining to blackish-brown; it communicates a faint brownish-yellow colour to a boiling solution of caustic potash.

Analysis by fast coking gave:

| | |
|--|----------|
| Hygroscopic water..... | 1·06 |
| Volatile combustible matter..... | 43·48 |
| Fixed carbon..... | 46·01 |
| Ash..... | 9·45 |
| | <hr/> |
| | 100·00 |
| Coke, per cent..... | 55·46 |
| Ratio of volatile combustible matter to fixed carbon | 1 : 1·06 |

It yields, by fast coking, a firm coherent coke. The gases evolved during coking burnt with a yellow, luminous, very smoky flame. Colour of the ash, faint reddish-white.

This fuel may be from another exposure of the same seam as that from which the coal, of which an analysis is given in the Annual Report of this Survey for 1887-88, p. 17 T, was taken.

- 84.—ANTHRACITE.—From Camp Anthracite, about five miles and a half north of Skidegate Inlet and three miles and a half west of Yakoun Lake, section 17, township 5, Graham Island, Queen Charlotte Islands, province of British Columbia. Geological position—Cretaceous.

a Coals and lignites, cont.
Anthracite from Camp Anthracite, Graham Island, B. C.

Structure, compact—shows slickensides in an eminent degree; colour, grayish-black; lustre, bright; brittle; fracture sub-conchoidal; powder black, slight grayish tinge; it communicates a faint brownish-yellow colouration to a boiling solution of caustic potash; when suddenly heated it decrepitates somewhat.

Analysis by fast coking gave :

| | |
|---------------------------------------|--------|
| Hygroscopic water | 1.52 |
| Volatile combustible matter | 8.69 |
| Fixed carbon | 80.07 |
| Ash | 9.72 |
| | <hr/> |
| | 100.00 |

Ratio of volatile combustible matter to fixed carbon 1 : 9.21

It yields a non-coherent coke; when heated in a covered crucible it evolves a small amount of gases which burn with a slightly yellowish, smokeless flame. Colour of the ash, reddish-brown.

- 85.—ANTHRACITE.—From the same locality as the preceding specimen.

Anthracite from Camp Anthracite, Graham Island, B. C.

Structure, compact; colour, grayish-black; lustre, bright; brittle; fracture, conchoidal; powder grayish-black, almost black; it communicates but a scarcely perceptible colouration to a boiling solution of caustic potash; when suddenly heated, decrepitates slightly.

Analysis by fast coking gave :

| | |
|---------------------------------------|--------|
| Hygroscopic water | 2.85 |
| Volatile combustible matter | 7.59 |
| Fixed carbon | 68.25 |
| Ash | 21.31 |
| | <hr/> |
| | 100.00 |

Ratio of volatile combustible matter to fixed carbon 1 : 8.99

It yields a non-coherent coke; the small amount of gases evolved during coking, burnt with a pale yellowish, smokeless flame. Colour of ash, light gray.

The specimen of this fuel received for examination was associated with a somewhat large proportion of a dark gray shale, hence the high percentage of ash and water shown in above analysis. The anthracite freed from associated rock matter, was found to contain only 1.33 per cent of water and but 6.50 per cent of ash.

MISCELLANEOUS MINERALS.

I. NATIVE PLATINUM.

Platinum,
native, from
Rock Creek,
Kettle River,
B. C.

A sample of heavy black sand taken from the ripples of sluice-boxes at Camp McKinney, Rock Creek, a tributary of Kettle River, Osoyoos division of Yale district, province of British Columbia, and which contained, in addition to gold, apparently a large proportion of native platinum, has been examined by Mr. Johnston, and found to have the following composition :

| | |
|----------------------|-------|
| Native platinum..... | 44.7 |
| Gold..... | 1.8 |
| Magnetite..... | 47.4 |
| Quartzose sand..... | 6.1 |
| | 100.0 |

The platinum was in the form of exceedingly minute to moderately coarse, irregular shaped grains, the largest of which measured four millimetres in diameter. Of the above 44.7 per cent platinum found in this material, 5.4 per cent was strongly magnetic ; 15.7 per cent but feebly magnetic, and the remaining 23.6 per cent non-magnetic. No free osmiridium was observed ; on dissolving a portion of the platinum, however, there remained numerous minute, thin, shining, steel-gray coloured scales of this alloy. The gold occurred in small, very irregular shaped grains, the largest not exceeding two to two and a half millimetres in diameter. The associated sand consisted of very fine grains of ash-gray coloured quartz, with a few intermixed grains of a light reddish coloured garnet, and an occasional grain of pyrite. A little chromite was in one instance detected in one of the pellets of platinum, and on another occasion very small quantities of a white felspathic rock was observed under similar conditions.

2. LEPIDOMELANE.

Lepidomelane
from Marmo-
ra, Hastings
county, Ont.

This mineral, the occurrence of which in Canada was first recognized by Mr. R. R. A. Johnston, in 1888, is found in considerable quantity, in aggregations of brilliant black plates or scales, in a fine granular arsenopyrite at the Bob Neill mine on lot fourteen of the tenth concession of the township of Marmorra, Hastings county, province of Ontario. An analysis of a specimen from this locality afforded Mr. Wait the following results :

| | |
|--|-------|
| Silica..... | 32·79 |
| Alumina | 14·34 |
| Ferric oxide..... | 4·52 |
| Ferrous oxide..... | 26·32 |
| Manganous oxide..... | 0·29 |
| Lime..... | 1·45 |
| Magnesia..... | 4·68 |
| Potassa..... | 7·24 |
| Soda..... | 2·00 |
| Titanium dioxide..... | 0·92 |
| Water, at 100° C..... | 1·38 |
| Water, above 100° C. (direct estimation)..... | 3·68 |
| | <hr/> |
| | 99·61 |
| The specific gravity, at 15·5° C., was found to be.... | 3·19 |

Miscellaneous
minerals, *cont.*
Lepidomelane
from Marmo-
ra, Hastings
county, Ont.,
cont.

Lepidomelane also exists abundantly, in the form of brilliant black scales and scaly aggregates, in quartz, at the Feigle mine on lot sixteen of the eleventh concession of the township of Marmora; and it has also been observed, in the form of brilliant black foliated masses and hexagonal tables, the latter sometimes ten to twelve millimetres in diameter, in specimens of the sodalite met with in nepheline-syenite on lot twenty-nine of the thirteenth, and lot twenty-five of the fourteenth concession of the township of Dungannon, also in Hastings county. Likewise, in brilliant black scaly aggregates in a fragment of associated pentlandite, nickeliferous pyrrhotite, and chalcopyrite, from the Worthington mine on lot two of the second concession of the township of Drury, district of Algoma, which, with the aforementioned localities, is in the province of Ontario.

3. ACTINOLITE.

A light greenish-gray, fine-fibrous, massive actinolite from the township of Westmeath, Renfrew county, province of Ontario, has been examined by Mr. Wait, and found to have a specific gravity, at 15·5° C., of 2·941, and—agreeably with the results of his analysis—the following composition:

Actinolite
from West-
meath, Ren-
frew county,
Ont.

| | |
|---|--------|
| Silica.... | 56·70 |
| Alumina..... | 1·62 |
| Ferric oxide..... | 3·06 |
| Ferrous oxide..... | 7·19 |
| Manganous oxide..... | 0·30 |
| Nickelous oxide..... | 0·54 |
| Lime..... | 10·62 |
| Magnesia..... | 17·20 |
| Potassa..... | 0·24 |
| Soda..... | 0·64 |
| Water, at 100° C..... | 0·64 |
| Water, above 100° C. (direct estimation)..... | 2·05 |
| | <hr/> |
| | 100·80 |

Miscellaneous
minerals, *cont.*

4. ANDRADITE.

Andradite
from Cawood,
Pontiac coun-
ty, Que.

From the township of Cawood, Pontiac county, province of Quebec.
Massive ; colour, black by reflected light, dark purplish-red in thin
splinters ; lustre, brilliant ; brittle. Specific gravity, at 15·5° C., 3·690.
An analysis by Mr. Wait gave :

| | |
|-----------------------|--------|
| Silica | 36·09 |
| Alumina | 12·69 |
| Ferric oxide..... | 12·33 |
| Ferrous oxide..... | 3·30 |
| Manganous oxide..... | 0·48 |
| Lime..... | 34·46 |
| Magnesia..... | 0·94 |
| Water, at 100° C..... | 0·04 |
| | 100·33 |

5. ANDRADITE.

Andradite
from near
Foster's Bar,
Fraser River,
B. C.

From near Foster's Bar, about twenty-three miles above Lytton,
Fraser River, Yale district, province of British Columbia.

Massive, very finely granular ; colour, clove-brown ; lustre, dull
resinous ; tough. Specific gravity, at 15·5° C., 3·706. An analysis by
Mr. Wait showed it to have the following composition :—

| | |
|-----------------------|--------|
| Silica..... | 34·52 |
| Alumina..... | 4·09 |
| Ferric oxide..... | 25·82 |
| Ferrous oxide..... | 2·66 |
| Manganous oxide | 0·94 |
| Lime..... | 31·49 |
| Magnesia..... | 0·59 |
| Water, at 100° C..... | 0·03 |
| | 100·14 |

6. GROSSULARITE.

Grossularite
from Litch-
field, Pontiac
county, Que.

From the twelfth lot of the first range of the township of Litchfield,
Pontiac county, province of Quebec.

A massive garnet, of a honey-yellow colour, vitreous lustre, and a
specific gravity, at 15·5° C., of 3·623. Agreeably with the results
of an analysis conducted by Mr. Wait, its composition is as follows :

| | |
|-----------------------|-------|
| Silica | 36·80 |
| Alumina..... | 20·53 |
| Ferric oxide..... | 2·38 |
| Ferrous oxide..... | 0·56 |
| Manganous oxide..... | 0·50 |
| Lime..... | 37·41 |
| Magnesia..... | 1·51 |
| Water, at 100° C..... | 0·07 |
| | 99·76 |

7. HORNBLENDE.

A fine fibrous, radiated, confusedly aggregated, massive, blackish-green hornblende, from near Foster's Bar, about twenty-three miles above Lytton, Fraser River, Yale district, province of British Columbia,—has been examined by Mr. Wait, and found to have a specific gravity, at 15° C., of 3.404, and—agreeably with the results of his analysis—the following composition :

| | |
|---|--------|
| Silica..... | 38.79 |
| Alumina..... | 11.51 |
| Ferric oxide..... | 16.88 |
| Ferrous oxide..... | 15.96 |
| Manganous oxide..... | 0.62 |
| Lime..... | 11.57 |
| Magnesia..... | 2.86 |
| Potassa..... | 1.36 |
| Soda..... | 0.71 |
| Water, at 100° C..... | 0.09 |
| Water, above 100° C. (direct estimation)..... | 0.83 |
| | 101.18 |

Hornblende
from near
Foster's Bar,
Fraser River,
B. C.

8. CLINOCHLORE.

Colour, white or faint bluish-white ; lustre, pearly ; in thin laminae, transparent ; specific gravity, at 15.5° C., 2.631. Occurs in the form of scales and more or less broadly foliated aggregations, distributed through a rock composed of white scapolite and light green-yellow-green serpentine, found on lot twenty-four of the twelfth range of the township of Buckingham, Ottawa county, province of Quebec.

Clinochlore
from Bucking-
ham, Ottawa
county, Que.

An analysis, by Mr. Johnston, conducted on carefully selected material, gave :

| | |
|-----------------------|--------|
| Silica..... | 28.65 |
| Alumina..... | 18.96 |
| Magnesia..... | 37.49 |
| Water (ignition)..... | 15.22 |
| | 100.32 |

The above specimen was collected by Mr. J. F. Torrance, who, at the time of writing his report on the apatite deposits of Ottawa county, provisionally referred the mineral in question, to pyrophyllite (Annual Report of this Survey, 1882-84, p. 20 J).

9. CLINOCHLORE.

From the sixteenth lot of the seventh concession of the township of Bagot, Renfrew county, province of Ontario.

Clinochlore,
from Bagot,
Renfrew
county, Ont.

Miscellaneous minerals, *cont.* Structure, broadly foliated; colour, dark green; lustre, pearly; transparent—even in tolerably thick plates.

Clinocllore from Bagot, Renfrew county, Ont., *cont.*

An analysis, by Mr. Johnston, gave the following results:

| | |
|--------------------------------|-------|
| Silica..... | 27.23 |
| Alumina..... | 19.44 |
| Ferric oxide..... | 2.17 |
| Ferrous oxide..... | 4.91 |
| Chromic oxide..... | 0.99 |
| Magnesia..... | 32.67 |
| Potassa..... | 0.08 |
| Water (direct estimation)..... | 12.04 |
| | <hr/> |
| | 99.53 |

10. TALC.

Talc from Grimsthorpe, Hastings county, Ont.

Occurs on lots eight and nine of the fifth concession of the township of Grimsthorpe, Hastings county, province of Ontario. Presented to the Survey by Mr. A. Moon.

Structure, foliated massive; lustre, pearly on the cleavage surface; colour, pale yellowish-green; in thin laminæ transparent; specific gravity, at 15.5° C., 2.65.

An analysis, by Mr. Wait, gave as follows:

| | |
|---|-------|
| Silica..... | 60.45 |
| Alumina..... | 0.27 |
| Ferric oxide..... | 0.78 |
| Ferrous oxide..... | 2.04 |
| Nickelous oxide..... | 0.50 |
| Lime..... | 0.16 |
| Magnesia..... | 29.84 |
| Water, at 100° C..... | 0.32 |
| Water, above 100° C. (direct estimation)..... | 5.42 |
| | <hr/> |
| | 99.78 |

11. DIALLAGE.

Diallage from Melbourne, Richmond county, Que.

A fine example of a thin-foliated, massive, light greenish-gray diallage, with a pseudo-metallic lustre, has been met with, in serpentine, by Mr. A. Webster, on the twenty-second lot of the second range of the township of Melbourne, Richmond county, province of Quebec.

Mr. Johnston found it to have a hardness of 3.5; a specific gravity, at 15.5° C., of 3.238, and—agreeably with the results of his analysis—the following composition:

| | |
|--------------------------------|-------|
| Silica..... | 50.66 |
| Alumina..... | 4.47 |
| Ferric oxide..... | 0.70 |
| Ferrous oxide..... | 2.75 |
| Chromic oxide..... | 1.40 |
| Lime..... | 21.81 |
| Magnesia..... | 17.45 |
| Water (direct estimation)..... | 0.69 |
| | <hr/> |
| | 99.93 |

12. COBALTIFEROUS LÖLLINGITE.

Miscellaneous
minerals, *cont.*

From the sixteenth lot of the fourteenth concession of the township of Galway, Peterborough county, province of Ontario. Received from the late Mr. J. B. Campbell, July 21, 1888.

Cobaltiferous
löllingite from
Galway,
Peterborough
county, Ont.

The mineral, which was associated with a small quantity of pyrrhotite and a little white translucent quartz, was massive and exhibited only in parts, and that but very indistinctly, any approach to crystalline structure. Colour, steel-gray; lustre, metallic; brittle; fracture uneven; streak, grayish-black; specific gravity (after correction for a little included quartz), at 15.5° C., 7.028.

An analysis, by Mr. Johnston, of carefully selected material, afforded the results given under I. Deducting the gangue (silica) and recalculating the remaining constituents for one hundred parts, we obtain the figures given under II.

| | I. | II. |
|----------------------|--------|--------|
| Arsenic | 70.11 | 70.85 |
| Sulphur | 0.80 | 0.81 |
| Iron | 24.41 | 24.67 |
| Cobalt | 2.85 | 2.88 |
| Nickel | 0.78 | 0.79 |
| Gangue (quartz)..... | 1.69 | .... |
| | 100.64 | 100.00 |

This mineral had not previously been identified as occurring in Canada. If found in quantity it would, by reason of its cobalt and nickel, be of some economic importance.

13. BISMUTHINITE.

From a coarse granite vein on the twenty-first lot of the north range of the road leading to Kaskouia, township of Jonquière, Chicoutimi county, province of Quebec. Collected by Mr. C. W. Willimott.

Bismuthinite
from Jon-
quière, Chi-
coutimi
county, Que.

A lead-gray coloured, foliated massive bismuthinite, with metallic lustre, in a gangue composed of white and pale flesh-red, indistinctly laminated, perthite, a more or less smoky quartz, and a hair-brown (pale yellowish-gray in thin laminae, by transmitted light) muscovite, with some black tourmaline and brownish-red spessartite.

Miscellaneous
minerals, *cont.*
Bismuthinite
from Jon-
quières, Chi-
coutimi coun-
ty, Que., *cont.*

Mr. Johnston found it to have a specific gravity, at 15.5° C., of 6.781 and—agreeably with the results of his analysis—the following composition :

| | |
|-----------------|--------|
| Sulphur | 18.46 |
| Bismuth | 79.28 |
| Lead | 1.68 |
| Copper. | 0.48 |
| Iron. | 0.74 |
| | <hr/> |
| | 100.64 |

This mineral has already been recognized as occurring, but in limited quantity only, in the provinces of Nova Scotia, Ontario and British Columbia.

14. DAMOURITE.

Damourite
from Kicking
Horse Valley
B. C.

This mineral, not previously recognized as occurring in Canada, has been identified by Mr. Johnston as a constituent of a rock specimen from the Kicking Horse Valley, Rocky Mountains, East Kootanie district, province of British Columbia, which had been forwarded to the Survey for assay.

It occurred in the form of yellowish-green scaly aggregations, unctuous to the feel, and of a pearly lustre, in a gangue consisting of an association of a ferruginous dolomite with small quantities of quartz and a little calcite, containing, here and there, a few particles of pyrite, and, in parts, coated with ferric hydrate.

Mr. Johnston found it to have a specific gravity, at 15.5° C., of 2.857, and, conformably with the results of his analysis, the following composition :

| | |
|---|-------|
| Silica | 44.28 |
| Alumina | 33.60 |
| Ferric oxide | 0.62 |
| Magnesia. | 3.03 |
| Potassa | 9.87 |
| Soda. | 0.40 |
| Fluorine | 0.59 |
| Chlorine. | 0.51 |
| Water. | 6.25 |
| | <hr/> |
| | 99.13 |
| Less oxygen, equivalent to fluorine and chlorine. | 0.36 |
| | <hr/> |
| | 98.77 |

In detail, the water determination was as follows :

| | |
|--|-------|
| Loss on drying over sulphuric acid. | 0.68 |
| Subsequent loss on drying at 100° C. | 0.03 |
| Further loss on ignition. | 5.54 |
| | <hr/> |
| | 6.25 |

15. SERICITE-SCHIST.

From the Wait-a-bit Creek which flows into the Columbia River, about two miles north of Donald, East Kootanie district, province of British Columbia, where, according to the collector, Mr. J. J. Driscoll, surveyor, it constitutes extensive rock masses, intersected by quartz veins. Material from some of these latter was found to consist of a white sub-translucent quartz, with inclusions of a white, occasionally light reddish, opaque, cleavable calcite, and small quantities of chalcocite, chalcopyrite, a little pyrrhotite, and a few small crystals of pyrite.

Sericite-schist
from Wait-a-
bit Creek,
Columbia
River, B. C.

The schist has a foliated structure, a light brownish-gray to light reddish-brown colour, a faintly glistening lustre, and an unctuous talc-like feel. A portion of the same was finely pulverized and treated with cold dilute hydrochloric acid (dilute nitric acid where the estimation of chlorine was involved) which removed 38.36 per cent, essentially carbonates, and left a very fine scaly residue, of what proved to be sericite, amounting to 61.64 per cent.

An analysis by Mr. Johnston, of the soluble portion of the rock, showed it to have the following centesimal composition :

| | |
|------------------------|--------|
| Lime | 31.12 |
| Magnesia | 5.84 |
| Ferric oxide | 13.66 |
| Ferrous oxide | 5.43 |
| Potassa | 0.05 |
| Soda | 2.79 |
| Carbonic acid | 35.41 |
| Sulphuric acid | 0.10 |
| Phosphoric acid | 0.10 |
| Silica | 0.96 |
| Chlorine | 0.10 |
| Water, at 100° C | 1.80 |
| Water, combined | 2.64 |
| | 100.00 |

The residue from the hydrochloric acid treatment was next examined, and with the results given under the following heading.

16. SERICITE.

This, the material above referred to as constituting the insoluble portion of the sericite-schist, consisted of very minute scales of a yellowish-brown material, which was found to be sericite.

Sericite from
Wait-a-bit
Creek, Col-
umbia River,
B. C.

Miscellaneous minerals, *cont.* lowish-white colour and pearly lustre. An analysis of the same, after drying at 100° C., afforded Mr. Johnston the following results :

Sericite from Wait-a-bit Creek, Columbia River, B. C., *cont.*

| | |
|--------------------------------|--------|
| Silica | 46.05 |
| Alumina..... | 38.36 |
| Ferric oxide..... | 0.97 |
| Lime..... | 2.40 |
| Magnesia..... | 0.47 |
| Potassa..... | 6.19 |
| Soda | 2.98 |
| Lithia..... | 0.34 |
| Caesia | 0.03 |
| Water (direct estimation)..... | 2.48 |
| | <hr/> |
| | 100.27 |

17. COOKEITE.

Cookeite from Wait-a-bit Creek, Columbia River, B.C. This was met with in the form of thin layers in the afore-mentioned sericite-schist, and was also found in small cavities in the quartz veins which traverse it.

It occurs in crystalline, foliated, translucent masses, of a faint grayish-white to white, or silvery-white and pale apple-green colour. In thin folia it is colourless and transparent; lustre, pearly; feel, greasy. Before the blow-pipe it exfoliates like vermiculite and colours the flame intense carmine-red; in the closed tube gives off water and affords a reaction for fluorine; it is slightly fusible, and gives a blue colour with cobalt solution; with salt of phosphorous it gives a skeleton of silica.

A carefully conducted analysis, by Mr. Johnston, upon apparently pure material, gave :

| | |
|--|--------|
| Silica | 32.00 |
| Alumina | 45.87 |
| Lime | 1.63 |
| Magnesia..... | 0.78 |
| Lithia..... | 2.10 |
| Potassa..... | 0.06 |
| Soda..... | 0.65 |
| Fluorine..... | 0.02 |
| Water | 17.29 |
| | <hr/> |
| | 100.40 |
| Less oxygen, equivalent to fluorine..... | 0.01 |
| | <hr/> |
| | 100.39 |

18. STRONTIANITE.

Strontianite from Nepean, Carleton county, Ont. Some very fine examples, one of which weighed twenty-one pounds, of this mineral have been met with by Mr. C. W. Willimott, on the thirty-first lot of concession A, of the township of Nepean, Carleton

county, province of Ontario—where, so far as his observations have extended, two veins at least, of from four to six inches in width, with a tendency to increase in width with depth, occur traversing the Chazy limestone.

Miscellaneous minerals, *cont.*
Strontianite from Nepean, Carleton county, Ont., *cont.*

The mineral, which entirely fills the veins, has a radiating crystalline massive structure, the foci of the separate divergent groupings being at either wall of the vein, the radial structure of each group extending thence inward, meeting and interlacing at their extremities with those of the similar groupings of the opposite side of the vein—or, failing that, as was occasionally found to be the case, and in the cavities thus formed, terminating in radiating groups of acicular crystals of from five to nine millimetres in length. Colour, pale yellow-green shading into white; translucent; specific gravity, at 15.5° C., 3.704.

An analysis by Mr. Johnston, upon carefully selected material, consisting of crystals, dried at 100° C., gave:

| | |
|-------------------------|-------|
| Carbonic acid | 30.54 |
| Strontia | 65.43 |
| Lime | 3.38 |
| Insoluble | 0.17 |
| | <hr/> |
| | 99.52 |

For economic uses of this mineral, see Strontianite, under Mineralogical Notes (note 24), beyond.

19. NATIVE IRON.

This occurrence, to which my attention was first drawn by Mr. R. L. Broadbent, was observed in some specimens of perthite, collected by Mr. A. E. Barlow in 1893, from a pegmatite vein on lot seven, concession B, of the township of Cameron, district of Nipissing, province of Ontario.

Iron, Native, from Cameron, district of Nipissing, Ont.

The perthite, consisting of inter-laminated brownish-red to reddish-brown orthoclase and reddish-white albite, contained, here and there, inclusions of a grayish-black, massive, feebly magnetic, partially altered, manganiferous magnetite, affording a dark reddish-brown streak.

Portions of the felspar showed marked signs of weathering, the albite more especially being more or less kaolinised. Imbedded in the kaolin, also in the dark reddish-brown limonite in immediate proximity to it, were observable numerous spherules of a steel-gray colour and metallic lustre. These spherules varied greatly in size, a few measuring as much as a millimetre in diameter, the greater number, however, being of far smaller dimensions and many of microscopic minuteness. They were almost perfectly spherical in shape; strongly magnetic; very hard,

Miscellaneous minerals, *cont.*
 Iron, Native, from Cameron, district of Nipissing, Ont., *cont.*

indenting and scratching a hardened steel mortar; brittle; when pulverized emit a distinct phosphoretted odour; immersed in a solution of cupric sulphate, become coated with a film of metallic copper. They were readily attacked by hydrochloric acid, with evolution of hydrogen and a strong odour of phosphine, leaving an insoluble residue consisting of light brownish coloured spherules which on ignition become perfectly white. These spherules, which form the nuclei of the metallic looking grains, have, apparently, a concretionary structure.

Mr. Johnston found the metallic spherules to have a specific gravity, at 15.5° C., of 7.257, and a composition, as follows:

| | |
|---------------------------------------|----------|
| Iron | 90.45 |
| Manganese | 0.75 |
| Nickel | trace. |
| Sulphur | } undet. |
| Phosphorus | |
| Organic matter | |
| Insoluble, non-metallic, residue..... | 7.26 |
| | 98.46 |

Cobalt and copper were sought for and found to be absent. He found the insoluble, non-metallic, residue to contain 88.77 per cent of silica, a little alumina and ferric oxide—not estimated, a very small quantity of lime and possibly some magnesia.

This occurrence recalls to mind that observed by me in a specimen of Huronian quartzite from the north shore of St. Joseph Island, Lake Huron, Ontario, the results of the examination of which appeared in the Transactions of the Royal Society of Canada, vol. VIII., 1890, sec. III., p. 39.

The spherules under consideration differ from those of the St. Joseph Island occurrence in that the metallic layer coating the siliceous nucleus is slightly thicker, giving the globules a higher specific gravity and somewhat different composition, containing but a trace of nickel and no cobalt or copper. Apart from this, there is nothing to lead to an inference that the metallic globules of the two localities have other than a community of origin.

MINERALOGICAL NOTES.

- Alunogen. 1.—Alunogen. Has been found in the form of white and faintly yellowish, silky, delicate fibrous masses on a grayish, somewhat pyritiferous, quartzo-felspathic rock, near Spatsum, on the line of the Canadian Pacific Railway; also, in pale yellowish to white, cellular, mammillary crusts, about four miles west of Savona

station, on the same line of railway, in Yale district, and Dr. G. M. Dawson has met with it in pale ochre-yellow to white, crystalline, cellular masses, at the mouth of Fountain Creek, Fraser River, province of British Columbia. Mineralogical notes, cont.

- 2.—Silver, Native. The material in question was found at a depth of about twenty-eight feet from the surface and immediately underlying the deposit of sphalerite on lot ten, range four, of Calumet township, Pontiac county, province of Quebec. It consisted of an association of a white, grayish-white, and dark gray quartz and a little dark-green diabase, through which was disseminated numerous laminae of native silver. It occurred, sparingly, both massive and in small octahedral crystals in the cavities of a specimen of much honeycombed grayish-white quartz, presented by Mr. Ruecau to Mr. E. D. Ingall, from fifteen miles south-east of Bear Lake, Kaslo-Slocan mining district, West Kootanie, province of British Columbia. Silver, Native.
- 3.—Steatite. A pale grayish-greenish-white, sub-translucent steatite, has been found at the Nith mine, Illecillewaet River, nearly opposite Illecillewaet station, on the line of the Canadian Pacific Railway, West Kootanie district, province of British Columbia. A very pale greenish-white steatite slightly seamed with ferric hydrate and containing, here and there, minute cavities filled with the same mineral, occurs at Stewartdale (Brigend) Mills near Whycomagh, Inverness County, and a greenish-gray sub-translucent steatite has been met with by Mr. Hugh Fletcher at Eagle Head, Gabarus Bay, Cape Breton county, in the province of Nova Scotia. Steatite.
- 4.—Celestite. The specimen forwarded to the Survey for examination consisted of a bluish-gray crystalline-granular massive celestite, in parts stained and permeated by ferric hydrate. It forms a bed about a foot in thickness, in Carboniferous limestone, on the right bank of Sydney River, about a mile and a half above Sydney Bridge, Cape Breton county, province of Nova Scotia. The occurrence is referred to by Mr. Hugh Fletcher in his report on explorations and surveys in Cape Breton, which appeared in the Report of Progress for 1875-76, pp. 399, 417. Celestite.
- 5.—Spinel. Small irregular shaped particles and more or less well defined octahedrons of translucent blue spinel occur, with grains of a yellowish-white garnet, scales of mica and graphite and a little Spinel.

Mineralogical
notes, cont.

serpentine, disseminated through a white, coarsely crystalline dolomitic limestone found on lot sixteen in the tenth range of the township of Portland West, Ottawa county, province of Quebec.

Arquerite.

- 6.—Arquerite. Is mentioned by Dr. G. M. Dawson (*Ann. Rep. Geol. Surv. Can.*, vol. iii., 1887-88, part R), as having been met with, in washing for gold, in several localities in the province of British Columbia, the most noteworthy being the Omenica district, where considerable quantities have been found in the form of scales and nuggets, with placer gold, particularly upon Vital and Silver creeks. The material of a sample from Vital Creek consisted of almost uniformly flattened grains and small nuggets of very irregular contour and varying in size from three to seventeen millimetres in their greatest diameter, and in weight from a little under a decigram to two or slightly over two grams. The maximum size and weight here mentioned is sometimes, if not frequently, exceeded—occasionally greatly so; an elongated flattened nugget, from Vital Creek, of a dull silver-white colour and which, apart from a few pittings, presented a comparatively smooth surface, measuring eighty-eight by forty-nine by nine millimetres and weighing 184.6 grams. An analysis of the material from Vital Creek afforded H. G. Hanks, silver 86.15, mercury, 11.90, silica, 0.45 = 98.50, and a nugget from this district, analysed by Riotte and Leckhardt of San Francisco, was found to contain: silver 83.30, mercury, 11.00, lead 0.40, copper 0.20 = 94.90, as well as traces of gold, platinum and iron.

Mountain
leather.

- 7.—Mountain leather. Some very pretty specimens of this mineral of a light grayish to white colour, attached to a colourless, transparent, cleavable calcite, have been met with in the shaft of the Lake Girard mica mine on lot twenty-three of the second range of the township of Wakefield, Ottawa county, province of Quebec.

Cuprite.

- 8.—Cuprite. Has been recognized as occurring in some specimens of copper ore from the ninth lot of the ninth range of the township of Sutton, Brome county, province of Quebec. These consisted of bornite with small, radiating crystalline masses of grass-green malachite, and, intimately associated with the latter, a hyacinth-red, brownish-red and tile-red, granular or earthy cuprite, in a gangue consisting of an association of white, sub-translucent to translucent quartz with some dark gray mica-schist.

Sulphur,
Native.

- 9.—Sulphur, Native. A specimen of pyrite, from the fifth lot of the fourth concession of the township of Darling, Lanark county,

which had been exposed for some time to the atmosphere of a damp cellar, was found to have become, in parts, covered with a bright lemon-yellow incrustation of sulphur; and a pale yellowish-grayish-white, earthy, slightly compacted, almost pure sulphur, resulting from the decomposition of pyrite, was found occupying cavities in a white translucent quartz from the third lot of the first concession of Denbigh, Addington county, province of Ontario.

Mineralogical
notes, cont.

- 10.—Chabazite. Pale wine-yellow and white crystals of chabazite have been met with, by Mr. H. P. Brumell, in the cavities or fissures of a vein, composed of pyroxene, biotite, scapolite and a little quartz and calcite, cutting granitic rock on lots twenty-four and twenty-five of the sixth concession of the township of Mont-eagle, Hastings county, province of Ontario. Chabazite.
- 11.—Chrome-magnesia mica. A very pretty, bright grass-green mica which entered largely into the composition of the gangue of a specimen of nickeliferous pyrrhotite from lot six, of the first concession of the township of Hyman, district of Algoma, province of Ontario, has been examined by Mr. R. A. A. Johnston, and proved to be a chromiferous biotite. Chrome-magnesia mica.
- 12.—Morenosite. Occurs as a greenish-white and pale apple-green incrustation on associated gersdorffite, niccolite, chalcopyrite and pyrrhotite, at the O'Connor claim on lot twelve of the third concession of the township of Denison, district of Algoma, province of Ontario; also, but more sparsely, as a greenish-white incrustation on some of the nickeliferous ore of the Worthington mine on lot two of the second concession of the township of Drury in the same district. Morenosite.
- 13.—Pyrargyrite, dark red silver ore, was observed as occurring in small aggregations, scattered through a purplish-bluish-gray, very fine granular galena—locally known as 'steel ore'—obtained by Mr. E. D. Ingall, from the Dardanelles claim, five miles south of Bear Lake, Kaslo-Slocan mining district, West Kootanie, province of British Columbia. This mineral had not previously been met with in Canada. Pyrargyrite.
- 14.—Anglesite. Was recognized by Mr. Johnston as occurring, in the form of small colourless translucent to sub-transparent rhombic octahedrons, with crystals of cerussite, implanted on the surface of a specimen of very fine granular galena, presented by Mr. Hector Anglesite.

Mineralogical
notes, *cont.*

McRae to the Survey, from the Wellington mine, two miles and a half north-east of Bear Lake, Kaslo-Slocan road, West Kootanie district, province of British Columbia. This mineral had not previously been identified as occurring in Canada.

- Tennantite. 15.—Tennantite. Among other specimens received for examination was a sample of ore from the ninth lot of the ninth concession of the township of Barrie, Frontenac county, province of Ontario, which was found to consist of a slightly argentiferous, somewhat coarse granular, massive tennantite, through which was disseminated a small quantity of quartzose gangue. More recently samples of ore have been sent by other parties which were taken respectively from lots six, seven and eight, in addition to nine, of aforementioned concession and township. These all consisted of tennantite similar to that above described, the specimens differing from each other only in the nature of the gangue, which consisted either exclusively of a fine granular dolomite or of a quartzofelspathic rock, or of an association of these or of the dolomite with a white sub-translucent quartz.
- Cerussite. 16.—Cerussite. Was identified by Mr. Johnston as occurring in the form of small white sub-transparent to transparent crystals, together with crystals of anglesite, on the surface of a specimen of very fine granular galena, presented to the Survey by Mr. Hector McRae, from the Wellington mine, two miles and a half north-east of Bear Lake, Kaslo-Slocan road, West Kootanie district, province of British Columbia; also, in yellowish-white to white, translucent to sub-transparent penetration twins, producing stellite forms, occurring, according to Mr. E. D. Ingall by whom the specimen was collected, in cavities in the galena at the Beaver mine, twelve miles west of Kaslo, on the abovementioned Kaslo-Slocan road.
- Calamine, Electric. 17.—Calamine, Electric. Has been identified by Mr. Johnston, as occurring in the form of small, brilliant, colourless, transparent, elongated tabular crystals having vertically striated faces, in radiating groups in cavities in a grayish-white cryptocrystalline quartz, obtained by Mr. E. D. Ingall, from the Skyline claim, two miles west-south-west from Ainsworth, West Kootanie district, province of British Columbia; and a confused loosely aggregated mass of similar crystals, containing in its interstices green carbonate of copper and some ferric hydrate, was met with, and presented by Mr. Ruecau to Mr. Ingall, eight miles east-south-east of the upper forks of Carpenter Creek, which flows into Slocan Lake, also

in the West Kootanie district. This mineral had not previously been recognized as occurring in Canada. Mineralogical notes, cont.

- 18.—Hydrous nickel arsenate. Some specimens of gersdorffite which had lain in the drawers of a mineral cabinet for about a couple of years, were found to have undergone a partial decomposition, with formation of a hydrous nickel arsenate. The material, which came from the O'Connor claim on lot twelve of the third concession of the township of Denison, district of Algoma, province of Ontario, consisted of gersdorffite, with here and there a few scattered particles of chalcopyrite, in a gangue of grayish-white to white translucent quartz, with which was associated small quantities of a fine grained diabase and chloritic schist. The nickel arsenate, which occurred both lining and filling cavities in the gersdorffite, was in the former case, in the form of botryoidal, globular or mammillary crusts of a greenish-yellow, pale grass-green, and honey-yellow to brownish colour and, exteriorly of a sub-vitreous to vitreous lustre; whilst that filling the cavities was compact and amorphous, texture colloid, of a greenish-yellow colour and waxy lustre, also occasionally, but more rarely, earthy, chalk-like and dull. Hydrous nickel arsenate.
- 19.—Lepidolite. Has been identified by Mr. Johnston as occurring in aggregations of white, translucent, pearly scales, with small crystals of calcite, in cavities in a specimen of highly rust-stained quartz, collected by Mr. E. D. Ingall, from the Gold Hill claim, about ten miles north-east of Illecillewaet station, on the line of the Canadian Pacific Railway, West Kootanie district, province of British Columbia. This mineral had not previously been recognized as occurring in Canada. Lepidolite.
- 20.—Altaite. Amongst other specimens, presented by Mr. Ruecau to Mr. Ingall, was one, recognized by Mr. Johnston as consisting of massive altaite or lead telluride, in a gangue of white sub-translucent quartz, said by him to have been found six miles north of Liddle Creek, Kaslo River, West Kootanie district, province of British Columbia. This mineral was not previously known to occur in Canada. Altaite.
- 21.—Opal, Common. A slightly bluish-white, in parts, faint bluish-green, sub-translucent, milk-opal, with a vitreous lustre, was presented to Mr. Ingall by Mr. Ruecau, as coming from three miles and a half south-east of Four-mile Creek, Slocan Lake, West Kootanie district, province of British Columbia. Opal, Common.

Mineralogical
notes, cont.
Arsenolite.

22.—Arsenolite. This was found by Mr. R. A. A. Johnston to enter very largely into the composition of a more or less heavy, white, in parts dull yellowish coloured, incrustation which occurred on a specimen of native arsenic from seven miles up Watson Creek, west side of the Fraser River, twenty-five miles above Lillooet, province of British Columbia. It has also been recognized by Mr. Johnston as occurring in the form of a more or less thick incrustation upon a specimen of arsenopyrite from mining location W. R. III., in township 40, south-east side of Lake Wahnapiatae, district of Nipissing, province of Ontario. The occurrence of this mineral in Canada had not previously been observed.

Jamesonite.

23.—Jamesonite. Amongst other specimens received for identification, were some good examples of a fibrous massive jamesonite from the seventh lot of the ninth concession, and tenth lot of the eighth concession, respectively, of the township of Barrie, Frontenac county, province of Ontario. Of these, that from the first mentioned locality was associated with a little chalcopyrite, and occurred in a gangue consisting of a fine-granular dolomite, with small quantities of quartz, and a little felspar; whilst that from the last mentioned locality, and from which the gangue had been removed, was associated with a little sphalerite.

Strontianite

24.—Strontianite. A fine example of this mineral, weighing some nine and a half ounces, in the form of a crust of from one and a half to two centimetres in thickness, having a prismatic crystalline structure, a pale yellow-green colour, and translucent, was found by Dr. G. M. Dawson on the property of the Horsefly Hydraulic Mining Company, Horsefly River, Cariboo district, province of British Columbia, where, as he informs me, "this mineral occurs incrusting boulders or filling irregular cavities in the lower or cemented portion of the auriferous gravels, and is also found disseminated in hard clayey concretionary masses formed beneath the auriferous gravels, in the decomposed superficial parts of the underlying Tertiary (Miocene) shales, which constitute the bed-rock at this mine."

The occurrence of strontianite in the township of Nepean, Carleton county, Ontario, has already been referred to in the preceding part of this report, where, under 'Miscellaneous minerals,' No. 18, a full description and analysis of the mineral from that locality will be found.

Strontianite, strontium carbonate, is of economic importance by reason of its employment for the manufacture of strontium hydrate, which is largely used in the preparation and refining of beet-root sugar, and in the extraction of crystallisable sugar from

molasses. It is also employed for the manufacture of strontium nitrate, a salt much used in pyrotechny. Mineralogical notes, cont.

- 25.—Cinnabar. What may prove to be an important deposit of this mineral, has been met with near the mouth of Copper Creek, Kamloops Lake, province of British Columbia, where, according to Dr. G. M. Dawson, from observations made in 1894, it occurs in veins, largely composed of quartz and calcite with some dolomite and barite, traversing Tertiary volcanic rocks. Cinnabar.

On the occasion of his visit to the above mentioned locality in 1892, Mr. E. D. Ingall obtained, at the Rosebush claim—where at that time some very encouraging showings of the ore had been exposed, several handsome specimens of the mineral. The finest of these—which weighed some six pounds six ounces, and contained, approximately, thirty per cent, by weight, of the mineral—consisted of a reddish-brown, sometimes cherry-red, more rarely cochineal-red coloured, granular massive cinnabar, with a few particles of pyrite, in a gangue consisting of an association of fine to somewhat coarse crystalline dolomite, with small quantities of a grayish-white feldspathic rock, weathering brownish-yellow, and a little barite. In other specimens the gangue was composed of an association of white crystalline calcite, with a bluish-gray crypto-crystalline quartz and small quantities of the aforementioned feldspathic rock. Stibnite may be referred to as an associated mineral, specimens of the same, in the form of radiating groups of acicular crystals in a gangue of white crystalline dolomite and barite, having been found by Dr. Dawson in some of the veins carrying cinnabar at the Rosebush claim.

ROCKS.

- 1.—A vesicular lava from Mount Franklin, Talbot county, Victoria, Australia. Collected by Dr. A. R. C. Selwyn. Lava from Mount Franklin, Victoria, Australia.

This was found—agreeably with the results of an analysis, conducted by Mr. Wait—to have the following composition :

| | |
|--------------------------|-------|
| Silica..... | 44·85 |
| Alumina..... | 20·63 |
| Ferric oxide..... | 6·91 |
| Ferrous oxide..... | 5·10 |
| Manganous oxide..... | 0·41 |
| Lime..... | 8·69 |
| Magnesia..... | 6·27 |
| Potassa..... | 2·65 |
| Soda..... | 3·28 |
| Water, at 100° C..... | 0·69 |
| Water, above 100° C..... | 1·15 |

100·63

Rocks, cont. 2.—Granites taken from different granite masses occurring at the undermentioned localities in Halifax county, province of Nova Scotia. Collected by Mr. E. R. Faribault, of the Survey, 1891 :

1, From the east side of Ship Harbour ; 2, 3, and 4, from Beaver Dam Lake, Sheet Harbour road ; 5, 6, and 7, from one mile north of the Waverley gold mine. An average sample prepared from equal weights of each of these seven specimens of granite, was found by Mr. Wait, to have the following composition :

| | |
|--------------------------|--------|
| Silica..... | 70·49 |
| Alumina..... | 17·47 |
| Ferric oxide..... | 1·14 |
| Manganous oxide..... | trace. |
| Lime..... | 1·71 |
| Magnesia..... | 0·57 |
| Potassa..... | 4·18 |
| Soda..... | 4·13 |
| Water, at 100° C..... | 0·15 |
| Water, above 100° C..... | 0·19 |

100·03

Andalusite and staurolite schists, etc., from Guysborough and Halifax counties, N. S. 3.—The following rocks, occurring in close proximity to masses of the same varieties of granite as the above, are from the undermentioned localities in Guysborough and Halifax counties. They were collected by Mr. Faribault, 1891 :

1, Slate from Larry's River, some two miles above the bridge ; 2, andalusite schist from Larry's River, one mile above the bridge ; 3, slate, from Larry's River, above lower bridge ; 4, slate, from Larry's River, at lower bridge ; 5, quartzite, from Country Harbour ; 6, altered quartzite, from the north end of Mount Misery ; 7, altered quartzite, from Mount Misery ; 8, andalusite schist, from Larry's River, two miles above the post office ; 9, staurolite schist, from Salmon River ; 10, breccia, from Mount Misery ; 11, andalusite schist, from Canso road, east of Fox Island post office ; 12, quartzite breccia, from Upper Liscomb River ; 13, andalusite schist, from point between American Cove and English Cove, Tor Bay ; 14, mica-schist, from Seven-mile Stream, Sheet Harbour, two miles above Indian road ; 15, altered quartzite, from the west side of Country Harbour, between Locusts Beach and Mount Misery. Of these localities, Nos. 9 and 14 are in Halifax county, and the remainder in Guysborough county.

An average sample prepared from equal weights of each of these fifteen rocks, was found by Mr. Wait to have the following composition :

| | |
|--------------------------|--------------|
| Silica..... | 62·11 |
| Alumina.. | 21·19 |
| Ferric oxide | 5·61 |
| Manganous oxide..... | 1·18 |
| Lime..... | 2·36 |
| Magnesia..... | 1·29 |
| Potassa | 3·59 |
| Soda..... | 2·12 |
| Water, at 100° C . | 0·33 |
| Water, above 100° C..... | 0·62 |
| | <hr/> 100·40 |

Rocks, *cont.*
Andalusite
and staurolite
schists, etc.,
from Guys-
borough and
Halifax
counties,
N. S., *cont.*

4.—Indurated clay, from Souris City, Souris River, province of Manitoba. Collected by Dr. A. R. C. Selwyn.

Indurated
clay from
Souris City,
Souris River,
Man.

Structure, compact. Colour, light bluish-gray. Lustre, dull. Smooth, but meagre to the touch. Adheres strongly to the tongue. Tough. Somewhat sonorous. Hardness, about 3. Fracture, irregular, occasionally imperfectly large conchoidal. Geological position, Cretaceous (Pierre formation).

Mr. Wait has made an analysis of this material, and with the following results :

| | |
|--------------------------|-------------|
| Silica..... | 79·55 |
| Alumina | 8·35 |
| Ferric oxide. | 1·90 |
| Lime..... | 1·50 |
| Magnesia..... | 1·02 |
| Potassa..... | 1·16 |
| Soda..... | 0·01 |
| Water, at 100° C. | 2·56 |
| Water, above 100° C..... | 3·50 |
| | <hr/> 99·55 |

This rock may be ground, with tolerable facility, to a soft impalpable powder, which forms with water a more or less plastic mass. It is, as may be seen by the result of my experiments (Report of Progress of this Survey for 1880-82, p. 2 H) exceedingly well adapted for the manufacture of both ordinary building and fire brick—the latter proving exceedingly refractory. The material is so situate as to be readily accessible, and occurs in practically unlimited quantity.

LIMESTONES.

Continued from page 27 R of the Annual Report of this Survey (vol. iv.) for 1888-89.

The following Cambro-Silurian limestones are from some of the more important beds (here referred to in descending order) at Wright's (formerly Mahoney's) quarry, ward No. 1, city of Hull, township of Hull, Ottawa county, province of Quebec.

Limestone
from upper-
most bed,
Wright's
quarry, Hull,
Ottawa
county, Que.

- 8.—From the uppermost bed. This has a thickness of two feet. The material of the same, which is much broken, is chiefly, if not exclusively, used for the manufacture of lime.

Structure, somewhat fine-crystalline; colour, faintly brownish ash-gray.

It was found, by Mr. Johnston, to have the following composition :

(After drying at 100° C.—Hygroscopic water = 0·14 per cent).

| | | |
|------------------------|-------|--------|
| Carbonate of lime..... | 97·66 | |
| “ magnesia..... | 1·38 | |
| “ iron..... | 0·16 | |
| Alumina..... | — | } 0·67 |
| Silica, soluble..... | — | |
| Insoluble matter..... | 0·67 | |
| | | 99·87 |

Limestone
from third
bed, Wright's
quarry, Hull,
Ottawa
county, Que.

- 9.—From the third bed; thickness of the same, one foot three inches. The stone is employed for building purposes.

Structure, somewhat fine-crystalline; colour, bluish-gray.

An analysis, by Mr. Johnston, showed it to have the following composition :

(After drying at 100° C.—Hygroscopic water = 0·09 per cent).

| | | |
|------------------------|-------|--------|
| Carbonate of lime..... | 96·25 | |
| “ magnesia..... | 2·18 | |
| “ iron..... | 0·32 | |
| Alumina..... | 0·05 | } 1·33 |
| Silica, soluble..... | 0·07 | |
| Insoluble matter..... | 1·21 | |
| | | 100·08 |

Limestone
from fifth bed,
Wright's
quarry, Hull,
Ottawa
county, Que.

- 10.—From the fifth bed; thickness of same, one foot two inches. The stone is employed for building purposes.

Structure, fine-crystalline; colour bluish-gray.

An analysis, conducted by Mr. Johnston, gave as follows :

(After drying at 100° C.—Hygroscopic water = 0·07 per cent).

| | | |
|------------------------|-------|--------|
| Carbonate of lime..... | 96·19 | |
| “ magnesia..... | 1·72 | |
| “ iron..... | 0·26 | |
| Alumina..... | 0·05 | } 1·74 |
| Silica, soluble..... | 0·09 | |
| Insoluble matter..... | 1·60 | |

99·91

Limestones,
cont.
Limestone
from fifth bed,
Wright's
quarry, Hull,
Ottawa
county, Que.

11.—From the tenth bed ; thickness of same, one foot six inches. The stone is employed for building purposes.

Structure, somewhat coarsely crystalline ; colour, faintly brownish ash-gray.

Agreeably with the results of an analysis, conducted by Mr. Johnston, it has the following composition :

(After drying at 100° C.—Hygroscopic water = 0·08 per cent).

| | | |
|------------------------|-------|--------|
| Carbonate of lime..... | 96·92 | |
| “ magnesia..... | 1·59 | |
| “ iron..... | 0·25 | |
| Alumina..... | 0·07 | } 2·06 |
| Silica, soluble..... | 0·02 | |
| Insoluble matter..... | 1·97 | |

100·82

Limestone
from tenth
bed, Wright's
quarry, Hull,
Ottawa
county, Que.

IRON ORES.

1.—Magnetite. From what has been described as a vein, twenty-five feet wide, on the north shore of West Redonda Island, Gulf of Georgia, province of British Columbia. Examined for Mr. Geo. De Wolf.

A grayish-black, highly magnetic, somewhat fine-crystalline granular, massive magnetite. Its analysis afforded Mr. Wait the following results :

| | |
|----------------------|--------|
| Ferric oxide..... | 62·952 |
| Ferrous oxide..... | 28·067 |
| Manganous oxide..... | 0·110 |
| Potassa..... | 0·080 |
| Soda..... | 0·230 |
| Lime..... | 2·234 |
| Magnesia..... | 1·300 |
| Alumina..... | 0·220 |
| Silica..... | 4·353 |
| Phosphoric acid..... | none. |
| Sulphur..... | 0·015 |
| Titanic acid..... | none. |
| Water..... | 0·045 |

99·606

| | |
|-----------------------------|--------|
| Iron, as ferric oxide..... | 44·066 |
| Iron, as ferrous oxide..... | 21·830 |
| Total metallic iron..... | 65·896 |
| Phosphorus..... | none. |
| Sulphur..... | 0·015 |

Iron ores,
cont.
Magnetite
from Big
Turtle River,
Ont.

- 2.—Magnetite. From Lake 'where the river bends,' Big Turtle River, district of Rainy River, province of Ontario. Collected by Mr. W. H. C. Smith.

A very fine-granular, massive magnetite. Mr. Wait found it to contain :

| | |
|-----------------------|-----------------|
| Metallic iron..... | 40·17 per cent. |
| Insoluble matter..... | 37·21 " |
| Titanic acid..... | none. |

Magnetite
from Crooked
River, Ont.

- 3.—Magnetite. From two miles south-west of intersection of south boundary of the township of Moss with Round Lake River—Crooked River, district of Thunder Bay, province of Ontario. This, and the two following specimens were collected by Mr. W. McInnes.

A fine-granular magnetite. Determinations by Mr. Wait, gave :

| | |
|-----------------------|-----------------|
| Metallic iron..... | 42·57 per cent. |
| Insoluble matter..... | 38·45 " |
| Titanic acid..... | none. |

Magnetite
from south of
Moss, Ont.

- 4.—Magnetite. From south of the township of Moss, a mile and a half west of locality of occurrence of the preceding specimen, district of Thunder Bay, province of Ontario.

A fine-granular magnetite. Examined by Mr. Wait it was found to contain :

| | |
|-----------------------|-----------------|
| Metallic iron..... | 42·64 per cent. |
| Insoluble matter..... | 38·63 " |
| Titanic acid..... | none. |

Magnetite
from south of
Moss, Ont.

- 5.—Magnetite. From south of the township of Moss, and north of locality of occurrence of the preceding specimen, district of Thunder Bay, province of Ontario.

A fine-granular magnetite. Mr. Wait found it to contain :

| | |
|-----------------------|-----------------|
| Metallic iron..... | 51·20 per cent. |
| Insoluble matter..... | 26·99 " |
| Titanic acid..... | none. |

Magnetite
from vicinity
of Little Pic
River, Ont.

- 6.—Magnetite. From the vicinity of Little Pic River, Heron Bay, Lake Superior, province of Ontario. Examined for Mr. Morisseau.

It consisted of an intimate association of magnetite, quartz, and garnet, and, agreeably with determinations conducted by Mr. Wait, contained :

| | |
|--------------------|-----------------|
| Metallic iron..... | 42·22 per cent. |
|--------------------|-----------------|

- 7.—Magnetite. From Green-water Lake, district of Thunder Bay, Iron ores, province of Ontario. Collected by Mr. W. McInnes. *cont.*
Magnetite from Green-water Lake, Ont.
- A very fine grained, almost compact, schistose magnetite.
- Determinations by Mr. Wait gave :

| | |
|------------------------|-----------------|
| Metallic iron | 52·82 per cent. |
| Insoluble matter | 22·31 “ |
| Titanic acid | none. |

- 8.—Clay iron-stone. From what has been designated the Christie Clay iron-stone from Christie coal mine, section 10, township 5, range 1, west of the 5th initial meridian, district of Alberta, North-west Territory. N. W. T.

The material, which was of a grayish-black colour, was found by Mr. Wait to contain :

| | |
|------------------------|-----------------|
| Metallic iron | 33·32 per cent. |
| Insoluble matter | 2·66 “ |

NICKEL AND COBALT,

Estimation of, in pyrrhotite from various localities in the provinces of Nova Scotia, Quebec, Ontario and British Columbia.—Continued from page 48 R of last Annual Report of this Survey, Vol. v., 1889-91.

- 1.—From the land of Mrs. Catherine O’Hanley, on the rear of Pyrrhotite from rear of George’s River, and known as Rear of Leitch’s Creek, Cape Leitch’s Breton county, province of Nova Scotia. Examined for Mr. Alex. McLeod. Creek, Cape Breton county, N. S.

The material consisted of pyrrhotite through which was disseminated a somewhat large amount of siliceous gangue. Mr. Wait found it to contain :

| | |
|--------------|----------------|
| Nickel | 0·75 per cent. |
| Cobalt | trace. |

The gangue constituted 25·40 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0·10 per cent nickel.

- 2.—From lot two of the eighth range of the township of Eardley, Pyrrhotite from Eardley Ottawa county, province of Quebec. Examined for Mr. W. A. Allan. Ottawa county, Que.

A massive pyrrhotite. An analysis by Mr. Johnston showed it to contain :

| | |
|--------------|----------------|
| Nickel | 0·13 per cent. |
| Cobalt | none. |

Nickel and cobalt, *cont.*
Pyrrhotite from Dalhousie, Lanark county, Ont.

- 3.—From the east-half of lot eighteen of the third concession of the township of Dalhousie, Lanark county, province of Ontario. Examined for Mr. W. C. Caldwell.

It consisted of an association of pyrrhotite with a small quantity of pyrite, in a gangue of quartz-mica-diorite. Mr. Wait found it to contain :

| | |
|--------------|-----------------|
| Nickel | .0·09 per cent. |
| Cobalt | trace. |

The gangue constituted 20·50 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0·11 per cent nickel.

Pyrrhotite from Anglesea, Addington county, Ont.

- 4.—From lot fifteen, range A of the township of Anglesea, Addington county, province of Ontario. Examined for Mr. B. Clark.

A dark gray gneissoid rock through which was disseminated a fairly large amount of pyrrhotite and a trifling quantity of copper-pyrites. Agreeably with the results of determinations made by Mr. Wait, it contained :

| | |
|--------------|----------------|
| Nickel | 0·10 per cent. |
| Cobalt | trace. |

The gangue constituted 37·89 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0·16 per cent nickel.

Pyrrhotite from Galway, Peterborough county, Ont.

- 5.—From the twelfth lot of the third concession of the township of Galway, Peterborough county, province of Ontario. Examined for Mr. E. D. Orde.

A compact, massive, pyrrhotite. It was found by Mr. Wait to contain :

| | |
|--------------|-----------------|
| Nickel | .0·16 per cent. |
| Cobalt | trace. |

Pyrrhotite from Galway, Peterborough county, Ont.

- 6.—From the eighteenth lot of the fourth concession of the township of Galway, Peterborough county, province of Ontario. Collected by Dr. F. D. Adams.

A massive pyrrhotite in association with very small quantities of iron-pyrites, in a gangue of white sub-translucent quartz. The specimen, which was in parts thickly coated with ferric hydrate, weighed one pound nine ounces. Determinations by Mr. Johnston gave :

| | |
|--------------|-----------------|
| Nickel | .0·10 per cent. |
| Cobalt | trace. |

The gangue constituted 17·25 per cent, by weight, of the whole. Nickel and Cobalt, *cont.*
The metalliferous portion of the ore contained, therefore, 0·12 per cent nickel.

- 7.—From the sixteenth lot of the fourteenth concession of the township of Galway, Peterborough county, province of Ontario. Examined for Mr. R. H. G. Chapman. *Pyrrhotite from Galway, Peterborough county, Ont.*

A compact, massive, pyrrhotite with which was associated a little pyrite and trifling amounts of copper-pyrites and quartz. Weight of sample, two pounds seven ounces. Mr. Wait found it to contain :

| | |
|--------------|----------------|
| Nickel..... | 0·10 per cent. |
| Cobalt | trace. |

- 8.—From the south end of lot sixteen in the fourteenth concession of the township of Galway, Peterborough county, province of Ontario. Collected by Dr. F. D. Adams. *Pyrrhotite from Galway, Peterborough county, Ont.*

A massive pyrrhotite with which was associated very small quantities of copper-pyrites, quartz and felspar. Determinations by Mr. Johnston gave :

| | |
|--------------|----------------|
| Nickel..... | 0·05 per cent. |
| Cobalt | trace. |

- 9.—From the sixteenth lot of the fifteenth concession of the township of Galway, Peterborough county, province of Ontario. Collected by Dr. F. D. Adams. *Pyrrhotite from Galway, Peterborough county, Ont.*

A white sub-translucent quartz, stained and coated with ferric hydrate, carrying some pyrrhotite and a small quantity of pyrite. Weight of sample, one pound three ounces. Mr. Johnston found it to contain :

| | |
|-------------|--------------|
| Nickel..... | faint trace, |
|-------------|--------------|

The gangue constituted 38·46 per cent, by weight, of the whole.

- 10.—A further specimen from the township of Galway (number of lot and concession not communicated), consisting of a massive pyrrhotite through which was disseminated a very trifling amount of calcite, was examined by Mr. Wait and found to contain :

| | |
|--------------|----------------|
| Nickel..... | 0·04 per cent. |
| Cobalt | trace. |

- 11.—From lot one of the eleventh concession of the township of Somerville, Victoria county, province of Ontario. Collected by Dr. F. D. Adams. *Pyrrhotite from Somerville, Victoria county, Ont.*

Nickel and
Cobalt, *cont.*

An association of white sub-translucent quartz, with a little felspar and a very little garnet, carrying small quantities of pyrite and pyrrhotite. The specimen which was in parts thickly coated with ferric hydrate, weighed fifteen ounces. Mr. Johnston found it to contain :

Nickel....., faint trace.

The gangue constituted 62.36 per cent, by weight, of the whole.

Pyrrhotite
from Somerville,
Victoria
county, Ont.,
cont.

12.—From the same township as the preceding specimen (number of lot and concession not communicated).

It consisted of pyrrhotite in a highly quartzose gangue, through which was disseminated a little garnet. Determinations by Mr. Wait gave :

Nickel... .. 0.06 per cent.
Cobalt... .. trace.

The gangue constituted 48.97 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0.12 per cent nickel.

Pyrrhotite
from Victoria
county, Ont.

13.—From one of the northern townships of Victoria county, province of Ontario.

A compact, massive pyrrhotite. Agreeably with the results of determinations made by Mr. Wait, it contained :

Nickel... .. 0.15 per cent.
Cobalt... .. trace.

Pyrite from
Vermilion
Lake, Ont.

14.—From Mr. E. V. Wright's claim on Vermilion Lake, north of east arm of Lake Temagami, district of Nipissing, province of Ontario. Collected by Mr. A. E. Barlow.

A very fine crystalline, massive iron-pyrites in a gangue of greenish-gray quartz-diorite. Mr. Wait found it to contain :

Nickel, with some cobalt... .. 0.05 per cent.

Pyrrhotite
from Hyman,
Ont.

15.—From the sixth lot of the first concession of the township of Hyman, district of Algoma, province of Ontario. Examined for Mr. J. H. Bowman.

It consisted of pyrrhotite in a gangue very largely composed of a dark brownish and bright grass-green mica, with but little visible quartz. The pyrrhotite, freed from all gangue, was found by Mr. Johnston to contain :

Nickel... .. 1.55 per cent.
Cobalt... .. none.

- 16.—From belt of Huronian schist, etc., which crosses English River nine miles north of the line of the Canadian Pacific Railway, district of Rainy River, province of Ontario. Collected by Mr. W. McInnes. Nickel and cobalt, *cont.*
Pyrrhotite from English River, Ont.

A massive pyrrhotite through which was disseminated a small amount of quartz. Mr. Wait found it to contain :

| | |
|-------------|----------------|
| Nickel..... | 0·12 per cent. |
| Cobalt..... | none. |

The gangue constituted 10·50 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0·13 per cent nickel.

- 17.—From the vicinity of Jackfish station on the line of the Canadian Pacific Railway, district of Thunder Bay, province of Ontario. Pyrite from vicinity of Jackfish station, C.P.R., Ont.
- A very fine-granular, massive pyrite, with which was associated small quantities of pyrrhotite. An analysis by Mr. Wait showed it to contain :

| | |
|-------------|--------|
| Nickel..... | trace. |
|-------------|--------|

- 18.—From the Illecillewaet district, West Kootanie, province of British Columbia. Pyrrhotite from the Illecillewaet district, B. C.
- It consisted of pyrrhotite in association with a little copper-pyrites, through which was disseminated small quantities of a dark green rock. Determinations by Mr. Wait gave :

| | |
|-------------|----------------|
| Nickel..... | 0·12 per cent. |
| Cobalt..... | trace. |

The gangue constituted 16·75 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0·14 per cent nickel.

- 19.—From an unnamed creek flowing into Downie Creek, some twenty miles above its entry into the Columbia River, West Kootanie district, province of British Columbia. Examined for Mr. J. D. Boyd. Pyrrhotite from creek entering Downie Creek, Columbia River, B. C.

A dark gray quartzo-felspathic rock through which was disseminated a somewhat large amount of pyrrhotite. It was examined by Mr. Johnston and found to contain :

| | |
|-------------|--------------|
| Nickel..... | faint trace. |
|-------------|--------------|

- 20.—From Crawford Bay, Kootanie Lake, Kootanie district, province of British Columbia. This, and the following specimen was examined for Cockle Bros. Pyrrhotite from Kootanie Lake, B. C.

Nickel and cobalt, *cont.*

It consisted of pyrrhotite, together with a very trifling amount of copper-pyrites in a gangue of white sub-translucent quartz, with some fine scales of mica. It was found by Mr. Wait to contain :

Nickel..... trace.

Pyrrhotite from Kootanie Lake, B. C.

- 21.—From the same locality as the preceding specimen.

It consisted of pyrrhotite, in association with small quantities of copper-pyrites and graphite, through which was disseminated small quantities of quartz, felspar and mica. Determinations by Mr. Wait gave :

Nickel..... 0·048 per cent.
Cobalt..... none.

The gangue constituted 10·70 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0·053 per cent nickel.

Pyrrhotite from near Savona station, C.P.R., B.C.

- 22.—From a few miles north of Savona station on the line of the Canadian Pacific Railway, Yale district, province of British Columbia. Examined for Mr. J. Dickenson.

A massive pyrrhotite, through which was disseminated a few specks of copper-pyrites and a small quantity of quartz. An analysis, by Mr. Wait, showed it to contain :

Nickel..... 0·031 per cent.

The gangue constituted 10·17 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0·034 per cent nickel.

Pyrrhotite from between North Thompson and Clearwater Rivers, B.C.

- 23.—From between the North Thompson and Clearwater Rivers, province of British Columbia.

It consisted of pyrrhotite in association with small quantities of copper-pyrites. Mr. Wait found it to contain :

Nickel..... trace.

Pyrrhotite from Mission City claims, B.C.

- 24.—From Mission City claims, townships seventeen and eighteen, Westminster district, province of British Columbia. Examined for Mr. D. Elliott.

A massive, fine-granular pyrrhotite through which was disseminated small quantities of iron-pyrites and a little copper-pyrites, and a somewhat large proportion of quartz gangue. Determinations by Mr. Wait gave :

Nickel..... 0·055 per cent.
Cobalt..... trace.

The gangue constituted 36.50 per cent, by weight, of the whole. Nickel and cobalt, *cont.*
The metalliferous portion of the ore contained, therefore, 0.09 per cent nickel.

25.—From Jarvis Inlet, province of British Columbia.

Pyrrhotite
from Jarvis
Inlet, B.C.

An association of pyrrhotite with some copper-pyrites and a little galena, through which was disseminated a small proportion of gangue, composed of gray quartz and a fine grained green diorite. Agreeably with the results of determinations by Mr. Wait, it contained :

| | |
|--------------|----------------|
| Nickel. | 0.24 per cent. |
| Cobalt. | trace. |

The gangue constituted 14.80 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0.28 per cent nickel.

26.—From Deer River, a tributary of the Churchill River, North-west Territory. Collected by Mr. D. B. Dowling (Survey).

Pyrrhotite
from Deer
River,
N.W.T.

It consisted of pyrrhotite in a gangue composed of quartz, felspar, and a little mica and graphite. Mr. Wait found it to contain :

| | |
|--------------|----------------|
| Nickel. | 0.06 per cent. |
| Cobalt. | trace. |

The gangue constituted 42.20 per cent, by weight, of the whole. The metalliferous portion of the ore contained, therefore, 0.10 per cent nickel.

The results of analysis of a highly interesting cobaltiferous and nickeliferous variety of löllingite from the township of Galway, Peterborough county, province of Ontario, and which if found in any quantity would be of economic importance, will be found under No. 12 "Miscellaneous minerals" in the previous part of this report.

GOLD AND SILVER ASSAYS.

These were all conducted by Mr. R. A. A. Johnston

PROVINCE OF NOVA SCOTIA.

1.—From the so-called Huntington mine, west side of Chegoggin Point, Yarmouth county. Examined for Mr. J. D. Huntington.

An association of quartz, garnet and mica, with some molybdenite and a little chlorite. Weight of specimen, two pounds and a half.

It contained neither gold nor silver.

PROVINCE OF NEW BRUNSWICK.

- 2.—This, and the following specimen is from Rocky Brook, Gloucester county, and was collected by Mr. H. P. Brumell.

Material representing an average sample of the ore from the vein. It consisted of a fine granular pyrrhotite together with some zinc-blende and mispickel disseminated through a gangue of grayish-white quartz. Weight of sample, two pounds fourteen ounces. Assays gave :

| | |
|-------------|---------------------------------------|
| Gold..... | distinct trace. |
| Silver..... | 5.950 ounces to the ton of 2,000 lbs. |

3. Material representing richer pay streaks in vein. It consisted of zinc-blende with small quantities of pyrrhotite and mispickel in a gangue of white opaque quartz and dolomite. The gangue constituting but a small proportion of the whole. Weight of sample, one pound nine ounces. It contained :

| | |
|-------------|--|
| Gold.... | distinct trace. |
| Silver..... | .43750 ounces to the ton of 2,000 lbs. |

- 4.—From Pollet River, one mile and a half from Aylwin Corner, Albert county. Examined for the Hon. A. R. McClelan.

An association of white sub-translucent quartz with a grayish-green chloritic schist, carrying small quantities of iron-pyrites. Weight of sample, one pound two ounces.

It contained neither gold nor silver.

- 5.—From Sawmill Creek, parish of Hopewell, near Memel Settlement, Albert county. Collected by Mr. H. P. Brumell.

A light gray felsite, through which was disseminated numerous small grains of iron-pyrites. Weight of sample, two pounds four ounces.

It contained neither gold nor silver.

- 6.—From Peck's Creek, two miles west of Albert mines, parish of Hillsborough, Albert county. Collected by Mr. H. P. Brumell.

A gray felsite schist, through which was disseminated numerous small grains of iron-pyrites. Weight of sample, one pound.

It contained neither gold nor silver.

- 7.—From half a mile from Upper Salmon River, parish of Alma, Albert County. Examined for Mr. James Robertson.

A crushed sample of quartzose rock containing a small quantity of copper-pyrites. It was found to contain :

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

- 8.—From a vein on Hammond River, King's county. Examined for Gold and silver assays, *cont.*
Mr. James Robertson.

A crushed sample of quartzose rock containing a small quantity of galena and copper-pyrites. Assays gave : Province of New Brunswick, *cont.*

Gold..... none.
Silver..... 1.692 ounce to the ton of 2,000 lbs.

- 9.—From L'Etete, Charlotte county.

An association of white sub-translucent quartz with a small quantity of dark grayish-green diorite, carrying a somewhat large amount of iron-pyrites. Weight of sample, one pound nine ounces. It contained :

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

- 10.—From Nigadoo River, parish of Beresford, Gloucester county.

An association of white opaque quartz with a light grayish-green to dark gray chloritic schist, carrying small quantities of iron-pyrites and zinc-blende. Assays gave :

Gold trace.
Silver.. . . . 0.700 of an ounce to the ton of 2,000 lbs.

- 11.—From Northumberland county. Examined for Mr. J. J. Miller.

An association of white sub-translucent quartz, with small quantities of dark gray chloritic schist, carrying small quantities of iron-pyrites. Weight of sample, eleven ounces. It was found to contain :

Gold trace.
Silver..... none.

PROVINCE OF QUEBEC.

- 12.—From the south-west half of lots four and five of the eighth range of the township of Calumet, Pontiac county. Examined for Mr. John Shea.

An intimate association of quartz, felspar and mica with, here and there, a few small crystals of garnet, through which was disseminated large quantities of iron-pyrites. Weight of sample, seventeen pounds two ounces. Assays showed it to contain :

Gold trace.
Silver..... 1.108 ounce to the ton of 2,000 lbs.

- 13.—From the Shipshaw River, Chicoutimi county. Collected by Mr. Walter McQuat.

Gold and
silver assays,
cont.

Province of
Quebec, *cont.*

An association of a white, somewhat coarsely crystalline limestone, with small quantities of a dark greenish-gray felspathic rock, carrying some zinc-blende and galena. The metallic sulphides constituted, approximately, twenty-one per cent, by weight, of the whole, and contained :

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

- 14.—This and the following specimen, is from the Suffield mine, lot three of the eleventh range of the township of Ascot, Sherbrooke county. They were examined for Mr. C. King.

A white, fine grained, quartzo-felspathic rock, through which was disseminated numerous fine particles of iron-pyrites, copper-pyrites and zinc-blende. Weight of sample, one pound thirteen ounces. Assays gave :

Gold..... trace.
Silver..... 1.575 ounce to the ton of 2,000 lbs.

- 15.—An association of white sub-translucent quartz with small quantities of white limestone and grayish-green chloritic schist, through which was disseminated small quantities of iron-pyrites, zinc-blende, copper-pyrites and galena. Weight of sample, two pounds five ounces. It was found to contain :

Gold..... trace.
Silver .. 20.475 ounces to the ton of 2,000 lbs.

- 16.—Tailings from gold washings on the Rivière du Loup, Beauce county.

The material consisted of a fine to coarse sand, composed of grains and crystals of magnetite and iron-pyrites, rounded grains of limonite and grains of quartz, feldspar and garnet. Weight of sample, one pound nine ounces. Assays showed it to contain :

Gold..... 5.454 ounces to the ton of 2,000 lbs.
Silver..... 0.379 of an ounce “ “

It was also examined for platinum and with negative results.

- 17.—From a so-called gold mine at a place called “La Barrière,” in the unsurveyed portion of the township of Courcelles, Berthier county. Collected by Mr. N. J. Giroux.

A white, coarsely crystalline quartz associated with small quantities of epidote and serpentine. Weight of sample, two pounds eleven ounces. Assays gave :

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

- 18.—From the same locality as the preceding specimen. Presented to Mr. Giroux by Mr. J. Obalski. Gold and silver assays, cont.

An association of a white, coarsely crystalline quartz, with small quantities of a salmon-coloured felspar. It was, in parts, stained with hydrated peroxide of iron. Weight of sample, five ounces. Province of Quebec, cont.
It contained :

| | |
|-------------|--------------|
| Gold..... | trace. |
| Silver..... | none. |

PROVINCE OF ONTARIO.

- 19.—From the twenty-fourth lot of the seventh concession of the township of Bastard, Leeds county. Examined for Mr. Arvin Brown.

An intimate mixture of carbonate and sulphate of lead with small quantities of undecomposed galena. Weight of sample, two ounces. It was found to contain :

| | |
|-------------|--|
| Gold..... | trace. |
| Silver..... | 21.875 ounces to the ton of 2,000 lbs. |

- 20.—From the sixteenth lot of the fourteenth concession of the township of Galway, Peterborough county. Examined for Mr. R. H. G. Chapman.

A fine crystalline, cavernous, to compact massive pyrite. Weight of sample, six ounces.

It contained neither gold nor silver.

- 21.—From Crooked Chenail Island, township of Ross, Renfrew county. Examined for Mr. W. Thomson.

A white sub-translucent cavernous quartz, carrying some pyrite and numerous fine scales of graphite. Weight of sample, one pound three ounces. Assays gave :

| | |
|-----------|--------------|
| Gold..... | trace. |
| Silver .. | none. |

- 22.—From lot thirty-four in the south-west concession of the Frontenac Road, in the township of Clarendon, Frontenac county. Examined for Mr. William White.

An association of quartz and a gneissoid rock, carrying small quantities of pyrite and pyrrhotite. It was, in parts, coated with hydrated peroxide of iron. Weight of sample, one pound seven ounces.

It contained neither gold nor silver.

Gold and
silver assays,
cont.
Province of
Ontario, *cont.*

- 23.—From the Kaladar or Golden Fleece mine, lot twenty-five of the sixth concession of the township of Kaladar, Addington county
Collected by Dr. A. R. C. Selwyn.

Hornblendic gneiss carrying small quantities of pyrite. Weight of sample, two pounds twelve ounces. Assays showed it to contain :

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

- 24.—From the twenty-sixth lot of the ninth concession of the township of Clarendon, Frontenac county. Examined for Mr. Jonathan Muldoon.

White sub-translucent quartz, carrying a somewhat large quantity of coarsely crystalline galena. The specimen was more or less thickly coated with earthy carbonate of lead. Weight of sample, two and a half pounds. The galena freed from gangue was found to contain :

Gold..... none.
Silver..... 59.062 ounces to the ton of 2,000 lbs.

- 25.—From the thirty-second lot of the eleventh concession of the township of Clarendon, Frontenac county. Examined for Mr. James Warner.

A white sub-translucent quartz, in parts stained with ferric hydrate, carrying a small quantity of pyrrhotite. Weight of sample, two pounds ten ounces.

It contained neither gold nor silver.

- 26.—From lot forty-two of the north-east concession of the township of Clarendon, Frontenac county. Examined for Mr. Jonathan Muldoon.

Weathered pyrrhotite. Weight of sample, seven pounds two ounces.

It contained neither gold nor silver.

- 27.—From the south-half of the eighth lot of the second concession of the township of Ross, Renfrew county. Examined for Mr. E. Tuffy.

The material, some thirteen fragments, consisted of a quartzofelspathic gneissoid rock with a somewhat coarsely crystalline limestone and a little pyroxene. Numerous small crystals of garnet and some minute specks of pyrrhotite were disseminated through certain of the fragments. Weight of sample, eleven pounds.

It contained neither gold nor silver.

- 28.—From the twelfth lot of the eighth concession of the township of Barrie, Frontenac county. Examined for Mr. Jonathan Muldoon. Gold and silver assays, cont.
Province of Ontario, cont.

A coarsely crystalline galena in a gangue of white crystalline limestone. The latter constituted but a small proportion, by weight, of the whole. Weight of sample, five pounds twelve ounces. Assays showed the galena, free from gangue, to contain :

| | |
|--------------|---|
| Gold..... | trace. |
| Silver | 137·083 ounces to the ton of 2,000 lbs. |

- 29.—From the ninth lot of the eighth concession of the township of Barrie, Frontenac county. The vein is said to be from five to eight or nine feet wide and to traverse, in addition to this lot, also lots ten and eleven as well as, as may be seen, from the preceding assay, lot twelve of this concession. Examined for Mr. W. J. Morris.

A coarsely crystalline galena with, here and there, a few specks of pyrite, in a gangue of white crystalline limestone. The latter constituted but a small proportion, by weight, of the whole. Weight of sample, five ounces. The galena, freed from all gangue, was found to contain :

| | |
|-------------|---|
| Gold..... | None. |
| Silver..... | 119·583 ounces to the ton of 2,000 lbs. |

- 30.—From a vein of quartz, fifty feet wide, on the west side of Little Clear Lake, two miles west of dam at outlet of Lake Wahnapiatae, district of Nipissing. This, and the four following specimens were collected by Dr. R. Bell.

An association of white sub-translucent, cavernous quartz with a small quantity of yellowish to reddish-gray dolomite, through which was disseminated a few grains of pyrite. The cavities in the quartz were lined with ferric hydrate. Weight of sample, fourteen ounces.

It contained neither gold nor silver.

- 31.—From a nine-inch vein on the east side of Waddell's Lake, district of Nipissing.

A white sub-translucent, cavernous quartz, the cavities of which were filled with ferric hydrate. Weight of sample, eight ounces. Assays gave :

| | |
|-------------|--------|
| Gold | trace. |
| Silver..... | none. |

Gold and
silver assays,
cont.
Province of
Ontario, *cont.*

- 32.—From vein No. 1 on mining location W. R. III., in township 40, south-east side of Lake Wahnapiatae, district of Nipissing. Property of Donald McLaren.

An association of white limestone, white sub-translucent quartz, and a reddish coloured granite—carrying large quantities of mispickel (which was more or less thickly incrustated with arsenolite) and small quantities of pyrite. Weight of sample, four ounces and a half. It contained :

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

- 33.—From vein No. 2 on mining location W. R. III.—same as that whence the preceding specimen was obtained.

An association of white crystalline limestone and white sub-translucent quartz, containing, here and there, a few grains of pyrite. Weight of sample, five ounces.

It contained neither gold nor silver.

- 34.—From location M. III., at southern extremity of Matagamishing Lake, a short distance north-east of Lake Wahnapiatae, district of Nipissing. Property of Donald McLaren.

A white sub-translucent quartz, more or less stained with ferric hydrate, carrying large quantities of pyrite. Weight of sample, seven ounces. It was found to contain:

Gold..... 1·167 ounce to the ton of 2,000 lbs.
Silver..... 0·233 of an ounce “ “

- 35.—From the big gash vein of quartz on lot eleven of the fourth concession of the township of Creighton, district of Algoma. This, and the two following specimens were collected by Mr. A. E. Barlow.

A white sub-translucent quartz, in parts coated with ferric hydrate. Weight of sample, one pound.

It contained neither gold nor silver.

- 36.—From Ahn's opening on lot eleven of the fourth concession of the township of Creighton, district of Algoma.

An association of white sub-translucent quartz with small quantities of white ankerite and a greenish-white felspar. The specimen was, in parts, coated with ferric hydrate. Weight of sample, fifteen ounces.

It contained neither gold nor silver.

- 37.—From Gordon's opening on lot two of the fourth concession of the township of Fairbank, district of Algoma. Gold and silver assays, *cont.*

A white sub-translucent to opaque quartz, in parts coated with ferric hydrate. Weight of sample, ten ounces. Province of Ontario, *cont.*

It contained neither gold nor silver.

- 38.—From about two miles east of Algoma Mills, township of Long, district of Algoma. Examined for Mr. E. I. Skead.

An association of white sub-translucent to dark gray quartz with a little dark green chloritic schist, carrying small quantities of pyrite. Weight of sample, two pounds eight ounces.

It contained neither gold nor silver.

- 39.—From the centre of large vein of quartz, Ophir mine, lot twelve of the third concession of the township of Galbraith, district of Algoma. This, and the nine following specimens were collected by Dr. R. Bell.

White sub-translucent quartz carrying very large quantities of pyrite. Weight of sample, three pounds ten ounces. It was found to contain :

| | |
|--------------|--|
| Gold | 0·175 of an ounce to the ton of 2,000 lbs. |
| Silver | none. |

- 40.—From the foot or north wall, west end of Ophir mine, lot twelve of the third concession of the township of Galbraith, district of Algoma.

A grayish-white sub-translucent quartz, in parts stained and coated with ferric hydrate, through which was disseminated a few grains of pyrite. Weight of sample, one pound ten ounces. Assays gave :

| | |
|--------------|-------------|
| Gold..... |trace. |
| Silver |none. |

- 41.—From the hanging or south wall, west end of Ophir mine, lot twelve of the third concession of the township of Galbraith, district of Algoma.

A white sub-translucent honeycombed quartz, the cavities of which were filled with ferric hydrate. It contained :

| | |
|-------------|--|
| Gold..... | trace. |
| Silver..... | 0·175 of an ounce to the ton of 2,000 lbs. |

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

- 42.—From near the hanging wall, eastern opening of Ophir mine, lot twelve of the third concession of the township of Galbraith, district of Algoma.

An association of grayish-white to dark gray quartz with a small quantity of white calcite, carrying a somewhat large quantity of copper-pyrites and a few flakes of native gold. It was found to contain :

Gold.....0.583 of an ounce to the ton of 2,000 lbs.
Silvernone.

- 43.—From No. 3 shaft, lot five of the fourth concession of the township of Denison, district of Algoma.

White sub-translucent quartz carrying small quantities of galena. Weight of sample, one pound eleven ounces. Assays gave :

Gold.....trace.
Silver0.525 of an ounce to the ton of 2,000 lbs.

- 44.—An average of six samples of crushed material from the east half of the Ross location, three miles north of the northern township line of the township of Morgan, district of Algoma.

The material, consisting of more or less weathered copper and iron-pyrites, weighed six ounces.

It contained neither gold nor silver.

- 45.—From Simpson's mine, near Whitefish station on the line of the Canadian Pacific Railway, lot eleven of the second concession of the township of Graham, district of Algoma.

A coarse to fine powder, composed of iron-pyrites with some siliceous matter. Weight of sample, three ounces. It was found on assay to contain :

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

- 46.—From Simon Obonsoing's mine, on the eighth lot of the third concession of the township of Moncrieff, district of Algoma.

A white sub-translucent, honeycombed quartz, the cavities of which were filled with ferric hydrate, through which was disseminated numerous small particles of pyrite. Weight of sample, one pound one ounce. It contained :

Goldtrace.
Silvernone.

- 47.—From near the line of the Canadian Pacific Railway, 480½ miles west of Montreal, township of Hess, district of Algoma. Gold and silver assays, *cont.*
- White crypto-crystalline quartz, stained and coated with ferric hydrate. Weight of sample, nine ounces. Assays gave: Province of Ontario, *cont.*
- | | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

- 48.—From the north-east corner of the township of Plummer, district of Algoma.

An association of white sub-translucent quartz with a little reddish-gray dolomite, carrying large quantities of chalcocite and a small amount of cuprite. It was found to contain:

| | |
|-------------|--------|
| Gold.... | trace. |
| Silver..... | none. |

PROVINCE OF MANITOBA.

Province of Manitoba.

- 49.—From the boring at Deloraine.

The material consisted of nodules of fine crystalline iron-pyrites which were met with, in clay, at a depth of eighteen hundred feet. Weight of sample, six ounces.

It contained neither gold nor silver.

- 50.—From lowest rapid on the L'Oiseau River. Received by Mr. J. B. Tyrrell from Mr. J. T. Little.

A dark gray quartz, stained and coated with ferric hydrate, carrying large quantities of pyrite. Weight of sample, two pounds seven ounces.

It contained neither gold nor silver.

NORTH-WEST TERRITORY.

- 51.—From the Mudjatick or Cariboo River, a tributary of the Churchill River, district of Saskatchewan. Collected by Mr. J. B. Tyrrell. North-west Territory.

White sub-translucent quartz, in parts stained with ferric hydrate, through which was disseminated numerous fine specks of pyrrhotite.

It contained neither gold nor silver.

- 52.—From the Barren Grounds, country near upper post, Great Fish River. Collected by Mr. Warburton Pike.

White sub-translucent quartz, stained with ferric hydrate, and carrying large quantities of pyrite. Weight of sample, ten ounces.

It contained neither gold nor silver.

Gold and
silver assays,
cont.

PROVINCE OF BRITISH COLUMBIA.

Of the following—

| | | | |
|----------------------|--------------|------------------|---------------|
| Specimens Nos. 53—56 | are from the | East Kootanie | district. |
| “ “ 57—138 | “ | West Kootanie | district.* |
| “ “ 139—176 | “ | Interior plateau | region. |
| “ “ 177—191 | “ | Coast Ranges and | coast region. |

(Specimens Nos. 62-70, 76-86, 90 and 95—138 were collected by Mr. E. D. Ingall : Nos. 148-170, by Dr. G. M. Dawson, and Nos. 171—173 by Mr. J. McEvoy.)

East Koota-
nie district.

53.—From slope of mountain south of Kinbasket Lake, Columbia River, East Kootanie district. Collected by Mr. R. G. McConnell.

White sub-translucent quartz, in parts stained with ferric hydrate, carrying large quantities of coarse crystalline galena.

The latter, freed from gangue, was found to contain :

| | |
|-------------|--|
| Gold..... | none. |
| Silver..... | 26·250 ounces to the ton of 2,000 lbs. |

54.—From the vicinity of Glacier House, on the line of the Canadian Pacific Railway, East Kootanie district. Collected by Dr. G. M. Dawson.

White sub-translucent quartz, in parts stained with ferric hydrate, through which was disseminated numerous small grains of pyrite. Weight of sample, one pound seven ounces. It contained :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

55.—From Vermont Creek, Middle Fork of the Spilimichine River, East Kootanie district. Examined for Mr. W. A. Jowett.

A fibrous jamesonite. Assays showed it to contain :

| | |
|-----------|---------------------------------------|
| Gold.... | trace. |
| Silver... | 5·833 ounces to the ton of 2,000 lbs. |

56.—From Carbonate Mountain, district of Golden, East Kootanie district. Examined for Mr. Walter Scott.

An association of malachite and azurite with intermixed ferric hydrate. Weight of sample, six ounces. It was found to contain :

| | |
|-------------|--|
| Gold..... | none. |
| Silver..... | 0·292 of an ounce to the ton of 2,000 lbs. |

* Of the mining centres beyond referred to as being in this district, the Hot Springs or Ainsworth camp is in 49° 44' N. Lat., 116° 55' W. Long. ; the Kaslo-Slocan mining camp in 49° 57' N. Lat., 117° 12' W. Long. and the Illecillewaet mines in 51° 0' N. Lat., 118° 0' W. Long.

57.—From Prairie Mountain, Bear Creek, Selkirk Range, West Kootanie district. Examined for Mr. J. J. Driscoll. Gold and silver assays, cont.

An association of white sub-translucent quartz with a small quantity of a dark gray talcose schist. The specimen, which was stained and coated with ferric hydrate, weighed two pounds five ounces. Assays gave : Province of British Columbia, cont. West Kootanie district.

Gold..... trace.
Silver none.

58.—From Goat River, Kootanie Lake, West Kootanie district.

It consisted of tetrahedrite disseminated through a gangue composed of white sub-translucent quartz and fine grained dolomite. The specimen, which was more or less coated with blue and green carbonate of copper and ferric hydrate, weighed one pound four ounces. It was found to contain :

Gold.... distinct trace.
Silver 28·437 ounces to the ton of 2,000 lbs.

59.—From about five miles from Trail Creek, east side of the Columbia River, West Kootanie district. Examined for Mr. J. O. Tretaway.

An association of a somewhat fine grained pyrrhotite with pyrite and a little chalcopyrite, through which was disseminated small quantities of a quartzose gangue. Weight of sample, eight ounces.

It contained neither gold nor silver.

60.—From a ledge south of Kootanie River, close to the Columbia River, West Kootanie district. Examined for Mr. J. J. Driscoll.

An association of white sub-translucent quartz with a dark gray gneissoid rock and a little dark grayish-green chloritic schist, through which was disseminated small quantities of chalcopyrite and a few specks of pyrite. The specimen, which was in parts coated with ferric hydrate and green carbonate of copper, weighed one pound fourteen ounces. It contained :

Gold.... trace.
Silver..... 0·467 of an ounce to the ton of 2,000 lbs.

61.—From a three-foot ledge situate four miles west of the cinnabar claims on Kamloops Lake, West Kootanie district. Examined for Mr. S. Macartney.

A somewhat coarsely crystalline grayish-white limestone, more or less thickly coated with ferric hydrate. Weight of sample, two pounds eight ounces. Assays showed it to contain :

Gold..... none.
Silver 1·341 ounce to the ton of 2,000 lbs.

Gold and
silver assays,
cont.

Province of
British Colum-
bia, *cont.*

West Koota-
nie district,
cont.

- 62.—This, and the following specimen, is from the Blue Bell claim, Illecillewaet mines, West Kootanie district.

A white sub-translucent quartz, in parts, thickly coated with ferric hydrate and green carbonate of copper, carrying large quantities of copper-pyrites. Weight of sample, thirteen ounces. It was found to contain :

Gold none.
Silver 11·608 ounces to the ton of 2,000 lbs.

- 63.—White sub-translucent quartz, in parts stained with ferric hydrate, carrying large quantities of coarsely crystalline galena. Assays gave :

Gold none.
Silver 40·833 ounces to the ton of 2,000 lbs.

- 64.—From the Cariboo claim, Illecillewaet mines, West Kootanie district.

An association of white sub-translucent quartz with a grayish-white felsite, carrying small quantities of iron-pyrites. The specimen, which was in parts coated with ferric hydrate, weighed nine ounces. Assays showed it contain :

Gold none.
Silver 0·223 of an ounce to the ton of 2,000 lbs.

- 65.—From the same claim as the last.

White sub-translucent quartz, carrying some coarsely crystalline galena, a little zinc-blende, and a few grains of pyrite. Weight of sample, five ounces. It contained :

Gold none.
Silver 0·317 of an ounce to the ton of 2,000 lbs.

- 66.—From the Edinborough claim, Illecillewaet mines, West Kootanie district.

A somewhat finely crystalline galena in a gangue of white sub-translucent quartz. The galena, freed from gangue, contained :

Gold none.
Silver 39·375 ounces to the ton of 2,000 lbs.

- 67.—From the same claim as the preceding specimen.

A coarse crystalline galena, through which was disseminated a trifling amount of a gray quartzose rock. Weight of sample, one and a quarter ounce. It was found, on assay, to contain :

Gold trace.
Silver 204·166 ounces to the ton of 2,000 lbs.

68.—From the Elizabeth claim, Illecillewaet mines, West Kootanie district. Gold and silver assays, *cont.*

The material, which was in a pulverulent form, was found to contain : Province of British Columbia, *cont.*

Gold..... none.

Silver..... 692·708 ounces to the ton of 2,000 lbs.

West Kootanie district, *cont.*

69.—From the same claim as the preceding specimen.

A coarsely crystalline galena, in parts coated with ferric hydrate.

Weight of sample, seven ounces. It contained :

Gold none.

Silver..... 318·646 ounces to the ton of 2,000 lbs.

70.—Also from the Elizabeth claim.

A friable admixture of calcite, galena and pyrite. Weight of sample, two ounces. Assays gave :

Gold..... none.

Silver..... 149·479 ounces to the ton of 2,000 lbs.

71.—From the same claim as that just referred to.

An association of coarse to fine crystalline galena, through which was disseminated a small amount of quartzose gangue. It was found to contain :

Gold... none.

Silver..... 175·729 ounces to the ton of 2,000 lbs.

72.—Another specimen from this claim,

Consisting of a coarse crystalline galena, gave on assay :

Gold none.

Silver..... 109·375 ounces to the ton of 2,000 lbs.

73.—Also from the Elizabeth claim.

A more or less weathered, fine to coarse crystalline galena.

Weight of sample, eight ounces. Assays gave :

Gold..... trace.

Silver 142·916 ounces to the ton of 2,000 lbs.

74.—From the Scotia claim, Fish Creek, West Kootanie district.

A highly weathered rock matter, consisting of fragments of white and blackish-gray quartz with kaolin. The material, which was assayed on behalf of Mr. Walter Scott—

Contained neither gold nor silver.

Gold and silver assays, *cont.*

Province of British Columbia, *cont.*

West Kootanie district, *cont.*

- 75.—From Fish Creek, which flows into the north-east arm of Upper Arrow Lake, West Kootanie district.

A fine crystalline and fibrous form of galena, in a gangue of white sub-translucent quartz. Weight of sample, one ounce. It contained :

| | |
|-------------|---|
| Gold..... | none. |
| Silver..... | 110·417 ounces to the ton of 2,000 lbs. |

- 76.—From Fishburn's claim, Illecillewaet mines, West Kootanie district.

Zinc-blende, more or less thickly coated with ferric hydrate. It was found, on assay, to contain :

| | |
|--------------|---------------------------------------|
| Gold..... | none. |
| Silver... .. | 5·833 ounces to the ton of 2,000 lbs. |

- 77.—From the Gold Hill claim, Illecillewaet mines, West Kootanie district.

A coarsely crystalline galena in a gangue of finely crystalline white limestone. Weight of sample, one pound two ounces. The galena, freed from gangue, was found to contain :

| | |
|-------------|--|
| Gold..... | none. |
| Silver..... | 18·958 ounces to the ton of 2,000 lbs. |

- 78.—From the Herring-back claim, Illecillewaet mines, West Kootanie district.

Zinc-blende together with a little pyrite, in a gangue of fine crystalline dolomitic limestone.

It contained neither gold nor silver.

- 79.—Also from the Herring-back claim.

A fine-crystalline galena, in a quartzose gangue. Assays gave :

| | |
|-------------|--|
| Gold..... | none. |
| Silver..... | 10·208 ounces to the ton of 2,000 lbs. |

- 80.—From the Jumbo claim, Illecillewaet mines, West Kootanie district.

An association of white sub-translucent quartz with gray chloritic schist. Weight of sample, six ounces. It contained :

| | |
|-------------|--|
| Gold..... | none. |
| Silver..... | 0·525 of an ounce to the ton of 2,000 lbs. |

81.—From the same claim as the last.

A white opaque quartz, in parts stained with ferric hydrate, carrying a finely crystalline galena and some pyrite. Weight of sample, twelve ounces. Assays showed it to contain :

Gold..... none.
Silver..... 12·075 ounces to the ton of 2,000 lbs.

Gold and
silver assays,
cont.
Province of
British Col-
umbia, *cont.*
West Kootanie
district,
cont.

82.—From the Lanark claim, Illecillewaet mines, West Kootanie district.

A coarsely crystalline galena, in parts coated with ferric hydrate. Weight of sample, nine ounces. It was found to contain :

Gold..... none.
Silver..... 57·604 ounces to the ton of 2,000 lbs.

83.—From the same claim as the preceding specimen.

A coarsely crystalline galena in a gangue of white sub-translucent quartz. Weight of sample, two ounces. The galena, freed from gangue, was found to contain :

Gold..... none.
Silver..... 73·646 ounces to the ton of 2,000 lbs.

84.—Also from the Lanark claim.

A white sub-translucent quartz, stained with ferric hydrate, carrying small quantities of coarsely crystalline galena. Weight of sample, seven ounces. Assays gave :

Gold..... none.
Silver..... 6·533 ounces to the ton of 2,000 lbs.

85.—From the Maple Leaf claim, Illecillewaet mines, West Kootanie district.

Limestone, in parts coated with ferric hydrate, carrying small quantities of coarsely crystalline galena. Weight of sample, fourteen ounces. It contained :

Gold..... none.
Silver..... 8·021 ounces to the ton of 2,000 lbs.

86.—From the Sanquhar claim, Illecillewaet mines, West Kootanie district.

An association of coarsely crystalline limestone with a little white sub-translucent quartz, carrying small quantities of coarsely crystalline galena. Weight of sample, one pound one ounce. Assays showed it to contain :

Gold..... none.
Silver..... 4·842 ounces to the ton of 2,000 lbs.

Gold and
silver assays,
cont.

Province of
British Col-
umbia, *cont.*

West Koota-
nie district,
cont.

87.—From the same claim as the preceding specimen.

A coarsely crystalline galena, coated with ferric hydrate.

Weight of sample, five ounces. Assays gave :

| | |
|-------------|---|
| Gold..... | none. |
| Silver..... | 106·854 ounces to the ton of 2,000 lbs. |

88.—Also from the Sanquhar claim.

A coarsely crystalline galena, in a gangue of coarse crystal-
line limestone. Weight of sample, six ounces. It was found to
contain :

| | |
|------------------|--|
| Gold..... | none. |
| Silver.. | 14·817 ounces to the ton of 2,000 lbs. |

89.—From the Silver Bow claim, Illecillewaet mines, West Kootanie
district. Examined for Mr. Walter Scott.

Bornite, through which was disseminated a little white sub-
translucent quartz. The specimen, which was more or less coated
with green carbonate of copper, weighed eight ounces. On assay
it was found to contain :

| | |
|-------------|--|
| Gold..... | very distinct trace. |
| Silver..... | 19·075 ounces to the ton of 2,000 lbs. |

90.—From the Iron Schist Belt claim, Illecillewaet mines, West
Kootanie district.

A white sub-translucent quartz, carrying a somewhat large
amount of hematite. Weight of sample, one pound.

It contained neither gold nor silver.

91.—From the Illecillewaet, West Kootanie district.

An association of white sub-translucent quartz with small quan-
tities of pale greenish-white euphyllite. The specimen, which
was, in parts, coated with ferric hydrate, weighed seven ounces.

It contained neither gold nor silver.

92.—From the Goat Cave claim, Illecillewaet mines, West Kootanie
district.

White sub-translucent quartz carrying a somewhat large amount
of galena. The specimen, which was in parts coated with ferric
hydrate, weighed eleven ounces. It contained :

| | |
|------------------|---|
| Gold.... | none. |
| Silver..... | 158·227 ounces to the ton of 2,000 lbs. |

93.—From the same claim as the preceding specimen.

An association of white sub-translucent quartz with a little chloritic schist, carrying a somewhat large amount of galena. Weight of sample, two ounces. Assays gave :

Gold..... none.
Silver..... 216·562 ounces to the ton of 2,000 lbs.

Gold and silver assays, cont.
Province of British Columbia, cont.
West Kootanie district, cont.

94.—From the Sutton claim, North Fork of the Illecillewaet River, West Kootanie district.

An association of coarse crystalline pyrite and fine grained galena. Weight of sample, six ounces. It was found to contain :

Gold..... none.
Silver..... 24·062 ounces to the ton of 2,000 lbs.

95.—From the Dictator claim, Hot Springs or Ainsworth camp, West Kootanie district.

An association of a fine crystalline grayish-white dolomitic limestone with some mica-schist, through which was disseminated small quantities of a coarsely crystalline galena. Weight of sample, one pound two ounces. The galena, freed from gangue, was found to contain :

Gold..... none.
Silver..... 137·083 ounces to the ton of 2,000 lbs.

96.—From the Kraeo claim, Hot Springs or Ainsworth camp, West Kootanie district.

A coarsely crystalline galena with a little zinc-blende, in a gangue of fine crystalline, grayish-white dolomitic limestone. Assays gave :

Gold..... none.
Silver..... 29·896 ounces to the ton of 2,000 lbs.

97.—From the same claim as the preceding specimen.

Consisted of zinc-blende in a gangue of finely crystalline dolomitic limestone. The zinc-blende, freed from gangue, was found to contain :

Gold..... none.
Silver..... 10·208 ounces to the ton of 2,000 lbs.

98.—From the Neosho claim, Hot Springs or Ainsworth camp, West Kootanie district.

Weathered rock matter. Weight of sample, five ounces. It was found to contain :

Gold..... none.
Silver..... 178·675 ounces to the ton of 2,000 lbs.

Gold and
silver assays,
cont.

Province of
British Colum-
bia, *cont.*
West Koota-
nie district,
cont.

- 99.—From the Skyline claim, Hot Springs or Ainsworth camp, West Kootanie district.

A grayish-white crypto-crystalline quartz, carrying small quantities of zinc-blende and coarsely crystalline galena. Weight of sample, two pounds seven ounces. It contained :

| | |
|------------------|--|
| Gold | distinct trace. |
| Silver | 68.425 ounces to the ton of 2,000 lbs. |

- 100.—From the Lady of the Lake claim, Hot Springs or Ainsworth camp, West Kootanie district.

A somewhat coarsely crystalline galena, distributed through a calcareous gangue. The galena, freed from gangue, contained :

| | |
|------------------|---|
| Gold | none. |
| Silver | 164.792 ounces to the ton of 2,000 lbs. |

- 101.—From the Beaver claim, Kaslo-Slocan mining camp, West Kootanie district.

A weathered limestone, in parts stained with blue and green carbonate of copper. Weight of sample, thirteen ounces. Assays showed it to contain :

| | |
|------------------|--|
| Gold | none. |
| Silver | 12.250 ounces to the ton of 2,000 lbs. |

- 102.—From the Best claim, Kaslo-Slocan mining camp, West Kootanie district.

An association of white, opaque quartz with a little white limestone, carrying small quantities of galena and iron-pyrites. Weight of sample, five ounces. It contained :

| | |
|------------------|---|
| Gold | none. |
| Silver | 107.858 ounces to the ton of 2,000 lbs. |

- 103.—From the same claim as the preceding specimen.

A fine crystalline and massive galena with a little pyrite and zinc-blende, in a gangue composed of white opaque quartz and a little coarsely crystalline limestone. The metallic sulphides, freed from gangue, contained :

| | |
|------------------|---|
| Gold | none. |
| Silver | 148.750 ounces to the ton of 2,000 lbs. |

- 104.—Also from the Best claim.

An exteriorly weathered specimen of coarsely crystalline galena. Weight of sample, one pound twelve ounces. Assays gave :

| | |
|------------------|---|
| Gold | none. |
| Silver | 521.354 ounces to the ton of 2,000 lbs. |

- 105.—From the Blue Bird claim, Kaslo-Slocan mining camp, West Kootanie district. Gold and silver assays, *cont.*
 A coarsely crystalline galena, so-called curved-face ore. It was Province of British Columbia, *cont.*
 found to contain : West Kootanie district, *cont.*
- | | |
|-------------|---|
| Gold... .. | none. |
| Silver..... | 146·562 ounces to the ton of 2,000 lbs. |
- 106.—From the same claim as the preceding specimen.
 A coarsely crystalline galena, more or less thickly coated with yellow, earthy carbonate of lead. A specimen of the so-called curved-face ore. It contained :
- | | |
|-------------|---|
| Gold..... | none. |
| Silver..... | 155·312 ounces to the ton of 2,000 lbs. |
- 107.—Also from the Blue Bird claim.
 A coarsely crystalline galena, so-called ribbed ore. Assays showed it to contain :
- | | |
|-------------|---|
| Gold..... | none. |
| Silver..... | 150·208 ounces to the ton of 2,000 lbs. |
- 108.—Another specimen from this claim—
 Consisting of a somewhat coarsely crystalline galena—the so-called spangle ore, was found to contain :
- | | |
|--------------|---|
| Gold.... | none. |
| Silver | 182·292 ounces to the ton of 2,000 lbs. |
- 109.—From the Dardanelles claim, Kaslo-Slocan mining camp, West Kootanie district.
 A very fine crystalline galena, traversed by a thin seam of white quartz and containing, in parts, a few small aggregations of pyrargyrite. The galena, freed from gangue, was found to contain :
- | | |
|-------------|---|
| Gold..... | none. |
| Silver..... | 360·208 ounces to the ton of 2,000 lbs. |
- 110.—From the Florence claim, Kaslo-Slocan mining camp, West Kootanie district.
 A reddish-yellow ochre. Assays of this gave :
- | | |
|-------------|--|
| Gold..... | none. |
| Silver..... | 0·357 of an ounce to the ton of 2,000 lbs. |
- 111.—From the Freddie Lee claim, Kaslo-Slocan mining camp, West Kootanie district.
 A coarsely crystalline galena. It contained :
- | | |
|-------------|---|
| Gold..... | none. |
| Silver..... | 120·312 ounces to the ton of 2,000 lbs. |

Gold and
silver assays,
cont.

Province of
British Col-
umbia, *cont.*

West Koota-
nie district,
cont.

112.—From the same claim as the preceding specimen.

A somewhat coarsely crystalline galena, so-called spangle ore.

Assays gave :

Gold..... none.
Silver..... 153·125 ounces to the ton of 2,000 lbs.

113.—Also from the Freddie Lee claim.

A red ochreous material with intermixed fragment of galena coated with ferric hydrate. It was found on assay to contain :

Gold..... none.
Silver.... 136·354 ounces to the ton of 2,000 lbs.

114.—From the Great Western claim, Kaslo-Slocan mining camp, West Kootanie district.

A somewhat coarsely crystalline galena, so-called spangle ore. It contained :

Gold..... none.
Silver..... 341·146 ounces to the ton of 2,000 lbs.

115.—From the Ibex claim, Kaslo-Slocan mining camp, West Kootanie district.

A somewhat finely crystalline galena, in parts stained with ferric hydrate. Assays showed it to contain :

Gold.. none.
Silver..... 79·479 ounces to the ton of 2,000 lbs.

116.—From the same claim as the preceding specimen.

An association of zinc-blende, with a little coarsely crystalline galena. It contained :

Gold..... none.
Silver..... 26·250 ounces to the ton of 2,000 lbs.

117.—From the Lucky Jim claim, Kaslo-Slocan mining camp, West Kootanie district.

Coarsely crystalline galena in association with a little finely crystalline white limestone. The galena, freed from gangue, was found to contain :

Gold none.
Silver..... 91·875 ounces to the ton of 2,000 lbs.

118.—From the Monte Cristo claim, Kaslo-Slocan mining camp, West Kootanie district.

A finely crystalline galena. Assays gave :

Gold..... none.
Silver..... 63·437 ounces to the ton of 2,000 lbs.

119.—From the Montezuma claim, Kaslo-Slocan mining camp, West Kootanie district. Gold and silver assays, cont.

A yellow, ochreous earth. It was found to contain :

Gold..... none.

Silver..... 20·417 ounces to the ton of 2,000 lbs.

Province of British Columbia, cont.

West Kootanie district, cont.

120.—From the same claim as the preceding specimen.

A somewhat coarsely crystalline galena, in parts coated with ferric hydrate and earthy carbonate of lead. Assays showed it to contain :

Gold..... none.

Silver 102·083 ounces to the ton of 2,000 lbs.

121.—Also from the Montezuma claim.

A somewhat coarsely crystalline galena, so-called spangle ore.

It contained :

Gold..... none.

Silver..... 136·354 ounces to the ton of 2,000 lbs.

122.—From the Payne claim, Kaslo-Slocan mining camp, West Kootanie district.

A coarsely crystalline galena. It was found to contain :

Gold..... none.

Silver.... 154·583 ounces to the ton of 2,000 lbs.

123.—From the same claim as the preceding specimen.

A finely crystalline galena. It contained :

Gold..... none.

Silver..... 186·667 ounces to the ton of 2,000 lbs.

124.—Also from the Payne claim.

A somewhat coarsely crystalline galena, locally known as spangle ore. Assays showed it to contain :

Gold..... none.

Silver..... 172·083 ounces to the ton of 2,000 lbs.

125.—Another specimen from this claim—

Consisting of a coarsely crystalline galena, in parts stained and coated with ferric hydrate, was found to contain :

Gold..... none.

Silver.. 120·312 ounces to the ton of 2,000 lbs.

Gold and
silver assays,
cont.

Province of
British Colum-
bia, *cont.*

West Koota-
nie district,
cont.

- 126.—From the Silver Tip claim, Kalso-Slocan mining camp, West Kootanie district.

A brownish-black zinc-blende, in a gangue of somewhat coarsely crystalline limestone. Assays gave :

Gold none.
Silver... 73·267 ounces to the ton of 2,000 lbs.

- 127.—From the Slocan Boy claim, Kaslo-Slocan mining camp, West Kootanie district.

A finely crystalline galena. It was found, on assay, to contain :

Gold none.
Silver..... 123·229 ounces to the ton of 2,000 lbs.

- 128.—From the Slocan Star claim, Kaslo-Slocan mining camp, West Kootanie district.

An association of a somewhat finely crystalline galena with small quantities of iron-pyrites. It contained :

Gold none.
Silver.... 73·646 ounces to the ton of 2,000 lbs.

- 129.—From the Solo claim, Kaslo-Slocan mining camp, West Kootanie district.

A somewhat coarsely crystalline galena in a gangue of dolomitic limestone. The galena, freed from the gangue, was found to contain :

Gold..... none.
Silver..... 38·612 ounces to the ton of 2,000 lbs.

- 130.—From the Triangle claim, Kaslo-Slocan mining camp, West Kootanie district.

A finely crystalline galena, more or less thickly coated with ferric hydrate. Assays gave :

Gold..... none.
Silver 136·354 ounces to the ton of 2,000 lbs.

- 131.—From the same claim as the preceding specimen.

A coarsely crystalline galena, more or less thickly coated with ferric hydrate. It was found, on assay, to contain :

Gold none.
Silver..... 107·184 ounces to the ton of 2,000 lbs.

- 132.—From the Washington claim, Kaslo-Slocan mining camp, West Kootanie district.

A finely crystalline galena. It contained :

Gold..... none.
Silver.... 110·104 ounces to the ton of 2,000 lbs.

133.—From the same claim as the preceding specimen.

A coarsely crystalline galena. Assays gave :

Gold..... none.
Silver 126·146 ounces to the ton of 2,000 lbs.

Gold and
silver assays,
cont.

Province of
British Colum-
bia, *cont.*

West Koota-
nie district,
cont.

134.—From the Wellington claim, Kaslo-Slocan mining camp, West Kootanie district.

An association of limestone and chloritic-schist, carrying small quantities of galena. The latter, freed from gangue, was found to contain :

Gold..... none.
Silver..... 166·250 ounces to the ton of 2,000 lbs.

135.—Also from the Wellington claim.

A yellowish-brown earthy matter. Assays showed it to contain :

Gold trace.
Silver 1630·416 ounces to the ton of 2,000 lbs.

136.—From the White Heather claim, Kaslo-Slocan mining camp, West Kootanie district.

A coarsely crystalline galena together with a little copper-pyrites, in a gangue of weathered rock. The galena, freed from gangue, was found to contain :

Gold..... none.
Silver..... 48·854 ounces to the ton of 2,000 lbs.

137.—From the Yosemite claim, Kaslo-Slocan mining camp, West Kootanie district.

A coarsely crystalline galena in association with a little pyrite. It was found, on assay, to contain :

Gold..... none.
Silver 146·562 ounces to the ton of 2,000 lbs.

138.—From the Okanagan claim, Kaslo-Slocan mining camp, West Kootanie district.

A compact galena in a gangue of white sub-translucent quartz. Assays gave :

Gold..... trace.
Silver..... 116·783 ounces to the ton of 2,000 lbs.

Gold and
silver assays,
cont.

Province of
British Col-
umbia, *cont.*
Interior pla-
teau region.

- 139.—From an outcrop, about seven miles from Kamloops, Interior plateau region. Examined for Mr. J. W. Mackay.

It consisted of pyrite and a ferriferous zinc-blende in a gangue of white quartz. Weight of sample, three ounces and a half. It was found to contain :

Gold..... none.
Silver..... 7.291 ounces to the ton of 2,000 lbs.

- 140.—From Mosquito Flat, North Thompson River, about sixty miles from Kamloops, Interior plateau region. Examined for Mr. J. W. Mackay.

An association of yellowish-brown zinc-blende, with very small quantities of galena. The specimen, which was more or less stained and coated with ferric hydrate, contained :

Gold..... none.
Silver..... 11.666 ounces to the ton of 2,000 lbs.

- 141.—From the same locality as the preceding specimen, but from a different lode. Examined for Mr. J. W. Mackay.

Consisted of galena and zinc-blende in a gangue of quartz. The specimen, which weighed fifteen ounces, was more or less stained and coated with ferric hydrate. Assays gave :

Gold none.
Silver..... 48.125 ounces to the ton of 2,000 lbs.

- 142.—From the Foster mine, Thompson siding, on the line of the Canadian Pacific Railway, Interior plateau region.

The material, which was taken from a depth of ten feet, consisted of a fine crystalline magnetite together with a small amount of pyrrhotite, in a gangue of fine crystalline limestone, with a little serpentine. Weight of sample, one pound four ounces.

It contained neither gold nor silver.

- 143.—Also from the Foster mine, but taken from a greater depth, namely twenty feet.

The material, which consisted of numerous fragments, was composed of a fine crystalline magnetite and a coarse crystalline pyrite in a gangue of white sub-translucent quartz associated with a dark yellowish-green chloritic schist and white calcite. Weight of sample, three pounds one ounce.

It contained neither gold nor silver.

- 144.—From near Hope, Fraser River, Interior plateau region. Gold and silver assays, *cont.*
 An intimate association of white quartz and felspar, carrying small quantities of copper-pyrites. Assays gave : Province of British Columbia, *cont.*
 Gold.... none. Interior plateau region, *cont.*
 Silver.... 0.758 of an ounce to the ton of 2,000 lbs.
- 145.—From Siwash Creek, Okanagan Lake, Interior plateau region. Examined for Mr. G. DeWolf.
 A white opaque quartz, traversed by bands of a dark gray quartzo-felsphatic rock, through which was disseminated numerous small crystals of pyrite. The specimen, which was more or less thickly coated with ferric hydrate, weighed one pound twelve ounces.
 It contained neither gold nor silver.
- 146.—From the Sh-ha-ha-nih Indian Reserve, Lower Nicola River, Interior plateau region. This, and the following specimen, was examined for Mr. J. W. Mackay.
 A coarse crystalline limestone, stained and coated with ferric hydrate, through which was disseminated a few particles of pyrite. Weight of sample, two pounds nine ounces. It contained :
 Gold..... trace.
 Silver..... none.
- 147.—From the claim of Frank Allingham on the right bank of the North Thompson River, thirty miles above the mouth of the Clearwater River, Interior plateau region.
 An association of white sub-translucent quartz with white crystalline dolomite carrying small quantities of tetrahedrite and pyrite. Weight of sample, two pounds six ounces. Assays gave :
 Gold..... trace
 Silver..... 1.925 ounce to the ton of 2,000 lbs.
- 148.—From the west side of the mouth of Botanie Creek, Thompson River, north of Lytton, Interior plateau region.
 Consisted of a conglomerate made up, for the most part, of rounded and angular fragments of quartz cemented together by ferric hydrate. Weight of sample, ten ounces.
 It contained neither gold nor silver
- 149.—From the west side of Hat Creek, about six miles from its entry into Bonaparte River, Interior plateau region.
 A light to dark gray conglomerate. Weight of sample, ten ounces and a half.
 It contained neither gold nor silver.

Gold and
silver assays,
cont.

Province of
British Col-
umbia, *cont.*

Interior pla-
teau region,
cont.

150.—From a mile and a half south-west of Copper Creek, near Kamloops Lake, Interior plateau region.

A dark gray conglomerate. Weight of sample, six ounces. It was found to contain :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

151.—From one mile south of Lac à la Fourche, south of Nicola Lake, Interior plateau region.

A weathered conglomerate. Weight of sample, four ounces. Assays gave :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

152.—From near longest lake in Garde Lafferty, north-west of and near Kamloops, Interior plateau region.

A highly weathered conglomerate. Weight of sample, twelve ounces.

It contained neither gold nor silver.

153.—From three miles west of McLean's Lake, west of Ashcroft, Interior plateau region.

A light to dark gray brecciated conglomerate. Weight of sample, fourteen ounces.

It contained neither gold nor silver.

154.—From the Upper Nicola, about two miles above Guichon's house, Interior plateau region.

Gray quartz, thickly coated with ferric hydrate. Weight of sample, one pound. It contained :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

155.—From head of Skull Creek, west side of the North Thompson River, Interior plateau region.

A white sub-translucent quartz, in association with small quantities of a very dark gray schist, in parts stained with ferric hydrate. Weight of sample, two pounds four ounces.

It contained neither gold nor silver.

156.—From near Pooytl Mountain, Interior plateau region.

An association of grayish-white granite with white opaque quartz, stained and coated with ferric hydrate. Weight of sample, one pound two ounces. Assays gave :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

157.—Also from near Pooytl Mountain.

White opaque to sub-translucent quartz, stained and coated with ferric hydrate. Weight of sample, thirteen ounces and a half. It contained :

Gold. trace.
Silver. none.

Gold and silver assays, *cont.*

Province of British Columbia, *cont.*

Interior plateau region, *cont.*

158.—From mountains east of Lytton, Interior plateau region.

A highly weathered rock. Weight of sample, fourteen ounces.

It contained neither gold nor silver.

159.—From near Savona, on the line of the Canadian Pacific Railway, Interior plateau region.

White sub-translucent quartz, carrying very appreciable quantities of mispickel. Weight of sample, twelve ounces. It was found to contain :

Gold trace.
Silver none.

160.—From near Monashee mine, head of Cherry Creek, Shuswap River, Interior plateau region.

An association of white sub-translucent quartz, calcite, and dark green diorite, carrying large quantities of pyrrhotite and a small quantity of chalcopyrite. Weight of sample, two pounds twelve ounces. Assays gave :

Gold trace.
Silver none.

161.—From the Monashee mine, referred to in connection with the preceding specimen.

A grayish-white crypto-crystalline and dark gray compact quartz, in parts stained with ferric hydrate, through which was disseminated a few grains of pyrite. Weight of sample, one pound eleven ounces. It contained :

Gold trace.
Silver none.

162.—Also from the Monashee mine, taken from tunnel C.

White sub-translucent quartz, in parts coated with a yellowish-white ochreous material. Weight of sample, one pound twelve ounces. Assays showed it to contain :

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

Gold and
silver assays,
cont.

Province of
British Col-
umbia, *cont.*

Interior pla-
teau region,
cont.

163.—Another specimen from this mine, taken from tunnel E—

Consisting of white sub-translucent quartz, more or less stained and coated with ferric hydrate, carrying small quantities of chalcopryrite and galena, and which weighed three pounds and a half, was found to contain :

| | | |
|-------------|-------|--------------------------------------|
| Gold..... | 0.583 | of an ounce to the ton of 2,000 lbs. |
| Silver..... | 2.683 | ounces |

164.—From Watching Creek, a branch of Tranquille River, Interior plateau region.

White sub-translucent to opaque quartz, associated with small quantities of dark gray argillite. Weight of sample, one pound eleven ounces. Assays gave :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

165.—From Poison Hill, west side of the North Thompson River, Interior plateau region.

An association of white limestone with a small amount of white sub-translucent quartz, traversed by thin seams of pyrite, and in parts stained and coated with ferric hydrate. Weight of sample, one pound fifteen ounces.

It contained neither gold nor silver.

166.—From between Louis Creek and Barrière River, east side of the North Thompson River, Interior plateau region.

An association of white sub-translucent quartz with small quantities of dark gray schist. The specimen, which was in parts stained and coated with ferric hydrate, weighed one pound thirteen ounces. It contained :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

167.—From Moore's Creek, west side of Stump Lake, Interior plateau region.

A white felstone, in parts stained and coated with ferric hydrate. Weight of sample, one pound ten ounces.

It contained neither gold nor silver.

168.—From Chi-wowh Creek, Thompson River, opposite Spences Bridge, Interior plateau region.

A highly weathered rock. Weight of sample, one pound ten ounces. Assays showed it to contain :

| | |
|-------------|--------|
| Gold..... | trace. |
| Silver..... | none. |

- 169.—From near Sin-soon-kum Lake, west side of the North Thompson River, Interior plateau region. Gold and silver assays, *cont.*
 An association of white sub-translucent quartz with small quantities of green chloritic schist. The specimen, which was in parts stained and coated with ferric hydrate, weighed one pound eight ounces. It contained : Province of British Columbia, *cont.*
Interior plateau region, *cont.*
 Gold..... trace.
 Silver..... none.
- 170.—From Moore's Creek, about three miles north of Nicola Lake, Interior plateau region.
 A white sub-translucent quartz stained with ferric hydrate. Weight of sample, one pound two ounces.
 It contained neither gold nor silver.
- 171.—From near trail, half a mile west of mouth of Copper Creek, north side of Kamloops Lake, Interior plateau region.
 A weathered granitoid rock. Weight of sample, one pound fourteen ounces.
 It contained neither gold nor silver.
- 172.—From about two hundred yards south-west of the locality whence the preceding specimen was obtained.
 A weathered conglomerate. Weight of sample, one pound six ounces.
 It contained neither gold nor silver.
- 173.—From two miles west of Cinnemousun Narrows, Shuswap Lake, south side, Interior plateau region.
 An association of a very fine granular pyrrhotite with small quantities of a gneissoid rock. The specimen, which was much weathered, weighed one pound fourteen ounces.
 It contained neither gold nor silver.
- 174.—From the Tenderfoot claim, Copper Creek, north side of Kamloops Lake, Interior plateau region. Examined for Mr. F. Y. Christie.
 An earthy admixture of ferric hydrate and blue and green carbonate of copper. Weight of sample, fourteen ounces. Assays gave :
 Gold..... trace.
 Silver..... 18·200 ounces to the ton of 2,000 lbs.

Gold and
silver assays,
cont.

Province of
British Col-
umbia, *cont.*

Interior pla-
teau region,
cont.

175.—From the same claim as the preceding specimen.

It consisted of bornite, thickly coated with ferric hydrate.

Weight of sample, an ounce and a quarter. It contained:

| | | |
|-------------|-------|---------------------------------------|
| Gold..... | ..... | trace. |
| Silver..... | ..... | 4.375 ounces to the ton of 2,000 lbs. |

176.—Also from the Tenderfoot claim.

An earthy admixture of green carbonate of copper and ferric hydrate. Weight of sample, one pound two ounces. Assays showed it to contain:

| | | |
|-------------|-------|--|
| Gold..... | ..... | trace. |
| Silver..... | ..... | 18.500 ounces to the ton of 2,000 lbs. |

Coast Ranges
and coast
region.

177.—This, and the two following specimens are from township seventeen, New Westminster district, Coast Ranges and coast region.

A fine granular quartz, through which was disseminated somewhat large quantities of pyrrhotite, iron-pyrites and copper-pyrites. Weight of sample, two pounds three ounces. Assays gave:

| | | |
|-------------|-------|--------|
| Gold..... | ..... | trace. |
| Silver..... | ..... | none. |

178.—White and grayish-white crypto-crystalline quartz, through which was disseminated small quantities of pyrrhotite. Weight of sample, one pound. It contained:

| | | |
|-------------|-------|--------|
| Gold..... | ..... | trace. |
| Silver..... | ..... | none. |

179.—A fine granular quartz, carrying very large quantities of pyrrhotite, iron-pyrites and copper-pyrites. Weight of sample, thirteen ounces. It was found to contain:

| | | |
|-------------|-------|-----------------|
| Gold..... | ..... | distinct trace. |
| Silver..... | ..... | none. |

180.—From Spuzzum Creek, west side of Fraser River, between Yale and Suspension Bridge, Coast Ranges and coast region.

An association of white sub-translucent to opaque quartz, with a small quantity of green chloritic schist. The specimen, which was more or less stained and coated with ferric hydrate, weighed four pounds five ounces.

It contained neither gold nor silver.

- 181.—From the Union Bar mine, near Hope station, on the line of the Canadian Pacific Railway, Coast Ranges and coast region. Examined for Mr. J. W. Mackay.

Bluish-white to white opaque quartz, traversed by fine seams of copper-pyrites. The specimen, which was in parts coated with ferric hydrate, weighed two pounds three ounces. Assays gave :

Gold trace.
Silver 1·167 ounces to the ton of 2,000 lbs.

Gold and silver assays, cont.
Province of British Columbia, cont.
Coast Ranges and coast region, cont.

- 182.—From Big Cañon, Fraser River, Coast Ranges and coast region. Examined for Mr. J. W. Mackay.

A coarse crystalline limestone, carrying large quantities of galena. Weight of sample, three ounces and a half. It contained :

Gold none.
Silver 1·458 ounces to the ton of 2,000 lbs.

- 183.—From eight miles north of Burrard Inlet, Coast Ranges and coast region. Examined for Mr. H. Abbott.

Dark brown sphalerite. Weight of sample, two ounces.

It contained neither gold nor silver.

- 184.—From the head of Eckstall Inlet, south of Port Essington, Skeena River, Coast Ranges and coast region.

A crystalline granular, massive, iron-pyrites, through which was disseminated a trifling amount of sphalerite. Weight of sample, ten ounces. Assays showed it to contain :

Gold trace.
Silver 0·350 of an ounce to the ton of 2,000 lbs.

This material is said to constitute, at the locality in question, a vein fifteen feet wide, nearly vertical, running in a north-easterly direction from the shore and traceable for nearly a mile.

- 185.—From Jarvis Inlet, Coast Ranges and coast region. Examined for Mr. A. A. Davidson.

An association of white sub-translucent quartz with small quantities of dark greenish-gray chloritic schist, carrying a little copper-pyrites. Assays gave :

Gold trace.
Silver 0·583 of an ounce to the ton of 2,000 lbs.

- 186.—From near the head of Barclay Sound, Vancouver Island, Coast Ranges and coast region.

A compact massive pyrrhotite. Weight of sample, two ounces. It contained :

Gold trace.
Silver 0·233 of an ounce to the ton of 2,000 lbs.

Gold and silver assays, *cont.*

Province of British Columbia, *cont.*

Coast Ranges and coast region, *cont.*

- 187.—From Dean's Channel, twenty-five miles up the Setskon or Salmon River, Coast Ranges and coast region. This, and the two following specimens were examined for Mr. P. Jacobsen.

An association of quartz with small quantities of a grayish quartzo-felspathic rock, carrying small quantities of copper-pyrites. The specimen, which was more or less stained with ferric hydrate, weighed seven ounces. It was found, on assay, to contain :

Gold..... trace.
Silver..... 0.292 of an ounce to the ton of 2,000 lbs.

- 188.—From Burke Channel, King Island, Coast Ranges and coast region.

White, sub-translucent quartz, stained with ferric hydrate and green carbonate of copper. Weight of sample, seven ounces.

It contained neither gold nor silver.

- 189.—From Bentinck Arm, Coast Ranges and coast region.

White, sub-translucent quartz, carrying bornite and copper-pyrites. Assays showed it to contain :

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

- 190.—From the east side of Cortez Island, Coast Ranges and coast region. Examined for Mr. W. H. Robertson.

An intimate association of serpentine, limestone, quartz, and felspar, with an occasional crystal of garnet, and here and there a little copper-pyrites. The specimen, which was in parts stained and coated with ferric hydrate and green carbonate of copper, weighed four ounces. It contained :

Gold..... trace.
Silver..... 1.167 ounce to the ton of 2,000 lbs.

- 191.—From Texada Island, Coast Ranges and coast region. Examined for Mr. John Campbell.

A brownish-yellow to reddish-brown, more or less vesicular, limonite, through which was disseminated small quantities of unaltered pyrite. Weight of sample, one pound six ounces.

It contained neither gold nor silver.

NATURAL WATERS.

Water from boring at Deloraine (1,855 feet), Man.

- 1.—Water from the boring at Deloraine, province of Manitoba. Taken at a depth of 1,855 feet. Collected, July, 1892.

At the time of examination it contained a small amount of suspended matter; this was removed by filtration. The filtered

water was colourless and odourless, and tasted mildly saline. Re- Natural
 action, neutral, when evaporated to a small volume, however, it waters, cont.
 becomes distinctly alkaline. Its specific gravity, at 15.5° C., was Water from
 found to be 1.0050. Boiling produced a slight precipitate con- boring at
 sisting of carbonate of lime with a little carbonate of magnesia. Deloraine
 (1,855 feet),
 Man., cont.

Agreeably with the results of an analysis, conducted by Mr. Wait, 1,000 parts, by weight, of the filtered water, at 15.5° C., contained :

| | |
|--|--------|
| Potassa | 0.0140 |
| Soda | 3.0611 |
| Lime | 0.0219 |
| Magnesia | 0.0159 |
| Chlorine | 2.6803 |
| Sulphuric acid | 0.2258 |
| Carbonic acid | 0.9284 |
| | <hr/> |
| | 6.9474 |
| Less oxygen equivalent to chlorine | 0.6040 |
| | <hr/> |
| | 6.3434 |

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

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

| | |
|---------------------------------|--------|
| Chloride of potassium | 0.0222 |
| “ sodium | 4.3995 |
| Sulphate of soda | 0.4008 |
| Bi-carbonate of soda | 1.3420 |
| “ lime | 0.0563 |
| “ magnesia | 0.0509 |
| | <hr/> |
| | 6.2717 |
| Carbonic acid, free | 0.0717 |
| | <hr/> |
| | 6.3434 |

An imperial gallon of the water, at the above-mentioned temperature, would contain :

| | Grains. |
|---------------------------------|---------|
| Chloride of potassium | 1.562 |
| “ sodium | 309.502 |
| Sulphate of soda | 28.196 |
| Bi-carbonate of soda | 94.409 |
| “ lime | 3.961 |
| “ magnesia | 3.581 |
| | <hr/> |
| | 441.211 |
| Carbonic acid, free | 5.044 |
| | <hr/> |
| | 446.255 |

The water was examined for barium and strontium, and these were both found to be absent. It was, however, found to contain a trace of lithium, a faint trace of bromine, and very distinct traces of iodine.

Natural
waters, *cont.*

Water from
boring at
Deloraine
(1,943 feet),
Man.

- 2.—From the same locality as the preceding water, and from the same boring, but taken at a greater depth, namely 1,943 feet, and at a much later date, that is to say, in February, 1894.

When first received the water was somewhat turbid, but on standing became perfectly clear and bright, with deposition of a small quantity of a brownish-yellow coloured sediment, consisting of argillaceous matter with some grains of colourless quartz, and a trifling quantity of ferric hydrate and organic matter.

The supernatant, clear and bright water, decanted from the sediment in question, was colourless and odourless and had a mildly saline taste. It exhibited a neutral reaction, when concentrated to a small volume, however, it becomes distinctly alkaline. The specific gravity of the water, at 15.5° C., was found to be 1.0049.

An analysis by Mr. Wait showed it to contain—in 1,000 parts, by weight :

| | |
|---|--------|
| Potassa | 0.0111 |
| Soda | 3.1433 |
| Lime | 0.0163 |
| Magnesia | 0.0094 |
| Alumina and ferrous oxide | 0.0002 |
| Chlorine | 2.7164 |
| Sulphuric acid | 0.2046 |
| Carbonic acid | 0.9398 |
| Silica | 0.0151 |
| | <hr/> |
| | 7.0562 |
| Less oxygen equivalent to chlorine. | 0.6121 |
| | <hr/> |
| | 6.4441 |

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

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

| | |
|---|--------|
| Chloride of potassium | 0.0177 |
| “ sodium | 4.4625 |
| Sulphate of soda | 0.3632 |
| Bi-carbonate of soda | 1.4998 |
| “ lime | 0.0419 |
| “ magnesia | 0.0301 |
| Alumina with a little ferrous oxide | 0.0002 |
| Silica | 0.0151 |
| | <hr/> |
| | 6.4305 |
| Carbonic acid, free | 0.0136 |
| | <hr/> |
| | 6.4441 |

An imperial gallon of the water, at the above-mentioned temperature, would contain :

| | Grains. |
|---|---------|
| Chloride of potassium | 1·245 |
| “ sodium | 313·915 |
| Sulphate of soda | 25·549 |
| Bi-carbonate of soda | 105·504 |
| “ lime | 2·947 |
| “ magnesia | 2·117 |
| Alumina with a little ferrous oxide | 0·014 |
| Silica | 1·062 |
| | 452·353 |
| Carbonic acid, free | 0·957 |
| | 453·310 |

Natural
waters, *cont.*
Water from
boring at
Deloraine
(1,943 feet),
Man., *cont.*

Boiling produced only a slight precipitate, which consisted of carbonate of lime with a little carbonate of magnesia.

The larger amount of water at the disposal of the operator, on this occasion, enabled him, not only to confirm the absence of barium and strontium, and to detect and estimate the silica, alumina and iron, but also to obtain satisfactory evidence of the presence of traces of boric acid and phosphoric acid, in addition to that of lithium, iodine and bromine, previously detected in the former sample of this water.

As may be seen on comparing the analyses of these two samples of the water, there is no very appreciable difference in the composition of that of the first collection, and that of the second, collected some nineteen months later and coming from a somewhat greater (eighty-eight feet) depth.

3.—From a spring at La Saline, east side of the Athabasca River, North-west Territory. Collected by Mr. R. G. McConnell, 1890.

Water from a
spring at La
Saline, Atha-
basca River,
N.W.T.

Specific gravity, at 15·5° C., 1·052. Agreeably with the results of an analysis conducted by Mr. Wait, it contained, in 1,000 parts, by weight :

| | |
|---|--------|
| Potassium | 0·868 |
| Sodium | 23·937 |
| Calcium | 1·574 |
| Magnesium | 0·496 |
| Sulphuric acid (SO ₄) | 4·702 |
| Chlorine | 38·461 |
| | 70·038 |
| Chlorine required, in addition to that found, to satisfy bases | 0·056 |
| | 70·094 |

Natural
waters, *cont.*
Water from a
spring at La
Saline, Atha-
basca River,
N. W. T.,
cont.

Hypothetical combination :

| | |
|---------------------------------|--------|
| Chloride of potassium | 1·655 |
| “ sodium | 60·883 |
| “ magnesium | 1·049 |
| Sulphate of lime | 5·352 |
| “ magnesia | 1·155 |

70·094

Total dissolved solid matter, by direct experiment,
dried at 180° C., 69·616.

There was not enough of the water at the disposal of the operator to admit of his examining it for any of the more rarely occurring constituents.

Water from a
spring near
Red Clay
Creek, Atha-
basca River,
N. W. T.

4.—From a spring on the bank of the Athabasca River, two miles above the Red Clay Creek, district of Athabasca, North-west Territory. Collected by Mr. R. G. McConnell, 1890.

Specific gravity at 15·5° C., 1·012. An analysis, by Mr. Wait, showed it to contain, in 1,000 parts, by weight :

| | |
|---|-------|
| Potassium | 0·036 |
| Sodium | 4·783 |
| Calcium | 0·947 |
| Magnesium | 0·122 |
| Sulphuric acid (SO ₄) | 2·759 |
| Chlorine | 7·394 |

16·041

Chlorine required, in addition to that found, to
satisfy bases

0·021

16·062

Hypothetical combination :

| | |
|---------------------------------|--------|
| Chloride of potassium | 0·069 |
| “ sodium | 12·165 |
| Sulphate of lime | 3·220 |
| “ magnesia | 0·608 |

16·062

Total dissolved solid matter, by direct experiment,
dried at 180° C., 16·263.

The quantity of the water at the disposal of the operator was too limited to allow of his examining it for any of the more rarely occurring constituents.

Water from a
spring near
Wallace,
Cumberland
county, N.S.

5.—From a spring in the vicinity of Wallace, Cumberland county, province of Nova Scotia. Examined for Mr. A. Macfarlane.

The water contained a little suspended matter, which was removed by filtration. The filtered water, which was colourless and odourless, possessed a faintly saline taste, and was found to

have a specific gravity, at 15.5° C., of 1.001, and to contain 1.827 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

A qualitative analysis, by Mr. Wait, showed it to contain :

| | |
|---------------------|--------------------------|
| Potassa..... | trace. |
| Soda..... | large quantity. |
| Lime..... | somewhat small quantity. |
| Sulphuric acid..... | small quantity. |
| Carbonic acid..... | very small quantity. |
| Chlorine..... | large quantity. |

Natural waters, *cont.*
Water from a spring near Wallace, Cumberland county, N. S., *cont.*

Boiling produced a slight precipitate, consisting of carbonate of lime.

6.—From a spring at East Bay, Cape Breton county, province of Nova Scotia.

The water was colourless and odourless, and had a bitter saline taste. It was found to have a specific gravity, at 15.5° C., of 1.006, and to contain 8.564 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Water from a spring near East Bay, Cape Breton county, N. S.

Mr. Wait made a qualitative analysis of this water and found it to contain :

| | |
|---------------------|----------------------------|
| Potassa..... | trace. |
| Soda..... | moderately large quantity. |
| Lime..... | fairly large quantity. |
| Magnesia..... | trace. |
| Sulphuric acid..... | trace. |
| Carbonic acid..... | trace. |
| Silica..... | trace. |
| Chlorine..... | large quantity. |

Boiling produced no precipitate.

7.—From a spring on the North River, about eight miles from Truro, Colchester county, province of Nova Scotia. Examined for Mr. E. A. Charters.

The water was both colourless and odourless. It had a saline taste, and contained 10.498 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Water from a spring on North River, Colchester county, N. S.

A qualitative analysis afforded Mr. Wait the following results :

| | |
|---------------------|------------------------|
| Potassa..... | trace. |
| Soda..... | large quantity. |
| Lime..... | rather large quantity. |
| Magnesia..... | small quantity. |
| Sulphuric acid..... | rather large quantity. |
| Carbonic acid..... | trace. |
| Chlorine..... | large quantity. |

Natural
waters, *cont.*
Water from a
spring at
Sussex, King's
county, N. B.

- 8.—From a spring at Sussex, King's county, province of New Brunswick. Examined for Mr. F. W. Stockton.

The water, as received, contained a small quantity of white flocculent suspended matter—this was removed by filtration. The filtered water had a pale brownish-yellow colour, and a faintly bitter saline taste. It was found to have a specific gravity, at 15.5° C., of 1.001 and to contain 2.717 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Agreeably with the results of a qualitative analysis, conducted by Mr. Wait, it contained :

| | |
|---------------------|------------------------|
| Potassa..... | trace. |
| Soda..... | large quantity. |
| Lime..... | very small quantity. |
| Magnesia..... | rather large quantity. |
| Sulphuric acid..... | small quantity. |
| Carbonic acid..... | small quantity. |
| Chlorine..... | large quantity. |
| Organic matter..... | very small quantity. |

Boiling produced a precipitate, consisting of carbonate of lime.

Water from a
spring at
Sussex, King's
county, N. B.

- 9.—From a spring at Sussex, King's county, province of New Brunswick. Examined for Mr. G. H. Congle.

The water was found to be clear, bright and colourless ; odourless and devoid of any marked taste. It contained 0.945 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

A qualitative analysis, by Mr. Wait, showed it to contain :

| | |
|---------------------|-----------------|
| Lime..... | large quantity, |
| Magnesia..... | trace. |
| Sulphuric acid..... | large quantity. |
| Chlorine..... | none. |

Water from
L'Avenir,
Drummond
county, Que.

- 10.—Water from L'Avenir, township of Durham, Drummond county, province of Quebec. Examined for Mr. D. A. Sutherland.

The water, which had a very pale yellow colour, was odourless and devoid of any marked taste. It contained 0.157 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Mr. Wait made a qualitative analysis of this water and found it to contain :

| | |
|--------------------------|----------------------|
| Soda | small quantity. |
| Lime | very small quantity. |
| Magnesia | trace. |
| Ferrous oxide | trace. |
| Carbonic acid | very small quantity. |
| Chlorine | very small quantity. |
| Organic matter | trace. |

Natural waters, *cont.*
Water from l'Avenir, Drummond county, Que., *cont.*

Boiling did not produce any precipitate.

11.—Also from L'Avenir, township of Durham, Drummond county. Examined for Mr. D. A. Sutherland.

Water from l'Avenir, Drummond county, Que.

This water, when received, was slightly opalescent and smelt strongly of sulphuretted hydrogen. It contained 0.428 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

A qualitative analysis, by Mr. Wait, showed it to contain :

| | |
|--------------------------|----------------------|
| Soda | very small quantity. |
| Lime | small quantity. |
| Magnesia | trace. |
| Ferrous oxide | trace. |
| Carbonic acid | small quantity. |
| Chlorine | very small quantity. |
| Organic matter | very small quantity. |

Boiling produced a slight precipitate, consisting of carbonate of lime.

12.—From a boring in West Belleville, Hastings county, province of Ontario. Examined for Mr. H. Corby.

Water from a boring in West Belleville, Hastings county, Ont.

The water, as received, contained a small quantity of suspended matter—this was removed by filtration. The filtered water was colourless and odourless. It had a bitter saline taste ; a specific gravity, at 15.5° C., of 1.011 ; and contained 14.637 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Agreeably with the results of a qualitative analysis, conducted by Mr. Wait, it contained :

| | |
|--------------------------|----------------------|
| Potassa | trace. |
| Soda | very large quantity. |
| Lithia | trace. |
| Baryta | trace. |
| Lime | very large quantity. |
| Magnesia | large quantity. |
| Ferrous oxide | trace. |
| Sulphuric acid | large quantity. |
| Chlorine | very large quantity. |
| Iodine | trace. |

Natural
waters, *cont.*

This water rises from the Trenton formation. It would appear to belong to the same class of waters as those of St. Catharines, Ancaster, Whitby and Hallowell, which were examined by Dr. T. S. Hunt—Geology of Canada, 1863.

Water from
Rednersville,
Prince-
Edward
county, Ont.

13.—From the farm of Mr. E. A. Brickman, Rednersville, Prince Edward county, province of Ontario. Examined for Mr. G. F. Clarke.

The sample received for examination was colourless, odourless, and devoid of any marked taste. It contained 0.271 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

A qualitative analysis, by Mr. Wait, showed it to contain :

| | |
|--------------------------|----------------------|
| Soda | very small quantity. |
| Lime | small quantity. |
| Magnesia | very small quantity. |
| Sulphuric acid | small quantity. |
| Carbonic acid | very small quantity. |
| Chlorine | very small quantity. |

Boiling produced a slight precipitate, consisting of carbonate of lime with a little sulphate of lime.

Water from a
spring near
Davenport
station, York
county, Ont.

14.—From a spring about half a mile from Davenport station, in the township of York, York county, province of Ontario. Examined for Mr. G. F. Clarke.

The water contained a very appreciable amount of white, loosely flocculent, suspended matter—this was removed by filtration. The filtered water was colourless and odourless, and devoid of any marked taste. It contained 0.414 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Mr. Wait made a qualitative analysis of this water and found it to contain :

| | |
|---------------------------|----------------------|
| Lime | small quantity. |
| Magnesia | very small quantity. |
| Sulphuric acid | very small quantity. |
| Phosphoric acid | trace. |
| Carbonic acid | small quantity. |
| Chlorine | trace. |
| Organic matter | very small quantity. |

Water from
Niagara-on-
the-Lake,
Lincoln
county, Ont.

15.—From Niagara-on-the-Lake, township of Niagara, Lincoln county, province of Ontario. Examined for Mr. G. F. Clarke.

When received, this water was turbid and contained a somewhat large quantity of a reddish-brown sediment. The latter was removed by filtration. The filtered water, which was colourless and devoid of any marked taste, was found to contain 0.309

parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Natural waters, *cont.*
Water from Niagara-on-the-Lake, Lincoln county, Ont., *cont.*

A qualitative analysis, conducted by Mr. Wait, showed it to contain :

| | |
|------------------|----------------------|
| Soda..... | very small quantity. |
| Lime..... | small quantity. |
| Sulphuric acid.. | small quantity. |
| Carbonic acid... | very small quantity. |
| Chlorine..... | very small quantity. |

Boiling produced a slight precipitate, consisting of carbonate, with a little sulphate, of lime.

- 16.—From a spring on the north bank of the Rideau River, about four hundred yards below the dam at Hog's Back, township of Nepean, Carleton county, province of Ontario. Collected by Mr. R. L. Broadbent, November 1, 1891.

Water from a spring on the Rideau River, Carleton county, Ont.

The water was colourless, odourless, and devoid of any marked taste. It was found to have a specific gravity, at 15·5° C., of 1·0003, and to contain 0·287 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Agreeably with the results of a qualitative analysis, conducted by Mr. Wait, it contained :

| | |
|---------------------|----------------------|
| Soda..... | very small quantity. |
| Lime..... | small quantity. |
| Magnesia..... | very small quantity. |
| Ferrous oxide.... | trace. |
| Sulphuric acid..... | very small quantity. |
| Carbonic acid..... | small quantity. |
| Silica..... | very small quantity. |
| Chlorine..... | very small quantity. |
| Organic matter... | trace. |

Boiling produced a slight precipitate, consisting of carbonate of lime with a very small quantity of carbonate of magnesia and a trace of iron.

- 17.—From Moose Jaw, district of Assiniboia, North-west Territory. Examined for Mr. Seymour Green.

The sample of this water received for examination contained a small quantity of brownish coloured suspended matter. This was removed by filtration. The filtered water was colourless and odourless ; taste, mildly saline ; reaction, neutral ; specific gravity, at 15·5° C., 1·0022. It contained 2·081 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

Water from Moose Jaw, district of Assiniboia, N.W.T.

Natural
waters, *cont.*

Water from
Moose Jaw,
district of
Assiniboia,
N. W. T.,
cont.

Mr. Wait made a qualitative analysis of this water and found it to contain :

| | |
|----------------------|-----------------|
| Potassa..... | trace. |
| Soda..... | large quantity. |
| Lime.. | small quantity. |
| Magnesia .. | large quantity. |
| Sulphuric acid..... | large quantity. |
| Carbonic acid..... | large quantity. |
| Chlorine..... | small quantity. |
| Organic matter | trace. |

Boiling produced a somewhat copious precipitate, consisting of carbonate of lime with some carbonate of magnesia.

Water from
a boring at
Medicine Hat,
district of
Assiniboia,
N.W.T.

18.—From a boring at Medicine Hat, district of Assiniboia, North-west Territory. Examined for Mr. E. Walton.

The water was colourless and odourless ; taste, saline. It was found to contain 5·848 parts of dissolved saline matter, dried at 180° C., in 1,000 parts, by weight, of the water.

A qualitative analysis, by Mr. Wait, gave :

| | |
|----------------------|----------------------|
| Soda..... | large quantity. |
| Lime..... | small quantity. |
| Magnesia..... | trace. |
| Carbonic acid..... | small quantity. |
| Chlorine | large quantity. |
| Organic matter | very small quantity. |

Boiling produced a slight precipitate, consisting of carbonate of lime.

Water from
a spring on
Kaslo Creek,
Kootanie
Lake, B.C.

19.—From a spring on Kaslo Creek, about four miles from its entry into Kootanie Lake, West Kootanie district, province of British Columbia. Examined for Mr. T. P. Lendrum.

It was bright, colourless, and odourless ; had a specific gravity, at 15·5° C., of 1·002, and was found to contain 1·525 parts of dissolved saline matter, dried at 180° C., in 1000 parts, by weight, of the water.

Agreeably with the results of a qualitative analysis, conducted by Mr. Wait, it contained :

| | |
|---------------------|----------------------|
| Soda..... | very small quantity. |
| Lime..... | large quantity.. |
| Magnesia | large quantity. |
| Ferrous oxide..... | trace. |
| Carbonic acid..... | very large quantity. |
| Chlorine..... | very small quantity. |
| Organic matter..... | trace. |

Boiling produced a copious precipitate, consisting of carbonates of lime and magnesia.

BRICK AND POTTERY-CLAYS.

PROVINCE OF PRINCE EDWARD ISLAND.

From the
Province of
Prince
Edward
Island.

- 1.—From mouth of harbour at Charlottetown.

Colour,* reddish-brown; slightly plastic; when burnt, has a pleasing reddish-brown colour. Is well adapted for the manufacture of pressed brick or other pressed ware, *i.e.*, architectural ornamentations. Perhaps scarcely sufficiently plastic for the potters use.

PROVINCE OF NOVA SCOTIA.

From the
Province of
Nova Scotia.

- 2.—From the east side of East Bay, Bras d'Or Lake, about twenty-five miles from Sydney, Cape Breton county.

A faint greenish coloured, plastic clay, containing a somewhat large proportion of gritty matter; when burnt, assumes a very pale reddish-brown colour; is fusible at a somewhat elevated temperature. It is suitable for the manufacture of ordinary building brick and common pottery.

- 3.—From the vicinity of Middleton, southern slope of North Mountains, Annapolis county. Examined for Mr. Isaiah Dodge.

a. A light gray, non-calcareous, but very slightly plastic, clay; burns white, with a faint reddish tinge; fuses at a somewhat elevated temperature. Is suitable for the manufacture of common building brick.

b. A bluish-gray, calcareous, but very slightly plastic, clay; when burnt assumes a pale reddish-white colour; fuses at a somewhat elevated temperature. Is suitable for the manufacture of common building brick.

c. A reddish-brown, non-calcareous, plastic clay; when burnt, has a red colour; fuses at a somewhat elevated temperature. Is suitable for the manufacture of bricks, drain-tiles, and similar ware.

- 4.—From McKenzie Brook, Middle Musquodoboit—similar material, however, occurs on either side of the Musquodoboit River, extending from Middle to Upper Musquodoboit, Halifax county. Collected by Mr. E. R. Faribault.

* The colour ascribed to the various clays is, in all instances, that of the air-dried material.

Brick and
pottery clays,
cont.

From the
province of
Nova Scotia,
cont.

Colour, light pearl gray, dark gray, brownish-red—mottled ; is non-calcareous ; plastic ; when burnt assumes a very pale reddish-brown colour ; is rather difficultly fusible at a high temperature. It would be well suited for the manufacture of ordinary building brick, and would most probably be found sufficiently refractory for stove-linings ; it could also be used for the manufacture of many varieties of earthenware.

Another sample of this material, answering in the main, to the above description, comprised fragments of a pure light pearl-gray colour, whilst others again were wholly dark gray. The two kinds were examined separately. The former was found to be highly plastic ; when burnt, of a pure white colour, and very difficultly fusible. Such material would, in addition to the uses above pointed out, be well adapted for the manufacture of the finer varieties of stoneware. The dark gray coloured fragments consisted of a good plastic clay, which, when burnt, assumed a pale reddish-white colour, and proved to be somewhat difficultly fusible. Its uses would be more strictly confined to those referred to above, when speaking of the material as a whole.

From the
North-west
Territory.

NORTH-WEST TERRITORY.

- 5.—From Crooked Creek, near Waterton Lake, district of Alberta. Collected by Mr. T. C. Weston, 1883.

Colour, light gray ; calcareous ; very plastic ; when burnt, very pale reddish-brown ; fusible at a somewhat elevated temperature. Is suitable for the manufacture of ordinary building brick, and common pottery.

- 6.—Occurs intercalated in boulder-clay, at Coal Banks, Belly River, district of Alberta. Collected by Mr. T. C. Weston, 1883.

Colour, brownish-yellow ; is non-calcareous ; very slightly plastic ; when burnt, has a pale brownish-yellow colour ; is fusible at a somewhat elevated temperature. The burnt mass is more or less tender—hence this material could not advantageously be employed for the manufacture of bricks.

- 7.—From three miles above Coal Banks, Belly River, district of Alberta. Collected by Mr. T. C. Weston, 1883.

Colour, ash-gray ; is calcareous ; only slightly plastic ; when burnt, has a brownish-yellow colour ; is fusible at a somewhat elevated temperature. The burnt mass is more or less tender, consequently this material would be but ill adapted for the manufacture of bricks.

- 8.—From a two-inch parting in coal seam at the Galt mine, Coal Banks, Belly River, district of Alberta. Collected by Mr. T. C. Weston, 1883. Brick and pottery clays, cont.
- From the North-west Territory, cont.
- Colour, light gray ; is non-calcareous ; plastic ; when burnt, assumes a brownish-red colour ; is fusible at a somewhat elevated temperature. This clay is well suited for the manufacture of ordinary building brick.
- 9.—Occurs overlying boulder-clay, near Fort Kipp, Old Man River, district of Alberta. Collected by Mr. T. C. Weston, 1883.
- Colour, ash-gray ; is slightly calcareous ; very plastic ; when burnt, assumes a reddish-brown colour ; fusible at a somewhat elevated temperature. It is well suited for the manufacture of ordinary building brick and common pottery.
- 10.—From Dutch Fred's crossing, Waterton River, district of Alberta. Collected by Mr. T. C. Weston, 1883.
- Colour, bluish-gray ; is calcareous ; only slightly plastic ; when burnt, has a reddish-brown colour ; is fusible at a somewhat elevated temperature. Would serve for the manufacture of common building brick.
- 11.—From an eight-inch thick deposit on Pincher Creek, district of Alberta. Collected by Mr. T. C. Weston, 1883.
- Colour, purplish-brown ; is non-calcareous ; plastic ; when burnt, assumes a reddish-brown colour ; is fusible at a somewhat elevated temperature. Might be employed for the manufacture of ordinary building brick and common pottery.
- 12.—From a deposit seven feet thick, on Pincher Creek, district of Alberta. Collected by Mr. T. C. Weston, 1883.
- Colour, bluish-gray ; is slightly calcareous ; plastic ; when burnt has a brownish-yellow colour ; is fusible at a somewhat elevated temperature. Could be used for the manufacture of ordinary building brick, and common pottery.
- 13.—Also from Pincher Creek, district of Alberta. Collected by Mr. T. C. Weston, 1883.
- Colour, light brownish-red ; is calcareous ; plastic ; when burnt assumes a reddish-brown colour ; is fusible at a somewhat elevated temperature. Might be employed for the manufacture of ordinary building brick.

Brick and
pottery clays,
cont.

From the
North-west
Territory,
cont.

- 14.—From lignite deposit on the south side of the South Saskatchewan River, about six miles above Medicine Hat, district of Assiniboia. Collected by Mr. T. C. Weston, 1884.

Colour, dark bluish-gray; is very slightly calcareous; plastic; when burnt has a pale brownish-yellow colour; is fusible at a somewhat elevated temperature. Could be used for the manufacture of ordinary building brick, drain tiles, and similar ware.

- 15.—From base of Fox Hills, White Mud River, district of Assiniboia. Collected by Mr. R. G. McConnell, 1883.

Colour, dark gray; is non-calcareous; plastic; when burnt has a very pale dull yellow colour; is somewhat difficultly fusible at a high temperature. This clay is well adapted for the manufacture of ordinary building brick; also for stove linings or even a fire-brick in which a high degree of refractoriness was not called for.

- 16.—From White Mud River, near the mouth of Farewell Creek, district of Assiniboia. Collected by Mr. R. G. McConnell, 1883.

Colour, pale bluish-grayish-white; is non-calcareous; highly plastic; when burnt, has a faint dull yellowish white colour; is not very readily fusible at an elevated temperature. Would be well adapted for the manufacture of ordinary building brick, common pottery, or even some of the finer kinds of stoneware.

- 17.—From above the boulder-clay, eight miles above the Forks of Red Deer River, district of Assiniboia. Collected by Mr. R. G. McConnell, 1883.

Colour, dark gray; non-calcareous; very plastic; when burnt, assumes a yellowish-red colour; is fusible at a somewhat elevated temperature. It is well suited for the manufacture of ordinary building brick and common pottery.

- 18.—From the Cypress Hills, district of Assiniboia. Collected by Mr. R. G. McConnell, 1883.

Colour, pale yellowish-gray; is non-calcareous; highly plastic; when burnt, has a dull yellow colour; is fusible at a somewhat elevated temperature. Might advantageously be employed for the manufacture of ordinary building brick and common pottery.

- 19.—From the Hazard coal mine, Souris River, eight miles south-east of Estevan on the Soo branch of the Canadian Pacific Railway, district of Assiniboia. Collected by Dr. A. R. C. Selwyn, 1892.

Colour, bluish-grey ; is highly calcareous ; very plastic ; when burnt, has a very pale reddish-brown colour ; is readily fusible at a somewhat elevated temperature. It would serve for the manufacture of ordinary building brick.

Brick and pottery clays, cont.

From the North-west Territory, cont.

- 20.—From the east-half of section 28, township 12, range 24, west of the second initial meridian, district of Assiniboia. Presented by Mr. W. H. Stevenson, 1886.

Colour, pale, bluish-grayish-white ; is non-calcareous ; highly plastic ; burns white, or all but ; is very difficultly fusible at a high temperature. It is well suited for the manufacture of ordinary building brick, stove-linings, and would make a fairly refractory fire-brick ; it could also be used for the manufacture of pottery, including the finer varieties of stoneware.

- 21.—From vicinity of Pasqua, township 16, range 25, west of the 2nd initial meridian, district of Assiniboia.

All that has been said in regard to the preceding sample of clay, applies equally well to this one, apart from the fact that, in this instance, the material burnt perfectly white. This clay may not improbably be from an extension of the same deposit.

PROVINCE OF BRITISH COLUMBIA.

From the province of British Columbia.

- 22.—From the North Arm, Burrard Inlet, New Westminster district. Examined for Mr. J. C. Keith.

Colour, light gray ; is non-calcareous ; plastic ; when burnt, has a reddish-brown colour ; is fusible at a somewhat elevated temperature. Might advantageously be employed for the manufacture of ordinary building brick and common pottery.

- 23.—From near Saanich, Vancouver Island.

Colour, bluish-gray ; is non-calcareous ; plastic ; when burnt, assumes a pale reddish-brown colour ; is somewhat readily fusible at an elevated temperature. Would be found well suited for the manufacture of ordinary building brick and common earthenware.

- 24.—From about three miles up Guichon Creek, Nicola River, Kamloops division of Yale district.

Colour, light brown ; is non-calcareous ; highly plastic ; when burnt, has a pale reddish-brown colour ; is fusible at a somewhat elevated temperature. An excellent clay for the manufacture of ordinary building brick, drain-tiles, and all kinds of common earthenware.

Brick and
pottery clays,
cont.

From the
province of
Manitoba.

For description and analysis of a fire-clay from Souris City, Man., see under 'Rocks,' ante, No. 4. A reference to the occurrence of China-stone, which is used in the manufacture of porcelain, in British Columbia, will be found under 'Miscellaneous Examinations,' beyond.

MISCELLANEOUS EXAMINATIONS.

- China-stone. 1.—CHINA-STONE. A light bluish-gray granitic rock, having its felspathic constituent more or less decomposed, but not completely kaolinised, and containing little or no mica, has been met with and according to reports occurs in large quantity, on the west bank of the Thompson River, opposite Spatsum station on the line of the west bank of the Canadian Pacific Railway, Yale district, province of British Columbia. China stone is much used in the manufacture of porcelain, and especially for the production of glazes.
- Ferruginous sandstone. 2.—FERRUGINOUS SANDSTONE. A coarse grained sandstone from the Athabasca River, district of Athabasca, North-west Territory, collected by Mr. R. G. McConnell, has been examined by Mr. Wait and found to contain ferric oxide equivalent to 12.43 per cent of metallic iron.
- Ferruginous rock. 3.—FERRUGINOUS ROCK. From Meadow's Road, East Bay, Cape Breton county, province of Nova Scotia. Examined for Mr. Joseph McMillan. It consisted of an association of quartz and calcite, through which was disseminated some earthy red hematite and a few scales of specular iron. Mr. Wait found it to contain 9.51 per cent of metallic iron.
- Phosphatic shale. 4.—PHOSPHATIC SHALE. From the Niobrara formation on Wilson River, section 18, township 25, range 20, west of the principal meridian, province of Manitoba. Collected by Mr. J. B. Tyrrell, who describes it as occurring at the bottom of the bank of the river, in an outcrop of a bed, of unknown extent, of shale made up largely of fish remains, underlying fifteen feet of a thick bedded calcareous shale.
- This shale, which is of a grayish-black colour, has been examined by Mr. Johnston and found to contain 17.27 per cent of phosphoric acid, which corresponds to 37.70 per cent of tri-basic phosphate of lime.

- 5.—COPPER ORE. From the Tender-foot claim, Copper Creek, north side of Kamloops Lake, Yale district, province of British Columbia. An earthy admixture of blue and green carbonate of copper and ferric hydrate. Agreeably with the results of determinations by Mr. Wait, it contained 41.66 of metallic copper—and submitted to assay, Mr. Johnston found it to contain a trace of gold, and silver at the rate of 18.200 ounces to the ton of 2,000 lbs. Miscellaneous examinations, cont.
Copper ore.
- 6.—ALUNOGEN. A sample of material, received from Mr. J. W. Mackay, Alunogen, reported as occurring in the form of a deposit, four miles west of Savona station and near the line of the Canadian Pacific Railway, Yale district, province of British Columbia, was examined by Mr. Wait and found to consist of alunogen.

