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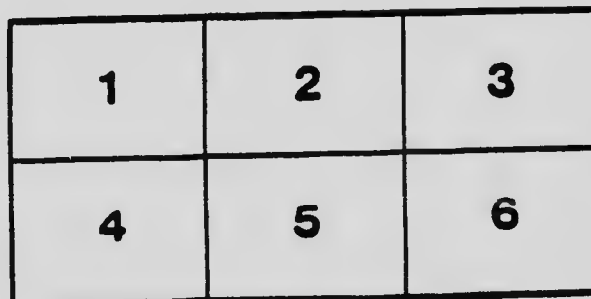
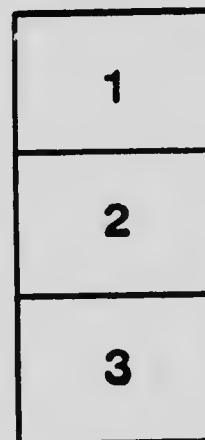
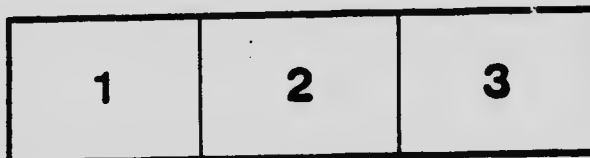
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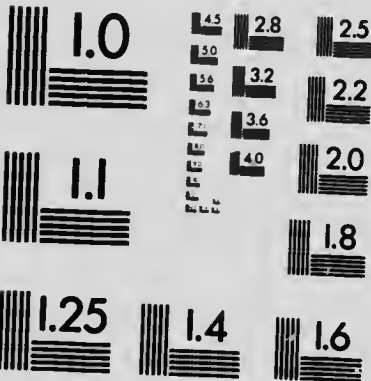
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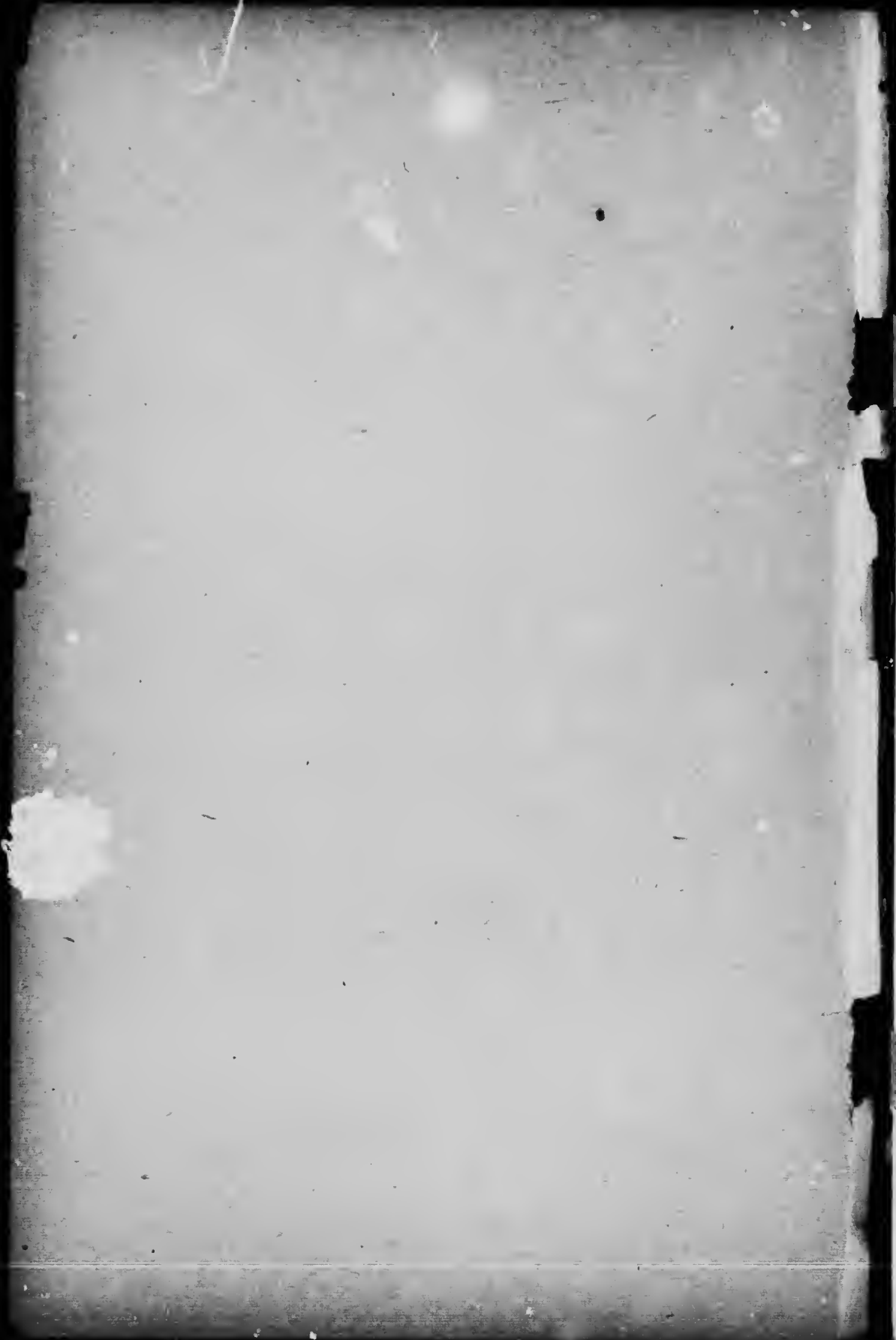
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**REPORT**  
ON  
**Coal Deposits in the Codroy  
River Valley**

By **JAMES P. HOWLEY, F.G.S.**  
for the Year 1897.



ST. JOHN'S, N.F.  
Robinson & Company, Limited, Press,  
1917



*11 J. P. Howley - 1897*

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# REPORT

ON

Coal Deposits in the Codroy River Valley, by James P. Howley,  
F.G.S., for the Year 1897.

Geological Survey Office,  
St. John's Newfoundland.

February 15th, 1898.

T. C. DUDER, Esq., M.H.A.,

*Surveyor General.*

SIR,—Herewith I beg to submit my annual report upon the operations of the Geological Survey during the season of 1897.

Early in the year just past I was instructed to prepare two sets of exhibits of the Mineral, Forestry and Agricultural products of the country, to be forwarded to the Imperial Institute, London, and the Bureau-Philadelphia Museum, Philadelphia, U. S. A. After some preliminary arrangements in reference to expenses attending the exhibits, hiring a suitable room wherein to place them preparatory to arranging, labelling and boxing up for shipment, &c., the work of getting together specimens was at once proceeded with. A room having been secured in the basement of the T. A. Hall and rough board counters provided therein, the Museum was first examined to see what could be spared therefrom, without materially affecting the collection. A printed circular, requesting contributions of mineral and other substances illustrative of the natural resources was prepared and despatched all over the country. It was sent to every person known to be in any way connected with or interested in mines, minerals, lumbering operations, &c., and the city of St. John's while many persons equally interested within the city were approached on the subject. In this manner a number of specimens were obtained, and a great many more promised soon as the spring opened and communication North and West was again fully established.

Early in the spring, however, before navigation had fully opened, or any specimens had been sent on from the extern districts, the Government decided that it was of immediate importance to have a thorough examination of the Codroy Valley made, and the staff of the

Geological Survey was ordered West to enter upon the exploration, with as little delay as possible.

In the meantime the collection of exhibits for the above named institutions had to remain in abeyance. All that could be done, during our absence, was to provide for the reception of such specimens as were sent, until some future time, when the arranging, &c., could be attended to.

Up to date the following specimens have been obtained from all sources:—

LIST OF MINERAL AND OTHER PRODUCTS, IN COURSE OF PREPARATION FOR THE IMPERIAL INSTITUTE, LONDON, AND BUREAU-PHILADELPHIA, U. S. A.

I. Metals and Metallic Ores,—

IRON.

SPECIMEN.	LOCALITY.
Magnetic Iron Ore . . . . .	Union Mine, Tilt C., N. D. Bay.
ditto . . . . .	Mings Bight.
ditto . . . . .	Bay St. George.
ditto . . . . .	Labrador.
Hematite . . . . .	Bell Island Mine, Great Bell Is., Conception Bay.
ditto . . . . .	North Shore, Conception Bay.
Limonite . . . . .	Portland Creek, West Coast.
Hematite . . . . .	Union Mine, Tilt C., N. D. Bay.
Manganiferous Iron Ore . . . .	Fortune Harbor, N. D. Bay.
Specular Iron Ore . . . . .	White Bay.
Clay Iron Stone . . . . .	Grand Lake.
Spathic Iron Ore . . . . .	Sandy Lake.
Bog Iron Or. . . . .	

COPPER.

Copper Pyrites . . . . .	Union Mine Tilt C., N. D. Bay.
Ditto . . . . .	Betts Head Mine, Betts C., do.
Ditto . . . . .	Pogues Harbor, N. D. Bay.
Ditto . . . . .	Colchester Mine, S. W. Arm, do.
Ditto . . . . .	Little Bay Mine, Little B., do.
Ditto . . . . .	Sunday Cove Is., Halls B., do.
Ditto . . . . .	Blomidon Mountains, B. of Is.
Ditto . . . . .	Rabbitts Arm Mine, N. D. Bay.
Erubescite . . . . .	Lady Pond, N. D. Bay.
Regulus, in various stages from Smelter . . . . .	Union Mine, Tilt C., N. D. Bay.
Ingot of Metallic Copper . . . .	ditto ditto

## NICKEL.

Nickel Pyrites	... Tilt Cove, N. D. Bay.
Copper Nickel	... Union Mine, Tilt C., N. D. Bay.

## ZINC.

Zincite	... Oil Island, Notre Dame Bay.
Zinc Blende	... Placentia.

## LEAD AND SILVER.

Galena	... La Manche Mine, Placentia Bay.
ditto	... Port-au-Port, West Coast.
ditto	... Little Lawn, Placentia Bay.
Galena Argentiferous	... Little Placentia, Placentia Bay.
ditto	... Oil Island, Notre Dame Bay.

## GOLD.

Gold	... Briggs, Conception Bay.
do.	... Mings Bight, N. E. Coast.
Auriferous Mispickel	... Moreton's Harbor, N. D. Bay.
Auriferous Quartz	... Cape Broyle Mine.

## ANTIMONY.

Stibnite	... Moreton's Hr. Mine, N. D. Bay.
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II. Materials used in the production of Heat and Light.

## COAL.

Bituminous Coal	... Jukes Seam, Bay St. George.
ditto	... Cleary seam, ditto
ditto	... Howley Seam ditto
ditto	... Shears Seam, ditto
ditto	... No. 4 Seam, Coal Brook, Grand Lake.
ditto	... No. 6 Seam, Coal Brook, Grand Lake.
ditto	... No. 12 Seam, Coal Brook, Grand Lake.
ditto	... No. 6 Seam, Aldery Brook, do.
ditto	... No. 7 Seam, ditto
ditto	... No. 12 Seam, ditto
ditto	... No. 16 Seam, ditto
ditto	... No. 25 Seam, ditto
ditto	... Jubilee Seam, Codroy Valley.
ditto	... 8 Feet Seam, ditto
Bituminous Shale	... Humber River.
ditto	... Grand Lake.
Petroleum	... Nfld. Oil Wells, Parson's Pond, West Coast.

III. Minerals applicable to certain Chemical Manufactories, &c.

## PYRITES.

Iron Pyrites	Pyrites Mines, Pilley's Is., N.D.B.
ditto	Tilt Cove, N. D. Bay.
ditto	Port-au-Port Bay.
ditto	Codroy Valley.
ditto	Hall's Bay.
Pyrrhotite	Rogues Harbor, N. D. Bay.
ditto	
Mispickel	Moreton's Harbor.
Magnesite	Lewis Hills, Port-au-Port Bay.
Manganite	Topsail Head, Conception Bay.
Chromic Iron Ore	Bluff Head Mine, Port-au-Port Bay.
ditto	Lot No. 1, Port-au-Port Bay.
ditto	Rocky Harbor, N. D. Bay.
Molybdenite	Fortune Bay.
Rutile	White Bay.
IV. Mineral Manures.	

## GYPSUM.

Gypsum	Romains Brook, Bay St. George
ditto	Flat Bay. ditto
ditto	Codroy River, Codroy.
Selenite	ditto ditto
Shell Marl	Bay St. George.
ditto	Codroy.
V. Mineral Pigments.	

## IRON OCHRES.

Red Ochre	River Brook, Bay, St. George
Red Ochreous Earth	ditto
Yellow Ochreous Earth	ditto
ditto ditto	ditto
Barite	Cross Point, Placentia Bay.
ditto	
Whiting Shell Marl	Romains Brook, Bay St. George.
VI. Refractory Materials.	

Plumbaginons Clay	Garia.
ditto	Bay D'Espoir.
Steatite	Tilt Cove.
Soapstone (slabs)	Fleur-de-Lys.
ditto	Tilt Cove.
Mica	Labrador.
do.	ditto.
Asbestos	Bond's Mine, West Coast.
do.	Bluff Head, Port-au-Port.

Fireclay ... .. Grand Lake.

Kaolin ... .. Bonavista Bay.

VII. Materials for Grinding, Polishing, &c.

Whetstones ... .. St. John's Slates, Carbonear.

ditto ... .. ditto Hodge Water.

ditto ... .. Sound Island, Placentia Bay.

Grindstones ... .. Codroy, West Coast.

Scythstones ... .. ditto

VIII. Materials suitable for Building and Decorative or Ornamental purposes

MARBLES, &c.

White Marble ... .. Inumber River.

Variegated Marble ... .. ditto

White ditto ... .. Canada Bay.

ditto ditto ... .. White Bay.

Limestone ... .. Topsail Head.

ditto ... .. ditto

ditto ... .. ditto

Serpentine ... .. Tilt Cove, N. D. Bay.

ditto (polished block) ditto

ditto ditto ... .. Lewis Hills, West Coast.

Granite ditto ... .. Rose Blanche.

ditto ditto ... .. Ganltois.

Granulite ditto ... .. Petites.

ditto ... .. Reid's Quarry, The Topsails.

Syenite ... .. Reid's Quarry, Shoal Harbor.

Granite ... .. ditto Benton.

ditto ... .. ditto near Terra Nova River.

ditto ... .. ditto Gambo.

ditto (Pillars Polished.) ... .. Petites.

Sandstone Block ... .. Fortune Bay.

ditto ... .. Bay of Exploits.

ditto ... ..

Freestone Block ... .. Codroy.

ditto ... .. ditto

Slate (Quarry) ... .. Smith Sound, Trinity Bay.

Slate (Dressed) ... .. ditto ditto

Flags of Syenite ... .. Petites.

Labradorite ... .. Labrador.

Agalmatolite ... .. Foxtrap.

Brick Clay ... .. Smith Sound, Trinity Bay.

IX. Materials applicable to the Fine Arts and to Jewellery &c.

Lithographic Stone ... .. Grand Lake.

A specimen of Porphyry, polished Petites.

Labradorite, polished	Labrador.
Red Jasper	Port-au-Port.
ditto polished	ditto
ditto (block)	Notre Dame Bay.
Agalmatolite, (polished)	Foxtrap, C. B.
Opalescent Quartz	Humber River.
Amethystine Quartz	Bonavista Bay.
Rock Crystals	Bay of Islands.
Garnets	
Iceland Spar, Amber colored	Cape La Hune.
Fluor Spar, shaded Green	Little Lawn.
Calcareous Spar, variegated	Grand Lake.

## MISCELLANEOUS.

Pyramid of Copper Ores	Notre Dame Bay.
Collection of Country Rocks	Tilt Cove.
Vein or Lode Rock	ditto
Small cabinet of Rocks and Minerals	ditto
Soil, upland	Bay St. George.
Soil, intervale	ditto

## TIMBER.

White Pine	Glenwood.
Yellow Pine	ditto
Spruce	Gander Lake.
do.	ditto
do.	ditto
Yellow Birch	Whitbourne.
ditto	ditto
ditto	ditto
White Birch	Gander Lake.
ditto	ditto
Tamarack	ditto
Aspen	ditto
Dressed Pine Plank, (section of)	Reid's Mill, Benton.
ditto	ditto
Dressed Pine Board	ditto
ditto	ditto
Dressed California Siding	ditto

### THE SEASON'S SURVEY OPERATIONS

The object, aimed at by the exploration of the Codroy Valley, was to ascertain, what were the prospects of available coal deposits, existing in that section of country, and what was the nature and extent of the coal seam located in the upper part of the Codroy Valley last season, by one of the staff of the Messrs. Reid.

We left St. John's in the S. S. Grand Lake, on the 19th of May last, and arrived at Channel on the 24th, where we were obliged to hire a schooner, to get up to the Codroys with all our outfit. The Grand River, Codroy, was reached next day, the 25th, and immediate preparations for the field-work entered upon.

The Little Codroy River was first visited, and some three weeks spent in exploring and costeaning along its lower reaches. We then ascended the Great Codroy to the Forks, and followed the Southern Branch up to the mouth of a small tributary flowing in from the South, upon which the coal seam mentioned above had been seen. The greater part of the season was spent here, in a thorough and close investigation of the surrounding country, and in extensive costeaning operations along the principal tributary brooks, wherever the coal measures proper exhibited themselves.

Towards the close of the season, a short time was spent at the Grand Lake, where a further examination of the coal seams already located there, was made.

**CARBONIFEROUS SERIES IN THE CODROY VALLEY**

As may be seen by reference to former reports, particularly those of Mr. Murray for the year 1866 and my own report for 1883, the entire valley of the Codroys, lying between the Anguille Range on the North and the Long Range Mountains on the South was shown to be occupied by the members of the Great Carboniferous Series. The lower members, including the limestones and gypsiferous deposits, are well displayed in the sea-cliffs near Codroy village and along the coast towards the long projection known as Stormy or Enragee Point. The strata in this section are considerably disturbed, being tilted up, corrugated, and several times repeated by dislocations. Stormy Point forms the Northern side of the bay or sweep in the coast line into which the Great Codroy River finds its exit to the waters of the Gulf of St. Lawrence. For several miles around this bay the coast is low and flat, occupied only by sand banks, and there is no rock exposure till reaching a point about one quarter of a mile South of the Gut or Channel forming the entrance to the river. The first exposure here consists of reddish and greenish gray shales and sandstones overlaid by coarse gray grits or fine conglomerates. The general aspect of these latter and the presence of numerous carbonized fragments of plants on the surfaces of some of the beds indicate pretty clearly a portion of the Millstone Grit Formation. A good section of this member of the series is exposed between the two rivers, though several repetitions of the same strata, caused by small dislocations, occur. Towards North-West Cove and Larkins Point, near the entrance to Little Codroy River, some of the uppermost strata assume an aspect not unlike portions of the true coal measures. Mr. Murray's estimated thickness of this section was but 2306 feet of vertical thickness. Messrs. Robb and Fletcher, after many careful measurements in Cape Breton Island, estimated the total thickness of the Millstone Grit formation there as 4591 feet. It, however, varies greatly in different localities. I am inclined to think, that while here at Codroy the accumulations may not reach such a volume as in Cape Breton, it is also more than probable that a considerable portion of the lower part of the formation is concealed under the flat country referred to, so that the great difference in thickness may not be as real as it appears to be.

From Larkins Point Southward, towards the base of the Long



Range Mountains, an interval of about one and a half miles occurs, of low flat country, chiefly occupied by the estuary of the Little Codroy River, where the underlying rocks are entirely concealed from view.

Referring back to the Carboniferous Limestone formation to the north of the Main River, it was found to strike eastward up the valley flanking the southern slope of the Anguille Range. At several points on the Main River and the tributaries flowing into it on the north side, portions of the limestone or gypsum exhibited themselves, always inclined southerly, at various angles.

The coarser grits, &c., of the succeeding formation, are also met with on many points along the Main River, and near the falls, about three miles above the tidewater, they strike obliquely across in very massive beds, forming low ledges. Here they are also characterized by some carbonized plant remains; and a little above the falls, on the north side, occurs an impure bed of carbonaceous shale. Near the forks of the river and along the northern branch, the Millstone Grits are displayed in considerable volume. The general inclination of these rocks, being always towards the south, this fact, together with other circumstances, left little room for doubt, that it was in the latter direction, and towards the base or northern slope of the Long Range that we might reasonably look for higher accumulations of strata with any prospect of finding even a portion of the true coal measures.

Acting upon this belief in the previous year, when the construction of the railway was approaching the Codroy valley, I intimated to the Messrs. Reid that it would be well to keep a lookout for coal near the line of route. It was no surprise, therefore, to learn, late in the autumn, that one of their staff had succeeded in locating a coal seam on a small tributary of the south branch of the Great Codroy River, close to the base of the mountains, at about two miles distant from the railway. Beyond the mere fact of its existence, nothing further was ascertained that season.

There had long been a tradition among the Indians Codroy, that coal had been seen away up the country somewhere. Jukes mentions this in his report in 1842, but he states that he could not find anyone to show him the precise spot.

In 1866 the late Alexander Murray, C.M.G., made an accurate topographical survey of the Codroy River up to its exit

from the mountains, and, though he had also heard of the existence of coal and came within a mile of the place where it was, it would appear he did not see it. Indeed it was no easy matter to locate the place, so confined was the area, and so hidden away under the mountain mass, and a much more minute and prolonged investigation was required to get at all the facts, than any of these cursory explorations and surveys aimed at. Nevertheless, the value of such a survey as Mr. Murray's in narrowing down the possible limits where coal might be expected to occur cannot be overestimated. In 1883, while the staff were engaged in blocking off the agricultural lands of the Codroy, some additional Geological facts were learned, but it remained till the season just past, to enter upon a regular systematical exploration for coal only.

When last May, I was called upon to make such a thorough examination of the district, I immediately set about preparing for operations, though the season was rather early for the successful prosecuting of field work.

It had been a very backward spring, and when we reached the Codroys on May 25th, the weather was still unsettled, much snow lay on the higher levels, and in the mountain gorges, and as a consequence the rivers were swollen by freshets, caused by the melting snows, and the ground saturated with cold snow water. It was deemed inadvisable to attempt proceeding up the country immediately, so a short time was given, while waiting for the water to subside and the weather to improve, to the examination of the lower reaches, especially of the Little Codroy River.

A close examination of the coast between the two rivers was first made, with the hope that possibly some portion of the true coal measures might still be found to exist near the top of the section there, with perhaps one or more coal seams included, but though several bands of carbonaceous shale, at times approaching impure coal, and little nests and strings of real coal were met with, it was clearly apparent that no genuine workable seam of real coal existed here. As there seemed a reasonable prospect of finding coal on the south side of Little River Estuary, close to the base of the Long Range, some three weeks were spent in a thorough exploration of this section. Not only the course of the Main River, but that of every little tributary flowing into it, was minutely examined, with the result, that on one of the latter, Campbell's

Brook, a small outcrop of true coal measures was met with. This was uncovered, and the sides of the Brook costeained up and down for several hundred yards, or as far as it was possible to get at the bed-rock. But a very small section was found to exist, consisting of finely micaceous, greenish gray sandstones, shales and clays, with a few dirt streaks, and some thin coaly layers. Towards the top a wide bed of drab fire-clay, supporting a seam of coal of about one foot in thickness, was uncovered. The coal was irregular, and in a distance of some ten yards along the strike had thinned down to a few inches.

A short distance beyond this outcrop the coal measures terminated very abruptly, coming in contact with the metamorphosed rocks forming the foothills of the Long Range, and being apparently cut off by a great fault. No other outcrop of these measures was anywhere else visible. Several attempts were made to penetrate the superficial deposits at points along the course of the Main River, but the immense depth and toughness of the accumulations and the influx of water in every case prevented our reaching the bed rock.

Seeing the futility of any further attempts, and as the weather by this time had vastly improved, while the waters in the rivers had greatly subsided, it was deemed better to abandon this locality, and push on up the country without further delay, to the point where the coal had been seen last year.

It was quite a heavy undertaking to get up so far with all our season's outfit, considering the means at our disposal. Having returned to Grand River, boats were employed to convey ourselves and baggage to the head of the tide-water, a distance of some seven miles. From thence a portage of two miles had to be made along the river side to the end of the railway track, where construction ceased last year. Here we found two heavy cars, such as are used for running out rails upon, when track-laying. These were brought into requisition, placed upon the rails, loaded up with all our belongings, and started along the line. By pulling and shoving the heavy cars with us, fairly good progress was made. Frequent stoppages to clear obstructions, or raise and fill up parts of the track where washouts had occurred, caused considerable delay. When we reached Mollychigueck Brook, the largest tributary on the south side of the Main River, the trestle was gone, leaving the sleepers

and rails only, suspended in a loop across the stream. The greatest part of a day was spent here, constructing temporary blocks under the track, to render it sufficiently strong to enable us to get the heavily laden cars across. This accomplished, we got on well for some distance further, till we came to a deep gravel cut, when our progress was stopped, owing to the caving in of the banks on both sides by which the track was buried several feet. The following morning, June 19th, we succeeded after much labour in clearing out the cut, and having then a clear track and down grade we soon arrived at the crossing of the South branch of the Main Codroy.

The trestle which had spanned this branch, had been completely demolished last fall, and nothing remained of it, except a few bent and twisted rails half buried in the bed of the river on the south side. We could proceed no further by the railroad, but we were now within two miles or so of the small tributary upon which the coal had been seen. Although the water in the main river was still pretty high, necessitating much wading, we commenced portaging at once, and on the 22nd inst., had all our things removed, and camps erected at the mouth of the above tributary. That same afternoon, we ascended the brook to where the coal outcrop was situated, and began to clear away the loose boulders and gravel, which encumbered the surface to a depth of some eight or ten feet. It was very tough work owing to the material being cemented together so firmly as to almost constitute a solid conglomerate rock. The outcrop was low down, nearly level with the water of the brook, and the coal-seam, when fully uncovered, was found to stand almost vertically, or inclined southward, at a very high angle of between 70 and 80 degrees. This seam was named the Jubilee Seam, this being the day set apart for the celebration of Her Majesty's 60th or Diamond Jubilee Regnal Year.

The work of uncovering this seam, and stripping the section above it on the left side of the brook was continued till the 24th, when the junction with the metamorphosed series, at the base of the mountains, was reached. Beside the coal seam just mentioned, but one or two dirt streaks shewing a little coal were met with in this cutting. The principal seam, however, appeared to be a fine one, and where first exposed gave the following measurement:—

	FT.	IN.
Fireclay .....	0	4
Coal, soft but bright ...	4	8
Clay and shale .....	0	5
Clay and Coal mixed ...	1	10
Coal and clay mixed ...	1	10
Arenaceous shale ...	1	1
Coal, Clay and Shale ...	0	7
Total .....	10	9
Coal .....	6	10

While engaged in uncovering this section, a new discovery was made further up the stream on the right side, where a considerable bend takes place, just before it enters the mountain gorge. The bank here is very steep and rises to a height of about 150 feet. It was covered, for the most part, with gravel, sand and clay, and supported a heavy growth of timber. A landslide at one part had laid bare a portion of the cliff, consisting of gray sandstones, tilted up at a very high angle, but slightly inclined Southward. The exposure gave a clew to the structure, and a few small fragments of coal and dirty clay found amongst the gravel led to the discovery of a coal seam. Upon removing the timber and then the gravel, &c., near the base of the cliff the coal seam exposed showed a thickness of about six feet. It was dull coloured and rather slack on the surface. The outcrop was followed up the slope and the whole surface of the cliff uncovered up to the junction with the older rocks. After cutting down all the timber and throwing it into the river below, the stumps had to be extracted, and then the gravel and clay cleared off down to the rock surface. The immense accumulation of material which had to be removed, and the labor involved, took our whole crew until the 8th day of July, to accomplish this work. When fully uncovered, this section exhibited four distinct seams of coal, in close proximity to each other. Only the first one however assumed any dimension worth considering. The other three were small and very irregular, the largest showing at one part, about two feet of coal, but this rapidly thinned away again. The main seam was uncovered for over ninety feet up and down the slope, and was found to vary somewhat in thickness. At

one part it showed six feet two inches of coal and lower down about four feet. It was much broken towards the top, and apparently a slip had occurred repeating a portion of the seam. The angle of inclination was still to the Southward and stood as high as 72 degrees. It was further very clearly apparent from the work done here, that the whole of the coal measures were cut off by a great fault, and that they occupied but a very limited space on the river. What the exact nature of the fault was, had yet to be ascertained, and the occurrence or otherwise of workable seams of coal still further removed therefrom and lower in the section, became a matter of much importance to determine. The costeaning was consequently continued along the right side of the river, down stream to the above junction to the lowest outcrop of the true coal measures, or to the point where the change from the gray sandstones to the reddish grits and sandstones of the Millstone Grit Formation took place. In this manner a complete section was obtained of the entire volume of the coal measures here, which was found to amount only to about 250 feet of vertical thickness, and owing to the high angle of inclination the horizontal measurement across the section was only four chains.

In carrying out this costeaning, a large seam of coal was struck nearly opposite to the one first seen. It was low down, and difficult to get at, owing to the heavy deposit of boulders and gravel under which the outcrop was concealed. On removing this an influx of water from the higher ground, greatly impeded our work, nevertheless we succeeded in uncovering it sufficiently to get a good view of the seam, make measurements, and obtain a general idea of its character. Its dimensions were as follows:—

	FT.	IN.
Fireclay . . . . .	3	0
Coal, bright and good . . . . .	12	10
Clay and shale . . . . .	1	0
Coal and shale . . . . .	0	10
Clay, shale and coal, mixed . . . . .	4	0
Coal with thin shale . . . . .	1	7
Clay, shale and coal, streaks . . . . .	0	8
Total . . . . .	23	11
Coal . . . . .	15	0

Two small seams occur above this large one, quite close together, and about four chains further down the stream another was uncovered, showing a thickness of about five feet, thus:—

	FT.	IN.
Fireclay . . . . .	0	1
Good clean coal . . . . .	1	9
Shale . . . . .	0	4
Coal . . . . .	0	1
Shale, clay, with streaks . . . . .	0	7
Good coal . . . . .	0	10
Clay, shale and coal streaks, mixed . . . . .	1	6
<b>Total . . . . .</b>	<b>5</b>	<b>2</b>
<b>Coal . . . . .</b>	<b>3</b>	<b>0</b>

Still lower down near the base of the section, some thin, irregular seams occur, making in all six or seven coal seams.

Whilst engaged in tripping the above section, the river up and down was most carefully and minutely examined, and the result was the finding of another seam on the left side at a sharp turn of the creek below. Upon being uncovered proved to be by far the finest seam yet seen. It measured at the base eight feet across, all clean coal and maintained this thickness for forty feet up the steep slope, or as far as could be followed on the surface. The coal was hard and clean and apparently very free from pyrites. The slope here, extending several chains up and down stream was quite steep and densely wooded. It was necessary to cut away the timber and then make a continuous trench either way from the eight foot seam, to the full extent of the coal measures, or to the junction with the other rocks, up and down stream.

At 34 feet above the eight feet seam, another one averaging two feet was met with, which, on being exposed, seemed to run into the former towards the top. Near the upper end of the cut, three small seams, close together, were found, divided by a few feet of shale, or argillaceous clay, and still further up near the fault, a couple of dirt streaks showing a little coal only were exposed.

In the lower part of the cutting two seams, a foot or so in thickness, were met with.

It was now become clearly apparent that the section here exposed corresponded, very nearly, in most respects, with that on the right side of the river, and still further investigation proved, beyond question, that they were one and the same. The eight feet seam of the last cutting, could be no other than the five feet seam on the opposite side, while the three smaller seams were ascertained to be the continuation westward of the first seam uncovered, the Jubilee seam, which had here become split up and divided by clay and shale partings. This latter in its eastern extension proved to be one with the twenty-four feet seam, and also with the seven feet seam furthest up stream. The fact that the brook here runs obliquely with the strike of the measures, and makes several sharp turns in its course, afforded opportunity of getting at the several outcrops.

During the prosecution of these coasting operations on the above brook, a continuous exploration of the surrounding country was kept up. The course of the Main River was examined, to its exit from the mountain range, as well as that of every tributary flowing into it on the south side. Expeditions were also made over the mountains, to ascertain the possible occurrence of any outliers of the Carboniferous series, in that direction.

Outcrops of the coal measures were come across on the west branch of the brook we were camped upon, and here a good section was exposed, which gave promise of containing one or more coal seams. Other outcrops were observed on two tributaries further up the country, to the eastward, one a little over a mile, the other one mile and three quarters distant, on the line of strike of the coal measures. Still further on the Main River, near the junction with the older series, another small outcrop was visible.

Our attention was first turned to the Western branch of the first brook, but in the meantime part of the crew under Mr. Thorburn's charge was dispatched up the country to the tributary furthest east to coast there. They spent eleven days there, and accomplished an immense amount of work. In the time, clearing the section on both sides of the brook, very thoroughly. On the left, or west side, they struck one coal seam, two feet three inches wide, containing about two feet of shaley coal, and a little further up a



band of fireclay three feet wide, containing a good deal of broken coal, but owing to the huge masses of loose rock covering this latter outcrop, it could not be properly examined. On the right side four small seams were laid bare. One of these consisted of about three feet of fireclay, with two inches of impure coal on top. Another further up was a foot and a half thick, with about one foot of good coal, while a third showed six inches of coal. A few dirt streaks also containing a little coal occur in the section.

On the western branch of the first river, only three or four outcrops of coal were met with, all, with the exception of one, being but a few inches only in thickness. On the left side a seam containing one foot seven inches of good coal was struck. It was the only true seam found on this branch, and there was every indication, that the larger ones of the eastern branch, either thinned out, or were cut off by the great fault before reaching so far west.

A short time previously, I had received a communication from the Government, to take out some sixty or seventy tons of coal, which was to be afterwards brought out to the sea-coast, for the purpose of being tested by H. M. ships on the station, with a view to ascertain its qualities for steam purposes.

On the 16th of August we received a visit from the Hon. H. J. B. Woods, Surveyor General. He was accompanied by Mr. W. D. Reid, Mr. Long and Mr. Park. The latter was an experienced coal miner, originally from Scotland, but at present employed at the Londonderry Iron Mine, Nova Scotia.

The surface display of coal at this time laid bare was most promising, and caused them no little surprise. It was now arranged that my party was to continue its coasting operations, to ascertain, if possible, by surface digging, how far the seams might extend. Mr. Park, with a few men from the railroad, should be employed opening up some of the seams, with a view to test their permanency underground, and prepare for the work of actual mining, should the result prove satisfactory.

A few days afterwards Mr. Park commenced to drive a tunnel on the course of the eight feet seam, near the base of the bank, or just above the level of the brook. The coal was found to be very hard and tightly nipped between the walls, but of excellent quality, being very free from pyrites, or other impurities. Only six feet of the actual thickness of the coal, was removed, the remaining two

feet being left to support the rather loose shaley roof. Good progress was made, as day and night shifts were kept going, but on the fourth day, August 21st, they came, quite unexpectedly, upon a wall of dead rock apparently stretching across the seam, and cutting it off. Mr. Park was inclined to think, it was a transverse fault, lifting the coal right out, but such was not the case. It proved to be a jog, or projection of the foot wall, into the body of the seam, whereby it was turned somewhat from its course, and compressed into the space of four feet. On passing this "trouble" it resumed its regular course and in a short time, increased again to six feet in thickness. It continued to maintain this thickness, but showed signs of deterioration, in the shape of shaley or earthy strings, and patches here and there called by Mr. Park "batte." At about sixty feet the coal began to rise in the seam, the bottom of the drift showing more and more dead rock, or batte. From this point to end of drift, thirty-four feet further, the coal rose rapidly, and began to thin out very perceptibly. Although the breadth between the walls of the seam remained nearly the same, the coal began to give place more and more, to this dead arenaceous rock, or batte till very little real coal was left in the end of the drift, 91 feet from the outerop. An opening near the top of the seam, confirmed the supposition previously entertained, that the two seams here came together, showing in this opening 91½ feet of coal, across the top, from side to side. In the meantime trial pits were sunk, at several other points, to test the other outerops. The five feet seam on opposite side of river, supposed to be the continuation of the eight feet seam, was driven upon some ten or twelve feet. At first it improved considerably, and about three feet of good coal was visible at one time, but it soon began to exhibit clay and shale streaks, and finally but very little coal. It was, however, a difficult place to get at and dangerous to work under, owing to the constant falling of the ground from above, and being lower than the level of the brook, it became impossible to keep it free from water.

Trial pits were also sunk on the Jubilee seam, at four different points and a drift of about thirty feet made on the strike of its farthest eastern outerop. The result of these trials, was as follows: At the most westerly outerop, where the seam is split into three parts, it appeared to improve at first, and at one time, showed three

feet of good coal, but this thinned out again, and gave place to clay and shale. At the next opening it showed a couple of feet of rather slack coal. In the third opening, where the seam was first uncovered, it was sunk upon for about ten feet, the principal band of coal only, in the seam, being tested. This was found to maintain pretty much the same character throughout, being rather slack, or shelly coal, but the band, which at the surface measured nearly five feet across, had contracted to three feet two inches, at bottom of pit. At the fourth opening, where the seam exhibits the great width of twenty-four feet, the principal layer of coal was again sunk upon to a depth of about eight feet, and then cut across from wall to wall. Here it was found to maintain its thickness of something over thirteen feet of good, solid, bright coal. A few layers of shale or batte, began to appear towards the bottom of the shaft. The outcrop here was situated at such a low level, and the soakage of water from above was so great, that a fair trial could not be given the seam. In the tunnel or drift on the last outcrop, the coal remained dead slack and of a dull colour throughout, and at twenty-eight feet on the strike, it had dwindled down to three feet in thickness.

While these testing operations were being carried out, several attempts to reach the bed-rock on either side of the brook, and on the supposed line of strike of the principal coal seams were made. In no case could we succeed, owing to the enormous amount of drift material covering the surface, most of which was so tough and firmly cemented together, that in our efforts to penetrate it, all our tools were completely used up. In some instances, the influx of water compelled us to abandon the work, as almost invariably when a certain depth was reached, water made its appearance in greater or less quantity. Small fragments of loose coal were scattered through the gravel in several pits, but as these may have been derived from the outcrops already mentioned, they afforded but little clue, as to whether the seams were continuous or not.

A close examination of the contact of the coal measures with the older (Silurian) schists, at all the places examined, left little room for doubt, of the existence of a great break, being an upthrow of the older series on the South side. The effect of this break was the complete cutting off of the coal measures which at one time must have occupied an extensive area, and leaving behind a few small segments only, of the northern edge of the trough. But one

of these appeared to be sufficiently extensive to afford much prospect of bringing in any of the workable coal seams, at least so far as has been ascertained. It was that which we had been uncovering during the greater part of the season.

It will be seen from the foregoing remarks, that although the surface indications when first exposed were most promising, yet the seams did not maintain this character throughout, and in almost every instance showed indications of failing, after very little testing. The close proximity of the measures to the line of great disturbance indicated as having, at one period, taken place, and the consequent broken, disturbed, and highly tilted condition of the strata, had undoubtedly much to do with the absence of permanency of the coal seams. In view of these unfavorable developments, and the now short remaining season which would not afford sufficient time to more thoroughly decide the value or otherwise of these deposits, the Messrs. Reid abandoned the idea of constructing a branch line of railway to the coal, at least for the present.

It was decided, before finally giving up the field work for the season, to devote a short time to the further testing of the coal seams near the Grand Lake. Accordingly, on the 18th of September, we began to move down again to the railway crossing, where we remained till the 25th, examining some of the smaller brooks below the trestle, where coal had been reported. An excursion was also made to Highland, or River Brook, of Bay St. George, and the portion above the railway crossing examined. Nothing of any consequence resulted. No portion of the true coal measures being visible on any of these brooks.

We arrived at the Grand Lake on the 27th of September, and camped near the track, about two miles beyond the crossing of Sandy Lake River. This position was selected, as being the nearest point to the coal outcrops on Kelvin Brook, which it was first intended to examine. The water in this brook was found rather high from the late rainfalls, and it soon became evident that we could not accomplish much work here.

The principal coal seam discovered in 1892 was so near the river, and so low down, that all attempts to uncover it properly or sink upon it, were frustrated by the influx of water from the river under which it dipped. A considerable amount of coasting was performed on the west side, some distance back from the brook,

where the ground rose a little, but here again the depth of clay and gravel was enormous. Much loose coal in small lumps, was scattered through the gravel, but only two small seams were met with in place. Having next accompanied Mr. Park to Aldery Brook and Coal Brook, where all the outcrops known to exist on these, were pointed out to him, and the best places to test the principal seams decided upon, I then left him and returned home to pay off my crew.

Nearly six months had been spent in the field, during which time a vast amount of work had been accomplished. Irrespective of the extensive costeaning operations, several of the chief tributaries were dialled, and lines run through the woods, on the strike of the principal coal seams. My assistant, Mr. Thos. Thorburn, was entrusted with the latter work, as also with the costeaning operations, on the most easterly tributary, all of which he performed most satisfactorily.

Not having heard from Mr. Park, up till the 20th of October, and being anxious to learn the result of his work at Aldery Brook, I decided to pay him a flying visit before he abandoned his work for the season. On reaching his camp at Aldery Brook I was greatly pleased to learn that things were looking very promising. The first opening was made on the right side of the brook on the exposed outcrop of seams No. 10, 11, and 12, of my section (vide Report of 1892,) where these had been shown to come together. The principal layer of coal in this outcrop, had been driven upon, for some ten or twelve feet, and had shown a decided improvement, both in size and quality. It had increased from four and a half, to nearly seven feet in thickness, and from being rather soft and dull at outcrop, now began to exhibit a fine face & clean, bright and tolerably hard coal.

Another opening had been made on the seam, near the top of the bank, which is here fully one hundred feet high, and again the coal looked well. At seven chains along the line of strike eastward, a pit had been sunk, some twelve feet through the gravel, and the coal seam was struck again, but owing to the usual impediments, it could not be well seen at this place. Still another pit was sunk, at a point thirteen chains eastward, and some loose coal found in the gravel, but the bed-rock was not reached on account of the influx of water. On the West side of Aldery Brook, where this same seam is

split up considerably, it was also drifted upon for a short distance, and began to improve much, one band containing about four feet of coal. No. 16 seam of my section, in Report of 1891, on West side of brook, was opened up for some ten or twelve feet. It maintained the same character as at the outcrop, and was seen to contain two and a half feet of very excellent coal.

Mr. Park next moved to Coal Brook, where he spent a short time testing the seams there, with favorable results, but the season had now so far advanced, and the weather become so cold and stormy, that it was considered useless to further prosecute the work, more especially without proper appliances for so doing.

Although the exploration of the Codroy Valley might be looked upon rather in the light of negative, than positive value, still there appears to me to be enough to justify further attempt at least to more thoroughly test the seams that have been discovered. The large size of some of these, and the superior quality of the coal contained therein, are in themselves sufficient to warrant a small extra expenditure. Possibly, the apparent cutting out of the coal at the end of the drift on the eight feet seam, is somewhat akin to certain interruptions, or irregularities found in some of the Cape Breton coal seams, notably the Victoria seam, at Sydney Harbor, and the Blockhouse seam at Cow Bay. Mr. Robb, of the Dominion Geological Survey, in his Report for 1875, refers to these interruptions, and quotes the opinion of Mr. Rutherford, M.E., late Inspector of Mines, Nova Scotia, upon their probable origin, and their effect upon the continuity of the coal seams. It would appear, from these reports, that such interruptions or rather thinning out of the coal, where it is replaced by shale or rock, are of frequent occurrence, and that they come in quite unexpectedly, without exhibiting any change in the thickness of the seam, &c. In some cases, but a few feet of dead rock occurs, but in other instances, between thirty and forty feet were found. On cutting through these walls, or barren ground, however, the seams resumed their usual character, and the coal its quality &c. Possibly then, this is the case here, and there may yet be a sufficient quantity of available coal in this locality to make it worth mining, even on a small scale.

With regard to the Grand Lake Area, it appears to me, an effort should be made to further test it by means of the diamond drill, with a view to ascertain, if possible, the full extent of this

important coal-field, which appears likely to be the first availed of. The Bay St. George District should certainly receive more attention also, as this is, in all probability, the most important Carboniferous Area in the Island.

Most of the other Economic Substances, observed during the season, have been treated of, in former reports. The Codroys contain an abundant supply of admirable freestone and material suitable for the manufacture of scythe, or grindstones.

Gypsum occurs along the southern slope of the Anguille Range at several points, and on the coast near Codroy Village, white, and variegated marble in considerable volume was met with on several of the smaller tributaries on the South side of the valley amongst the altered schists, which form the foothills of the Long Range.

In most cases it is tilted up on end and much shattered. There may, however, be portions of these outcrops, where by the removal of the weathered surface, and quarrying into the main body of the rock, it may be found less broken and of better quality generally. Some small loose fragments, picked up in the bed of the brooks, seemed to indicate a fairly good marble.

Iron pyrites, Galena, and Molybdenite were observed sparsely disseminated in quartz veins amongst this same set of rocks. At one point, near the junction of the Carboniferous, with the Silurian Series, a rather large quartz vein was seen, pretty well charged with pyrites.

Near the railway siding at River Brook, a brine spring occurs, and surrounding it for many yards there is a thick deposit of red and yellow ochre, which attains a depth of six feet or more, and spreads over, at least, a couple of acres of surface. The material seems free from grit, and should be of considerable commercial value, for use as a pigment. The brine spring, no doubt, indicates a deposit of salt beneath the surface, but of what extent, can only be determined by boring. The frequency of the occurrence of similar springs, among the lower members of the Carboniferous series, would seem to point to a possible industry, in the manufacture of salt from these brines by means of evaporation. Much would of course depend upon the percentage of saline matter, freedom from earthy impurities, and lasting character of the wells, all of which can only be determined by actual tests.

There is an abundance of excellent fireclay in the vicinity of,

and associated with the coal deposits, which would make good fire-brick. Some specimens of mica were shown me as coming from the Long Range, several miles back. It appeared to be of large size and fairly good quality, nothing however was learned of the extent of the deposit.

I have the honour to be, Sir,

Your obedient servant,

JAMES P. HOWLEY.





