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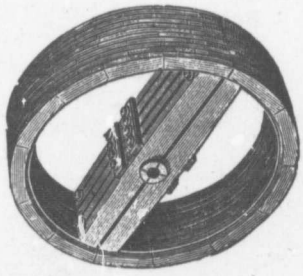

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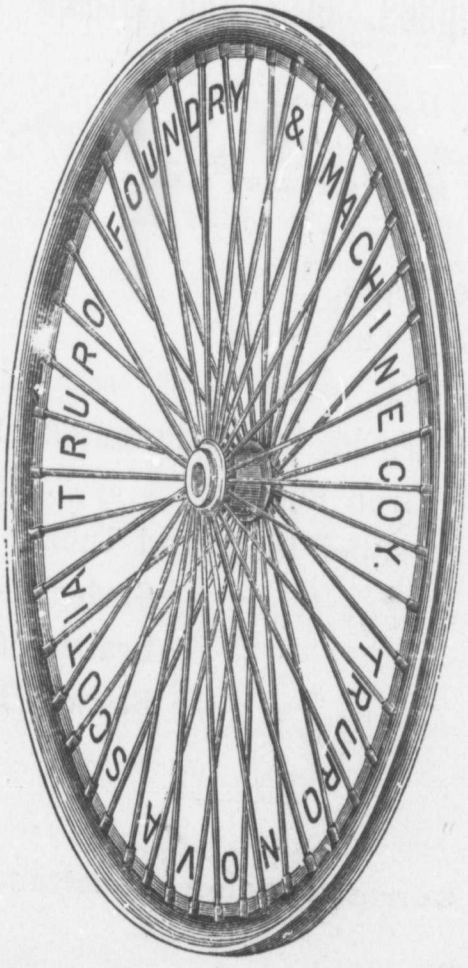


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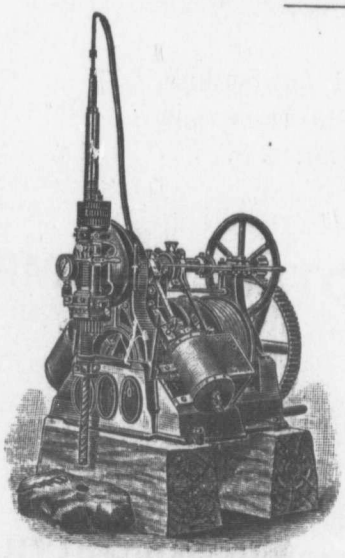

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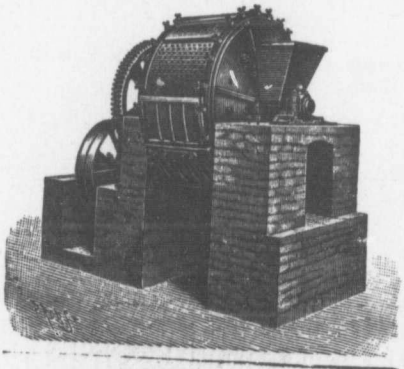

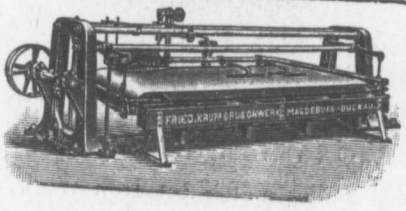


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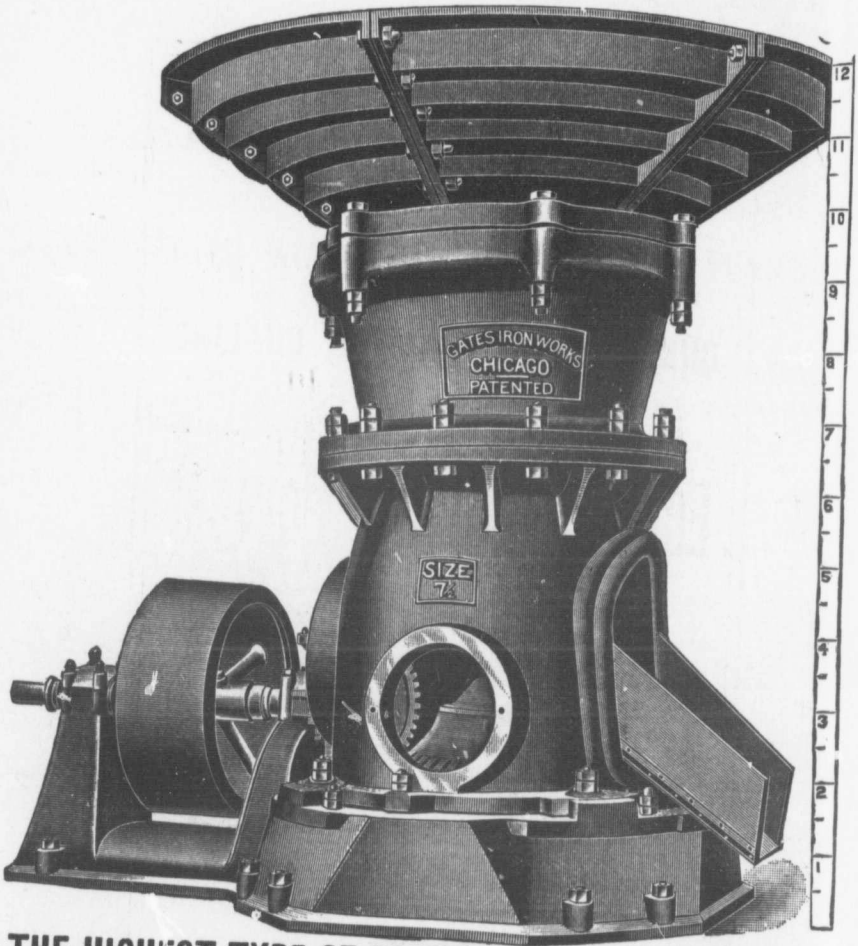


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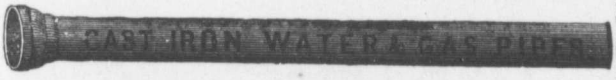


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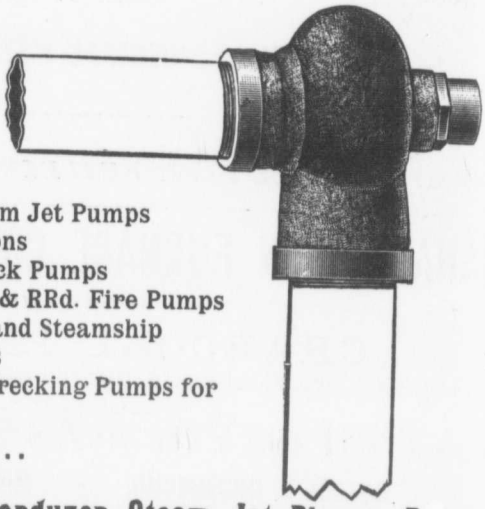

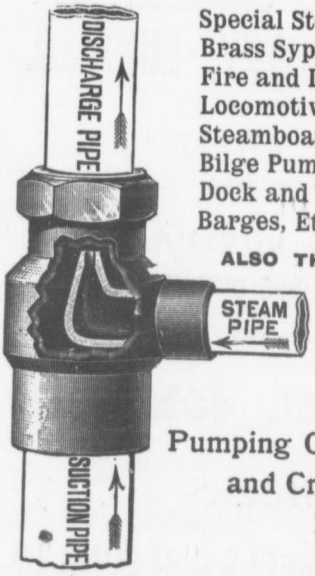


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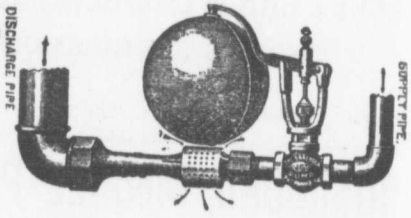


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The COLLIERIES produced 1,000,000 tons of coal.
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One QUARTZ MINE, with a 10-stamp mill produced $105,000 in gold.
The KOOTENAY DISTRICTS yielded over $3,000,000 in gold, silver, lead and copper.

The PROSPECTS for 1896 promise a very great increase in the tonnage of the mines and the value of the ore that will be shipped, and many new mines will be developed, while other districts as well as those now better known, will be eagerly prospected, as many ore horizons long considered valueless, are being proved up as rich deposits, for example the great masses of Pyrrhotite that in the TRAIL CREEK DISTRICT, are now being mined for the high value in gold and copper they contain.

Valuable MERCURY deposits are now being exploited, while the rich gold placers are being got ready for hydraulic mining on an extensive scale, and the river beds are to be worked by powerful dredgers.

New railroads are being built and other lines will soon be begun, while capital is seeking investment to an extent here not known before.

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2. In surveyed townships the three classes respectively comprise one, two and four lots.

All lands supposed to contain mines or ores belonging to the Crown may be acquired from the Commissioner of Crown Lands (*a*) as a mining concession by purchase, or (*b*) be occupied and worked under a mining license.

No sale of mining concessions containing more than 400 acres in superficies can be made by the Commissioner to the same person. The Governor-in-Council may, however, grant a larger extent of territory up to 1,000 acres under special circumstances.

The rates charged and to be paid in full at the time of the purchase are $5 and $10 per acre for mining lands containing the superior metals*;

*The superior metals include the ores of gold, silver, lead, copper, nickel, graphite, asbestos, mica, and phosphate of lime. The words inferior metals include all other minerals and ores.

the first-named price being for lands situated more than 12 miles and the last-named for lands situated less than 12 miles from the railway.

If containing the inferior metals, $2 and $4, according to distance from railway.

Unless stipulated to the contrary in the letters patent in concessions for the mining of superior metals, the purchaser has the right to mine for all metals found therein ; in concessions for the mining of the inferior metals, those only may be mined for.

Mining lands are sold on the express condition that the purchaser shall commence *bona fide* to mine within two years from the date of purchase, and shall spend not less than $500 if mining for the superior metals ; and not less than $200 if for inferior metals. In default, cancellation of sale of the mining land.

(*b*) Licenses may be obtained from the Commissioner on the following terms : Application for an exploration and prospecting license, if the mine is on private land, $2 for every 100 acres or fraction of 100 ; if the mine is on Crown Lands (1) in surveyed territory $5 for every 100 acres, and (2) in unsurveyed territory $5 for each square mile, the license to be valid for three months and renewable. The holder of such license may afterwards purchase the mine, paying the prices mentioned.

Licenses for mining are of two kinds. Private lands licenses where the mining rights belong to the Crown, and public lands licenses. These licenses are granted on payment of a fee of $5, and an annual rental of $1 per acre. Each license is granted for 200 acres or less but not for more ; is valid for one year and is renewable on the same terms as those on which it was originally granted. The Governor-in-Council may at any time require the payment of the royalty in lieu of fees for a mining license and the annual rental—such royalties, unless otherwise determined by letters patent or other title from the Crown, being fixed at a rate not to exceed three per cent. of the value at the mine of the mineral extracted after deducting the cost of mining it.

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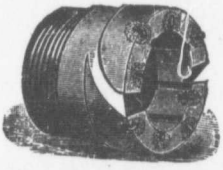

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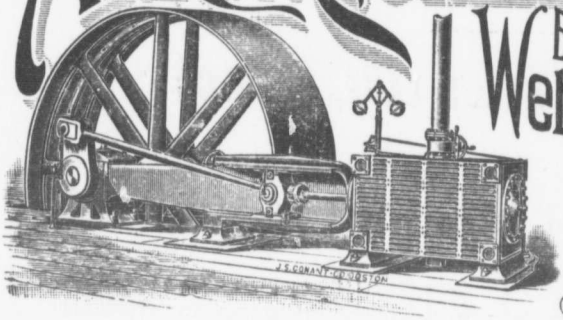

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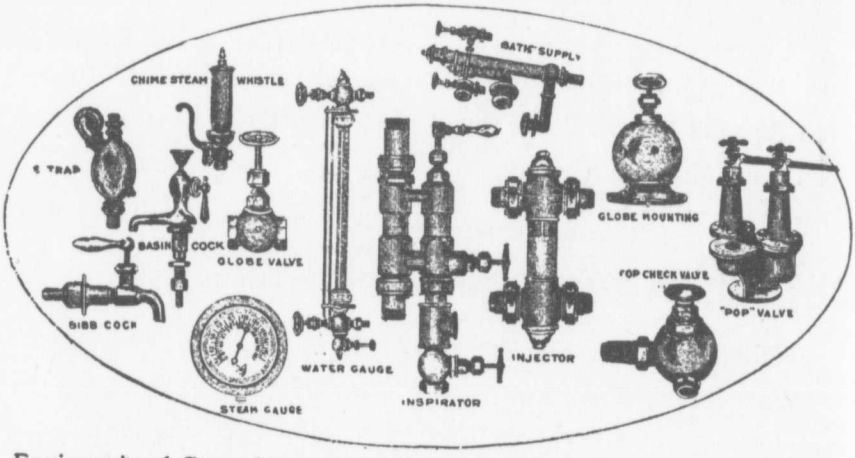


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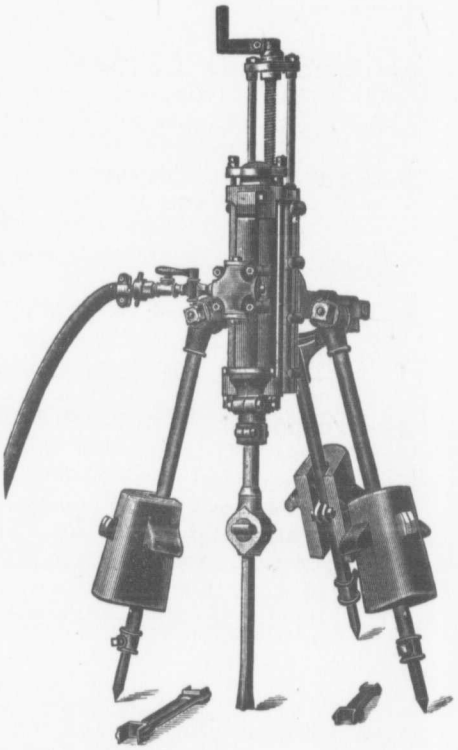

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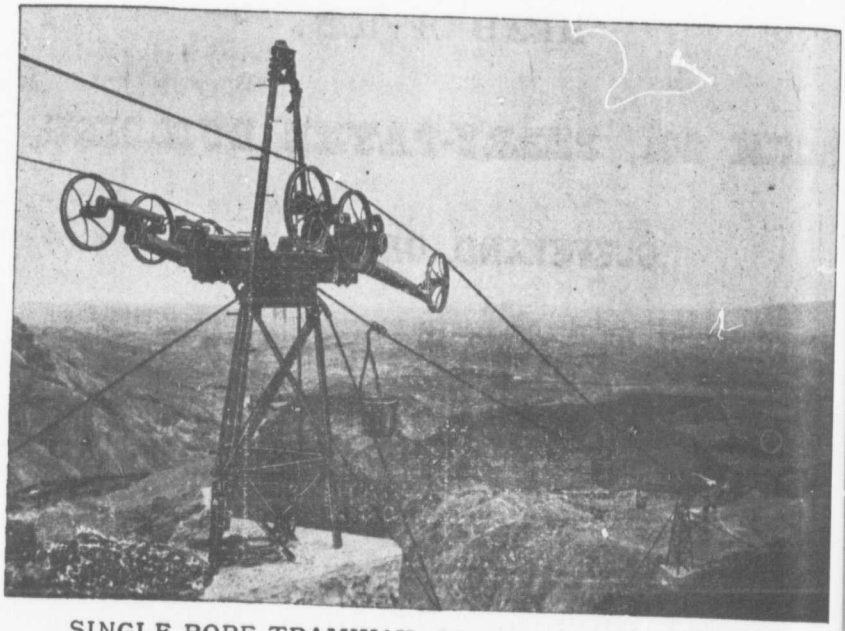

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# THE CANADIAN MINING, IRON AND STEEL MANUAL

## 1896

A CAREFUL DIGEST OF INFORMATION RELATING TO THE HISTORY, ORGANIZATION, AND OPERATIONS OF ALL CANADIAN MINING, SMELTING AND IRON AND STEEL COMPANIES.

COMPILED FROM THE MOST AUTHENTIC SOURCES

BY

**B. T. A. BELL,**

*Editor of the Canadian Mining Review, Secretary Canadian Mining Institute, Secretary General Mining Association of the Province of Quebec, Secretary Ontario Mining Institute, Hon. Secretary Mining Society of Nova Scotia, &c.*

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# PREFACE.

—

During the past year the mineral industries of the Dominion have made distinct progress, and the production, notably of the precious metals, has largely increased, the total value being estimated to exceed $22,500,000 as compared with $20,900,000 in 1894 The value of the principal products were :—

| | | | |
|---|---|---|---|
| Coal | $7,774,178 | Petroleum | $1,201,184 |
| Gold | 1,910,921 | Natural gas | 423,032 |
| Nickel | 1,360,984 | Asbestos | 368,175 |
| Silver | 1,158,633 | Gypsum | 202,608 |
| Copper | 949,229 | Mica | 100,000 |
| Lead | 749,966 | Salt | 180,417 |
| Iron | 238,070 | Coke | 143,047 |
| Pyrites | 102,594 | Phosphate | 9,565 |
| Chromite | 41,301 | Manganese | 8,464 |
| Ochres | 14,600 | Graphite | 6,150 |

It is also gratifying to be able to report an important increase in the number of our dividend-paying mines.

The year has been noteworthy for the opening up and development of new districts in all the Provinces, the construction of important smelting and reduction works at various points in British Columbia, the completion and successful inauguration of an additional iron furnace in Ontario, increased capacities for gold milling in Nova Scotia, and the formation of numerous corporations and enterprises. The coal, iron and steel, asbestos, mica and graphite industries also give evidence of greater activity and largely increased outputs in 1896. The current year will, therefore, it is confidently anticipated, show a very largely increased

mineral production over any previous period in the history of Canadian mining undertakings.

The aim of THE MANUAL, as in former years, has been to present in a handy and concise form authentic information respecting the history, organization, equipment and operations of our mines and mining companies, classified by industries and by Provinces, and accompanied with notes and statistics for reference.

Much of the present edition has been re-written and the information as far as possible brought down to date.

The publisher again desires to express obligation to the uniform courtesy and kindness of the managers and secretaries in promptly furnishing particulars of their operations, and to the Geological Survey, the Reports of the Inspectors of Mines, the Statistical Year Book and other Government publications for much of the material embodied in the work.

OTTAWA, 1st June, 1896.

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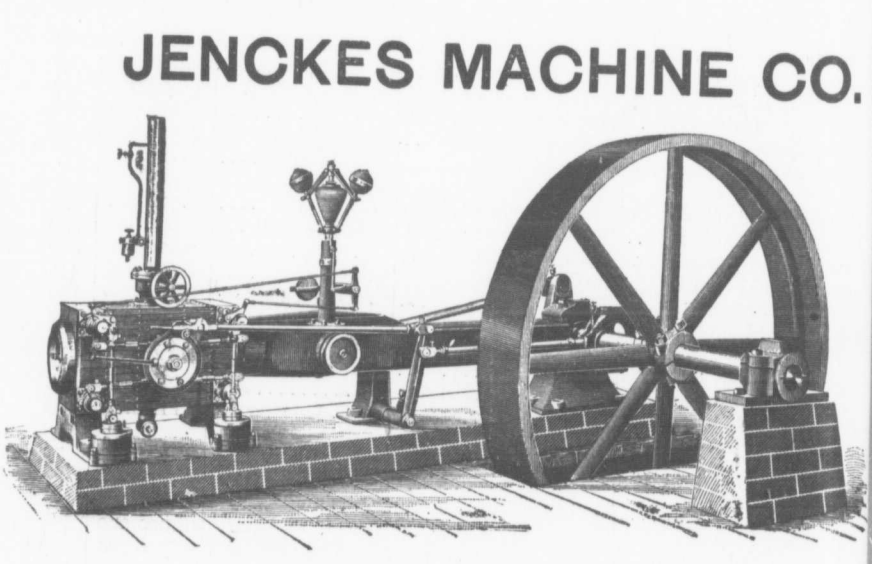

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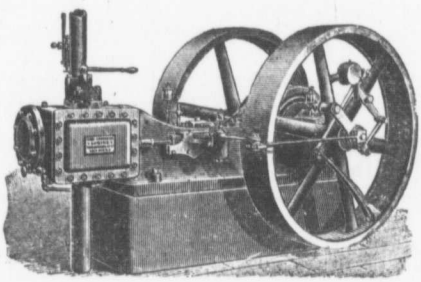

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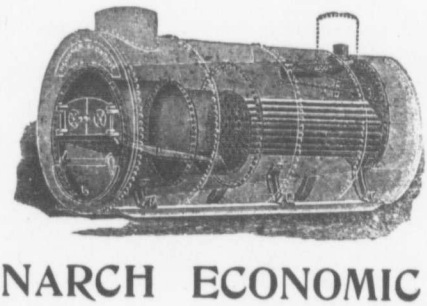

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# HADFIELD'S STEEL FOUNDRY COMPANY, LTD.

**Hecla Works, Sheffield, England.**

**MANUFACTURERS OF**

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**Which include**

**TUB WHEELS and AXLES, ROLLERS, PULLEYS, PEDESTALS, CAGE GUIDES, ROPE CLIPS, Etc., Etc.**

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***Possess the Qualities of STRENGTH, DURABILITY, UNIFORMITY of SURFACE, WEAR, Etc.***

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# MINING · PUMPS

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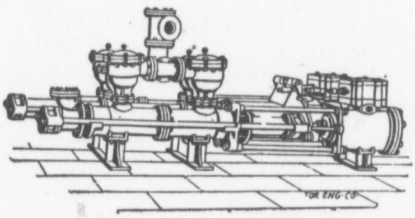
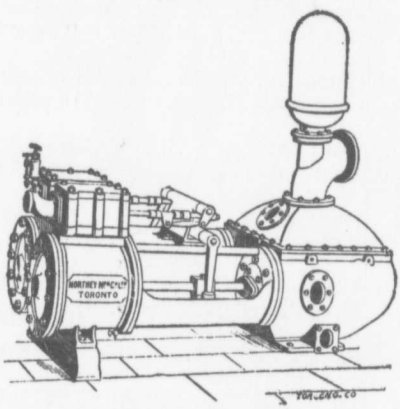


Pot Valve Pattern.




Regular Duplex.

## WRITE FOR QUOTATIONS.

# Northey Manufacturing Co. Ltd.

## TORONTO, ONTARIO.

## ONTARIO.

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COAL MINING MACHINES
STEAM HOISTS AND ALL SUPPLIES
203 ST. JAMES ST. MONTREAL, QUE.

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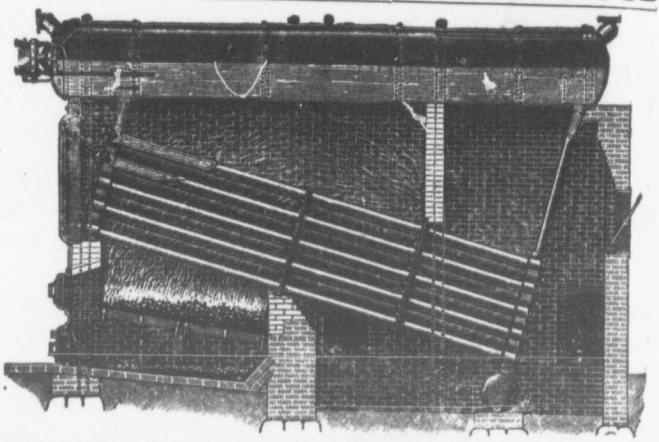

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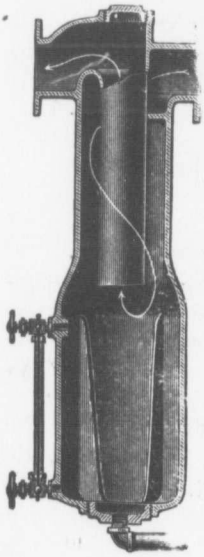

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# ASBESTOS.

# ASBESTOS.

## Varieties.

The fibrous material known to commerce under the name of asbestos comprises at least two distinct species of minerals, one of which—a variety of hornblende, is properly called asbestos ; the other is chrysotile, a variety of serpentine, and may be readily distinguished from asbestos by yielding water when heated in a closed tube. Both asbestos and chrysotile are found in regions of altered crystalline rocks, and yet each has its own particular associates. The former occurs with metamorphic rocks rich in hornblende, while the latter is found in distinct veins penetrating masses of serpentine.

## Character and Occurrence.

The mineral which is produced in Canada at the present time properly belongs to the chrysotile variety. This occurs in veins in certain portions of the great belt of serpentine rocks of the Eastern Townships of Quebec, though in the serpentines of the Laurentian the mineral is found in small veins, but not as yet in a quantity to be economically available, though subsequent exploration in this direction may disclose workable deposits there as well. In the Laurentian rocks of certain areas, however, the variety actinolite sometimes forms hilly masses of considerable size, which has been mined for several years, and while not as yet found to be suited for the manufacture of millboard and the finer qualities of steam packing, answers admirably for cements, paints, etc., in the same way as the tremolite of the State of New York ; these deposits of actinolite are therefore highly important, and will without doubt increase rapidly in value.

Although of such recent date, the Eastern Townships asbestos, for the name may as well be retained, has now a world-wide reputation, and is shipped in large quantities to the various countries in Europe, England, Italy, Germany and Belgium, and to the United States also, and of the many firms now engaged in its manufacture, the greater portion draw the bulk of their raw material from a small area in Eastern

Quebec; the Italian mines, from which the asbestos was formerly obtained, being worked with far greater difficulty than those in Canada, while the supply of the mineral is much more uncertain, and although for certain special lines the Italian may be more valuable than the Canadian, the latter has been found of sufficient value for most purposes, so as to almost entirely supplant the former, even with those firms who control the output of the Italian mineral, a fact evidenced by the purchase of a Canadian property by the United Asbestos Co. of London, England.

### Eastern Townships.

Although asbestos was known at many points in Eastern Quebec more than thirty years ago, and was exhibited at the International Exhibition in London in 1862, no attempt was made to work the mineral for some years. The credit of the discovery of the Thetford area is probably due to a French-Canadian named Fecteau, and following up his discovery certain areas were secured from the Government by private parties. The true value of the mineral was not at first recognized, and in the first year of mining operations (1878) only 50 tons were taken out, for which a ready sale was not at first obtained. The importance of the discovery was, however, speedily ascertained, and new companies obtained tracts of rocky land in the townships of Thetford and Coleraine, and began the work of exploration and mining. Had the Government of Quebec at that day been in possession of the requisite information regarding its mineral lands, it is very probable that the thousands of acres which rapidly changed hands in that section of the Province would have brought in much greater returns than the usual Government rate. Curiously enough, however, though the areas of the serpentine in the townships of Thetford, Coleraine, Ireland and Wolfestown are very extensive, the portions in which the mineral asbestos is found are comparatively rare, and the mining though now prosecuted for fifteen years, is practically confined to two small sections about four miles apart. The first, and as yet the most important of these, is a small mound near the Thetford station on the Quebec Central railway, which rises about 80 to 90 feet above the track; the other, the bold ridge of brownish-looking rock to the south-east of Black Lake station, which assumes much greater prominence, and probably has an elevation of 650 to 700 feet above the railway at this point. It must, however, be

said in regard to some of the areas of serpentine that lack of sufficient exposures, owing to soil and forest growth, prevents in many cases a careful search, but in other portions where the bare rock is well exposed, as on the great ridge of Ireland and Wolfestown, as well as much of that towards Lake Caribou and Little St. Francis, much of the rock has a hard reddish-brown weathered surface which does not promise favorable results to the prospector, who from a comparatively brief experience can very generally decide, with a fair amount of assurance, whether certain areas are likely to prove of value or not as a source of supply for asbestos.

The most westerly area in the Eastern Townships in which the mineral is mined is at the Jeffrey mine, four miles east of Danville village, on lot 9, range 3, Shipton. The asbestos here occurs in a rounded knoll, one of a series which extends from Melbourne through Cleveland into the south-east corner of Tingwick, and is the only one in which valuable veins have yet been found in this direction. This was first worked in 1884, and has yielded a large amount of asbestos of excellent quality.

### Ottawa County.

In connection with the Laurentian rocks of Ottawa county the serpentinous limestones sometimes carry veins of a pale yellowish asbestos, generally of short fibre, but at times having a length of three-fourths to one inch. In some pieces of rock several of these, six, eight or more, are found, occupying a breadth of ten to twelve inches, the thickness of the veins ranging from one-fourth of an inch upward. Few attempts have, in so far as can be learned, been made to work these asbestos veins, some of which, as in Templeton, might, if they were continuous to any extent, afford material of second and third quality, the fibre having scarcely a sufficient length to class it as first. Both the serpentine and asbestos of the Laurentian rocks differ in quality from that of the Eastern Townships, as might indeed be supposed from their mode of occurrence and from the associated rocks. In connection with some of the phosphate deposits, as at the Emerald mine on the Lievre in Buckingham, considerable masses of the variety of asbestos known as mountain cork are found, but this has as yet no economic value.

## Methods of Mining.*

Thirteen incorporated companies, with an authorized capital of about three and one-half millions of dollars, of which a portion, however, is employed in the manufacturing business in England, with a number of very prominent private concerns, occupy themselves today with the production of asbestos and asbestos mining, and I believe that my estimate that about two and one-quarter millions of dollars are invested in the industry in Canada comes very close to the reality.

While until about four or five years ago, with one single exception, hand work, occasionally connected with horse-power hoisting, was exclusively used in asbestos mining, the leading mines are now equipped with more or less extensive plants of machinery to carry on the work.

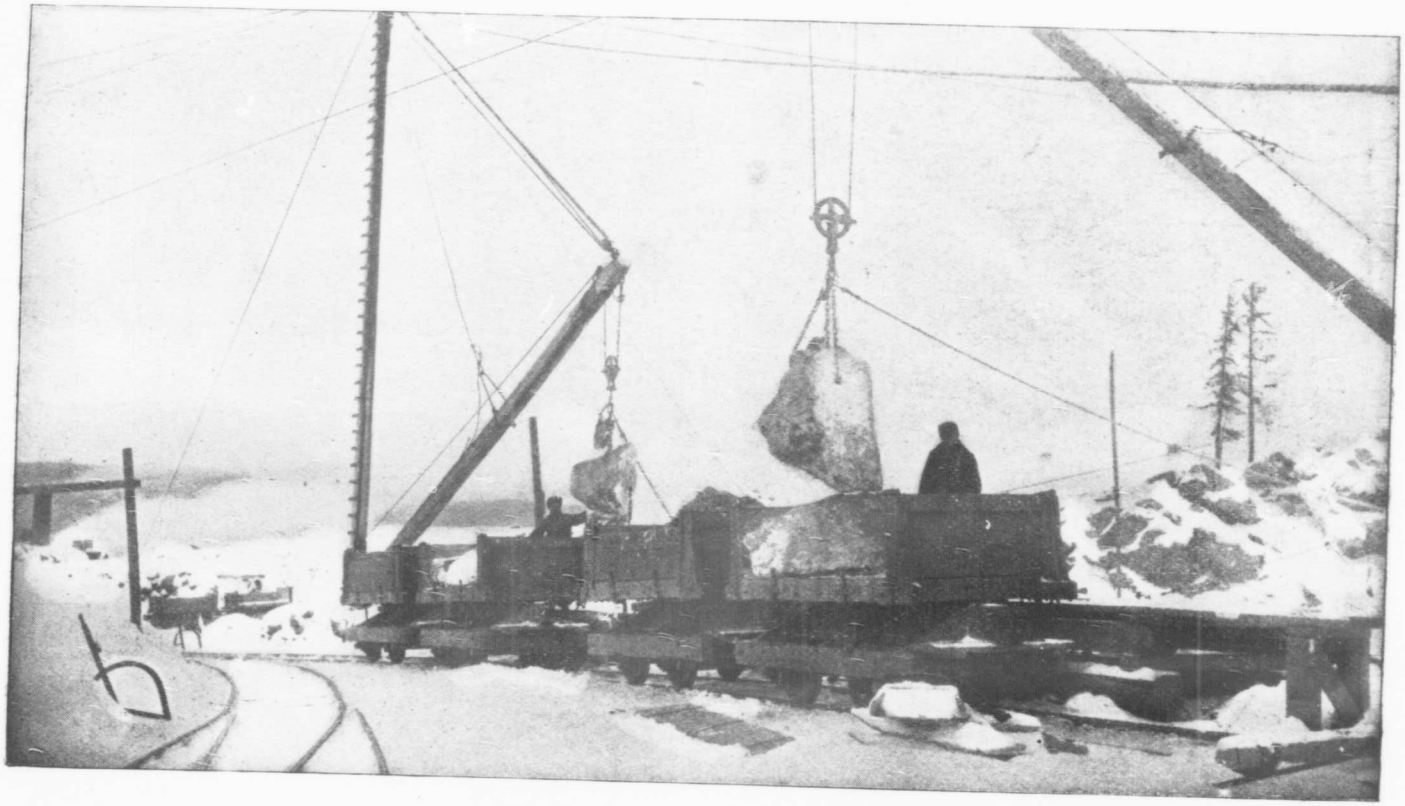
This work consists: Firstly—Of the proper mining operations, such as the drilling, blasting, removing of the broken rock out of the pits to the dumps, hand in hand with the gathering up of the asbestos veins and transport of same to the dressing establishments or cobbing sheds.

Secondly—The dressing or cobbing, that is, the separating of the asbestos fibre from the adhering rock and the grading of the former in different qualities, followed by packing, transport to railroad, loading, shipping and marketing. It may not be unwise to review these different operations briefly, as the circumstances under which asbestos is produced are entirely different from nearly any other mineral or ore, and we find nearly every item which we were used to consider as a thoroughly established rule greatly changed by these circumstances.

This may be more readily understood when we consider the large amount of rock which has to be handled in comparison to the mineral, the peculiar nature of this rock, the character of the mineral, which is a fine silky fibre, and must be carefully protected from injury, and so on.

As to the drilling, hand-drilling is still in existence in all the newly opened mi .es for prospecting work, and even in one or the other of these mines which have already reached considerable prominence. It is further nearly exclusively used for block-holing—only very recently one of the mines has introduced a small size machine drill for the purpose. It is done by three men with 1-inch octagon steel, and 6 to 7 lb. hammers. The average capacity is about 15 to 16 ft. a day of 10 hours,

* From a paper by Mr. L. A. Klein, read before the General Mining Association of Quebec.



Bell's Asbestos Co. Ltd.—Thetford Mines, Que.

and the cost about 20c. per ft. The depth of holes seldom exceeds 4 ft. Some of the mines have lately adopted a plan of block-holing with one man only, using ¾ inch steel, and 3 to 4 lbs short-handled hammer. The capacity is thus about 8 ft for 10 hours' work and the cost only about 14 cents.

Most of the mines do their drilling, however, with steam or compressed air, 45 ft. per day of 10 hours in the former case, and from 50 to 55 ft. in the latter being considered a fair day's work. The expense per foot may be set, considering the present prices for fuel, at from 7 to 8 cents per foot, not including wear and tear on machinery and interest for capital involved in the buying of the necessary machinery. There are in all 7 compressors with a total of 44 drill capacity in use, 4 of them being built by the Rand Drill Company, 2 by the Ingersoll Rock Drill Company, and 1 by the Norwalk people. At present also, 44 steam drills are employed in the industry, of which, however, 11 are run by steam. About one-half of all drills used are Rand's Little Giant No. 3, 3 Rand Sluggers, 5 Ingersoll 3 inch, and 12 Sergeant's—a couple or so being of other manufacture. The steel in use is 1¼ inch octagon and costs in the neighborhood of 10c. a pound. As a rule the drills are worked under 80 lbs. pressure to square inch. We may consider an expense of 3½c. to the ton of broken rock as the average cost at present.

The next operation is the removing of the broken rock from the pits to the dumps with which the picking up of all the asbestos veins goes hand in hand. If the bottoms of the pits are on the same level with the top of the dumps, the operation is simply to load the refuse rock on trucks, stone-boards, wheelbarrows, etc., and bring it by one or the other of these means to the dumps; where this is not the case, as in most of the more extensively worked mines, where pits vary in depth from about 30 to 150 ft., the rock has to be hoisted up by means of derricks. At the disposal of this industry there are at this time about 75 derricks, of which, in two cases hand, and in twelve or thirteen cases horse power is applied as a motor, the rest being steam derricks. Hand and horse derricks have of course only a right to exist where there is a comparatively small amount of rock to be handled and where the works are of a more or less exploring character only, and the first expense of putting in steam plant seems inadvisable. The steam derricks are to be distinguished in two classes, boom and cable derricks; of the latter class only

two being so far in use. Boom derricks consist of a mast held by means of guys in a vertical position and turnable on its own axis, while to the foot of the mast a boom or arm is attached and suspended in a more or less horizontal position by means of ropes stretching from end of mast to end of boom. The length of the latter is generally from 40 to 50 ft., and it is clear that the working space of such a boom is limited by its length and can, economically, hardly be extended to more than say 50 ft.

The cable derricks have a mast somewhat similar to the former, but instead of a boom, a cable with a traveller on it, which cable is stretched from top of mast to some point across the pit, allowing by means of the traveller, to hoist from any point of the cable. As this may be stretched to a length of 400 and more feet the enormous advantage over boom derricks seems clear, and I have no doubt that its general introduction is only a question of time. The ropes used for hoisting are ⅝ to ¾ in. crucible cast steel, the guy ropes generally ⅞ of an inch; the cables 1½ or 2 inch steel ropes.

There are eighteen double and twenty-four single drum hoisting and winding engines employed in the industry, or a total of sixty drums. The hoisted refuse rock is placed on lorries and wheeled out on the dumps either by hand, or, where the dumps are somewhat long, by horses, and there discharged. In some of the mines, to a great advantage, self-dumping cars of a very simple construction are being used. While now nearly all the larger mines use iron or steel rails, and lately, specially of the lighter sort, (19 lbs. Canadian make, at a price of $40 per ton delivered), there are still some wooden rails with band-iron top in use, which, however, with the growth of the industry, will have to be soon abandoned.

The transport of the crude asbestos to the dressing or cobbing sheds is in most cases done by the simple means of a cart and a horse, or where sheds of a more or less provisional character are placed right on the edge of the pits, carried in by hand. Where the cobbing is more concentrated in a special and permanent establishment we find rail connection for the purpose. Two of the mines, however, have a more or less systematic handling of the stuff in this state—consisting of iron self-dumping skips, which are loaded directly from the pits, whence they proceed down an inclined railroad and discharge their loads directly in the cobbing establishment. The skips are brought back by means of

winding engines. The cost of the above described operations, viz.: removing of refuse rock, hoisting, picking of asbestos and its transport to sheds, is of course somewhat influenced by the size of the veins in the respective bed-rock, the height and accessibility of the pit face, length of dumps, and so on, but may with fair certainty be set at 22 cents per ton of rock handled in summer-time, which figures unfortunately increase in winter-time, in some cases to 35 cents, and may be accepted at 25 cents for all year round work.

### Preparation for Market.

The second part of the operation at the asbestos mine is the dressing, or commonly called cobbing, which comprises the freeing of the asbestos veins from rock as much as possible, (the crude asbestos in the market still contains from 15 to 40 per cent. of rock, some manufacturers even claim more than that while they are negotiating new contracts), and the grading in two, three or four different grades. This operation is as a rule done by hand by little boys, with the aid of a hammer weighing about 1½ lbs. Some of the mines, however, have partially or entirely adopted the aid of machinery, and this more particularly for the transformation of the so-called cobbing stones—*i.e.*, larger pieces of rock with a more or less valuable asbestos vein in it, a vein, however, which did not give away from the blast, and which requires the breaking away of the adhering rock by means of powerful blows, (sledge hammers), or compression (crushers). The first to try and solve the problem was the Scottish Canadian Asbestos Co. Unfortunately the development of the process sustained a sudden interruption by the closing of the mines in the autumn of 1888. The plant here consists of a 50 h. p. engine, Blake rock-breaker, travelling picking-tables, set of Cornish rolls, revolving screens, elevators, shakers, two large blowers, and so forth. Next the American Asbestos Co. started in to experiment in the winter of 1890-91. The main object then was to do away with the somewhat indistinguishable grade of No. 2, an object, however, which was difficult to reach, unless the fibre could have been thoroughly loosened and freed from stone. The plant consisted in the main of a Blake crusher, to which the crude asbestos is conveyed by an inclined railway, and automatically dumped in front of the crusher. The jaws of the crusher are set at 1½ inches, the crushed stuff drops on an inclined

sieve in shaking motion, which separates all the loose fibre and the dust from the larger pieces of rock and asbestos veins, the former going directly to the cleaning or grading machines, the latter dropping on a revolving picking table, where the barren rock is removed by hand to one side of the table, the asbestos veins being left on the other. At the end of the table is a receiving chute which is divided into two compartments, and into which rock and asbestos are discharged respectively. The rock drops from the chute directly into a lorry and is wheeled to the dumps, while the asbestos is conveyed either to the dry kilns, as necessary in winter-time or rainy weather, or to the fine crushers for further manipulation. These latter are of unique construction, of which the object is to allow particles of a certain size and loosened fibre to go through, without being further crushed, as thereby the asbestos fibre is likely to be injured. This so reduced stuff is brought to the cleaning and grading machines, consisting mainly of a set of inclined sieves in rapid shaking motion in connection with blowers, fans etc.—remaining unbroken stone and unloosened fibre going back to a set of still finer crushers to undergo the process again. The plant at King Bros' mine in Thetford, which was principally erected for the extraction of asbestos out of large pieces of rock on the old dumps—works which some years ago did not warrant the expense of block-holing and further handling—consists of a Blake crusher, from which the stuff is conveyed on a set of Cornish rolls with the intention of having all stone reduced to powder—from there to a revolving screen of which the object was to screen out all the dust and leave the clean fibre. This object, however, has not been fully realized, owing to the failure of the rolls to break up the rock entirely, and an additional blowing and screening plant has been put in, which produces now a very clean product of one grade. The Anglo-Canadian also runs a crusher and a set of sieves, and the Johnson's Co. has recently put in a couple of crushers to overwork the old dumps."

Among the more recent improvements in mechanical separation should be mentioned the fine new milling plants of the Bell's Asbestos Co., Ltd., at Thetford, and the Danville Asbestos and Slate Co. at Danville, where crushers, rolls, picking tables, cyclone mills, cylindrical dryers and other appliances are successfully used in the production of the various grades of merchantable fibre.

American Asbestos Co. Ltd.—View of Main Pit, Black Lake, Que.

### Compared with Italian.

The composition of Canadian asbestos in comparison with the product of Italian mines is shown by the following analysis by Donald:

| | Asbestos. | |
|---|---|---|
| | Canadian. | Italian. |
| Silica | 40.57% | 40.30% |
| Magnesia | 41.50% | 43.37% |
| Ferrous oxide | 2.81% | .87% |
| Alumina | .90% | 2.27% |
| Water | 13.55% | 13.72% |
| | 99.33% | 100.53% |

### Uses of Asbestos.

It is clear that a mineral which has been successfully exposed to a heat of 4,500 to 5,000 degrees F., which is a non-conductor of electricity and which may be spun like cotton and flax, has merits in itself and will stand on those merits. The uses of asbestos are steadily increasing. It is used in the manufacture of fireproof paints, roofing, piston packing, felt packing, fireproof cements, sheet and roll millboards, flooring, and for a covering for steam pipes and boilers. It is largely used in lining for fireproof safes, and is also made into yarn, cloth and paper. Non-consuming lampwicks and fireproof drop curtains for theatres are now being made of this material. Some demand has also been created for its use in the manufacture of insulators for electric wires.

### Production.

(Geological Survey of Canada.)

| Year. | Tons. | Value. | Year. | Tons. | Value. |
|---|---|---|---|---|---|
| 1880 | 380 | $24,700 | 1887 | 4,619 | $226,976 |
| 1881 | 540 | 35,100 | 1888 | 4,404 | 255,007 |
| 1882 | 810 | 52,650 | 1889 | 6,113 | 426,554 |
| 1883 | 955 | 68,750 | 1890 | 9,860 | 1,260,240 |
| 1884 | 1,141 | 75,097 | 1891 | 9,279 | 999,878 |
| 1885 | 2,440 | 142,441 | 1892 | 6,082 | 390,462 |
| 1886 | 3,458 | 206,251 | 1893 | 6,331 | 310,156 |
| | | | 1894 | 7,630 | 420,825 |

## Railway Shipments, 1881–1894.

The following returns have been courteously furnished by Mr. J. H. Walsh, General Passenger Agent of the Quebec Central Railway, showing the quantities shipped from the mines at Thetford, Black Lake and other stations on the line of this railway :—

| | | | | | |
|---|---|---|---|---|---|
| 1881— | 9 | months | ending | Dec. 31st..... | 617,635 lbs. |
| 1882—12 | | " | " | " ..... | 1,358,820 " |
| 1883—12 | | " | " | " ..... | 1,429,850 " |
| 1884—12 | | " | " | " ..... | 1,935,525 " |
| 1885—12 | | " | " | " ..... | 2,735,140 " |
| 1886—12 | | " | " | " ..... | 4,306,925 " |
| 1887—12 | | " | " | " ..... | 6,962,875 " |
| 1888—12 | | " | " | " ..... | 8,030,950 " |
| 1889—12 | | " | " | " ..... | 11,747,580 " |
| 1890—12 | | " | " | " ..... | 15,651,250 " |
| 1891—12 | | " | " | " ..... | 14,672,180 " |
| 1892—12 | | " | " | " ..... | 8,674,560 " |
| 1893—12 | | " | " | " ..... | 10,677,900 " |
| 1894—12 | | " | " | " ..... | 14,683,055 " |

## Shipments, 1895.

The following returns are officially reported for the year ended 31st December, 1895 :—

| From | Tons. |
|---|---|
| Black Lake via Quebec Central Ry..... | 735½ |
| Thetford Mines, etc., via " ..... ..... | 5,235¼ |
| Danville via Grand Trunk Ry..... ..... | 2,310 |
| Township of Low via Gatineau Valley Ry ..... | 35 |
| Total, 1895..... | 8,315¾ |

## Exports of Canadian Asbestos, 1888-1895.

| | No. I. | | No. II. | | No. III. | | Total Exports. | |
|---|---|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| | | $ | | $ | | $ | | $ |
| 1888..... | 2,555 | 193,052 | 621 | 26,566 | 252 | 8,737 | 3,428 | 228,355 |
| 1889..... | 4,228 | 304,336 | 237½ | 11,192 | 183 | 8,358 | 4,648 | 323,886 |
| 1890..... | 5,716 | 412,598 | 480 | 20,571 | 367 | 10,990 | 6,563 | 444,159 |
| 1891..... | 5,180 | 413,231 | 1,449 | 83,639 | 393 | 17,039 | 7,022 | 513,909 |
| 1892..... | 2,398 | 191,494 | 4,243 | 292,598 | 675 | 30,320 | 7,216 | 514,412 |
| 1893..... | 1,399 | 114,058 | 4,073 | 267,518 | 426 | 15,142 | 5,898 | 396,718 |
| 1894..... | 2,173 | 115,056 | 3,178 | 191,840 | 878 | 32,860 | 6,229 | 439,756 |
| 1895..... | 5,696 | 312,572 | 1,744 | 126,921 | 1165 | 53,832 | 8,605 | 493,325 |

## Exports by Countries, 1891-1895.

(From Trade and Navigation Returns.)

### Year Ended 30th June, 1891.

| Exported to | No. I Grade. | | No. II Grade. | | No. III Grade. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Great Britain... | 772 | $78,147 | 187 | $9,406 | 181 | $7,557 |
| France..... | 85 | 14,447 | 143 | 12,832 | 28 | 2,400 |
| Germany..... | 68 | 5,240 | 56 | 3,300 | 162 | 5,800 |
| United States.... | 4,255 | 315,397 | 1,063 | 58,041 | 21 | 1,249 |
| Newfoundland. | .... | ..... | .... | ..... | 1 | 33 |

### Year Ended 30th June, 1892.

| Exported to | No. I Grade. | | No. II Grade. | | No. III Grade. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Great Britain.... | 581 | $67,450 | 316 | $36,431 | 59 | $3,108 |
| France..... | 40 | 8,039 | 156 | 14,225 | 6 | 283 |
| Germany..... | .... | ..... | .... | ..... | 212 | 8,920 |
| United States.... | 1,777 | 116,005 | 3,771 | 241,942 | 398 | 18,000 |
| Newfoundland... | .... | ..... | .... | ..... | .... | ..... |

### Year Ended 30th June, 1893.

| Exported to | No. I Grade. | | No. II Grade. | | No. III Grade. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Great Britain.... | 74 | $8,660 | 77 | $3,120 | 222 | $8,270 |
| Germany..... | 4 | 975 | 49 | 2,070 | 20 | 600 |
| Holland ..... | 20 | 3,200 | .... | ..... | 27 | 1,050 |
| United States.... | 1,301 | 101,223 | 3,947 | 262,328 | 137 | 4,822 |
| Belgium.... .... | .... | ..... | .... | ..... | 20 | 400 |
| France..... | .... | ..... | .... | ..... | .... | ..... |

YEAR ENDED 30TH JUNE, 1894.

| Exported to | No. I. Grade. | | No. II. Grade. | | No. III. Grade. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Great Britain .... | 186¾ | $17,508 | 190 | $7,549 | 137 | $5,963 |
| Germany..... | ¼ | 70 | 236 | 7,083 | 264 | 10,292 |
| Holland..... | ..... | .... ..... | 93 | 2,790 | 140 | 5,200 |
| United States.... | 1,936 | 96,378 | 2,659 | 174,418 | 297 | 9,130 |
| Belgium..... | ..... | ..... | ..... | ..... | 40 | 2,275 |
| France..... | 50 | 1,100 | ..... | ..... | ..... | ..... |

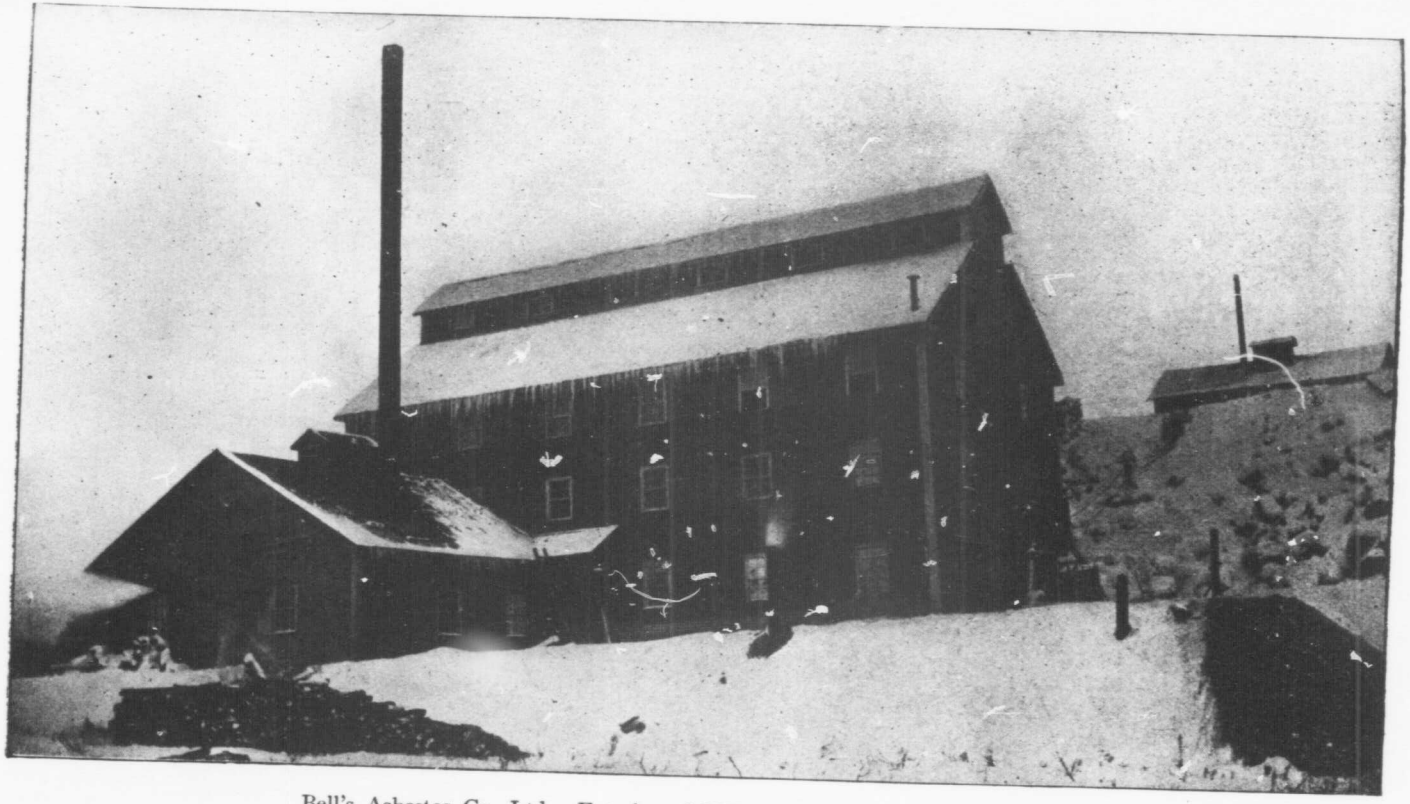
YEAR ENDED 30TH JUNE, 1895.

| Exported to | No. I Grade. | | No. II Grade. | | No. III Grade. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Great Britain.... | 1,996 | 105,790 | 62 | 4,700 | 144 | 8,362 |
| Germany..... | 20 | 2,200 | 186 | 15,501 | 164 | 9,585 |
| Holland..... | .... | ..... | 28 | 2,800 | .... | ..... |
| United States.... | 3,680 | 204,582 | 1,456 | 102,810 | 857 | 35,885 |
| Belgium.... .... | .... | ..... | 12 | 1,110 | .... | ..... |
| Total..... | 5,696 | 312,572 | 1,744 | 126,921 | 1,165 | 53,832 |

IMPORTS OF ASBESTOS (MANUFACTURED).

Duty—25 per cent.

| Year ended 30th June. | Value. | Year ended 30th June. | Value. |
|---|---|---|---|
| 1885..... | $ 674 | 1891..... | $13,298 |
| 1886..... | 6,831 | 1892..... | 14,090 |
| 1887..... | 7,836 | 1893..... | 25,133 |
| 1888..... ..... | 8,793 | 1894..... | 25,124 |
| 1889..... | 9,943 | 1895..... | 27,304 |
| 1890..... | 13,250 | | |



Bell's Asbestos Co. Ltd —Exterior of Mill Building, Thetford Mines, Que.

UNITED STATES PRODUCTION.

The production of Asbestos in the United States since 1880, has been as follows :

| Year. | Tons. | Value. | Year. | Tons. | Value. |
|---|---|---|---|---|---|
| 1880..... | 150 | $4,312 | 1887..... | 150 | 4,500 |
| 1881..... | 200 | 7,000 | 1888..... | 100 | 3,000 |
| 1882..... | 1200 | 36,000 | 1889..... | 30 | 1,800 |
| 1883..... | 1000 | 30,000 | 1890..... | 71 | 4,560 |
| 1884..... | 1000 | 30,000 | 1891..... | 66 | 3,960 |
| 1885..... | 300 | 9,000 | 1892..... | 104 | 6,416 |
| 1886..... | 200 | 6,000 | 1893..... | 50 | 2,514 |

ITALIAN EXPORTS.

The official returns of exports from Italian mines for the year 1894, are as follows :

| | Total Quintals. | Total Francs. |
|---|---|---|
| To France..... | 438 | 26,280 |
| Germany..... | 31 | 1,860 |
| Great Britain..... | 53 | 3,180 |
| Spain..... | 157 | 9,420 |
| Switzerland..... | 24 | 1,440 |
| Totals..... | 703 | 42,180 |

## AMERICAN ASBESTOS CO., Ltd.

Registered 18th November, 1889. Authorized Capital, £50,000 sterling, divided into 10,000 shares of £5 sterling.

**Directors :**

Louis Wertheim, Frankfort, Germany,
L. A. Heinsheimer, New York, | V. Ehrmann, Frankfort,
D. Gabrielsen, Liverpool.

**Registered Office : D. Gabrielsen, Sec'y, 5 Chapels Walk, Liverpool, Eng.**

Formed to acquire and work asbestos and other mineral lands in the Dominion of Canada. In 1888 Mr. Louis Wertheim, the promoter of the company, purchased from Dr. James Reed, Reedsdale, Que., Lots 27 and 28 (S. W. ½ of each), in Range B., Coleraine, Province of Quebec, in extent some 104 acres. The price stated was $40,000. Mines and works situated between Black Lake and Thetford Station, on the line of the Quebec Central Railroad. The mine is equipped with excellent accommodation, and a first-class working plant, including one 16 x 24 Rand 7-drill straight-line compressor, 5 Rand 3 in. steam drills, 5 boom and cable derricks, 2 pumps (Blake and Hunt make respectively), 1 Blake crusher (9 in. by 15 in.), cobbing, cleaning and fibreizing machinery of unique design, 4 boilers (2 45 h. p., 1 80 h. p., 1 30 h. p.), Copeland & Bacon hoists, etc. Mill building, 30 x 82 ; crusher house, 30 x 25, 3 storeys ; 2 engine houses (one 6 x 48, the other 25 x 45) ; 13 double tenement miners' dwelling houses, 4 cottages, etc. The whole of an estimated value of $60,000. The mine has been in operation ever since April, 1889, with but one interruption (1892), and has proved to be one of the most uniform producers of crude asbestos in the district.

**Resident Engineer and Manager : L. A. Klein, Wertheim Mines, Que.**

## ANGLO-CANADIAN ASBESTOS CO., Ltd.

Registered 14th August, 1889. Authorized Capital, £20,000, in shares of £1, of which £11,490 has been issued and paid. There are also 6 per cent. debentures to the amount of £4,034, repayable 15th September, 1904. The accounts are made up annually to December 31st, and submitted in March.

**Directors:**

R. T. Hopper, *President*,
H. F. Watson, | H. W. Paul, | R. W. Potter,
R. H. Holland.

**English Office: 15 Poultry Chambers, London, E.C.**

**CANADIAN OFFICE:**

**R. T. Hopper, President and Managing Director, 314 Board of Trade Building, Montreal.**

This company owns and operates certain asbestos lands in Block A, Coleraine, in the Province of Quebec. Mines located about one-quarter of a mile from Black Lake Station, on the line of the Quebec Central Railway. Engine equipment comprises: 1 Duplex Rand 5-drill air compressor, Ingersoll and Beatty hoists, 1 Northey and 1 Valley Machine Co. pump, one 60 h. p. and one 35 h. p. boiler, 4 derricks, etc. Well equipped with building accommodation. 75 persons employed in 1895. Also mines chromic iron.

*Mine Superintendent:* Capt. W. Prideaux, Desjardins P.O., Que.

## ASBESTOS CO. OF NEWFOUNDLAND.

Registered in London, 1893. Authorized Capital, £10,000 stg. in shares of £1.

**Directors:**

J. W. Shepherd, | R. W. Mitchell.

**R. H. Jones, Manager, Port-au-Port Bay, Newfoundland.**

Formed to carry into effect an agreement with R. H. Jones on the one part, and N. W. H. Eady, on behalf of the company, of the other part; and generally to search for and deal in asbestos and other minerals. Some prospecting was done in 1893 on a property owned by the company in the Port-au-Port Bay district, Newfoundland.

## ASBESTOS MINING AND MANUFACTURING CO.

Incorporated April, 1895. Authorized Capital, $50,000, in shares of a value of $100.00.

**Directors:**

J. Smith, | John L. Armitage, | R. Burrage, | E. Hammell.

**Head Office: John L. Armitage, Treasurer, Prudential Bdg., Newark, N.J.**

Owns and operates an asbestos property containing 140 acres in the Township of Lowe, Ottawa County, Province of Quebec, on which from 20 to 30 persons were employed in 1895. The output for the year is reported by the company as follows:— No. I., 100 tons; No. II., 200 tons, and No. III., 50 tons.

## BEAVER ASBESTOS CO., Ltd.

Incorporated 1890, under Letters Patent from the Local Legislature of the Province of Quebec. Capital stock, $100,000, in shares of $100 each. Fully subscribed and paid up.

**Directors:**

R. H. Martin, New York, *President*,

H. D. Lawrence, J. W. Woodside, | Jas. S. Mitchell, Sherbrooke, *V.-Pres.* H. J. Williams, Danville, Que.

**Head Office: J. W. Woodside, Secretary, Sherbrooke, Que.**

Formed to acquire and work asbestos and other mineral lands in the Province of Quebec, more particularly Lots 31, 32, Range C, Coleraine, in the County of Megantic, Que. Mines situated half a mile from Thetford Station on the Quebec Central Railway. Machinery comprises: 2 boilers, 125 h. p.; 1 single drum and 1 double drum hoist and 1 winding engine, built by the Jenckes Machine Co.; 4 boom and 1 cable derricks; 4 steam drills (Rand); 1 Blake and 2 Northey steam pumps, etc. Well equipped with suitable buildings.

## BELL'S ASBESTOS CO., Ltd.

Registered 4th May, 1888. Authorized Capital, £200,000 stg., in shares of £5, £120,000 stg. of which has been allotted and paid up in full. In 1895 the Capital was reduced to £200,000, in 200,000 shares of £1. Accounts to December 31st submitted in February. Dividends for 1888 and 1889, 22½ per cent. each year; 1890, 15 per cent.; 1891, 10 per cent.; 1892, 7½ per cent.; 1893, 5 per cent.; 1894, 10 per cent.; 1895, 10 per cent.

**Directors:**

Hy. Heywood, *Chairman*,

T. B. Lightfoot, | H. A. Bell, | A. J. Burnett.

**Head Office:**

Geo. W. Giles, Secretary, Southwark Street, London, S.E.

**CANADIAN OFFICE:**

**George R. Smith, Manager, Thetford Mines, Que.**

Formed to take over the business of Messrs. John Bell & Son, and to buy and work the freehold deposits of asbestos at Thetford, Hayden and Belmina, and elsewhere in the Townships of Thetford and Coleraine, Province of Quebec. The purchase price for these properties was: Belmina, £8,394, Thetford at £41,300 stg., and Hayden at £8,000 stg. Mines at Thetford Station on the Q. C. Ry. 280 persons employed. The machinery equipment at date comprises:

*Boilers*—Three 20 h. p., two 100 h. p., two 60 h. p., one 150 h. p.

*Air Compressor*—One Norwalk, 12 drill capacity.

*Hoisting Engines*—Three Ingersoll and four Bacon in place; cyl., 8¼ x 10 in.; diameter of drums, 24 x 36 in.

*Rock Drills*—Nine in place; six Sergeant, 3¼ in.; three Ingersoll, 3¼ in.

*Derricks*—Three cable and five boom.

**BELL'S ASBESTOS CO.**—Continued

*Pumps*—Five in place, Blake and Worthington.
*Rock Breaker*—One Gates.

Asbestos mill equipped with a first-class plant for mechanical separation of asbestos, including rolls, crushers, picking tables, screens, and a cyclone mill.
Works lit by electricity.

## DIRECTORS' REPORT.

At the seventh ordinary meeting of the shareholders, the chairman, Mr. Henry Heywood, said :—"I have now, gentlemen, to propose the adoption of the report and balance sheet, and as 'good wine needs no bush,' very little labor is required on my part to-day to commend so satisfactory a report to your approval. It is, I am sure, a great pleasure for us to meet you here under very different circumstances from those which have prevailed since you did me the honor of electing me on the board. We have had falling dividends for the last three years ; but I think we have reached the bottom, and are now on the first rung of the ladder which, I hope, will lead to greater prosperity. The accounts are so clearly put before you that it is scarcely necessary for me to make comparisons, and I doubt not you have already compared this year's balance sheet with the previous one. The accounts have been audited with the usual severity by Messrs. Cooper Bros. & Co., and you may therefore rely on the strict accuracy of the figures in every respect. The first item, I think, which will have attracted your notice will be the very satisfactory one of £28,443 by profit at London and branches, and asbestos estates, Canada. The explanation of this is very simple, and for the purpose of such explanation I might divide it into three parts—Firstly, that of the increased sales which have been effected both in this country and the colonies. We have certainly done a very greatly enlarged business, and are endeavoring to extend the advantages we have already secured in the colonies and elsewhere. In whatever place we see an opportunity of doing a profitable business, in such a place you may expect to find an agent of Bell's Asbestos Company, Limited. I have also been pleased to learn, and I am glad to tell you, that many of our old customers, who left us some years ago for reasons I need not enter upon, are returning to us. (Applause.) Whether it is due to the very careful selections at the mines, by hand-picking of the fibre, in the first instance, or to the greater care in every process of manipulation in Southwark Street, in my opinion, and certain it is, the manufactures of Bell's Asbestos Company are the best of their kind, made in this country or anywhere else. Further, gentlemen, we find that those of our customers who were sparing in their orders have now larger accounts with us, and I attribute this fact—and it is confirmed by experience—to the superior quality of our manufactured article, to which I have just alluded. The second point I wish to refer to as having enabled us to show higher profits than hitherto is on the question of the stock. It is common knowledge to you, I think, that some years ago, when prices were very high, it was thought to be to the advantage of the company to make very extensive purchases of manufactured asbestos. As prices have fallen from that high figure, we have, in taking stock, religiously written down the value to the lowest point of the time, and in doing so have necessarily been obliged to take away a very large sum—some thousands of pounds—from the profits of each year. I want this to be quite clear. Naturally, when you write down the value of a large stock to the extent of some thousands of pounds, you take away a considerable sum from the profits you have earned. At the end of 1893 we appeared to have got to rock bottom, and it has not been necessary during 1894, I am very pleased to say, although the stock has been valued with the greatest severity, to write down any portion of our profits on account of that asbestos loss. That stock has now been considerably reduced. and this, in itself, is, I think, very satisfactory. Then, again, the severe times have taught us a strict lesson with regard to economy. With regard to the mines, what I said last year will apply today. The reports we receive from them are perfectly satisfactory ; I cannot say they look any better or any worse. The managing director made his usual visit during the early part of last year, and he was accompanied by Mr. Lightfoot. He reported to us on his return all that we expected he would say ; that is to say, he simply confirmed what I have previously told you. He is good enough to tell me that if any shareholder cares to ask any questions with

Bell's Asbestos Co. Ltd.—Interior of Main Pitt, Thetford Mines, Que.

reference to the mines, he, personally, will be very glad to answer them. You will notice an item here that has not appeared before—£750 for machinery reserve fund. We have written down the machinery to its correct value, and we have spent a considerable amount out of revenue in putting it into first rate order. There is not a machine on your works that is not thoroughly and efficaciously employed. Still, the conservative policy which has guided us somewhat from the first suggested that we should provide a fund in case of any new discovery being made or new machinery invented which we might find it profitable to employ either here or at the mines, and, therefore, instead of probably withdrawing a large sum either from revenue account or from the larger reserve fund, we thought it advisable to set aside, as a beginning, £750 for the purpose of providing new machinery, should it ever be required. Naturally it will be. At the same time we write off also each year and take a valuation of the machinery, just as we value the stock, with strict and great severity. Now, gentlemen, one word with regard to the suggestion that the dividend should be 10s. per share, together with a bonus. Upon this point your board had a very long discussion. I, personally, may be too conservative in my views. As you know, I have maintained all along that our first duty here is to put the works in a very strong position—(applause)—and I take it from you, by the applause, that you approve of that course, inasmuch as you wish us to write off the goodwill, and you would also, I dare say, like something written off the mines. So should I. But it was argued, on the other hand, that many who are shareholders to-day will not be to-morrow, or at the end of the year; and that the proprietors at the present time who have been with us during the course of the year are entitled to such reasonable profits as we have made, after setting aside a reasonable sum to reserve fund. I think probably what had more weight with me was this—that we have done very well, while the prospects are equally buoyant, and that as we have had to pay smaller dividends in the past two or three years than we hoped to, we might on this occasion pay 2 per cent. by way of bonus. Therefore it is that we have come to the decision to recommend to you the payment of 10s. a share and 2 per cent. bonus. With these remarks I beg to move: 'That the report of the board of directors and of the auditors, and the financial statement submitted to this meeting for the year ended December 31st, 1894, be and the same are hereby approved, adopted and confirmed.'" (Applause.)

Mr. T. B. Lightfoot seconded the motion, which was duly carried, and the dividend and bonus were declared.

## BROMPTON LAKE ASBESTOS CO.

Incorporated 1890. Capital, $60,000, divided into 600 shares of $100 each.

**Directors:**

E. B. Greenshields, Montreal,

Archibald H. Cook, Quebec, | E. J. Hale, Quebec,
Andrew Thomson, Quebec, | G. H. Thomson, Quebec.

**Head Office: A. H. Cook, Secretary, Quebec, Que.**

Formed to acquire and work asbestos lands in the Province of Quebec. The company owns Lot 26 and half of Lot 25, in the 9th Range of Brompton, in all 377 acres, situate 8 miles from the line of the Grand Trunk Railway, and 13 miles northwest of the city of Sherbrooke, Que. In 1895 property worked under lease by Boston people.

*Mine Superintendent:* J. McCaw, Sherbrooke, Que.

## CLEARY'S ASBESTOS MINE.

**Owner: Hon. Philip Cleary, St. John's, Newfoundland.**

The property contains about 2,560 acres at Port-au-Port, on the west coast of Newfoundland. A certain amount of exploratory work has been done and about 20 tons asbestos mined from surface.

"During 1894 only a few days' labor were expended on a new opening on the Bluff-head portion of the property. Within a space of 22 feet a number of veins were uncovered—one 27 inches wide, two 10 inches each, and others of minor width—all carrying fibre of good quality, though somewhat short. Over three tons cobbed mineral were removed, at an expense of 22 hours' labor, which would average over 50 per cent. fibre." Nothing done in 1895.

## THE DANVILLE ASBESTOS AND SLATE CO., Ltd.

Incorporated under Dominion Charter, 1895. Authorized Capital, $250,000, in shares of $100.

**Directors:**

Feodor Boas, St. Hyacinthe, *President*, | R. H. Martin, New York, *Vice-President*.
J. N. Greenshields, Montreal. | H. W. Johns, Jr., New York.
George E. Weed, New York.

**Head Office: B. Marcuse, Secretary-Treasurer, Danville, Que.**

Proprietors of the well-known "Jeffery" asbestos mine (15 acres on Lot 9 in the III. range of Shipton) at Danville, Que., from which in 1894 about 1,800 tons of asbestos of all grades were produced; 1895, 2,310 tons. It also owns and operates a slate quarry and other property in the same neighborhood. 400 persons employed in 1895.

Asbestos mines equipment comprises:

*Boilers*—Three upright, of 40 h. p. each.

*Hoisting Engines*—Six in place (single and double drums), Bacon make; cyl. 7 x 10 in.; diameter of drums, 25 in.

*Rock Drills*—Three Rand.

*Derricks*—Two cable, six boom.

*Pumps*—Three Blake.

*Rock Breakers*—Three Blake-Marsden.

*Mill Building*—Driven by steam, contains a first-class crushing and fibreizing plant.

Slate quarry equipment comprises:

*Boilers*—Two 90 h. p., upright horizontal.

*Hoisting Engines*—Three in place, made by Ingersoll Rock Drill Co. and Canadian Rock Drill Co.; cyl., 8 in.; stroke, 12 in.; diameter of drum, 30 in.

*Rock Dailles*—Two Ingersoll.

*Derricks*—Three cable and one boom.

*Mill Building*—Equipped with excellent plant for manufacture of roofing and school slate.

H. J. Williams, *Mine Superintendent.*

## GLASGOW AND MONTREAL ASBESTOS CO., Ltd.

Registered in Edinburgh, Scotland, 23rd July, 1891. Authorized Capital, £70,000, divided into 35,000 preferred and 35,000 deferred shares of £1 each. The preferred shares rank first for non-cumulative dividends of 7 per cent. per annum, and take one-half the surplus profits, the remaining half going to the deferred. The preferred shares have also a priority as to capital.

**Glasgow Board:**

R. E. Aitken, C.A., | Wm. Jacks, M.P., | W. H. Kidston.

**CANADIAN BOARD:**

E. Hanson, Montreal,
E. B. Greenshields, Montreal, | William Ramsay, Montreal.

**Scottish Offices:**

Messrs. Mackenzie & Aitken, C.A., Secretaries, 68 St. Vincent Street, Glasgow.

**CANADIAN OFFICES:**

**Matthew Penhale, Manager, Black Lake, Que.**

Formed to adopt and carry out an agreement with Robert Easton Aitken, chartered accountant and stock broker, in Glasgow, providing for the purchase by the company of the properties, mining rights, and others, including the Martin mines in the Township of Coleraine, Megantic County, and the Fraser mines in the Township of Broughton and County of Beauce, both in the Province of Quebec, with all the mining machinery, plant, tools and other personal property and the whole other rights, members, and appurtenances; to carry on the business of asbestos producers, manufacturers, and merchants, of a mineral or mining company in all its branches. The property owned and operated was formerly worked by the Scottish Canadian Asbestos Company. Work commenced in May, 1891, by present company, 200 persons employed. *Engine equipment:* Two 60 h. p. boilers; one 16 x 24 Ingersoll straight line 7-drill air compressor; two 8 x 12 Bacon winding engines; Blake and Cameron pumps; two small hoists, etc., etc. Mill building contains 60 h. p. boilers, horizontal Brush engine, Blake crusher, set 24 in. Cornish rolls, revolving picking tables, Sturtevant double exhaust blower, screens, etc., the whole of an estimated value of $50,000.

## HALIFAX ASBESTOS CO., Ltd.

Incorporated 1893. Authorized Capital, $15,000.

**Directors:**

C. E. Willis, | T. R. Gue, | Arthur E. Curran, | Joseph H. Austen.

**Head Office: H. M. Wylde, Secretary, 129 Hollis Street, Halifax.**

Formed to acquire and work asbestos and other minerals. Holds under Crown lease a property containing two square miles at Port-au-Port Bay, Newfoundland.

Only prospecting done to date, a large portion of the land being proved to be asbestos-bearing.

## JOHNSON'S CO.

Incorporated 1885, under letters patent from the Local Legislature of Quebec. Capital $250,000, in shares of $500 each, fully subscribed and paid up.

**Directors:**

Hon. George Irvine, Q.C., Quebec, *President*,

John Mooney, Inverness, Que., | W. J. Johnson, Clapham, Que.,
Samuel J. Johnson, Inverness, Que., | A. S. Johnson, Thetford, Que.

Lawrence Lynch, *Secretary-Treasurer*, Quebec, Que.

**Head Office: Lawrence Lynch, Secretary, Quebec.**

Formed to acquire and work asbestos and other mineral lands in the Province of Quebec, particularly Lot 27, 6th Range of Thetford, and Lots 25 and 26 in the 10th Range of Ireland, also Lots 25, 29, 30, in Range 3 of the Township of Colerraine, all in the County of Megantic.

Engine equipment including steam drills, horizontal and upright boilers, pumps, single and double hoisting engines, and a complete crushing and separating plant; has been considerably augmented during 1892.

A. S. Johnson, *Managing Director*, Thetford, Que.

## KING BROTHERS.

A private company, consisting of the following partners:—

Chas. King, | James King, M.P.P., | E. A. King.

**Head Office: 15 Bell's Lane, Quebec, Que.**

This company is one of the largest producers of crude asbestos in Canada, and is the owner of some 21,000 acres of mineral lands in the Townships of Thetford and Ireland. Thetford mines at Thetford station, on the line of the Quebec Central Railway; on an average about 200 persons employed. Engine equipment includes Rand compressor (7 drill), three Copeland & Bacon hoisting engines, steam pumps, cable derricks, etc. Output for 1889, about 1,500 tons all grades; 1890, 1,050 tons all grades, 1891, 925 tons; 1892, 550 tons; output in 1893, 400 tons; output in 1894, 550 tons; working only one pit; 1895, 850 tons.

*General Superintendent:* Wm. King, Thetford, Que.

## LAURIER MINING CO.

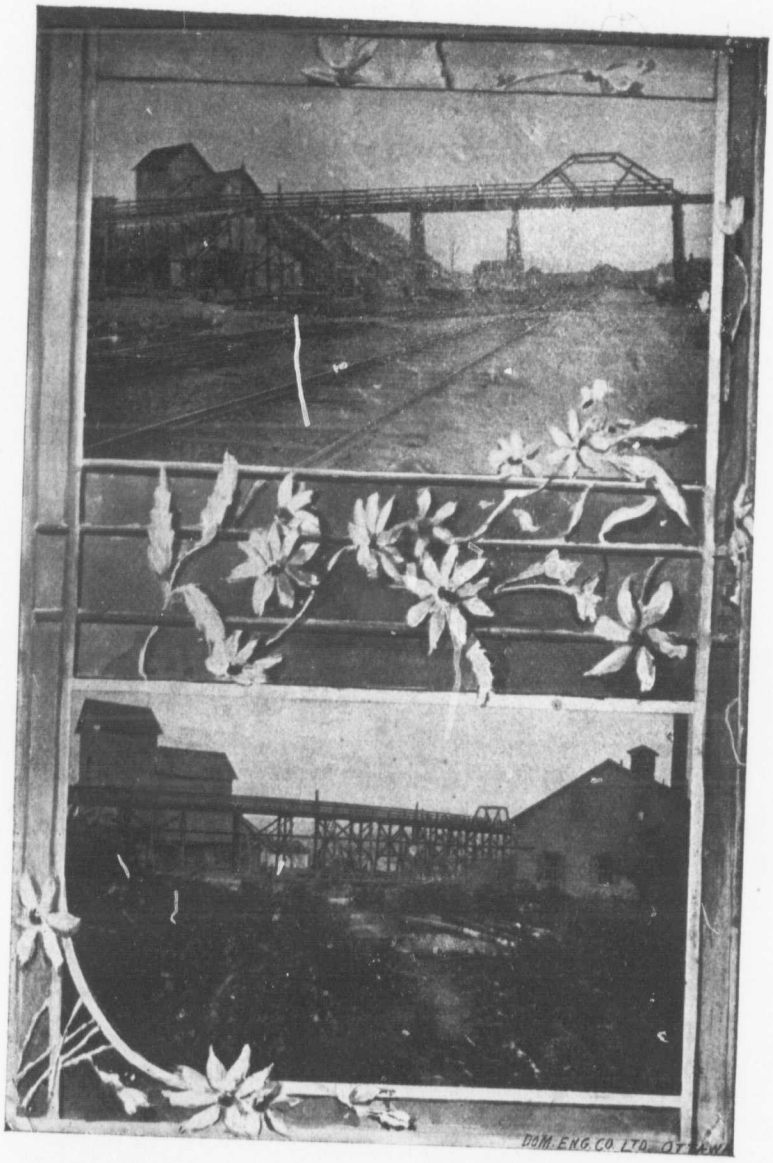
Registered in October, 1889. Capital, $25,000.

**Directors:**

Hon. W. Laurier, M.P.,

J. Lavergne, M.P., | F. Beauchene,
L. Lavergne, N.P., | T. Baril.

**Head Office: J. Lavergne, Secretary, Arthabaskaville, Que.**




New Trestle to convey Dumping Material over the Quebec Central Railway recently completed at King Bros. Asbestos Mines, Thetford, Q.

Formed to acquire and work asbestos and other mineral lands in the Province of Quebec. The company owns a small asbestos property adjoining the mines of the Anglo-Canadian Asbestos Company, and the mine formerly owned by Johnson and Loomis, in the district of Black Lake; also properties in the Township of Chester, Tingwick and Ham, all in the Eastern Townships of the Province of Quebec. No work done in 1895.

## REED ASBESTOS CO.

**Sole Owner:**

Dr. James Reed, Reedsdale, Que.

The properties owned cover three hundred acres, and are known as Lots 27, 28 and 29, Range A, Coleraine, Que. The engine and machinery equipment at date includes: two 60 h. p. boilers; one 16 x 24 Ingersoll air compressor; seven 3⅛ . . Ingersoll rock drills; one double drum Ingersoll hoisting engine, and the necessary pumps, air receivers and attachments to make the plant complete, the whole being of a value of $12,000. Dr. Reed is also owner of 20,000 acres of mineral lands in Coleraine, Thetford and South Ham, containing antimony, asbestos, copper and iron deposits. The output of asbestos in 1892 was 6 tons No. 1; 60 tons No. 2; 30 tons No. 3. No work done in 1895.

## STANDARD ASBESTOS CO., Ltd.

Incorporated October, 1890. Authorised Capital, $100,000, divided into 100 shares of $100 each.

**Directors:**

Hon. J. E. Campbell, Hamilton, Ohio, | F. J. Falding, New York.

**Head Office: Hon. J. E. Campbell, 120 Broadway, New York.**

**CANADIAN OFFICE:**

**J. E. Harrison, Supt., Bridgewater, Ont.**

Formed to acquire by purchase, lease, location or otherwise, and hold asbestos and other mineral lands, locations, mining rights, limits or any interest therein: or lands supposed to contain minerals or any interest therein. The property acquired contains 249 acres, and is situate in the Township of Elzevir, in the County of Hastings, Province of Ontario. Some development work done in 1895.

## THETFORD ASBESTOS MINING CO.

Incorporated March, 1889, under letters patent from the Government of the Province of Quebec. Capital Stock, $200,000, in shares of $100 each, fully subscribed and paid up.

**Directors:**

A. H. Murphy, Montreal, Que.

**THETFORD ASBESTOS MINING CO.**—Continued

W. S. Patterson, Montreal, | George Irvine, Quebec,
J. T. Wilson, Montreal, | J. C. Eno, Quebec.

**Head Office: Thetford, Que.**

The company owns Lots 30 and 31 in Range A, Lot 32 in Range B, and Lot 28 in the 6th Range, all in the Township of Coleraine, Province of Quebec, in all about 500 acres of mineral bearing lands. Not in operation in 1895.

## UNITED ASBESTOS CO., Ltd.

Registered 1st November, 1880. The Capital is £9,970, in fully paid 10 per cent. non-cumulative preference shares of £10, £30,000 in 6 per cent. cumulative preference shares, £49,875 in fully paid ordinary (A) shares of £5, and £50,000 in fully paid deferred (B) shares of £5. The "B" shares were issued as fully paid up to the subscribers of "A" shares. All the shares were originally of £10, but at the end of 1883 it was decided to write off £5 per share from the ordinary and deferred capital (the preference not having then been issued). After payment of the preference dividend the ordinary shares rank first for a cumulative dividend of 14 per cent. per annum. The deferred shares then take 14 per cent. surplus profits to be divided equally between the ordinary and deferred. There are also loans on mortgages, etc., to the amount of £39,000. In 1888 there was a profit, after providing for interest, of £1,222, and a debit to profit and loss brought forward was thereby reduced to £2,272, while in 1889 there was a profit of £2,501, a credit balance of £229 being thus carried forward. In 1890 this balance was increased £3,879, out of which a dividend of 10 per cent. was paid on the preference shares, and £2,882 was carried forward. For the year 1891, after providing for interest and sinking fund on mortgages, a dividend of 10 per cent. on the preference shares and 5 per cent. on the ordinary shares, leaving a credit balance of £3,068 to be carried forward. For the year 1892 the same dividends were paid as in 1891, including 6 per cent. on the new preference shares. In 1893, 10 per cent. on £5 preference shares, 2½ per cent. on the ordinary shares, carrying forward equal to 5¾ per cent. on the ordinary shares. In 1894 no dividends were paid, but the balance carried forward was increased.

**Directors:**

E. Gellatly, *Chairman.*

H. A. Allport, | E. Elias, | J. P. Hurst, | J. R. T. Upton.

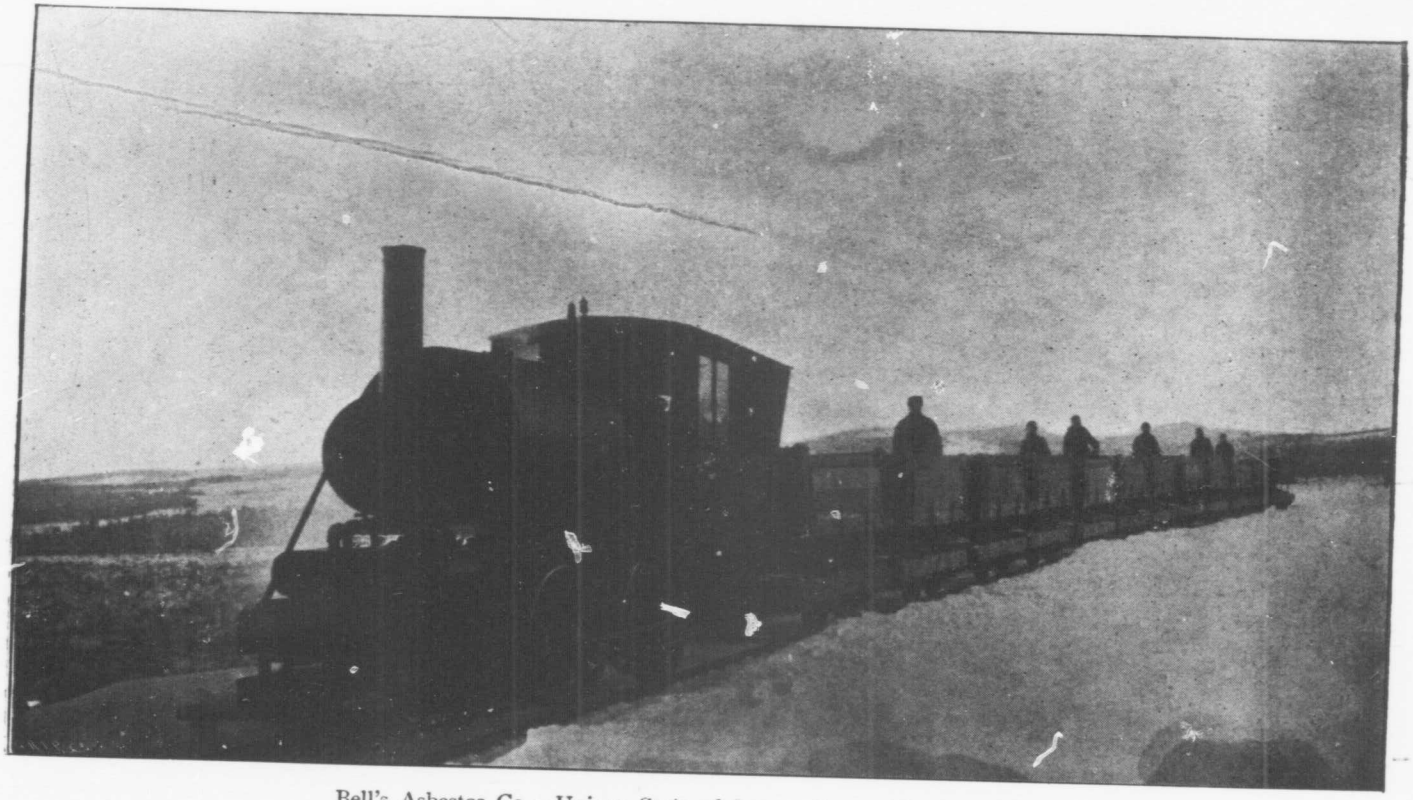
**Head Office:**

J. A. Fisher, *General Manager,*
J. Hawkridge, *Assistant* " } Dock House, Billiter Street, London, E.C.

**CANADIAN OFFICE:**

**John J. Penhale, Superintendent, Black Lake, Que.**

Formed in 1880 to take over the business of the Italo-English Pure Asbestos Co. Ltd., the asbestos mines and business of Messrs. Furse Bros. & Co., of Rome, the Patent Asbestos Manufacturing Co., and to acquire and work asbestos estates in Italy, Canada, and elsewhere. In 1889 it purchased the property formerly worked by the



Bell's Asbestos Co.—Unique Style of Locomotive at Thetford Mines.

Frechette Mining Co., containing some 75 acres of asbestos lands situate in Block A, Township of Coleraine, Province of Quebec. Mine located about one quarter of a mile from Black Lake station on the line of the Quebec Central Railway. An average force of 150 men and boys employed. Engine and machinery equipment comprises: two 70 h. p., one 50 h. p. and one 25 h. p. boilers; one 16 x 24 straight line Rand compressor with the necessary equipment; one 7 x 10 in. duplex double drum Bacon hoisting engine; 7 x 12 x 15 in. duplex double drum Beatty hoisting engine, and one 12 x 15 x 60 in. duplex winding engine, with drums flanged for winding 4,000 ft. ⅞ in. rope. Dressing mill, 40 x 75 ft., 3 stories, equipped with 50 h.p. engine, rock breakers, small crusher, roll and fibreizing apparatus. The Bacon winding engine operates tramway 3,800 ft. on the main and tail rope system; tram line was built in 1892 to carry off the dumps to rear of property; Ingersoll and Rand drills; Blake and Cameron pumps, four boom and two cable derricks. The company also operated in 1895 the Broughton asbestos mine, under lease from the Glasgow and Montreal Asbestos Co. The work has been more in the nature of opening and developing new ground. A small force was put to work on the "main vein," and good results were obtained. The fibre from this property is recognized as the finest on this continent, being noted for its length and fine, silky nature.

# GAS AND OIL.

# GAS AND OIL.

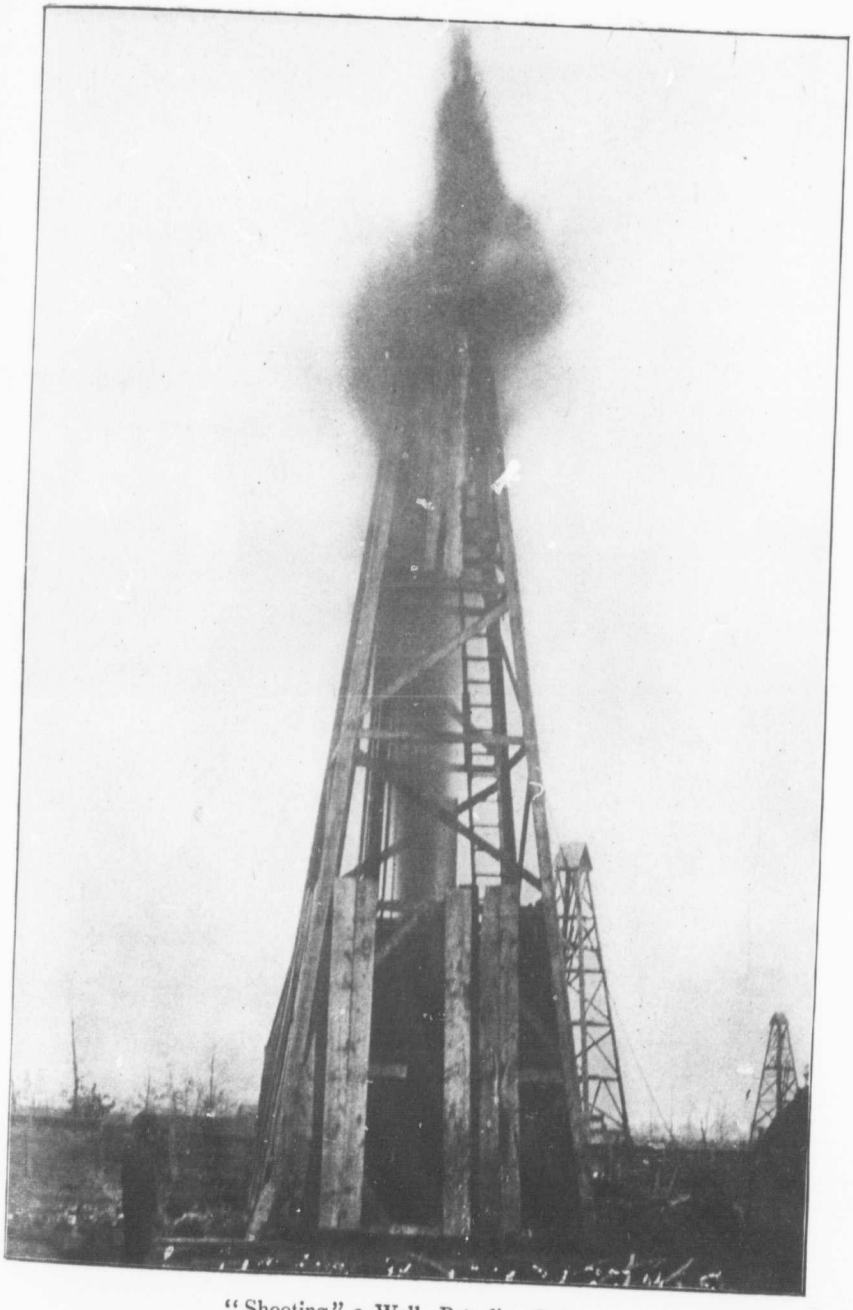
## PETROLEUM.

The petroleum field of the County of Lambton in western Ontario continues to be the only considerable source of supply of this important product yet developed in Canada. Oil was first obtained in this district at Oil Springs in 1861 from surface wells dug to a depth of 40 to 60 ft. in the neighborhood of peculiar deposits, locally known as "gum beds," formed by the evaporation of the petroleum which found its way to the surface. These primitive attempts were quickly followed by wells drilled in the rock, some of which were extraordinarily productive. The oil was reached at a depth varying from 100 to 240 ft., and the first gush in some wells yielded as much as 6,000 barrels per 24 hours. The famous Black & Mathewson well flowed at the rate of 7,500 barrels per day for a short time. This enormous output, owing to the low price of oil and insufficient methods of controlling the wells and storing the product, went almost wholly to waste. It has been calculated that during the spring and summer of 1861 not less than 5,000,000 barrels of oil flowed off on the waters of Black creek—a quantity equal to five or six times the present annual production.

The Petrolia field was opened in 1865, and the period of greatest production was reached in 1866, when the noted King wells were struck, yielding 400 barrels per day. The Oil Springs and Petrolia fields are situated in the Township of Enniskillen, and comprise the main producing district. They are both of small extent. The former has an area of about 2½ square miles, and the latter of about 26 square miles. The area of production is, however, gradually enlarging, and drilling in new ground has been stimulated by the higher prices for crude oil which ruled during the past season (1895). About a dozen wells are now yielding oil in the southwest corner of Plympton township, northeast of Mandaumin, the product of which is pumped into Petrolia through pipe lines. Several new wells were bored last year and in 1894 in the fourth concession of Euphemia, about a mile northeast of Shetland. One well sunk here ten years ago yielded 100 barrels per day for a short time, and another 20 or 30 barrels per day for a year. The average output of the

producing wells in this small pool is now half a barrel per day. At Comber in Essex county oil was found some years ago at a depth of 124 ft. The well pumped 100 barrels of oil, and flowed half a barrel per day. Pelee Island in Lake Erie is the scene of the latest discovery. The Pelee Island Gas and Oil Company of Kingsville put down two wells in 1895, in the second of which they struck gas at 705 ft. and oil at 733 ft., the total depth bored being 750 ft. A pump was put in and 5 to 7 barrels of oil raised. A contract has been let for the boring of a third well. The oil is said to be of fine quality. The average yield of the wells in the Lambton district has steadily decreased since the field was opened, and instead of the great gushers which which were common at the beginning, wells now opened rarely give more than a barrel or a barrel and a half per day for a month or six weeks, when they sink to a yield of eight or ten barrels per month, which is about the average production of wells in the district. The field, however, shows little sign of exhaustion, and its output remains comparatively steady from year to year, the annual return being from 800,000 to 1,000,000 barrels. In 1891 the production was 894,647 barrels, in 1892 800,000 barrels, in 1893 973,000 barrels, and in 1894 997,500 barrels. A barrel contains 35 Imperial gallons. Old wells are constantly being abandoned, and new ones put down. Forty drilling outfits were at work in 1895, and about 100 wells per month bored. The total number of wells in operation on 30th September, 1895, was 9,963, of which 3,176 were in the Oil Springs, and 6,787 in the Petrolia district. The long life of the wells and their great number to a large extent offset the decrease in their yield.

The oil-bearing rock is the Corniferous limestone, which at Petrolia lies at a depth of about 400 ft. below the surface, and in all cases the oil is found in what is known as the "lower vein," which occurs at a depth of about 65 ft. in the formation. At Oil Springs the depth of the borings is somewhat less, oil being found at 370 ft. from the ground and about 60 ft. below the surface of the Corniferous limestone. The Trenton limestone, which is the great oil-bearing formation in Ohio, underlies the Corniferous in Lambton county, being separated from it by various other members of the Silurian system, and in the opinion of some geologists it is not unlikely that the petroleum originates in the Trenton and finds its way up to the Corniferous. Dr. Selwyn, late director of the Geological



"Shooting" a Well, Petrolia, Ont.

Survey of Canada, has stated that "in all probability there is a very large area of petroleum-bearing strata under central Ontario which has as yet never been reached, and which corresponds with the Ohio petroleum-bearing strata." * The deepest boring yet made in the oil district reached a depth of 1,505 ft., but it probably ended in the Onondaga formation, a long distance above the Trenton, and it has yet to be proven by actual demonstration that the latter is an oil-bearing system in the present petroleum region, or indeed elsewhere in Ontario.

Like all petroleum derived from limestone rocks, the Ontario product carries a good deal of sulphur, being in this respect more akin to the Ohio than to the Pennsylvania article. The following analyses show approximately the comparative composition of the Ontario and Ohio petroleums :—

| | Ontario. | Ohio. |
|---|---|---|
| Carbon | 83.94 | 84.57 |
| Hydrogen | 13.37 | 13.62 |
| Sulphur | 1.01 | .72 |
| Specific gravity | .860 | .338 † |

The crude petroleum of Ontario is thick, and dark in color, and its treatment for the production of high grade illuminating oil was at first beset with a good deal of difficulty, owing chiefly to the trouble experienced in eliminating the sulphur. But by introducing the method of redistillation and various other improvements, the Ontario refiners have been enabled to place on the market an oil very little, if at all inferior, to the best American. The percentage of illuminating oil now recovered from the crude is also greater than formerly; in 1894 the average was 41.10 per cent., as against 38.67 per cent. in 1892. The Pennsylvania crude is much richer in illuminating oils than the Canadian, but the latter yields a greater proportion, and it is asserted a better quality, of lubricating oils. These form about 12 per cent. of the crude oil, and are produced in many grades, to suit the purposes for which they are intended. All other products, except paraffin, make up 28 per cent.; these include benzine, gasoline, naphtha, vaseline, etc. From the paraffin wax, of which a gallon of crude oil yields about .08 lb., candles and other articles are manufactured. A complete enumeration of the

* Report Royal Commission on Mineral Resources of Ontario, 1890, page 69.

† Composition of the American Sulphur Petroleums, by Prof. C. F. Mabery, pp. 25, 39.

products of evaporation would be about as follows: illuminating oil, 40 per cent.; gas oil, 17 per cent.; tar, 18 per cent.; waste, 10 per cent.; water, 6 per cent.; coke, 9 per cent. In 1894 the total output of crude petroleum was 34,912,360 imperial gallons, valued at $1,094,852, from which there were manufactured 14,349,472 gallons illuminating oil worth $1,337,040; 3,817,181 gallons lubricating oil worth $242,688; 10,632,141 gallons all other oils worth $343,416; 2,754,300 lbs. paraffin wax worth $152,467; and fuel product worth $71,326, The price for Canadian crude showed a steady decline for some years prior to 1894, and in May of that year it reached a minimum of 92 cents per barrel, when a rapid recovery of value set in, and the year 1895 closed with crude oil worth $1.70 per barrel for Petrolia and $1.72 for Oil Springs, and in active demand. The refined article at the same time was worth 10½ cents per gallon in bulk and 13 cents per gallon in barrels f. o. b. at Petrolia.

The business of refining is now mainly centred at Petrolia, where four refineries are in operation, with a capacity more than equal to the entire output of the oil field. The oil is distilled in large sheet-iron retorts. The heat is furnished by a spray of mixed petroleum and steam, injected into the fire chamber below the retort, which is lined with fire-brick. The distillate is carried through tubes immersed in long vats of water. As the different distillates make their appearance at various stages of the process, they are led into different troughs and flow into separate tanks. First, the incondensable gases, gasoline and naphtha, come off; then the illuminating oil; following that, the intermediate and wool oils, and lastly the lubricating oils; while an incrustation of carbonaceous matter or coke is left in the retort, which makes a good fuel. All the grades of the distillation are divided at will, either by stopping the process at various stages or by subsequent redistillation and treatment, into an almost endless variety of lighter and highly combustible intermediate illuminating oils, and also into such solids as vaseline, paraffin, etc. To refine the illuminating oil it is agitated with 2 per cent. sulphuric acid for the purpose of removing the free carbon or tarry materials, which are drawn off below, then after washing it with water, caustic soda and litharge are added. The litharge combines with the sulphur and forms lead sulphide. Flowers of sulphur is then added, which precipitates the lead and other impurities, and the oil is left cleared, but with still a small

proportion of sulphur. To overcome this for the higher grade of oils, redistillation is resorted to, after the litharge and caustic soda have been added and before the flowers of sulphur has been put in. The greater part of the remaining sulphur is thus got rid of, being left in the retort in combination with the lead. The result of this process is an excellent quality of illuminating oil.

The Petrolia Oil Company was incorporated in 1881, with a capital of $40,000. The refinery was established in 1872 by Messrs. Cochrane and Williams, the latter of whom was the pioneer of oil refining in the Petrolia region. Its capacity is 10,000 barrels crude per week. The president of the company is Mr. R. D. Noble. The works of the Imperial Oil Company have a refining capacity of 750,000 barrels of crude per annum. This company was incorporated in 1880, and has a capital of $500,000. Mr. F. A. Fitzgerald is president. The National Oil Company, John Macdonald, president, was organized in 1892 with a capital of $150,000. Its capacity is 4,000 barrels crude per week. The partnership concern of Messrs. Fairbank, Rogers & Co. was formed in 1892, Mr. Fairbank being the largest single producer of crude oil in Canada. The capacity of the works is 2,000 barrels crude per week. The Empire Oil Company of London is also engaged in the refining of Petrolia crude oil. The Canadian Oil Co., whose works were at Sarnia, went into liquidation in September, 1895, and is now extinct. Its refinery was in operation during the months of January, February and March. The products of the refineries are illuminating and lubricating oils of various grades, wool and cylinder oils, paraffin wax, benzine, gasoline, naphtha, binding twine oil, etc. Most of the oil is shipped in barrels, but some of the illuminating is put up in square tin cans. The Petrolia Crude Oil and Tanking Company carries on the business of dealing in and storing crude oil in the underground tanks described below. Its capital is $50,000, and the president of the company is Mr. Charles Jenkins.

The crude oil is collected from the individual wells by waggon tanks and delivered at receiving tanks, whence it is pumped to the refineries. A method of storing the oil has been adopted which is peculiar to this field. Eighteen or twenty feet below the surface is found an impervious blue clay, and excavations are made in this 60 ft. deep and 30 ft. in diameter. A wooden lining extends 30 ft. down into the tank, and the crude oil is kept in this way without danger of fire or leakage. Another

characteristic method of the district is that of raising the oil from the wells. They have all to be pumped, and as the yield is small economy forbids the employment of a separate engine for each well. The "jerker" system of pumping was therefore introduced, and is now in universal use. A 12 h. p. engine operating a horizontal wheel, with which a combination of pump rods is connected, so arranged that their weights about balance one another, suffices to raise the oil from a large number of wells —as many as 90 in some cases.

In the Province of Quebec borings for petroleum have been carried on for a period covering many years in the County of Gaspé. Latterly the work has been done by the Petroleum Oil Trust, Ltd., of London, England, chiefly on the left bank of the York river. A light green oil, said to resemble that of Pennsylvania, has been struck in several of the wells at a depth of about 2,000 ft., and a certain number of barrels have been got out as samples, but no regular work of production has yet been begun. A remarkable and extensive series found along the Athabasca river, in the district of Athabasca, N. W. T., and known as the "tar sands," contains a large proportion of bitumen, and drillings have been undertaken by the Dominion Government to ascertain whether supplies of petroleum exist in the underlying Devonian rocks. No decisive results have yet been reached. Petroleum has also been found in the South Kootenay Pass, B.C.

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## NATURAL GAS.

It is true of natural gas, as of petroleum, that the Province of Ontario is the only portion of the Dominion where it has been found in large quantity, and so far as is known the supply is limited to two fields. One occupies a small area along the north shore of Lake Erie, chiefly in the township of Gosfield South, in the County of Essex, where the gas-bearing formation is supposed to be either a Clinton or a Niagara limestone, and is reached at a depth of 1,050 ft. In this field there are eight producing wells whose capacity is estimated at 40,000,000 to 42,500,000 cubic feet per day. The gas is supplied to the neighboring villages of Kingsville, Ruthven and Leamington, but the main outlet and place of consumption is the city of Detroit, Mich., to which the gas is piped through the intervening distance of 35 miles, and across the bed of the

Jerkers in the Petrolia Oil Field.

Detroit river. The towns of Windsor, Walkerville and Sandwich, on the Canadian side, are also supplied from the same line. The Ontario Natural Gas Company and the Kingsville Natural Gas and Oil Company are the two concerns which operate the wells and control the gas territory in this district. The other gas field is in the counties of Welland and Haldimand; and it is stated to extend from the village of Ridgeway in the former county to the village of Cayuga in the latter, a total length of 35 miles. The field, however, is probably not productive for the whole of the length. The principal gas-bearing rock is the Medina sandstone at a depth of about 850 ft.; but west of the Welland canal the supply seems to come from the overlying Clinton limestone at a depth of about 700 ft. The owners of wells in Cayuga, Dunnville, Port Colborne and Humberstone village supply the needs of their respective localities, but the main producers of gas are the Provincial Natural Gas Company and the Erie Natural Gas Company, who deliver nearly the whole of the output of their wells in the townships of Bertie and Humberstone to the city of Buffalo, N. Y. The length of the former company's pipe line from the centre of their gas field is 14 miles, and in 1894 the delivery of gas to Buffalo was at the rate of 4,600,000 cubic feet per day. The Welland gas field has been in operation for nearly six years, and under the continuous demand upon it is giving signs of approaching exhaustion, the rock pressure, which stood originally at about 570 lb., having fallen to one-fifth of that amount, or less. Gas began to be delivered at Detroit from the Essex field early in 1895, and the effects of the steady delivery of large quantities of gas has not yet had time to be fully felt. There are grounds for supposing that notwithstanding the limited area covered by the wells in Essex, the field is really of large extent, and perhaps underlies a portion of the bed of Lake Erie. The total output of natural gas in Ontario in 1893 was 2,342,000,000 cubic feet, valued at $238,200; in 1894 it had fallen to 1,653,000,000 cubic feet, worth $204,179. The bulk of the product in both years was from the Welland gas field.

Natural gas is found in greater or smaller quantities wherever petroleum is found, but the former often occurs where the latter is present in small quantity, or even is wholly absent. The Trenton limestone, the great natural-gas bearing formation of Ohio, underlies a large part of southern Ontario and Quebec, and in many places where it has been reached by borings in the former province small flows of gas have been

struck, but no large or continuous yield has yet been obtained from it. In the counties of Kent and Elgin, in Ontario, gas is quite commonly found in the drift above the bed rock, but the quantity is small and soon exhausted. A deep well is now being sunk at Ridgetown, in the former county, where much surface gas has been got, the intention being to strike the Clinton formation, which it is hoped will prove to be productive of gas here as well as in Welland county. Small flows have been obtained from the Trenton at St. Gregoire and elsewhere in Quebec, and it is regarded as probable that its exploitation at other points would lead to further discoveries. In several of the other Provinces of the Dominion and in the Northwest Territories natural gas has been found, but so far the discoveries have not seemed of sufficient promise, or have been too far from means of utilization, to warrant large expenditures of money in developing them.

The conditions which must be present in a petroleum or gas-bearing formation to constitute a productive field are (1) sufficient porosity to afford storage accommodation for the oil or gas, whether generated in the formation itself or in underlying strata, (2) continuity of the beds and an absence of faults or fissures through which the oil or gas might escape, and (3) an impervious covering of shale or clay to confine the product within the limits of the formation. The strata must be unaltered and sedimentary in character, and the localities most likely to prove reservoirs of gas or oil are the anticlinals, or dome-like configurations, usually present in fields of large supply. As to the origin of petroleum and natural gas various theories have been propounded, though all authorities agree in assigning them, at least for the most part, a common source. One is that they are of purely inorganic origin, and are formed by the action of water on heated carbides of the metals in the interior of the earth, but the prevalent opinion is that they are the result of the decomposition of animal and vegetable remains enclosed within the rocks. Under the former view, oil and gas are in continuous process of production, and we may hope for a constant and almost unlimited supply; under the latter, the quantity of both is practically fixed, and no more can be looked for from a field than is contained within it when first opened. The partial, and in some cases, total exhaustion of oil and gas fields in the United States and elsewhere seems to point to the conclusion that, like mineral deposits in general, the accumulations of petroleum and natural gas are already complete, and are therefore in the strictest sense limited and exhaustible.

### Duty.

Illuminating oils, composed wholly or in part of the products of petroleum, coal, shale, or lignite, costing more than 30 cents per gallon, 25%; lubricating oils composed wholly or in part of petroleum, and costing less than 25 cents per gallon, 6 cents per gallon; all other lubricating oils, N.E.S., 25%.

### Production.

| Product. | 1893. Quantity. | 1893. Value. | 1894. Quantity. | 1894. Value. |
|---|---|---|---|---|
| Petroleum —Imp. Gal. | 34,055,000 | ..... | 34,912,360 | ..... |
| Illuminating Oil. " | 13,322,320 | $1,372,209 | 14,349,472 | $1,337,040 |
| Lubricating Oil. " | 4,239,847 | 277,500 | 3,817,181 | 242,688 |
| Other Oils... " | 11,220,705 | 323,156 | 10,632,141 | 343,416 |
| Paraffin Wax, lbs..... | 2,250,000 | 143,325 | 2,754,300 | 152,467 |
| Fuel Product..... | ..... | 72,500 | ..... | 71,326 |

### Average Price of Crude Oil on the Petrolia Oil Exchange.

| | | | |
|---|---|---|---|
| 1886..... | 88·68 per barrel. | 1891..... | 133·77 per barrel. |
| 1887 ..... | 78 " | 1892..... | 126·50 " |
| 1888..... | 103·84 " | 1893..... | 110·25 " |
| 1889..... | 95·54 " | 1894..... | 101·50 " |
| 1890 ..... | 117·86 " | 1895..... | 140 " |

### Canadian Petroleum and Naptha Inspected and Corresponding Quantities of Crude Oil, 1881-1893.

| Year. | Refined Oils. | Crude equivalent calculated. |
|---|---|---|
| | Imp. galls. | Imp. galls. |
| 1881..... | 6,406,783 | 12,813,566 |
| 1882..... | 5,910,787 | 13,134,993 |
| 1883..... | 6,970,550 | 15,490,111 |
| 1884..... | 7,656,011 | 19,140,027 |
| 1885..... | 7,661,617 | 19,154,042 |
| 1886..... | 8,149,472 | 21,445,979 |
| 1887..... | 8,243,962 | 21,694,637 |
| 1888..... | 9,545,895 | 25,120,776 |
| 1889..... | 9,462,834 | 24,902,195 |
| 1890..... | 10,121,210 | 26,634,763 |
| 1891..... | 10,270,827 | 27,028,492 |
| 1892..... | 10,238,426 | 26,943,227 |
| 1893..... | 10,683,806 | 28,115,278 |
| 1894..... | 10,825,350 | 28,487,763 |

## BERTIE NATURAL GAS COMPANY.

Incorporated 21st February, 1891. Authorized Capital, $8,000, of which to date about $4,000 has been paid up.

**Directors:**

H. N. Hibbard,

B. M. Disher, | I. L. Pound,
John Young, | A. H. Kilman.

**Head Office: A. H. Kilman, Sec.-Treas., Ridgeway, Ont.**

The operations of this company are at the village of Ridgeway, on the Buffalo and Goderich line of the Grand Trunk Railway. One well 870 ft. deep; pipe line laid for about two miles; product entirely consumed in the village for light, heat and motive power. The first gas was found in the Clinton limestone at 725 ft.; the second in red Medina sandstone at 785 ft.; but the best flow was obtained at 840 to 850 ft. in the white Medina. A 3 inch pipe has been put down to the bottom of the well, through which the gas from the second and third horizons is delivered to the service pipe.

In 1893 a second well was put down. It is located about half a mile northeast of No. 1 well. The formations passed through were very similar to those pierced in boring the first well, the chief difference being that corresponding strata were found at from 10 to 15 ft. nearer the surface, due to the southerly dip of the rock. The product of No. 2 is estimated at about half that of No. 1; that is to say, nearly 250,000 cubic feet in 24 hours. This well is now piped to the regulating station, and the gas from either well or from both may be used at will. This gas is used for local purposes only.

Reporting 1st Jan., 1896, the Secretary writes:—"The product of gas from these two wells is yet sufficient to supply the village, though a decrease of pressure is noticeable—not, however, running so low as to allow the water to enter or to necessitate 'blowing off.' The gas is used economically and is indeed a boon to the village. About 120 houses, stores, hotels, etc., are supplied with fuel from the two wells. The Standard Oil Company—controlling the gas field here—pipe the product to Buffalo. Our little local company is struggling to save for our own people a share of the vanishing luxury—natural gas. The output of great wells around us goes by our village at high pressure. The effect of the heavy drain begins to show, as during some months our wells have steadily decreased and the water must be 'blown off' at regular intervals to prevent flooding the regulators."

## CROWN WAREHOUSING CO., Ltd.

Incorporated 1885. Authorized Capital, $50,000, in shares of $100. Paid up Capital, $33,000.

**Directors:**

R. Morris, *President*,

John Noble, *Vice-President*, | Robert D. Noble.

**Head Office: Stafford D. Noble, Secretary, Petrolia, Ont.**
**John Josh, Superintendent.**

This company operates 16 wells at Petrolia, and a similar number at Oil Springs, Ontario, producing about 375 barrels per month. Length of pipe lines, 15 miles. Receiving stations at Petrolia and Oil Springs, having a storage capacity of 50,000 barrels of underground tankage for holding crude oil.

Imperial Oil Co. Stills at Petrolia, Ont.

## DUNNVILLE NATURAL GAS CO.

Incorporated 1891. Authorized Capital, $20,000, in 600 shares of a value of $25 each.

**Directors:**

F. J. Ramsay, *President*,

J. Brown, Dr. G. A. McCallum, | J. Taylor, A. Boyle, T. Armour, | J. Carmody, J. Mahle, L. A. Congdon. | W. F. Haskins, W. D. Swayze,

**Head Office: Louis A. Congdon, Secretary, Dunnville, Haldimand Co., Ont.**

Formed to bore and drill for natural gas, and supplying the same in the town of Dunnville, Haldimand Co., Province of Ontario. The Secretary writes that at date eight wells have been sunk in the village of Dunnville, yielding approximately about 400,000 ft. of gas per day. The first show of gas was found in the Clinton formation at 612 ft., and this bed yields about one-fifth of the total flow. The second flow was obtained in the white Medina sandstone, between 740 and 752 ft., but the strongest flow came from 747 ft. The boring was continued in the red shale so that it might serve as a drain or pocket to receive any fragment of sand or other rock which might fall into it. When the well was finished the gas showed a pressure of 335 lbs., and the yield was estimated at 150,000 to 200,000 cubic ft. per day, measured with an open flow. A second well was commenced immediately after on the left bank of the Grand river, distant about a mile from the first and bored to a depth of 780 ft. A third and fourth well were afterwards put down. At last report six wells had been completed and the seventh was down about 100 ft. The flow in the fifth and sixth wells was similar to No. I. and larger than either No. II., III. or IV. The well pressure has decreased from 335 lbs. to 250 lbs. The product is consumed for fuel in 100 cooking stoves and about the same number of heating appliances, and perhaps 50 lamps or jets. Two miles of pipe line owned. Writing under date of 26th January, 1896, the Secretary says: "The rock pressure does not exceed 200 pounds, and volume of flow is gradually decreasing, being now about 50 per cent. less than three years ago."

## FAIRBANKS, ROGERS & CO.

Organized July, 1892. Capital invested at date of last report, $50,000.

**Managing Owner: J. H. Fairbanks, Petrolia.**

Carry on the business of oil refiners at Petrolia, Ont. 20 persons employed. The annual capacity of the works may be stated to be as follows:—

| | |
|---|---|
| Crude oil (barrels) | 75,000 |
| Illuminating oils (galls) | 1,000,000 |
| Benzine and naphtha (galls) | 150,000 |
| Paraffin oils (galls) | 130,000 |
| Lubricating oils, gas, oil and tar (barrels) | 30,000 |
| Paraffin wax (lbs) | 170,000 |

## IMPERIAL OIL CO.

Incorporated May, 1880. Authorized Capital, $500,000, in shares of $100.

**Directors:**

F. A. Fitzgerald, *President.*

| | |
|---|---|
| J. L. Englehart. | Frank Smith. |
| T. H. Smallman. | Frank Ward. |
| H. Waterman. | T. D. Hodgens. |

**Head Office: Wm. Pratt, Secretary, Petrolia.**

Probably the most important oil refining company in Canada, but no statistics of production obtainable for publication.

## KINGSVILLE NATURAL GAS AND OIL CO.

Incorporated 30th October, 1890. Authorized Capital, $43,740, all subscribed and one-ninth paid up. Shares, $20 each.

**Directors:**

Dr. S. A. King, *President.*

| | |
|---|---|
| Jas. Brown, *Vice-President.* | George Jasperson. |
| Curtis Green. | Sol. Wigle. |

Dr. Allworth, *Treasurer.*

**Head Office: Jas. W. King, Secretary, Kingsville, Ont.**

This company was first known as the Kingsville Citizens' Natural Gas Oil Association. Four wells have been put down at the village of Kingsville, Ont., the average depth being 1,035 ft. Writing under date of 2nd February, 1892, the Secretary reports: "We are supplying the village of Ruthven, a small place four miles east of us, and the line has been extended to the west, until at present we have upwards of ten miles of pipe line, with five reducing stations. The pipe lines vary from 1 to 4 inches. Our main high pressure line to Kingsville is 3 inches to the reducing station. After leaving the station the main low pressure line is 4 inches, from which different sized lines branch. In the village of Ruthven we carry from 1 to 1½ pounds pressure. In Kingsville we carry from 1 to 2 pounds. We have about 350 cook stoves attached, 175 heating stoves, 25 house furnaces, besides open grates, lights, etc. Then in addition to this we supply gas to the woollen mill, grist mill, sash and door factories, turning factory, grain elevator, the Mettawas summer resort, fruit drying establishment, the churches, halls, lodge rooms and many other places. It also furnishes the fuel for burning lime, the stone for which is brought here from Pelee Island." Reporting on 13th January, 1896, the Secretary writes: "We have added to our list of consumers about 50 stoves, the South Essex preserving factory, a basket factory, and a foundry. The supply at date is entirely taken from one well which has been in use for over five years, and the pressure shows no sign of diminution, notwithstanding there are two 8 inch lines taking gas out of the field supplying Walkerville, Windsor and Detroit.

Imperial Oil Co.—Oil Wells and Refinery, at Petrolea, Ont.

## MUTUAL NATURAL GAS CO. OF PORT COLBORNE, Ltd.

Incorporated 1891. Authorized Capital, $20,000, in 200 shares of $100 each, of which $14,000 has been subscribed and paid.

**Directors:**

DeWitt Carter, *President.* | J. A. Ramsden, *Vice-President.*
J. H. Smith. | Henry Cronmiller. | J. C. Jordan.

**Head Office: Frank D. Noble, Secretary, Port Colborne, Ont.**

Formed to drill wells for natural gas, oil and other mineral products, to construct pipe lines, etc. The company owns 25 acres, situated on the west side of the Welland Canal, in the County of Welland, Province of Ontario, and to date has drilled five wells, each of a depth of 830 ft., yielding a daily flow of about 1,500,000 cubic feet of gas. It supplies the village of Port Colborne, the number of consumers being about 285. Among other industrial consumers are the Ontario Silver Company's works at Humberstone, where the gas is used for annealing and the estimated daily consumption is 50,000 cubic feet in winter and 25,000 to 30,000 cubic feet in summer, Neff Bros' foundry and machine shop, Morningstar's grist mills, and Grand Trunk Railway water pumping station. The value of machinery plant and buildings owned by this company is estimated at $27,000.

## NATIONAL OIL CO., Ltd.

Incorporated 15th July, 1892. Authorized Capital, $150,000, in shares of $100.00. Invested Capital, $110,000.

**Directors:**

James Fiddes. | John McDonald. | W. E. Langford.

**Head Office: John McDonald, President, Petrolia, Ont.**
**W. E. Langford, Secretary.**

Engaged in the business of oil refiners at Petrolia, Ont. Eighteen persons employed.

ANNUAL CAPACITY.

| | |
|---|---|
| Illuminating oils (gallons) | 2,520,000 |
| Benzine and naphtha " | 478,000 |
| Paraffin oils " | 315,000 |
| Lubricating oils and tar | 2,961,000 |
| Paraffin wax (lbs.) | 1,134,000 |

ANNUAL CONSUMPTION OF CHEMICALS.

| | | | |
|---|---|---|---|
| Sulphuric acid | 705,004 | lbs., valued at | $9,519.16 |
| Litharge | 154,966 | " " | 4,617.09 |
| Caustic soda | 37,465 | " " | 859.79 |
| Sulphur | 16,384 | " " | 267.46 |

## NATURAL GAS AND OIL CO. OF ONTARIO, (Ltd.)

Incorporated 1894. Authorized Capital, $500,000 in shares of $50.00.

**Directors :**

Hiram Walker, Detroit.

S. A. King, Kingsville, Ont. | C. M. Walker, Walkerville, Ont.
Thos. Reid, Walkerville, Ont. | Hiram A. Walker, Walkerville, Ont.

**Head Office : S. T. Copus, Secretary, Windsor, Ont.**

Formed to acquire in the County of Essex lands or interest in which to sink wells for natural gas, oil and other minerals. The company has about twenty producing wells, from which the town of Walkerville, City of Windsor, Ont., and the City of Detroit, Mich., are supplied ; the plants being fed by two lines, one an eight inch extending 33 miles, and another, a telescope of eight and ten inches.

## PELEE GAS AND OIL CO. OF ONTARIO.

Incorporated 1895. Authorized Capital, $30,000.

**Directors :**

George Jasperson. | S. L. McKay. | Herman Dey. | W. A. Smith.
H. Mosher. | W. A. Nelson. | Bon. Jasperson. | A. Wigle.

**Head Office : Kingsville, Ont.**

Formed to acquire and work gas and oil wells in the Township of Pelee and at the village of Kingsville in the County of Essex, and in the County of Essex, Province of Ontario. Being organized.

## PETROLIA CRUDE OIL AND TANKING CO.

Incorporated 1874. Capital stock, $50,000, divided into 1,000 shares of $50 each, of which, to date $49,376.36 has been subscribed and paid up.

**Directors :**

Chas. Jenkins, *President.*

J. D. Noble. | J. H. Fairbank.
R. D. Noble. | R. I. Bradley.
R. Morris. | John Fraser.

**Head Office : Chas. Jenkins, President, Petrolia, Ont.**

This company owns and operates 31 wells, situate on Lot 12 in the 12th Concession of Enniskillen, Lot 12 in the 11th Concession, Petrolia, and Lot 16 in 2nd Concession Oil Springs, Ont. Average depth, 470 ft.; average daily capacity of each, one-half to three-fourths of a barrel. The company has 50 tanks, with a storing capacity of about 300,000 barrels. Receiving stations at Oil Springs, Marthaville, and three at Petrolia ; owns 30 miles of pipe line. It has an oil refinery capable of turning out from seven to eight hundred barrels of refined oil weekly.

The following statistics have heen kindly furnished by the secretary :

| | Bbls. Received. | Bbls. Shipped. |
|---|---|---|
| 1884 | | |
| 1885 | 255,768 | 184,214 |
| 1886 | 299,407 | 312,554 |
| 1887 | 255,022 | 240,134 |
| 1888 | 244,979 | 360,309 |
| 1889 | 285,013 | 240,950 |
| 1890 | 298,806 | 341,346 |
| 1891 | 288,330 | 333,052 |
| 1892 | 294,222 | 311,215 |
| 1893 | 309,898 | 296,796 |
| 1894 | 273,966 | 274,352 |
| 1895 | 238,055 | 257,609 |
| | 240,939 | 247,702 |

Estimated value of machinery and plant, etc., $100,000. Seventeen men and boys employed.

## PRODUCERS' TANKING CO.

Incorporated 1884. Capital Stock, 50,000, divided into 500 shares of $100 each, of which, to date, $25,328.63 have been subscribed and paid up.

**Directors :**

W. H. Hammond, *President.*

John Kerr. | J. H. Fairbank. | Jas. McCort. | John Walker. | D. Trotter. | H. Canneff. | A. T. Gurt. | John Macalpine

**Head Office : W. H. Hammond, Secretary, Petrolia, Ont.**

This company owns and operates some nineteen oil wells at Petrolia, in the Province of Ontario ; average depth of each, 470 ft.; average yearly production, about 2,000 bbls. The company also carries on the business of storers for the other producers ; capacity of tanks, about 82,000 bbls. It also owns a pipe line extending for a distance of seven miles around the corporation. Machinery plant includes Northey, McKee and Marwick pumps, engine and boiler, etc. Six men and boys employed.

## PETROLIA OIL CO.

Incorporated 31st January, 1881. Authorized Capital, $40,000, divided into 1,000 shares of a value of $40 each, of which $20,040 has been subscribed and paid up.

**Directors :**

Robert D. Noble.

John D. Noble. | Charles Jenkins.

**Head Office : Robert D. Noble, President, Petrolia, Ont.**

This company owns 22 acres of land situate in the township of Enniskillen, in the County of Lambton, in the Province of Ontario. It also operates 48 wells, each of an average depth of 460 feet, and yielding in the aggregate six barrels of crude oil per diem. The company also manufactures the celebrated "Jacques Cartier" brand of refined oil ; also refined benzine, gasoline and lubricating oils at Petrolia, Ont. ; and they have made arrangements for barreling oil at Ottawa and Montreal for distribution in those districts. They also do a large lubricating oil business. Fourteen men employed. Estimated value of machinery, plant, building, etc., $13,000.

**PETROLIA OIL CO.**—Continued

PRODUCTION OF CRUDE OIL TO DATE.

| | | | |
|---|---|---|---|
| 1883 | 3,314 Bbls. | 1890 | 1,051 Bbls. |
| 1884 | 2,518 " | 1891 | 1,346 " |
| 1885 | 1,860 " | 1892 | 930 " |
| 1886 | 2,090 " | 1893 | 918 " |
| 1887 | 1,653 " | 1894 | 876 " |
| 1888 | 1,626 " | 1895 | 1,871 " |
| 1889 | 1,723 " | | |

*Managing Director :* John D. Noble, Petrolia, Ont.

## PETROLEUM OIL TRUST, Ltd.

Registered 20th August, 1891. Authorized Capital, £430,000 ; £330,000 in ordinary shares of £1, and £100,000 in preference shares of £10, ranking first for dividends of 7 per cent. per annum, with the option to holders of converting into ordinary shares at any time within three years on six months' notice. Of the ordinary capital, £345,940 has been allotted and paid up, £314,988 having been issued to the vendors, and of the preference capital, £39,490 has been subscribed and called up. The preference dividend is guaranteed for three years by the Charing Cross Bank, and has been regularly paid in June and December.

**Directors :**

Lord Berwick, *Chairman.*

J. H. Atkins. | A. W. Carpenter. | J. Foley. | P. A. Hutchison.

**Head Office : E. S. Peach, Secretary, 22 Henrietta Street, London, W.C.**

**Canadian Office : J. Foley, New York Life Building, Montreal.**

**Works and Wells : C. B. K. Carpenter, Supt., Gaspe, Que.**

Formed to acquire properties in the Gaspé district and elsewhere in the Province of Quebec, covering an area of 40,137 acres freehold, with mining rights over 10,220 acres in addition. At 10th January, 1896, the company had 26 derricks, some of the wells being put down to a considerable depth. A number of the wells are reported to be pumping oil of a very superior quality. Ten new derricks have recently been constructed and are now drilling. The oil is found at depths varying from 1,300 to 3,000 ft., and is of a light green colour, perfectly odorless.

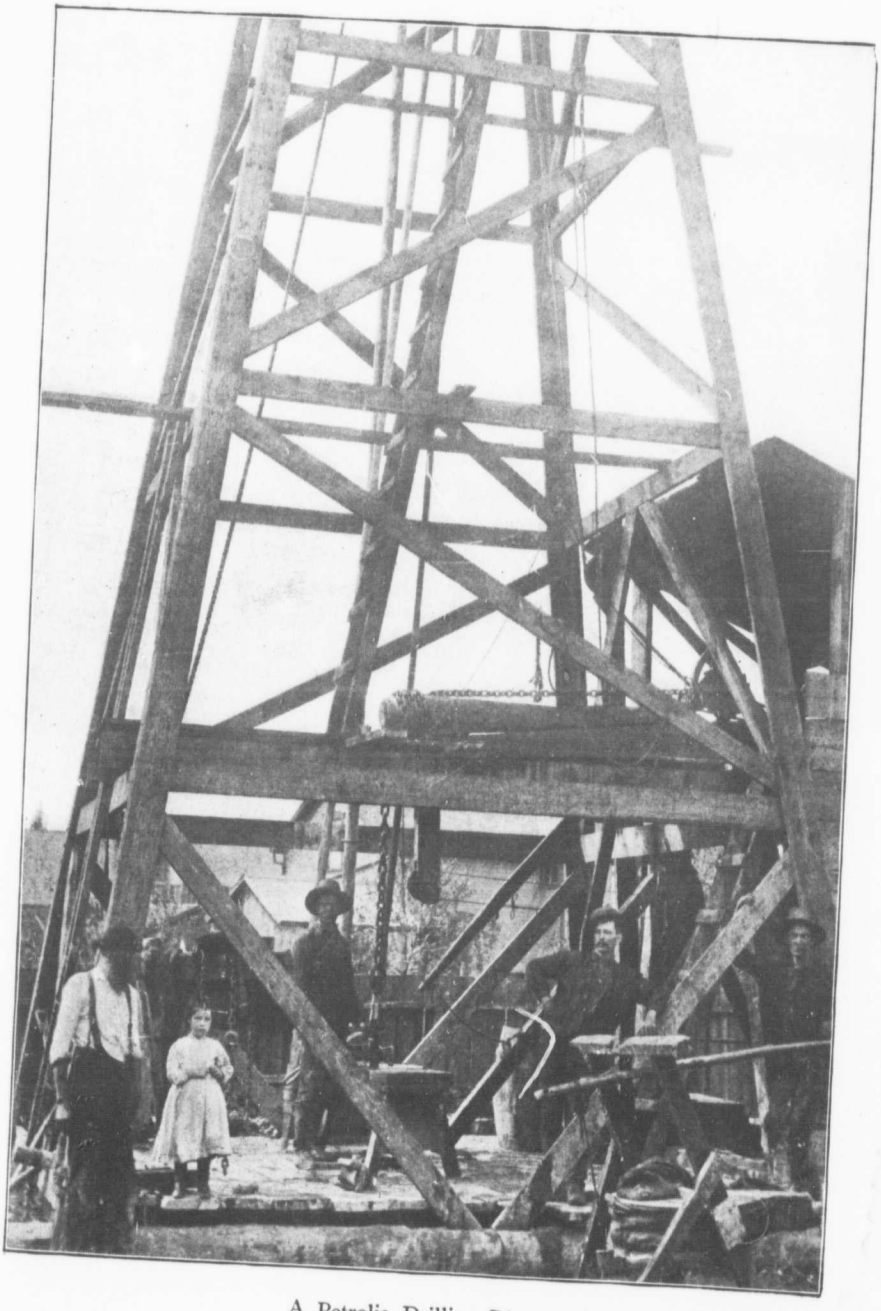
## PROVINCIAL NATURAL GAS AND FUEL CO. OF ONT., Ltd.

Incorporated 1890, under letters patent from the Federal Government of Canada. Authorized Capital, $510,000, in shares of $85.00 each. In March, 1892, there was a quarterly dividend of 1½ per cent., the remaining quarters yielding one per cent. each. In 1893 one per cent. was paid every quarter, and the same in 1894, 1895, and 1st quarter of 1896.

**Directors :**

Hon. Peter McLaren, Perth, Ont., *President.*

N. A. Coste, Amherstburg. | D. McGillivray, Port Colborne.
Daniel O'Day, New York. | Samuel, Rogers, Toronto.
C. N. Payne, Oil City, Pa. | E. Strong, Oil City, Pa.



A Petrolia Drilling Rig.

**Head Office : D. W. Vaughan, Sec.-Treas., 53 Coal and Iron Exchange Bdg., Buffalo, N.Y. E. M. Coste, M.E,, Manager.**

The company now holds under lease a property containing about 20,000 acres in the County of Welland. Total wells drilled 119, of which 71 are connected to the two 8 inch pipe lines to Buffalo, N.Y., Fort Erie, and Bridgeburg, Ont. Pump station erected 1893 in the gas field near Sherkstown, Ont., and used in 1894 ; discontinued last year and not in use at date. The plant consists of 100 h. p. boilers and of three gas compressors, two Norwalk 26x30 inch, and one Rand 24x30 inch. Pump and boiler houses are lighted by electricity from company's dynamo, and natural gas used under boilers. The company at 1st January, 1896, owned 125 miles of pipe lines of a size varying 8 to 1 inch. In Buffalo the gas is sold to the Buffalo Natural Gas Fuel Co., who in turn sell it to private consumers in the city at the rate of 25 cts. a thousand. This Buffalo company has been selling natural gas in Buffalo since 1886, when they completed a line 90 miles long from several fields located in Pennsylvania. Both the Canadian and Pennsylvania lines are now furnishing gas simply with the natural rock pressure of the gas.

## SAMUEL ROGERS & COMPANY.

Private Company. Organized 1878.

**Directors :**

Joseph P. Rogers. | Samuel Rogers. | Albert S. Rogers.

**Head Office : 30 Front Street, Toronto.**

Conducts a manufacturing and jobbing business at Toronto, the premises being known as the Queen City Oil Works, and is associated with a group of firms operating in the Petrolia and Oil Springs fields. The trade of these joint concerns is stated to be about 85,000 barrels of refined oils, Canadian and American ; and 50,000 barrels of lubricating and other oils. The firm are partners in the refinery of Fairbank, Rogers & Co., of Petrolia, and market all its products. Other associate firms are : The Rogers & Morris Co., Ltd., Ottawa ; Rogers, Robertson & Co., Montreal ; Hamilton Oil Co., Hamilton.

## STANDARD OIL AND GAS CO. OF ESSEX, Ltd.

Incorporated 1894. Authorized Capital, $400,000, in shares of $100.

**Directors :**

C. Currie. | J. B. Moore. | F. P. Byrne. | E. E. Harris.
A. H. Clarke.

**Head Office : A. H. Clarke, Secretary, Windsor, Ont.**

Formed to drill and operate for petroleum, oil and gas, etc., the operations to be carried on in the Counties of Essex and Kent, in the Province of Ontario. The company has drilled five gas wells and two more are in progress. Of these, four were good powerful wells. The fifth produced a light flow of gas and was distant some miles from the developed territory. The company proposes to continue operations and develop the resources of the property.

## STRATHROY PETROLEUM CO., Ltd.

Incorporated 1894. Authorized Capital, $90,000, in shares of $100.

**Directors:**

G. A. McGillivray. | Dr. W. B. Lindsay, *President.* | Chas. Grist.

**Head Office: Chas. Grist, Secretary-Treasurer, Strathroy, Ont.**

Owns and operates about 100 oil wells, averaging in depth about 500 ft., in the Petrolia district, Lambton County, Ontario. Small force employed.

## TILBURY PENINSULAR OIL AND GAS CO., Ltd.

Incorporated 1895. Authorized Capital, $20,000, in shares of $50.

**Directors:**

W. C. Crawford. | C. C. Kippen. | F. M. Scarff. | P. E. Gurd. | N. Mills.

**Head Office: Tilbury Centre, Ont.**

Formed to search for oil, natural gas, etc., in the counties of Kent and Essex in Ontario. Being organized at date of report.

# COAL MINING AND TRADE.

The coal areas of the Dominion are estimated at 97,200 square miles, not including areas known, but as yet undeveloped, in the far north.

There are, first the coal fields of Nova Scotia and New Brunswick; second, those of Manitoba and the Northwest Territory; third, those of the Province of British Columbia.

## Nova Scotia.

The coal areas of this province are estimated to cover 635 square miles, and so far as they are at present worked, are divided into the Cape Breton, Pictou and Cumberland districts.

*The Cape Breton Coal Field*—The coal fields of Cape Breton comprise four large areas, (1) on the coast east and west of Sydney harbor, (2) in Inverness County, between Margaree harbor and Port Hood, including important mines at Broad Cove, (3) a basin on River Inhabitants, near Glendale, and (4) a tract in Richmond County, near the mouth of River Inhabitants. But as all the mines at present worked, producing about one million tons of coal annually, lie within the Sydney coal field, this alone will be referred to.

The land area occupied by coal bearing rocks in the Sydney coal field, has been estimated at two hundred square miles, while an immense sub-marine area contains large seams of coal in workable condition, easily accessible. The rocks are regular and rest everywhere upon the millstone grit, except where brought by a fault against a mountain of Laurentian rocks at New Campbellton at the western edge of the coal field. The largest mining companies are the Dominion Coal Company and the General Mining Association, while smaller outputs of coal are shipped from the Cape Breton colliery, worked in conjunction with a large deposit of the finest dolomite at New Campbellton and from the North Sydney Mining Company at Indian Cove; and during the summer of 1895 important systematic explorations with the diamond drill have been made to test the extent and quality of the lowest seams.

The coal measures have been folded into subordinate basins so as to bring the coal seams to the surface under the most favorable conditions for their extraction and shipment. The whole coast is deeply indented by bays and channels approximately coinciding with the axes of these folds, affording in the sea cliffs numerous natural exposures of the coal seams and accompanying strata, and constituting excellent harbors, one of which, Sydney harbor, situated towards the centre of the district, is one of the finest in the world. During the few months of winter, when the more northerly harbors are closed or obstructed by ice, a railway carries coal from the collieries east of Sydney harbor to the fine winter port of Louisburg.

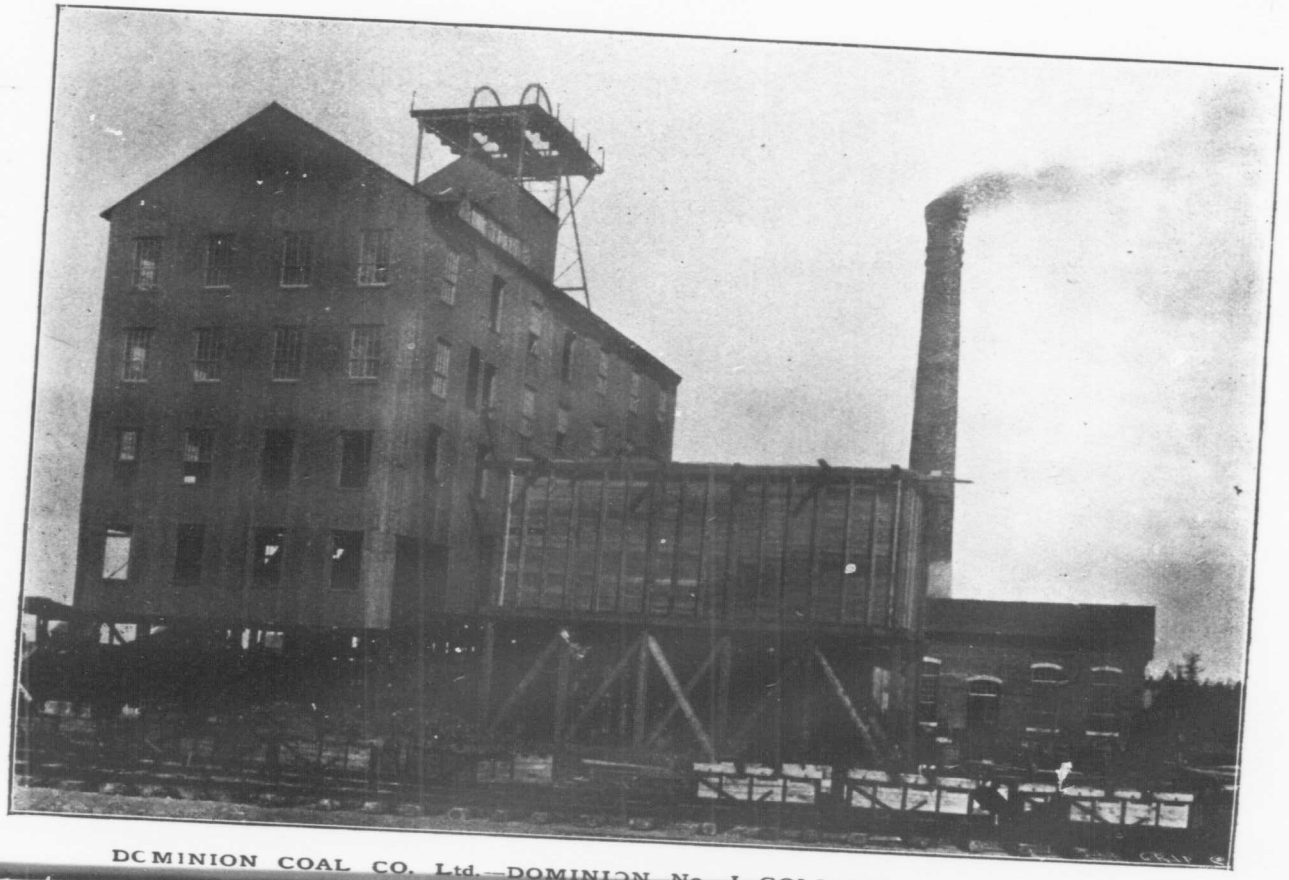
The cliffs are generally from thirty to one hundred feet high, and the country is of a gently rolling character, the highest altitudes seldom exceeding two hundred and fifty feet. Such natural advantages, combined with its highly favorable geographical position, point to this district as probably the most important in the Dominion for the supply of fuel to the numerous steamers navigating the Atlantic.

Taking the average of all the sections, the total number of seams in the productive measures is twenty-four, of which six are three feet or upwards in thickness, and the total average thickness of coal may be stated at forty-six feet. The similarity and persistency of the seams over great areas is very remarkable, although local variations are frequent. There is, therefore, no great uncertainty in regard to the equivalency of the various seams at different points. They generally dip at a very low angle and are little affected by faults and disturbances.

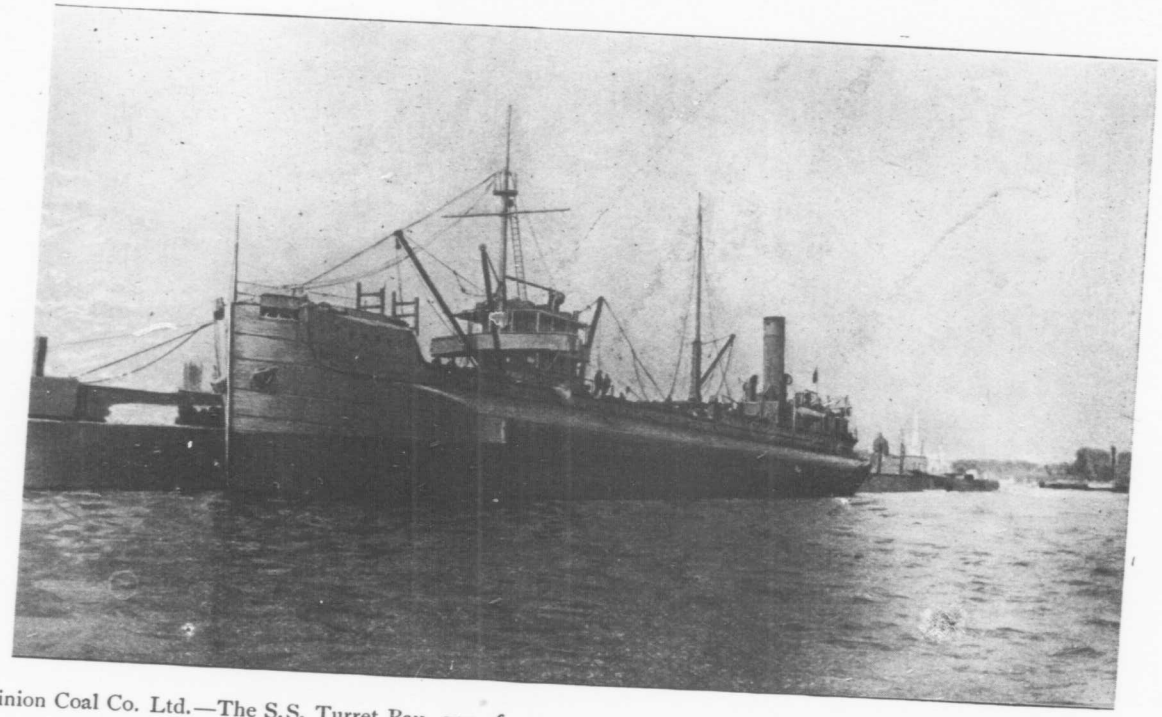
The coal is of the soft, or bituminous variety, with comparatively little diversity in the quality of the different seams, all of which yield a coal exceedingly well adapted for steam and domestic purposes, while that of some of them is specially applicable to the manufacture of gas. Much of it will compare very favorably with the best English coal. As compared with the Pictou coal it is characterized by a greater proportion of combustible matter and a smaller proportion of ash; but on the other hand it usually contains a greater amount of sulphur, although experiments made on a small scale at Ferrona seem to prove that some of the coals will yield a coke as suitable for iron smelting as that made from a mixture of Acadia, Drummond and Springhill coals.

# Coal Mining and Trade.

DOMINION COAL CO. Ltd.—DOMINION No. 1 COLLIERY CAPE BRETON.



DOMINION COAL CO. Ltd.—DOMINION No. 1 COLLIERY CAPE BRETON.



Dominion Coal Co. Ltd.—The S.S. Turret Bay, one of a new type of Coal Steamers employed in the St. Lawrence Trade.

Underclays, charged with roots and innumerable rootlets, occur beneath every coal seam and bed of carbonaceous shale, and their roof-shales are for the most part rich in fossil plants. The productive measures contain also beds of argillaceous and arenaceous shale, usually grey; sandstone, limestone, red and green marl. They are underlaid in descending order by the millstone grit, carboniferous limestone and conglomerate.

*The Pictou Coal Field* is situated in the county of the same name. The seams occur as a long, narrow synclinal about twelve miles in length and four in greatest width, having dips up to 40 degrees. Though small in area, this field contains some of the thickest seams of bituminous coal worked, one measuring 40 ft.

The following analysis will show the general composition of the seams of this district:—

| | |
|---|---|
| Moisture | 1.19 |
| Volatile combustible matter | 29.10 |
| Fixed carbon | 60.63 |
| Ash | 9.34 |

The coals are largely used for steam purposes, for iron working, and an excellent coke is furnished by several of them. Careful attention is directed to ventilation as the seams give off much gas, and the "back balance system of working requires ample air supplies.

The principal operators are the Acadia Coal Co., Ltd., and the Intercolonial Coal Co., Ltd.

*The Cumberland Coal Field*, which is the most westerly of the coal districts of the Province, lies, for the most part, adjacent to Chignecto Bay, the more northerly and westerly of the two arms into which the upper part of the Bay of Fundy is divided.

The coal measures outcrop on the shores of Cumberland basin, run eastward into the land for about eighteen miles and outcrop again before they enter upon the return outcrop, running westward to the sea shore. The northern outcrop has been systematically worked on the shore at the Joggins mines with a present annual output of about 80,000 tons on a seam yielding about 6 ft. of coal. The remainder of this side of the basin has not yet received much attention, but will, as the demand for coal increases, become more fully worked. The principal operations in

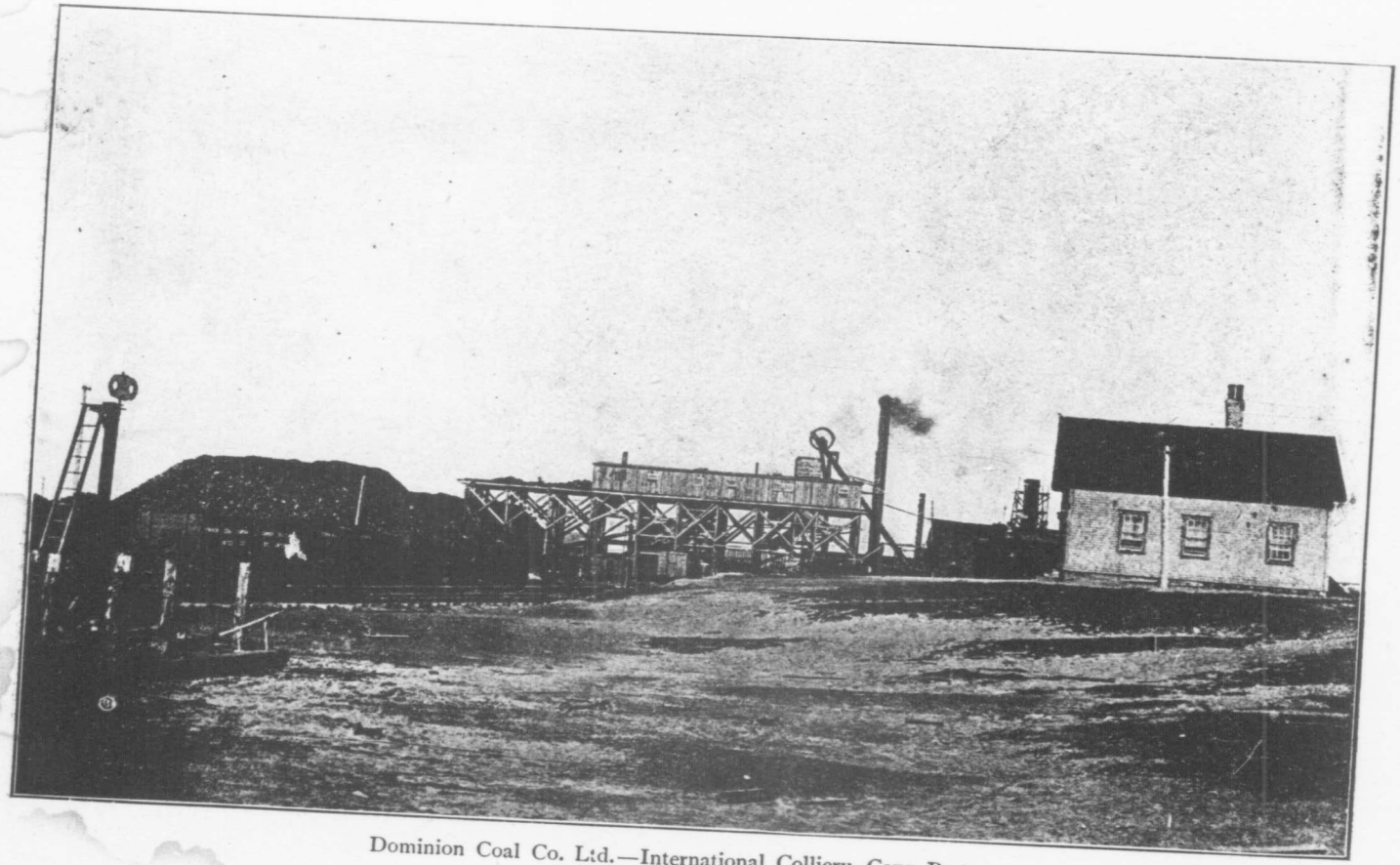
this district are at the apex of the basin; as at Springhill, where the Cumberland Railway & Coal Co. is engaged in mining three valuable seams. The seams dipping at angles of from 10 to 35 degrees, are entered by slopes to a depth of 4,000 ft., and worked by shoots and "balances," and, in the case of the thinner parts of the seams, by long-wall. The extraction of pillars has been carried on systematically and with unusual success. As a certain amount of gas is evolved in these mines, no explosive is used in getting the coal. The ventilation is provided for by blow-down fans with numerous outlets.

The general composition of the coals of this district is about as follows:—

| | |
|---|---|
| Moisture | 1.46 |
| Volatile combustible matter | 33.69 |
| Fixed carbon | 59.35 |
| Ash | 5.50 |

They are very extensively used as a locomotive fuel and for coke and domestic purposes.

*Royalty.*—All the coal belongs to the Government of Nova Scotia and is leased to operators in areas of one square mile for a period of years at a royalty of 10 cents per long ton sold or removed from the mines or used in the manufacture of coke, exemption being made in the case of coal used by the workmen and in colliery consumption. By special legislation the Dominion Coal Co., Ltd., acquired in 1893 a 99 years' lease of a property in Cape Breton containing some eighty square miles at a fixed and unalterable royalty of 12½ cents per ton, the Government stipulating a minimum annual payment on the basis of the largest quantity of coal sold by the collieries prior to their acquisition by the company. During the year ended 30th September, 1895, the revenue from coal royalties received by the Government amounted to $214,647.76, as against $209,330.52 in 1895.



Dominion Coal Co. Ltd.—International Colliery, Cape Breton.

*Colliery Output*—The output and sales of the various collieries for the fiscal years ended 30th September, 1894 and 1895 are given below. The returns for the twelve months will be found in the notices of the operations of the various companies.

| Name of Colliery. | District. | Output. 1894 | Sales. | | |
|---|---|---|---|---|---|
| | | | Round. | Slack. | Run of Mine. |
| Chignecto | Cumberland County. | 450 | 274 | 106 | .. |
| Joggins | " | 91,810 | 64,820 | 16,897 | . |
| Springhill | " | 448,728 | 100,229 | 139,904 | 154,366 |
| Minudie | " | 2,385 | 2,298 | .. | .. |
| Scotia | " | 456 | 456 | .. | .. |
| Acadia | Pictou | 235,923 | 131,466 | 73,796 | .. |
| Drummond | " | 220,069 | 149,057 | 57,720 | .. |
| Dominion | Cape Breton. | 950,683 | 714,051 | 89,462 | 91,178 |
| Sydney | " | 234,672 | 184,396 | 35,686 | .. |
| Broad Cove | " | 181 | 138 | .. | .. |
| Mabou | " | 365 | 326 | .. | .. |
| Cape Breton | " | 14,513 | 11,202 | 1,784 | 130 |
| Total | .. | 2,200,235 | 1,358,713 | 415,355 | 245,674 |

| Name of Colliery. | District. | Output. 1895 | Sales. | | |
|---|---|---|---|---|---|
| | | | Round. | Slack. | Run of Mine. |
| Chignecto | Cumberland | 660 | 474 | 56 | .. |
| Joggins | " | 110,082 | 76,282 | 18,794 | .. |
| River Hebert | " | 2,599 | 1,359 | .. | .. |
| Springhill | " | 381,032 | 74,399 | 128,983 | 120,877 |
| Scotia | " | 996 | 859 | 127 | .. |
| Acadia | Pictou | 206,798 | 113,309 | 60,653 | .. |
| Intercolonial | " | 209,538 | 141,113 | 53,709 | .. |
| Dominion | Cape Breton | 905,671 | 690,648 | 91,228 | 27,342 |
| Sydney | " | 259,608 | 189,220 | 32,676 | .. |
| North Sydney | " | 672 | 227 | .. | .. |
| Cape Breton | " | 10,344 | 8,451 | 243 | .. |
| Broad Cove | " | 1,245 | 328 | .. | .. |
| Total | .. | 2,089,245 | 1,296,669 | 386,469 | 148,219 |

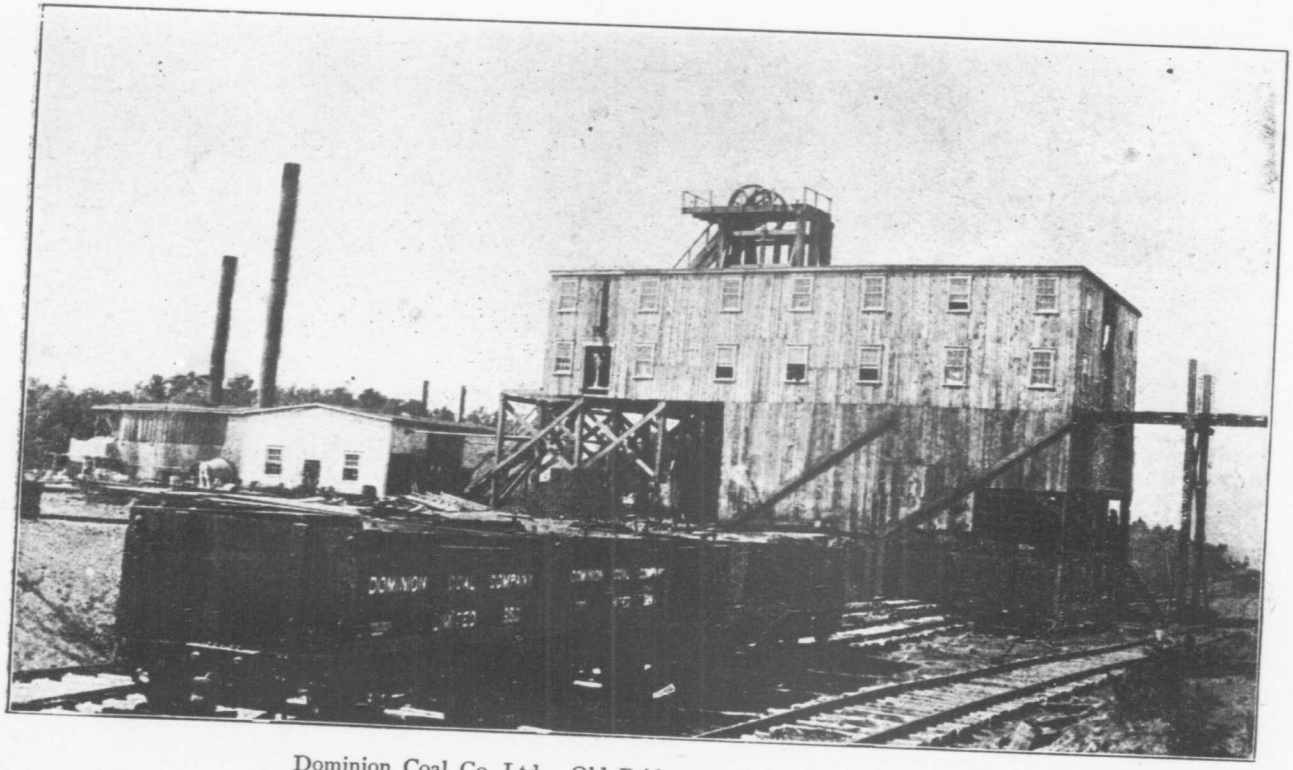
*Prices and Water Freights*—The following is a comparative statement of the prices of Sydney coal at Montreal from the year 1871 :—

| Year. | Rate Freight to Montreal. | Price F. O. B. | Sales, Montreal. | Year. | Rate Freight to Montreal. | Price F. O. B. | Sales, Montreal. |
|---|---|---|---|---|---|---|---|
| 1871 | $2.25 to $2 50 | ..... | $3.90 to $4.35 | 1884 | $1.50 | $1.80 to $1.90 | $3.10 to $3.20 |
| 1872 | 3.50 | $2 00 | 6.75 to 7.00 | 1885 | 1.50 | 1.80 | 2.95 to 3.10 |
| 1873 | 3.50 | 2.50 to $3.00 | 7.00 | 1886 | 1.40 | 1.50 | 2.95 to 3.10 |
| 1874 | 3.50 | 2 00 to 2.50 | 4.50 | 1887 | 1.25 | 1.50 to 1.60 | 2.95 to 3.10 |
| 1875 | 1.50 | 2.00 to 2 25 | 3.75 to 4.00 | 1888 | 1 40 | 1.45 | 3.00 to 3.20 |
| 1876 | 1.50 to $2 00 | 2.00 to 2.25 | 3.50 to 3.75 | 1889 | 1.65 | 1.50 | 3.15 to 3.30 |
| 1877 | 1.50 to 2.00 | 1.80 | 3.50 | 1890 | 1.40 | 1.60 | 3.00 to 3.20 |
| 1878 | 1.40 to 1.50 | 1.25 to 1.40 | 3.25 | 1891 | 1.25 | 1.60 to 1.70 | 3.20 |
| 1879 | 1.50 | 1.25 to 1.40 | 3.25 | 1892 | 1.00 to $1.20 | 1.60 to 1.70 | 3.20 |
| 1880 | 1.50 to 1.75 | 1.25 to 1.40 | 3.25 to 3.50 | 1893 | 1.00 to 1.20 | 1.60 to 1.70 | 3.20 |
| 1881 | 1.50 | 1.50 | 3.50 to 3.75 | 1894 | 1.00 to 1 20 | 1.60 to 1.70 | 3.25 |
| 1882 | 1.50 | 1 60 | 3.75 to 4.00 | 1895 | * .90 to 1.00 | ..... | ..... |
| 1883 | 1.50 | 2.00 | 3.75 to 4.25 | | | | |

In 1873 slack sold at $5.10 per ton. * By tramps; time boats, $1.25.

*Railway Deliveries*—The following table shows the number of tons of coal carried over the Intercolonial Railway from the Nova Scotia collieries to Chaudiere Junction and St. John for points west thereof, and to local stations in each year since the commencement of the trade in 1878-79 :—

| Year. | For the West. | | To Local Stations. | Total. |
|---|---|---|---|---|
| | *Via* Chaudiere. | *Via* St. John. | | |
| 1876-77 | ..... | ..... | 103,420 | 103,420 |
| 1877-78 | ..... | ..... | 97,043 | 97,043 |
| 1878-79 | 300 | ..... | 112,232 | 112,532 |
| 1879-80 | 1,097 | ..... | 135,369 | 136,466 |
| 1880-81 | 6,102 | 4,022 | 174,483 | 184,607 |
| 1881-82 | 18,015 | 11,779 | 218,364 | 248,158 |
| 1882-83 | 12,837 | 22,206 | 227,380 | 262,423 |
| 1883-84 | 22,014 | 19,534 | 252,014 | 293,562 |
| 1884-85 | 133,440 | 1,773 | 213,791 | 349,004 |
| 1885-86 | 171,170 | 21,150 | 215,272 | 407,592 |
| 1886-87 | 192,871 | 27,536 | 233,178 | 453,585 |
| 1887-88 | 183,704 | 36,228 | 309,727 | 529,659 |
| 1888-89 | 160,026 | 27,923 | 338,538 | 526,487 |
| 1889-90 | 164,453 | 25,126 | 366,967 | 556,546 |
| 1890-91 | 113,996 | 39,213 | 344,829 | 498,038 |
| 1891-92 | 35,447 | 5,918 | 392,441 | 433,806 |
| 1892-93 | 136,868 | 3,775 | 402,653 | 543,296 |
| 1893-94 | 102,273 | 8,028 | 367,390 | 478,691 |
| 1894-95 | 67,082 | 7,865 | 310,253 | 385,200 |



Dominion Coal Co. Ltd.—Old Bridgeport Colliery, Cape Breton.

*Exports to United States*—The following table of exports to the United States is taken from the Report of the Department of Mines for 1895 :—

| Years. | Tons. | Duty. | Years. | Tons. | Duty. |
|---|---|---|---|---|---|
| 1850 | 118,173 | 24 ad. | 1873 | 264,760 | 75c. |
| 1851 | 116,274 | " | 1874 | 138,336 | " |
| 1852 | 87,542 | " | 1875 | 89,746 | " |
| 1853 | 120,764 | " | 1776 | 71,634 | " |
| 1854 | 139,125 | Free. | 1877 | 118,216 | " |
| 1855 | 103,222 | " | 1878 | 88,495 | " |
| 1856 | 126,152 | " | 1879 | 51,641 | " |
| 1857 | 123,335 | " | 1880 | 123,423 | " |
| 1858 | 186,743 | " | 1881 | 113,728 | " |
| 1859 | 122,720 | " | 1882 | 99,302 | " |
| 1860 | 149,289 | " | 1883 | 102,755 | " |
| 1861 | 204,457 | " | 1884 | 64,515 | " |
| 1862 | 192,612 | " | 1885 | 34,483 | " |
| 1863 | 282,775 | " | 1886 | 66,003 | " |
| 1864 | 347,594 | " | 1887 | 73,892 | " |
| 1865 | 465,194 | " | 1888 | 30,198 | " |
| 1866 | 404,252 | " | 1889 | 29,986 | " |
| 1867 | 338,492 | $1.25 | 1890 | 50,854 | " |
| 1868 | 228,132 | " | 1891 | 25,431 | " |
| 1869 | 257,485 | " | 1892 | 13,883 | " |
| 1870 | 168,180 | " | *1893 | 16,099 | " |
| 1871 | 165,431 | " | †1894 | 79,837 | 40c. |
| 1872 | 154,092 | 75c. | 1895 | 73,097 | " |

NOTE—The quantities given for the years 1852 to 1872 are on the authority of the Board of Trade, Philadelphia, and are probably under-estimated.
*Nine months only.
†After August 1st, 1894, duty on Round Coal 40 cents, on Culm or Slack, 15 cents.
Fiscal year begins Oct. 1st and ends Sept. 30th.

*Markets*—The markets found for the coal under the head of sales have been :

| Markets. | 1890. | 1891. | 1892. | 1893 | 1894. | 1895. |
|---|---|---|---|---|---|---|
| Nova Scotia | 601,946 | 639,737 | 623,978 | 680,000 | 671,883 | 633,041 |
| Quebec | 751,931 | 775,286 | 746,037 | 863,744 | 877,743 | 740,098 |
| New Brunswick | 224,786 | 229,315 | 214,550 | 260,266 | 221,844 | 228,525 |
| Newfoundland | 96,133 | 108,617 | 94,999 | 77,651 | 97,378 | 63,232 |
| Prince E. Island | 55,843 | 67,473 | 56,638 | 57,593 | 63,734 | 81,492 |
| United States | 50,754 | 25,431 | 13,883 | 25,096 | 79,837 | 73,097 |
| West Indies | 4,708 | 4,086 | 2,849 | 1,508 | 5,526 | 11,872 |
| Other Countries | .... | .... | .... | 33 | 1,797 | |
| | 1,786,101 | 1,849,945 | 1,752,934 | 1,965,891 | 2,019,742 | 1,831,357 |

*Water and Rail Deliveries to the Province of Quebec.*—The following figures are for the calendar years :

| — | 1894 | 1895 | Increase | Decrease |
|---|---|---|---|---|
| | Tons. | Tons. | Tons. | Tons. |
| *Nova Scotia Coal by Water :* | | | | |
| Dominion Coal Co | 553,781 | 459,124 | ..... | 94,657 |
| General Mining Association | 109,351 | 115,435 | 6,084 | |
| Intercolonial Coal Co | 80,587 | 75,634 | ..... | 4,953 |
| Cape Breton Colliery | 900 | 1,291 | 391 | |
| *Nova Scotia Seaborne :* | 744,619 | 651,484 | | |
| Scotch, Welsh, English and American Bituminous | 73,658 | 88,429 | | |
| Total Seaborne | 818,277 | 739,913 | ..... | 93,135 |
| *American Bituminous* | | | | |
| By Canals—Estimated | 10,000 | 12,000 | | |
| Total Water Receipts | 828,277 | 751,913 | ..... | 76,324 |
| *Nova Scotia Coal by Rail :* | | | | |
| Cumberland Railway and Coal Co. | 98,913 | 64,828 | ..... | 34,085 |
| Acadia Coal Co | 5,129 | 3,205 | ..... | 1,795 |
| Canada Coals and Railway Co. | 15,800 | 20,372 | 4,572 | |
| Intercolonial Coal Co | 100 | | | |
| Total Bituminous Receipts by Province of Quebec | 948,219 | 840,318 | ..... | 107,901 |

## New Brunswick.

The only productive coal area in New Brunswick is that situated in Queen's County, about the head of Grand Lake, and limited quantities are mined here annually for local consumption and on a small scale for export. The product may be described as a bituminous coking coal giving a rather large percentage of ash. It is excellently adapted for blacksmiths' use and is used with satisfaction to the consumers as a house coal.

The result of a geological survey of the carboniferous area of New Brunswick has been to show that it is extremely probable that the beds

H. W. McNeill Co. Ltd.—Mines at Anthracite, N.W.T.

referred to, which occupy such a large area in Queen's County, practically constitute the only seams of coal in the Province which can be considered available for practical working. Other beds it is true have been found at various points, but where seen they are nowhere of any great thickness, and as they for the most part occur in what we believe to be the limestone grit, there does not seem to be any good reason to hope that thicker beds will be found. Borings too, though they have not been numerous enough to prove that the lower coal measures may not occur in depression in the underlying rocks, yet they do show that these lower beds are certainly wanting over all those areas where they have been made, and we are warranted in believing that their existence here at all is very doubtful and that if they do occur it can only be in troughs of very limited extent.

The large area covered by the seams which are now worked and their easy accessibility render them well worthy of consideration in reckoning up the available mineral resources of the Province.

Though the exaggerated reports of the enormous value of these coal beds which were current some years ago have, with our increase in actual knowledge of the facts, been long discredited, yet there remains the knowledge that we have here a coal field easily accessible and capable of yielding a large amount of coal of good quality. The workable beds have been estimated to contain, if they keep about the same average thickness over the area, over 150,000,000 tons of coal.

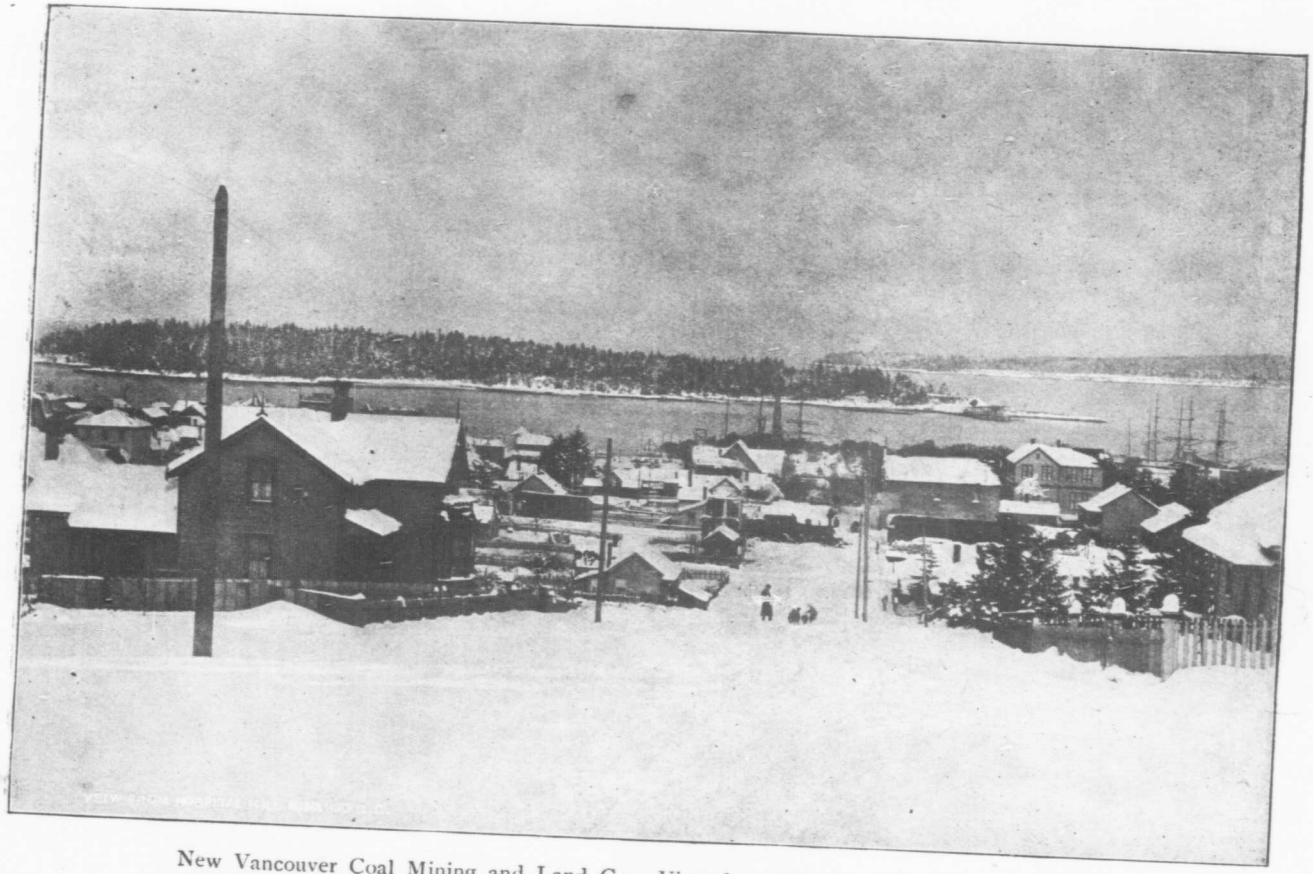
## Manitoba and North-West Territory.

The coal fields of Manitoba and of the North-West Territories are thus described by Dr. G. M. Dawson, Director of the Geological Survey of Canada :—"The known area of true and lignite coals of the best quality extends along the base of the Rocky Mountains from the 49th parallel to the vicinity of Peace River, a distance of 500 miles, with an average width of, say, 100 miles, giving a total area of 50,000 square miles. It is not intended to affirm that the whole of this area is continuously underlain by coal, but outcrops of coal are so general throughout it, that, taken in connection with the character and the regularity of the strata, it may safely be stated that it is, throughout, a coal field. An additional area, stretching eastward as far as the Souris River and Turtle

Mountains, yielding lignites only, but these often of very good quality and well fitted for local uses, may be roughly estimated at 15,000 square miles." These fields, owing to the limited demand for their produce, have hardly been touched as yet; but, when the scarcity of timber over a great part of the area in question is considered, it is evident that their existence is of the greatest moment in relation to the future settlement of the North-West.

The areas within the Rocky Mountains, though small as measured by miles, contain much coal of the best quality. One of these areas, on the Bow and Cascades rivers, has been found to hold several good seams of anthracite of good quality. The principal of these are at Marsh Mine, near the south end of the field, 1¾ miles from the main line of the Canadian Pacific Railway, and 550 ft. above its level. Two thick seams of coal are found, one 17 ft. (with 15½ ft. coal), and the other 9½ ft. (with 8½ ft. coal) in thickness. About three miles to the north-west of Marsh Mine and about a mile from the railway, there are eight openings into outcrops of workable seams. Six of these are apparently one above the other, containing 30 ft. coal. At Canmore, about a mile from the railway station and about 100 ft. above it, there are three seams, one 4 ft., another 12½ ft., and the third 16 ft. in thickness. At Anthracite, close to the railway, three seams are being worked, respectively 6 ft. (4½ ft. coal), 3½ ft. (3 ft. coal), and 5½ ft. (4 ft. coal), in thickness; at Moberley, which is near the north-west end of the field, there is a seam of coal 4½ ft. thick (3 ft. 8 in. coal). Two of these seams near Canmore are vertical, apparently from some disturbance, but with these exceptions they all dip to the south-west at angles ranging from 12 to 60 degrees. The relation of the various outcrops to Canmore mines can best be ascertained by drifting.

These mines were opened first by the Canadian Anthracite Coal Co., Ltd., which leased them in 1891 to the H. W. McNeill Co., Ltd., the present operator, the coal finding a ready market as far east as Winnipeg. The true anthracite character of the coal is shown by its yielding, on analysis, 87 per cent. of fixed carbon, by its burning with a clear, smokeless, almost flameless glow and by its ash being white and non-ferruginous.



New Vancouver Coal Mining and Land Co.—View from Hospital Hill, Nanaimo, B.C.

Mr. Ralph Moore, M.E., of Glasgow, late Her Majesty's Inspector of Coal Mines for Scotland, says in his report of these mines, which he visited in 1889, that there is coal sufficient for an output of two thousand tons a day for over one hundred years. John R. Hoffmann and R. C. Luther, of Pottsvale, Pa., mining engineers of the Philadelphia and Reading Coal Company, have both minutely examined the property and estimate the contents of coal at one hundred and fifty millions of tons minimum.

## British Columbia.

The principal coal mining district is at Nanaimo, on Vancouver Island. Work was begun here in 1852, and, before the close of 1853, 2,000 tons are reported to have been shipped, chiefly to San Francisco. The price of coal at Nanaimo was at this time $11 and at San Francisco $28 a ton. The Hudson Bay Company, under the name of the Nanaimo Coal Company, continued to work the mines thus opened until 1861, when they were sold to the Vancouver Coal Mining and Land Co., Ltd., an English syndicate, by which they are still operated.

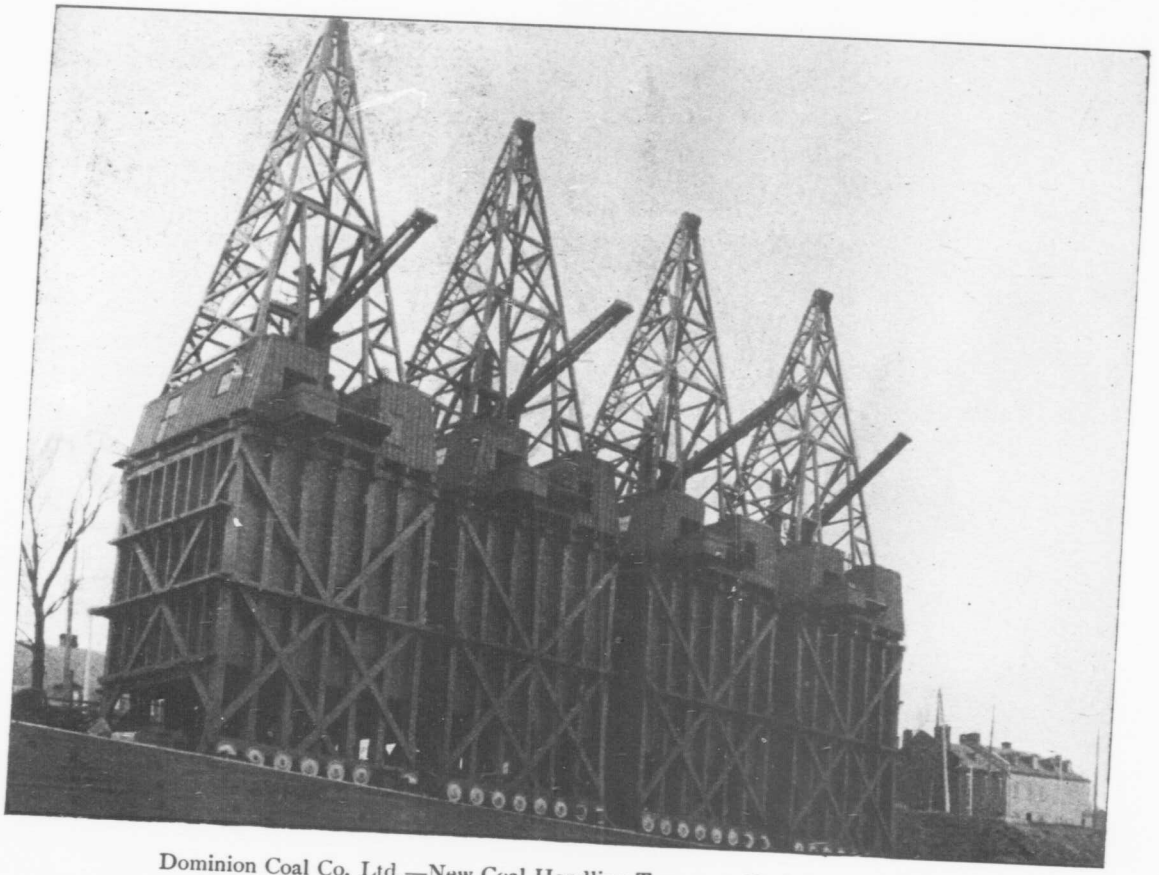
The total output of coal from the Province for the year ended 31st December, 1895, was 939,634 tons, of which 736,333 were exported. The exports are principally to San Francisco, San Pedro and San Diego in California, and smaller quantities are shipped to the Hawaiian Islands, to China, Japan, and other places. In the various ports of the Pacific Ocean, the coal from British Columbia comes into competition with coal from Puget Sound in the State of Washington, which, because of the high protective duty established by the United States is enabled to achieve a large sale in California, notwithstanding its inferior quality. It has also to compete with shipments from Great Britain, brought out practically as ballast, with the coals of New Castle in New South Wales, with coal from Japan; and in regard to the Pacific ports of the Russian empire, with coal raised by convict labor at Duai, at Saghalien Island in the Okotsk Sea. It is sufficient guarantee for the quality of the coal of British Columbia that it is able to hold its own against all these competitors. In an excellent address to the Royal Colonial Institute, Dr. Dawson summarizes the coal areas of British Columbia as follows:—"Though Nanaimo has been from the first the chief point of production of coal,

work has been extended within the last few years to the Comox district, also situated on Vancouver Island; while other promising coal bearing tracts have been in part explored and examined on this island, and on the Queen Charlotte Islands. These particular coal regions, bordering upon the Pacific Ocean, have naturally been the first to be employed, but they by no means exhaust the resources of the province in respect to coal. Deposits of good bituminous coal are known also in the inland region, and some of these in the vicinity of the line of railway are now being opened up, while others, still far from any practical means of transport or convenient market, have been discovered, and lie in reserve. One of the most remarkable of these undeveloped fields is that of the Crow's Nest Pass, in the Rocky Mountains, where a large number of superposed beds of exceptional thickness and quality have been defined.

"Besides the bituminous coals, there are also in the interior of the province widely extended deposits of lignite coals, of later geological age, which, though inferior as fuels, possess considerable value for local use. In the Queen Charlotte Islands anthracite coal is found, but has not yet been successfully worked. The coals of British Columbia may, in fact, be said to represent in regard to quality and composition, every stage from hard and smokeless fuels, such as anthracite, to lignites, and brown coals like those of Saxony and Bohemia. Many features of interest to the geologist might be mentioned in relation to these coal deposits, did time permit, but it must not be forgotten to note one principal fact of this kind—the very recent geological age to which all the coals belong. None of the coals of British Columbia are as old as those worked in Great Britain; they are in fact all contained in the cretaceous and tertiary rocks."

The same eminent authority estimates the extent of the coal fields to be:—

| | Square Miles. |
|---|---|
| Nanaimo coal basin (coals), approximately correct | 200 |
| Comox coal basin (coals), rough approximation | 700 |
| Queen Charlotte Islands, very rough approximation | 800 |
| Tertiary lignite bearing rocks in different parts of British Columbia south of the 54th parallel of latitude (very rough approximation) | 12,000 |



Dominion Coal Co. Ltd.—New Coal Handling Towers at Hochelaga, Montreal.

*Coal Output of British Columbia.*—The following table shows the output of each year from 1874 to 1895, inclusive:

| Year. | No. of Tons. | Year. | No. of Tons. |
|---|---|---|---|
| 1874 | 81,000 | 1885 | 365,000 |
| 1875 | 110,000 | 1886 | 326,636 |
| 1876 | 139,000 | 1887 | 413,360 |
| 1877 | 154,000 | 1888 | 489,300 |
| 1878 | 171,000 | 1889 | 579,830 |
| 1879 | 241,000 | 1890 | 678,140 |
| 1880 | 268,000 | 1891 | 1,029,097 |
| 1881 | 228,000 | 1892 | 826,335 |
| 1882 | 282,000 | 1893 | 978,294 |
| 1883 | 213,000 | 1894 | 1,012,953 |
| 1884 | 239,070 | 1895 | 939,634 |

COAL TRADE OF THE DOMINION.

*Exports of Coal from Nova Scotia, British Columbia and New Brunswick.*—1868-94. Tons of 2,000 lbs.:

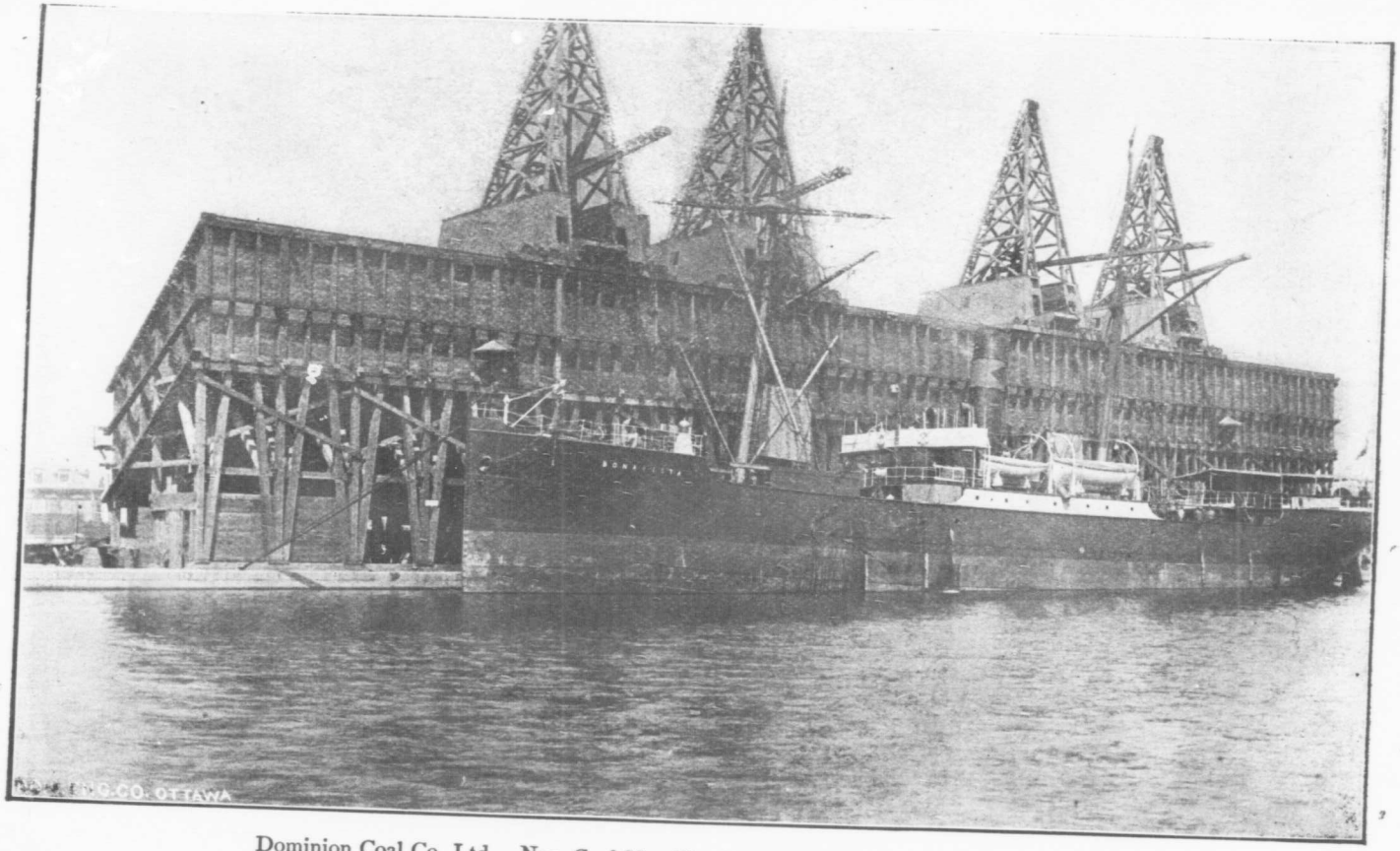
| Year ended 30th June. | Nova Scotia. | British Columbia. | New Brunswick. | Total. |
|---|---|---|---|---|
| | Tons. | Tons. | Tons. | Tons. |
| 1868 | 252,760 | ..... | 12,575 | 265,335 |
| 1869 | 431,968 | ..... | 8,175 | 440,143 |
| 1870 | 281,149 | ..... | 5,425 | 286,574 |
| 1871 | 311,116 | ..... | 6,992 | 318,108 |
| 1872 | 292,747 | 26,761 | 2,469 | 321,977 |
| 1873 | 364,899 | 33,786 | 6,013 | 404,698 |
| 1874 | 360,184 | 50,671 | 6,627 | 417,482 |
| 1875 | 222,856 | 59,355 | 5,616 | 287,827 |
| 1876 | 170,517 | 101,908 | 5,147 | 277,572 |
| 1877 | 140,210 | 102,830 | 6,237 | 249,277 |
| 1878 | 185,443 | 145,542 | 9,130 | 340,115 |
| 1879 | 134,017 | 173,789 | 7,803 | 315,609 |
| 1880 | 132,796 | 204,525 | 7,206 | 344,527 |
| 1881 | 190,551 | 214,243 | 14,794 | 419,588 |
| 1882 | 196,905 | 210,556 | 13,465 | 420,926 |
| 1883 | 216,805 | 193,485 | 17,670 | 427,960 |
| 1884 | 213,144 | 218,856 | 10,744 | 442,744 |
| 1885 | 201,949 | 275,621 | 1,099 | 478,669 |
| 1886 | 232,991 | 258,671 | 555 | 492,217 |
| 1887 | 190,788 | 325,034 | 156 | 515,978 |
| 1888 | 198,913 | 350,048 | 1,202 | 550,163 |
| 1889 | 176,186 | 452,625 | ..... | 628,811 |
| 1890 | 205,630 | 500,534 | 710 | 706,874 |
| 1891 | 173,105 | 647,508 | 37 | 820,650 |
| 1892 | 210,934 | 695,560 | 1,761 | 908,255 |
| 1893 | 189,685 | 669,792 | 5,582 | 865,059 |
| 1894 | 240,954 | 716,304 | 3,227 | 960,485 |
| Total | 6,119,202 | 6,628,004 | 160,417 | 12,907,623 |

IMPORTS FOR HOME CONSUMPTION.

| FISCAL YEAR. — PROVINCES. | 1889. | 1890. | 1891. | 1892. | 1893. | 1894. |
|---|---|---|---|---|---|---|
| | Tons. | Tons. | Tons. | Tons. | Tons. | Tons. |
| Ontario | 1,986,504 | 2,109,770 | 2,441,874 | 2,557,767 | 2,531,173 | 2,292,811 |
| Quebec | 457,985 | 400,781 | 449,542 | 426,363 | 452,473 | 470,388 |
| Nova Scotia | 27,982 | 30,033 | 33,174 | 27,314 | 33,687 | 40,902 |
| New Brunswick | 53,967 | 53,099 | 54,866 | 55,974 | 54,447 | 63,576 |
| Manitoba | 5,256 | 14,245 | 16,012 | 23,940 | 27,253 | 18,918 |
| British Columbia | 774 | 855 | 1,099 | 1,446 | 3,232 | 1,564 |
| P. E. Island | 2,195 | 1,934 | 2,243 | 1,522 | 1,420 | 1,836 |
| N. W. Territories | ..... | ..... | 159 | ..... | 19 | 36 |
| Total | 2,534,663 | 2,610,717 | 2,998,969 | 3,094,326 | 3,103,704 | 2,890,031 |

EXPORTS OF CANADIAN COAL, 1868-1895.

| Year ended 30th June. | EXPORTS OF COAL. | | Year ended 30th June. | EXPORTS OF COAL. | |
|---|---|---|---|---|---|
| | Quantity. | Value. | | Quantity. | Value. |
| | Tons. | $ | | Tons. | $ |
| 1868 | 265,335 | 640,708 | 1882 | 421,311 | 1,078,704 |
| 1869 | 440,308 | 763,262 | 1883 | 444,142 | 1,158,705 |
| 1870 | 286,707 | 588,799 | 1884 | 451,631 | 1,201,172 |
| 1871 | 318,287 | 662,451 | 1885 | 479,706 | 1,468,166 |
| 1872 | 295,522 | 578,691 | 1886 | 493,508 | 1,416,160 |
| 1873 | 404,757 | 951,886 | 1887 | 527,004 | 1,522,272 |
| 1874 | 418,357 | 1,343,739 | 1888 | 563,341 | 1,730,466 |
| 1875 | 288,176 | 937,923 | 1889 | 645,515 | 2,232,154 |
| 1876 | 277,832 | 977,188 | 1890 | 715,364 | 2,447,936 |
| 1877 | 249,536 | 855,968 | 1891 | 833,684 | 2,916,465 |
| 1878 | 340,127 | 1,210,689 | 1892 | 945,125 | 3,195,467 |
| 1879 | 315,793 | 937,268 | 1893 | 908,232 | 3,114,558 |
| 1880 | 344,694 | 1,013,899 | 1894 | 995,998 | 3,321,565 |
| 1881 | 420.055 | 1,123,091 | | | |



Dominion Coal Co. Ltd.—New Coal Handling Towers at Point St. Charles, Montreal.

COAL passed through the Welland Canal from 1885 to 1894 inclusive.

| Year. | From United States Ports to United States Ports. | | From United States Ports to Canadian Ports. | | Total Tons. | Amount of Tolls Paid. — Rate 20 cents a ton. |
|---|---|---|---|---|---|---|
| | Up. | Down. | Up. | Down. | | |
| | Tons. | Tons. | Tons. | Tons. | | $ cts. |
| 1885..... | 193,442 | 4,974 | 10,321 | 31,350 | 240,087 | 48,017 40 |
| 1886..... | 184,564 | 5,400 | 22,187 | 49,724 | 261,875 | 52,375 00 |
| 1887..... | 81,617 | 1,163 | 26,775 | 25,968 | 135,523 | 27,104 60 |
| 1888..... | 172,381 | 878 | 17,365 | 27,183 | 217,807 | 43.561 40 |
| 1889..... | 226,352 | 1,124 | 12,036 | 25,931 | 265,443 | 53,188 60 |
| 1890..... | 116,616 | 615 | 17,280 | 22,781 | 202,372 | 38,222 30 |
| 1891..... | 185,190 | 1,382 | 17,374 | 20,698 | 224,644 | 44,928 20 |
| 1892..... | 183,244 | 651 | 12,391 | 15,330 | 211,616 | 42,284 13 |
| 1893..... | 204,704 | 2,123 | 8,325 | 17,944 | 233,096 | 46,619 20 |
| 1894..... | 187,794 | 727 | 1,269 | 13,947 | 203,737 | 40,789 93 |

NOTE.—Tolls on soft coal passed down the Welland Canal, during the season of 1890, were reduced from 20 to 10 cents a ton, per O. C. 11th May, 1890, for the season of 1890 only, the rate for 1891, 1892, 1893 and 1894 being 20 cents a ton for passage either eastward or westward.

COAL passed through the whole length of the St. Lawrence Canals during the seasons from 1885 to 1894 inclusive.

| Year. | Quantity passed up Free of Tolls. | Quantity passed down to Montreal. | Total Quantity passed up and down. | Amount of Tolls on Quantity passed down to Montreal. |
|---|---|---|---|---|
| | Tons. | Tons. | Tons. | $ cts. |
| 1885..... | 5,035 | 122,829 | 127,864 | 18,424 35 |
| 1886..... | 3,301 | 118,802 | 122,103 | 17,820 70 |
| 1887..... | 7,579 | 121,618 | 129,197 | 18,242 70 |
| 1888..... | 8,341 | 123,050 | 131,391 | 18,423 90 |
| 1889..... | 5,360 | 124,290 | 129,650 | 18,604 90 |
| 1890..... | 6,538 | 135,168 | 141,706 | 20.275 20 |
| 1891..... | 7,951 | 141,701 | 149,652 | 21,255 15 |
| 1892..... | 7,543 | 157,134 | 164,677 | 23,570 10 |
| 1893..... | 2,285 | 147,139 | 149,424 | 22,070 85 |
| 1894..... | 16,213 | 169,552 | 185,765 | 25,432 80 |

COAL CONSUMPTION OF CANADA.

| PERIOD. | Consumption. Net Tons, 2,000 lbs. | ANNUAL AVERAGE CONSUMPTION. | | | Per cent. of imported to total. |
|---|---|---|---|---|---|
| | | Total Consumed. | Home Production. | Imported. | |
| 1872-75..... | 5,443,055 | 1,360,764 | 740,488 | 620,276 | 45·6 |
| 1876-79..... .... | 6,625,540 | 1,656,385 | 761,385 | 895,000 | 54·0 |
| 1880-83..... ..... | 10,149,867 | 2,537,467 | 1,261,713 | 1,275,754 | 50 2 |
| 1884-87..... ..... | 14,622,965 | 3,655,741 | 1,596,671 | 2,059,070 | 56·3 |
| 1888-91..... | 21,057,284 | 5,264,321 | 2,310,914 | 2,953,407 | 56·1 |
| 1892..... | 5,609,187 | 5,609,187 | 2,397,665 | 3,211,522 | 57·2 |
| 1893..... | 5,671,845 | 5,671,849 | 2,687,129 | 2,984,720 | 52·6 |
| 1894..... | 5,828,715 | 5,828,715 | 2,795,473 | 3,033,242 | 52·0 |

## ACADIA COAL CO., Ltd.

Incorporated by Act of the Legislature of Nova Scotia. Authorized Capital $4,000,000; $3,846,100 issued unassessable. No bonds or mortgages.

**Directors:**

J. W. Clendenin, *President*, 1 Broadway, New York.

| | |
|---|---|
| Bryce J. Allan, | Thomas H. Hubbard, |
| H. Montagu Allan, | Johnston Livingston, |
| Hugh Andrew Allan, | J. Pierpont Morgan, Jr. |
| James W. Clendenin, | Edwards S. Sandford, |
| William Henry Davies, | George G. Ward. |

**Head Office: Henry S. Poole, F.G.S., M.E. General Manager, Stellarton, N.S**
**J. George Rutherford, M.E., Asst. General Manager.**

Formed to acquire and work coal areas in Pictou county and elsewhere in the Province of Nova Scotia.

*Acadia Colliery*, at Westville, 3 miles from Stellarton. *Mine Manager:* James Maxwell; *Overman:* J. Patton.

Seam of 10 ft. worked: dip averages 27 deg.; slope 3,900 ft.; extreme vertical depth, 1,700 ft.

System of working: in lifts of 300 ft., longwall with timber packs of 5 ft. square.

Ventilation by fan, 24 ft. by 8 ft., iron casing; engine 20 in. by 20 in. cut-off; 17 in. water-gauge, barometer, etc.; Liveing's gas indicator.

Lamps—Mueseler and Marsaut.

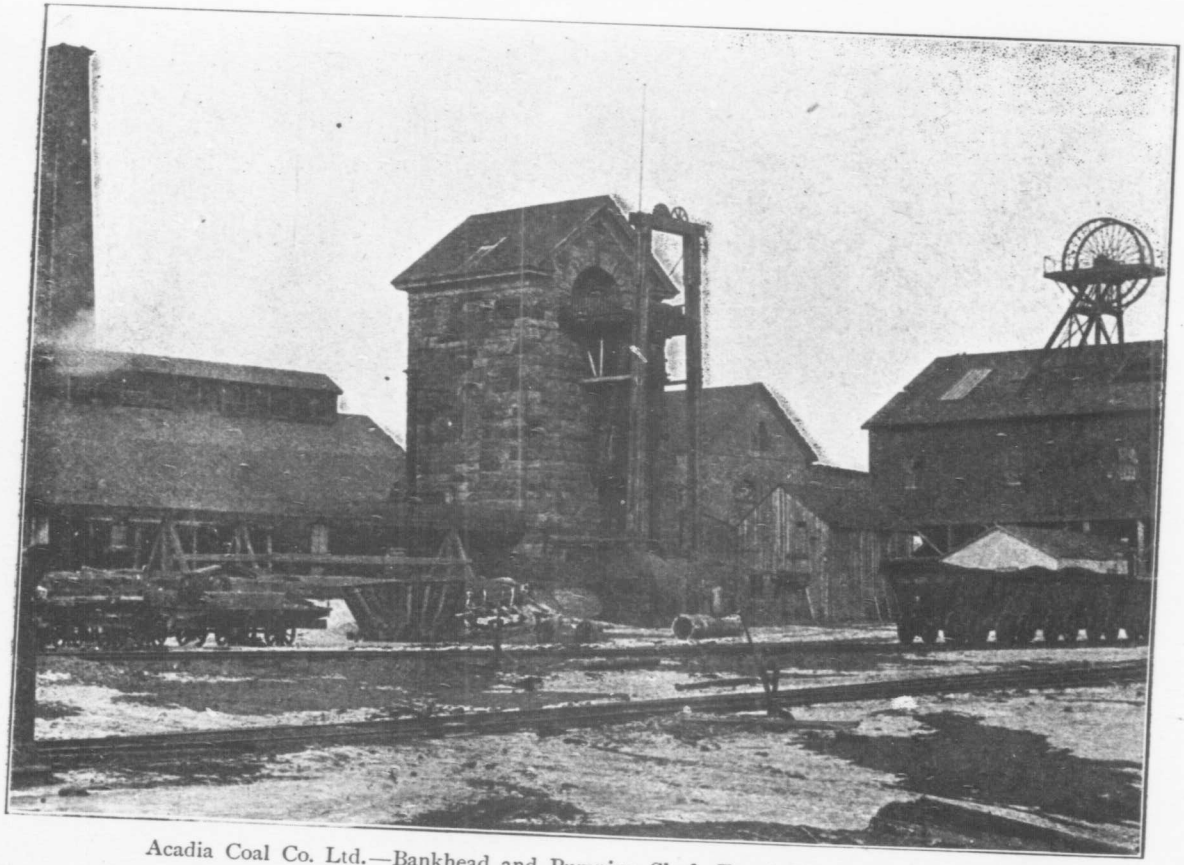
Hoisting engine on slope, pair 32 in. cyl., 60 in stroke direct; drum 10 ft.

Pumping—Duplex compound condensing, 22 by 11 in. x 24 in.; rams 5.5 in.; column length, 2,400 ft.; vertical head, 990 ft.; wrought pipe tarred 6 in. upset ends vanishing threads, metal flanges, no leaks; steam pressure on top, 105 lbs., pipe 4 in. covered; air feeder added to air chamber. Auxiliary direct acting 11 x 12 in. x 4 in. pump driven by compressed air, at bottom of pit head 600 ft.

Two air compressors, 16 in. and 20 in. with receivers at bank and in pit; air pipe, 4 in., length, 4,000 ft.

Boilers—Water-tube; fuel, culm.

Screens, double—Primary, 2 in; secondary ¾ in., apart, curved; 5 sizes of coal; elevator, picking table, shaking screens.



Acadia Coal Co. Ltd.—Bankhead and Pumping Shaft, Foord Pit, Stellarton, N.S.

Destruction of Acadia surface works by fire Nov. 1894 caused the output from that pit to be very small for six months.

*Albion Colliery*, at Stellarton on I. C. Railway; J. Dunbar, *Manager;* A. McDonald, *Overman.* Railway second built in America; locomotives include "Samson," built in 1838 (since sold); main seam, 38 ft. thick; 148 ft. lower, deep seam, 22 ft. thick; Foord pit, vertical, 900 feet deep; sunk to main seam; scene of explosion in 1880; loss of life, 44; workings now full of water; machinery massive; hoisting engine, 38 in. cyls. 5 ft. stroke, 18 ft. dia. drum; Cornish pumps, 62 in. cyl., 9 ft. stroke; beam, 34 ft. long, 7 ft. deep in the middle; weight 18 tons; working barrel, 18 in. dia.; pit head frame 50 ft. high; independent condenser on hoisting engine. Fire has been in the old rise workings for 25 years.

Air-compressors in course of erection at time of explosion, and now not in use; steam cyls., 36 in.; dia., do., 40 in.; stroke, 6 ft.; fly wheel, 22 ft. dia.; weight 20 tons; present workings in lower seams; capacity 1,000 tons per diem; ventilation by fans, the latter 30 ft. dia. by 10 ft. wide; a new fan in course of erection at the third seam 18 ft., high speed, rope driven with compound engines; lamps, Mueseler; coal used for coking purposes; 125 ovens; bee-hive, 10 ft. diam.; average pitch of seam, 22 degrees.

*Vale Colliery*, 6 miles east of New Glasgow. McBean seam worked by slope 3,100 ft. long; dips 14° to 35°; vertical depth 1,600 ft., not working.

Six ft. seam; slope 2,400 ft.; outcrop for 500 ft. left unworked; a new winning ventilated by compression fan, 16 ft. by 6 ft.; engine, 10 in. by 16 in.

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PRODUCTION, 1895.

| | | |
|---|---|---|
| Total coal raised | 202,971 | tons. |
| Total coal sold | 173,242 | " |
| Total coke sold | 12,508 | " |

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LABOR, 1895.

| | |
|---|---|
| Above ground | 250 |
| Below ground | 526 |
| Total | 776 |

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COAL DISPOSALS, 1891-94.

*(As per Returns Furnished by the Company.)*

| DISTRIBUTION. | 1891 | 1892 | 1893 | 1894 |
|---|---|---|---|---|
| Nova Scotia | 171,806 | 123,797 | 178,429 | 126,836 |
| Prince Edward Island | 33,577 | 21,354 | 24,500 | 25,950 |
| Quebec | 9,459 | 4,822 | 9,557 | 5,129 |
| New Brunswick | 18,885 | 16,268 | 19,329 | 7,199 |
| Newfoundland | 46 | ..... | ..... | ..... |
| United States | ..... | ..... | ..... | ..... |
| Other Countries | ..... | ..... | ..... | 270 |
| St. Pierre Miquelon, | ..... | ..... | ..... | 144 |
| Colliery Employees | 6,118 | 5,496 | 5,803 | 5,514 |
| Bunker Steamers | 15,250 | 7,662 | 12,954 | ..... |
| Engines and Coke Ovens | ..... | 73,142 | 22,634 | 55,400 |
| | 255,231 | 252,541 | 273,206 | 226,442 |

**ACADIA COAL CO.**—Continued

COAL DISPOSALS, 1895.

| | Tons. |
|---|---|
| Nova Scotia | 113,674 |
| Prince Edward Island | 18,916 |
| Quebec | 3,152 |
| New Brunswick | 6,242 |
| Newfoundland | 92 |
| Colliery Employees | 5,243 |
| Bunker Steamers | 7,427 |
| Engines and Coke Ovens | 48,458 |
| Total | 203,204 |

## ALBERTA RAILWAY AND COAL COMPANY

Incorporated 20th January, 1889. Authorized capital, $1,750,000, in fully paid ordinary shares of $100; $1,000,000 in fully paid 6 per cent. preference shares of £100, and 6 per cent. first mortgage debentures for £890,000, with coupons payable January 1st, and July 1st, and the principal repayable at 105 on Jan. 1st, 1920, or earlier at 115 at the option of the Company on six months notice, power being reserved to purchase the debentures in the market at price not exceeding 115. The accounts for the year ending 30th June, 1894, show a net profit of $15,670.35, excluding interest on the first mortgage debentures, in lieu of which the holders under agreement accept the net earnings of the Company until the 1st July, 1895.

**Directors :**

Elliott T. Galt, *President*, Lethbridge, N.W.T.

Col. R. R. B. Wodehouse, *Vice-Pres.*, London, Eng.

W. Burdett-Coutts, M.P., London, Eng. | Edwin Waterhouse, London, Eng.
Edward Crabb, " " | W. M. Ramsay, Montreal, Canada.
T. C. Farrer, " " | Thomas Davidson, " "

Sir R. W. Cameron, New York, U.S.A.

**CANADIAN OFFICE :**

Elliott T. Galt, *President*, Lethbridge, N.W.T.; W. D. Barclay, *Manager*, Lethbridge, N.W.T.; Robt. Simpson, *Colliery Supt.*, Lethbridge, N.W.T.; C. A. Magrath, *Land Commissioner*, Lethbridge, N.W.T.

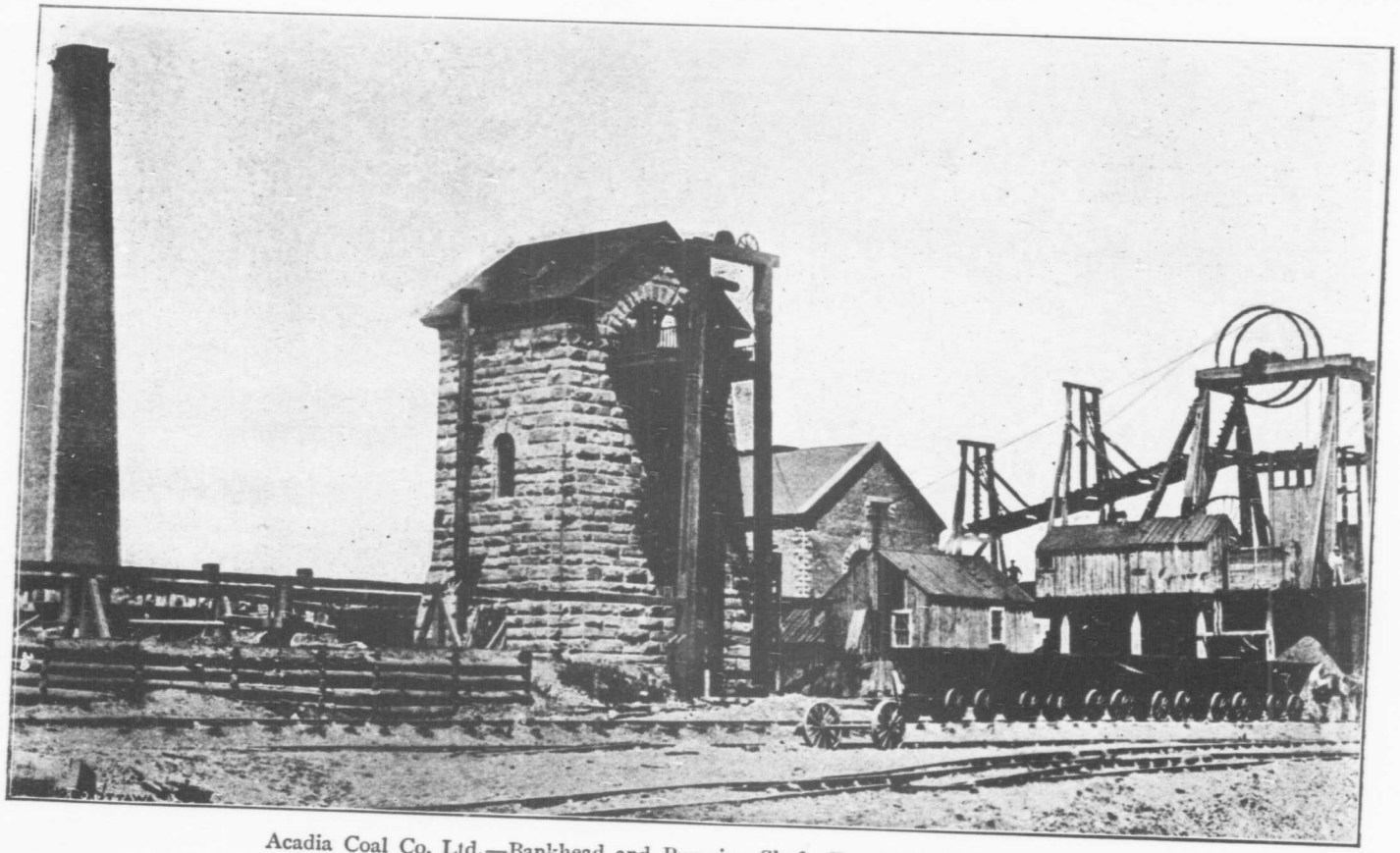
**Head Office : George Edwards, Secretary, 37 Old Jewry, London, Eng.**

Formed to take over and control the lands, works, mines and railways formerly owned and operated by the Northwestern Coal and Navigation Company (Ltd.)

The Company owns the railway from Lethbridge to Great Falls, Montana, U.S.A., 200 miles in length, 3 foot gauge, equipped with 25 locomotives and 450 cars.

The railway from Lethbridge to Dunmore, 110 miles in length, likewise narrow gauge, was changed to standard gauge during the summer of 1893 and sold to the C.P.R., and is now being operated as a portion of that company's system.

The Company owns the Lethbridge collieries at Lethbridge, in the district of Alberta, N.W.T. The workings consist of three shafts sunk from the level of the prairie to the coal, a distance of about 300 feet, and situated about half a mile from each other.



Acadia Coal Co. Ltd.—Bankhead and Pumping Shaft, Foord Pit, Stellarton, N.S.

The system of mining the coal is that known as "pillar and stall" and consists of double entries, each six feet wide, driven parallel with a pillar of coal not less than 30 feet between. Every 400 feet a new pair of entries are extended into the coal parallel to the first pair and along each individual entry a room is turned off every 34 feet, and driven at right angles to and in the opposite direction from the adjoining entry. At a distance of 30 feet, the room is opened out to a width of about 20 feet, and continued into the coal until it reaches its maximum depth from the entry, viz., 200 ft., there meeting a room which has been taken a similar depth from the next pair of entries, either above or below as the case may be. After carrying rooms to their full depth, the miner returns withdrawing the pillar between his and the adjoining room. There are practically two seams of coal worked. These are separated by a parting of fire clay varying from one to two inches. The lower bench coal has a thickness of 2 ft. 8 inches, while the upper bench is 1 ft. 10 inches.

The mode of ventilation is by means of two Murphy fans, 6 ft. diameter. These fans will either exhaust the air from the shaft or force it down, as sometimes required by the state of the weather. The reversing of the current of air is made by opening or closing certain openings. The speed of the fans is usually about 200 revolutions per minute. The winding engines for these shafts are two 20 inch cylinders, direct acting, on a spirally grooved drum and excellent brake connection. The pithead frame, screening and general arrangement are of the most modern type, including a safety clutch on the cage, so that if the wire rope was to break the cage would only descend a few yards until the clutch acted on the guides of the cage, stopping any further descent.

The workings are sufficiently developed so as to permit the present output of 1,000 tons daily to be increased on the shortest notice to 1,500 tons.

The output of coal in 1885 was 22,000 tons; in 1892 142,000 tons; 1893 144,000 tons; 1894 120,000 tons.

The Company has extensive machine shops equipped with machinery suitable for all classes of repairs.

The acquirement and development of the properties has caused an expenditure of about $5,000,000, and in the service of the Company there are on an average about 600 men employed, for whose accommodation the Company has erected dwellings.

The Company markets its coal at no less than 180 points in Manitoba, the Canadian North-West, British Columbia and in the States of Montana and Washington in the United States of America, the most distant selling point being 830 miles from Lethbridge.

The analysis of Galt coal is:— Carbon 56.20, ash 6.40, water 4.90, vol. matter 32.40.

The Company's landed estate consists of 1,100,000 acres of farm ranching land situated in alternate Townships in the district of Alberta, N.W.T. Of this 750,000 acres have been transferred to the Lethbridge Land Company, an affiliated Company, formed to improve, colonize and dispose of them.

## BALTIMORE COAL MINING AND RAILWAY CO.

Incorporated by the Legislature of New Brunswick, April, 1894. Authorized capital, $300,000 in 3,000 shares of $100. The six incorporators or original owners of licenses, have transferred their interests and rights to the company for 1,500 fully paid up shares, and have agreed that 850 shares be transferred in trust to its officers, to be offered to the public at a greatly reduced price from the par value of the stock, and the proceeds are to be expended in developing the mine, railway surveys and other improvements. The directors have obtained from the local Government a rebate of royalty upon the first 500,000 tons of cannel coal raised from the property, an equivalent to $50,000.

**Directors:**

Charles Archibald, *President.*

Blowers Archibald, | Wm. F. Wortman, | Frederic Steeves, | Warren Taylor, Francis Ritchie.

**BALTIMORE COAL MINING & RAILWAY CO.**—Continued

**Head Office : Hillsborough, N.B.**

The property controlled by the company is located at Baltimore, in Albert Co., Province of New Brunswick, coves 640 acres by license to work, and 2,560 acres by license to search, which in due time will be converted into a lease, containing such area of the above as the company may direct. A report on the property made by Mr. Wm. Hall, M.E., gives the thickness of the seams as follows:—No. 1 seam, 5 ft.; No. 2, 4 ft.; No. 3, 4½ ft.; No. 4, 20 ft.; west seam, 21 ft. The mineral is a cannellite shale giving on analysis: Volatile matter, 56.3 per cent.; fixed carbon, 42.2; ash, 1.5. The cost of mining is estimated at 80 cents per ton; to handle, crush, and put it on board the cars, 30 cents. The product is used principally for the large quantity of oil, gas and tar it yields.

## BOSTON AND NOVA SCOTIA COAL CO., Ltd.

Incorporated by an Act of the Legislature of Nova Scotia, May 1893. Authorized Capital, $5,000,000, in shares $100, of which $500,000 was reported to have been subscribed at the date of last report.

**Directors:**

Hon. John W. Candler, Boston, *President.*

| | |
|---|---|
| John Russell Gladding, Providence, R.I. | John C. Cobb, Boston. |
| Hon. David S. Baker, Jr., Providence. | W. J. Fraser, Halifax. |
| John McKeen, Mabou, C.B. | A. C. Ross, North Sydney. |

R. P. Fraser, Pictou, C.B.

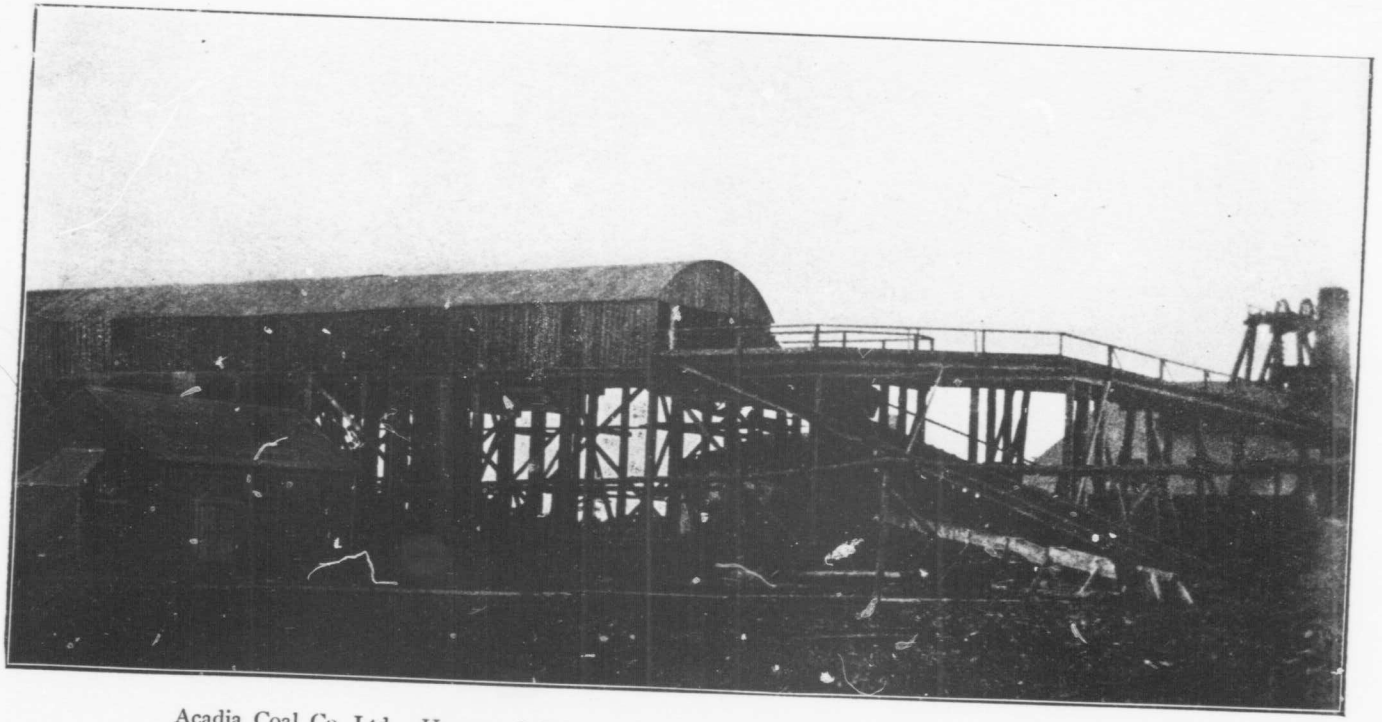
**Head Office:**

66 State Street, Boston, Mass.

**CANADIAN OFFICE:**

**A. C. Ross, Secretary, North Sydney, Cape Breton.**

Formed to purchase, hold, lease and sell any coal, iron or other mineral properties, also earths, clays, stone or mineral substances and the product thereof, manufactured or otherwise, and to mine, quarry and prepare for sale by any process of manufacture, and sell the outputs and products thereof from such mines and properties, etc. The properties acquired by the company are the Broad Cove and Chimney Corner groups, situated in Inverness County, Cape Breton, Province of Nova Scotia, and contain an area of 30 square miles of coal lands. The mines are situated about 14 miles from Mabou, 35 miles from Orangedale station on the Intercolonial Railway, and 27 miles from shipping pier to be erected at Whycocomagh and Cariboo Cove, on the Straits of Canso. In 1894 the plans of the company were altered so as to make Mabou Harbor, 14 miles from the mines, a shipping port. This will necessitate extensive dredging in Mabou Harbor, for, while inside the main harbor there is ample sea room and plenty of water, the channel leading to it for half a mile has a depth of 14 ft. only. This change has necessitated an entirely new location of the railway, as the old line was some 4 miles from the present proposed shipping pier. This new location was made during the past summer, the intention still being to build the line through to a junction with the I. C. Ry. at Orangedale, a distance by the new route *via* Mabou of 40 miles. The property includes a very extensive and valuable brown free-stone quarry on the line of their railway about 4 miles from tide-water at Whycocomagh.



Acadia Coal Co. Ltd.—Heapstead, No. II Slope, III Seam, Albion Mines, Pictou County, N.S.

## BRITISH COLUMBIA COAL, PETROLEUM AND MINERAL CO., Ltd.

Incorporated 25th March, 1889. Authorized Capital, $4,000,000, divided into 40,000 shares of a par value of $100 each.

**Directors:**

Lt.-Col. James Baker, M.P.P., *President.*

Col. E. G. Prior, M.P. | B. W. Pearse. | A. W. Vowell. | E. Hanson.
W. Hanson. | W. Fernie. | J. A. Gemmill.

F. B. Pemberton, *Secretary.*

**Head Office: 45 Fort Street, Victoria, B.C.**

This company owns 11,169 acres of coal lands situate near Martin creek, and also near Morrissey creek, in the East Kootenay district, Province of British Columbia. On the easternmost property, near Martin creek, containing 3,969 acres, there are fifteen seams of coal, four of which are a very valuable cannel or gas coal. The remaining seams are bituminous and admirably adapted for coking. In the westernmost property of 7,200 acres, a distance of 12 miles from the former property, there are 12 superposed seams of coal cropping out of the side of the mountain, varying from 2 to 30 ft. in thickness. Up to 1st Dec., 1895, $100,000 have been expended on prospecting and preliminary development, but mining on a more extensive scale will not be begun until better shipping facilities have been provided. Average men employed, 20. An analysis of a sample of fast coking gave:—

| | |
|---|---|
| Hydroscopic water | 1·89 |
| Volatile combustible matter | 30·41 |
| Fixed carbon | 63·33 |
| Ash | 4·37 |

## BROAD COVE COAL CO., Ltd.

Incorporated by the Nova Scotia Legislature, February 12th, 1894. Authorized Capital: Bonds, $1,500,000; Preferred Stock, $1,500,000; Common Stock, $1,500,000. Amount reserved in the treasury for future needs of the Company: Bonds, $700,000; Preferred Stock, $400,000; Common Stock, $400,000.

**Officers:**

John M. Raymond, *President.*

Alpheus B. Alger, *Vice-President.* | Wm. Penn Hussey, *Treas. & Gen. Man.*
Edgar S. Buffon, *Secretary.* | Warren D. King, *Electrical Engineer.*

**Directors:**

W. H. Monroe, Martha's Vineyard, Mass. | George W. Gale, Boston, Mass.
Hon. John Y. Payzant, Halifax, N.S. | Hon. John M. Raymond, Salem, Mass.
Warren D. King, Peabody, Mass. | Hon. A. B. Alger, Cambridge, Mass.
Edgar S. Buffum, Salem, Mass. | J. R. Naegeli, Zurich, Switzerland.

William Penn Hussey, Danversport, Mass.

**Mines Office: Broad Cove, Cape Breton.**

**BROAD COVE COAL CO.**—Continued.

This company controls four square miles of coal lands at Broad Cove, in the county of Inverness, Cape Breton, upon which there are twelve seams, ranging in thickness from two to fourteen feet. All the seams are of the bituminous variety, of superior quality, admirably adapted for steam and domestic purposes. During the past summer the company built two and a half miles of railway, connecting the openings on the different seams with the harbor at McIsaac's Lake. Four levels have been run in on the larger seams, from which a large quantity of coal can be mined daily. The channel between McIsaac's Lake and the Gulf of St. Lawrence has been cut through by the company, and in the spring will be dredged to a sufficient depth to admit large vessels. This harbor, when completed, will be the only deep water harbor on 90 miles of coast line, and will be of immense value as a harbor of refuge.

## CANADA COALS AND RAILWAY CO.

Incorporated by Act of the Legislature of Nova Scotia, 1892. Capital Stock, $750,000. Bonds, $750,000.

**Directors:**

S. Finlay, *President.*

R. J. Gault. | S. H. Ewing. | E. W. Wilson.
A. G. Galt. | F. Hanson. | R. Wilson Smith.

**Mines Office: A. Dick, General Manager, Joggins Mines, N.S.**

Formed to mine, quarry, work, win and prepare for sale, by any process, and to carry, sell and deal in coal, iron and other minerals, etc. The company controls an area of fifteen square miles, upon which is situated the Joggins Colliery, at Joggins Mines, in the County of Cumberland, Province of Nova Scotia.

COAL DISPOSALS.

| | 1892. Tons. | 1893. Tons. | 1894. Tons. | 1895. Tons. |
|---|---|---|---|---|
| New Brunswick | 41,553 | 48,750 | 56,558 | 55,435 |
| Nova Scotia | 5,817 | 10,793 | 11,894 | 9,624 |
| Quebec | 16,497 | 23,774 | 15,800 | 20,371 |
| United States | 395 | 248 | 7,347 | 2,457 |
| P. E. Island | ..... | ..... | 401 | 418 |
| Colliery employees, engines, etc. | 4,905 | 7,685 | 10,029 | 13,381 |
| | 69,167 | 91,250 | 102,031 | 101,686 |

Colliery eleven miles from Maccan station, on the main line of the Intercolonial railway, connected by a standard gauge railway; also one mile from Joggins wharf, on Chignecto Bay, connected by tramway. Rolling stock comprises two locomotives, four passenger coaches, 30 box and flat cars, etc.

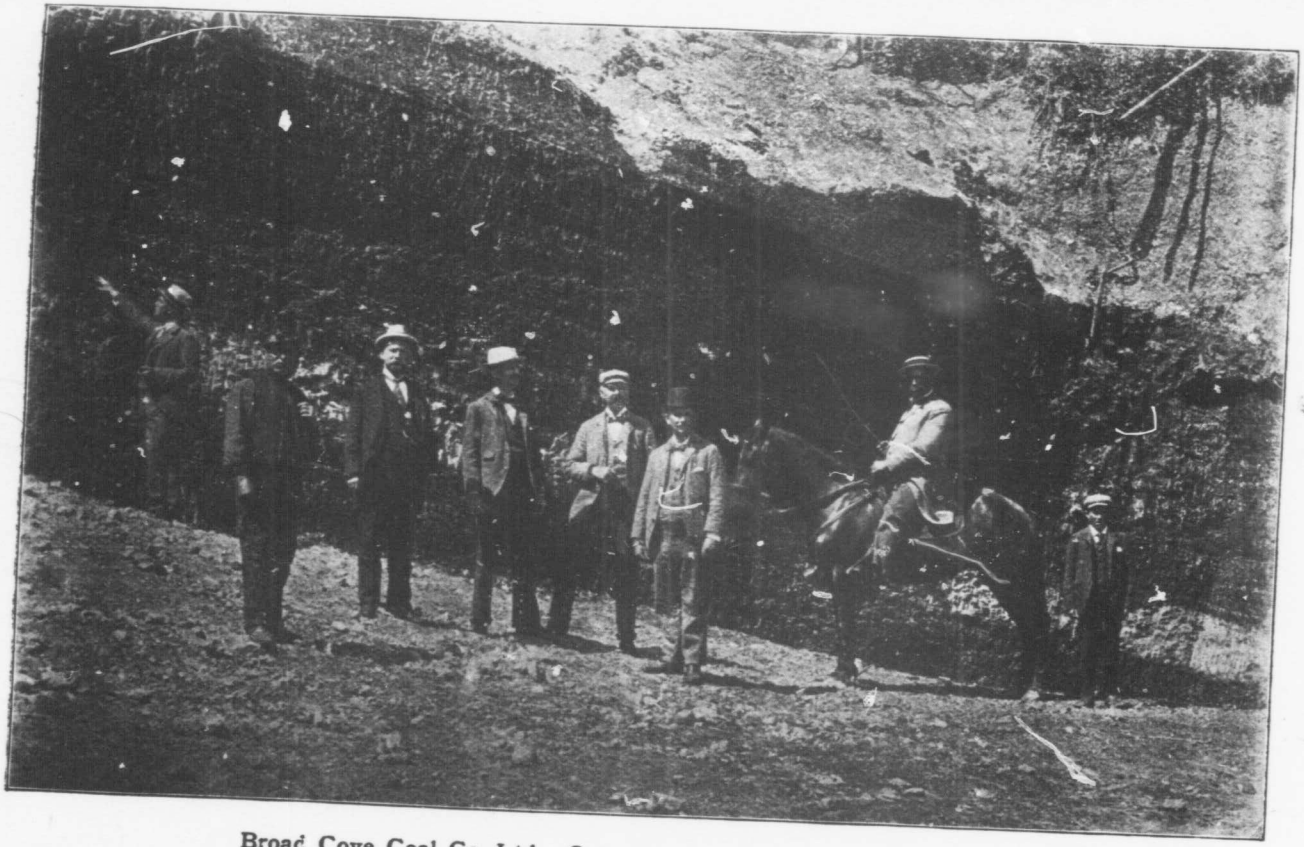
Seam from 6 ft. to 8½ ft. worked; coal from 4 ft. to 5½ ft.; clay in centre of seam from 1 ft. to 3 ft.; dip, 17°; slope, 2,700 ft.; coal raised, 1894, 102,031 tons; shipped, 92,001 tons.

System of working—Longwall and bord and pillar.

Ventilation by furnace.

Lamps—Anton; all open lights.

Winding engines—One double 18 in. x 42 in. geared 3 to 1; one 15 in. x 30 in. operating saw mill; one 14 in. x 24 in. hauls empty cars from pier to pit; one double



Broad Cove Coal Co. Ltd.—Outcrop of 14 Foot Seam, Cape Breton.

3 in. x 10 in. used in sinking; one 5 in. by 10 in., and one 7 in. x 16 in.; at No. III. slope, one 17 in. cyl. x 36 in. stroke.

Haulage engine (tail rope) 10 in. cyl. and 12 in. stroke.

Pumps—Two Burrell-Johnson and one Northey, and one Northey force pump on surface.

Screens—Six in use.

Boilers—No. II. slope, 8 double flue 3 ft. x 30 ft. long, and two 5 ft. dia. and 30 ft. long; No. III. slope, 2 double flue Lancashire boilers, 7 ft. dia. and 30 ft. long.

Employees—Above ground, 96; below, 244; total, 340.

## CANADA NORTH-WEST COAL AND LUMBER SYNDICATE, Ltd.

Registered 14th August, 1889. Authorized Capital, £70,200, £45,000 being in A shares of £100, £25,000 in B shares of £100, and £200 in founders' shares of £1. The A shares rank first for dividends up to 10 per cent. and the founders' shares take half the surplus profits after providing for 10 per cent. on the A and B shares.

**Directors:**

Sir George Baden Powell, M.P. | The Earl of Norbury.
L. G. W. Milles. | T. B. H. Cochrane.

**Head Office:**

J. W. Knowles, *Secretrry*, 6 Clement's Lane, London, E.C.

**CANADIAN OFFICE:**

**T. B. H. Cochrane, Managing Director, Canmore and Mitford, Alta.**

This company owns 1,280 acres of coal lands at Canmore, and 2,880 at Mitford, in the Province of Alberta. Seam worked averages 16 ft.; dip, 45°; slope, 270 ft.; length of tunnel, 270 ft.; gangway, east, 1,500 ft.; gangway, west, 700 ft.; ventilation by Guibal fan (self-contained) 6 ft. dia. 200 revs.; one multitubular boiler; one Polson hoist, geared, reversing, capacity 300 tons per diem; one small Blake 15 h.p. pump; Ingersoll drill; two screens, 20 ft. steel bars, nut screen, ½ in. mesh; 35°; capacity, 160 tons each; coal raised in 1890, 10,000 tons; no increase in 1891, owing to surface improvements; coal largely used on locomotives of Canadian Pacific Railway. No report for 1892-3-4-5 obtained.

## CANADIAN ANTHRACITE COAL CO. Ltd.

Incorporated 28th October, 1886. Capital Stock, $1,000,000 fully subscribed and paid up.

**Officers:**

Hon. J. G. Thorpe, Cambridge, Mass., *President.*
O. H. Ingram, Eau Claire, Wis. | Archibald Stewart, Ottawa.
W. K. Coffin, Eau Claire, Wis. | L. Crannell, Ottawa, *Secretary.*

**CANADIAN ANTHRACITE COAL CO.**—Continued

**Head Office: The Molsons Bank Chambers, 14 Metcalfe St., Ottawa, Ont.**

Formed to mine and extract coal, especially anthracite coal, in the Dominion of Canada, and generally to carry on the business of colliery proprietors, miners and engineers, in all their branches; and also the trade or business of carriers, by water, of coal, minerals and other freight from, to and within Canada, etc., etc. The Company owns about 7,000 acres of coal lands in the district of Alberta, N.W. Territories. In 1891, the colliery and lands were leased for ten years to the H. W. McNeill Company, Ltd., notice of which will be found on another page.

## CAPE BRETON COLLIERY.

Organized, 1893.

**Owners:**

J. T. Burchell. | J. E. Burchell.

**Managing Owner: J. T. Burchell, New Campbellton, C.B., N.S.**

The colliery worked was acquired by the present owners in June, 1893, but was worked as far back as 1861. It is situated at New Campbellton, at the mouth of the Big Bras d'Or Lake, Cape Breton County, Province of Nova Scotia. The property covers an area of three miles.

Seam of 4 ft. worked; dip, 12°; opened by slope, 1000 ft. A. Ferguson *Underground Manager.*

System of working—Pillar and room.
Ventilation by furnace.
Lamps—Naked.
Hoisting engines—Pair, 12 in. x 16 in. cyl., single drum, dia. 5 ft.
Pumps—One Cameron, 15 in. cyl., 9 in. plunger.
Boilers—Two locomotive, 50 h.p., and one tubular boiler, 110 h.p.
Railway—One and a-half miles to shipping wharf, 3 ft. gauge, 40 lb. steel rails.
Ingersoll compressor, 16 x 18.
Five Ingersoll coal cutting machines.

COAL DISPOSALS.

| | 1894—Tons. | 1895—Tons. |
|---|---|---|
| To Quebec | 900 | 1,303 |
| " Newfoundland | 3,915 | 68 |
| " Nova Scotia | 6,036 | 4,763 |
| " P. E. Island | 2,331 | 624 |
| " New Brunswick | 898 | 368 |
| " St. Pierre | ..... | 365 |
| " Other countries | 595 | ..... |
| " Colliery consumption | 2,098 | 1,680 |
| " " employees | 313 | 318 |
| Total, 1894 | 17,086 | 9,489 |
| On hand 31st Dec., 1894 | 2,000 | |
| | 19,086 | |

Cumberland Railway and Coal Co.—Springhill Collieries, Cumberland Co., N.S.—Trestle ince destroyed by fire.

# CUMBERLAND RAILWAY AND COAL CO.

Incorporated 25th May, 1883. Authorized Capital, $2,000,000. Bonds, $1,250,000, of which $1,000,000 have been issued.

**Directors:**

Robert Cowans, *President.*

Hon. G. A. Drummond, *Vice-President.*

David Morrice. | J. R. Cowans.
H. R. Drummond. | W. J. Morrice.

**Head Office: H. R. Drummond, Secretary, Imperial Building, Place d'Armes, Montreal.**

## MINES OFFICE:

**J. R. Cowans, General Manager, Springhill, N.S.**

C. Hargreaves, *Manager*, Colliery Department, - - -
W. D. Matthews, *Assistant to Manager*, Colliery Department,
G. Hall, *Mechanical Foreman*, - - - - - - -
R. H. Cooper, *Cashier*, - - - - - - - - } Springhill, N. S.
J. G. Aikman, *Superintendent* Railway Department, Parrsboro, N.S.

Formed to acquire, work and develop coal lands, of which some 70 square miles are held under lease from the Government of Nova Scotia.

*No. 1 Slope.*—A. D. Ferguson, Underground Manager.

Seam of 8 ft. worked; dip, 30°; slope, 2,600 ft.

System of working, pillar and bord.

Ventilation—By blow-down fan, 20 ft. dia.; width of blade, 8 ft.; length of blade, 6 ft. 8 in.; length of shaft, 11 ft. 3 in.; dia. of shaft, 8 in.

Lamps—Marsaut.

Boilers—6 double flue, 45 h.p. each; 4 tubular, 25 h.p., loco. pattern.

Hoisting engines—1 double-geared winding engine, cyls. 18 x 36 in., drum 9 ft. dia.; 1 elevator engine, cyl. 9 x 18 in.; 1 electric light engine, cyl. 8 x 12 in.; 1 engine driving slack conveyors, elevator and rotary screen, cyl. 12 x 30 in.; 1 fan engine, cyl. 15 x 30 in.; 1 pr. Link reversing geared haulage engines, cyls. 16 x 20 in., with four 5 ft. drums to operate underground haulage system.

Pumps—2 Blake, 11½ x 28 x 36 in.; 1 Cameron, 4 x 10 x 15 in.; 1 boiler feed, Jeanesville, duplex, 8 x 4 x 8 in.

Screens—Straight steel bars, 15 ft. long; rotary screen, 20 x 5 ft., with conveyors and elevators.

*No. 2 Slope.*—W. Lorimer, Underground Manager.

Seam of 10 ft. 6 in. worked; dip, 30°; length of slope, 3,000 ft.

System of working—Pillar and bord.

Ventilation—By blow-down fan, dia. 16 ft.; length of blade, 6 ft. 6 in.; width of blade, 4 ft. 10 in.; dia. of shaft, 8 in.; length of shaft, 10 ft. 8 in.

Lamps—Marsaut.

Boilers—6 double flue, 40 h. p. each; 2 Lancashire flue, 70 h. p. each; one return tubular, 45 h. p.

Hoisting engines—1 double-geared winding engine, cyls. 22 x 36 in.; drum dia., 9 ft. 10 in.

Pumps—2 Allison, 14¼x30x72 in.; 1 boiler feed (Jeanesville), duplex, 8x4x8 in.

1 pr. Link reversing-geared haulage engines, cyl. 16 x 20 in., with four 5 ft. drums, to operate underground haulage system.

1 direct acting fan engine, cyl. 12 x 30 in.

**CUMBERLAND RAILWAY & COAL CO.**—Continued

*No. 3 Slope.*—M. Blue, Underground Manager.

Seam of 10 ft. worked; dip, 28°; slope, 2,600 ft.

System of working—Bord and pillar and longwall.

Lamps—Marsaut.

Ventilation—By blow-down fan, 14 ft. dia.; length of blade, 3 ft. 6 in.; width, 6 ft.; dia. shaft, 7½ in.; direct acting engine, cyl. 12 x 30 in.

Boilers—8 double flue, 40 h. p. each.

Hoisting engines—1 double-geared winding engine, cyl. 18 x 36 in.; dia. of drum, 9 ft. 1 engine, cyl. 6 x 12 in., for hoisting timber to bank, and empty boxes up incline.

1 pr. Link reversing-geared haulage engines, cyls. 16 x 20 in., with four 5 ft. drums to operate underground haulage.

1 direct acting fan engine, cyl. 12 x 24 in.

Pumps—1 Jeanesville compound duplex, cyls. 38 in. and 25 in., 10 in. plungers, 36 in. stroke; 1 Cameron, 4 x 6 in.; 1 Jeanesville boiler feed, duplex, 8 x 4 x 8 in.

Machine shop fitted with necessary tools for repairs to colliery plant, inluding eight locomotives which are employed in hauling coal from the collieries. etc.

COAL SALES.

| —— | 1889. | 1890. | 1891. | 1892. | 1893. | 1894. |
|---|---|---|---|---|---|---|
| Nova Scotia | 99,847 | 89,525 | 109,783 | 118,884 | 129,515 | 123,795 |
| New Brunswick | 93,527 | 107,047 | 123,652 | 105,472 | 133,290 | 126,057 |
| Quebec | 172,406 | 173,277 | 163,956 | 129,271 | 119,284 | 98,914 |
| United States | 9,986 | 7,734 | 8,815 | 8,374 | 9,050 | 36,205 |
| | 375,766 | 377,583 | 406,206 | 362,001 | 391,139 | 384,971 |

COAL DISPOSALS, 1895.

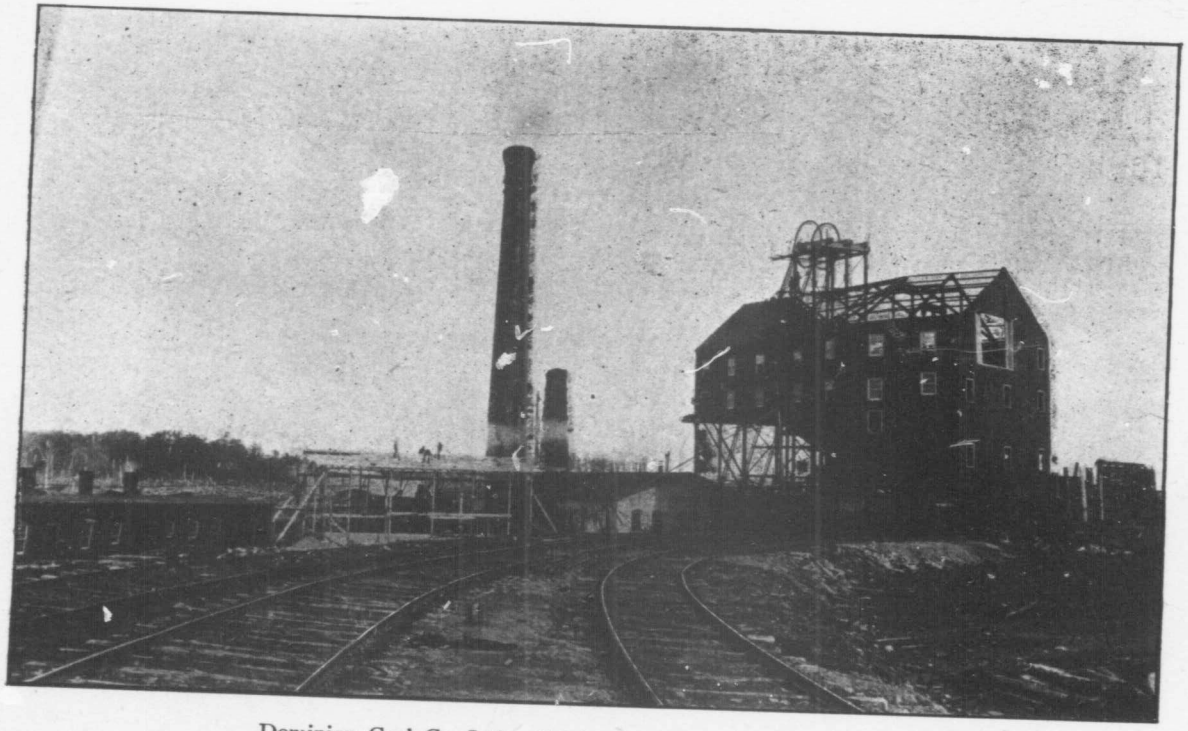
| | Tons. |
|---|---|
| Nova Scotia | 123,848¾ |
| Quebec | 123,443½ |
| New Brunswick | 64,828¾ |
| St. Pierre | 16,545½ |
| Total | 328,666 |

LABOR EMPLOYED, 1895.

| | |
|---|---|
| Above ground | 300 |
| Below ground | 700 |
| Total | 1,000 |
| Total coal raised | 375,788 |
| " sold | 328,666 |

## DOMINION COAL CO., Ltd.

Incorporated by Act of the Legislature of Nova Scotia, 1st February, 1893. Authorized Capital, $18,000,000. Issued, 16,500,000. Common, $15,000,000. Preferred, 1,500,000. Authorized bonded indebtedness, $3,000,000, first mortgage bonds at 6 per cent. Issued, $3,000,000.



Dominion Coal Co. Ltd.—Caledonia Colliery, Glace Bay, C.B.

**Directors:**

Henry M. Whitney, Boston.

Sir Donald A. Smith, Montreal.
Henry F. Dimock, New York.
Hugh McLennan, Montreal.
F. S. Pearson, Boston.
W. C. Van Horne, Montreal.
Robert Winsor, Boston.
W. B. Ross, Q.C., Halifax.
Alfred Winsor, Boston.

**General Offices: 95 Milk Street, Boston.**

Henry M. Whitney, *President.*
Alfred Winsor, *Vice-President.*
John S. McLennan, *Treasurer.*
F. S. Pearson, *Chief Engineer.*

**CANADIAN OFFICE: Glace Bay, Cape Breton, Nova Scotia.**

Hon. David McKeen, *Resident Man.*
J. R. Blackett, *Cashier.*
W. Blakemore, M.E., *Ass. Res. Man.*
B. F. Pearson, Halifax, *Secretary.*

**CANADIAN SELLING AGENTS:**

**Kingman Brown & Co., 14 Place Royale, Montreal, and M. R. Morrow, 171 Lower Water St., Halifax.**

This company has been formed to carry on the business of mining, transporting and selling bituminous coal from the County of Cape Breton, Nova Scotia. It operates under a lease which gives a tenure of its mining property of ninety-nine years, the royalty to the Nova Scotia government for the whole period being fixed at a maximum of 12½ cents per ton with a minimum gross amount for each year to be paid on at least as many tons as were, in the year 1891, sold by all the mines included in the new company.

At 1st March, 1894, it had acquired an area of some seventy square miles of coal lands in Cape Breton upon which are the following collieries:—"Caledonia," (formerly the property of the Caledonia Coal and Railway Co., Ltd.); "International," (formerly owned by the International Coal Co., Ltd.); "Gardiner," (formerly owned by Burchell Bros., Sydney; "Glace Bay." (formerly owned by the Glace Bay Mining Co., Ltd.); "Old Bridgeport," (formerly owned by the International Coal Co., Ltd.); "Reserve," formerly owned by the Sydney & Louisburg Coal and Railway Co., Ltd.); "Gowrie," (formerly owned by the Gowrie Coal Mining Co., Ltd.); "Victoria," (formerly owned by the Low Point, Barrasois and Lingan Mining Co., Ltd.); the "Ontario" Colliery, and the "Sword," "Meagher" and other coal areas, steamers, lines of railway, etc., etc.

*Caledonia Colliery*—One mile from Little Glace Bay. *Underground Manager*, George Greenwell.

Phelan seam of 7 ft. worked; dip averages 1 ft. in 12; vertical depth of shaft, 185 ft.; length of east slope, 2,300 ft.; west slope, 2,500 ft.; west level, 4,000 ft.

System of working: pillar and bord, and longwall.

Ventilation by Murphy fan, 12 x 6 ft., running 120 revolutions per minute and giving 100,000 cubic ft. of air.

Naked lights.

Boilers: 3 Babcock.

Pumps: 2 bucket and lift and one No. 7 Blake; 1 Northey Compound Duplex, capable of raising 1,000 gallons per minute to the surface.

Hoisting engines: 1 20-in. double cylinder, 3 ft. 6 in. stroke, with 8-ft. drum; 1 double engine for hauling coal from deep, having 12-in. cylinder, 15-in. stroke.

Air compressor: 1 20 x 30 piston inlet, Ingersoll make, with a capacity for 12 coal cutters; 8 coal mining machines, 1 longwall undercutter, with necessary boilers, air receivers, piping, etc.

**DOMINION COAL CO.**– Continued

Coal heading machines—Two Stanley.
Endless haulage, driven by 1-12 cyl. engine.
Patent dumping cages and self-weighing tanks.
One Rand compressor, 48 x 30, with Corliss valves.
Steam water heater.

A large plant is now being laid down to instal a system of endless haulage throughout the mine, consisting of one 22x54 in. steam cylinder and three sets of hauling gear with independent friction clutches.

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*Glace Bay Colliery*—Situated 14 miles from the town of Sydney, and half a mile from Glace Bay Harbor, from which shipments are made. J. G. S. Hudson, *Superintendent;* William Adamson, *Underground Manager.*

Harbor seam, 6 ft.; dip averages 1 ft. in 12; vertical depth of shaft, 240 ft.

System of working—Pillar and bord. Coal from rise workings lowered to pit bottom by self-acting incline.

Ventilation—by Murphy Champion fan, 8 ft. dia., driven at a speed of 100 revolutions per minute, giving 50,000 ft of air.

Naked lights.

Boilers—2 Babcock, each 210 h. p.

Hoisting engines (on surface)—1 double drum, 18 in. cylinder 24 in. stroke; drums, 8 ft., built by Matheson, New Glasgow.

Pumps—2 in number, one steam (Cameron's "special"), and one double 10 in., having independent 9 in. col. (double).

Screens—Ordinary plain parallel, ¾ stationary.

Air compressor—One 20 x 20 x 24 in. stroke, and one 24 x 30 Rand.

Haulage—Endless rope throughout, driven by 18x36 in. engine, placed on surface.

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*International Colliery* at Bridgeport, 12 miles from the town of Sydney; James Purves, *Superintendent*; Thomas Johnstone, *Underground Manager.*

Harbor seam worked averages 5 ft. 10 in.; dip, 1 in 12; length of slope, 4,000 ft.; vertical depth shaft, 90 ft.

System of working—Pillar and room.

Ventilation—Murphy fan, 8 ft. dia.

Naked lights.

Winding engines (on surface)—Pair 16 x 36 in. and 14 x 30 in.; 8 ft. drum.

Pumps—1 Knowles, 160 ft. suction, 2,300 ft. discharge.

Boilers—1 Babcock, 210 h. p.; 2 plain cylindrical, 30 x 5 ft.

Haulage—One 18 x 36 for driving endless haulage, fixed on surface.

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*Gowrie Colliery*, situated on the north side of Cow Bay; Alex. Macdonald, *Underground Manager*; John Johnstone, *Superintendent.*

Seam worked (MacAuley) averages 5 ft.; dip, 1 in 8; Odiorne shaft, 200 ft.; new pit, 260 ft.; east slope, 2,800 ft.

System of working—Pillar and room (modified, the rooms being 10 yards wide and the pillars 7 yards), and one section long wall.

Ventilation—By furnace, 7 ft. 8 in. x 6 ft., giving 40,000 c. ft. air.

Naked lights.

Winding engines—Pair, 20 in. x 3 ft. 6 in., direct acting by hoisting engines; 8 ft. drum; also pair 9 x 12 in. tail rope hauling engines, geared 6-1; two drums 3 ft. 6 in.

Pumps—1 Knowles pump, 20 x 36 x 10 in., capacity about 30,000 gals. per hour; 1 fly wheel pump, 10 x 12 x 5½ in., capacity about 6,000 gals. per hour; 1 V. Bob Lift pump, 16½ x 48 x 10½ in., capacity about 18,000 gals. per hour.

Boilers—3 Lancashire, each 150 h. p.

Screens—Common bar (3); angle 31°; size, 18 ft. x 5 ft. 9 in.

Air compressors—One 16½ x 20 x 24 in. stroke; one 20 x 20 x 24 in. stroke, and one Rand Comp., 24x30.

DOMINION COAL CO. Ltd.—DOMINION No. I COLLIERY CAPE . RETON.

Patent fuel plant—Yeadon's; capacity, five tons per hour.
Mitchell longwall machine.
Haulage—One 18 x 36 in. engine fixed below, geared for endless haulage.

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*Reserve Colliery*, situated at Bridgeport Basin, two and one-half miles from Glace Bay; James McVey, *Superintendent;* Norman McKenzie, *Underground Manager.*

Phelan seam, averages 8 ft. 8 in.; dip, 1 in 13; worked by two slopes, of which the "Main" is 2,500 ft., and the "French" 3,580 ft. long; vertical depth, about 267 feet.

System of working—Pillar and room.
Ventilation by furnace, about 70,000 cubic ft. of air per minute.
Naked lights.
Hoisting engines—One winding engine, 22 in. cyl., 3½ ft. stroke; geared 5 to 1, working endless haulage.
Pumps—One pumping engine, 15 in. cyl., 8 in. water cyl., 24 in. stroke; one Cameron pump, 14 in. steam cyl., 8 in. water cyl., 18 in. stroke.
Boilers—Two Babcock, each 210 h.p.
Screens—Three in use, 20 ft. long.
Ingersoll coal cutters.
Mitchell's patent tippler.
Slack pocket, elevator and conveyor.

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*Old Bridgeport Colliery*, situate on north side of Lingan Bay, ten miles from the town of Sydney; Robert Robson, *Superintendent;* J. McEachren, *Underground Manager.*

Phalen seam, 8 ft. worked; dip averages 1 in 11; shaft 120 ft; system of working, pillar and bord.
Naked lights.
Ventilation by furnace.
Two air compressors; one 20 x 20 x 24 in. stroke; one 24 x 24 x 30 in. stroke.
Hoisting engines—1 pair Crooks 14 x 24 double, 5 ft, drum.
Boilers—Three 40 h.p. water bottom, tubular, loco. type.
Pumps—None. (Level to sea, natural drainage.)
Screens—Two ⅜ mesh, 20 x 6 ft.
Patent self-dumping cages and self-weighing tanks.
Ingersoll coal cutters.
Haulage—One Lidgerwood on surface, 10 x 12 in., geared 5 to 1; one Lidgerwood below, 10 x 12 in., geared 5 to 1.

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*Victoria Colliery*, situate at Low Point, on the south side of Sydney Harbor; T. J. Brown, *Superintendent;* John Connors, *Underground Manager.*
Ross seam, 6 ft. 7 in. worked; dip averages 25°; length of slope, 1,740 ft.
System of working—Pillar and bord; bords 1[illegible] ft. wide.
Ventilation—Murphy fan, 6 ft. dia., giving 40,000 cubic ft. per min.
Naked lights.
Hoisting engines—One horizontal engine, having two cylinders, each 24 in. dia., by 4 ft. stroke; drum 7 ft. dia.
Pumps—One Blake pump, cyl. 18 in. dia. by 4 ft. stroke; pump dia. 8 in.; one Knowles, cyl. 12 in. dia. by 1 ft. 3 in. stroke.
Boilers—Three cylindrical egg-end, 30 ft. long, and four multitubular.
Screens—Four, each 5 ft. wide by 20 ft. long.
There are also two locomotives and 120 waggons.
A bore-hole, 8 in. dia. and 600 ft. deep has been put down for pumping water to surface.

**DOMINION COAL CO.**—Continued

*Dominion No. 1 Colliery*, situate about 10 miles from the town of Sydney. Opened in 1894. J. C. Mitchell, *Superintendent*, J. Scott, *Underground Manager.*

Phalen seam, 8 ft. worked ; dip, 1 in 14 ; depth of shaft, 150 ft. (24 x 10 ft. 6 in.)

System of working—Pillar and bord ; pillars, 12 ft.; rooms, 22 ft.

Ventilation—One 12 ft. Murphy fan, running direct and producing 120,000 cubic ft.

Boilers—Three Babcock, each 210 h.p., working at 100 lbs. pressure.

Winding engines—One pair 24 x 54 in. cyl.; 8 ft. drum ; link motion, slide valve ; built by Smith & Co., Airdrie, Scotland. Man hoisting engine, 16 x 30, built by I. Matheson & Co., New Glasgow.

Air compressors—Two Ingersoll-Sergeant compound, each 48 x 30, with Corliss valves.

Pumps—One Cameron, 18 x 24. ft.

Coal heading machines—Two Stanley.

Coal cutting machines—Yoch and Ingersoll.

Other engines—Two 18 x 36 in., below ground, for driving endless haulage, built by Wilkes-Petsall Foundry, England.

One Mitchell longwall machine.

Steam water heater.

Steam reversing gear.

Slack pocket, elevator and conveyor

Self-dumping cages, weighing tanks.

Steel lattice pit frame, 85 ft. high.

NOTE—It is intended to cut the whole of the coal in this mine (2,000 tons pe day) by machinery.

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*Roost Colliery*—Working the Hub seam, which is 8 ft. thick, at a depth of 130 ft. *Manager*, J. G. S. Hudson, *Under Manager*, John Adamson. This mine has been closed upwards of 20 years, and was flooded. The water has all been pumped out and the mine re-opened and equipped with a modern plant, and is now equal to an output of 1000 tons a day.

One pair Corliss valve hoisting engines, 24 x 42 in., with 8 ft. drum.

One pair direct acting engines, 16 x 32, for hoisting men.

Two Babcock boilers, each 210 h.p.

Steam water heater.

Bankhead and frame 85 ft. high.

Automatic loading screens and chutes.

Self-dumping cages.

One pair engines, 12 x 20, geared 5 to 1, for endless haulage, fixed on surface.

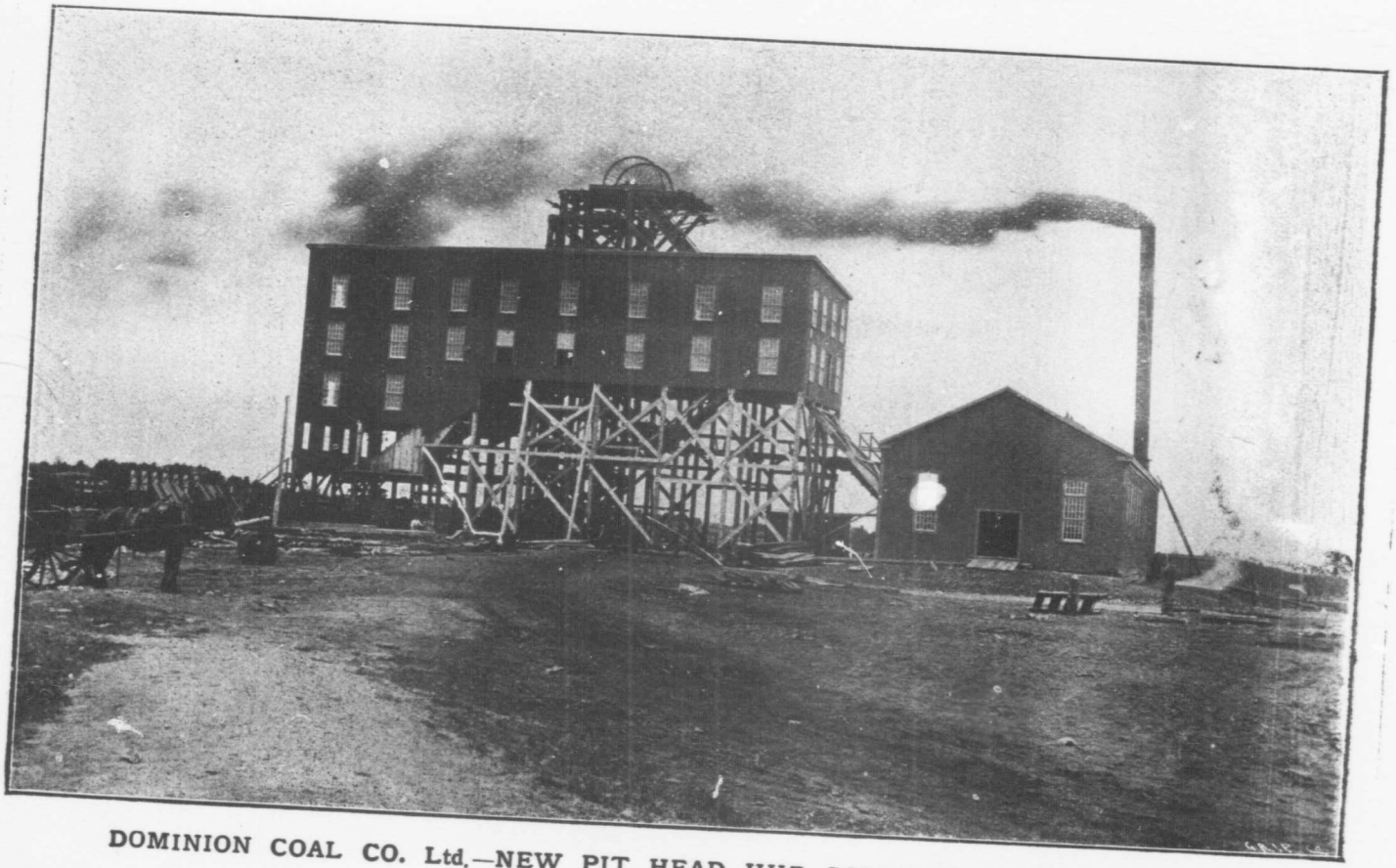
One Cameron pump, 18 x 24 x 8, below, raises all the water to the surface.

Carpenters' and smiths' shops, engine, boiler and compressor house erected, and commodious railway sidings, standard guage, connect this mine with the company's general Sydney and Louisburg system.

---

COLLIERY RETURNS, 1894.

| | Coal Raised. Tons. | Coal Shipped. Tons. |
|---|---|---|
| Gowrie | 138,286 | 127,018 |
| Reserve | 223,079 | 209,343 |
| Old Bridgeport | 54,842 | 54,656 |
| Glace Bay | 144,341 | 137,567 |
| Victoria | 130,962 | 120,647 |
| Caledonia | 125,124 | 118,872 |
| International | 138,190 | 127,205 |
| Dominion No. 1 | 33,346 | 33,776 |
| | 988,170 | 929,084 |



DOMINION COAL CO. Ltd.—NEW PIT HEAD HUB COLLIERY, CAPE BRETON.

COLLIERY RETURNS, 1895.

| | Coal Raised. Tons. | Coal Shipped & Land Sales. Tons. |
|---|---|---|
| Gowrie | 54,138 | 41,052 |
| Reserve | 199,553 | 192,887 |
| Old Bridgeport | 107,202 | 99,329 |
| Glace Bay | 49,795 | 44,143 |
| Victoria | 96,931 | 83,051 |
| Caledonia | 163,423 | 145,227 |
| International | 96,605 | 86,041 |
| Dominion No. 1 | 73,167 | 63,109 |
| Hub | 33,617 | 29,960 |
| Total | 874,431 | 784,799 |

DISTRIBUTION. 1895.

| | |
|---|---|
| Nova Scotia | 148,938 |
| Prince Edward Island | 12,101 |
| Newfoundland | 38,907 |
| Quebec | 459,124 |
| New Brunswick | 25,739 |
| St. Pierre | 4,662 |
| West Indies | 266 |
| United States | 56,534 |
| Steamers | 38,528 |
| Colliery consumption | 44,469 |
| Company's railways | 7,146 |
| Colliery employees | 18,738 |
| | 855,152 |

RECAPITULATION.

| | |
|---|---|
| Shipped | 784,241 |
| Land sales | 558 |
| Collieries and railway | 51,615 |
| Employees | 18,738 |
| | 855,152 |

## DIRECTORS' REPORT.

The report of the Directors and accounts for the fourteen months ended 28th February, 1895, submitted at the annual meeting on 6th June, were as follows:--In submitting this report the attention of shareholders is called to the fact that to the time of making the report for 1893 the operations of this company were carried on for about ten months, but in consequence of the change in the fiscal year, which now begins March 1st, this present report covers a period of fourteen months.

January and February are months when the mines are practically closed and no revenue is received. The accounts for these two months are shown separately. Had this statement included but twelve months from January 1, 1894, the net surplus would stand increased by the sum of $64,597.65, or $92,211.56 instead of $27,613.91.

The quantity of coal mined was $1,020,537 tons, being an increase of 186,518 tons over the business of 1893.

In addition to this business much progress has been made in opening new pits, one on a seam of coal believed to be of superior quality, and in providing modern apparatus and machinery for mining and handling coal. This work is so far complete that no further expenditures are contemplated. As the coal seams of Cape Breton resemble those of the United States, it is believed that the same cheapening of cost will follow these improvements in the one case as in the other.

**DOMINION COAL CO.**—Continued.

This cheaper cost of production and cheaper transportation will enable the company to market its coal in places which would otherwise be inaccessible, thus making a larger output possible, increasing the length of time when mining operations can be carried on, increasing the revenue of the company and giving more employment and for a longer time to its employees.

The railroad to Louisburg is substantially completed as well as its piers at Sydney and Louisburg, and it is expected that the railroad will be open for freight and passenger business over the whole route on the first of July. The opening of the road to Louisburg will afford for the first time an opportunity for winter shipments of coal, and will consequently cheapen the cost of sea transportation to the lower Maritime Provinces, and to New England ports. The road is now forty-two miles in length, with grades exceedingly favorable. It is laid with 80-lb. rails and is in every respect first-class, and has connection by branches to all the company's collieries but one. That one is located at some distance from the main line and is equipped with a short piece of railroad and independent pier. During the past year a large amount of equipment, principally coal cars (of which four hundred are of a capacity of sixteen tons each) and three locomotives have been added. The local freight and passenger traffic has proved satisfactory.

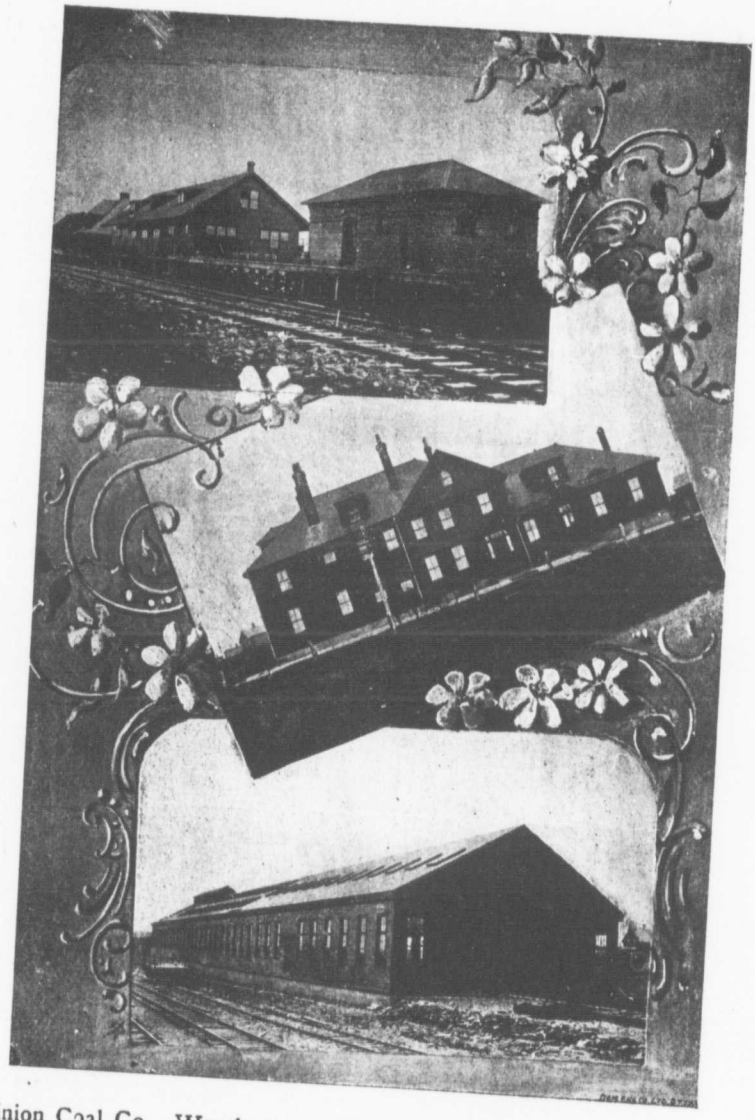
All the construction work in contemplation at the time of organization is now completed. All of the bonds held for this expenditure ($1,500,000) have been sold at a satisfactory price. The proceeds (in part received) place the company in a satisfactory financial position.

The net revenue since organization has been sufficient to provide for all interest, sinking fund and dividend requirements on preferred stock and to pay a considerable sum toward depreciation and expenses for change in the fiscal year. When the savings by the new methods begin to be realized, it is believed that the net results will show a gratifying increase which can be used for dividends on the common stock.

The sinking fund provision for the bonds requires the payment to the trustees, the New England Trust Company, of two cents per ton on all coal mined the first year (1893), three cents the second year, four cents the third year, and five cents thereafter, and after the sum of $125,000 has been received by the trustees (which shall be held in cash or in securities) the bonds will be called for payment and cancellation. Even on the present basis of output a small amount will be required to be called in April, 1897, and thereafter an amount equal to five cents per ton on the output. The amount now in the sinking fund has been invested in United States bonds.

*Report of the Treasurer, January 1, 1894, to February 28, 1895.*

| | | |
|---|---|---|
| Net proceeds 1,020,537 tons coal, less cost mining, transportation, royalty, etc | | $184,075 01 |
| Profit on steamships, railway, barges, etc | | 196,873 43 |
| | | $380,948 44 |
| From which has been paid— | | |
| Balance sinking fund (1893) | $320 43 | |
| Interest | 176,864 31 | |
| Dividends, preferred stock | 120,000 00 | |
| General expense | 47,857 69 | |
| | | 345,042 43 |
| Balance | | $35,906 01 |
| Add— | | |
| Surplus from 1893 | $51,977 48 | |
| Four months' interest allowed in 1893 statement afterwards paid in above interest account | 30,000 00 | |
| | | 81,977 48 |
| Total | | $117,883 49 |



Dominion Coal Co.—Warehouse at Glace Bay, C.B., New General Offices, New Machine Shops.

| | | |
|---|---|---|
| For which provision must be made for— | | |
| Dividend preferred stock, 2 months, January and February, 1895 | $20,000 00 | |
| Sundry accounts payable | 3,343 45 | |
| Sinking fund | 28,055 05 | |
| | | 51,398 50 |
| Add subsidy received for railway construction | | $66,484 99 |
| Gross surplus | | 64,000 00 |
| Written off as follows— | | $130,484 99 |
| Subsidy to suspense account for future depreciation railway and equipment | $64,000 00 | |
| To profit and loss, depreciation in property | 21,054 98 | |
| " " provision doubtful accounts | 5,638 42 | |
| " " sundry items properly chargeable to 1893 business | 12,177 68 | |
| | | 102,871 08 |
| Net surplus carried over | | $27,613 91 |

NOTE—This surplus remains after deducting expenses of two unproductive months, costing as follows :—

| | |
|---|---|
| Maintenance of mines, offices, etc | $29,597 65 |
| Interest on bonds | 15,000 00 |
| Dividend, preferred stock | 20,000 00 |
| Total | $64,597 65 |

*Balances, February 28, 1895.*

| | | |
|---|---|---|
| Assets— | | |
| Property | $19,194,123 54 | |
| New supplies, warehouses and stores | 107,315 09 | |
| Agents' balances | 188,085 10 | |
| Bills receivable | 3,000 00 | |
| New England Trust Co. sinking fund | 15,469 28 | |
| " " interest account | 63,465 00 | |
| " " special account | 106 00 | |
| American Loan & Trust Co., dividend account | 1,892 00 | |
| Cash | 54,041 76 | |
| | | $19,627,497 77 |
| Liabilities— | | |
| Common stock | $15,000,000 00 | |
| Preferred stock | 1,500,000 00 | |
| First mortgage bonds | 2,100,000 00 | |
| Bills payable | 719,147 64 | |
| Unpaid coupons | 63,465 00 | |
| " dividends | 1,892 00 | |
| Coal, balance payable | 29,026 91 | |
| Accounts payable | 3,343 45 | |
| Royalty, 5 months | 32,082 73 | |
| Accrued dividend, 2 months | 20,000 00 | |
| Sinking fund | 28,055 05 | |
| Railway subsidy, suspense account | 64,000 00 | |
| To profit and loss | 38,871 08 | |
| To surplus, 1895 | 27,613 91 | |
| | | $19,627,497 77 |

## DOMINION COAL, COKE & TRANSPORTATION CO.

Incorporated by Dominion Charter, 1883. Authorized Capital, $500,000; subscribed, $250,000; paid, $190,000.

**Directors:**

D. E. Adams, Winnipeg, *President.*
A. G. Yates, Rochester, N.Y. | A. Jardine, Winnipeg.
Major Walsh, Brockville, Ont. | D. Adams, Winnipeg.

**Head Office: W. McQuaker, Secretary, Winnipeg.**

Company owns 2,000 acres of coal lands in the Province of Assiniboia. Mines at the town of Estevan, in the Souris district; connected with the Souris line of the Canadian Pacific Railway, and the main line of the Sault branch from St. Paul, connecting with the Canadian Pacific Railway at Pasqua; mining for lignite began in November, 1892; output to date averages about 10,000 tons per annum, sold altogether in Manitoba; seam averages 8 ft.; opened by three side drifts, 500 ft. in at date; method of working, pillar and room; 50 persons employed.

## EAST WELLINGTON COAL CO.

Authorized Capital, $1,500,000.

**Directors:**

J. Lawrence Pool, *President*, San Francisco.
J. Eastland, *Vice-President*, San Francisco.
Col. Mendall, *Director*, San Francisco.
R. D. Chandler, *Treasurer*, San Francisco.
Wm. Whitney, *Secretary*, San Francisco.

**Head Office: 507-509 East Street, San Francisco, Cal.**

**CANADIAN OFFICE:**

**W. S. Chandler, General Manager, East Wellington, B.C.**

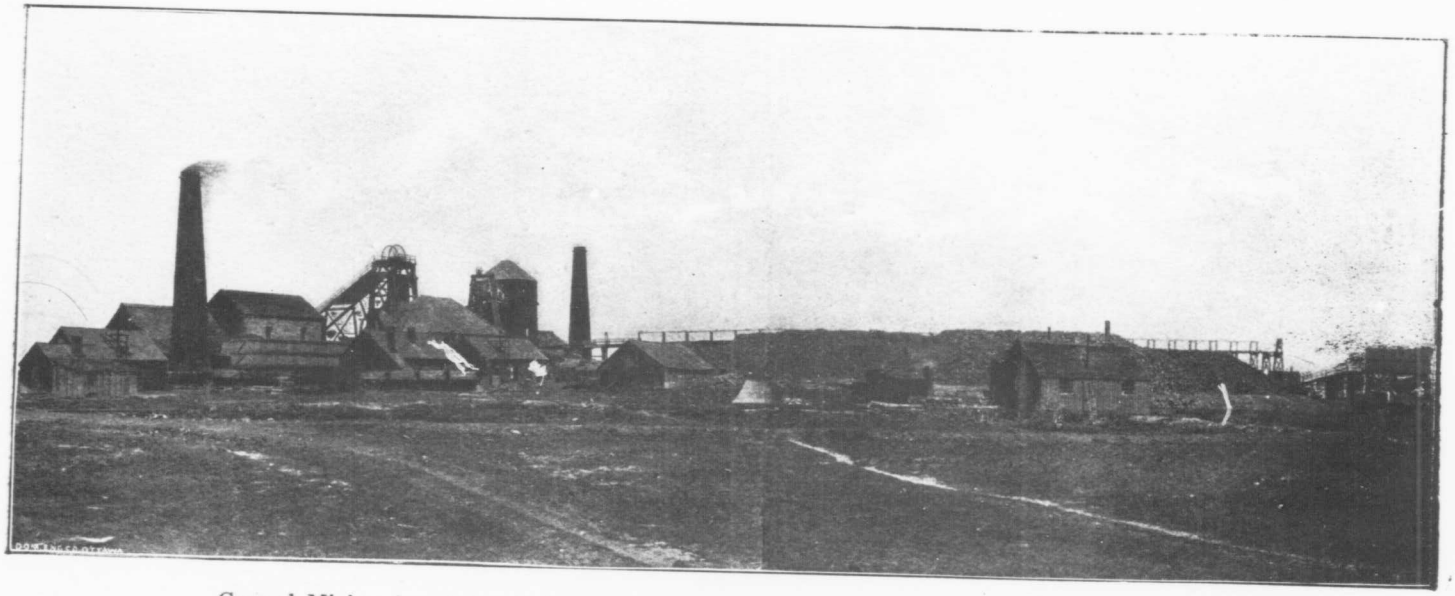
The company owns a property containing 650 acres, upon which is the East Wellington colliery, at East Wellington, in the Province of British Columbia. In 1893, from January to October, 140 persons were employed and 28,000 tons of coal raised. The seam being thin and expensive to work, a reduction of wages was decided upon in the fall of 1894, to which the men objected and the pit was closed, with but slight prospects of ever being opened again.

## GABRIOLA COAL CO. Ltd.

Incorporated 1895. Authorized capital, $1,000,000, in shares of $10.

**Directors:**

Marcus Wolfe. | A. E. Rand. | A. J. Hill | Elijah Priest.
W. W. B. McInnes.



General Mining Association, Ltd.—Surface Works, Princess Pit, Old Sydney Mines, Cape Breton.

**Head Office: Nanaimo, B.C.**

At date of report the company had bonded about 2,000 acres of coal lands on the north end of Gabriola Island, British Columbia, and arrangements had been made to put down a series of bore holes, with a view to determining the value of the coal seams.

## GENERAL MINING ASSOCIATION, Ltd., OF LONDON, ENG.

Registered 1825. The capital was £274,600 in fully paid shares of £10, but in 1874 a return of £1 per share was made, in 1880 a further £1 per share was repaid and in 1894 a return of £2 10s. was made. There is now, therefore, a capital of £151,079 10s. in shares of £5 10s. fully paid. Accounts to December 31st, submitted in April, but an interim meeting is held in November. A dividend of 2s. 6d. per share was paid in 1877; for 1878 4s.; for 1879, 2. 6d.; for 1880, 4s. 6d.; for 1881 and 1882, 8s.; for 1883 a dividend of 10s. per share was paid, with a bonus of 5s. per share out of the profits derived from the sale of shares in the Spring Hill Mining Company; in 1884 a dividend of 8s.; for 1885 and 1886, 5s. each year; 1887, 7s. 6d.; 1889 and 1890, 6s.; 1891, 8s.; 1892, 10s.; 1893, 15s.; 1894, 14s. Reserve Fund, £29,850 stg.; carried forward 31st Dec. 1894, £459.

**Directors:**

J. D. Hill, *Chairman.*

Sir Charles Tupper, Bart. | W. S. Cunard.

Col. W. C. Western.

**Head Office: E. E. Bigge, Secretary, Blomfield House, London Wall, London, E.C., England.**

**Mines Office: R. H. Brown, General Manager, Sydney Mines, C.B.**

**CANADIAN AGENTS:**

**Messrs. Cunard & Morrow, Halifax, N.S.**

In the year 1825 this company purchased the Duke of York's right to all the coal mines in Nova Scotia. In 1826 it sent out the late Mr. Richard Brown, father of the present manager, to survey and report upon the coal fields of Nova Scotia and Cape Breton. He found that the Sydney Mines, first opened in 1785 and under lease to Messrs. T. S. and W. R. Brown, was not included in the lease to the Duke of York, and as their lease expired on the 31st December, 1826, and they did not care to renew it at the heavy royalty of 4s. 3d. per ton, which they had been paying, Mr. Brown took the lease from the Government for the General Mining Association. The opening out of works was commenced at the beginning of 1830, when the first shaft, 200 ft. deep, was sunk. Iron foundry and fitting up shops were then erected and a railway from the pits to North Sydney for a shipping port was completed in 1834. Previous to this date the coal had been shipped at a small wharf outside the bars. In 1834 a

**GENERAL MINING ASSOCIATION**– Continued

second shaft further to the dip was sunk. In 1854 a third shaft 400 ft. in depth was put into operation. A still further move to the dip was made as the underground works advanced in that direction, and the fourth winning was got into operation in 1876. This last is known as the Princess Pit. In addition to their works at Sydney Mines, the G. M. Association opened a colliery at Bridgeport in 1830, which was closed in 1849, they also operated a small colliery at Bras d'Or from the year 1833 to 1849. They opened a colliery at Lingan in 1854, which worked until 1886, while they opened the Victoria Colliery (now owned by the Dominion Coal Co., Ltd.) in 1882.

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*Sydney Mines Colliery*—Situated in the town of Sydney Mines, on the north side of Sydney Harbor, about three miles from the town of North Sydney. Edward Wilkinson, Underground Manager. Average persons employed: Below ground, 456; above ground, 220. The average output during the past three years has been 225,000 tons per annum.

Main seam 5 ft. 4 in. worked, dip averages 1 in 12.

Opened by shaft 13 ft. dia. by 690 ft. deep.

System of working—Bord and pillar, the bords being 17 ft. wide.

Lamps—Muesler and naked lights.

Ventilation by Guibal fan, 30 ft. dia. by 10 ft. wide, and by a Murphy fan, 10 ft. dia. by 4 ft. wide.

Hoisting engines having two horizontal cylinders each 36 in. dia. by 5 ft. stroke, drum 18 ft. dia., draws two tubs of coal in a cage at once, and can hoist 126 tons coal per hour.

Pumps—One Cornish pump, steam cylinder, vertical, 68 in. dia. by 9 ft. stroke, pumps about 550 imperial gallons water per minute and works for 9 hours per day. Pumps are in two lifts, each 20 in. dia. by 336 ft. in height. One forcing set, steam cylinder, horizontal, 30 in. dia. by 4 ft. stroke, pumps about 42 galls. per minute, in one column of pumps which are 8 in. dia. by 360 ft. in height. The water from the faces of the workings at the dip is pumped to the shaft bottom by two duplex pumps; one a Worthington, 4½ x 2¾ x 4 in., forces the water to a distance of 1,600 ft. back from the working faces and to a vertical height of 155 ft.; the other a Northey, 7½ x 4½ x 10 in., forces the water thence to the pit bottom, a distance of 3,194 ft., and to a vertical height of 209 ft. 9 in. These two pumps are actuated by compressed air produced on the surface and carried to the pumps in malleable iron pipes.

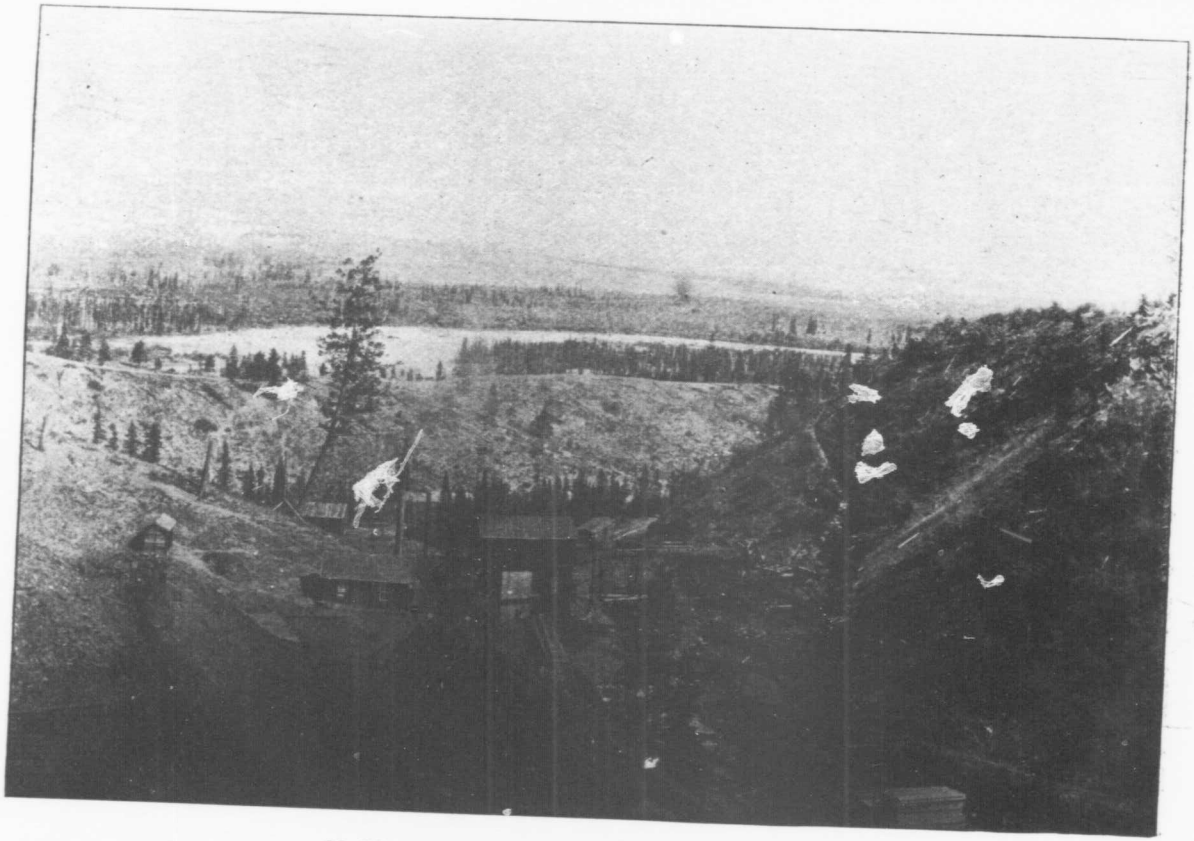
Boilers—Nine egg-ended cylindrical boilers from 5 to 6 ft. dia. by 30 ft. to 35 ft. long; three tubular boilers each 18 ft. 9 in. long by 5 ft. 6 in. dia.; two steel tubular boilers each 14 ft. long by 60 in. dia., with 62 tubes of 3½ in. dia.; and one steel tubular boiler, 14 ft. long by 54 in. dia., having 54 tubes of 3½ in. dia.

Screens—Five, each 5 ft. wide by 24 ft. long.

Railroad is $4\frac{8}{10}$ miles in length to the shipping piers at North Sydney; also connected with the main line of the Intercolonial Railway at North Sydney station. There are four locomotives and 220 coal cars of the capacity of from 4 to 6 tons each. They have two commodious shipping piers at their loading ground at North Sydney.

COAL SALES.

| | Round. | Slack. |
|---|---|---|
| 1890 | 143,365½ tons. | 9,316 tons. |
| 1891 | 136,552 " | 6,740 " |
| 1892 | 151,884 " | 7,631 " |
| 1893 | 186,615 " | 8,994 " |
| 1894 | 211,000 " | 12,000 " |
| 1895 | 203,039 " | 6,856 " |



H. W. McNeill Co. Ltd.—Mines at Canmore, Alta.

## H. W. McNEILL CO., Ltd.

Incorporated 8th January, 1892. Authorized Capital, $50,000, in 500 shares of $100.

**Directors:**

H. W. McNeill, Anthracite, N.W.T.
E. L. Little, Anthracite, N.W.T. | Will. F. Little, Anthracite, N.W.T.

**Head Office: H. W. McNeill, President and Manager, Anthracite.**

W. F. Little, *Assistant Manager.*

Formed to mine and extract coal in the Dominion of Canada. It operates mines under a ten years' lease, from June 1st, 1891, on the property of the Canadian Anthracite Coal Co., Ltd., on the line of the Canadian Pacific Railway, at Anthracite and Canmore, Province of Alberta.

Mining capacity at Anthracite, for house use exclusively, 150 tons per day. Mining capacity at Canmore, for locomotive use, 250 tons per day.

Business year ends June 1st. 65,000 tons hoisted last year. Mueseler safety lamps used. Fan ventilation. Pillar and room system. Three hundred men employed.

## INTERCOLONIAL COAL MINING CO., Ltd.

Incorporated 1867 by Act of the Legislature of Nova Scotia.

| Capital. | Authorized. | Issued. |
|---|---|---|
| Common stock | $500,000 | $500,000 |
| Preferred stock | 250,000 | 219,700 |
| First mortgage bonds | 250,000 | 250,000 |

**Directors:**

Jas. P. Cleghorn, *President.*

Henry A. Budden.
Hartland S. Macdougall.
W. M. Ramsay.
A. W. Hooper.

G. Goff Penny.
W. J. Nelson.
Thomas Wilson.
R. McD. Paterson.

**Head Office: Wm. J. Nelson, Secretary, 199 Commissioner St., Montreal.**
**H. A. Budden, Vice-President and Managing Director.**

**Mines Office: Chas. Fergie, M.E., Westville, N.S.**

This company's property contains 2¾ square miles of coal areas upon which is the Drummond Colliery at Westville, in the County of Pictou, Nova Scotia.

The main and second seams are worked, the third and fourth being intact. The second seam is only in process of being opened up, and the following notes refer to the main seam alone, which is worked by slopes, size 12 x 8 ft., having an average dip of 16 degrees, and are 5,000 ft. long; the fan shaft is situated to the south of these slopes at a vertical depth of 70 ft., and is 10 x 8 ft. The coal is good for steam and household purposes and makes excellent coke. The No. 1 slope is used exclusively

**INTERCOLONIAL COAL MINING CO.**—Continued

for hoisting coal, the No. 2 for lowering and raising men, also for dropping down timber, materials, etc.

*Mode of Working*—The seam is worked on the bord and pillar system; each lift is 450 ft.; the levels are S.E. and N.W. 20 degrees; the dip is 24 degrees on the north and 19 degrees on the south side; counterbalance planes are driven every 450 to 500 ft.; the bords are 10 ft. wide by 9 ft. high on the south, and 10 ft. wide by 7 ft. 6 in. high on the north side; heads are driven 100 ft. apart, 6 x 6 ft.; the pillars average 80 x 40 ft. The main levels of every lift are driven out to the extreme boundary before the work of opening out bye-bords is commenced. The coal is then worked back towards the slopes. No explosive is used, the coal being worked by maul and wedge.

*Employees*—The average number of persons employed is:—Undergound cutters, 176; loaders, 34; on cost, 90; boys, 50; total, 350. Surface, 118 men and boys. Total—Underground and surface, 468. The average daily output is 1,000 tons in summer and 600 tons during winter months when working.

*Lamps*—To further increase the already many precautions taken with safety lamps and principally to protect them in very high currents a new small air compressor has been erected in the lamp room; to this compressor a ½-inch pipe is connected, arranged so that by opening a foot valve the glass and joints are subjected to a pressure of 30 lbs. per square inch. In case of any defect the lamp is immediately extinguished. The same compressor also supplies air for cleansing the gauzes of dust.

*Ventilation*—The ventilation of the mine is produced by a Walker "Indestructible" fan of the Guibal type. It is 18 ft. dia. by 6 ft., driven by cotton ropes and geared 2 to 1. Engines for driving the fan are of the compound expansive cut-off type. High pressure cylinder, 17 in. dia.; low pressure cylinder, 23 in. dia. The engines are constructed to work independently of each other if necessary.

There is also an alternative fan of the Guibal type, built by G.W. Snider, Pottsville, Pa., and erected July 8, 1875. It is 20 x 7 ft. wide, driven direct by an engine 16 x 24 in. The engine and fan running at 45 revolutions per minute produce 100,000 cubic ft. of air per minute.

A steam jet is also provided in case of accident, and is capable of producing 25,000 cubic ft. per minute.

*Winding.*—The winding and hauling egines are set back in direct line with the slopes. No. 1 winding engine has two horizontal cylinders, 28 x 60 in. stroke; balanced piston valves; pair of plain drums 10 ft. diameter by 3 ft. 6 in. wide, with independent action. The Lane friction gear is used; hauls 12 boxes, each containing 1,344 lbs. of coal, up 4,300 ft. in three minutes.

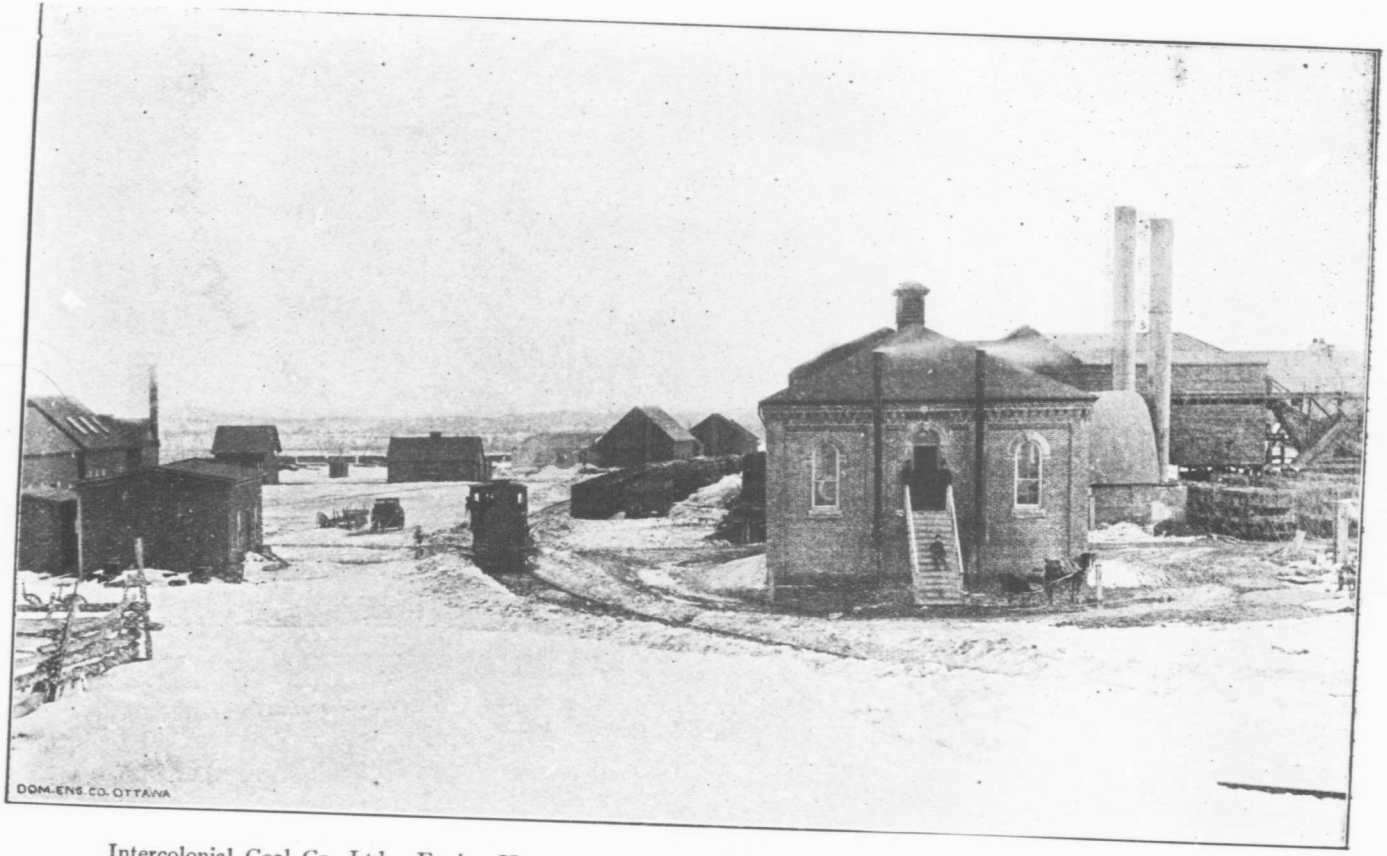
No. 2 winding engines are a pair of 16 x 36 in. V friction, geared 2 to 1; drums 8 ft. diameter; work singly or connected. The rope used is ⅞ in. of crucible steel.

*Hauling Ropes.*—These are of plough steel, 1⅛ in. diameter, "Lang's" patent.

*Boxes.*—These are of wood, size 4 ft. 2 in. x 2 ft. 2 in. wide by 2 ft. 6 in. deep. The wheels are steel, 12 in. diameter, fast to the axle, which is 1⅝ in. diameter, and also steel; the bearings are inside; the gauge is 2 ft. 8½ in.; 400 boxes are used in and about the mine and the greasing is done on the surface.

*Boilers.*—There are 5 egg-end steel boilers, each 30 ft. x 3 ft. 6 in.; the working pressure of steam is 80 lbs.; two Cornish steel boilers, 30 ft. by 5 ft. 6 in., flues 1 ft. 10 in. diameter, working in conjunction with 1 "Heine" boiler of 200 h.p., the working pressure of these is 100 lbs.; this latter boiler is a quick generator of steam, accessible at all points, costs little to erect and will burn the smallest slack or duff. Steam is conveyed down the mine by 5 in. cast iron pipes, having spigot and faucet joints, for the first 2,000 ft., afterwards by 3 in. wrought iron flanged pipes to a point of 3,700 ft., on the slope. The latest pipes provided for the lower workings are 3 in. wrought iron tubing flanged at ends, with loose cast iron spigot and faucet flanges. More mechanical labor saving appliances having been introduced, it was found necessary to erect in 1894 two more boilers; these are of the Stirling water tube safety type. Two of this class have been erected of 300 horse power.

*Pumping*—Three steam pumps are employed. No. 1 is "Knowles" direct acting compound plunger pump, cylinder 8 in. and 14 in., plunger 6 in., stroke 24 in.; inde-




Intercolonial Coal Co. Ltd.—Engine House and Surface Works, Drummond Colliery, Westville, Nova Scotia.

pendent condenser; vertical lift, 347 ft.; column 10 in. cast iron. No. 3 is a "Northey," improved steam pump, cylinder 14 in., plunger 5 in., stroke 12 in., with separate condenser; vertical lift 500 ft.; column 4 in. cast iron. No. 4 is also a "Northey," 12 in. cylinder, 4 in. plunger, 12 in. stroke; vertical lift 80 ft.; column 3 in. wrought iron. No. 2 is a Northey compound condensing, duplex plunger pump erected at the 4,000 ft. level with a capacity of 80,000 gallons, throwing a vertical distance of 600 ft.

*Underground Hauling*—The haulage on the south levels, from which two-thirds or more of the output is taken, is by tail-rope; the engines, a pair of 12 in. by 14 in. stroke, geared 3½ to 1; drums 4 ft. by 3 ft.; haul 24 boxes each trip; average speed of boxes 6 miles per hour; rope, crucible steel ⅝ in. diameter; boxes run on T rails 18 lbs. to the yard.

*Coke Ovens*—There are twenty bee-hive ovens, each 12 ft. dia. by 6 ft. high; a charge consists of 5 tons of washed coal, and which has passed over a ½ in. square mesh screen; ovens are drawn every 60 to 70 hours: the average yield of coke is 3 tons per oven per charge. A Sheppard deadweight crusher, reduces the coal to the required size. The coal is washed by a "Robinson" coal washer, and which is capable of washing 100 tons in 10 hours.

*Lighting*—All workshops, engine houses and bankhead are lighted by the incandescent electric light. No open lights are allowed in any part of the mine, the lamps used are of the Marsaut type.

*Screens*—Two ordinary fixed screens and one shaker screen receive all the coal produced. The shaker screen is fed by a revolving tippler which deposits the coal gently on the screen, which is delivered on to a picking belt 60 ft. long by 4 ft. wide, to allow of the thorough picking and cleaning of the coal.

*Workshops*—These consist of a carpenters', blacksmiths', car, machine shops and sawmill. The machine shop contains lathes, drilling and screwing machines, also the dynamo for electric lighting. The sawmill contains travelling rotary saw and cross-cut, drilling and notching machine for cutting groove in edge-rail sleepers. This machine will cut and groove 60 sleepers per hour. When formerly cut by hand they were turned out at the rate of 10 per hour per man.

*Shipping Wharf*—This is situated at Granton, on the Middle River, 7 miles north of the mines, with which it is connected by a line of railway owned and operated by the company. Steamers of 3,000 tonnage can load here. Two locomotives and some 160 hopper cars are employed during the shipping season.

A compound air compressor 14 in. by 22 in. is being erected; the air is to displace the steam in the mine, which is giving trouble in consequence of the long distance it has to be carried.

COAL DISPOSALS.

| — | 1892. | | | 1893. | | |
|---|---|---|---|---|---|---|
| | Round | Slack | Total | Round | Slack | Total |
| Nova Scotia | 39,367 | 37,744 | 77,111 | 53,613 | 47,038 | 100,651 |
| New Brunswick | 5,388 | 2,701 | 8,089 | 2,912 | 653 | 3,565 |
| Prince Edward Island | 2,213 | 3,654 | 5,867 | 8,812 | 7 133 | 15,945 |
| Quebec | 83,439 | 9,073 | 92,512 | 79,794 | 6,101 | 85,895 |
| Ontario | ..... | ... . | ..... | 23 | 10 | 33 |
| Newfoundland | ..... | ..... | .. ... | 880 | ..... | 880 |
| Coke ovens | 38 | 2,312 | 2,350 | 143 | 987 | 1,130 |
| Colliery employees | 2,854 | 62 | 2,916 | 3,402 | 18 | 3,420 |
| Colliery engines | 3,540 | 5,263 | 8,803 | 8,111 | 2,755 | 10,866 |
| Totals | 136,839 | 60,809 | 197,648 | 157,690 | 64,695 | 222,385 |

**INTERCOLONIAL COAL MINING CO** —Continued.

| — | 1894. | | | 1895. | | |
|---|---|---|---|---|---|---|
| | Round | Slack | Total | Round | Slack | Total |
| Nova Scotia | 57,043 | 43,465 | 100,508 | 52,219 | 39,865 | 92,084 |
| New Brunswick | 6,995 | 245 | 7,240 | 3,886 | 312 | 4,198 |
| Prince Edward Island | 8,480 | 6,859 | 15,339 | 10,270 | 6,046 | 16,316 |
| Quebec | 73,193 | 7,494 | 80,687 | 70,086 | 5,548 | 75,634 |
| United States | 2,050 | 1,009 | 3,059 | ..... | ..... | ..... |
| West Indies | 1,052 | .... | 1,052 | 313 | ..... | 313 |
| South America | 536 | .... | 536 | ..... | ..... | ..... |
| Colliery employees and local | 4,503 | 370 | 4,873 | 4,140 | 75 | 4,215 |
| Colliery engines | 2,152 | 9,297 | 11,449 | 3,011 | 8,473 | 11,484 |
| Totals | 156,004 | 68,739 | 224,743 | 143,925 | 60,319 | 204,244 |

## NEW VANCOUVER COAL MINING AND LAND CO.

Organized 1862, and reconstructed 30th January, 1889. The authorized capital is £215,000 in 215,000 fully paid shares of £1 each. The capital was increased from £185,000 to its present amount in January, 1892, by the creation of 30,000 new shares which were issued credited as paid to Messrs. Rosenfeld, the agents, in settlement of a debt to that amount. Shareholders in the old company receive 10 new £1 shares in exchange for each old share of £10. There are 6 per cent. debentures amounting to £67,100, £60,000 of which were issued in exchange for similar debentures in the old company, and the remainder form part of an issue of £20,000 authorized 1892. The bonds are registered, and are secured on the whole of the properties as a floating security, the interest being payable half yearly on the 31st March and 30th September. In April, 1889, previous to the transfer of the undertaking, the old company declared a bonus of £1 per share, but as the old shares were then only £9 paid, a final call of £1 per share was made, and the bonus applied in payment of the call.

**Dividends:**

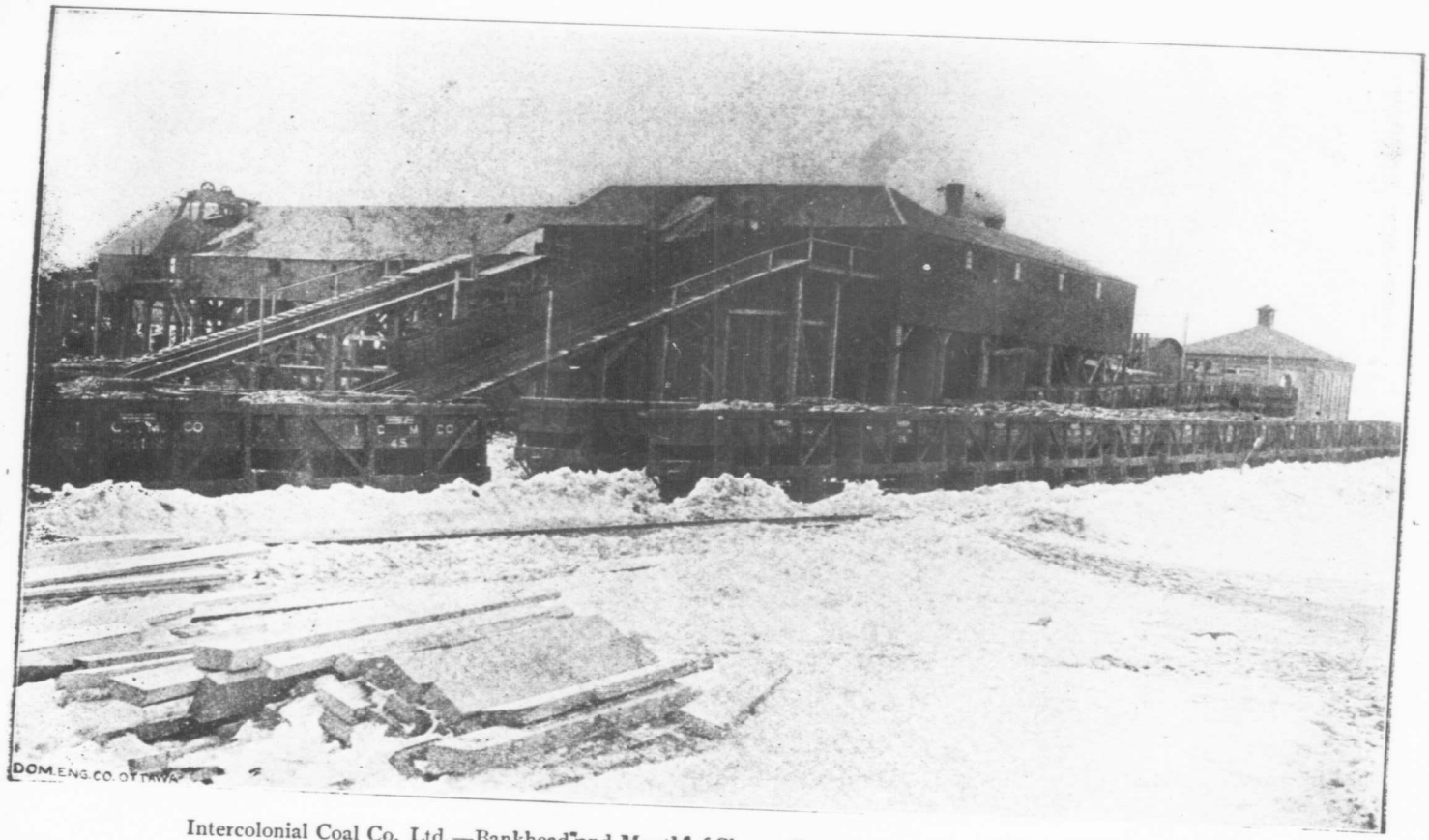
| | | | |
|---|---|---|---|
| June, 1889 | 2½ per cent. | Dec., 1891 | 2½ per cent. |
| Dec., 1889 | 2½ " | June, 1892 | 1½ " |
| June, 1890 | 2 " | June, 1894 | 3 " |
| Dec., 1890 | 3 " | Dec., 1894 | 2 " |
| June, 1891 | 3 " | May, 1895 | 2 " |

At the 31st December, 1890, a credit to profit and loss of £7,699 12s. 1d. was carried forward after payment of a dividend. The accounts to the 31st December, 1891, showed a profit on the half year of £7,850; after payment of dividend a balance of £23,981 18s. 3d. was carried forward. For the half year ending the 30th June, 1892, a loss of £4,691 7s. 4d. was shown, reducing the credit balance to £19,290 10s. 11d. At the 31st December, 1892, a profit on the half year of £3,097 5s. 10d. was shown, making a credit to profit and loss of £22,387 16s. 9d., which was carried forward. Reserve fund, £20,000.

**Directors:**

John Galsworthy, *Chairman.*

| | |
|---|---|
| Joseph Fry. | Frederick Tendron. |
| William Needham. | Edwin Andrew. |




Intercolonial Coal Co. Ltd.—Bankhead and Mouth of Slopes, Drummond Colliery, Westville, Nova Scotia.

**Head Office:**

Joseph Ramsden, *Secretary*, 12 Old Jewry Chambers, Old Jewry, London, E.C.

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## CANADIAN OFFICE:

**Samuel M. Robins, Superintendent, North Corner of Farquhar Street and Esplanade, Nanaimo, B.C.**

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*Agents at San Francisco:* Messrs. John Rosenfeld's Sons.

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Formed to acquire the properties of the Vancouver Coal Mining and Land Company, Limited, registered in 1862. The company owns some 32,000 acres of freehold land, and operates the Nanaimo Collieries, Vancouver Island, in the Province of British Columbia.

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*Northfield Colliery*—Four miles from Departure Bay, Nanaimo. Work at this mine has been suspended.

Wellington seam, averages from 3 to 5 ft.; dip, 6 degs., or about 1 in 10; vertical depth of shaft, 440 ft.; length of slope at foot of shaft, 700 yds.

System of working—Longwall.

Ventilation—By double fan, 8 ft. dia., 220 revolutions, giving 65,000 c. ft. of air per minute.

Lamps—Naked lights.

Boilers—Four Lancaster double flue, 4½ ft. x 25 ft., aggregate 200 h.p.

Winding engines—One high press., direct-acting, double horizontal at shaft, 16 in. dia., stroke 36 in., dia. of drum 6 ft.; at head of slope, one 8 in. cyl., 12 in. stroke, drum 2 ft. 10 in.; at ventilation shaft, one 10 in. cyl., 12 in. stroke, 4 ft. drum.

Pumps—Four Cameron.

Screens—Two stationary ⅝ in. x ¾ in. mesh, length, 16 ft.

Other plant—An air compressor on surface supplying power for running small pumps below. Fire pump with necessary hose. Patent tipplers for delivering coal to screens, etc.

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*No. 1 Esplanade*—Situate half-mile from wharves, Nanaimo harbor; 475 persons employed. Joseph Randle, *Underground Manager.*

Douglas seam, averages from 5 to 10 ft.; dip, 6 degs.; hoisting and ventilating shaft, 650 ft.

System of working—Pillar and stall.

Ventilation—Guibal fan, 36 ft. dia., 12 ft. wide, giving 119,000 ft. per minute.

Lamps—Naked lights.

Boilers—Six plain cylindrical, 5 x 30 ft., and four double flue Lancaster, 5 x 30 ft.

Winding engines—One high pressure, direct acting, double horizontal, at head of shaft, 30 in. cylinder, 60 in. stroke, drum 14 ft.; one (at head of slope) 16 in. cyl., 36 in. stroke, drum, 5 ft.; one (at air shaft) 7 in. cyl., 10 in. stroke, drum 3 ft.

Pumps—One Cameron, 16 x 6 x 36, and one Blake, 12 x 6 x 12, for pumping water from dip workings to shaft bottom; water hauled from shaft in tanks under cage.

Screens—Two, fixed; length, 16 ft.; ½ in. x ⅝ in. mesh, with tipplers for placing coal on screen; 3 chutes with tipplers for supplying town coal.

Electric haulage—In hauling the coal from levels, which are in from foot of shaft a distance of two miles, the company utilizes three 30 ton electric motors made by the Edison General Electric Company. There is also a large power house on surface, having two double flue boilers, 4½ x 25 ft.; one ball engine of 150 h.p.; one kilowatt dynamo, and all necessary equipment for lighting and generating power required.

**NEW VANCOUVER COAL MINING CO.**—Continued.

Other plant—Air compressing plant for running underground pumps. Fire pumps with necessary hose to protect buildings on surface.

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*South Field Mine, No. 2*—Situate five miles south-east from the town of Nanaimo. Work at this mine is at present suspended.

Douglas seam worked; average from 6 to 12 ft.; dip, 8 deg.; length of slope from surface, 800 yds.; small ventilating shaft 70 ft.

System of working—Pillar and stall.

Ventilation—Guibal fan, 14 ft. dia. x 5 ft. wide, running 110 ft. per minute, and circulating 109,000 cubic feet of air per minute.

Lamps—Naked lights.

Boilers—Two plain cylindrical egg end, 5 x 30 ft., each 40 h.p.

Winding engine—One direct acting, high pressure, horizontal winding engine, 16 in. cyl., 36 in. stroke, drum 5 ft.

Pumps—Two Cameron; col., 5 in.; dis. 100 to 200 gals. per minute.

Screens—One stationary, ½ in. mesh, 14 ft. long.

Other plant—Air compressor on surface for supplying power for pumps; small power hoists for hauling from dip places underground.

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*South Field Colliery, No. 5*—Situated five miles from Nanaimo; 200 persons employed. Richard Gibson, *Underground Manager.*

Douglas seam (South Field coal), averages from 6 ft. to 18 ft.; dip, 6 deg.; vertical depth of shaft 508 ft.

System of working—Pillar and stall.

Ventilation—Double fan (Murphy) 8 ft. dia., circulating 50,000 ft. per min.

Lamps—Naked lights.

Boilers—Two double flue Lancaster, 4½ ft. dia., 25 ft. long, 100 h.p., and one tubular boiler.

Winding engines—Pair of 16 x 36 engines, drum 6 ft. dia., and one underground at head of slope, 7 in. cyl., 10 in. stroke, 2 ft. 10 in. drum.

Pumps—One Cameron, 3 in. col., discharging 40 galls. per min.

Screens—One stationary, ⅝ in. mesh, 16 ft. long with tippler for placing coal on screens.

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*Protection Island Shaft*—(Nanaimo Harbor), situate 300 yds. from shipping wharf and half mile from town of Nanaimo; 200 persons employed; Robt. Jamieson, *Underground Manager.*

Seams worked—Douglas, upper and lower. Upper seam averages from 6 ft. to 10 ft. in thickness; dip, 6°; vertical depth of shaft to seam, 670 ft.; lower seam averages from 3½ to 4½ ft.; dip, 6°; vertical depth of shaft to seam, 740 ft. Upper seam, two slopes, main and diagonal; main slope, 900 yds.; diagonal, 600 yds.

System of working—Pillar and stall, same as in No. 1 shaft, Esplanade, across the harbor, with which it is connected.

Ventilation—By fan, as at No. 1 Esplanade shaft.

Lamps—Naked lights.

Boilers—Six double flue, Lancaster, 4½ ft. x 25 ft., 300 h. p.

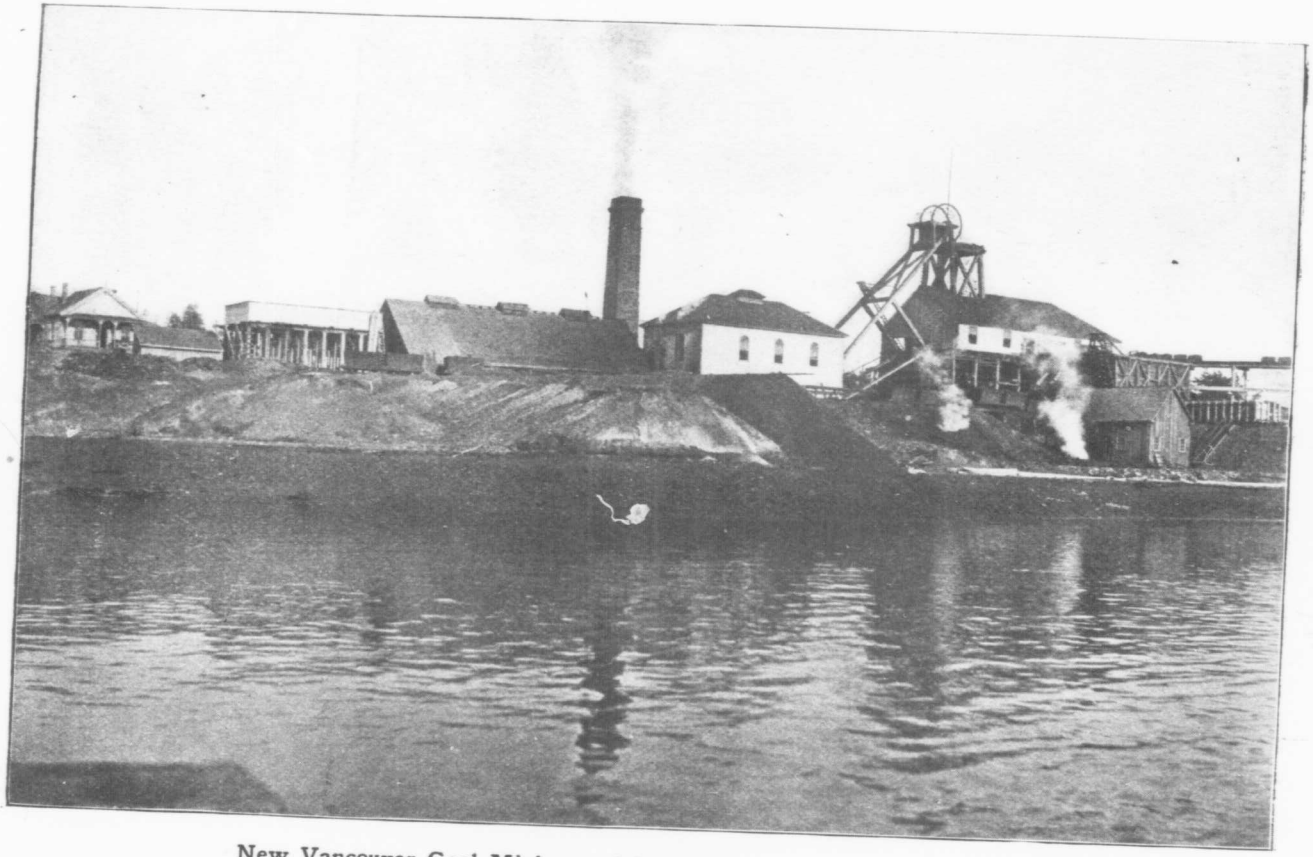
Winding engines—Two, one for shaft and the other for operating slopes by endless ropes; one pair 26 in. cyl., 42 in. stroke, drums 10 ft. and 10 ft. 11 in., so as to adjust ropes in hauling from both seams.

Pumps—One Cameron, 30 x 36, 2 in. col. discharging 20 galls. per minute.

Screens—Not yet in place, but it is intended to put in shaking screens and travelling belts.

Bunkers to hold 1,200 tons have been erected, and hydraulic lifts for elevating coal into bunkers.

Wharf accommodation for loading vessels of largest size, and appliances for lowering coal into ship hold so as to avoid breakage.



New Vancouver Coal Mining and Land Co.—No. 1 Shaft from Harbor.

*Harewood Estate.*—Several bores and trial shafts have been put down and a prospect tunnel has been driven in near the croppings where there is 5 ft. of good hard coal.

In addition to railway and plant at mines there are five locomotives, 237 coal cars (6 tons), besides lumber and ballast cars; bunker with a capacity of 2,000 tons; fitting shops with turning lathes, boring, drilling, planing, screw cutting machines, hydraulic press, steam hammer, &c., &c.; diamond boring machinery (bores to 4,000 ft.); wharves, 2,000 ft. frontage, at which ships of the largest size can load at all stages of the tide. Estimated value of plant, $350,000.

*Output.*

| Year. | Tons. T. | C. |
|---|---|---|
| 1890 | 389,505 | 12 |
| 1891 | 527,457 | 15 |
| 1892 | 433,386 | 7 |
| 1893 | 469,311 | 15 |
| 1894 | 393,772 | 17 |
| 1895 | 339,704 | .. |

*Shipments.*

| Year. | Tons. T. | C. |
|---|---|---|
| 1890 | 391,149 | 5 |
| 1891 | 524,647 | .. |
| 1892 | 437,652 | 6 |
| 1893 | 468,578 | 15 |
| 1894 | 344,645 | 17 |
| 1895 | 286,675 | 1 |

BALANCE SHEET FOR THE HALF YEAR ENDED 30TH JUNE, 1895.

**Dr.**

| | £ s. d. | £ s. d. |
|---|---|---|
| To 215,000 Shares of £1 each, fully paid | | 215,000 0 0 |
| Debenture Capital | | 67,100 0 0 |
| Insurance Fund Account | 1,300 0 0 | |
| Land Sales Reserve Fund Account | 18,487 19 9 | |
| Reserve Fund Account | 20,000 0 0 | |
| | | 39,787 19 9 |
| Sundry Creditors | | 51,229 1 8 |
| Profit and Loss Account | | 13,225 17 11 |
| | | £386,342 19 4 |

**Cr.**

| | £ s. d. | £ s. d. |
|---|---|---|
| By Estates, Buildings, Collieries, Railways, Plant, Rolling Stock and Wharves | 312,087 9 0 | |
| Less Estate Fund Account for half-year | 3,498 12 2 | |
| | | 308,588 16 10 |
| Goods Depot and Reserve Stores | | 6,386 15 2 |
| Coal in bin and in transit | | 38,095 13 2 |
| Sundry Debtors for Land | 12,477 15 3 | |
| " " Coal and General | 16,530 17 10 | |
| | | 29,008 13 1 |
| Investment in £2,000 Metropolitan £3 10s. Stock | | 1,945 0 6 |
| Nanaimo Gas Company's Shares | | 291 13 4 |
| Cash in London and Colony | | 2,026 7 3 |
| | | £386,342 19 4 |

**NEW VANCOUVER COAL MINING CO.**—Continued.

PROFIT AND LOSS ACCOUNT FOR THE SIX MONTHS ENDED 30TH JUNE, 1895.

**Dr.**

| | £ s. d. | £ s. d. |
|---|---|---|
| To Amount carried to Insurance Fund Account..... | 100 0 0 | |
| " Land Sales Reserve Fund Account ..... | 240 2 7 | |
| " Estate Fund Account..... | 3,498 12 2 | |
| | | 3,838 14 9 |
| Directors' Fees..... | 450 0 0 | |
| Auditor's Fees..... | 15 15 0 | |
| Office Rent..... | 50 0 0 | |
| Salaries..... | 251 5 0 | |
| Printing, stationery, postages, telegrams, commission, and incidental expenses ..... | 174 5 1 | |
| | | 941 5 1 |
| Debenture Interest..... | | 2,013 0 0 |
| Income Tax..... | | 420 17 4 |
| | | £7,213 17 2 |
| Balance, as per Balance Sheet..... | | £13,225 17 11 |

**Cr.**

| | £ s. d. |
|---|---|
| By Nanaimo profit, including £480 5 2 realized from land sales, after making provision for repairs and maintenance..... | 5,515 2 5 |
| Dividends on Metropolitan £3 10 0 stock..... | 33 16 8 |
| Registration Fees..... | 1 2 6 |
| Loss for half-year (carried down) ..... | 1,663 15 7 |
| | £7,213 17 2 |

| | £ s. d. | £ s. d. |
|---|---|---|
| Balance brought forward from last Account..... | 19,189 13 6 | |
| Less Dividend paid in May last... £4,300 0 0 | | |
| " Loss this half-year bro't down 1,663 15 7 | | |
| | 5,963 15 7 | |
| | | 13,225 17 11 |

## NORTH SAANICH COAL CO. Ltd.

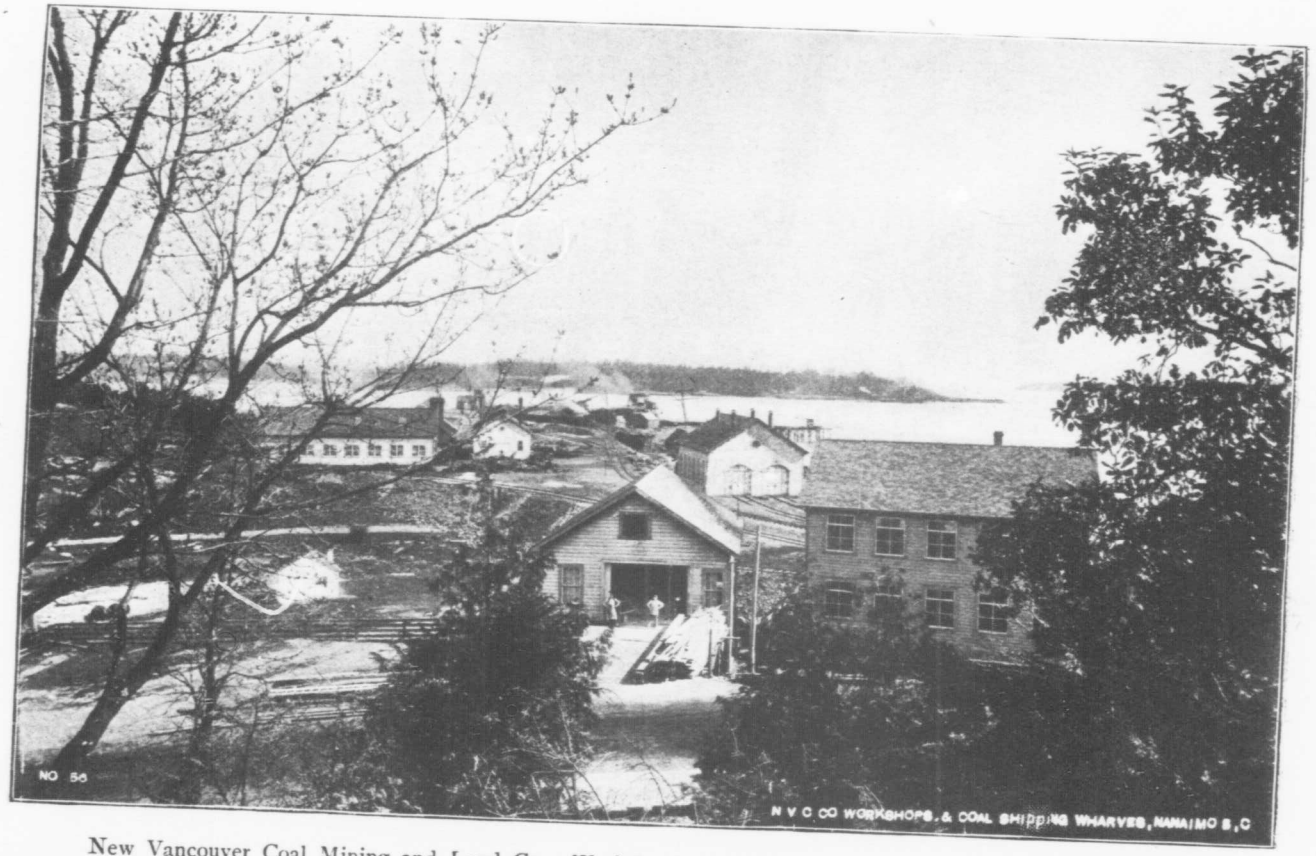
Incorporated 1895. Authorized Capital, $25,000.

**Directors:**

T. W. Paterson | Wm. Templeman | E. B. Martin.

**Head Office: Beaumont Boggs, Secretary, 28 Broad St., Victoria, B.C.**

Formed to prospect for coal on the northern extremity of the Saanich Peninsula, B.C. At date of report about 2,000 acres of coal land being held under bond by the company.




New Vancouver Coal Mining and Land Co.—Workshops and Shipping Wharves at Nanaimo, B.C.

## NOVA SCOTIA COAL MINING CO. Ltd.

Incorporated 1895. Authorized Capital, $50,000, in shares of $50 each.

**Directors:**

C. F. W. Bell, | E. Lawrence, | W. Macdonald, | A. McKay,
A. H. Learmont, | J. L. Stevens, | L. B. Crowe, | A. C. McKenzie

**Head Office: Truro, N.S.**

Formed to acquire and work certain coal areas in the Province of Nova Scotia.

## UNION COLLIERY CO. OF BRITISH COLUMBIA, Limited.

Incorporated 25th July, 1888. Authorized Capital, $1,000,000, divided into 10,000 shares of $100 each.

**Directors:**

Robert Dunsmuir, | James Dunsmuir, *President*, | John Bryden.

**Head Office: Francis D. Little, General Manager, Comox, B.C.**

This company owns a property containing 3,000 acres of coal lands, and operates the Union colliery, near Comox, on Vancouver Island, British Columbia.

*Union Colliery*—Eleven miles from shipping wharf, connected by standard gauge railway. Rolling stock includes four locomotives (Baldwin), of 45, 30, 25 and 15 tons respectively; 150 25-ton coal cars, etc.; 442 persons employed 1893.

Two seams worked, averaging 3 ft. and 5 ft. respectively; dip, 1ft. in 6ft. (north), No. 1 slope, 700 yards; No. 11 slope 1,000 yards; adit level in upper seam, 600 yards.

System of working—Longwall in upper seam, pillar and stall in lower.

Ventilation—No 1 slope by Murphy fan, 8 ft. dia., 200 rev.; No. 4 slope by Guibal fan, 14 ft. dia.; adit level by Fairman fan. Ventilated on the separate split system, the intake being the slope; the air afterwards is split in two divisions, one for No. 4 level and the other for No. 3; after going around the working places it unites in one volume and goes along the air way and out at the upcast shaft.

Lamps—Naked lights.

Boilers—No. 1 slope, two 24ft. x 48in. each; return flues, 80 lbs. press.; at No. 2 slope there are four boilers same size and style as No. 1. There are also three upright tubular boilers 7ft. x 42in., for prospecting engines.

Winding engines—Three in place at No. 1 slope, one direct acting, 16in.; cyl. dble., 36in. stroke, drums 6ft.; No. 4 slope, tail-rope, four drums, geared, 16in.; cyl. 24in. stroke, drums 6ft.; at No. 2 (prospecting) one geared, 8in. cyl., 12in. stroke, dia. of drum 4ft.

Pumps—Six in place; three Worthington; one fly wheel pump and one Gould electric pump with Jeffrey motor.

Screens—1in. main screen 12 feet long. At date of report the company was completing a Sheppard washer having a capacity of 300 tons per day.

Coal cutters—Four Jeffrey electric coal cutting machines.

Other plant—This includes a diamond drill; one steam pile driver; a saw mill having a capacity of 10,000 ft. per day.

**UNION COLLIERY CO.**—Continued.

OFFICIAL RETURNS OF OUTPUT.

| | Output at 31st Dec. Tons. | Exported. Tons. | Home Consumpt'n. Tons. |
|---|---|---|---|
| 1889 | 31,204 | 23,790 | 100 |
| 1890 | 69,537 | 74,048 | 1,481 |
| 1891 | 114,792 | 103,960 | 294 |
| 1892 | 68,928 | 66,556 | .... |
| 1893 | 143,927 | 114,356 | 29,478 |
| 1894 | 241,372 | 233,660 | 7,222 |

Value of plant, $115,000.

## WELLINGTON COLLIERY CO.

**Owners :**

Robert Dunsmuir & Sons, Wellingston, B.C.

*General Manager*—John Bryden. | *General Overman*—Alexander Sharp.

**Head Office : Wellington Colliery, Wellington, B.C.**

This company owns and operates the Wellington colliery, situate at Wellington, Vancouver, Island, B.C.

Name of seam—Wellington. No. I, II, III, IV, V, VI.

Value of plant—$150,000

Workings—Operated by five shafts with necessary slopes, airways and levels; three air shafts.

Tramway plant and rolling stock—Five miles of railway, with sidings and branches; six locomotives; 250 coal cars; 13 stationary engines; 9 steam pumps; 4 wharves for loading vessels, etc.

OFFICIAL RETURNS FOR OUTPUT.

| | Output. Tons. | Shipment. Tons. | Home Sales. Tons. |
|---|---|---|---|
| 1889 | 273,383 | 197,510 | 76,524 |
| 1890 | 174,496 | 106,281 | 68,769 |
| 1891 | 345,182 | 282,452 | 54,724 |
| 1892 | 200,370 | 238,400 | ..... |
| 1893 | 337,334 | 295,212 | 41,121 |
| 1894 | 376,956 | 304,852 | 50,165 |

Output of fire clay, 1893, 642 tons, 1894, 145$\frac{5}{20}$ tons; number of persons employed, 1894, 986.

No. 1 Shaft, New Vancouver Coal Mining Co., Nanaimo, B.C.

# Gold Mining Industries.

# GOLD MINING INDUSTRIES.

Gold, which ranks next to coal among the mineral products, is at present principally obtained in the provinces of British Columbia, Ontario and Nova Scotia.

## Nova Scotia.

By Mr. John E. Hardman, M.E., S.B., Montreal.

The first discovery of gold in Nova Scotia was made at Tangier in 1860; but as an industry gold mining may be said to date from 1862, when most of the older districts were proclaimed by the Government, a "Chief Gold Commissioner" was appointed, and laws were framed governing the acquisition and working of gold-bearing lands.

During that year several quartz-crushing mills (some thirty in number) were built, of types varying from the arrastra, and its offspring, the Chilian mill, to the stamp batteries of that date. No royalties, however, were collected by the Government until the year following.

From the year 1862 dates also the wild excitement consequent upon the inception of mining work in many and distant sections of the province; an excitement which was in part due to the richness of the gold streaks which were found cropping to the surface; in part due to the schemes of both English and American speculators, and also in part due to the greatly exaggerated idea of the value of the fields thus discovered.

This excitement culminated in 1867 and 1868, when the inevitable leaner or poorer portions of the lodes began to predominate, and when shareholders began to realize that their extravagant expectations of dividends were doomed to disappointment.

The reaction was natural and inevitable when the mines were managed by men not trained to mining, and entirely unfamiliar with the business. Large losses occurred in milling, and the peculations of the

workmen at that time were not inconsiderable. Thus, when these lower grade spots were encountered, profits temporarily ceased, there being no development of the veins ahead, and consequently no body of reserves to fall back upon, and, but too often, no treasury fund to pay for development work. Of course, primarily the cause of all this was the incapacity and inexperience of the then managing men, but another reason contributed largely to the same effect, and that was the idea (promulgated, it is said, by a Mr. Thomas Belt) that no lode would be found to be auriferous below depths varying from 100 to 200 feet. This notion seems to have been borrowed or transplanted from Australia, where the same idea was prevalent from 1865 to 1875. The notion is so absurd as to need no refutation.

There followed a period of general depression, and, amongst capitalists, a great distrust of Nova Scotia gold properties. From 1871 to 1882 the production and the number of men employed fell off greatly, in some years to the extent of more than one-half. During this period of ten years the production was maintained chiefly by the discovery of new districts and the finding of one or two rich veins in some of the older districts. Unfortunately, however, experience had not taught wisdom, and these later discoveries were worked in the same systemless manner that the earlier mines had been, and of course with the same results. No mine being opened in a systematic manner, so soon as its rich quartz was all extracted from the surface workings it was declared "worked out" and was abandoned.

In 1883 and 1884, however, several attempts were made by men of experience and training in other countries to re-open and work some mines which had been idle and filled with water for ten or fifteen years. These attempts were successful, and from the year 1885 dates a new era or epoch in the gold mining industry of Nova Scotia. In that year the annual production exceeded the average annual production by 7,000 ounces, and in 1889 the production was nearly 10,000 ounces in excess of the average annual production of that date. In 1890 the production was about 8,000 ounces in excess of the average, and the number of tons of stone crushed was the highest in the history of the industry.

In the following table is given the production of gold for each year from 1862 to 1895 inclusive, also the number of tons of stone crushed and the average yield per ton for each year :—

General View of Waverley Gold District, Halifax Co., Nova Scotia.

| Year. | Total Ounces of Gold. | | | Stone Crushed. | Yield per Ton of 2,000 lbs. | | |
|---|---|---|---|---|---|---|---|
| | Oz. | Dwt. | Grs. | Tons. | Oz. | Dwt. | Grs. |
| 1862 | 7,275 | .. | .. | 6,473 | 1 | 2 | 11 |
| 1863 | 14,001 | 14 | 17 | 17,002 | .. | 16 | 11 |
| 1864 | 20,022 | 18 | 13 | 21,434 | .. | 18 | 16 |
| 1865 | 25,454 | 4 | 8 | 24,423 | 1 | .. | 20 |
| 1866 | 25,204 | 13 | 2 | 32,162 | .. | 15 | 2 |
| 1867 | 27,314 | 11 | 11 | 31,386 | .. | 17 | 9 |
| 1868 | 20,541 | 6 | 10 | 32,262 | .. | 12 | 17 |
| 1869 | 17,868 | .. | 19 | 35,147 | .. | 10 | 4 |
| 1870 | 19,866 | 5 | 5 | 30,829 | .. | 12 | 21 |
| 1871 | 19,227 | 7 | 4 | 30,791 | .. | 12 | 11 |
| 1872 | 13,094 | 17 | 6 | 17,093 | .. | 15 | 7 |
| 1873 | 11,852 | 7 | 19 | 17,708 | .. | 13 | 9 |
| 1874 | 9,140 | 13 | 9 | 13,844 | .. | 13 | 5 |
| 1875 | 11,208 | 14 | 19 | 14,810 | .. | 15 | 4 |
| 1876 | 12,038 | 13 | 18 | 15,490 | .. | 15 | 13 |
| 1877 | 16,882 | 6 | 1 | 17,369 | .. | 19 | 10 |
| 1878 | 12,577 | 1 | 22 | 17,990 | .. | 13 | 23 |
| 1879 | 13,801 | 8 | 10 | 15,936 | . | 17 | 8 |
| 1880 | 13,234 | .. | 4 | 14,037 | .. | 18 | 20 |
| 1881 | 10,756 | 13 | 2 | 15,556 | .. | 12 | 20 |
| 1882 | 14,107 | 3 | 20 | 22,081 | .. | 12 | 18 |
| 1883 | 15,446 | 9 | 23 | 25,954 | .. | 10 | 21 |
| 1884 | 16,059 | 18 | 17 | 25,147 | .. | 12 | 18 |
| 1885 | 22,203 | 12 | 20 | 28,890 | | 15 | 4 |
| 1886 | 23,362 | 5 | 13 | 29,010 | .. | 16 | 2 |
| 1887 | 21,211 | 17 | 18 | 22,280 | .. | 19 | 11 |
| 1888 | 22,407 | 3 | 10 | 36,178 | .. | 15 | 21 |
| 1889 | 26,155 | 6 | 13 | 39,160 | .. | 17 | 22 |
| 1890 | 24,358 | 9 | 9 | 42,749 | .. | 11 | 9 |
| 1891 | 23,391 | .. | .. | 36,543 | .. | 13 | 7 |
| 1892 | 19,998 | 3 | 18 | 32,552 | .. | 12 | 7 |
| *1893 (nine months) | 14,030 | 5 | 7 | 28,040 | . | 10 | .. |
| 1894 | 18,402 | 16 | 12 | 39,333 | .. | 7 | 12 |
| 1895 | 22,112 | 17 | 21 | 58,082 | .. | 7 | 15 |
| Total | 604,610 | 9 | 16 | 887,731 | .. | 13 | 15 |

*In 1892 a change was made by the Government altering the date of the close of the official year from December 31st to September 30th. The returns, therefore, for 1893 are for the first nine months only, and for 1894 are for the last three months of 1893 and the first nine months of 1894.

The years since 1885 have been marked by the successful opening of old and previously abandoned mines in nearly all the older districts in the province; by the introduction of modern mining and milling machinery, and by greatly improved systematic and scientific methods of mining and exploitation. To develop your mine is now considered the "correct and necessary thing," but the writer well remembers being laughed at in 1884 by one of the "old timers" when he intimated his

intention of opening up a mine by sinking, driving levels and opening up for backs and reserves. And last, though by no means least, this period has been marked by a partial disappearance of distrust amongst capitalists, and by the attraction of foreign capital to our gold fields as being ventures in which money can be profitably invested.

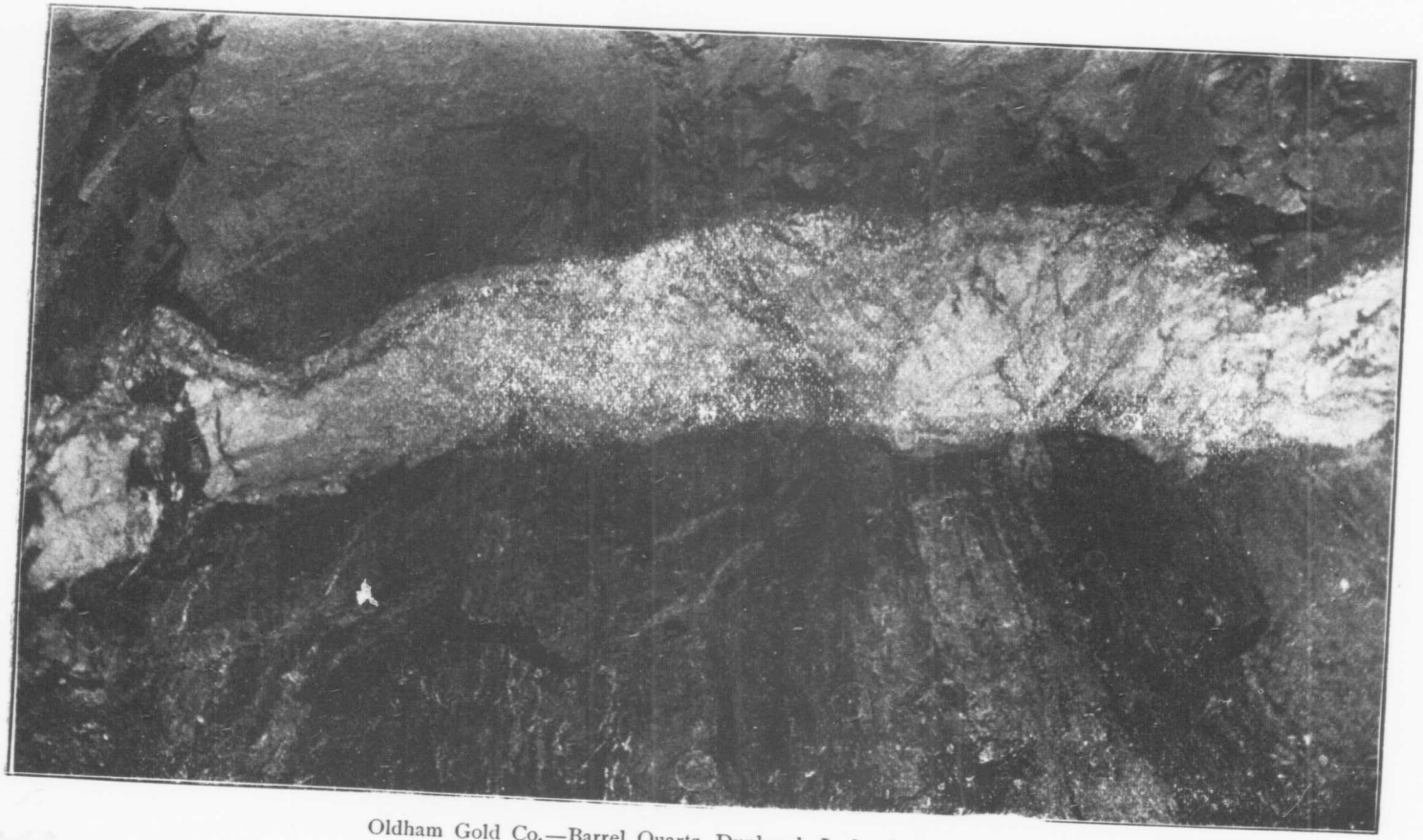
In most cases this investment has proved profitable, but in one or two cases, which derive prominence from their rarity, money has been paid for properties which were valueless from the start, or a management has been appointed whose incompetency doomed the enterprise to failure from the beginning, or the money for development has been squandered in huge surface plants and high salaried officials.

In almost every case where ordinary business prudence has been exercised in the selection of a property, or in the choice of a manager, success has been the result, and not failure.

During 1893 and 1894 an impetus was given to the industry by the working, in several places, of large bodies of low grade ore. Several deposits, yielding from three dollars to seven dollars per ton, were exploited and equipped with modern machinery, and each of them has prospered, having earned dividends for the companies owing them.

In many places these properties have been equipped with plants that will stand comparison, for effectiveness and economy, with those of any other gold producing country of the world, and it is not going too far to say that the working of such properties so equipped cannot fail to remove the impression which has been so prevalent in other countries that Nova Scotia had "only narrow veins of high grade but uncertain rock." The record of 1894 certainly removes this reproach and makes it utterly false.

The gold-bearing quartz lodes of Nova Scotia occur in the Cambrian or Cambro-Silurian measures, and belong chiefly to the class of "bedded" veins, or perhaps are "ore deposits along bedding planes," being conformable throughout with the beds of quartzite and slate with which they are interstratified, but not contemporaneous. As to whether these deposits are segregations from the enclosing silicious rocks, having formed in those openings between successive strata which have accompanied the lines of least resistance in folding, is a question better left to professional geologists. Two other classes of auriferous deposits are more seldom met with: (1) "Fissure" veins, so called, being in some cases true fault



Oldham Gold Co.—Barrel Quartz, Dunbrack Lode, Oldham, N.S.

fissures subsequently filled in, but more frequently being deposits filling crevices which were caused by secondary disturbances; (2) intercalated or "gash" veins of local origin and extent.

By far the greater bulk of the gold produced has hitherto come from the regular or "bedded" lodes. Sometimes these bedded deposits take the form of large interstratified belts of bluish fissile slate in which occur intercalated veins of quartz, thus forming large bodies of low-grade ore upon which, in the opinion of the writer, the future of the industry will ultimately depend. The districts of Goldenville, Beaver Dam and Mount Uniacke afford the best example of this class of deposits. In Mount Uniacke a successful working of one of these deposits has been commenced, and the more promising district of Goldenville has witnessed a revival during 1895.

In the working of these extensive deposits mining departs from the speculative phase and assumes that of a legitimate business, as witness the continuous and successful workings of the "Great Belt" in the Black Hills of South Dakota, more familiarly known as the "Homestake" mines, which for eighteen years have been steady dividend paying properties.

The large bodies of auriferous rock in this Province, like the "Palmerston" at Goldenville, are very similar in character to the Black Hills deposits and offer equal inducements for successful working.

The regular lodes vary, as a rule, from 2 in. to 30 in. in width, instances occuring where the lodes thin down to a fraction of an inch, or swell to 26 ft. wide, as notably in the Dufferin lode on Salmon river. The average width of the quartz may be taken as from 6 to 12 in. in the narrow veins, and the width of the milling stone in the low grade deposits at from 4 to 10 ft.

The richness of these lodes varies as much as their width does, running from $3 to $16 per ton.* The general average of each year is shown in the table; the average for the thirty-four years is about $13.25 per ton.

Upon lodes of such variable width and nature the cost of production will, of course, also vary widely; but as a general guide it may be

* The year 1891 was remarkable for high yields. South Uniake returned many lots of 10 ounces to 20 ounces to the ton, and Oldham surpassed its previous records with a yield of 643 ounces from eight tons of quartz.

stated that a lode 12 in. wide, yielding $10 to the ton, pays well to work.

During 1894 and 1895 several mines, working veins from 1 ft. to 7 ft. wide, produced and milled their quartz for prices varying from $2.27 to $3.58 per ton.*

In Stormont district one mine, having a lode varying from 2 ft. to 22 ft. in thickness, but averaging from 7 to 10 ft., is meeting all its expenses and paying a dividend on three dollar rock. In Waverley district another mine, whose vein averages only 12 in. in width, pays all expenses with rock that yields $4.00 per ton. Both of these properties are obliged to burn coal for fuel, which is a heavy item in the cost accounts.

There are at the present time over thirty-five localities in the Province in which workable deposits of gold have been found, and from three thousand to four thousand persons are dependent to a great extent, or entirely, upon the industry. The area of the gold measures in Nova Scotia has been estimated by various authorities to be from 5,000 to 7,000 square miles, or from one-fifth to one-third the area of the Province, yet the actual area from which the gold thus far obtained has been won is less than 40 square miles. Taking the total value of the whole gold product to the first of the present year as $12,000,000 in round numbers, it will be seen that each square mile of surface upon which paying gold lodes have been found has yielded nearly $9,000 per year for each year since discovery, or $300,000 per square mile.

The mining laws of Nova Scotia are, in the main, good, and are yearly being amended for the better. Their essential features are :—

1. All mines of gold and silver are the property of the Crown, from which titles or leases are obtained for working the same; all gold obtained is subject to a royalty of two per centum, or thirty-eight cents for each ounce of smelted gold.

2. Lands containing gold or silver are laid off in areas measuring 150 ft. by 250 ft., the lesser length being along the course of the lodes, and a lease can be obtained for any number of areas in any such one lease up to one hundred.

3. Such a lease runs for forty years, and costs the applicant $2 for each and every area contained therein. Upon each such lease in each year there must be performed a certain number of days' work, or as an equivalent, the lessee is given the option of paying annually 50 cents for each

* See Transactions Mining Society of Nova Scotia, Volume III.

Richardson Gold Mine, N.S.—Face East Tunnel, width 20 Feet.

area therein contained: such labor being performed or such annual payment being made, the lease is non-forfeitable. At any time prior to the expiration of said forty years the holder of the lease can surrender it and obtain a new lease for a second period of forty years. Such a lease is deemed personal property and is transferable.

4. Where such areas are situate upon private lands the law requires that an agreement must be made with the owner of the soil for leave to enter, and if such agreement cannot be made, a method of arbitration is provided whereby damages may be assessed, paid in, and leave to enter given to the owner of the lease.

Examination into the history of any mineral industry will show that such industry has only reached its full development and highest point through a complete knowledge of the methods and processes peculiar to that industry, and applying this standard to the gold mining industry of Nova Scotia, one is warranted in saying that its outlook was never more promising. There is to-day a greater amount of professional knowledge and technical skill engaged in gold mining here than ever before. The lodes are being worked with ability, with that wise economy which avails itself of every known device to save labor and cost, and also with the introduction into every-day matters of true business methods. It must not be forgotten that a gold mine is a manufactory of gold which must be conducted, even to its minutest details, with the most jealous regard to economy in all departments.

The easy means of access to the Province, and consequent convenience of personal examination, the low cost of working, the cheapness of labor, fuel and supplies, the probable permanent nature of the deposits, as inferred from their geological structure, are all good and sufficient reasons why capital should seek investment in the gold mines of this Province.

NOVA SCOTIA OUTPUT FOR THE YEAR ENDED 30TH SEPTEMBER, 1895.

| DISTRICT. | No. of Mines. | Days' Labor. | Mills. | Tons Crushed | Yield of Gold per Ton. | | | Total Yield of Gold. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Oz. | Dwts. | Grs. | Oz. | Dwts. | Grs. |
| Oldham | 2 | 3484 | 1 | 594 | .. | 16 | 11 | 489 | 7 | 10 |
| Brookfield | 1 | 13212 | 1 | 3344 | .. | 11 | 21 | 1992 | 3 | 4 |
| Sherbrooke | 4 | 17271 | 3 | 3397 | .. | 11 | 10 | 1942 | 2 | 0 |
| Fifteen Mile Stream | 2 | 10703 | 1 | 4734 | .. | 11 | 5 | 2661 | 12 | 0 |
| Gold River | 2 | 2801 | 1 | 80 | 1 | 10 | 4 | 120 | 15 | 0 |
| Lake Catcha | 2 | 6241 | 2 | 1501 | .. | 11 | 10 | 858 | 15 | 7 |
| Stormont | 5 | 17628 | 4 | 16582 | .. | 5 | 2 | 4225 | 6 | 11 |
| Caribou, Moose River | 4 | 30711 | 4 | 11565 | .. | 5 | 12 | 3189 | 11 | 1 |
| Renfrew | 2 | 8303 | 1 | 1242 | 1 | 2 | 0 | 1366 | 17 | 0 |
| Uniacke | 4 | 13897 | 3 | 3516 | .. | 14 | 10 | 2535 | 13 | 13 |
| Waverley | 2 | 15083 | 1 | 6315 | .. | 4 | 21 | 1540 | 2 | 0 |
| Unproclaimed and other Districts | 7 | 20230 | 5 | 5212 | .. | 4 | 13 | 1190 | 12 | 23 |
| Total | 37 | 159564 | 27 | 58082 | | | | 22112 | 17 | 21 |

PRODUCTION OF THE DIFFERENT DISTRICTS FROM 1862 TO 1891.

| DISTRICT. | Tons Crushed. | TOTAL YIELD. | | | | Average Yield per Ton. |
|---|---|---|---|---|---|---|
| | | Oz. | Dwt. | Grs. | Value. | |
| Caribou and Moose River | 56,949 | 27,877 | 13 | 20 | $543,615 | $9 55 |
| Montague | 18,771 | 36,144 | 2 | 16 | 704,810 | 37 54 |
| Oldham | 42,425 | 47,245 | 9 | 18 | 921,287 | 21 71 |
| Renfrew | 46,071 | 31,814 | 13 | 2 | 620,385 | 13 46 |
| Sherbrooke | 167,188 | 119,946 | 17 | 22 | 2,338,964 | 13 99 |
| Stormont | 26,749 | 26,748 | 17 | 11 | 521,603 | 19 49 |
| Tangier | 29,803 | 19,301 | 16 | 6 | 376,386 | 12 63 |
| Uniacke | 39,993 | 27,196 | 2 | 22 | 530,324 | 13 26 |
| Waverley | 97,846 | 55,382 | 14 | 14 | 1,079,963 | 11 03 |
| Salmon River | 44,005 | 13,163 | 14 | 0 | 256,693 | 5 83 |
| Brookfield | 5,663 | 4,858 | 4 | 9 | 94,735 | 16 73 |
| Whiteburn | 5,875 | 9,281 | 2 | 20 | 180,982 | 30 82 |
| Lake Catcha | 8,926 | 8,477 | 17 | 19 | 165,318 | 18 52 |
| Rawdon | 11,389 | 9,060 | 14 | 4 | 176,684 | 15 51 |
| Wine Harbor | 41,798 | 28,639 | 6 | 1 | 558,467 | 13 36 |
| Darr's Hill | 39,909 | 18,715 | 19 | 19 | 364,962 | 9 14 |
| Fifteen Mile Stream | 15,775 | 8,783 | 19 | 5 | 171,288 | 10 85 |
| Malaga | 18,567 | 15,343 | 10 | 8 | 299,199 | 16 11 |
| Unproclaimed, etc | 54,357 | 41,717 | 15 | 13 | 813,497 | 14 96 |
| Totals | 772,059 | 549,700 | 12 | 13 | $10,719,162 | $13 88 |

PRODUCTION OF THE DIFFERENT DISTRICTS FROM 1892 TO 1895.

| DISTRICT. | Tons Crushed. | Total Yield. | | | Value at $20 per oz. | Average Yield per Ton. | | |
|---|---|---|---|---|---|---|---|---|
| | | Oz. | Dwts. | Grs. | | Oz. | Dwts. | Grs. |
| Caribou and Moose River | 37000 | 12039 | 7 | 17 | $240,788 | .. | 6 | 9 |
| Montague | 5813 | 4621 | 14 | 18 | 92,435 | .. | 15 | 21 |
| Oldham | 6349 | 7491 | 4 | 9 | 149,820 | 1 | 3 | 14 |
| Renfrew | 2304 | 2094 | 14 | 15 | 41,895 | . | 18 | 4 |
| Sherbrooke | 4380 | 2074 | 1 | 8 | 41,490 | .. | 9 | 11 |
| Stormont | 48005 | 15861 | 15 | 15 | 317,235 | .. | 6 | 14 |
| Tangier | 5469 | 1341 | 9 | 8 | 26,829 | . | 4 | 21 |
| Uniacke | 8006 | 7889 | 12 | 11 | 157,792 | .. | 19 | 17 |
| Waverley | 25346 | 6174 | 1 | .. | 123,481 | .. | 4 | 20 |
| Salmon River—1892 to 1894 | 9379 | 2205 | 10 | .. | 44,110 | .. | 4 | 16 |
| Brookfield | 5352 | 3760 | 0 | 5 | 75,200 | .. | 14 | 1 |
| Whiteburn—1893-94 only | 1418 | 939 | 4 | . | 18,784 | .. | 13 | 5 |
| Lake Catcha | 5669 | 3026 | 16 | 20 | 60,437 | .. | 10 | 16 |
| Rawdon, Central and East—1892 to 1894 only | 1218 | 393 | 14 | 8 | 7,874 | .. | 6 | 11 |
| Wine Harbor | 877 | 444 | 0 | 22 | 8,881 | .. | 10 | 0 |
| Fifteen Mile Stream | 10779 | 5791 | 6 | .. | 115,826 | .. | 10 | 17 |
| Malaga | 6559 | 4281 | 18 | 18 | 85,638 | .. | 13 | 1 |
| Unproclaimed, etc | 3112 | 1460 | 9 | 4 | 29,209 | .. | 9 | 9 |
| Total | 183935 | 81892 | 1 | 10 | $1,637,724* | | | |

*Oz. and Dwts. only.

## New Brunswick.

The amount of positive information possessed regarding the presence of this metal in New Brunswick at present is very small. Reports of its discovery have indeed been frequent, but in the very few instances in which these appear to have emanated from reliable sources the amount of gold observed has been so small as to discourage further efforts to obtain it. While, however, the amount of the metal actually obtained is thus insignificant, it is worth while to notice that rocks very nearly resembling those of the auriferous belt of Nova Scotia, and believed to be of the same age, are largely developed here, and further, that it is in connection with these same rocks that very many of the reported discoveries of gold have been made. The rocks referred to are those composing the slate and quartzite belts which border the great central granite axis of York and Northumberland counties, and which with the latter

traverse the entire breadth of the Province. Much of this region is still densely forest-clad and difficult of access, but should any portion of it prove to be auriferous the discovery would be of inestimable value to the Province, as helping to open up an extensive region, otherwise likely to remain permanently in a wilderness condition. Among the points at which gold has been reported in small quantities may be mentioned the vicinity of the St. Croix River, in Charlotte county, the Nashwaak river above Stanley, in York county, the Muniac River in Carleton county, and the Serpentine river in Victoria county.

### Quebec.

It is a matter for enquiry why the gold fields of this Province, concerning which so much has in former years been recorded, should have failed to attract the attention they so evidently deserve. For that in the Province of Quebec there exists a very large extent of territory containing rich deposits of gold, not only in the alluvions of its ancient river channels, but in many of the quartz veins which traverse the slates and sandstones of the Chaudiere and Ditton districts, and of the whole belt of similar rocks which extend along the eastern portion of the Province, contiguous to the boundary of New Hampshire and a portion of Maine, has been very conclusively established. One has but to take up the papers written on this subject by the late Mr. James Douglas, of Quebec, or to glance over the earlier reports of the Geological Survey, more especially those from 1847 to 1866, to see that in this area the chances for profitable gold mining, under suitable Government regulations and proper management, are unsurpassed by any other portion of the Dominion, and possibly even by the adjoining States.

The evidence also presented before the Select Committee appointed by the Quebec Government in 1865, to consider the question of the Chaudiere gold field, while containing, doubtless, some statements bordering on the sensational, and therefore requiring to be cautiously accepted, present such a mass of cumulative evidence, both on the part of skilled workmen in this field as well as from ordinary explorers, that we can but come to the conclusion that had such stories of the presence of gold in large quantity proceeded from any other section of the country than the Province of Quebec, the influx of gold miners and of capital would have almost equalled that of the palmy days of the Californian discovery

The evidence presented in the different reports of the Geological Survey is also largely confirmatory of that stated by other writers on the subject; and yet in the face of all evidence tending to prove the existence of a gold field, adapted, possibly for quartz mining, but unquestionably containing large and valuable alluvial workings, we find not more than three or four companies, almost without capital, trying in a very small way, with the worst appliances, and an almost entire lack of proper mining skill, to extract the gold from the ancient river channels, whose presence and richness have been known for twenty years, but which, except in two or three widely separated cases, have never been explored to any extent.

The history of gold mining in Quebec, from the first discovery, sixty years ago, furnishes reading, not only of great interest, but of a kind from which good sound practical lessons may be derived. The first piece of gold found in 1836 was valued at from $50 to $60; a very fair-sized nugget for any country, and sufficiently large, one would suppose, to warrant anyone interested in gold mining to make further and vigorous search; yet for nearly fifteen years but little attention seems to have been pait to it, further than in the securing, in 1846, by the DeLery family, of the mining rights to a large territory. From 1850 to 1860 desultory mining operations were carried on at a number of points by various parties. Some exceedingly rich pockets were found on the Des Plantes and the Gilbert, as well as on the main Chaudiere river, while a series of trials at the forks of the DuLoup in 1851-52, extending over one acre of gravel from the bank of the stream with ordinary appliances only, showed a margin of profit sufficient to warrant anyone in investing the capital necessary to make a speedy and abundant fortune should the proper appliances be used The amount of the gold obtained from this acre of gravel was $4,328, the profit, $2,148. Yet, owing to some dispute with the proprietor of a neighboring lot, the work which promised so well had to be abandoned, and nothing further was done in this quarter for nearly thirty years. It is unfortunate that the next attempt to extract the gold from the gravels of the DuLoup in 1879-80 should not have been undertaken by some one with even a slight pretence to mining knowledge, so that the most fitting plan for successfully carrying on the washing of the gravels, and what is equally important the collecting of the gold afterward, might have been adopted, but instead we find

a very large amount of money, aggregating many thousands of dollars, placed in the hands of a person who certainly, from his previous occupation, could not be supposed to have acquired much practical or scientific knowledge of the best means to be employed in the extracting of the gold. A trench eleven miles in length was dug along the banks of the River du Loup for conveying water for the hydraulic process, and a magnificent head of about 150 feet was obtained, sufficient to tear down the gravel banks at any desired rate, but very slight provision appears to have been made for collecting the gold, either coarse or fine, after the bank was torn down; though from the trials made in 1852 it is known that there was sufficient in every cubic yard to have paid most handsome dividends, even by the old rocker method of washing. Under such management it can scarcely be a matter of wonder that the costly experiment was a failure of the worst kind.

In the work on the Gilbert, where exceedingly rich ground was found in 1863-66, the mining also was of the crudest kind. The claims allotted were very small, water could not be obtained for washing the gravel properly, and there appears to have been no proper appliances for saving the fine gold. A sluice, 1,800 feet long, built at a cost of about $12,000, to bring water from the upper part of the stream, which had been dammed for that purpose, was destroyed before it could be utilized, simply through lack of proper precautions in its construction; yet here, in the face of all these adverse circumstances, gold was obtained in large quantities, so that four men, working under the greatest disadvantages, are said to have taken out nearly $80,000 in less than four years. Anyone visiting the workings as conducted at the present day must wonder how any gold, except the coarsest, can be saved at all. Sluices of very slight pitch and of insufficient length, are unfitted with any proper means for saving the fine gold, the greater part of which must of necessity be carried away down the stream with the tailings. The only mining skill observed is on the part of those who have used the pick and shovel in some former enterprise in the vicinity, and yet, gold in good paying quantities continues to be obtained, simply because much of the gold in the district is coarse, and nuggets of ten to one hundred dollars are not uncommon, while others, having a weight of nearly sixty ounces have been obtained.

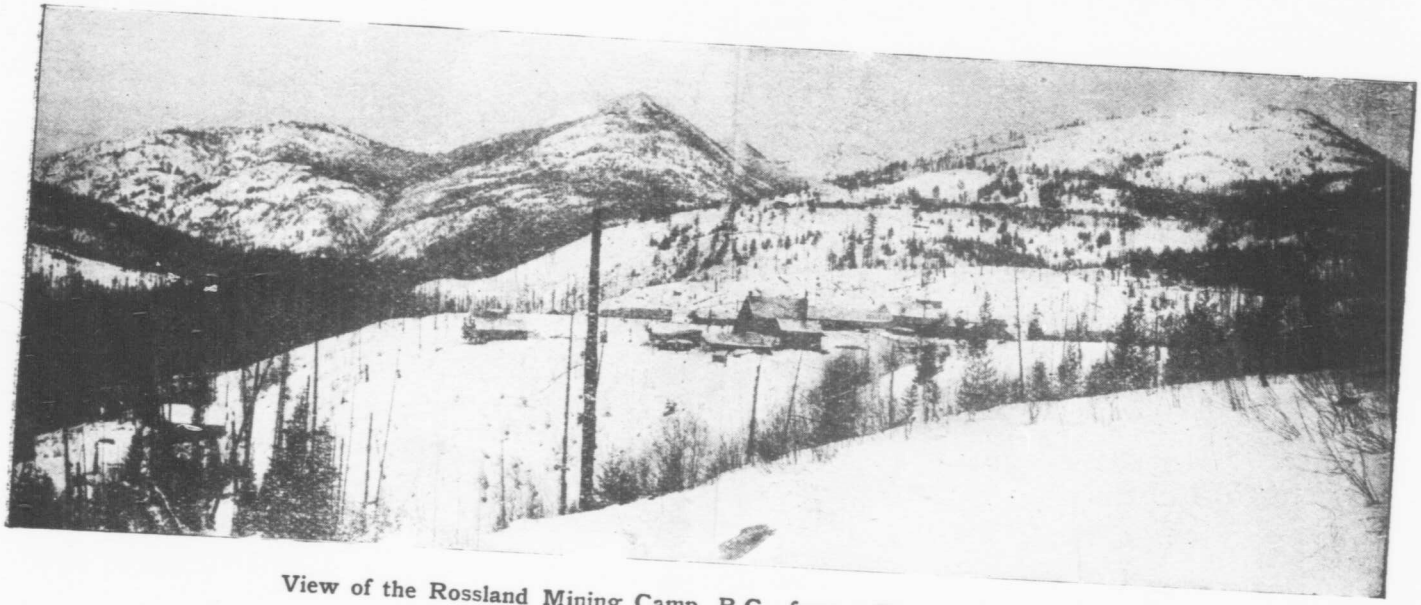
Such coarse gold does not travel far, yet no practical attempt to test the quartz leads by milling has been made until recently except by one ill-starred crusher, so faulty in construction that when free gold was put in none ever could be extracted. Yet, in spite of all these well known facts, when the value and importance of the gold fields of Eastern Quebec are mentioned most people calmly shrug their shoulders and smile incredulously. Why? Because most people are content to take the results, or rather the lack of results due to stupid blundering and ignorance of the first principles of mining, properly so called, as a satisfactory and conclusive test of the true value of the entire district.

There is no doubt, as can be proved by the evidence furnished both from official reports and from other sources, that in the ancient channels of nearly every stream, tributary to the Chaudiere above St. Joseph, gold can be obtained in paying quantities with proper management and appliances.

## Ontario.

Gold mining in Ontario makes slow progress, but there is progress. Hitherto the business has been limited to the operations of the explorer and the prospector. The former has been successful in finding shows of gold in many places, and in a few instances the latter has demonstrated that the precious metal exists in sufficient quantity to make the mining and treating of its ores a profitable business. In the far western corner of the Province discoveries of gold-bearing veins have been made over an extent of 2,000 square miles, throughout a tract 100 miles wide and 200 miles long. It reaches as far north as Lake Seul on the northern boundary of the Province, around Lake of the Woods on the western boundary, and up the Seine river as far as Lac des Milles Lacs. But it is not an unbroken area, for as a rule the gold ores are limited to Laurentian rocks of eruptive granite (or protogine as some prefer to call it), and to Huronian belts of the Keewatin series. These latter are very extensive, especially along the Seine river, from mouth to source; and also northward of Rainy lake along the Vermillion and Wabigoon rivers, as far as the Canadian Pacific Railway. The former exhibits its largest known extent on the north side of Shoal lake, where many promising veins have been discovered; but the Lake Harold mine, near Steep Rock lake, is in the same formation, and so is the Regina mine on Whitefish bay, Lake of the Woods. The vein of the Sultana mine is in

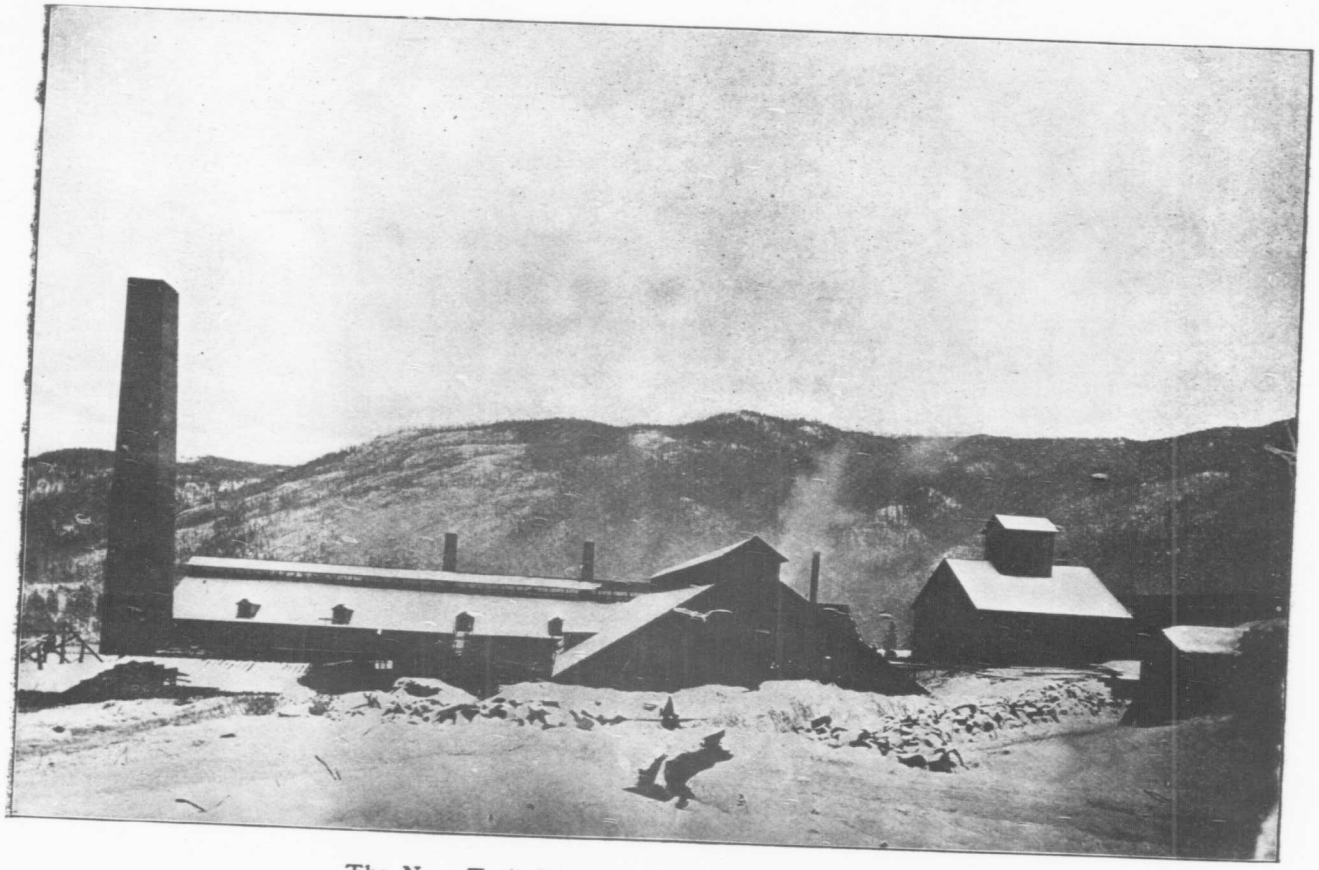
green Keewatin schist. A new gold field was exploited last year on the north shore of lake Superior, about a hundred miles east of Fort William. The veins are described as massive and continuous, and many wondrously rich specimens have been taken from one location. This is also a Huronian area. Farther east, in the vicinity of Sudbury, there is another field, but not enough is yet known of it for a safe opinion to be formed of its value. Prospecting operations carried on with a diamond drill in the township of Creighton have proved the existence of large veins which carry gold, and on the eastern and northern side of lake Wahnapitæ work on a small scale has been carried on during the past year with gratifying prospects as far as small mill tests can show. In the Marmora country there is little of actual work to record; those who have free milling ores are lacking for the capital to work them, and those who have the arsenical ores are lacking both for capital and the knowlege to treat them. But towards the end of the year several thousands of acres were leased by an enterprising Englishman, including among other properties the once famous Deloro mine, and it is reported that work will be commenced there early in the present year. At the price to which arsenic has gone up, one might suppose that the production of that article itself could under proper management make a property like the Deloro mine pay. The most successful mine now in operation is undoubtedly the Sultana, and it merits the name of a developed property. It was worked continuously during the past year, excepting for a few days after a fire which consumed the shaft house, and the ten-stamp mill was kept busy on the ore. Between the second and third levels, at a depth of 150 to 200 ft., the vein has a width of about 25 ft.; and the works are now sufficiently extensive to allow of the ore body being attacked from a number of points, so that it can be raised economically and in quantity to supply the mill when running at its full capacity. At the end of the year the main shaft had reached a depth of 250 ft., and it is reported that not only is the ore found to grow richer as the shaft is sunk, but that the gold is also finer. The Sultana vein is supposed to extend some distance southward under the water of Lake of the Woods and to outcrop on one or more islands, and at the present time an Ottawa syndicate is prospecting it with a diamond drill. The reduction works at Rat Portage and the Gold Hill and Black Jack properties on Big Stone bay were purchased last year by an English syndicate which has



View of the Rossland Mining Camp, B.C., from a Photo taken in 1894.

since been organized under the title of the Dominion Gold Mining and Reduction Company, Limited, with a capital of £20,000. The reduction works have been thoroughly reconstructed, most of the old machinery having been torn out and a plant of twenty stamps set up instead. It is said to be part of the scheme of the company to operate these works as a custom mill, where ore from any properties in the district may be treated at a certain rate of charge to prove its value, as is done in some localities of the western States and Territories. The mill at the Gold Hill mine has also been refitted, and some new mining machinery has been set up; but the works have been closed for the winter. Several other properties in the vicinity of Rat Portage are under process of exploration, and favorable reports continue to be made concerning them. The Regina mine is about 45 miles southeast from Rat Portage, and is situated on Whitefish bay, one of the numerous sheets of water connected with Lake of the Woods which radiate in all directions from the main body like the tentacles of an octopus, but beneficent in the sense that they furnish the highways for reaching easily an extensive area of country by the crafts which ply the lake. The Regina mine is owned by an English company, whose president is General Wilkinson, with a capital of £130,000. A neat and well equipped mill with ten stamps was erected on the property last year, and commenced to run in September. Since then it has been working as steadily as the supply of ore would warrant; but as only a little development work had been done it was not possible at first to deliver enough ore to keep the mill going at its full capacity. The latest reports, however, indicate that the supply is steadily increasing, and that gold bars are being produced with greater frequence. A large force of miners is employed sinking shafts and driving tunnels on two of the four veins which extend from the shore line across the granite into the green schists. On Shoal lake, which is an expansion of the Seine river, a number of properties are being explored. The principal of these is the Wiegand location, upon which a Duluth syndicate began last summer to sink two shafts. They have now reached a depth in each shaft of about 150 ft., and accounts received from recent visitors to the property are very favorable as regards the appearance of the veins and the quality of the ore. Upon another property in the same district a five-stamp mill was built last year, and a quantity of ore was treated; but for some cause not very clearly explained by the parties interested

(apparently a want of funds), the works were closed down after a very short run. At the Lake Harold mine a five-stamp mill was also erected last summer and was worked for a few weeks; Development work is going on, and it is expected that the mill will start up again in the spring with five additional stamps. The owners of this mine have also taken up locations on Saw Bill lake, some forty miles northeast of Lake Harold mine, where rich gold ores were discovered last year, and it is probable that mining operations will be undertaken there this year. A number of other properties have been secured by prospectors in the same locality. The Empress Gold Mining Company, composed entirely of local capitalists, has been stocked for $100,000 to operate the property near Jackfish Bay on the north shore of Lake Superior. A little prospecting work was done late in the season, a camp is in process of construction, and a mill for treating the ore has been ordered. The example of the Empress Company, in so far as local organization is concerned, is worthy of emulation elsewhere. It is not for lack of capital in Canada that our mineral wealth is allowed to lie dormant. The official statement for December showed that there was deposited by the public in the chartered banks of the Dominion at the end of that month the enormous sum of $187,119,573, more than one-third of which was at call and of course earning no interest, while the balance ($119,667,176) is earning 2½ or possibly 3 per cent. If there were openings for investment in which people with money had confidence, it is manifest that no such moneys would be allowed to lie in the banks for safe-keeping. Is it not worth enquiring whether openings are not presented in the mineral districts of the Province to win the wealth hidden there? Profits cannot be assured to any one; but the experience of every country in which a mining industry has been established goes to show that mining investments are on the whole as safe as any other. There will be losses, and there may be large gains; there is risk in every business. Why should not some small portion of the idle capital of Canadians be risked in an effort to open up our mines, when there is reasonable hope of its being a good investment? If the venture is successful our own moneyed men will earn the profits, idle men as well as idle capital will find employment, and the industry will react healthily upon the whole country.



The New Trail Smelter. Daily Capacity 200 Tons.

## British Columbia.

Gold was first discovered in British Columbia in 1851, but was little sought till 1857, when four or five Canadians and half-breeds crossed over to the Thompson river, and succeeded in finding workable placers at Nicoamen, on that river, nine miles above its mouth. In the following year it is estimated that within three months over 20,000 people arrived at the remote trading port which then stood upon the present site of the city of Victoria, while many more made their way over-land to the new El Dorado. We cannot do better than continue Dr. Dawson's sketch of the early history of the industry. He says:—"Hudson's Bay Company found gold on the banks of the Thompson, a tributary of the Fraser river, and their discovery becoming known, changed the whole fortunes of the country. California was at this time filled with gold miners, and it required only the rumour of a new discovery of gold to create a new 'excitement.'

"The difficulties in the way of these fortune hunters were great. The country was without roads or other means of communication, save such rough trails and tracks as had served the purpose of the natives and those of the fur trader. The Indians, if not openly hostile, were treacherous, and not a few of the men who actually reached the Fraser canons, were never again heard of. The Fraser and Thompson were at this time the objective points, and much of the lengths of these rivers were impracticable torrents. It is not, therefore, surprising that by far the larger part of those engaged in this sudden migration returned disappointed, many without ever reaching their destination. Some, however, persevered, several thousand miners actually got to work on the auriferous bars of the Fraser, and a new state of affairs was thus fairly inaugurated. To follow the rapid progress of these miners along the Fraser and Thompson with their tributaries, would be full of interest, though the records of their work now existing are scanty, but this again would lead us too far afield. The gold found on the lower reaches of the Fraser was what is known to miners as 'fine' gold, or gold in very small scales or dust, minutely divided. Farther up 'coarser' gold was obtained, and the miners very naturally jumped to the conclusion that somewhere still farther up the great stream the source of all the gold should be found. Thus, with restless energy they pushed on until be-

fore long the Cariboo country, some 400 miles from the sea, was reached; and here the richest deposits of alluvial or 'placer' gold were found, and for a number of years continued to be worked, with results which, considering the comparatively small number of men engaged, were most remarkable.

"Later and more thorough investigations show that the theory so readily adopted by the miners was incorrect; that there is no regular gradation in amount or 'coarseness' of gold from the lower part of the Fraser to the head-waters in Cariboo, but that the gold found on the bars of the river is of more local origin. Still the theory referred to, as a matter of fact, led the miners to Cariboo, which proved not only to be the richest district so far discovered in British Columbia, but for its area one of the richest placer mining districts ever found. In this district the valleys of two streams Lightning and Williams creeks, have been the most remunerative, and these and their tributaries have actually yielded the greater part of the gold obtained. The work was begun by the washing of the gravels of the streams themselves, but with the experience already gained in California and Australia, the miners soon began to search deeper. The valleys through which these streams flowed were found to be filled to a considerable depth by loose material, gravel and boulder clay, due to the glacial period or to inwash from the sides of the bordering mountain ranges; and in sinking beneath all this material the channels of older streams, the predecessors of the present were found, with their rocky beds smoothed and worn and filled with rounded boulders and gravel. These contained vastly richer deposits of gold, because they represented the concentrated accumulations of great periods of continued work by natural forces of denudation and river action.

"This discovery, once made, led to the initiation of more extended mining operations, which often necessitated large expense in labor and the construction of heavy pumping machinery; but the results as a rule repaid the enterprising miners. Thus the old deeply buried channel of Lightning creek was found to average something like $200 in gold to each running foot of its length, while considerable lengths of Williams creek yielded as much as $1,000 to the same unit of measurement. Williams creek affords some notable instances of the extraordinary concentration of 'coarse' gold in limited areas:—Thus, from Steele's claim,

**Exhibit of Gold Bricks from Horsefly and Cariboo Mines, B.C.**

80 x 25 ft., over $100,000 worth of gold was obtained. From the Diller Company's claim, it is stated that in one day 200 lbs. weight of gold, valued at $38,400, was raised; and, in 1863, 20 claims were producing 70 to 400 ounces of gold each per diem. Four hundred miners were at work on Williams creek in this year, which is still admirably spoken of as the 'golden year.' Though, like Williams creek, discovered in 1861, the deep channel of Lightning creek was not successfully reached until 1870, but great developments followed. The Butcher claim at one time yielded 350 ounces of gold a day; the Aurora, 300 to 600 ounces; and the Caledonia, 300 ounces.

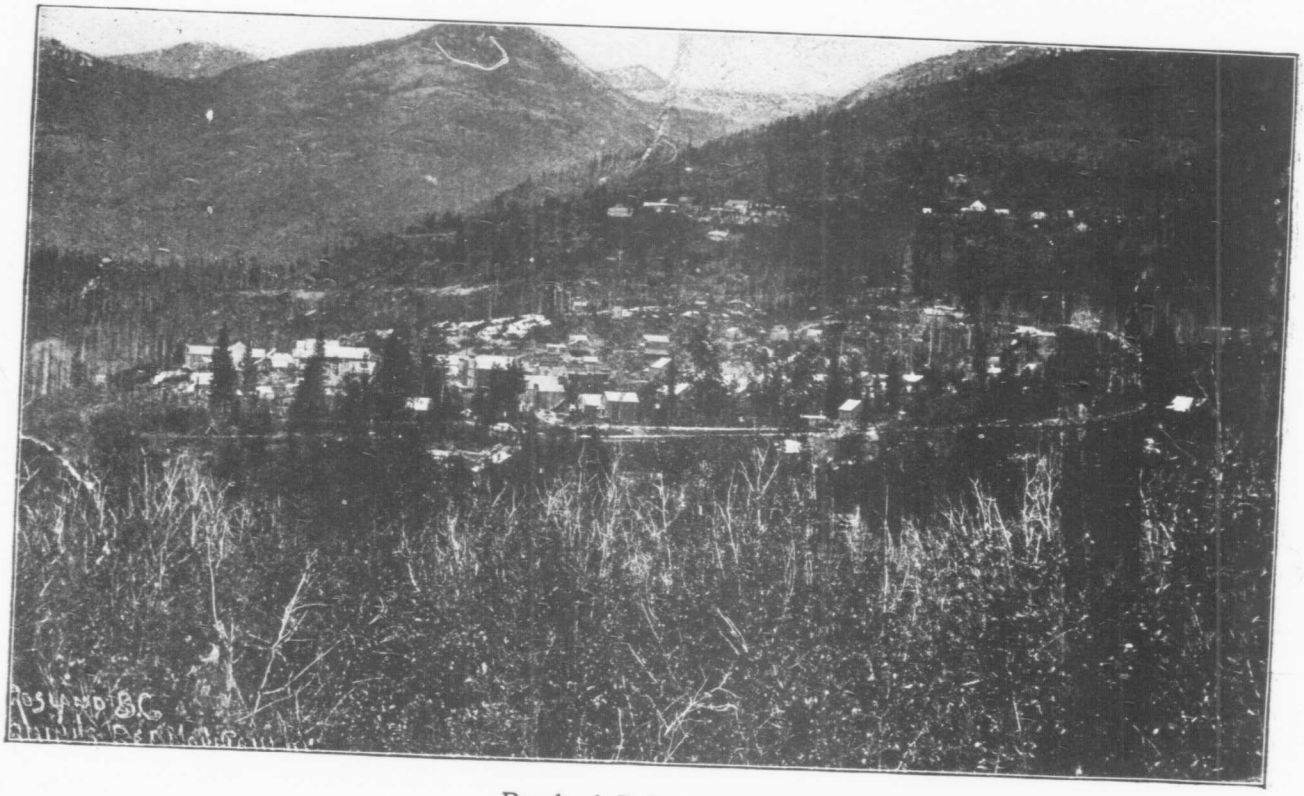
"It must be remembered that the Cariboo mining district is situated in a high and densely forested mountainous region, which, because of its inaccessible character, had remained almost unknown even to the wandering native hunters. At the time in which these great discoveries in it occurred, it was reached only with extreme difficulty by trails or imperfect tracks, over mountains and across unbridged rivers. Every article required by the miner was obtained at an excessive cost; but all these drawbacks did not prevent the rapid growth of typical mining camps in the centre of this remote wilderness, with their accompanying lavish expenditure and costly if rude pleasures. So long as the golden stream continued to flow in undiminished volume, everything that gold alone could buy was to be obtained in Cariboo.

"Perhaps more worthy of note is the fact that the development of these mines was carried out entirely by the miners themselves. No outside capital or backing was asked for or obtained. Money made in one venture was freely and at once embarked in another, and the investors were to be found working with pick and shovel in the shaft or drift. But the lengths of the rich old channels on both these famous creeks, which could be worked in this way, proved to be limited to a few miles. Below a certain point in each case, the 'bed-rock' was found to be at so great a depth, that it was not possible to reach it through the loose and water-saturated materials filling the old valley. Thus the great yield of gold became gradually reduced to comparatively modest proportions, and at the present time mining in Cariboo district is mainly confined to hydraulic workings, by which poorer ground is utilized and a much larger quantity of material requires to be removed to obtain a given amount of gold. But the old valleys of Cariboo have never ceased to produce gold, and in 1892, their product still amounted in value to about $200,000.

"It has been impossible to follow the fortunes of the Cariboo mining district in any detail, and time can only be afforded to name the other placer mining districts of the Province. The Omineca district was discovered soon after Cariboo, but little was done there till 1867. This district is situated in latitude 56°, in the drainage basin of the Peace river, and, though so remote, has produced a considerable quantity of gold. Still further to the north, in latitude 58°, is the Cassiar district, first found to be auriferous in 1872, for some years thereafter resorted to by many miners, and still a mining centre not without importance. This is the northernmost mining region of British Columbia proper, but beyond the 60th parallel (forming the northern boundary of the Province) alluvial gold mining has of late years been developed in the Yukon district, embracing the numerous upper tributaries of that great river, and extending to the borders of the United States territory of Alaska. Neither must it be forgotten to note, that the working of alluvial gold deposits of greater or less importance, has occurred at many places in the southern part of the Province, to the east of the Fraser river, including Big Bend, Similkameen, and Kootenay districts, from all of which some gold still continues to be produced by the old methods.

"The story of the discovery and development, the palmy days and the gradual decline in importance of any one of these mining regions, rightly told and in sufficient detail, would constitute in itself a subject of interest. But without attempting to do more than name the districts here, it is of importance to note how general, throughout the whole extent of the great area of British Columbia, the occurrence of deposits of alluvial gold has been proved to be. The gold thus found in the gravels and river beds is merely that collected in those places by natural processes of waste, acting on the rocks, and the concentration of their heavy materials during the long course of time. The gold has been collected in these places by the untiring action of the streams and rivers, and it must in all cases be accepted as an indication of the gold-bearing veins which traverse the rocky sub-structure of the country, and which await merely the necessary skill and capital to yield to the miner still more abundantly.

"Nevertheless, the results of alluvial or placer gold mining alone in British Columbia have not been insignificant, for, since the early years of the discovery, the Province has contributed gold to the value of some



Rossland, B.C., in 1895.

$50,000,000 to the world. One feature in particular requires special mention, and this is a deduction which depends not alone on experience in British Columbia, but which is based as well on that resulting from the study and examination of other regions. The 'heavy' or 'coarse' gold, meaning by these miners' terms the gold which occurs in pellets or nuggets of some size, never travels far from its place of origin. It is from this point of view that it becomes important to note and record the localities in which rich alluvial deposits have been found, even when the working of these has been abandoned by the placer miner. Their existence points to that of neighboring deposits in the rock itself, which may be confidently looked for, and which are likely to constitute a greater and more permanent source of wealth than that afforded by their derived gold.

"Reverting for a moment to the Cariboo district, where such notably rich deposits of alluvial gold have been found within a limited area, and where, very often, the gold obtained has been actually mingled with the quartz of the parent veins, it cannot be doubted that these veins will before long be drawn upon to produce a second golden harvest. This district has suffered and still suffers from its great distance from efficient means of communication; but, notwithstanding this, praiseworthy efforts have been made towards the development of 'quartz mining,' while much also remains to be done in utilizing by operations on a larger scale, and with better appliances, the less accessible placer deposits which have so far baffled the efforts of the local miner.

"It is necessary to bear in mind that alluvial gold mining or placer mining requires but a minimum amount of knowledge on the part of the miner, though it may call for much individual enterprise and effort when a new and difficult region is to be entered. Any man of ordinary intelligence may soon become an expert placer miner. It is after all, in the main, a poor man's method of mining; and, as a rule, the placer miner lacks the knowledge as well as the capital necessary to enable him to undertake regular mining operations on veins and lodes. However promising the indications may be for such mining, he either does not appreciate them, or passes them over as being beyond his experience or means. He would rather travel hundreds of miles to test a new reported discovery, than spend a summer in endeavoring to trace out a quartz reef, with the uncertain prospect of being unable to dispose of it at some later date."

During the past three years extensive hydraulic operations have been initiated, notably by the Cariboo Hydraulic Co., on the South Fork of the Quesnelle river, the Horsefly Hydraulic Mining Co., on the river of the same name, and by the Van Winkle Hydraulic Co. near Lytton. The first two companies are under the management of Mr. John B. Hobson, a Californian mining engineer of wide experience in hydraulicing. Mr. Hobson, in a paper before the General Mining Association of the Province of Quebec, gave the following opinion of the value of the auriferous deposits of the province:—

"The auriferous deposits of California remaining unworked are estimated at 2,108,875,000 cubic yards. The gold tenure of these gravels vary from one to thirty cents per cubic yard, and the total gold content estimated at about $500,000,000.

"I have seen in British Colnmbia, included in the Yale, Lillooet and Cariboo districts, three times the area of auriferous deposits that are known to exist in the whole of the State of California.

"The British Columbia gravels that I have examined, and that may be considered available for hydraulic working, yielded results varying from one cent to $1.50 per cubic yard, and as a whole average richer than any I have seen in California.

"In some properties examined, I sampled streaks, some of which were on bedrock and others 150 feet above the bedrock, that yielded prospects varying from $2 to $36 per cubic yard. We have no such rich deposits in California.

"The exploitation and equipment of hydraulic mines is expensive, and large sums of money are required to provide water supply and hydraulic plant, to get the mines opened and placed on a paying basis.

"For this reasou great care should be exercised by those intending to engage in such enterprises. Competent engineers should be employed to investigate the source of water supply, determine the available gradient for sluices, dump for debris and the gold tenure of the gravel. The absence or insufficiency of either of the first three of these conditions means the failure of the enterprise to prove remunerative.

"I do not hesitate to predict that the day is not far distant when the gold output from the auriferous placers of British Columbia will not only surprise Canadians, but will astonish the civilized world."

The New Smelter at Trail, B.C.—Combined Automatic Roasting and Matteing Furnaces.

*Quartz Mining*—The principal quartz mining district in British Columbia is at Trail Creek, about seven miles west of the Columbia river, and six miles north of the international boundry. The ore mined is an intimate mixture of pyrrhotite and chalcopyrite, very similar to that worked in the nickel mines of the Sudbury district, Ontario. The ore bodies occur in size from small stringers a few inches wide up to great lodes 10 to 15 feet in thickness, and from 100 to 150 feet or more in length.

*Le Roi Mine*—One of the most important mines in the district is the Le Roi, operated by the Le Roi Mining and Smelting Co., a Spokane corporation. It is situated on a spur of Red Mountain, about half a mile west of and 350ft. above the town of Rossland. It is opened on the lead by an inclined shaft 450 feet deep at the east end of the claim. A smaller shaft has been sunk and a short tunnel driven on the west end of the claim. Levels have been run on both sides of the 450 foot shaft at convenient depths apart, and the regular system of back stoping is used to take out the ore. On the surface of the claim the vein is traceable nearly the whole length, except on the lower end, where a heavy wash has covered it up. On the surface the ore shows a width varying from 5 to 10 ft. In many places the vein assumed a lenticular form, and on the 300 foot level bulged out to a width of 30 feet, all shipping ore. During the sinking of the shaft from 300 foot level to the 450 foot level, careful average samples were taken daily, and an assay value of less than $100 per ton was rarely returned. The assays often run as high as $200 and $300, and once or twice $500. The width of the vein from the 350 foot to the 450 foot level has not been determined, as the shaft is following one wall and is in ore all the time. We are unable to state the exact amount of gold and copper taken from this mine up to date, but believe the amount to be at least $500,000, and this must have been done within the last eighteen months, as nothing more than development work was done previous to that time, and that in a somewhat leisurely manner.

The timbering of the mine is in accordance with the usual western practice for such veins. Stulls are used when convenient, and when the ore body gets too wide regular square sets of round timber are substituted. All the ore is broken by machine drills, and after being broken is hoisted and trammed to an ore house, which has a capacity of 2,000

tons. It is then dumped on a sorting floor above the bins and after having the larger pieces of the waste picked out, is dumped into the bins and is ready for hauling to the river.

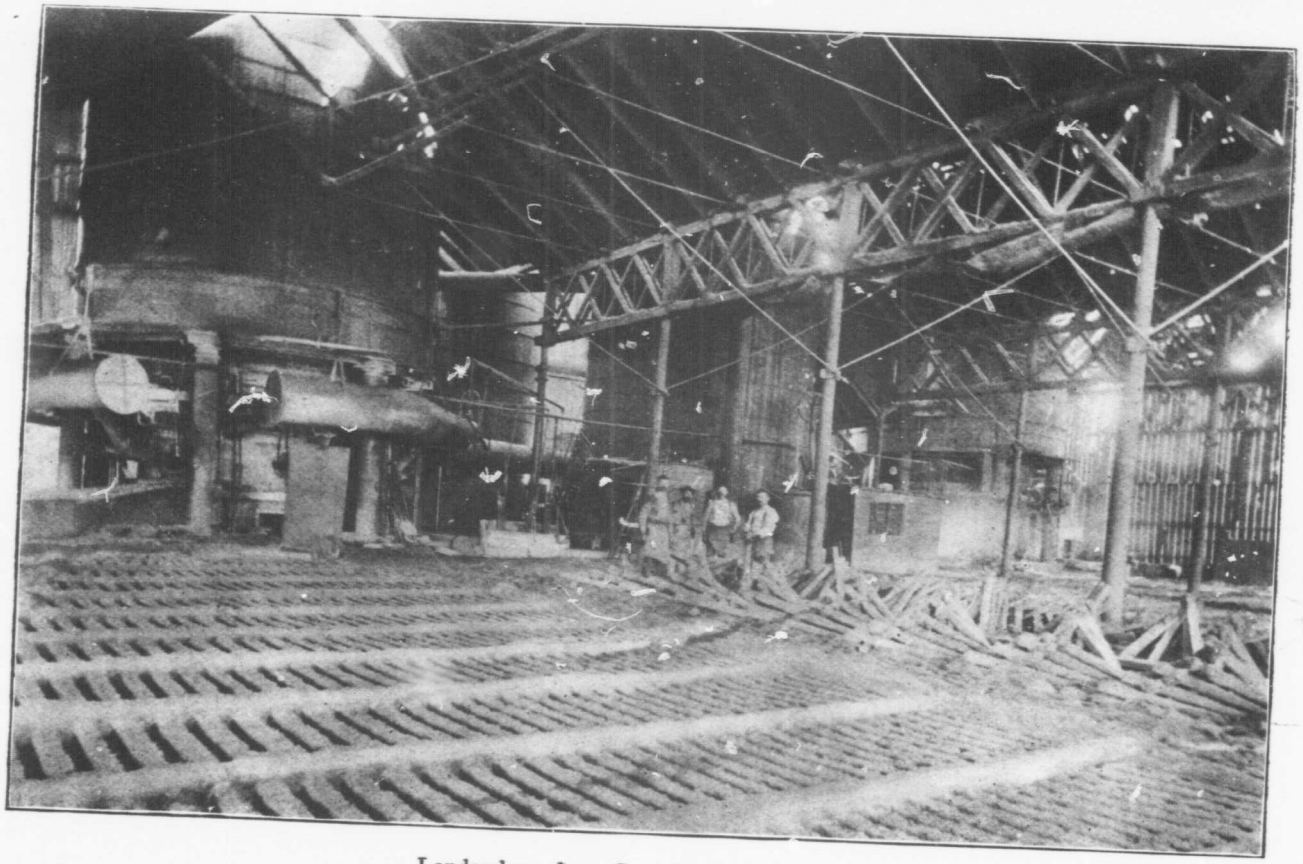
The average value of the ore is from $35 to $45 in gold, silver and copper, the value being principally in gold, there being only from 2 to 5 per. cent. of copper and one or two dollars' worth of silver in the ore The amount of ore hoisted daily from the mine runs between 75 and 125 tons, or an average of about 100 tons. The mine is well equipped with a mining plant, consisting of a compressor, eight or nine drills, two hoisting engines and three boilers, and the company have recently added a large electric diamond drill to their plant.

Judge Turner, the president of the company, estimates there to be at least 100,000 tons of ore in sight. A contract was made in 1895 to furnish 75,000 tons of ore to the British Columbia Smelting Co. at Trail.

A couple of hundred yards north of the 'Le Roi' is the 'War Eagle' mine, operated by the War Eagle Gold Mining Co. another Spokane corporation. Up to October, 1895, this mine, on which work was actively commenced late in 1894, produced upwards of 7,000 tons of ore averaging 2¼ ounces in gold, 3 per cent. in copper, and about 3 ounces in silver. The mine is developed by two tunnels, from which ore is being steadily taken out; another large tunnel is being driven to tap known ore bodies on a lower level in the neighborhood of 200 ft. lower than the present lowest working. The mode of mining and handling the ore is similar to that pursued in the Le Roi mine.

In making the excavations for the lower tunnel a strong, rich vein was uncovered, but whether this is what is known as the War Eagle vein or still another one is still uncertain; the ore appears, however, to have more copper in it than the War Eagle vein proper. The plant of this company erected at the mouth of the new tunnel is a model one in every respect and splendidly installed, and consists of two 100 h. p. boilers, one Duplex Corliss compressor of 20 drill capacity, and a full complement of Ingersoll-Sergeant drills, the air-pipe in use being worthy of remark as it is an 8-in. spiral welded steel pipe.

*Josie Mine*—The Josie mine, operated and owned by the Josie Gold Mining Co., also of Spokane, adjoins the Le Roi and War Eagle claims, and is in nearly every respect similar to them, the difference of course being that there is a great deal less development work done, and



Londonderry Iron Co.—Interior of Cast House.

consequently not such a large amount of ore shipped. The development in this mine has not been pushed as much as it might have been, due in a great measure to the lack of machinery, all work being done by hand. It is opened by a tunnel 350 feet long, in the whole length of which there is a strong continuous chute of ore. A shaft has also been sunk to a depth of about 70 feet at the mouth of the tunnel, and the ore shows up well in this also. A complete mining plant is ordered for the property, and is to be in operation in February, when its production will be greatly increased. The ore is equal in value to either the Le Roi or War Eagle. Some very rich ore is, however, occasionally shipped from this mine, one large shipment averaging $160 per ton. The plant ordered consists of a compressor, boiler, hoisting engines, pump and drills.

*Centre Star Mining Co.*—This property also adjoins the War Eagle and Le Roi mines, the main and working vein of which is supposed to be the Le Roi vein. It, in conjunction with the Idaho, is owned by the Centre Star Mining Co. It is opened by a 500 ft. tunnel, driven on the vein, and a 172 ft. shaft sunk from the surface to the tunnel in the vein also. Both the tunnel and shaft are driven into solid ore, the only exception being when the continuity of the ore is broken for a short distance by a hitch or fault. It is the intention of the management to thoroughly develop the mine before taking out any ore other than that extracted on development, and they are continuing the tunnel 800 ft. farther to their west end line, which abuts on the Le Roi ground. There are three other parallel veins on the claim at present unexploited.

A large number of other claims, some of which show considerable bodies of ore, are being developed.

ORE SHIPMENTS FROM NELSON, 1895.

| | | Ozs. | Value. |
|---|---|---|---|
| Gold | | | $822,008 |
| Silver | | 1,176,360 | 736,841 |
| Copper | lbs. | 1,856,653 | 117,788 |
| Lead | lbs. | 18,065,317 | 351,463 |

Or a total value of $2,028,100. These do not include the shipments made by way of Revelstoke, between 1st June and 31st December, the returns not being received at date of going to press These figures have been courteously furnished by Mr. George Johnstone, the Collector of Customs, at Nelson.

TABLE showing the actual known and estimated yield of gold; the number of miners employed, and the average earnings per man per year, from 1858 to 1894, in the Province of British Columbia.

| YEAR. | Amount actually known to have been exported by Banks, &c. | Amount added to represent gold carried away in private hands. | Total. | Number of Miners employed. | Average yearly earnings per man. |
|---|---|---|---|---|---|
| | $ | $ | $ | | $ |
| 1858 (partial return) | 543,000 | ..... | *705,000 | 3,000 | 235 |
| 1859 | 1,211,304 | 1-3rd 403,768 | 1,615,072 | 4,000 | 403 |
| 1860 | 1,671,410 | " 557,133 | 2,228,543 | 4,400 | 506 |
| 1861 | 1,999,589 | " 666,529 | 2,666,118 | 4,200 | 634 |
| 1862 | 1,992,677 | " 664,226 | 2,656,903 | 4,100 | 648 |
| 1863 | 2,935,172 | " 978,391 | 3,913,563 | 4,400 | 889 |
| 1864 | 2,801,888 | " 933,962 | 3,735,850 | 4,400 | 849 |
| 1865 | 2,618,404 | " 872,801 | 3,491,205 | 4,294 | 813 |
| 1866 | 1,996,580 | " 665,526 | 2,662,106 | 2,982 | 893 |
| 1867 | 1,860,651 | " 620,217 | 2,480,868 | 3,044 | 814 |
| 1868 | 1,779,729 | " 593,243 | 2,372,972 | 2,390 | 992 |
| 1869 | 1,331,234 | " 443,744 | 1,774,978 | 2,369 | 749 |
| 1870 | 1,002,717 | " 334,239 | 1,336,956 | 2,348 | 569 |
| 1871 | 1,349,580 | " 449,860 | 1,799,440 | 2,450 | 734 |
| 1872 | 1,208,229 | " 402,743 | 1,610,972 | 2,400 | 671 |
| 1873 | 979,312 | " 326,437 | 1,305,749 | 2,300 | 567 |
| 1874 | 1,383,464 | " 461,154 | 1,844,618 | 2,868 | 643 |
| 1875 | 1,856,178 | " 618,726 | 2,474,904 | 2,024 | 1,222 |
| 1876 | 1,339,986 | " 446,662 | 1,786,648 | 2,282 | 783 |
| 1877 | 1,206,136 | " 402,045 | 1,608,182 | 1,960 | 820 |
| 1878 | 1,062,670 | 1-5th 212,534 | 1,275,204 | 1,883 | 677 |
| 1879 | 1,075,049 | " 215,009 | 1,290,058 | 2,124 | 607 |
| 1880 | 844,856 | " 168,971 | 1,013,827 | 1,955 | 518 |
| 1881 | 872,281 | " 174,456 | 1,046,737 | 1,898 | 551 |
| 1882 | 795,071 | " 159,014 | 954,085 | 1,738 | 548 |
| 1883 | 661,877 | " 132,375 | 794,252 | 1,965 | 404 |
| 1884 | 613,304 | " 122,861 | 736,165 | 1,858 | 396 |
| 1885 | 594,782 | " 118,956 | 713,738 | 2,902 | 246 |
| 1886 | 753,043 | " 150,608 | 903,651 | 3,147 | 287 |
| 1887 | 578,924 | " 115,785 | 693,709 | †2,342 | 296 |
| 1888 | 513,943 | " 102,788 | 616,731 | 2,007 | 307 |
| 1889 | 490,769 | " 98,154 | 588,923 | 1,929 | 330 |
| 1890 | 412,029 | " 82,406 | 494,436 | *1,342 | 423 |
| 1891 | 358,176 | " 71,635 | 429,811 | 1,199 | 358 |
| 1892 | 322,938 | " 66,588 | 399,526 | 1,340 | 298 |
| 1893 | 316,279 | " 63,256 | 379,535 | 1,247 | 304 |
| 1894 | 380,055 | " 70,011 | 436,066 | 1,610 | 283 |

* Waddington's estimate.
† Exclusive of a number of men working on or prospecting for quartz.

British Columbia Smelting and Refining Co.—O'Hara Furnace Building.

## ALABAMA HYDRAULIC COMPANY.

Organized 1878.

**Head Office: H. E. Flynn, Barkerville, B.C.**

Owns and operates a mineral claim containing five acres on Mosquito creek, in the Cariboo district, Province of British Columbia. Small force employed.

## ANTIGONISH GOLD MINING COMPANY.

Incorporated 1892. Authorized capital, $20,000 in shares of $100, all subscribed and half paid at date.

**Directors:**

J. C. McDonald. | C. M. Wilkie. | J. D. Copeland. | C. E. Harris.

**Head Office: C. M. Wilkie, Secretary, Antigonish.**

This company controls about 120 gold areas in Stormont district, Guysboro County, Nova Scotia. Equipped with 15-stamp mill (steam), and pumping and hoisting plant.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Gold yield, | 1892, | 2,191 ozs. | 18 dwts. | 14 grs., | from | 3,405 | tons rock crushed. |
| " | 1893, | 1,966 " | 19 " | 18 " | " | 4,681 | " | " |
| " | 1894, | 2,111 " | 10 " | — " | " | 6,299 | " | " |

**J. C. McDonald, Managing Director, Country Harbor Mines, Guysboro County, Nova Scotia.**

## ARGANAUT GOLD MINING CO. OF KOOTENAY, Ltd.

Incorporated 1895. Authorized Capital, $500,000.

**Directors:**

A. Graham Ferguson. | S. O. Richards. | John G. Woods.

**Head Office: Vancouver, B.C.**

Formed to take over mining property in British Columbia, and in particular to acquire from F. C. Innes two mineral claims in the Trail Division, Kootenay District, B.C., known as the Eleanor and Londonderry claims. No report.

## ALEXANDRA MINING AND DREDGING CO., Ltd.

Incorporated 1895. Authorized Capital, $3,000,000.

**Directors:**

Marshall H. Alworth. | Chas. Wilson. | J. B. Heinrick. | George Turner. J. B. Hanrahan.

**Head Office: Vancouver, B.C.**

Formed to carry on the business of gold mining in the Province of British Columbia. No report.

## ANDERSON GOLD MINE.

Capital invested, about $10,000.

**Sole Owner :**

John H. Anderson, Musquodoboit Harbor, Halifax Co., N.S.

This mine is situated in the Lake Catcha district, about four miles from the village of Musquodoboit Harbor, in the County of Halifax, Province of Nova Scotia. Property comprises 91 gold areas. Small force employed. Equipped with 10-stamp mill and other plant estimated to be of a value of $6,000. The official returns for 1892, '93 and '94 are :—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1892... | ..282 ozs. | 11 | dwts. | 6 | grs. | from 344 | tons rock crushed. |
| 1893..... | 262 " | 3 | " | ..... | " | 156 | " |
| 1894..... | 642 " | 4 | " | ..... | " | 661 | " |

## ANGLO-AMERICAN GOLD AND PLATINUM HYDRAULIC MINING CO., Ltd.

Incorporated 1890. Authorized Capital, $250,000, in 50,000 shares of $5.00.

**Directors :**

J. Barnet Maclaren, New Westminster, B.C., *President.*

Capt. S. F. Scott, Vancouver, B.C. | G. D. McKay, Vancouver, B. C.
Capt. R. Hughes, Vancouver, B.C.

**Head Office : Capt. S. F. Scott, Managing Director, Vancouver, B.C.**

Formed to work four hydraulic claims situated on the south fork of the Similkameen river in the Similkameen division of the Yale district, Province of British Columbia. The result of the development work done to date shows the average gold value of the gravel to be 27½ cents per cubic yard ; the value of the platinum being in addition more than 6½ cents per cubic yard ; and the total value of metals not less than 34 cents per cubic yard of dirt washed. Water supply reported to be ample and convenient.

## BARACHOIS GOLD MINING CO.

**Directors :**

Steven Dawson. | Rod. Macdonald. | B. M. Davidson. | W. A. Adams.

**Mines Office : B. M. Davidson, Wine Harbor, Nova Scotia.**

Property at Wine Harbor, Nova Scotia. 40 persons employed. No returns of yield reported.

## BLACK CREEK HYDRAULIC MINING CO. OF CARIBOO, Ltd.

Incorporated 1894. Authorized Capital $300,000, in shares of $5.00.

**Directors :**

W. F. Salsbury. | Johann Wullfshon. | Edward Mahon.

**Head Office : Vancouver, B.C.**

Formed to take over and acquire mining leases of lands or mining claims in any part of the Province, and in particular nine tracts of 160 acres each, on Black Creek, Cariboo district, for which tracts of lands application has been made for mining leases, and a mining lease granted 15th February, 1893, of a tract of land on said Black Creek to the Black Creek Hydraulic Mining Company, and to acquire all the rights and interests of all parties interested in any mining claims on Black Creek and Club Creek, and the water privileges in connection therewith.

## BLACK JACK QUARTZ MINING CO., Ltd.

Incorporated 18th March, 1890. Capital Stock, $120,000, divided into 60,000 shares of $2 each.

**Directors :**

S. A. Rogers, Barkerville, B.C. | A. McIntyre, Barkerville, B.C.
John Stevenson, " " | John Houser, " "
A. Locke, Quesnelle, B.C.

**Head Office : W. H. Phelps, Secretary, Barkerville, B.C.**

Formed for the purpose of mining quartz for precious metals and minerals in British Columbia, etc. The company owns two locations, each 1,500 ft., near Barkerville, Province of British Columbia. No report, 1895.

## BONANZA GOLD MINING CO., Ltd.

**Owners :**

Judge Drake. | Henry Harvey.
J. McB. Smith. | E. Bell.
F. Soues. | C. Phair.
John Marshall. | A. W. Smith.

**Head Office : E. Bell, Secretary, Clinton, B.C.**

This company owns six mineral claims, each 1,500 x 600 ft., for which they hold Crown grants for each location, about 120 acres. Situated eight miles from the town of Lillooet, in the district of Lillooet, in the Province of British Columbia.

This company has bonded two of the above mineral claims to parties who have been steadily at work for the last four months developing the same. They have now on the dump a large quantity of fine ore and at an early date contemplate putting up a stamp mill.

## BRITISH COLUMBIA GOLD DREDGING CO., Ltd.

Incorporated 1894. Authorized capital $1,500,000, in shares of $10.00.

**Directors:**

W. A. Shahan. | J. E. W. Macfarlane. | J. W. Campion.

**Head Office: Vancouver, B.C.**

Formed to operate certain mineral claims in the Province of British Columbia. Being organized at date of report.

## BOSTON BAR GOLD MINING CO.

Incorporated under the Statutes of British Columbia, 1893. Authorized capital $50,000, in shares of $10 each.

**Directors:**

Daniel R. Young, Vancouver, B.C.
A. F. Griffiths, Vancouver, B.C. | W. R. Robertson, Vancouver, B.C.

**Head Office: Vancouver, B.C.**

Formed to obtain by purchase or otherwise and work certain mineral claims at or near Bootanie creek, on th Fraser river, Province of British Columbia.

## BRITISH COLUMBIA GOLD FIELDS EXPLORATION AND CONCESSIONS CO., Ltd.

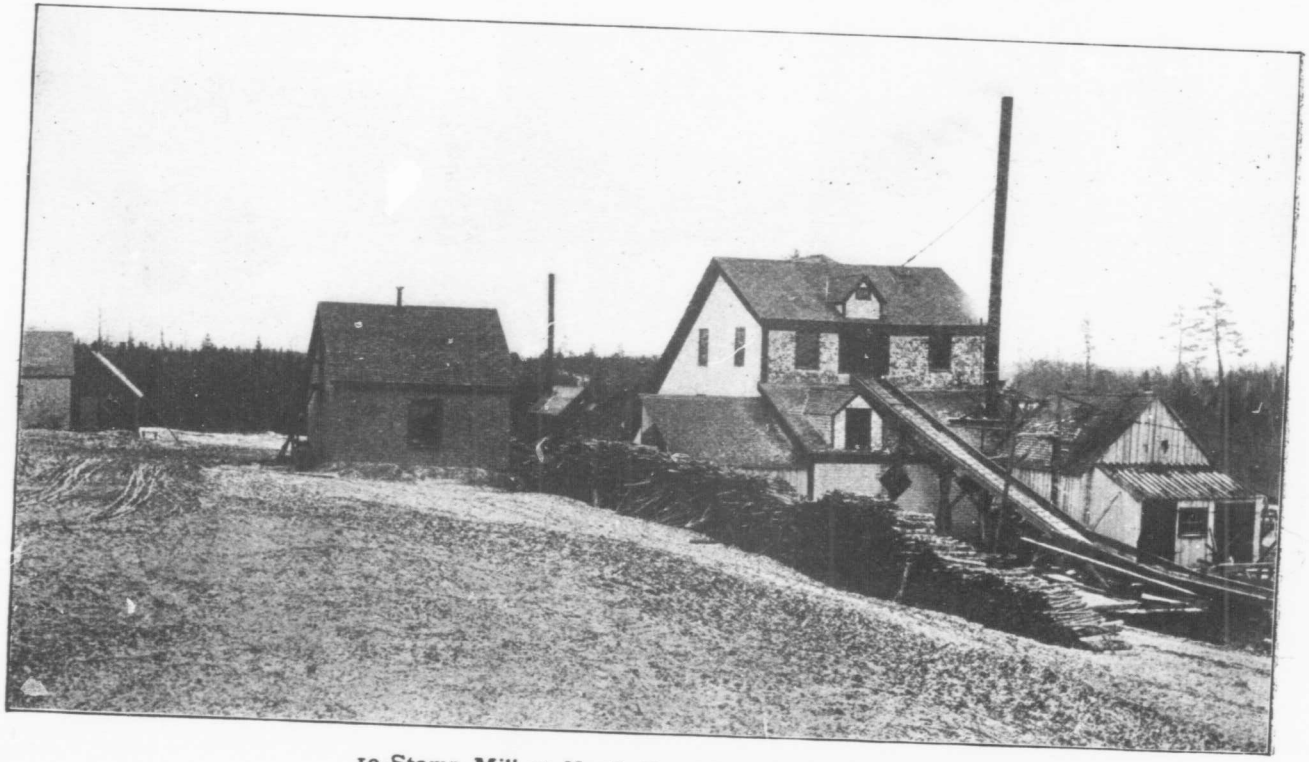
Registered 13th March, 1895. Authorized capital $500,000, in shares of $5.00.

**Directors:**

J. M. Browning. | H. Abbott. | A. G. Ferguson. | C. Wilson.
J. M. Buxton.

**Head Office: Vancouver, B.C.**

Formed with the following objects: (*a*) To acquire, by subscription, purchase, exchange or otherwise, any approved shares in companies operating, or about to operate, any mining claims in the Province; also to acquire, by purchase, lease, exchange or otherwise, any gold or other mining claims, whether developed or not, in the Province of British Columbia. (*b*) To acquire, by purchase, lease or otherwise, any water rights, lands, or property, either real or personal, that it may be found necessary to acquire for the proper working, operating and developing of any gold or other mining claims in the Province that the company may acquire or have an interest in. (*c*) To make sales of, or dispose of in exchange or otherwise, any shares in mining companies, operating or about to operate, or of gold or othre mining claims, water rights or prop-



10-Stamp Mill at North Brockfield, Nova Scotia.

erty, either real or personal, connected therewith, in the Province of British Columbia, to any person, persons, body or bodies corporate. (*d*) To promote and form companies having for their object the purchase and development of any gold or other mining claims in the Province of British Columbia, and to subscribe for shares in the same. (*e*) To employ prospectors to ascertain the value, position and locality of any claims, and to acquire the same, when duly ascertained, by purchase, lease or otherwise.

## BROOKFIELD MINING ASSOCIATES.

A Private Corporation.

**Owners :**

Wilbur L. Libbey. | Elijah H. Harding.

**Mines Office : W. L. Libbey, Manager, North Brookfield, Queen's, N.S.**

The property comprises 104 areas at North Brookfield, Queen's county, Nova Scotia. Main shaft down 295 feet and sinking. 10-stamp mill. 45 persons employed in 1895. The yield in 1895 was :—

| | Tons. Crushed. | Gold Received. | | |
|---|---|---|---|---|
| | | ozs. | dwts. | grs. |
| January | 375 | 144 | 4 | .. |
| February | 380 | 128 | 1 | .. |
| March | 390 | 151 | 6 | .. |
| April | 300 | 140 | 16 | .. |
| May | 318 | 205 | 10 | 13 |
| June | 268 | 231 | 10 | 4 |
| July | 272 | 211 | .. | 2 |
| August | 202 | 183 | 4 | .. |
| September | 364 | 303 | 10 | 5 |
| October | 450 | 321 | 5 | 15 |
| November | 458 | 394 | 4 | .. |
| December | 465 | 561 | .. | .. |
| | 4242 | 2975 | 11 | 15 |

## CENTRE STAR MINING AND SMELTING CO., Ltd.

Incorporated 16th July, 1895. Authorized Capital, $500,000.

**Head Office : Butte, Montana.**

**Mines Office : Oliver Durant, Trail, B.C.**

Formed to carry on mining in the Trail Creek division, West Kootenay district, Province of British Columbia, and to develop the Centre Star mineral claim. Being worked. Equipped with 7 drill Ingersoll compressor, rock drills, &c.

## CARIBOO AND KOOTENAY PROSPECTING AND MINING CO., Ltd.

Incorporated March, 1894. Authorized Capital, $100 000.

**Directors:**

W. H. Kendall. | B. J. Cornish. | E. E. Penzer. | F. M. Robertson. | John Williams

**Head Office: H. H. Davies, Secretary, P. O. Box 307, Vancouver, B.C.**

Holds under 5 years' lease, among other mineral claims, a placer property on Lardeau Creek covering 1½ miles. A considerable amount of work has been done towards opening up this claim, and work is proceeding.

## CARIBOO GOLD FIELDS, Ltd.

Incorporated under the Foreign Companies Act, B.C., 1895. Authorized Capital, £100,000 sterling, in shares of £1 sterling.

**Mines Office: A. D. Whittier, General Manager, Barkerville, B.C.**

Formed to adopt and carry into effect an agreement dated 21st November, 1894, between the Whittier Gold Concessions, Limited, of the one part, and W. W. Ellwood on behalf of the company, to acquire and work mining rights in the Province of British Columbia.

## CARIBOO HYDRAULIC MINING CO. (Lim. Lia.)

Incorporated 1893. Authorized Capital, $300,000, in shares of $5.

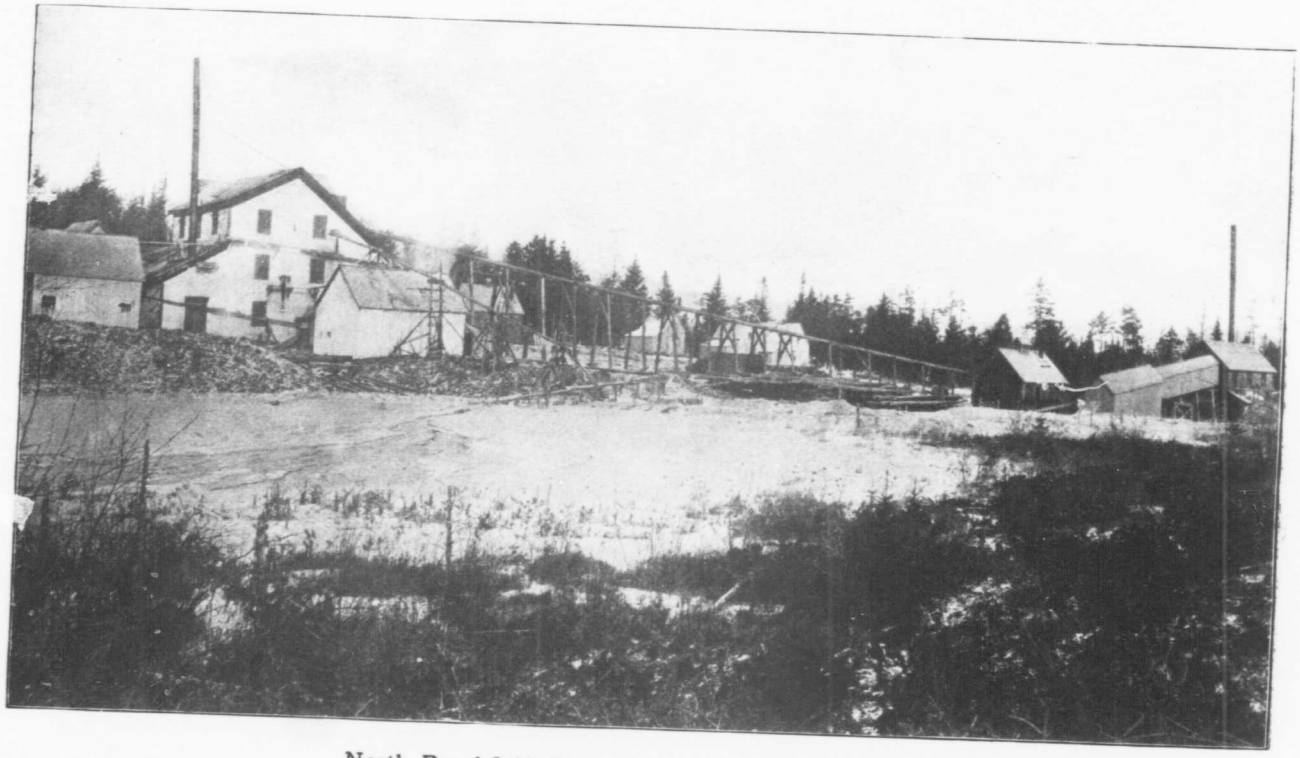
**Directors:**

O. Plunkett. | J. M. Browning, *President.* Pierce Lloyd, *Secretary.* | F. C. Innes.

**Principal place of Business: Vancouver, B.C.**
**Location of Works: Quesnelle Forks, Cariboo District, B.C.**

*Manager*, J. B. Hobson, M.E., Quesnelle Forks, B.C.
*Asst. Manager*, L. F. Warner, Jr., M.E., Quesnelle Forks, B.C.

The property is situated on the south side of the Quesnelle river, about 4 miles east of the town of Quesnelle Forks. It comprises eight mining leases, aggregating 426 acres of land, which covers the auriferous deposits of an ancient river channel, which is separated for a considerable distance from the modern deep and canon-like gorge of the south fork of Quesnelle river, forms the north rim of the ancient river channel, which is now found filled to a depth of 400 ft. with a heavy deposit of high grade auriferous gravel.



North Brookfield Go'd Mine and Mill, Nova Scotia.

Near the lower end of the property, on Dancing Bill Gulch, successful hydraulic mining on a small scale with 5 in. pipes and 1½ in. nozzles was carried on by Chinese companies for a period of about 18 years. About one acre of gravel 300 ft. deep was excavated without reaching the bedrock or bottom of the channel.

The water is delivered and utilized through a system of ditches 7 x 13 x 3 ft. deep, 17½ miles in length, from the mine to the source of supply at Six Mile creek, the outlet of Polleys and Boot Jack lakes, which have a storage area of about 2,200 acres, and have been converted into storage reservoirs by the construction of substantial dams 8 ft. high across their outlets. This supply is augmented by the water of numerous streams on line of main canal, which insures a supply varying from 2,000 to 3,000 miners' inches throughout the season.

The mine is equipped with a portable hydraulic plant, consisting of two lines of 22 in. and one line of 18 in. steel pipe, aggregating 4,000 ft. in length, also 5 No. 8 giants, having nozzles varying from 5 to 9 in. in diameter.

The gold saving appliances consist of 526 ft. of 3 x 5 ft. sluices, and 588 ft. of 3 x 6 ft. sluices, paved with improved iron riffles.

The water is delivered at the mine on the floor of the hydraulic excavations with a head of 300 ft.

During the progress of the work of equipment and installation of the heavy plant and opening the working hydraulic pits, extending over the seasons of 1894 and 1895, water was used about 48 days in the removal of about 210,000 cubic yards of earth, gravel and bowlders, a large percentage of which was composed of accumulations of tailings and bowlders left piled in Dancing Bill Gulch by the Chinese miners, and the product therefrom has been $65,467. Two working pits are now opened in the upper gravels, the banks of which are about 300 ft. in height.

The floor of these hydraulic excavations lie from 50 to 100 feet above the bottom of the channel. This lower bench of high grade gravel will be opened and worked as soon as the upper workings are carried forward a sufficient distance to leave the lower workings safe from the danger of caves from the upper workings.

The mines are now on a basis for profitable production, and it is expected that during the ensuing season of 1896 the mine will be run nearly full time, and the output increased in proportion.

SECOND ANNUAL REPORT—YEAR ENDED 31ST DECEMBER, 1895.

Toward the end of last season the contractor completed the work of extending the ditch to Polley's lake. The necessary buildings were finished, and the giants put in operation.

The results of the washing and the "clean-ups" are given in the Manager's report.

It was the original intention to construct a ditch capable of providing 2,000 miner's inches of water, and the contract was made upon that basis, but while the work was in progress, the Manager recommended in the strongest terms, that the capacity of the ditch be increased to 3,000 miner's inches, in view of the fact that the work could be done cheaper then than at any other time, and that the additional profits resulting from the increased head of water would give a very large return for the investment. Your Directors, convinced that the Manager was right, authorized the additional work, and arranged to borrow for the company the necessary money to pay for it.

During the spring months your property was exposed to very serious damage from the torrents from Dancing Bill gulch, and your Directors, upon the recommendation of the Manager, authorized the necessary expenditure to divert the water passing through this gulch to the ditch, so as to utilize for washing purposes a stream that would otherwise be a continual menace to the property. Your Directors also borrowed the necessary money to complete this work.

The details of these large but necessary expenditures, together with the amount required for a connection to Boot Jack lake, and for other unforeseen works, compelled your Directors to incur a total debt of about one hundred and twenty thousand dollars ($120,000). Of this amount eighty thousand dollars ($80,000) was borrowed, and the balance is in the shape of bank overdrafts, some of which are guaranteed.

**CARIBOO HYDRAULIC MINING CO.**—Continued

Your Directors estimate that to provide the supplies, explosives, and additional equipment, and to pay for labor up to the 31st May, an additional amount of about fifty-five thousand dollars ($55,000) will be required.

In order to pay off the floating debt, and to provide about twenty-five thousand dollars ($25,000) of working capital, your Directors recommend that the capital stock of the company be increased to five hundred thousand dollars ($500,000), and that the new shares be offered at par to the shareholders *pro rata*, according to their holdings when the books are closed.

Resolutions authorizing the increase of the capital stock of the company from three hundred thousand dollars ($300,000) to five hundred thousand dollars ($500,000), and specifying the terms upon which the two hundred thousand dollars ($200,000) of new stock shall be offered to the shareholders, or otherwise disposed of, will be submitted for your approval.

(Signed) J. M. BROWNING, *President.*

Vancouver, B.C., Feb. 22nd, 1896.

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MANAGER'S REPORT.

DEAR SIRS,—As the Manager of the Cariboo Hydraulic Mining Co., Ltd., I have the honor of making the following report relative to the work accomplished at the company's mines from April 1st to November 12th, 1895.

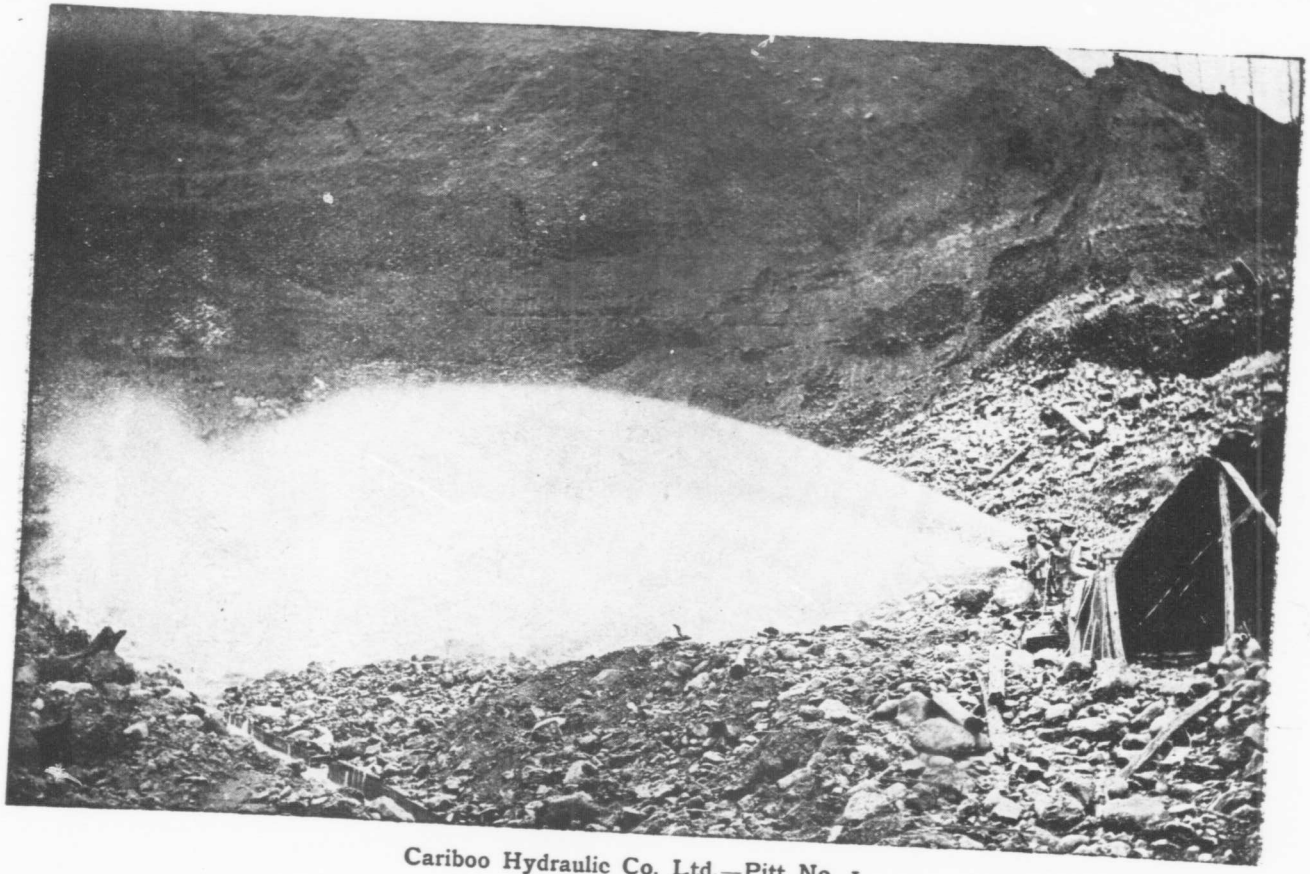
*Permanent Improvements.*—Under this heading I place the extension of ditch from Hazeltine creek to Six Mile creek, the construction of dams, gates and other work required to convert both Polley's and Boot Jack lake into storage reservoirs; construction of ditch to divert water from Dancing Bill gulch to the South Fork pooling reservoir; construction of road and trails, erection of camp buildings, and other work appertaining to the equipment of the company's mines.

*Operating Mines.*—Results of the past season's work are tabulated as follows:—

| | |
|---|---|
| Water used in Pit No. 1 | 19 days, 11 hours. |
| " " Pit No. 2 | 25 " 22½ " |
| Total | 45 days, 9½ hours. |
| Gold product of season, gross | $60,306.93 |
| Yield per miner's inch per day (estimated) | 56 cents |
| Pit No. 1— | |
| Quantity of water used | 42,933 inches |
| Gravel removed (estimated) | 60,000 yards |
| Gold recovered (estimated) | $35,000.00 |
| Yield per cubic yard | $58\frac{3}{10}$ cents |
| Duty of water per miner's inch per day. | $1\frac{4}{10}$ cubic yards |
| Pit No. 2— | |
| Quantity of water used | 64,731 inches |
| Gravel removed (estimated) | 150,000 cubic yards |
| Gold recovered (estimated) | $25,306.93 |
| Yield per cubic yard | $16\frac{9}{10}$ cents |
| Duty of water per miner's inch per day. | $2\frac{3}{10}$ cubic yards |

The full effective duty of the water cannot be attained until the working pits are enlarged to dimensions sufficient to accommodate a proper system of branch sluices, and more room is still required to permit the heavy hydraulic plant to be placed and handled with economy and safety to plant and men.

The greater portion of the expenditure in the mine included under the head of "Operating" has been applied to opening Pit No. 2, with the object of so enlarging the working space that the above conditions may be speedily attained, and the continuous working of the mine, day and night, with rapid removal of auriferous gravel, may be carried on with safety and despatch.



Cariboo Hydraulic Co. Ltd.—Pitt No. 1.

The duty of the water and the resulting gold product will increase with the further opening of the mine.

| | |
|---|---|
| The estimated gross product for the season of 1896 is. | $300,000.00 |
| The estimated cost of operating the mine for a period of 180 days during season 1896 is ..... | 87,000.00 |
| (The estimated possible number of working days with water, 150.) | |
| Leaving a net estimated profit for season of 1896, say. | $213,000.00 |

When the present working hydraulic pits, at Dancing Bill gulch, are sufficiently enlarged, and the lower or bed-rock bench of high grade gravel opened up for working, so as to accommodate the continuous use of the present water supply, and facilitate the rapid removal of the auriferous gravel, the product will be increased and the following result attained :—

| | |
|---|---|
| 2,000 miner's inches of water will remove in 24 hours, cubic yards of gravel ..... | 7,000 |
| Value of gold per cubic yard ..... ..... | 50 cents |
| Estimated daily gross product..... | $ 3,500.00 |
| Deduct daily cost of mining..... | 500.00 |
| Estimated daily net profit..... ..... ..... | $ 3,000.00 |
| Possible working days per season..... | 180 |
| Estimated annual net profit..... | $540,000.00 |

This result can be doubled when desired, by completing the construction of the ditch to Morehead creek, which will add two thousand miners inches to the company's water supply, which can be used in the operation of the working hydraulic pits at Black Jack gulch on the South Fork mine.

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*Water Supply*—The water supply upon which the mining operations for the ensuing year must depend, will be derived from two sources, namely :—1st. The early rain and snow-water supply from tributary streams to the main ditch, which supply has been augmented over that of previous years by the construction of a relief ditch for freshet waters of Dancing Bill gulch, which are now diverted into our mine reservoir, placing such water under control for utilization at the mine, and by the additional tributary feeders cut by the 9 miles of main ditch constructed last summer. 2nd. The two storage reservoir lakes, known as the Polleys lake and Boot Jack lake, situate at the head of main ditch.

The early supply is difficult to estimate with exactitude, so much depending upon the vicissitudes of a variable climate, where snow-fall, rain and temperature materially influence the flow of the tributary streams, that figures made in advance can hardly be depended upon with certainty.

But it is hoped and expected that sufficient water will be obtained to carry on mining operations up to July 1st without drawing upon the reservoirs at the lakes. In seasons of ordinary precipitation this will certainly be the case. In extra dry seasons the reservoirs will probably have to be tapped before that time, and in wet seasons they will not be opened until later.

The reservoirs can be utilized to the following depths of water: Polleys lake, 8 ft.; Boot Jack lake, 5 ft. Their storage area is not known, but the use of the water this season has given data as follows:

The lakes delivered (measured at the mine) 2,000 miners' inches of water for a period of 46 days' time, reducing their level 66 inches, or an equivalent of $1\frac{46}{100}$ inches reduction in depth per day, for such 2,000 inches supply.

The lakes can therefore be counted upon to furnish, without aid after July 1st, on the same basis as above, 108 days continuous water of 2,000 inches volume, or 72 days water of 3,000 inches volume.

In the first case certainly, ample water for balance of season, and in second instance probably sufficient to supply 3,000 inches for all available mining time during the balance of season.

**CARIBOO HYDRAULIC MINING CO.**—Continued

Consolidation of ditch banks and siltage of ditch with ensuing years, will tend to increase above figures, and each and every summer shower of rain will add materially to available water.

The company is now assured of a water supply, that under the most unfavorable circumstances can only compel a certain degree of economy in its use.

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*The Ditch System*—The water is delivered and utilized through a system of ditches, 17½ miles in length.

The water of Polleys lake is controlled by a double screw gate, each three feet ten inches wide, in a deep cut tapping this lake 8 feet below the high water mark. The water discharged therefrom is conducted into the original channel of Six Mile creek, by a cut of 8 feet deep and ½ mile long.

Boot Jack lake has its outlet closed by a crib dam, sheeted with split cedar and covered with earth 7 feet high, and having a double screw gate, each three feet six inches wide, discharging the water into the original creek, which channel it follows about 2½ miles, and finds its way into Six Mile creek, near the outlet of Polleys Lake cut.

One quarter of a mile below this confluence, Six Mile creek is closed by a crib dam, 7 ft. high and 100 ft. long, (sheeted with cedar and covered with earth) provided with a 19 ft. gate, closed in time of use by three gates, one of which is manipulated by a screw.

This dam raises the waters in Six Mile creek about 5 ft. into the head of main ditch, where it enters ditch through another double screw gate, each 3½ ft. wide.

The water then flows through 16 miles of ditch to South Fork reservoir.

The first nine miles to Hazeltine creek is through ditch constructed the past summer, and is a ditch 13 ft. 7 in. x 3 ft. deep and on 5 ft. grade per mile, capable of carrying 3,000 miners' inches, when banks slightly more consolidated. It is well built, on even grade and shows but little erosion, has no flumes, is supplied with 12 waste gases, and will be easily maintained at a nominal cost. It picks up the waters of numerous creeks of considerable volume during spring months and at time of summer rains.

The next seven miles is through the old South Fork ditch, widened and repaired to a capacity equal to the newer ditch of this season. This section has the disadvantage of a broken grade, forced upon this company by the faults of the old South Forks Company's construction.

The weak points have been strengthened by walls of rock and by flumes, and erosion retarded in many places by rock and timber walls, but this portion of the ditch, will, for some time to come, be saddled by more expenditure in maintenance than the upper section, by reason of its original faulty construction.

After the water passes into the reservoir it flows one mile to the sand box at the head of hydraulic pipe through old ditch previously reported.

The ditch from Dancing Bill gulch, constructed this summer, takes up the water of that creek above the mine, carries it one mile around the hillside and drops it into South Fork reservoir. This not only permits the control and use of freshet water, but was absolutely necessary for the purpose of keeping the freshet out of the hydraulic pits, through which the original stream flowed in a deep and rugged gulch.

About half a mile above South Fork reservoir the water of the main ditch is dropped vertically 53 ft. This drop should not have been made by the South Fork Company, and it is only a question of time, the sooner the better, when a ditch will have to be extended at this higher level to the mine, a distance of 2½ miles as the ditch would run.

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*Condition of the Mine*—The opening of two working hydraulic pits has been commenced.

Cariboo Hydraulic Mining Co. Ltd.—General View of Pit No. 1, Cariboo District, B.C.

Pit No. 1 includes the old excavation in the Choo Fan or Bullion lease, lying east of Dancing Bill gulch.

Pit No. 2 is being opened into the "Loo Qnong Ching Tong" ground, lying west of Dancing Bill gulch.

The working floor of both pits lies from 50 ft. to 80 ft. above the bedrock or bottom channel.

Both pits have been operated by one 22 in. supply pipe and distributer. Two giants have been used in pit No. 1 and one giant in pit No. 2.

The main and branch sluices placed in pit No. 1 are 5 ft. wide, 3 ft. deep, and 526 ft. in length. Those in pit No. 2 are 6 ft. wide, 3 ft. deep and 364 ft. in length.

In Dancing Bill gulch, immediately below the sluice outlet of pit No. 2 there is placed a section of 3 ft. x 8 ft. flume, 32 ft. long.

At the lower end of gulch there is placed a line of sluices, 3 ft. x 6 ft., and 222 ft. in length.

The gravel underlying the boulder clay in pit No. 1 is very free and yields readily to the force of the hydraulic streams, and contains a large percentage of boulders and heavy cobbles, but it is extremely rich.

The boulder clay is apparently decreasing in thickness, and is evidently a slide and local, instead of forming a continuous capping as at first supposed.

The gravel encountered in opening pit No. 2 was mainly slide material, but the stratified gravel is now exposed around the south and west sides of the excavation. The gravel has gradually improved as the workings advanced and better results may be expected from the next season's work in this pit. The pay gravel is overlaid by a stratum of sand and a deposit of low grade top gravel. No boulder clay has been encountered in these workings.

The rock, which is apparently the west rim of the channel, has been exposed on the west side of the excavation in pit No. 2.

The bottom bench of gravel underlying the workings in both pits, is of high grade. Two strata, exposed by a slide on west side of Dancing Bill gulch, give prospects varying from $1 to $3 per cubic yard.

No openings have been made to test bedrock.

The workings of the lower bench cannot be attempted until such time as the workings now in progress in the top bench have been carried up the channel about 300 ft. from the face of the present workings in pit No. 1.

Pit No. 2 is now in condition to accommodate a separate hydraulic plant of 22 inch pipe. This must be provided so that each pit can be operated independently of the other, and the opportunity afforded for the continuous use of the company's water supply.

With the additional plant referred to, the mine will be in fairly good shape for the use of next season's water supply. The high grade of the deposits make it appear reasonable to predict a most successful and profitable run for the season of 1896.

The estimates for the additional plant, &c., &c., necessary to facilitate the continuous and profitable operation of the mine during the season of 1896, amount to about $10,000, and the estimated cost of extension of main ditch from drop above South Fork reservoir, around head of reservoir of Dancing Bill gulch, with repairs to dam at South Fork reservoir will be about $16,000.

The extension of this ditch will be required to facilitate the operation of the mine during the season of 1897, for the reason that the present ditch from South Fork reservoir will be too low for use in working top bench, and must be applied to the working of the lower bench of the bottom gravel, while the hydraulic plant applied to the working of the upper bench must be supplied with water from the main ditch extension, which will deliver the water at a point on Dancing Bill gulch, about 60 ft. above point of delivery of the present lower ditch from South Fork reservoir.

(Sgd.) J. B. HOBSON,

*Manager.*

**CARIBOO HYDRAULIC MINING CO.**—Continued.

CAPITAL ACCOUNT.

*Receipts.*

| | |
|---|---|
| Paid-up Capital Stock, 60,000 shares at $5 each | $300,000 00 |
| Gold taken out in 1894 | 5,161 85 |
| Balance carried to Profit and Loss Account | 118,760 98 |
| | $423,922 83 |

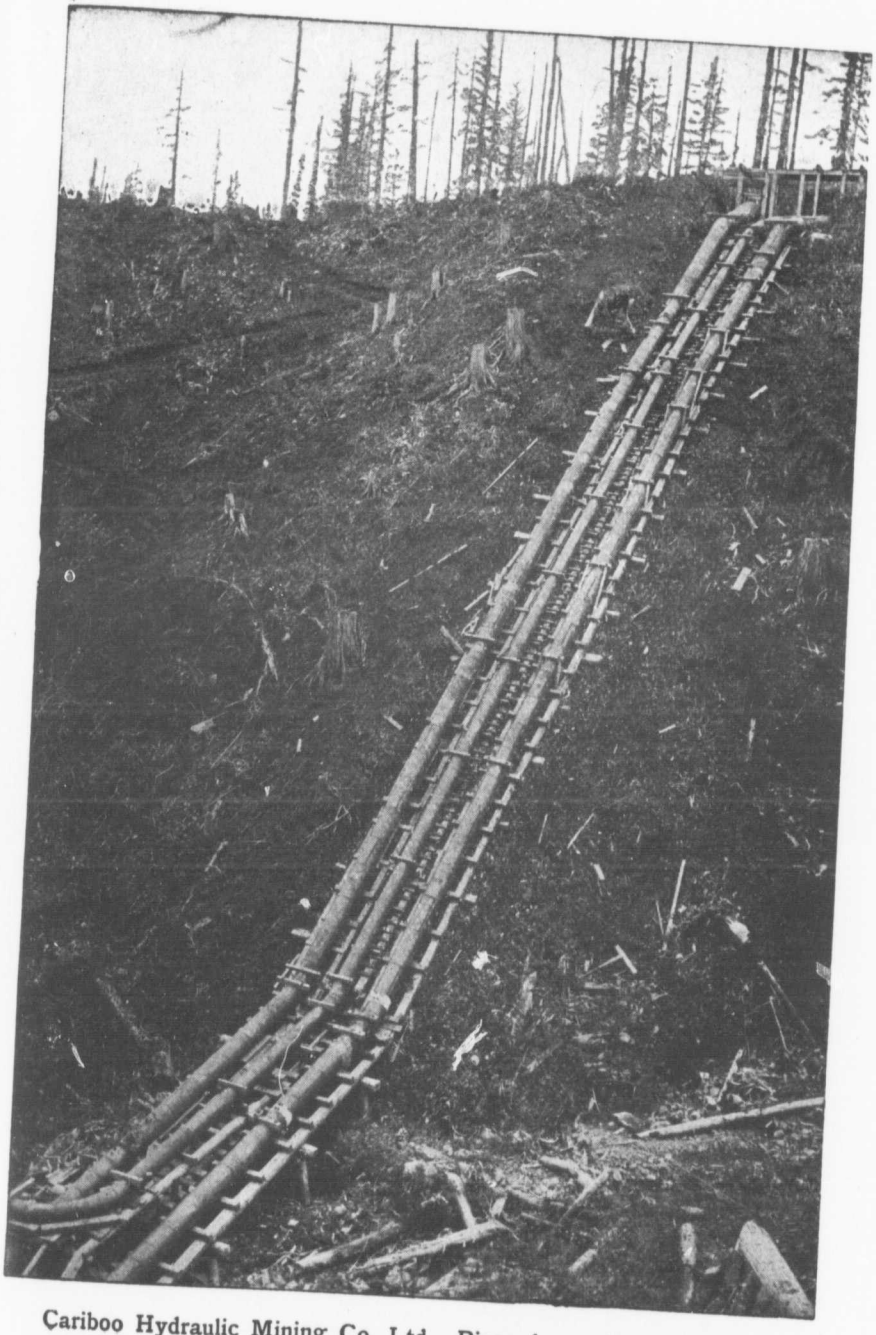
*Expenditure.*

| | |
|---|---|
| Mine Purchases and Leases | $180,704 10 |
| Moorehead Ditch Survey | 534 38 |
| Ditches and Equipment of Mine | 163,258 70 |
| Dams, Sluices, Flumes, Sand Boxes, etc | 11,324 33 |
| Reservoirs | 10,063 98 |
| Mine Labor, etc | 24,901 00 |
| Buildings | 5,182 73 |
| Hydraulic Plant | 3,753 99 |
| Melting and Lighting Plant | 44 78 |
| Saw Mill | 2,465 25 |
| Roads and Trails | 3,688 50 |
| Pasture Lands | 1,001 05 |
| Horses and Waggons | 2,531 67 |
| Transportation | 2,485 96 |
| Furniture | 553 70 |
| Operating | 3,171 57 |
| Management | 2,500 00 |
| | $418,165 60 |
| Head Office and General Expenses to March, 1895 | 5,757 14 |
| | $423,922 83 |

OPERATING ACCOUNT.

*Expenses Operating Mine, Season 1895.*

| | |
|---|---|
| Gold | $58,571 19 |
| Management | $ 2,250 00 |
| Mining expenses, labor, and explosives | 23,725 98 |
| Maintenance of Ditch | 9,119 67 |
| " Pipe | 56 09 |
| " Sluices | 1,711 60 |
| " Flumes, sand-boxes, etc | 31 70 |
| " Hydraulic plant | 465 36 |
| " Lighting plant | 111 45 |
| " Camp | 634 90 |
| " Tools and implements | 655 70 |
| Waggons, harness, etc | 10 85 |
| Stable expenses | 1,020 70 |
| Farm | 350 93 |
| Boarding house | 630 87 |
| Travelling expenses | 982 70 |
| Stationery and printing | 166 85 |
| Telegrams and postage | 98 09 |
| Insurance (accident) | 162 50 |
| | $42,185 94 |
| Balance carried to Profit and Loss Account | 16,385 25 |
| | $58,571 19 |



Cariboo Hydraulic Mining Co. Ltd.—Pipes down side of Dancing Bill Gulch, Cariboo, B.C.

PROFIT AND LOSS ACCOUNT.

*Dr.*

| | |
|---|---|
| Balance brought from Operating Account | $ 16,285 25 |
| Balance carried to General Balance Sheet | 104,050 58 |
| | $120,435 83 |

*Cr.*

| | |
|---|---|
| Balance brought from Capital Account | $118,760 98 |
| Head Office and General Expenses to December, 1895 | 1,674 85 |
| | $120,435 83 |

GENERAL BALANCE SHEET.

*Dr.*

| | | |
|---|---|---|
| Loans | $79,699 45 | |
| Bank advances | 40,000 00 | |
| | | $119,699 45 |
| Bills Payable, outstanding drafts issued at mine, and personal accounts, less cash in bank, etc | | 6,250 66 |
| | | $125,950 11 |

*Cr.*

| | |
|---|---|
| Balance from Profit and Loss Account | $104,050 58 |
| Stores on hand | 21,899 53 |
| | $125,950 11 |

## CARIBOO MINING AND MILLING CO.

**Principals :**

Messrs. Jas. Monaghan & Co.

**Mines Office: James Cronin, Manager, Camp McKinney, B.C.**

Owns and operates the "Cariboo" and "Amelia" gold claims, at Camp McKinney in the O'Kanagan district, British Columbia. 30 persons employed 1894. Equipped with 10 stamp mill and other machinery; output between 1st May and 1st November, 1894, $34,750, and 60 tons of concentrates.

## CARIBOU GOLD MINING CO., Ltd.

Incorporated by an Act of the Legislature of Nova Scotia, 1894.

Authorized Capital, $500,000.

**Directors :**

Hon. David McLellan, St. John, *President.*

Nathaniel Curry, Amherst.
A. G. Cunningham, Halifax.
Hon. J. W. Longley, Halifax.
Hon. A. C. Blair, St. John.
J. Lester Jennison, New Glasgow.
J. Fenwick Fraser, St. John.

**CARIBOO GOLD MINING CO.**—Continued.

**Head Office : A. G. Cunningham, Sec.-Treas., P. O. Box 102, Halifax.**
**J. Fenwick Fraser, St. John, N.B., Managing Director.**

The property comprises certain gold mining areas in the Caribou district, County of Halifax, N.S. Operated in 1894-95.

Roderick Macleod, *Manager* Caribou Mines, Halifax Co., N.S.

## CROCKER GOLD MINES.

**Owner :**

Charles T. Crocker.

**Manager : Kendall F. Crocker, Whiteburn, N.S.**

Property comprises eighty areas at Whiteburn, N.S. 10 stamp mill and other machinery. Small force. For five months in 1894, there were reported at the Mines Office 236 ozs. 16 dwts. gold from 478 tons rock crushed.

## CENTRAL RAWDON MINING CO., Ltd.

Incorporated 1890. Capital, $120,000 in shares of $100 each, fully subscribed and paid.

**Directors :**

Clarence H. Dimock, *President*, Windsor, N.S.
Wm. O'Brien Windsor, N.S. | J. C. Geldert, Windsor, N.S.

**Head Office : J. C. Geldert, Secretary, Windsor, Hants Co., N.S.**

The company holds from 150 to 200 gold areas under lease from the Government of Nova Scotia. The mines, which are at Rawdon, are equipped with 15 stamp mill, hoisting and pumping gear and other machinery.

## CONSOLIDATED GOLD LAKE MINING CO., Ltd.

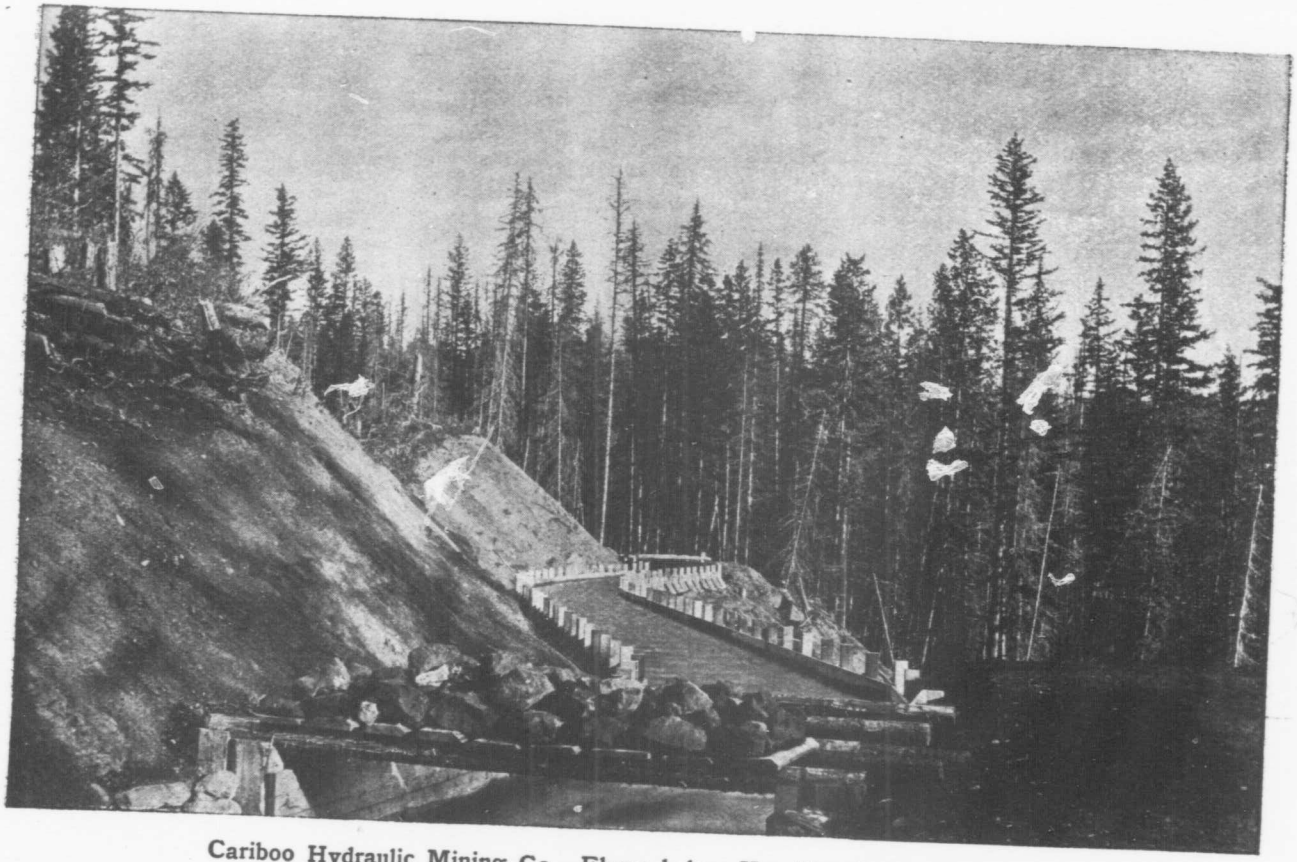
Incorporated 1895. Authorized Capital, $400,000.

**Directors :**

J. B. Neiley. | W. A. Temple. | James Reeves. | H. C. Walker.
G. H. McKinley.

**Mines Office : Gold Lake, N.S.**

Formed to acquire and work a property containing 305 gold areas at Gold Lake, Province of Nova Scotia.



Cariboo Hydraulic Mining Co.—Flume below Hazeltine Creek, built 1895.

## CRYSTAL GOLD MINING CO. OF RATHBURN, Ltd.

Incorporated 1894. Authorized Capital $1,000,000, in shares of $100.

**Directors:**

Hon. Peter White, Pembroke, Ont.
Alexander Barnet, Renfrew. | Thos. Hale, Pembroke. | Jas. B. Klock, Klock's Mills.
R. McConnell, Mattawa.

**Head Office: W. R. White, Secretary-Treasurer, Pembroke, Ont.**

**Rinaldo McConnell, Managing Director, Mattawa, Ont.**

Owns and operates a gold mining property at Lake Wahnapitae, on which, at date, development work is proceeding. To erect a mill in 1896.

## DIXON GOLD MINE.

A private company in which Messrs. Hartlen, Dixon and Putnam are the principals.

**Mine Office: Herbert Dixon, Managing Owner, Caribou, N.S.**

*Mines:* Upper Musquodoboit, Halifax Co., N.S.

This company owns and operates a gold mining property containing some 72 gold areas in the Caribou district, County of Halifax, Province of Nova Scotia. 25 men employed 1893. Equipped with 5-stamp mill, and steam pumping and hoisting equipment of an estimated value of $2,500.

GOLD YIELD, 1892, '93 AND '94.

| | | | | |
|---|---|---|---|---|
| 1892 | 1,118 ozs., 10 dwt., | from | 730 | tons rock crushed. |
| 1893 | 1,014 " | " | 710 | " |
| 1894 (7 months) | 972 " | " | 673 | " |

## DOMINION GOLD DREDGING AND PLACER MINING CO., Ltd.

Incorporated under Dominion Statutes, 1894. Authorized Capital, $40,000, in $100 shares.

**Directors:**

James Amess, Toronto. | John Perkins, Toronto.
Alex. Leslie, Toronto.

**Head Office: Toronto, Ont.**

Formed to carry on mining in the Province of British Columbia and the North-West Territory.

# DOMINION GOLD MINING AND REDUCTION CO., Ltd.

Organized August, 1895. Authorized Capital, £175,000.

**Head Office: F. W. Croncher, 371-4 Mansion House Chambers, London, E.C.**

**Canadian Office: Robt. H. Ahn, Rat Portage, Ont.**

Owns and operates a property containing about 3,000 acres in the Lake of the Woods district, Province of Ontario, on which are the "Gold Hill" and "Black Jack" mines; also a reduction works at the town of Rat Portage. 100 persons employed in 1895. Reduction works contain 20 stamps, 10 of which are 850 lbs. and 750 lbs., driven by an 80 h. p. engine and boiler; Blake ore-breaker; Tullock automatic feeder; "Perfection" concentrators, supplied by the Colorado Iron Works; Frue vanners, etc.; 10-ton chlorination plant to be added for treatment of concentrates. At the Gold Hill mine there is a 10-stamp mill driven by 40 h. p. engine. In his report to the shareholders, under date 10th December, the chairman said:—"During the four months of the company's existence substantial progress has been made in developing the various mining locations owned by the company, which are for the most part situated near the shores of the Lake of the Woods, within a radius of thirty miles of Rat Portage (on the Canadian Pacific Railroad), which is rapidly becoming an important mining centre. Since the company acquired its properties, prospectors and surveyors have been kept systematically at work with very gratifying results, and a number of valuable veins have been discovered. Some prospect work has been done on several outlying properties, but the principal work of development, so far undertaken, has been on the Gold Hill group, which consist of a solid block of properties covering about 1,200 acres, on which 28 auriferous veins of more or less magnitude have already been discovered and to some extent tested. Work has been commenced in earnest on the Pebble vein, on which two shafts and a winze have been sunk to a depth of about 90 ft., 30 ft. and 40 ft. respectively. Rich ore has been passed through while sinking in all the shafts, and a portion of the same has been passed through the mill with good results. One run of 25 tons yielded 26 ounces of gold, and the second run of 43 tons yielded 46 ounces. The vein appears to be a true fissure, and the vein matter is increasing in width and richness with depth. Some development work has been done on other veins near the Pebble, but the latter is the only one on which systematic mining has been commenced. A small stamp mill on the property has been equipped, and is now in full working order for testing purposes, but it is contemplated to erect a larger mill on the lake shore of sufficient capacity to develop and work all the workable veins at as early a date as possible. The reduction works owned by the company were completed about the middle of November, and consist of 20 stamps of four separate batteries of 5 stamps each, for the purpose of dealing with ores from different properties simultaneously. These works are considered to be the best equipped in Canada, and the prospects are that they will pay handsomely as a customs mill, apart from their value to the company, for treating ores mined in development of their own properties and properties under option of purchase. Their situation renders transportation by water from a large area exceedingly cheap; while their close proximity to the Canadian Pacific Railroad, from which a spur line has been built into the works, will enable ores to be brought in by rail from long distances. The opening of these works and the facilities they offer to the owners of mining claims to develop their properties and obtain returns to enable them to continue such development, has started a number of camps in the districts, and already shipments of custom ore have been received for treatment. A number of rich discoveries have recently been made in the district, which augur well for the future of this company, which has been formed to acquire mineral properties; and if the present policy is pursued of acquiring them under working option, owing to its exceptional position the future prospects of the company are exceedingly bright."

Cariboo Hydraulic Mining Co.—Head of Main Ditch with Division Dam in Six Mile Creek and Head Gate in Main Ditch.

# DUFFERIN GOLD MINING CO.

Reorganized and Incorporated 1890. Authorized Capital Stock, $500,000, divided into shares of a value of $25 each, the whole of which has been fully subscribed and paid up.

**Directors:**

Gardner Clish, Truro, N.S.
A. Kent Archibald, Truro, N.S. | John McNab, Halifax, N.S.
Silias Tupper, Truro, N.S.

**Head Office: A. Kent Archibald, Managing Director, Truro, N.S.**

Formed to mine and smelt ores in the Province of Nova Scotia. The Dufferin mines of the company are situated in the Darrs Hill district, four-and-a-half miles from the village of Salmon River, in the County of Halifax. The distance by water to Halifax is about 70 miles, by road 90 miles, and by a good waggon road to Shubenacadie, the nearest station on the Intercolonial Railway, 68 miles. The fee simple rights cover about 1,000 acres. The property on which mining rights are held is in two blocks. The one on which the mines are situated, comprises 342 gold areas, each 150 x 250 ft., making an aggregate of 8,550 ft. in length on the gold belt and 1,500 ft. across it. The other block containing 14 areas further south. (For history of discovery of this productive property see Canadian Mining Manual, 1893.)

After paying over $150,000 in costs for litigation, which lasted continuously for more than nine years, and which finally ended before the Privy Council, and paying for all lands, machinery, construction works and equipments, all expenses, including labor and management, the owners had received up to 1887 in net profits, over $300,000. The official returns of the gold yield are as follows:—

| Year. | Tons Rock Crushed. | Gold Yield. | |
|---|---|---|---|
| | | Ozs. | Dwts. |
| 1881 | 1640 | 1785 | 16 |
| 1882 | 3460 | 4315 | 16 |
| 1883 | 7474 | 3635 | 15 |
| 1884 | 9799 | 3397 | .. |
| 1885 | 10880 | 4924 | .. |
| 1886 | 10557 | 6509 | .. |
| 1887 | 10702 | 3258 | .. |
| 1888 | 9935 | 3354 | 10 |
| 1889 | 7740 | 1961 | 10 |
| 1890 | 6415 | 2070 | .. |
| 1891 | 5210 | 1407 | .. |
| 1892 | 445 | 1042 | 10 |
| 1893 | 3560 | 965 | .. |
| 1894 (Report for 8 months only) | 1467 | 271 | 5 |

The machinery equipment comprises a 20-stamp mill driven by a Little Giant turbine of 96 h.p.; stamps drop 95 per min., weight 850 lbs.; automatic Hammond feeder; capacity, 60 tons per 24 hours. There is a wire transmission of a distance of 4,067 feet, driven by Vulcan 52 in. wheel of 146 h.p., operating plunger pumps, four suction pumps, Blake rock breaker, etc. Opened by 13 shafts, the deepest of which is 300 ft. Underground works aggregate between 1,700 and 1,800 ft.

## EAST WAVERLEY TUNNEL CO.

**Directors :**

T. R. Gue, Halifax, N.S. | B. C. Wilson, Waverley, N.S.

**Head Office : Metropole Bdg., 193 Hollis St., Halifax.**

Owns a gold mining property known as Laidlaw's Hill at Waverley, in the County of Halifax, Province of Nova Scotia. A cross-cut tunnel has been driven a distance of 635 ft., cutting at that point the Barrel quartz lode, at a distance of something like 200 ft. on the incline below the outcrop. The vein has been opened systematically by levels and upraise, and everywhere shows a large body of quartz, the vein running from 10 inches to 20 inches in thickness. Only one small lot has been milled, yielding about 8 dwts. per ton, but the mine is now ready for its milling equipment and will undoubtedly give a good account of itself. The management report :— "Development has progressed uninterruptedly since last report. North and south levels have been extended until there is over 20,000 tons of ore in sight. A winze 125 ft. deep is nearly completed, from which levels will be driven, and a tunnel driven to cut the other veins. The management deferred the erection of a stamp mill until the Collins mill, designed to treat 100 tons per day, now being erected at the mouth of the tunnel, has been tested on the ore. If the results are not satisfactory a stamp mill of like capacity will be erected at once, using the adjacent water power for mining, milling and lighting purposes.

## EMPRESS GOLD MINING CO., Ltd.

Incorporated 1896.

Authorized Capital, $100,000, divided into 20,000 shares of $5.00 each.

**Directors :**

John McKellar. | Walter Ross. | Peter McKellar.
George Clavet. | John T. Horne. | George A. Graham.

**Head Office : Fort William, Ont.**
**Mines Office : Jackfish, via C. P. Ry., Ont.**

Owns and operates mining location R. 569, situated at a point four miles north of Jackfish Bay, on the north shore of Lake Superior, Province of Ontario. The vein worked is from 10 to 40 ft. wide. Being equipped at date of report with a 10 stamp mill and other machinery. Sixteen persons employed.

## EVENING STAR MINING CO.

Incorporated September, 1895. Authorized Capital, $1,000,000.

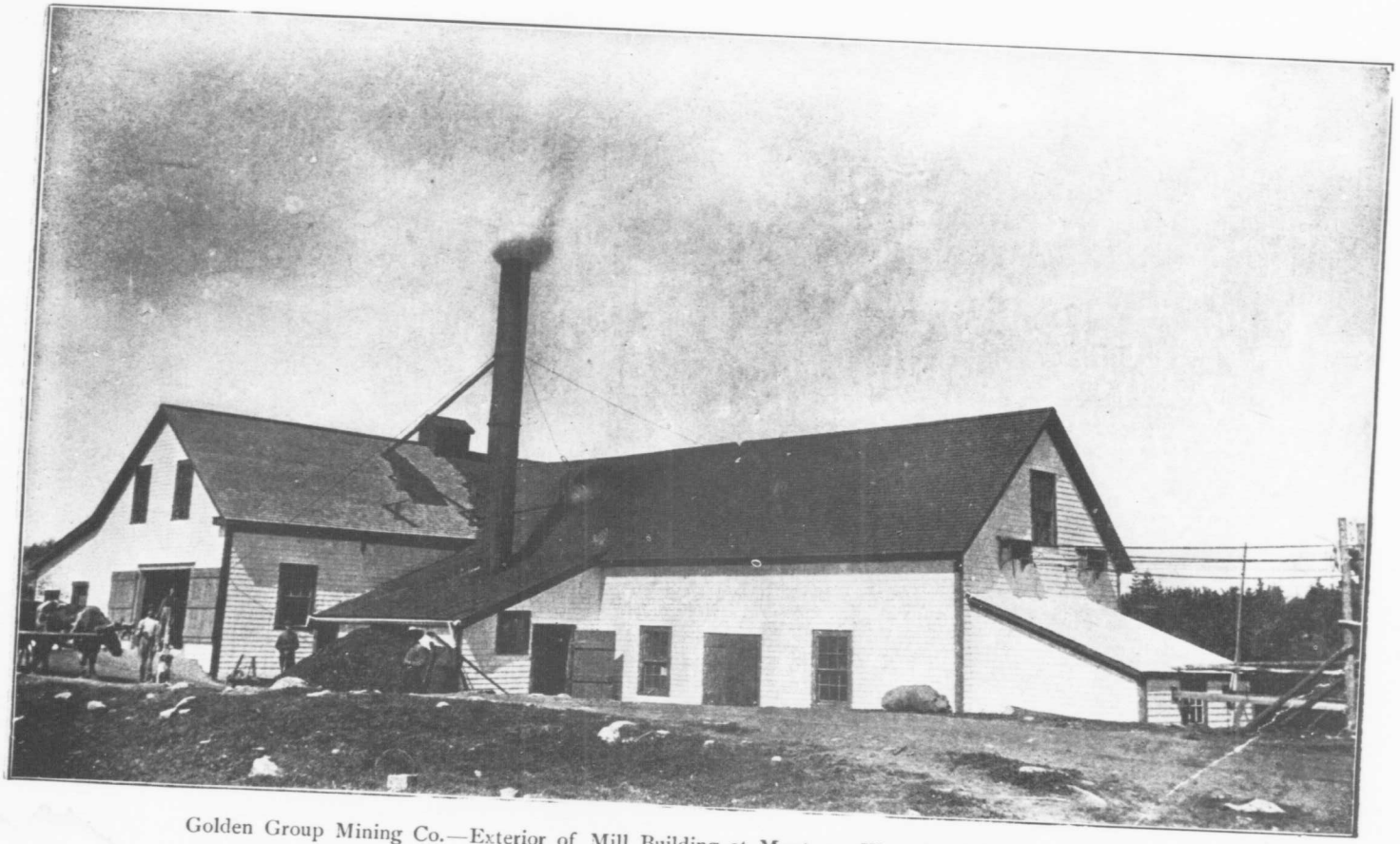
**Directors :**

D. M. Drumheller. | H. B. Nichols. | F. P. Hogan.
J. L. Drumheller. | W. E. Blackmen. | S. S. Bailey.
D. G. Russell.

**Head Office : H. B. Nichols, Secretary, Spokane, Wash.**

Owns and operates a gold quartz claim situated on the north-east side of Monte Cristo hill in the Trail Creek district, Province of British Columbia. Being opened up.

James Cronan, *Superintendent*, Rossland, B.C.



Golden Group Mining Co.—Exterior of Mill Building at Montagu, Waverley District, Nova Scotia.

## FORREST ROSE AND ST. GEORGE HYDRAULIC GOLD MINING CO.

A Private Company, organized in 1876, and composed of the following shareholders :

James Innes.
W. P. Smith. | William Manson.

**Head Office : James Innes, Barkerville, B.C.**

The company holds 172 acres of land in fee simple, and has for a number of years successfully worked alluvial ground at William Creek in the Cariboo district, British Columbia. $25,000 expended to date in opening up the claims. The previous owners won gold to the value of $750,000 ; since 1876, when this present company started, gold to the value of $50,000 has been taken out. Dividends have been paid regularly since 1884.

## 43rd MINING AND MILLING CO. OF OMENICA, Ltd.

Incorporated 1896. Authorized Capital, $600,000.

**Trustees :**

Lt.-Col. Wright. | Capt. W. A. Jamieson. | Capt. M. N. Garland.
F. W. Valleau, C.E. | J. S. Holloway.

**Directors :**

N. C. Sparks, Ottawa, *President.*

| | | | |
|---|---|---|---|
| Wm. McGillivray, | Ottawa. | Thos. Kenny, | Ottawa. |
| Capt. S. M. Rogers, | " | Lieut. H. Watters, | " |
| Major A. P. Sherwood, | " | Lieut. S. E. De LaRonde, | " |

**Head Office : Capt. S. M. Rogers, Sec.-Treas., 97 Sparks St., Ottawa.**
**Mines Office : Capt. M. N. Garland, North Bend, B.C.**

This company has been formed for the purpose of working and developing the following auriferous bench diggings and creek diggings situated on Manson and Slate creeks in the Omenica division of the Cariboo district, British Columbia, containing 720 acres of bench diggings and three miles of creek diggings, and recorded as leases No. 55,563-4-5-6-7-8-9-70-1-2-3-4-5-6-7—15 leases in all ; 9 being bench diggings and 6 creek diggings.

## GOLDEN GROUP MINING CO., Ltd.

Incorporated 1896. Authorized Capital, $100,000.

**Directors :**

A. Hayward. | F. S. Andrews. | H. H. Bell.

**Head Office : H. H. Bell, Halifax.**

The property operated by this company is situated in the Montague district, seven miles from the city of Halifax, and contains the 'Rose' group of 18 areas, the 'Annand' 25 areas, the 'Montreal' 32 areas, and the 'Lawson' 18 areas. Equipped with a complete mining plant, consisting of a 10 stamp mill, hoisting and pumping plant, air compressor, rock drills, &c., and also a laboratory with assay outfit, &c. The purchase consideration was $8,500 cash and 50,000 fully paid up shares in the company.

## GOLD HILL MINING CO. OF ONTARIO, Ltd.

Incorporated 1895. Authorized Capital, $250,000, in shares of $50.

**Directors:**

O. R. Sprague. | B. F. Fellows. | J. T. Ferries. | G. O. Stohrer.
A. M. Stohrer.

**Head Office: O. R. Sprague, Madoc, Ont.**

Formed to carry on mining in the Counties of Hastings and Addington, in the Province of Ontario.

## GOLDEN LODE MINING CO., Ltd.

Incorporated by Act of the Legislature of Nova Scotia, 1894. Authorized Capital, $30,000 in 300 shares of $100.00.

**Directors:**

H. H. Bell, *President.*

A. M. Jack.
A. A. Haywood, *Man. Dir.* | J. P. Chipman.
W. G. Brookfield.

**Head Office: A. M. Jack, Sec.-Treas., 165 Hollis Street, Halifax.**

Formed to acquire and operate gold properties at Mount Uniacke, County of Halifax, and elsewhere in the Province of Nova Scotia. Mines at South Uniacke. Equipped with steam stamp mill and hoisting and pumping plant. 22 persons employed in 1895.

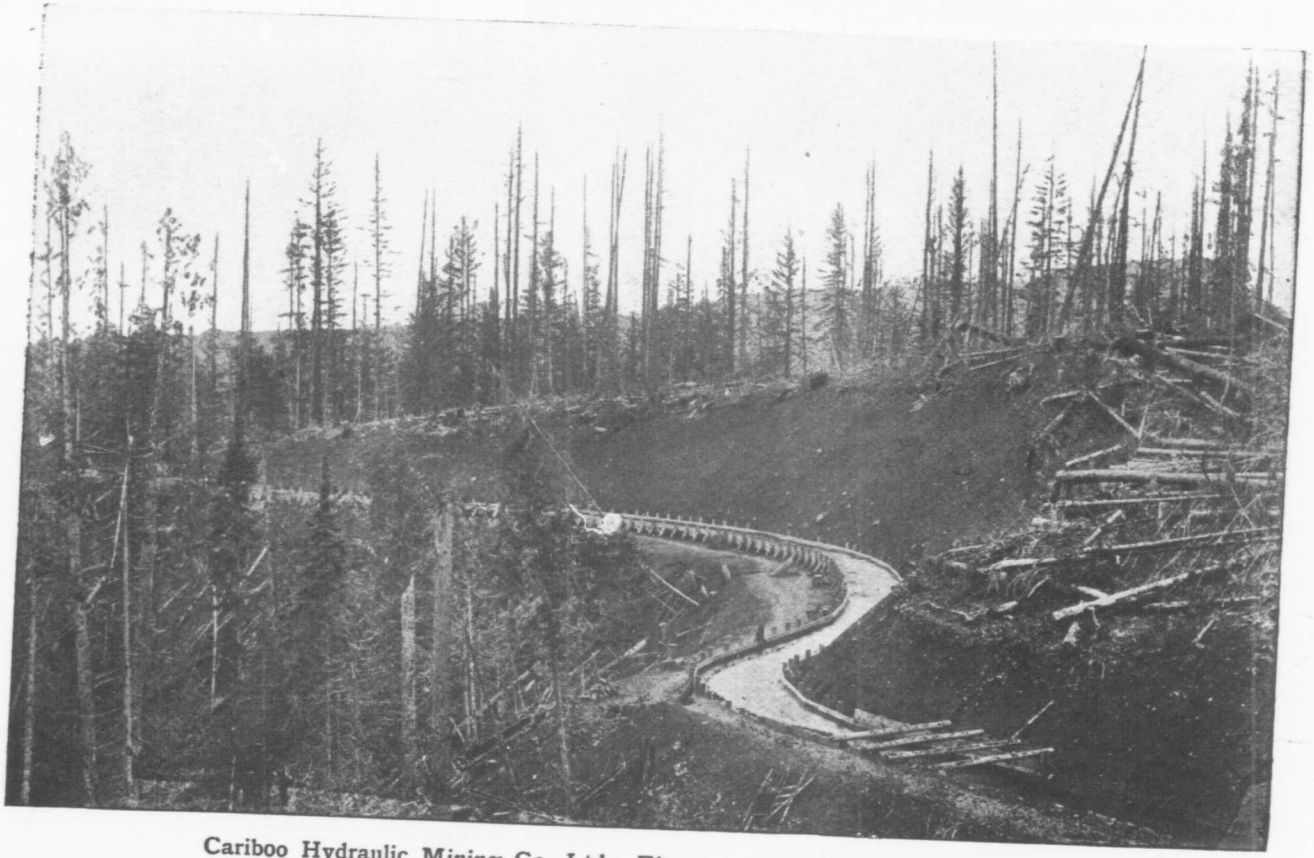
At the second annual meeting of shareholders held at Halifax February, 1896, the following report was presented to the shareholders:—

"The record of your property at South Uniacke, for the past twelve months, has been such as enables your directors to congratulate you heartily on the result of the year's work.

"While this report deals with the year 1895, we beg to call your attention to a fact which must commend itself to all shareholders, viz., that two years have elapsed since the beginning of operations on January 2nd, 1894, and that during that period, notwithstanding the many difficulties which have arisen, the mine has been worked continuously without a day's interruption, which, we are sure you will admit, is somewhat unusual for enterprises of this nature.

"The plant originally erected, having been intended only for prospecting and developing the property, it became necessary with the increasing depth from month to month, and the consequent increase of water encountered—as in all operations of this nature, which increased greatly the labor to be expended in pumping and in hoisting—that steps be taken to provide increased steam and pumping plant. During the month of June our neighbors to the west, Messrs. Thompson & Quirk, closed down, which caused all the water in their mine to gradually flow into our lower workings, and it became necessary that immediate steps be taken to provide the additional plant above referred to if the continuation of the heretofore successful and uninterrupted operations were to be maintained.

"Contracts were at once entered into for the building and delivering of a large locomotive boiler, also a large compound duplex, outside-packed plunger pump, having a capacity of 160 gallons per minute against a pressure of 300 pounds per square inch, and for the accommodation of this new boiler addition to our engine house was neces-



Cariboo Hydraulic Mining Co. Ltd.—Flume at Belloe Gulch, Built in 1895.

sary. After the arrival of this machinery much time and labor was required in its erection, particularly the steam pump, which required an excavation to be made in the solid rock at the bottom of the shaft, 27 ft. x 16 ft. x 14 ft. In this cavity an engine-house was constructed in which the pump is located. The steam is carried direct from the boiler and exhausted into a gravity condenser, and to supply this condenser with water, and to draw the water from the Thompson & Quirk mine, so as to prevent its running down and finding its way into our lower workings, a tunnel was driven 16 ft. from the shaft in a westerly direction. From this heading a drill hole was driven by a machine drill 16 ft., tapping the body of water in the Thompson & Quirk mine. The water was then led through a pipe to the condensers and from this into the main sump in the bottom of the main shaft.

"During the accomplishment of this work the mine steadily continued to produce and to pay its regular dividend, and today we have a pumping plant sufficient to work the property to a depth of 2,000 ft., unless an extraordinarily large body of water is encountered.

"During the year other improvements have been made. On the surface, an extension to the boarding-house, equal in size to the original building, has been built and some improvements and repairs have been made in other buildings. Underground, an upraise has been driven from the lower streak to the upper, at a point 150 ft. from the shaft. In passing, we would say, that a test of the ore made from this upper streak gave 6 ounces per ton.

"This lode has now been worked about five years, during which period no serious disturbance has been encountered, and this in mining operations is the exception rather than the rule.

"During the year the mill has continued to give every satisfaction, and to save a very high percentage of the gold in the ore. From assays made of the tailings the average loss is about $4 per ton, and as the average value of the ore is about $180 per ton, it will be seen that the percentage of loss is extremely small.

"The average amount of gold per ton has been about 9½ ounces.

"The mine has produced 1,955 ounces of gold, from which we have paid nine monthly dividends of 5 per cent. each, which makes 45 per cent. on the par value of the stock for the year. We have also expended a large sum on capital account. This result can, we think, be pointed to as being seldom equalled by any joint stock enterprise in our Province, and is strong evidence that the gold mining industry is capable of being redeemed from the rank of purely speculative ventures, and placed among the steady dividend-earning industries of our Province."

## GRANITE CREEK MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $150,000, in shares of $10 each.

**Directors:**

Robert Stevenson, *President.*

W. Barclay Stephens. | W. L. Hogg. | A. W. Fleck. | J. N. Greenshields. | W. Dale Harris. | C. R. Gillard.

**Eastern Office: W. L. Hogg, Secretary, St. Francois-Xavier St., Montreal.**

**Mines Office: Granite Creek, Yale District, B.C.**

Formed to acquire and work an auriferous bench property, containing 640 acres, at Granite Creek, in the Similkameen division, Yale district, Province of British Columbia. The ground has been prospected and is reported to average from 25 to 35 cents to the cubic yard. Being opened up.

## GREAT WESTERN MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $1,000,000.

**Directors:**

John M. Burke. | C. E. Barr. | D. M. Drumheller. | C. S. Warren.
H. M. Stephens. | Jas. B. Jones. | L. L. Bertonneau.

**Head Office: Spokane, Wash.**

**Mines Office: Rossland, B.C.**

Formed to carry on mining operations in the Trail mining camp, Province of British Columbia.

## HIGH ORE GOLD MINING AND SMELTING CO., Ltd.

Incorporated 14th June, 1895. Authorized Capital, $500,000.

**Directors:**

Cyrus Happy. | J. H. Griffith. | W. G. Estess. | H. L. Rodgers.
D. M. McLeod.

**Head Office: D. M. McLeod, 201 Mohawk Block, Spokane, Wash.**

Owns and operates in British Columbia, in the Trail mining district, a mineral claim upon which development work is being carried on with a small force.

## HOMESTAKE GOLD MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $500,000.

**Directors:**

W. G. Johnson, Vancouver, *President.*

| | |
|---|---|
| E. E. Evans, Vancouver. | C. B. Hopkins, Spokane. |
| O. Plunkett, " | John M. Burke, Rossland. |
| J. M. Campion, " | D. M. Simard, Vancouver. |

**Head Office: Osborne Plunkett, Secretary, Vancouver, B.C.**

**Mines Office: Trail Creek, B.C.**

Owns and operates the 'Homestake' gold mine at Trail Creek, Province of British Columbia. The ore carries gold, silver, lead and copper, and is reported to average $30 per ton.

Cariboo Hydraulic Mining Co.—Flume at Stevens Gulch, Built in 1894.

## HORSEFLY GOLD MINING CO.,

Incorporated under the laws of the State of California. Authorized Capital, $1,000,000, in shares of $10, of which at date 800,000 shares have been subscribed.

**Directors:**

Edward P. Flint, *President.*

Chas. Roberts. | C. Waterhouse. | M. W. Hartney.
H. N. Morse. | Milton E. Ball. | Fred. H. Beaven.

R. T. Ward, *General Agent.*

**Registered Office: 16 Chancery Lane, Victoria, B.C.**

**Head Office: R. T. Ward, Secretary and General Agent, 610 Clay St., San Francisco, Cal.**

**Mines Office: Quesnelle, B.C.**

The property contains 360 acres of auriferous mining ground on the Horsefly river, Cariboo district, Province of British Columbia; 140 miles by waggon road, north of Ashcroft, a station on the main line of the Canadian Pacific Railway, together with the right to all the necessary water from an adjacent stream, to hydraulic the same, arriving on the ground under a pressure of over 300 feet. The property was formerly known as the Harper leasehold. The claim is 2,640 x 5,940 feet, with an estimated average depth of over fifty feet, and is located on an ancient channel similar in formation and appearance to the well known blue gravel lead of California. On this lead, within the boundary of this claim, over thirty shafts have been put down to bedrock from thirty to one hundred and fifty feet in depth and numerous tunnels and cross-cuts run in different directions to prospect the ground, in all of which gold is found in paying quantities. For twenty years placer claims have been worked on the surface of this ground in a small way with sluice and rockers, with flattering results, one claim alone having taken out in this way over $300,000—and rockers have been known to pay from bedrock over $200 per day to a single rocker. The company has acquired the whole property, which, in addition to the mining ground and water right, has a good steam plant, pumps, saw mill, blacksmith shop, carpenter shop, and several buildings for general purposes. It proposes to bring in 2,000 inches of water through a ditch and pipe line six miles in length and hydraulic the same. This ditch has already been commenced, and it is claimed over $100,000 has been expended in sinking, prospecting, working and improving this property. A pipe line 9,000 feet in length, of 30 in. steel pipe, was being put in at date of report, and the works were expected to be completed by 1st July, 1896.

## THE HORSEFLY HYDRAULIC MINING CO. Limited.

Incorporated 1893. Authorized Capital, $250,000, in shares of $10. In 1896 it was proposed to issue debentures for a sum not to exceed $150,000, payable in five years and bearing interest at 10% per annum.

**Directors:**

J. M. Browning, *President.*

**HORSEFLY HYDRAULIC MINING CO.**—Continued.

F. C. Innes. | Pierce Lloyd, *Secretary.* | W. F. Salsbury.

**Principal Place of Business: Vancouver, B.C.**

**Location of Works: Horsefly, Cariboo District, B.C.**

*Manager:* J. B. Hobson, M.E., Horsefly, B C.

*Asst. Manager:* W. N. Bissett, " "

The property is situated on the Horsefly river, about 53 miles north of the 108 Mile House on the Cariboo waggon road, and about six miles south of the Quesnelle lake, Cariboo district, B.C. It comprises 11 mining leases aggregating 1475 acres of land, covering the auriferous gravel deposits of an ancient river, a portion of which is similar in character to the famous ancient river deposits in California known as the blue lode.

The hydraulic system now successfully completed brings water from Mussel creek, a southern tributary of the Horsefly river, by a ditch and pipe line 12½ miles in length, with a capacity for delivering 1800 miners' inches of water.

The pipe line is of steel, 30 in. diameter, made in two inverted syphons aggregating 8,300 feet. There is also three sections of flume, 3 x 5 ft., aggregating 600 feet.

Water is delivered from the main ditch with a head of 168 feet and from the pooling reservoir near the mine with a head of 106 feet.

The bedrock constituting the floor of the hydraulic workings is about 90 feet above high water mark of the Horsefly river.

The mines are equipped with a portable hydraulic plant consisting of three lines of 22 inch steel pipes, aggregating 3,000 ft., 2,000 ft. of 18 in. steel branch pipes, 3 No. 8 18 in. hydraulic Giants, with nozzles ranging from 5 to 8 inches.

The gold saving appliances are 800 feet of 3 x 6 ft. sluice, paved with improved iron riffles.

Since the completion of the company's system of water supply, the work of breaking cuts through the rim of the deposits, opening up of the working hydraulic pits, installing the gold saving appliances and hydraulic plant therein, was pushed with vigor.

During the progress of the above work an extremely hard body of cemented blue gravel fronting on the rim of the deposit had to be removed. One blast of 37,000 lbs. of black powder was exploded to disintegrate about three acres of the cemented material and get in shape for removal. The hard material has decreased to a thin stratum of high grade cement, varying from 1 to 6 feet lying near the bedrock.

During the progress of the opening work done during the seasons of 1894 and 1895, water was used 104 days, during which time about 450,000 cubic yards of rock cement and gravel was removed and the gold recovered is valued at $59,640, an average of about 13c. per cubic yard of material removed.

Two working pits are now opened sufficiently to accommodate the use of six Giants and is on a basis for continuous work throughout the whole of the water season. The mine is on a basis for a profitable production.

## MANAGER'S REPORT, 1ST DEC., 1895.

As the manager of the Horsefly Hydraulic Mining Co., Ltd., I have the honor of making the following report relative to the work accomplished at the company's mines during the past season, together with an estimate of the receipts and expenditures for the year 1896.

Cariboo Hydraulic Mining Co. Ltd.—Camp No. 4, Hazeltine Creek, Head of Original Park Ditch, beginning of Extension, 1895, 9 miles from head.

PERMANENT IMPROVEMENTS.

Under this heading I place the eleven buildings which were erected this year, and other extensions and additions to the Company's plant, necessary to facilitate the opening and operation of the Company's mines.

OPERATION.

During the past season a large percentage of the work was applied to opening the mine, extending and deepening the main and branch cuts, extending sluices and making room to facilitate the operation of the hydraulic plant, and the removal of the auriferous gravel.

The time water was used in the mine—86 days.
The quantity of water used—223,442 miner's inches.
The area of bedrock uncovered—15,911 square yards.
The quantity of gravel removed—349,525 cubic yards.
The amount of gold recovered (gross)—2,720 ounces (value, $45,966.23).
The average yield per miner's inch of water—20$\frac{8}{10}$ cents.
The average yield of gravel per cubic yard—13·151 cents.
The duty of water per miner's inch—1·564 cubic yards.
The bedrock uncovered during the summer and fall runs was not cleaned.

CONDITION OF THE MINE.

The body of cement encountered east of the main cut in pit No. 1, running from 10 to 80 feet in thickness, has greatly exceeded my anticipations. It proved extremely hard, and was an awkward and costly impediment to the progress of opening and operating of the mine, and caused the loss of a large percentage of gold that remained enclosed in lumps of the cement that went to the dumps.

The cement however has apparently decreased, and the tenure of the bottom gravel has greatly improved.

The thickness of the cement clear around the face of pit No. 1 is confined to a stratum varying from 1 foot to 10 feet, and lying from a half foot to 3 feet above the bedrock.

A large percentage of this cemented stratum is of a high grade, and it is believed would pay handsomely for milling.

By reference to Mr. Pelley Harvey's certificate, which gives the result of a working test of 150 lbs. of cemented gravel, it can be plainly seen that a large percentage of the gold inclosed in the cemented gravel passed through the sluices to the dump.

This loss can be prevented, and the output of the mine increased by adding to the plant a water power stamp mill to crush and amalgamate the cemented material.

ASSAY CERTIFICATE.

[*Copy.*]

Dear Sir: Vancouver, B.C., January 8th, 1896.

I have carefully tested the samples submitted for my examination, and received from Horse Fly Hydraulic Mining Company, on 7th inst., and append herewith the results.

Yours truly

W. PELLEW HARVEY.

**HORSEFLY HYDRAULIC MINING CO.**—Continued.

| Mark or No. | Gold. | | | Silver. | | | Value per Ton. | Other Metals |
|---|---|---|---|---|---|---|---|---|
| | ozs. | dwts | grs. | ozs. | dwts | grs. | | |
| General average all passed 50 Mesh..... | 0 | 10 | 16 | 0 | 2 | 16 | $ 10.64 | |
| *Concentrate Assay.* | | | | | | | | |
| Concentrated 18·7 tons to 1 ton..... ..... | 8 | 10 | 1 | .... | .... | .... | 170.04 | Mechanical loss |

Free gold recovered by amalgamation..... 83·7 per cent.
Gold in sulphurets by difference..... .....16·3 " "

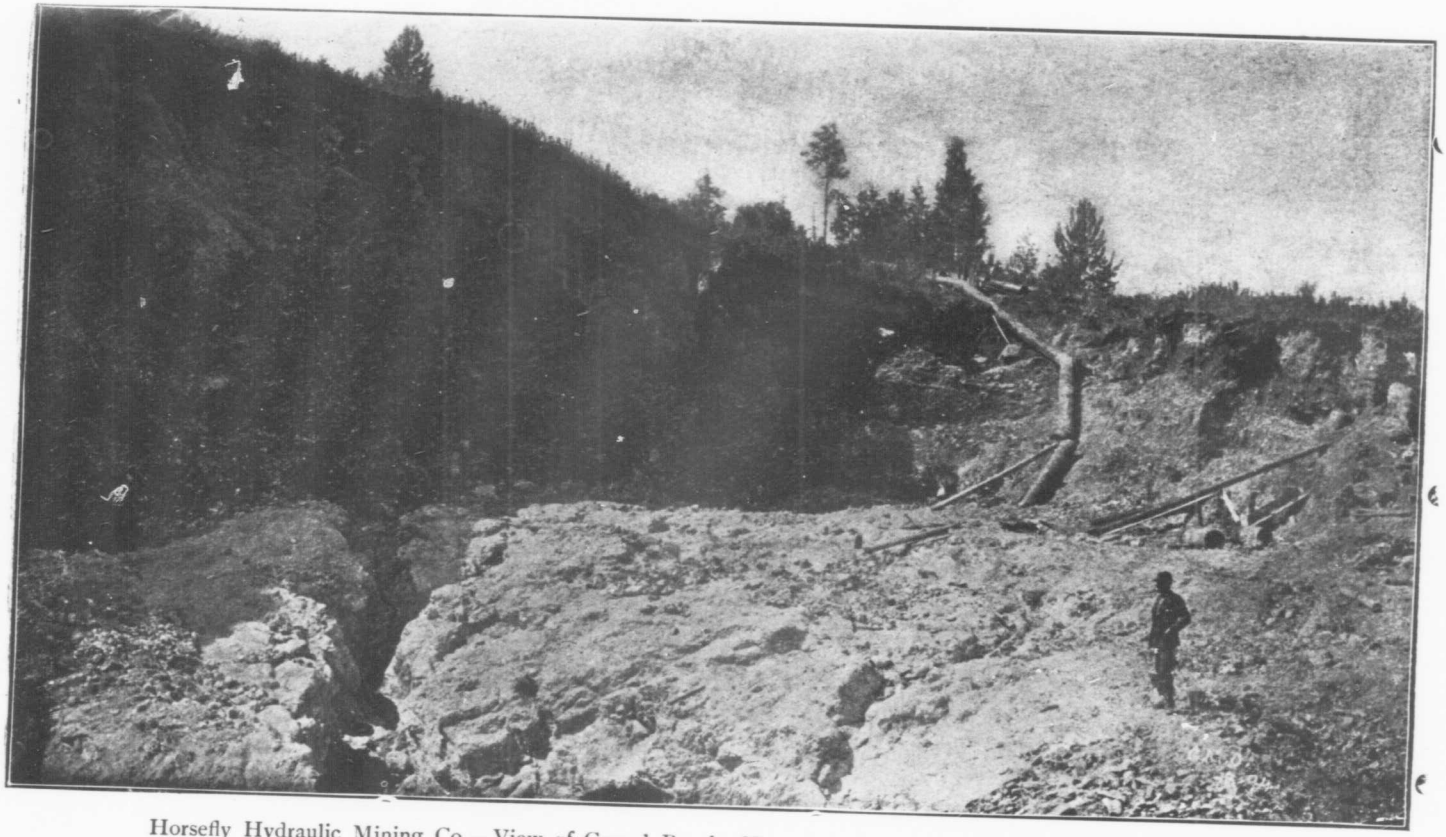
100·0 per cent.

Gold calculated at $20 per oz.

The returns show that $10.64 per ton in free gold was recovered by amalgamation, and about $9.00 per ton in the concentrates; total value per ton, $19.64—a result double what was expected from the sample. Hand mortar tests made at the mine during the past season gave an average of over $4.00 in free gold per ton of cement, but Mr. Harvey's test indicates that a large percentage of the value is held in the concentrates after extracting the free gold by amalgamation. These concentrates can be recovered by vanners, and worked by chlorination or sold to the smelters.

ESTIMATED RESULT OF WORKING A 20 STAMP WATER POWER MILL ON THE LOWER STRATUM OF CEMENTED GRAVEL.

| | | |
|---|---|---|
| 20 stamps will crush in 24 hours, cemented gravel ..... | | 200 tons. |
| Estimated value in free gold per ton..... | | $ 4.00 |
| Daily gross product..... | | $ 800.00 |
| Cost of mining per ton, at $1.50..... | $300.00 | |
| " milling " at 0.20..... | 40.00 | |
| | | 340.00 |
| Daily net in free gold recovered by amalgamation..... | | $ 460.00 |
| To which can be added the product of 4 tons of concentrates at $150 per ton..... | $600.00 | |
| Freight on 4 tons to smelter at $80 per ton.. | $320.00 | |
| 80 sacks..... ..... | 40.00 | |
| Smelter charges..... | 80.00 | |
| | 440.00 | |
| Net profit in concentrates..... | | 160.00 |
| Daily net results..... ..... ..... | | $620 00 |
| Possible number of working days per season, with water power. | | 180 |
| Annual net profit ..... | | $111,600.00 |



Horsefly Hydraulic Mining Co.—View of Gravel Bench, Horsefly River, Cariboo District, British Columbia.

The ditch was in good condition when the work closed down, and there was nothing to indicate that any breaks would occur, or that any extensive repairs will be required next season.

The season of 1895 was probably the driest experienced in this region since the year 1878. Mussel creek went entirely dry, but we were enabled to keep the ditch full nearly the whole season by cutting beaver dams at the outlet of two large lakes on line of road to 108 Mile House.

The mine is now fully equipped, and sufficiently opened to make it possible to operate the mine close to full time. This condition, together with the improvement in the character and tenure of the deposits, make it appear reasonable to predict a successful and profitable run for the season of 1896.

| | |
|---|---|
| The estimated gross product for the season of 1896 is | $90,000.00 |
| The estimated cost of operating the mine during the same period, say 180 days, is | 52,313.40 |
| Leaving net profit for the season | $37,786.60 |

(Signed) J. B. HOBSON, *Manager.*

CAPITAL ACCOUNT.

*Receipts.*

| | |
|---|---|
| Paid-up Capital Stock, 15,000 shares at $10 each | $150,000 00 |
| Gold taken out previous to 1895 | 13,547 18 |
| Boarding house profit to 31st March, 1895 | 369 15 |
| Balance carried to Profit and Loss Account | 43,951 17 |
| | $207,867 50 |

*Expenditure.*

| | | |
|---|---|---|
| Mine Accounts— | | |
| Mine purchases and leases | $ 26,915 00 | |
| Prospecting | 11,568 50 | |
| Ditch and pipe line | 83,093 34 | |
| Dams | 3,368 04 | |
| Flumes, sand-boxes, etc | 1,079 07 | |
| Sluices | 8,344 04 | |
| Buildings | 7,944 01 | |
| Mine labor, explosives, etc | 21,453 39 | |
| Mining plant, saw mill, lighting and melting plant | 14,159 60 | |
| Road to 108 Mile House, etc | 2,354 40 | |
| Farm | 942 56 | |
| Live stock | 5,675 48 | |
| Waggons and harness | 118 00 | |
| Management | 8,221 09 | |
| Salaries, stationery and general expenses | 3,284 72 | |
| Travelling expenses, transportation of miners, etc | 1,428 39 | |
| | | $199,949 63 |
| Head Office and General Expenses— | | |
| Interest account | $ 2,731 40 | |
| Legal expenses | 2,825 79 | |
| Stationery and printing | 164 84 | |
| Telegrams and postages | 66 78 | |
| Travelling expenses | 86 75 | |
| General and incidental expenses | 2,042 31 | |
| | | 7,917 87 |
| | | $207,867 50 |

**HORSEFLY HYDRAULIC MINING CO.**—Continued.

OPERATING ACCOUNT—EXPENSES OPERATING MINE, SEASON 1895.

*Receipts.*

| | | |
|---|---|---|
| Gold account | | $44,443 33 |
| Boarding house, profit 1895 | | 1,566 61 |
| Balance carried to Profit and Loss Account | | 11,795 63 |
| | | $57,805 57 |

*Expenditure.*

| | | |
|---|---|---|
| Management | | $ 2,900 00 |
| Mining expenses—Labor | $23,790 84 | |
| Explosives | 19,037 60 | |
| | | 42,828 44 |
| Maintenance of Ditch | | 3,623 92 |
| do Dams | | 1,003 92 |
| do Pipe | | 1,008 25 |
| do Sluices | | 35 62 |
| do Hydraulic plant | | 132 95 |
| do Tools and implements | | 632 01 |
| Wages and general expenses of camp | | 981 25 |
| Wagons, harness, etc., repairs | | 35 18 |
| Stable expenses | | 997 30 |
| Pack train expenses | | 1,511 11 |
| Farm expenses | | 1,306 16 |
| Travelling expenses | | 249 25 |
| Accident insurance | | 162 50 |
| Roads and trails | | 6 00 |
| Stationery and printing | | 58 60 |
| Telegrams and postages | | 333 11 |
| | | $57,805 57 |

PROFIT AND LOSS ACCOUNT.

*Dr.*

| | | |
|---|---|---|
| Balance carried to General Balance Sheet | | $58,641 61 |
| | | $58,641 61 |

*Cr.*

| | | |
|---|---|---|
| Balance from Capital Account | $43,951 17 | |
| do Operating Account | 11,795 63 | |
| | | $55,746 80 |
| Head Office and general expenses for 1895 | | 2,894 81 |
| | | $58,641 61 |

GENERAL BALANCE SHEET.

*Dr.*

| | | |
|---|---|---|
| Bank advances | | $70,000 00 |
| Outstanding drafts issued at mine, and personal accounts | | 8,149 45 |
| | | $78,149 45 |

*Cr.*

| | | |
|---|---|---|
| Balance from Profit and Loss Account | | $58,641 61 |
| Stores on hand | $10,858 37 | |
| Lumber on hand | 771 66 | |
| | | 11,630 03 |
| Cash in bank | | 7,877 81 |
| | | $78,149 45 |

Cariboo Hydraulic Mining Co.—Head Gate and Crib Work at Polley's Lake, B.C.

## IDAHO GOLD MINING AND SMELTING CO., Ltd.

Registered 1895. Authorized Capital, $500,000.

**Head Office: Butte, Montana.**

**Mines Office: Trail, B.C.**

Formed to acquire and work the Idaho mineral claim at Trail Creek, West Kootenay district, B.C. Being developed.

## IRON HORSE MINING AND MILLING CO., Ltd.

Registered 10th August, 1895. Authorized Capital, $1,000,000.

**Head Office: Spokane.**

**Mines Office: Trail, B.C.**

Formed to carry on mining in British Columbia. Operates the "Iron Horse" mine at Trail, B.C.

## ISLANDER GOLD QUARTZ MINING AND MILLING CO., Ltd.

Registered 1895. Authorized Capital, $100,000.

**Directors:**

John Irving, M.P.P. | Wm. Munsie. | W. G. Mackenzie.

**Head Office: Thos. A. Prosser, Secretary, 18 Broad Street, Victoria, B.C.**

Formed to take over and work the Islander mineral claim, situated on a branch of Granite creek, Alberni district, Vancouver Island, British Columbia. To be opened in 1896.

## JOSIE GOLD MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $700,000.

**Head Office: Spokane, Wash.**

**Mines Office: Trail, B. C.**

Operates the "Josie" mine, in the Trail Creek district, Province of British Columbia. Opened by tunnel, in, at date of report, 350 ft.; also by shaft, 70 ft. sinking. Being fully equipped with plant.

## KOOTENAY CONSOLIDATED MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $500,000.

**Directors :**

J. W. Horne, Vancouver, *President.*
Geo. D. Scott, Vancouver, *Vice-President.*
Thos. Dunn. | George Wilson. | F. H. Young. | A. H. Macneill.

**Head Office : A. J. Scott, Secretary, 305 Cordova Street, Vancouver, B.C.**

Formed to acquire and work the mineral claim "Stephanie," situated on Sable creek, a tributary of Fish creek, Lardeau county, West Kootenay district, British Columbia.

A tunnel, tapping the vein, has been started about 300 ft. above the stream, which when driven 200 ft. will give a depth of about 800 ft. It is the intention of the company to run several similar levels on the vein at various distances, in order to ascertain the value and extent of the mineral in sight, with a view to working or selling the claim. The mineral worked carries copper, silver and gold. An average of ten assays, taken from the lode in several places on extensions, show gold, $10.00 ; copper, 12½ per cent., $21.00 ; silver, $26.50.

## KOOTENAY GOLD, SILVER AND COPPER MINING CO., Ltd.

Incorporated 22nd April, 1895. Authorized Capital, $100,000, in shares of $25 each.

**Directors :**

Fred Cope, Vancouver, *President.*
T. R. Morrow. | C. J. Mitchell. | R. Warmington. | Wm. Ralph.
Dr. R. E. McKechnie.

**Head Office : George D. Scott, Secretary, Vancouver, B.C.**

The company has purchased the mineral claims 'Agnes' and 'Lucky Jim,' situated on Sabre creek, a tributary of Fish creek, West Kootenay district, Province of British Columbia. Assays from the outcrop of the 'Agnes' show :— Copper, 15 per cent. ; silver from 64 to 103 oz. ; gold, 24 to 27.50. A small force was employed opening up the claim in 1895.

## LAKE HAROLD GOLD MINES, Ltd.

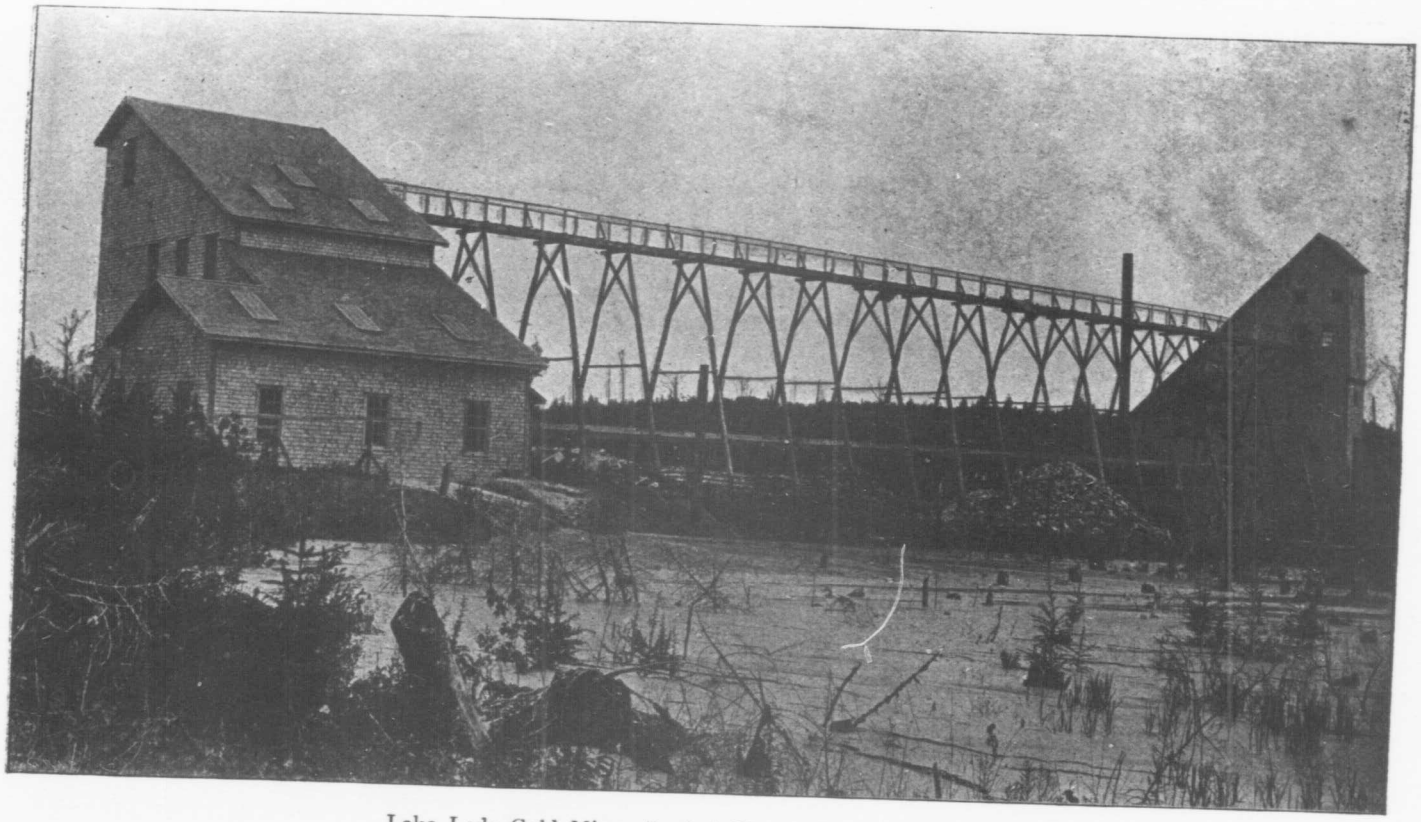
Incorporated 1896. Authorized Capital, $150,000.

**Directors :**

G. T. Marks. | F. N. Gibbs. | F. S. Wiley. | H. A. Wiley.

**Head Office : F. N. Gibbs, C.E., Managing Director, Port Arthur.**

Owns and operates mining location 219X, with an area of 80 acres, on the shore of Lake Harold, an arm of the Seine river, some thirty miles above Sturgeon Falls, in the Rainy River district, Province of Ontario. Equipped with 10 stamp mill and other plant.



Lake Lode Gold Mine—Sander's New Mill and Shaft House.

## LAKE LODE GOLD MINE.

**Owner :**

W. A. Sanders, Cariboo, N.S.

**Mines Office : Cariboo, Halifax County, N.S.**

This property, formerly owned and operated by the Lake Lode Gold Mining Co. was acquired by the present owner in June, 1893, who, in 1895 equipped it with a modern mill and complete mining plant at a cost of $21,000.

The quantity of gold won under the present management as reported to the Mines Office at Nov. 1895 was 1,372 oz., equivalent to $26,121.

30 persons employed in 1895. Equipment comprises :

Boilers—One 80 h.p., 'Monarch' type.

Hoisting—One Bacon double drum, link motion winding engine, 10 x 15 in. cylinder, drums 4 ft. in diameter.

Pumps—One 40 h.p., and one Eclipse pump for fire purposes.

Rock breakers—One 7 x 10 in. Blake crusher.

Lighting—One 30 light dynamo.

Engine—One Robb-Armstrong automatic engine.

Mill—10 stamps, 875 lbs., drop 100 per min. ; weight of mortars, 6,200 lbs. each, with steel linings and cast iron aprons. Cast iron silver traps at end of electro plates. Tappets, cams, shoes and dies are of the best chrome steel. One amalgamating barrel and two Hendy 'Challenge' ore feeders. Mortars, mercury traps, amalgamating barrels, are of the owner's latest design.

## LE ROI MINING AND SMELTING CO.

Incorporated 20th May, 1891. Authorized Capital, $2,500,000, in shares of $5.00.

**Directors :**

George Turner. | W. W. D. Turner. | J. M. Armstrong.
W. M. Ridpath. | L. F. Williams. | D. W. Henley.
F. H. Graves. | W. J. Harris. | E. D. Sanders.

**Head Office : Spokane, Wash.**

**Mines Office : Trail, B.C.**

George Turner, *General Manager.*
W. M. Ridpath and W. J. Harris, *Assistants.*
John Moynahan, *Mine Superintendent.*

Owns and operates at Trail, British Columbia, the 'Le Roi,' 'Black Bear' and 'Ivanhoe' claims, employing in 1895 about 75 persons.

The 'Le Roi' workings comprise an inclined shaft, at date of report down 450 ft., with levels driven every 50 ft. A tunnel, in 400 ft., has also been driven on the west side of the claim.

The average value of the ore is from $35.00 to $45.00 in gold, silver and copper, the principal content being gold, there being only from 2 to 5 per cent. of copper, and one or two dollars worth of silver.

**LE ROI MINING AND SMELTING CO.**—Continued.

OUTPUT.

| | |
|---|---|
| 1894 | 6,000 tons. |
| 1895 | 11,000 " |

The machinery equipment comprises :
Boilers—One 40 h.p., one 80 h.p., and one 100 h.p.
Compressor—One Rand, 10 drills.
Drills—Five Ingersoll-Sargeant, two Rand.
Pumps—Four Knowles.
Hoisting—Two Lidgerwood, cyl. 3½ x 4½, and 5 x 7.
Lighting—Westinghouse lighting plant.
Diamond drill—One Sullivan diamond drill (Electric.)

The Montana Ore Purchasing Co. has erected a smelting plant of a capacity of 125 tons per day near the town of Trail to treat the ores from this mine, which hitherto have been shipped to the United States for treatment.

## LILLOOET, FRASER RIVER AND CARIBOO GOLD FIELDS. Ltd.

Registered 24th January, 1895. Authorized Capital, £300,000, in shares of £1.

**Directors :**

R. Horne Payne, *Chairman.*

| | |
|---|---|
| Hon. F. G. Vernon. | Wm. Farrell. |
| Baron J. Machiels. | J. A. Mara, M.P. |
| M. Henri Rosenheim. | F. S. Barnard, M.P. |
| Dr. Jules Goldschmidt. | R. Northall Laurie. |

**Head Office : Edgar A. Bennett, 1 and 2 Great Winchester Street, London, E.C., England.**

**Canadian Office : F. S. Barnard, M.P., Managing Director, Victoria, B.C.**
**Mines Office : D. T. Hughes, Superintendent, Lillooet, B.C.**

Formed to acquire and develop gold claims in British Columbia, and in particular to acquire and work the gold deposits in certain lands at and about the village of Lillooet. Being operated, but no information respecting work done in 1895 obtainable.

## MALAGA GOLD MINING CO.

Authorized Capital, $250,000.

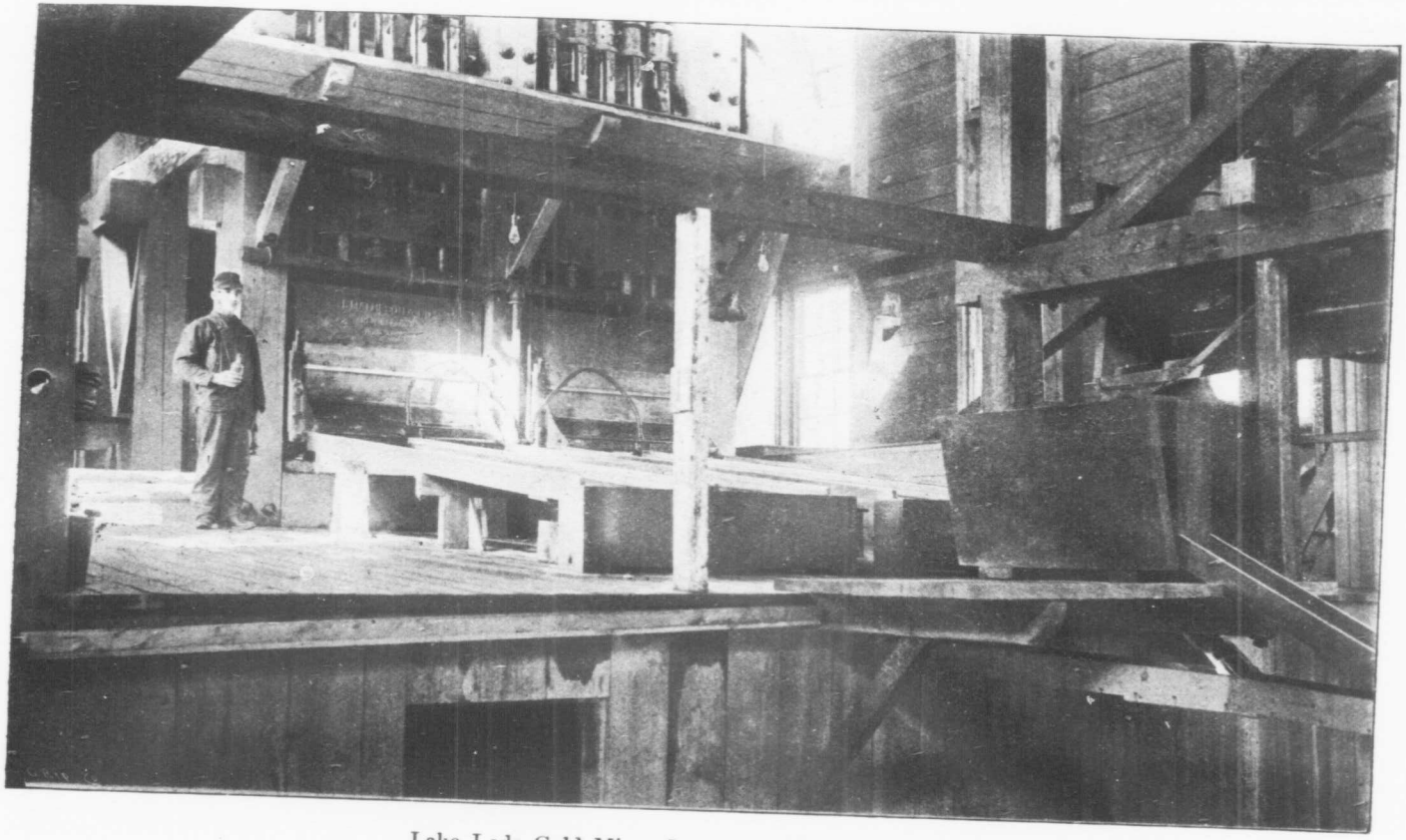
**Directors :**

Francis Davison, *President.*

| | | |
|---|---|---|
| C. H. Davison. | T. A. Wilson. | R. A. Logan. |
| C. Clish. | J. D. Eisenhour. | F. B. Wade. |

**Head Office : F. Davison, Bridgewater, N.S.**

This company owns and operates 246 gold areas at Malaga, Queen's county, Province of Nova Scotia. Small working force in 1895. 20-stamp mill (steam) and other plant.



Lake Lode Gold Mine—Interior of Ten Stamp Mill.

## MILD BROOK MINING AND REDUCTION CO., Ltd.

Incorporated 1895. Authorized Capital, $500,000.

**Directors:**

G. B. Lutz. | J. N. Wilbur. | John Beaton. | L. Crandel.
W. Lutz. | T. White. | R. M. Dryden.

**Head Office: J. Beaton, Secretary, Moncton, N.B.**

Owns certain gold and silver claims in the parish of Alma, Albert county, Province of New Brunswick. A small prospecting force employed in 1895.

## MINERAL CREEK GOLD MINING CO., Ltd.

Incorporated 3rd June, 1895. Authorized Capital, $500,000.

**Directors:**

Walter Jones. | W. J. Curry. | Geo. Bevilockway. | Lorne Simpson.

**Head Office: W. J. Simpson, Secretary, Nanaimo.**

Owns a number of mineral claims on Mineral creek, Alberni district, Vancouver Island, British Columbia, on which development work is proceeding.

## MODSTOCK GOLD MINING CO.

Organized 1895. A private company.

**Owners:**

Robert Dickson. | C. N. Wilkie. | R. D. Kirk. | A. Wilkie. | J. D. Copeland.

**Head Office: J. D. Copeland, Secretary, Antigonish, N.S.**

Owns and operates 57 gold areas at Isaac's Harbor, in the Stormont district, Province of Nova Scotia. 55 persons employed in 1895. Equipped with 10-stamp mill (steam) and other plant. Output in 1895—998 oz. 4 dwt. from 1,676 tons rock crushed.

W. J. McIntosh, Cross Roads, Country Harbor, *Mine Superintendent.*

## MONTREAL HYDRAULIC MINING CO. OF CARIBOO, Ltd.

Incorporated 27th March, 1895. Authorized Capital, $250,000.

**Directors:**

S. O. Richards. | F. C. Innes, *President.* J. M. Browning. E. B. Greenshields. | John Kennedy.

**MONTREAL HYDRAULIC MINING CO.**—Continued.

**Head Office: C. C. Bennett, Secretary, Vancouver, B.C.**

Owns some fifteen claims aggregating about 2,000 acres and located on Quesnelle river, about half-way between the forks of Quesnelle and Quesnelle mouth, Cariboo district, British Columbia. 20 persons employed in 1895 prospecting the claims.

Thos. Drummond, Beaver Lake, 150-Mile House, B.C., *Mine Superintendent.*

## MOOSE RIVER GOLD MINING CO., Ltd.

Organized 1881.

**Mines Office: Andrew McGregor, Moose River Gold Mines, Musquodoboit Harbor, N.S.**

Property contains 129 gold areas in the Caribou district, Nova Scotia. 10-stamp mill, water driven, with complete equipment of ore feeders, rock breaker, vanners, etc. Air-drilling plant. Worked in 1895 by about 20 men on tribute.

## MOUNT HOOD CONSOLIDATED MINING CO., Ltd.

Incorporated 1895.

**Officers:**

Lane C. Guilliaume, *President.*
F. C. Bellamy, *Vice-President.*
W. W. McCalley, *Manager.*

**Head Office: W. E. Blackmer, Secretary, Spokane, Wash.**

**Mines Office: Trail Creek, B.C.**

Formed to take over and work the "Mount Hood," "Only One," and "St. Patrick" mineral claims in the Trail creek district, Province of British Columbia.

## NANAIMO ALBERNI GOLD MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $300,000.

**Directors:**

Andrew Haslam, M.P. | W. K. Leighton. | W. E. Norris.

**Head Office: W. E. Norris, Secretary, P. O. Box 270, Nanaimo, B.C.**

Formed to acquire certain mineral claims held by W. L. Jones and A. R. Hyland respectively. Situated on China creek in the district of Alberni, B.C. A small force employed in 1895 opening up the property.

## NELSON HYDRAULIC MINING CO., Ltd.

Incorporated 13th Dec., 1893. Authorized Capital, $100,000, divided into 20,000 shares of $5 each; 15,000 being ordinary shares, and 5,000 preference shares.

**Principals:**

R. B. Dougan. | J. A. Kirk, C.E. | F. M. McLeod.
John Elliott. | R. J. Bealey. | G. W. Richardson.
J. F. Ritchie.

**Head Office: G. W. Richardson, Secretary, Nelson, B.C.**

Formed to acquire and work an alluvial claim 1¾ miles in length and 700 ft. in breadth, (350 ft. on each side of the creek) containing valuable deposits of coarse gold and known as the Boulder, St. John, St. George and St. Joe placer claims, on Forty-nine creek, about eight miles west from the town of Nelson, in the West Kootenay district, Province of British Columbia. The terms of purchase are 9,060 shares in the company to the former owner, Mr. R. B. Dougan and the syndicate.

Tests made in an open cut in the channel gravel for a distance of 70 feet, gave returns of one-half cent per pan, or about 60 cents per cubic yard. The uneven nature of the bed rock and the character of the gold distributed through the entire deposit point to rich deposits in favored places on the bottom.

The channel gold is heavy, of a flat, angular shape, comparatively coarse, and of a character to save in the sluices. The rim bars, or banks, on either side, are in places extensive deposits that vary in depth and extent, in some places showing a depth of 40 to 60 feet, and extending over several acres, consisting for the most part of a finer gravel than that of the channel, and an occasional strata of sandy clay, which varies in thickness from a few inches to several feet. Gold is disseminated through the entire deposit, from grains at the surface to heavy and coarser particles as depth is attained and the gravel more compact. Samples taken from over a large area, including the surface, sides, and foot of the banks and the surface of the channel give an average of 20 cents per cubic yard.

## NEW EGERTON MINING CO.

A private organization.

**Directors:**

John Macdougald, M.P., Westville, N.S. | J. D. McGregor, M.P.P., New Glasgow.

**Head Office: J. D. McGregor, M.P.P., New Glasgow, N.S.**

Owns about two hundred gold areas in the 15-Mile Stream district, Province of Nova Scotia. The official returns of the gold won by the former and present operators are as follows:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1887..... | 299 | ounces, | 15 | dwts. | from | 569 | tons rock crushed. |
| 1888..... | 946 | " | 8 | " | " | 2,151 | " |
| 1889..... | 786 | " | 9 | " | " | 1,417 | " |
| 1890..... | 2,184 | " | 9 | " | " | 2,476 | " |
| 1891..... | 2,446 | " | 5 | " | " | 4,263 | " |
| 1892..... | 1,285 | " | | " | " | 2,460 | " |
| 1893..... | 497 | " | 17 | " | " | 1,401 | " |
| 1894..... | 552 | " | .. | " | " | 1,173 | " |
| 1895..... | 2,956 | " | 2 | " | " | 5,239 | " |

Equipped with an excellent working plant which includes two mills (of 15 and 10 stamps respectively), Rand air compressor, hoisting and pumping gear.

## NEW GLASGOW GOLD MINING CO., Ltd.

Incorporated by an Act of the Legislature of Nova Scotia, 1895.
Authorized Capital, $20,000.

**Directors:**

John McIntosh, Stellarton. | Angus Chisholm, New Glasgow.
J. A. Fraser, New Glasgow.

**Head Office: J. A. Fraser, New Glasgow, N.S.**

Property at Goldenville, Guysborough County, Nova Scotia. Being organized at date.

## NORTH STAR GOLD MINING CO.

A private organization.

**Owners:**

C. De W. Smith. | John Smith. | George Churchill.
John Churchill. | Dr. Cameron. | Walter Brookfield.
W. H. Johnson. | Alex. Macdonald. | Rod'k Macdonald.
J. A. Macdonald. | Rufus O. Bayer.

**Head Office: J. A. Macdonald, Halifax, N.S.**

**Mines Office: Roderick McLeod, Isaac's Harbor, N.S.**

This company's property at date comprises about 30 gold areas held under Crown lease, and 90 areas operated under prospecting license, and situate on the west side of Isaac's Harbor, Guysboro County, Province of Nova Scotia. Equipped with 10-stamp mill and other machinery of an estimated value of $5,800. Five months' returns in 1895 give 86 ozs. 1 dwt. of gold from 133 tons 19 cwt. rock crushed.

## NORTHUP GOLD MINING CO., Ltd.

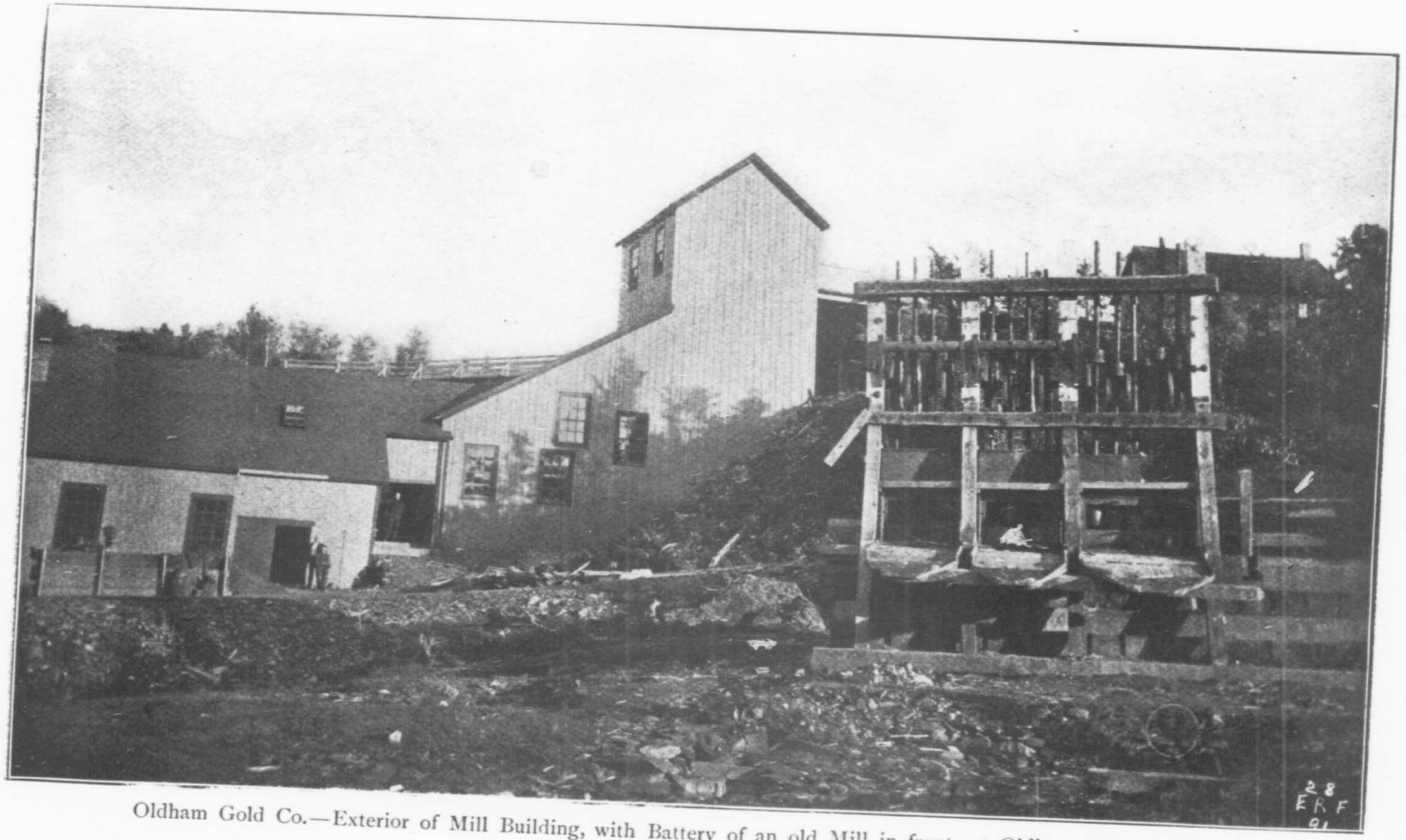
Incorporated 1895. Authorized Capital, $100,000, in shares of $100.

**Directors:**

Clarence H. Dimock. | E. Norman Dimock.

**Head Office: Clarence H. Dimock, Windsor, N.S.**

Holds a number of gold areas at Central Rawdon, Hants County, Province of Nova Scotia. 20 persons employed in 1895. Four months' milling in 1895 gave 408 oz. from 414 tons rock crushed. Equipped with 10-stamp mill, driven by 40 h. p. engine and 50 h. p. boiler; 1 double cylinder Lidgerwood hoisting engine with 36 in. diameter drums; steam pumping plant, etc.



Oldham Gold Co.—Exterior of Mill Building, with Battery of an old Mill in front, at Oldham, Nova Scotia.

## OLDHAM GOLD CO.

**Owners:**

John E. Hardman, Montreal. | Frederick Taylor, Lowell, Mass.

**Mines Office: Oldham, N.S.**

This company controls a property containing some 96 gold areas, situate in the District of Oldham, in the County of Halifax in the Province of Nova Scotia. Mines about three miles from Enfield station on the main line of the I. C. Railway. The mines, which have been operated since 1884, have been thoroughly and systematically developed, and at date consist of the following workings:

No. 5 shaft, 420 ft. deep; No. 3 shaft, 380 ft.; has three sets of levels aggregating 1,500 ft.; total length of openings, 2,500 ft. Average men employed, 12. Engine and machinery equipment comprises: Double hoisting and pumping gear operated by 60 h. p. compound condensing engine; new 10-stamp mill operated by a Pelton water wheel working under a 78 ft. head; stamps weigh 860 pounds and drop 90 to the minute, crushing two and one-half tons quartz to the stamp in 24 hours; Forster rock breaker; roll feeders, also Golden Gate concentrator. Concentrates assay $75.00 to the ton. Official returns kindly furnished by the Mines Department report the yield from this mill as follows:—

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1885.... | 925 | tons, | 6 | cwt., | rock crushed, | yielding | 1,700 | ounces, | 6 | dwt., | 17 | grs. |
| 1886.... | 928 | " | 8 | " | " | " | 2,164 | " | 17 | " | 3 | " |
| 1887.... | 2,359 | " | 16 | " | " | " | 2,560 | " | 8 | " | 11 | " |
| 1888.... | 2,107 | " | 6 | " | " | " | 1,699 | " | 9 | " | 15 | " |
| 1889.... | 1,393 | " | 2 | " | " | " | 2,705 | " | 4 | " | 18 | " |
| 1890.... | 1,126 | " | 14 | " | " | " | 2,775 | " | .. | | 20 | " |
| 1891.... | 1,789 | " | 14 | " | " | " | 2,447 | " | 19 | " | . | |
| 1892.... | 2,233 | " | .. | | " | " | 3,089 | " | 4 | " | 12 | " |
| 1893.... | 2,334 | " | 5 | " | " | " | 3,292 | " | .. | | 8 | " |
| 1894.... | 918 | " | 2 | " | " | " | 536 | " | 18 | " | 10 | " |

## OLD PROVINCIAL GOLD MINING CO.

Incorporated under the laws of the State of Maine. Authorized Capital, $200,000, in 20,000 shares of $10 each.

**Directors:**

H. S. Mackay. | R. D. Evans, *President.* | J. Murray Marshall.

**Head Office: H. S. Mackay, Sec.-Treas., 64 Devonshire Street, Boston.**

**Mines Office: Dean S. Turnbull, Manager, Sheet Harbor, N.S.**

The property owned and operated by this company contains 96 gold areas, and is located on Killag river, near Sheet Harbor, County of Halifax, Province of Nova Scotia. Twenty persons employed in 1893. Equipped with 10-stamp mill operated by 60 h. p. slow speed engine; weight stamps, 950 lbs.; drop 100 p.m.; 2 Hammond self-feeders; 400 light dynamo; 30 h. p. hoist, 11 x 16 in., double drums, 32 in. dia.; Rand drills; Blake ore-breakers, pumps, etc., etc.; the whole being of an estimated value of $20,000. Cost of mining and milling reported by management to be $4.90 per ton. Official returns for 1894 were:—119 ozs., 16 dwt. 7 grs. from 199 tons of rock crushed.

## OTTAWA HYDRAULIC MINING AND MILLING CO., Ltd.

Incorporated 1895. Authorized Capital, $250,000, in shares of $5.00.

**Directors:**

Lt.-Col. Joshua Wright. | Capt. M. N. Garland. | F. W. Valleau.

**Head Office: Capt. W. A. Jamieson, Secretary, Ottawa.**

**Mines Office: Capt. M. N. Garland, North Bend, B.C.**

Formed to acquire and work certain auriferous bench claims in the Province of British Columbia, particularly a location on the east bank of the Fraser river, between Anderson river and Four Mile creek, and about the centre of the Boston Bar flat, in the District of Yale. From careful tests made it is estimated that the average value of the ground to be worked will be at least 25 cents per yard. In 1895 work was mainly centred in the construction of a flume three miles in length, connecting the claims with Four Mile creek, from which the company has secured ample water for hydraulicing in 1896.

## OTTER FLAT GOLD AND PLATINUM MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $200,000, in shares of $5.00.

**Directors:**

Samuel K. Twigg. | B. J. Cornish. | A. B. Diplock.

**Head Office: Vancouver, B.C.**

Formed to carry on gold mining in British Columbia. Being organized at date of report.

## OXFORD GOLD MINING CO.

Incorporated under the laws of the State of New York in 1882. Authorized Capital, $125,000.

**Directors:**

G. J. Partington. | C. E. Willis. | C. H. Covert.

**Head Office: G. J. Partington, Manager, Musquodoboit Harbor, N.S.**

This company owns 63 gold areas situated at Lake Catcha district, near Musquodoboit Harbor, and 25 miles east of Halifax, Nova Scotia. The working plant comprises:— A steam 10-stamp mill complete, with Blake breaker; ore bins; automatic feeders, etc.; 1 5-drill duplex air compressor; 3 engines, one 12 x 24, one

10 x 16, and one 9 x 12; two 40 and two 20 h.p. boilers; hoists, pumps, and everything necessary to a well equipped mine, the machinery and buildings being of a value of over $14,000. Twenty-five men employed. The average value and profit per ton of ore are $22.66 and $6.14 respectively. Dividends paid, $78,000. Official returns of the gold yield are:

| Year. | Rock crushed. | Gold Yield. |
|---|---|---|
| 1882..... | 615 tons giving | 1,017 ounces, 2 dwts., 3 grs. |
| 1883 ..... | 1,472 " " | 2,575 " 15 " 19 " |
| 1884..... | 2,287 " " | 2,019 " 19 " .. |
| 1885..... | 1,670 " " | 1,094 " 14 " .. |
| 1886..... | 492 " " | 1,683 " 18 " 15 " |
| 1887..... .... | 886 " " | 3,050 " 2 " .. |
| 1888..... .... | 1,559 " " | 2,161 " 15 " .. |
| 1889..... ..... | 767 " " | 588 " 2 " .. |
| 1890..... | 901 " " | 779 " 5 " .. |
| 1891..... | 2,177 " " | 580 " 8 " .. |
| 1892..... | 2,124 " " | 764 " 7 " 14 " |
| 1893..... | 1,646 " " | 811 " .. " .. |
| 1894..... | 1,643 " " | 944 " 18 " .. |
| 1895..... .... | 321 " " | 107 " 18 " .. |

## PICTOU DEVELOPMENT & MINING CO., Ltd.

Incorporated 1894, by an Act of the Legislature of Nova Scotia. Authorized Capital, $300,000.

**Principals:**

W. McKenzie. | A. J. Craig. | Thos. Tanner. | George A. Pyke. | D. A. McDonald. | C. L. Rood. | Hugh D. McKenzie.

**Head Office: A. J. Craig, Secretary, Pictou, N.S.**

Formed to acquire and work the gold mining property at Renfrew, Hantz County, Province of Nova Scotia, as follows:—

| | | |
|---|---|---|
| New Haven and Renfrew Co's property..... | | 42 areas. |
| North Mining Co's | " ..... ..... | 242 " |
| Colonial Gold Co's | " ..... | 101 " |

## PRINCE ALBERT FLAT HYDRAULIC MINING CO., Ltd.

Incorporated 1893. Authorized Capital, $200,000.

**Directors:**

George D. Scott. | W. J. McGunigan. | A. H. McNeil.

**Head Office: Geo. D. Scott, Sec.-Treas., Vancouver, B.C.**

Formed to take over and acquire mining leases of lands or claims in the Province of British Columbia, and to acquire all the rights and interest of all parties interested in such lands; to carry on the business of hydraulic processes of mining, etc.

Property near Yale, B.C. In 1894 ran an open cut to supposed back channel of Fraser river, 30 ft. deep and 400 ft. long, and at date of Secretary's report the preliminary work was almost completed. Water used, 1,500 miner's inches. Ground averages 20 cents per cubic yard. No report for 1895.



Kirkpatrick Gold Mine—40-Stamp Mill at Country Harbor N S

## PROVIDENCE GOLD MINING CO. OF NORLAND, Ltd.

Incorporated under Ontario Statutes, 1895. Authorized Capital, $40,000.

**Directors :**

George Arnold. | Chesley Tomlinson. | Thomas Rue.

**Head Office : Chesley Tomlinson, East Gwilliamsburg, York Co., Ont.**

Formed to open up and work a property at Norland, in the County of Victoria, Ontario.

## PROVINCIAL MINING AND DREDGING CO., Ltd.

Registered 12th Sept., 1894. Authorized Capital, $1,000,000, in shares of $10.00.

**Directors :**

Norman McLean. | Hugh McLean. | W. F. Gore.

**Head Office : Norman McLean, Secretary, Vancouver, B.C.**

Formed for the purpose of prospecting, dredging for and mining all kinds of precious and base metals in the Province of British Columbia. Owns two gold claims in the Lillooet district.

## QUESNELLE FORKS CANAL AND HYDRAULIC MINING CO., Ltd.

Incorporated 1893. Authorized Capital, $300,000, in shares of $100.

**Directors :**

J. Lewan. | C. Y. Gowan.
W. P. Sayward. | Wm. Wilson.
F. S. Barnard, M.P.

**Head Office : Victoria, B.C.**

Formed to take over and operate certain water rights, and for bringing a ditch or canal to the bench lands in the neighborhood of the North and South Forks of the Quesnelle river, in the Cariboo district, in the Province of British Columbia, etc.

## QUESNELLE RIVER HYDRAULIC GOLD MINING CO., Ltd.

Registered 14th August, 1894. Authorized Capital, $600,000, in shares of $100.

Richardson Gold Mine—40-Stamp Mill at Country Harbor, N.S.

**Directors:**

J. Barnet McLaren, New Westminster, B.C.
F. S. Reynolds, Quesnelle, B.C. | W. C. Fry, Quesnelle, B.C.

**Head Office: J. Barnet McLaren, Managing Director, New Westminster, B.C.**

Formed to take over mining leases on Quesnelle river, Province of British Columbia. Working, but no report received for 1895.

## RAY-WIEGAND GOLD MINE.

A private company comprising the following

**Owners:**

S. W. Ray. | Thos. Wiegand. | John Green.

**Mine Office: J. C. Foley, Manager, Seine River City, Ont.**

Owns and operates gold mining location A. L. 74 at Shoal Lake, in the Rainy River district, Province of Ontario. 25 persons employed in 1895.

## REGINA GOLD MINE, Ltd.

Registered January, 1895. Authorized Capital, £130,000.

**Directors:**

J. Mieville. | Lieut.-General Wilkinson, C.B., *Chairman.* | J. Masters.

**Head Office: J. L. Middleton, Secretary, 13-14 Wallbrook, London, Eng.**

**Canadian Office: W. G. Motley, Resident Manager, Rat Portage, Ont.**

Owns and operates a gold mining property containing 77 acres at Whitefish Bay, 45 miles south-east of the town of Rat Portage, Province of Ontario. Equipped with 10-stamp mill and modern mining plant. 60 persons employed in 1895.

## RICHARDSON GOLD MINING CO.

Paid up Capital, $50,000. Organized 1892.

**Directors:**

A. N. Whitman,
G. A. Pyke. | Thos. Spry.
C. F. Andrews. | S. R. Griffin.

**Head Office: C. F. Andrews, Manager, Isaac's Harbor, N.S.**

Owns 126 gold areas at Cold Brook, in the Stormont district, Nova Scotia. Mine equipped with 80 h. p. boiler and comp. engine. Double skip tracks in main shaft. Skips self-dumping, 32 feet above mouth of pit. Ore breaker at deck-head. Ore falls from breaker through a bin to cars. Cars hauled by steel cable over steel rails, ¼ mile to mill.

**RICHARDSON GOLD MINING CO.**—Continued.

Mill, forty (850 lb.) stamps; one 60 and one 80 h. p. boiler; Corliss engine, 16 x 42 in.

All buildings, offices and stables lit by company's electric plant, also four main loading stages in hoisting shaft lit by electric lights.

Main shaft, 200 feet deep; underground works, 600 feet long; width of ore belt from 9 to 20 feet.

Cost of mining and milling, with 20 stamps, $2.05 per ton; with 40 stamps, about $1.65 per ton, including all charges. Gold yield, 1893: 2,237 ounces, 18 dwt., 10 grs., from 6,048 tons quartz crushed; 1894: 1,674 ounces, 10 dwts., 10 grs., from 7,016 tons rock; 1895: 1,677 ounces, 7 dwts., from 10,383 tons rock crushed.

## SALISBURY GOLD MINING CO.

Incorporated 1892. Authorized Capital, $50,000.

**Directors:**

P. L. Price. | F. W. Borden, M.P. | Barclay Webster.

**Head Office: P. L. Price, Secretary, Kentville, N.S.**

Formed to acquire and work a property containing fifty gold areas in the Montagu district, County of Halifax, Province of Nova Scotia. *Rose lode:* shaft 70 ft.; at a depth of 50 ft., tunnels driven east and west a distance of 70 ft.; width of lode in the drifts, from 4 to 7 inches. *Skerry lode:* shaft 75 ft.; lode from 2 to 10 inches in width. *Maynard lode:* shaft 50 ft.; lode from 2 to 8 inches. Equipped with 5-stamp mill and other plant. The main shaft is a second shaft on Skerry lode, worked by steam hoist from the mill; depth of shaft 90 ft.; lode varying in depth to 2 ft.

## SIMILKAMEEN GOLD GRAVELS EXPLORATION CO., Ltd.

Incorporated under the laws of British Columbia, August, 1893. Authorized Capital, $100,000, in 4,000 shares of $25 each.

**Directors:**

H. Hoy. | A. H. Chaldecott. | T. R. Morrow.
J. M. Murray. | H. Rhodes. | W. Patterson.
C. E. Hope, *Secretary.*

**Head Office: Chas. E. Hope, Secretary, Hastings Street, Vancouver, B.C.**

The alluvial ground operated by this company contains 667 acres, under lease, and is situated on the Similkameen river, at a point near the settlement of Princeton, in the Similkameen district, Province of British Columbia. Opened by three shafts of an average depth of 30 ft., and an adit 60 ft. The average value of the gravel is reported to be from 15 to 35 cents per yard (a good deal of it being as high as $1.20 per yard, and in some few places as high as $4.80 per yard). The average value of the gravel is reported to be from 15c. to 35c. per yard, and the cost of working, 6 cents per yard. Small working force employed. Operations on an extensive scale are expected to commence in the spring. The company has water rights covering 5,000 miner's inches.

Richardson Gold Mining Co.—Shaft House and Forge.

## SIWASH CREEK BED ROCK FLUME CO., Ltd.

Incorporated March, 1893. Authorized Capital, $50,000, in shares of $10.

**Directors :**

George de Wolff. | Henry T. Ceperley. | Johann Wulffshon.
J. M. Buxton. | Edward Mahon.

**Head Office : Vancouver, B.C.**

Formed to take over and acquire three mining leases known as the "Siwash Creek Syndicate Leases," situate on Siwash creek, Yale district, B.C., granted to J. T. Nelson, B. F. Dunn and W. H. McLaren; to carry on the business of hydraulic or other process or processes of mining; to own and construct ditches, flumes, or other systems of water-ways; to purchase, own, operate, lease and sell or lease mines, minerals and water and water-ways; to acquire water leases and water rights from the government, etc.

## SIWASH CREEK GOLD MINING CO., Ltd.

Incorporated 1893. Authorized Capital, $500,000, in shares of $10.

**Directors :**

Chas. T. Dunbar. | E. L. Phillips.
B. T. Rogers. | C. J. Loewen.
C. St. A. Pearce. | Hon. M. W. Elphinston.

**Head Office : Charles T. Loewen, Secretary, Inns of Court Building, Hastings Street, Vancouver.**

Formed to take over the benefits of three mining leases, dated respectively the 9th day of December, 1891, between George Christie Turnstall, Gold Commissioner, of the one part, and John P. Roddick, of the other part, recorded the 11th December, 1891, 26th January, 1893, and made between G. C. Tunstall, Gold Commissioner of the one part, and Charles T. Dunbar of the other part, recorded 22nd March, 1893, and the 25th day of January, 1893, and made between G. C. Tunstall, Gold Commissioner, of the one part, and J. C. Keith, recorded 22nd March, 1893, and now vested in Wm. Farrel, E. Lindsay Phillips and Charles T. Dunbar, subject to an agreement dated the 18th day of September, 1893, between the said William Farrel, E. Lindsay Phillips, and Charles T. Dunbar, and C. St. Aubyn Pearce, and Mount Stewart, William Elphinstone, to carry on the business of mining and all that pertains thereto, and to procure, by purchase or otherwise, mine and work ores, minerals, and metallic substances, and compounds of all kinds, etc.

## SLOUGH CREEK MINING CO.

Incorporated under the laws of the State of Washington, in January, 1892. Authorized Capital, $500,000, divided into 500,000 shares of a value of $1 each.

**Directors :**

W. H. Fife, *President.*

J. B. Clift. | J. D. Caughran. | E. N. Ouimette.
Hon. Henry Drum. | W. H. Ellis.

**SLOUGH CREEK MINING CO.**—Continued.

**Head Office: W. F. Sargent, Secretary, Tacoma, Wash.**

Controls and operates a fifteen year lease of a grant from the local government, embracing an area three miles in length, by one-half mile in width, in the bed or valley of Slough creek, in the district of Cariboo, Province of British Columbia. Reporting on the work done in 1895 the Secretary writes:

"At the beginning of the year a working shaft was being sunk at a point near the centre of the valley through the alluvial strata, which work was continuously prosecuted until the month of June, when the attempt to further sink at that point was abandoned on account of an excess of surface water. As soon as it had been decided to discontinue sinking at this point hydraulic jetting machines were put in operation and a further number of prospect shafts were drilled from the surface to the bed rock, thus completing a series of prospect shafts across the valley, and from the results a cross section of the entire width of the valley has been prepared. It was found that the extreme depth of the old channel is 287 feet. Previous to the beginning of this year a drain tunnel had been constructed for the purpose of shedding the surface water as far as possible, in length 2,150 feet, which connected with the main working shaft at about 40 feet from the surface. It was decided to construct a lateral extension of this drain tunnel to the rim rock, an estimated distance of about 400 feet, for the double purpose of draining the high rock so that it might be worked for gold, and permitting a bedrock shaft to be sunk at the point where the tunnel connects with the rim. While the prospect shafts were being sunk this year this tunnel extension was being run, and about one-half or 200 feet has been completed. When it has been completed it is proposed to sink a bed rock shaft to a sufficient depth, say 325 feet, to permit a drive or tunnel to be run out under the old channel reaching a point 300 feet from the surface. This will allow 13 feet to provide for any possible depression lower than the 287 feet depth as shown by the jetting machine. A very encouraging fact in connection with the drilling is that gold colors in considerable quantity were brought up from all the holes drilled at different depths and particularly from the bed rock. The best showing was from the deepest hole. It is the purpose of the company to prosecute the development work as rapidly as possible until the old channel is reached and at the same time to work the high rock. From twenty-five to thirty men have been employed during the greater part of the year."

## SOUTH WALES LEASE CO.

Organized September, 1890.

**Owners:**

Harry Jones. | Watkin C. Price. | F. J. Tregillus.

**Mines Office: Harry Jones, Manager, Stanley, Cariboo, B.C.**

Operates a claim commencing a little above the town of Van Winkle and extending half a mile up Lightning creek, in the Cariboo district, Province of British Columbia. The pay dirt is on bed-rock, 90 ft. below creek surface, and is hoisted out of a shaft by friction pulleys and a drum, power being furnished by an overshot wheel, 14 ft. diameter and 3½ ft. breast. At date of report a drain 1,500 ft. long to bottom of shaft had been completed and 150 ft. more would be required to cut surface water. To date about 200 ounces had been taken out.

## SPRINGFIELD GOLD MINING CO.

**Owners:**

Partridge & Arthur.

**Mine Office: A. McNaughton, Superintendent, Goldenville, N.S.**

Owns and operates a gold property at Goldenville in the Sherbrooke district, Province of Nova Scotia. Equipped with 12-stamp mill and other plant. Between 20 and 30 persons employed in 1895.

## STANDARD GOLD COMPANY.

(See also Oldham Gold Company.)

Organized 1891. A private company consisting of the following

**Owners:**

John E. Hardman, M.E., Montreal Que. | Frederick Taylor, Lowell, Mass.

**Head Office: Oldham, N.S.**

The company holds a property containing 384 gold areas, situate in the district of Oldham, Halifax county, Province of Nova Scotia. Mine situate about three miles from Enfield station on the main line of the I. C. Railway. Property operated since 1884. East shaft (Dunbrack lode), 470 ft.; main shaft, 480 ft., connected with east shaft by 150 ft., 300 ft., 350 ft. and 450 ft. levels. Levels have been driven for over 4,000 ft. on the vein. Aggregate openings, 6,500 ft. Average persons employed, 35. Plant comprises: steam winding engine, 15 h. p., cylinder 9 x 8, drum 36 x 30; Rand compressor operating five drills; one pumping engine operating 5 in. Cornish pump. Quartz is crushed by contract with the Oldham Gold Co. at its mill.

## STELLARTON GOLD MINING CO., Ltd.

Incorporated in 1894. Authorized Capital, $20,000, in shares of $10.00.

**Directors:**

John McQuarrie, Stellarton, N.S.

James Keith, New Glasgow. | W. Ormond, Stellarton, N.S.

Duncan McGregor, Westville, N.S. | John G. McQuarrie, Sherbrooke.

**Head Office: G. B. Sutherland, Secretary, New Glasgow.**

**John McQuarrie, Stellarton, Man. Director.**

Formed for the purpose of mining in the Sherbrooke district, Province of Nova Scotia. Property contains 36 gold areas. 15 stamp mill. 25 to 30 persons employed in 1894. Returns for seven months in 1895 gave 946 oz. 6 dwt. from 1930 tons rock crushed.

## ST. ELMO GOLD MINING CO.

Incorporated June, 1895. Authorized Capital, $1,000,000.

**Directors :**

F. C. Loring. | F. E. Snodgrass. | George T. Crane. | W. R. Rust.

**Head Office : F. C. Loring, President and Manager, Spokane, Wash.**
**F. E. Snodgrass, Secretary-Treasurer.**

**Mine Office : Rossland, Trail Creek, B.C.**

The property of this company consists of the St. Elmo mining claim, situated on Red Mountain, Trail Creek sub-division of west Kootenay mining district, Province of British Columbia. Operations are conducted on a quartz vein carrying $8 in gold, 10 per cent. of copper, and 5 ounces of silver to the ton, the mining work at date of report consisting of a tunnel driven 250 ft. and several open cuts and shafts. Small force employed in 1895 developing property.

## STEVENSON GOLD AND PLATINUM HYDRAULIC MINING CO., Ltd.

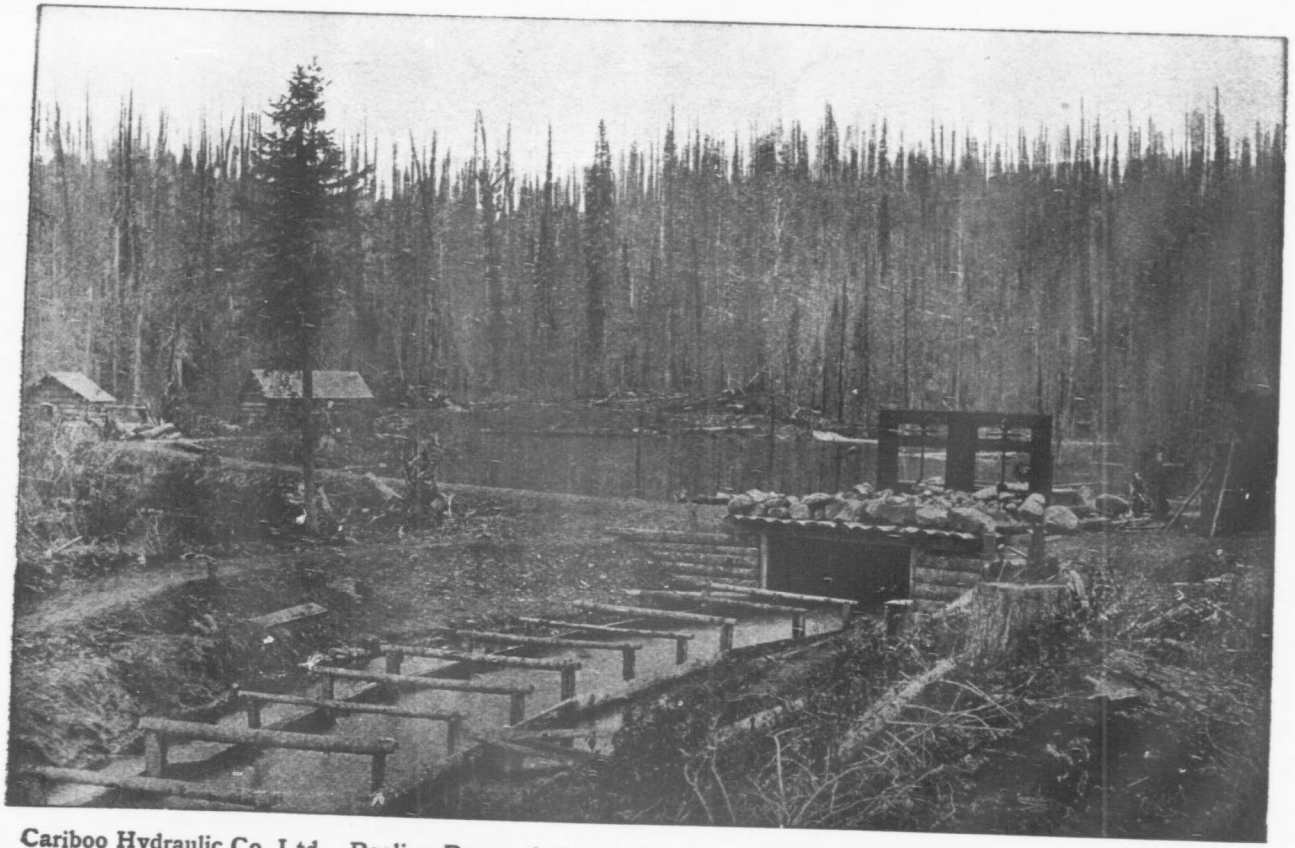
Since going to press, a Dominion Charter has been obtained under title of the Granite Creek Gold Mining Co., Ltd., for the purpose of taking over the assets and liabilities of this company, and to reduce the capital from $1,000,000 to $150,000.

**Directors :**

J. H. Thain. | W. L. Hogg. | Robert Stevenson.

**Head Office : W. L. Hogg, Secretary, Vancouver, B.C.**

Formed to develop a placer mining claim on Granite creek, Similkameen division of the Yale district, British Columbia, containing in all about 640 acres. Tests on the upper benches, which average from 30 to 150 ft. in depth, are reported to have given as high as $1.50 per cubic yard, but the average is expected to run from 25 to 35 cents to the cubic yard. Under date of 11th November, 1895, the Secretary reported to the shareholders as follows :—"Work was begun on the company's claims on the first day of April under the supervision of Mr. Robert Stevenson, one of the oldest and most experienced gold miners in the Province, and has been steadily prosecuted since. We fully expected to be hydraulicing before the middle of August, but owing to a series of accidents over which we had no possible control we have been delayed in our work for the period of three months. Being situated about 110 miles from the railroad, and our goods having to be teamed and packed that distance principally by Indians (who place very little value on time), and some of the machinery being too heavy for packing, we had to build a raft and boat and transport them by lakes and rivers, succeeding extremely well in spite of the difficulties encountered until within a few miles of the claim. The raft unfortunately got snagged in the Tulameen river, capsized, depositing its load in the bottom of the stream. As the river was then rising rapidly we had to wait for it to subside before attempting to recover the articles, which we recovered



Cariboo Hydraulic Co. Ltd.—Pooling Reservoir for Main Ditch—Old South Fork Reservoir Gates and Cabins.

intact weeks afterwards none the worse of the submersion. This accident has been the principal cause of the delay that has occurred. One has no idea, unless by visiting the works, of the amount of work necessary to put this valuable property into shape. We have built over seven miles of waggon road, and also several miles of foot trail (these being necessary to get around, the hills being precipitous). We have built two waggons, one raft, one boat of two tons' capacity, a boarding house, a lodging house, office and stables. A saw mill (water power) has been erected, size 25 x 40 ft., with tanks and ditches leading to the reservoirs on the hills. This mill is 55 horse power, and capable of cutting 24,000 ft. of lumber per day—the contract only called for a capacity of 2,000 ft. The supply of water is intermittent. We are thus enabled to cut a very large quantity of lumber in a very short time when conditions are favorable. This mill in future will constitute a very valuable asset of the company by doing custom work for other companies on the Tulameen river and at our own prices. Two hundred thousand feet of logs are cut, hauled and stacked alongside the mill in readiness for use. Trestle work for the flume of a most substantial nature has been laid through the Gladstone claim to the North Fork of Granite creek, a distance of 7,500 ft. This trestle has mostly been run around the face of high, precipitous bluffs, and has necessitated a vast amount of dangerous work as well as endangering the lives of the workmen, yet I am glad to say that no serious accident has happened to any of the workmen. We have run a tunnel 172 feet on the flume line through a "hog's-back," it being cheaper than to run a long distance round it. The piping, over 800 ft., is now all on the ground and placed in position, and a large tank of 10 in. lumber for a penstock has been put up on the Gladstone claim, sites for the monitor and pipes blasted out of solid bed-rock. Our flume connection with the North Fork will give us ample water for washing on the Gladstone claim as soon as the weather will permit of it in the spring.

"We have secured an option from the proprietors, on very advantageous terms, of the Amberty lease of 80 acres, and the Swan lease of 40 acres. These leases form the central portion of our system of claims, and will be a most desirable addition. They have been well prospected, and are highly auriferous. These purchases would enlarge our acreage from 640 to 760 acres, and give us absolute ownership of all the gold gravel benches on the creek. The extension of the flume to these properties will be much more simple and easy of erection than the part just finished, having the saw mill and the logs already cut we can extend the work and have two other monitors working on these properties by the first day of June next."

## STYNE CREEK CONSOLIDATED GOLD GRAVELS CO., Ltd.

Incorporated 1895. Authorized Capital, $250,000.

**Directors:**

R. G. Tatlow. | Edward Mahon. | C. Smith.

**Head Office: Vancouver, B.C.**

Formed to acquire and hold mining leases of the lands known as the Van Winkle Bar, in the Yale district, and all the water rights, privileges, &c., held at present by the Van Winkle Consolidated Hydraulic Mining Co., Ltd., and also a mining lease of a claim situated on the right bank of the Fraser river, in township 15, range 27, west of the sixth I.M., in British Columbia, and all water rights, privileges and assets held at present by the Styne Creek Gold Mining Co., Ltd.

## SULTANA GOLD MINE.

**Owner and Manager :**

John F. Caldwell, Winnipeg.

**Mines Office : Sultana Mine, via Rat Portage, Ont.**

The Sultana mine, known as location 42X, is situated on Sultana island on the north shore of the Lake of the Woods. Prospecting was commenced by the present owner in 1890, but mining was not begun until March, 1892. Opened by shafts, of which at date of report the main or No. 1 was down 250 feet, and the others about 50 feet. Equipped with 20-stamp mill, driven by 60 h. p. Waterous engine and a Waterous steel tubular boiler; stamps 850 lbs., drop 90 per m.; Tullock automatic feeder; Blake ore breaker; improved Frue vanners, etc. The mining plant includes a Jenckes hoisting engine, Rand air compressor, and Little Giant rock drills, etc. About 50 persons employed. The yield of gold from this mine to date is reported by the owner to be of a value of $90,000.

## TEXADA GOLD AND SILVER MINING CO.

**Directors :**

Joseph W. Stirton, J.P., *President*, Nanaimo, B.C.
Alfred Raper, Nanaimo, B.C. | J. H. Pleace, Nanaimo, B.C.
Elijah Priest, C.E., Nanaimo, B.C. | T. D. Jones.

**Head Office : Alfred Raper, Secretary, Drawer 2, Nanaimo, B.C.**

This company's property consists of 800 acres of land, on Texada Island, B.C. This property adjoins the well known Puget Sound iron mine, and contains veins of silver, copper, gold and other ores. Limestone and black marble of a superior quality is also found thereon. In 1894 a small force was employed opening up property for copper.

*Mine Superintendent* : Elijah Priest, C.E., Nanaimo, B.C.

## THOMPSON & QUIRK GOLD CO.

**Owners :**

Messrs. Thomson & Quirk, South Uniacke, N.S.

A private company, organized to work certain gold areas at South Uniacke, in the County of Hants, Province of Nova Scotia. Official returns of the gold yield from October, 1889, to 31st December, 1891, report 3,201 ounces 15 dwts. gold from 298 tons rock crushed.

GOLD YIELD, 1892, '93 AND '94.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1892..... | 1,803 | ozs. | 4 | dwts., | 18 | grs., | from | 180 | tons | rock crushed. |
| 1893..... | 1,175 | " | 6 | " | 11 | " | " | 115 | " | " |
| 1894..... | 790 | " | 3 | " | 2 | " | " | 129 | " | " |
| 1895 (5 mons) | 104 | " | 10 | " | 6 | " | " | 66 | " | " |

## THOMPSON RIVER HYDRAULIC MINING CO., Ltd.

Incorporated 1893. Authorized Capital, $100,000, in shares of $10.00.

**Directors:**

John Hendry. | J. W. Vaughan. | Robert Jardine.
All of New Westminster, B.C.

**Head Office: J. W. Vaughan, Managing Director, New Westminster, B.C.**

Formed to acquire and work certain placer claims on the Thompson river and its tributaries, Province of British Columbia. During 1894 the company acquired three leases on Tranquille river, about 12 miles from Kamloops, built a dam, flume and ditches, and placed a plant capable of moving 2,000 yards per day. It was only able to get a partial clean-up owing to the early frost, but succeeded in proving a portion of the ground, being 100 feet above the water level, which gave a result of about 50 cents per yard.

## TOUQUOY GOLD MINE.

Estimated Capital invested to date, including purchase of property, machinery, erection of buildings, development of mine, labor, etc., $50,000.

**Owner:**

**Damas Touquoy, Moose River Gold Mines, Mid. Musquodoboit Harbor, Halifax County, N.S.**

Owns and operates the Touquoy gold mines, in the Carbou district, Halifax Co., Nova Scotia, containing a leasehold from the Crown covering 55 gold areas. Mines worked since 1877; the present owner reports that during the past seven years he has won gold to the value of $110,000. Equipped with 15-stamp mill driven by a Little Giant turbine, 40 h.p.; stamps weigh 675 lbs., drop 50 to 60 per m., and other plant. In 1894 the gold yield was 342 ozs. 12 dwts. 17 grs. from 4,131 tons rock crushed; 1895, 404 ozs. 19 dwts. 12 grs. from 5,174 tons rock crushed.

## TRAIL MINING CO., Ltd.

Registered 1894. Authorized Capital, $250,000, in shares of $100.

**Head Office: Chicago.**

**Mines Office: Trail, B.C.**

Formed to acquire and operate certain gold properties in the Trail Creek district, Province of British Columbia.

## TUDOR GOLD MINING CO., Ltd.

Incorporated 1894. Authorized Capital, $150,000, divided into 15,000 shares of a value of $10 each.

**Directors:**

Chas. F. Ayer, *President*, Lowell, Mass.
James C. Ayer, New York, | S. W. Thurlow, Lowell, Mass.
Fredk. Taylor, Lowell, Mass. | J. E. Hardman, Halifax, N.S.

**Head Office: S. W. Thurlow, Treasurer, Lowell, Mass.**
**Mines Office: Waverley N. S.**

This company controls, under lease from the local Government, a property containing over 100 gold areas, situate in the Waverley district, Halifax county, Province of Nova Scotia. Mine ten miles from the city of Halifax. 75 men employed. 20-stamp mill, driven by compound condensing steam engine; one compound condensing duplex 10-drill Rand compressor; one double cylindered, double drum winding engine built by the Jenckes Machine Co. (cyl. 8 in. x 12 in., drum 42 in. x 36 in.); one 12 in. x 24 in. Forster ore breaker, with a capacity of 120 tons in 10 hours; two 50 h. p. horizontal tubular boilers, and one upright 25 h. p. boiler; stamp mill equipped with "Golden Gate" and "Perfection" concentrators.

In 1895, from January to September the yield reported for royalty was 989 oz. 7 dwt., from 4,457 tons rock crushed.

## TULAMEEN HYDRAULIC AND IMPROVEMENT CO., Ltd.

Incorporated 1891. Authorized Capital, $60,000.

**Directors:**

R. G. Tatlow, Vancouver, B.C. | J. C. Armstrong, New Westminster, B.C.
Alexander Ewen, New Westminster, B.C. | Hon. D. McInnes, Victoria, B.C.
Benjamin Douglas, New Westminster, B.C.

**Head Office: Walter J. Walker, Secretary, New Westminster, B.C.**

Formed for the purpose of acquiring and consolidating certain leases known as the "Tulameen," the "Hines Creek" and the "Eagle Creek" claims situated on the Tulameen river, in the Yale division of British Columbia. The workings are distant from Kamloops station, on the line of the C.P.R., about 125 miles by waggon road and trail. The claims owned by the company extend from Eagle creek, a distance of two and a-half miles down the Tulameen river, and contain large benches or alluvial deposits of platinum and gold-bearing gravel.

In his report upon the property Mr. G. Attwood, M.E., F.G.S., says: "For cutting timber and making boards, etc., a saw-mill has been erected near the junction of the Tulameen river with Eagle creek. The power employed consists of an overshot wheel 20 ft. in diameter with a 4 ft. breast which drives a 40 in. (in diameter) circular saw, having a capacity of making from 1,000 to 4,000 ft. of boards a day. Across the Eagle creek a dam has been constructed of heavy stones and logs in a deep gorge which forms almost a natural dam, is about 25 to 30 ft. across and is about 10 ft. deep in the centre. A water flume about one mile in length carries the water from the dam to the present point of hydraulic working. The flume is made of 1½ in. plank and is

Tudor Gold Mining Co. Ltd.—Shaft House and Mine Buildings at Waverley, Nova Scotia.

5 ft. wide in the clear, and 20 in. high, except a short distance at the lower end where it is about 11 in. high. The general grade of the flumes is ¼ in. in 12 ft., although it is not quite as steep in some places. The foundation of the flume had to be made for some distance, by blasting a bed out of the solid rock around the mountain side and the work has been well done. For saving platinum and gold a bed-rock flume has been constructed 160 ft. long, about 43 in. wide at the bottom and 27 in. high, with 8 in. fall in 12 ft. The flume is provided with wood-block riffles, 5 in. high and three abreast, and with two under-currents near the end for saving the finer species of metal. At the end of the flume a penstock is in place and to which is attached about 300 ft. of steel pipe 10 in. in diameter, No. 14 sheet, and having a monitor and adjustable nozzle which can be moved by hand and by which the stream of water can be directed on the gravel bench at any angle with a nozzle 4 in. in diameter. The pressure of water now being used is about 110 ft. vertical and the quantity about 350 to 400 miner's inches. The Tulameen river has, from all appearances, gradually cut its way through the country rock until its present level is far below what it was in ancient times, and in so doing it has left banks, sometimes on one side and sometime on the other, of large benches of gold and platinum-bearing gravel. The benches vary in length and width according to location, and out of the four miles on the run of the river, fully one-half (say two miles) is covered with the gravel. The cost of removing one cubic yard of gravel by the use of free water which the company enjoys should never exceed 10 cents per cubic yard, and with proper management 6 cents a yard should cover all the working expenses. To estimate the quantity of platinum and gold-bearing gravel on the benches belonging to the company is a very difficult matter, but a walk on the ground will soon convince anyone that the supply is enormous and that it will take a number of years to exhaust the same."

In consequence of several propositions to purchase the above properties, now consolidated in one lease from the Government, all work in 1895 was delayed and held over until the mining season closed. It is expected that before the 1896 season opens, the future ownership of the mines will be arranged, and work recommenced either by the present company, or one of the companies which are in treaty with it.

## TULAMEEN MINING CO., Ltd.

Incorporated 1894. Authorized Capital, $20,000.

**Directors:**

W. B. Stephens, Montreal. | A. Fleck, Ottawa. | C. Berkely Powell, Ottawa.
W. Harris, C.E., Ottawa. | W. L. Hogg, Vancouver.

**Head Office: W. L. Hogg, Secretary, Vancouver, B.C.**

Formed to acquire and operate hydraulic claims in British Columbia. Will operate in 1896.

## VAN WINKLE CONSOLIDATED HYDRAULIC MINING CO., Ltd.

Incorporated December, 1892, under the laws of British Columbia. Authorized Capital, $500,000, in 50,000 shares.

**Directors:**

R. G. Tatlow. | A. T. Ceperley. | H. E. Newton. | E. Mahon. | G. de Wolff.

**VAN WINKLE CONSOLIDATED HYDRAULIC MINING CO.**—Continued.

**Head Office: G. de Wolff, Secretary, Hastings Street, Vancouver, B.C.**

Formed to take over the mining leases of the lands known as the Van Winkle Bar, in the Yale district, Province of British Columbia; also certain grants and water rights, dated 27th October, 1892, granted to Francis Helen de Wolff and to William Munro, and to acquire all the rights and interest of all the parties interested in what is known as the Van Winkle Bar, and the water privileges in connection therewith, also to carry on hydraulic or other mining.

The property contains 700 acres, and is situated two miles from the town of Lytton, on the opposite side of th Fraser river, and is operated under lease at a yearly rental of $250 per annum. The water is brought from Last Chance creek, a distance of two miles, by 1¾ miles of ditching and ¼ mile piping, the gore at the penstock being 36 in. in diameter and tapering from 12 ft. to 18 in.; the balance of the pipe is 18, 16 and 15½ in. in diameter. The sand tank is 375 ft. above the flume, near the river, where the monitor is placed. Benches 110 to 397 ft. high. Gravel averages 10 cents per cubic yard and the working cost is estimated at 3 cents per 7 inches.

In the year 1894 the management report:—"On account of the water supply suddenly failing us, we were only able to pipe three months this season, during which time we took out $4,489.77. The main sluice is now 1,176 ft. long and is within 250 ft. of the second bench where (according to the prospecting) we expect to get the rich pay. When up to this second bench, we will have a face of 96 ft. (in height) of gravel, and having two No. 6 monitors and the requisite pipe in place, a very large quantity of gravel should be put through daily next season."

In 1895 a run of 27 days gave a clean-up of $1,300. No other report received.

## VICTORIA CONSOLIDATED MINING CO., Ltd.

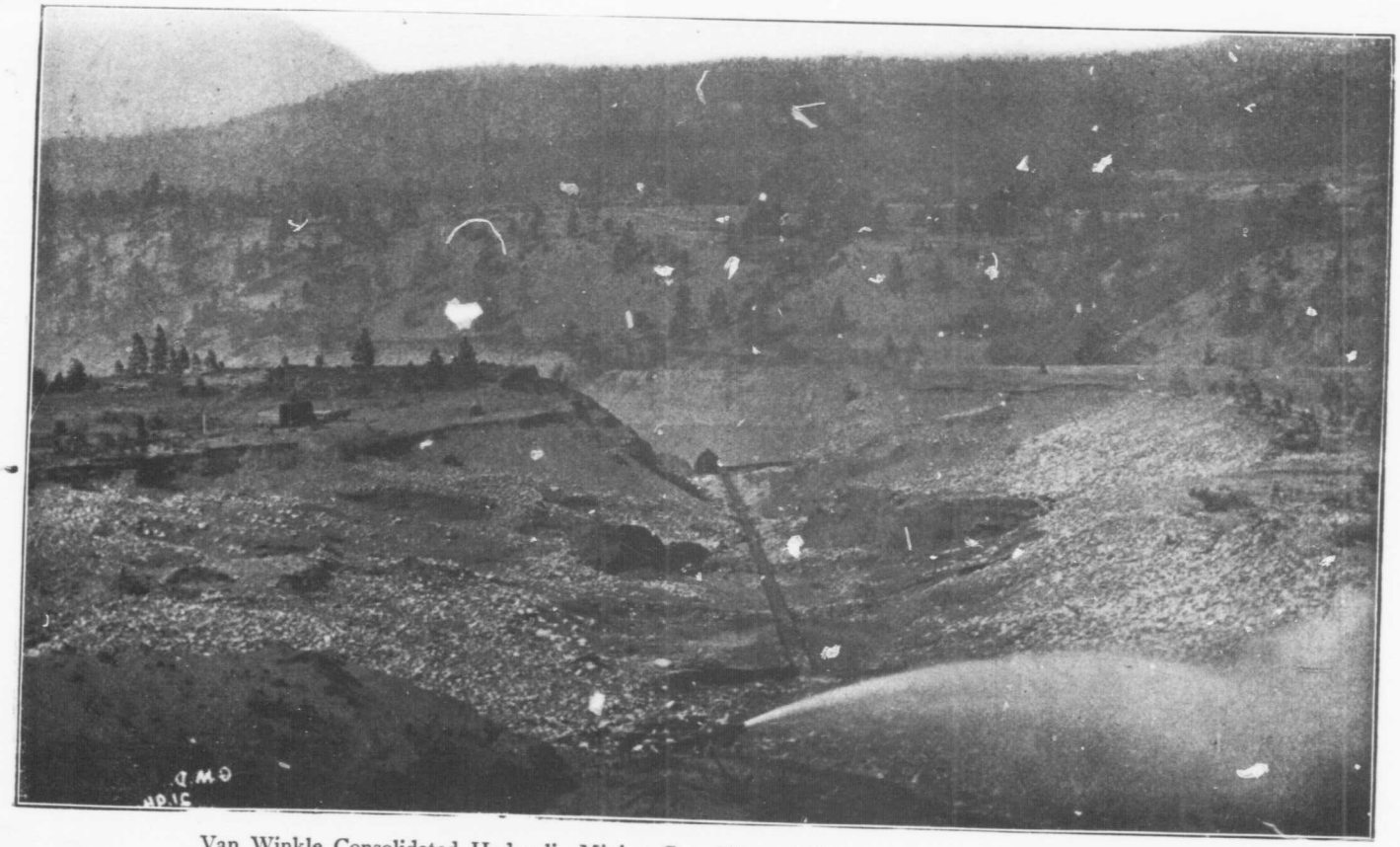
Incorporated by an Act of the Legislature of the Province of British Columbia, 1895.
Authorized Capital, $300,000.

**Directors:**

Wm. McKenzie, Toronto.
George A. Cox, Toronto. | Thos. G. Holt, Montreal.
Donald D. Mann, Montreal. | Wm. Wilson, Victoria.
F. S. Barnard, M.P., Victoria.

**Head Office: F. Nicholls, Secretary, 65 Front St. W., Toronto.**
**Mines Office: Mr. Brigham, Manager, Forks Quesnelle, Caribou, B C.**

The property comprises hydraulic ground on the south side of the South Fork of the Quesnelle river and adjoining the Hop E. Tong Company on Dancing Bill gulch, commencing at a stake placed about 20 feet northwesterly from the Hop E. Tong Company's tank, where they take water into their hydraulic pipe, thence extending in a westerly direction one mile, thence northerly one-fourth of a mile, thence easterly one mile, thence southerly one-fourth of a mile to the point of commencement, as indicated by stakes at the four corners, and which is held under a lease from the Crown, dated 6th November, 1890, for a term of twenty years at the yearly rental of fifty dollars, save and except thereout that mining ground known as the "Loo Quong Ching Tong" line claims, containing twelve acres, more or less, on Dancing Bill gulch, and which said ground was demised by the Lieut.-Gov. in Council to the Cariboo Hydraulic Mining Co., Ltd. During the season of 1895 operations were directed towards getting ditch in working order and in opening up the face of the mine.



Van Winkle Consolidated Hydraulic Mining Co.—View of Claim near Lytton, British Columbia.

## WAR EAGLE GOLD MINING CO.

Incorporated 3rd December, 1894. Authorized Capital, $500,000, divided into 500,000 shares of $1.00.

**Directors:**

Patrick Clark. | John A. Finch. | Austin Corbin.
H. L. Franks. | B. C. Kingsbury. | W. J. C. Wakefield.
A. B. Campbell.

**Head Office: 39 Zeigler Block, Spokane, Wash.**

**Mines Office: Patrick Clark, Manager, Rossland, B.C.**

This company owns and operates the "War Eagle," "Iron Mask" and "Virginia" claims at Trail Creek, in the West Kootenay mining division of British Columbia. Ninety-two persons employed in 1895. The ore mined is a pyrrhotite, containing calcopyrite assaying about 2 ounces gold, 4 ounces silver, and 5 per cent. copper. The output in 1895 (reported to 15th Nov.) was 9,362¾ tons. During 1896 the output is estimated to reach 11,362 tons. The output is shipped to the United Smelting and Refining Co., Prickley Pear Jct., Montana.

The "War Eagle" is opened by two tunnels, No. 1 being in at date of report 800 feet, connected with surface by three shafts, one 65 feet, near mouth; the other two, 120 feet on incline. Tunnel No. 2 (at date of report not quite in to vein) 600 ft., will tap vein 126·8 feet below tunnel No. 1. Tunnel No. 3, in about 30 ft. at date of report, will be 1,800 ft. long, tapping vein at a depth of 255 feet below tunnel No. 2. Vein averages about 7 feet, in places 12 to 15 feet. Equipped with two 100 h. p. boilers; two compressors, Rand make, one of a capacity of 20 drills. Ingersoll-Sergeant rock drills and other plant.

## WEST LE ROI AND JOSIE MINING CO.

Incorporated 1895. Authorized Capital, $500,000.

**Directors:**

D. Holzman, *President.*

G. H. Casey. | S. Silverman. | C. S. Vorhees.
C. G. Griffith. | J. L. Wilson. | H. M. Stephens.
J. M. Burke. | J. B. Jones. | Ross Thompson.

**Head Office: H. M. Stephens, Treasurer, Spokane.**
**Mine Office: John M. Burke, Man. Dir., Rossland, B.C.**

Owns and operates two claims on Red Mountain, Trail district, Province of British Columbia. Being opened. Tunnel in 125 ft.; three shafts, 40 ft.; pits and open cuts aggregating 300 feet at date of report.

## WIEGAND GOLD MINING CO.

Organized 1894.

**Officers:**

Joseph C. Foley, *President.*
V. D. Cliff, *Vice-President.* | J. J. McAuliff, *Secretary.*

**Mines Office: Shoal Lake, via Fort William, Ont.**

Formed to operate the Wiegand gold location at Shoal Lake, Ont. Being developed at date.

## WILLOW RIVER MINING CO.

A private company.

**Owners:**

| | | | |
|---|---|---|---|
| Charles House. | W. H. Phelps. | G. Cowan. | M. Nason. |
| W. Blackwood. | P. McGregor. | C. F. Law. | F. C. Laird. |

**Head Office: W. J. Kirkpatrick, Superintendent, Barkerville, B.C.**

Owns and operaters a claim on Willow river, at mouth of Mosquito creek, about seven miles from the town of Barkerville, Cariboo district, Province of British Columbia. At present engaged in sinking bed-rock shaft to drift through rock to channel, thus avoiding surface water which, hitherto, has greatly retarded the work of development. A small force employed.

## WINE HARBOR GOLD MINING CO., Ltd.

Incorporated 1894. Authorized Capital, $160,000, in shares of $1.

**Directors:**

| | | |
|---|---|---|
| Geo. W. Stuart. | Thos. G. McMullen. | H. T. Harding. |
| J. A. Kirkpatrick. | A. C. Bertram. | J. M. Higgins. |
| | A. T. Dalrymple. | |

**Head Office: H. T. Harding, Truro, N.S.**

Formed to operate twenty-two areas at Wine Harbor, in Guysboro County, Province of Nova Scotia. 20 persons employed in 1894. No report in 1895.

## WYCOTT HYDRAULIC MINING CO.

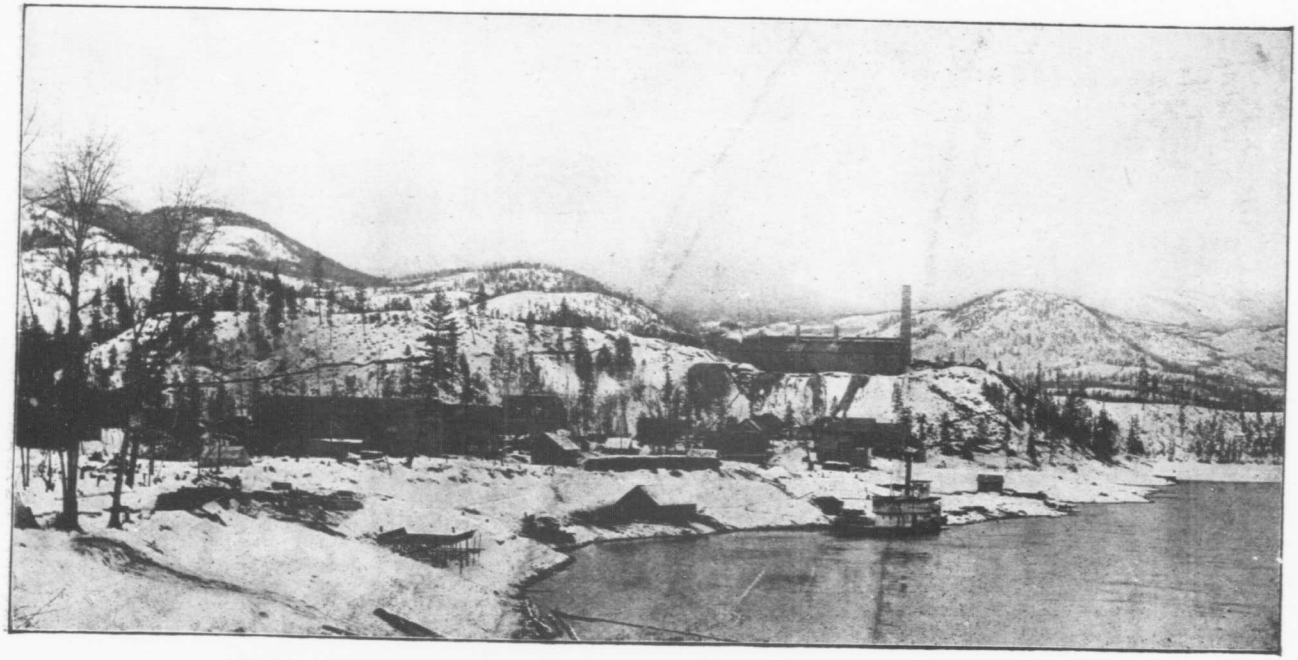
Incorporated 1893. Authorized Capital, $500,000, in 50,000 shares of $10 each.

**Directors:**

S. K. Twigge, John Twigge, J. M. Spinkes, M. M. Hirschberg, all of Vancouver, B.C.; T. J. Trapp, New Westminster, B.C.

**Head Office: M. M. Hirschberg, Vancouver, B.C.**

Formed to take over, purchase and acquire a mining lease or leases, dated 4th July, 1892, granted to J. M. Harvey and Thos. J. Trapp of New Westminster, B.C., and the water privileges in connection therewith, near Lillooet, B.C. To be worked by hydraulicing in 1896.



British Columbia Refining and Smelting Co.—New Works at Trail, B.C.

## OTHER GOLD MINING COMPANIES AND CLAIMS.

*(From which only limited reports of operations have been received.)*

| COMPANIES. | LOCATION OF CLAIM. | HEAD OFFICE. | REMARKS. |
|---|---|---|---|
| Allison McDougal Co | Princeton, B.C. | W. C. McDougall, Princeton, B.C. | Bench claim of 640 acres. |
| Anglo-American Gold and Platinum Hydraulic Co | Similkameen River, B.C. | R. C. Lowry, Vancouver | Claim contains 640 acres. |
| Bellingham Bay Hyd. Mining Co. | British Columbia | Head Office: Fairhaven, Whatcom Co., Wash. | |
| Big Bar Hydraulic Co. | Big Bar, Lillooet, B.C. | Jas. Dunn, Big Bar, Lillooet, B.C | Bench claim. Sluicing. |
| Blue Lead Hydraulic Co., Ltd. | Hixon Creek, Cariboo, B.C. | Hon. J. Reid, Quesnelle Mouth, B.C | Authorized Capital, $100,000. Work suspended. |
| Bonanza Mining Co | Lightning Creek, Cariboo, B.C. | John Boyd, Cottonwood, B.C. | Small force 1894. Owned by Boyd, McAlpine & Co. |
| Bootanie Creek Gold Min. Co., Ltd | Bootanie Creek, B.C | R. C. C. Johnstone, Vancouver. | Developing claim. |
| Boyce & Taylor | Williams' Creek, Cariboo, B.C. | Jas. Boyce, Barkerville, B.C. | Small force prospecting. |
| B. C. Smelting and Refining Co., Ltd. | Trail, B.C. | F. A. Heinze, Trail, B.C. | * Operates works at Trail, B.C., having a capacity of 250 tons per day. Main furnace building, 310 ft. long, 60 ft. wide, 40 ft. to chords. |
| Bridge River Gold Mining Co. | Horseshoe Bend, Lillooet, B.C | G. E. Bower, Vancouver | Capital, $25,000. Operated in 1895. Opening up hydraulic claim. |
| Consolidated Gold Mining Co. | Not known | J. B. Neilly, Halifax | Organized 1895. Authorized Capital $400.000 |

*The plant proper consists of 150 ton sampling works and O'Hara calcining department, containing O'Hara furnaces and circular calciners of the most approved pattern. The smelter building contains two reverberatory furnaces of modern design, as lately erected for the Butte smelting practice, and one blast furnace. The ores treated at date are almost entirely the output of the Le Roi Mining and Smelting Company at Trail.

## OTHER GOLD MINING COMPANIES AND CLAIMS.—*Continued.*

| COMPANIES. | LOCATION OF CLAIM. | HEAD OFFICE. | REMARKS. |
|---|---|---|---|
| Consolidated Alberni G'ld. Min. Co. | Alberni, B.C. | Vancouver, B.C. | Organized 1896. Capital $500,000. |
| Country Harbor Gold Mines | Stormont, N.S. | O. B. Brown, Country Harbor, N.S. | Milled in 1894, 1,025 tons, yielding 420 ozs. |
| C. P. F. Mining Association | Mt. Uniacke, N.S. | Col. Curran *et al*, Halifax | Milled 1,311 tons, giving 237 ozs. in 1894. |
| Columbia Hydraulic Mining Co. | Hills' Bar, Cariboo, B.C. | Chicago | Registered 1895. Authorized Capital $100,000. |
| Creighton Gold Mining Co., Ltd. | Larchwood, Ont | A. W. Fraser, Ottawa, Sec'y. | Capital $1,000,000. Mining suspended. |
| Elk Gold Mining Co., Ltd. | British Columbia | O. Marstrand, Vancouver, B.C. | Capital $10,000. |
| Garibaldi Placer Co. | Hartsgrabble Creek, Cariboo, B.C. | J. Shaw, Barkerville, B.C. | Developing claim. Small force. |
| Golden Chest Mining Co. | Island Mountain, Cariboo, B.C. | S. J. Marsh, Barkerville, B.C. | Developing quartz claim. |
| Golden Chord Mining Co. | N. Thompson, Cariboo, B.C. | S. J. Marsh, Barkerville, B.C. | Not operated in 1894. |
| Golden Gate Mining Co. of Granite Creek | Granite Creek, B.C. | Vancouver, B.C. | Claim 1½ miles. Capital $60,000. Organized 1896. |
| Gold Point Hydraulic Co. | S. F. Similkameen River, B.C. | W. L. Wateman, New Westminster, B. C. | Claim contains 320 acres. |
| Granite Creek Gold Mining Co. | Granite Creek, B.C. | R. C. C. Johnstone, Vancouver. | Claim 4½ miles long. |
| Gulch Hydraulic Co. | Conklin Gulch, Cariboo, B.C. | G. Ferguson. | Claim owned by Ferguson, McDermott & Coutts. |
| Hepburn Hydraulic Mining Co. | Quesnelle Forks, Cariboo, B.C. | J. Hepburn, Forks, Quesnelle, B.C. | Hydraulic mining. Works expected to be large. |
| International Mining & Milling Co. | Lake of the Woods, Ont. | Col. J. S. Morgan, Euclid Ave., Cleveland, Ohio | Property contains 120 acres. Authorized capital, $500,000 |
| Irving & Co. | Lillooet, B.C. | J. Irving, P.O. Box K, Victoria, B.C. | Hydraulic. Not worked in 1894. |

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| Irving & Co. | Lillooet, B.C. | J. Irving, P.O. Box K, Victoria, B.C. | Hydraulic. | Not worked in 1894. |

## OTHER GOLD MINING COMPANIES AND CLAIMS.—*Continued.*

| Companies. | Location of Claim. | Head Office. | Remarks. |
|---|---|---|---|
| Kootenai Hydraulic Mining Co. | Pend d'Orielle Dist., B.C. | Rochester, N.Y. | Organized 1895. Capital $500,000. |
| Little Giant Quartz Mining Co. | Island Mountain, B.C. | S. J. Marsh, Barkerville, B.C. | Development begun in 1894. |
| Lookout Mining & Milling Co., Ltd. | British Columbia | G. E. Kumpe, Spokane. | Registered 1895. Capital $250,000. |
| Main Quesnelle Gold Dredging and Mining Co. | Cariboo, B.C. | Tacoma, Wash | Organized 1896. Capital, $250,000. |
| Mina Placer Mining Co. | Bridge River, Lillooet Dist., B.C. | A. S. Bell, Lillooet, B.C. | Bench claim sluicing. Under option to an English Company. |
| Mineral Creek Gold Min. Co., Ltd. | Alberni District, B.C. | Nanaimo, B. C. | Capital $500,000. Being organized. |
| Moose River Gold Mine. | Moose River, Caribou, N.S. | D. Touquoy | Milled in 1894, 2,501 tons, giving 551 oz. 6 dwts. 21 grs. |
| Morning Star Gold Co. | Fairview, Okanagan, B. C. | Steve Mangott, Fairview, B.C. | Two claims worked. Quartz averages in free gold about $13.50 per ton. 20 tons crushed daily at Stratheyre mill. Output for Jan. and Feb., '95, $13,000. |
| Narrow Escape Co. | McArthur Gulch, Cariboo, B.C. | W. L. Jones, Barkerville, B.C. | Small force employed. Claim owned by Messrs. W. L. & E. T. Jones. |
| Nestegg Mining Co. | West Kootenay, B.C. | G. A. Kirk, Victoria, B. C. | Capital $500,000. Being organized. |
| Nip-and-Tuck Hydraulic Gold Mining Co. | Wild Horse Creek, Kootenay, B.C. | J. M. Buxton, Vancouver, B.C. | Capital $35,000. Being organized. |
| North American Placer Co. | Lillooet, B.C. | A. McDonald, Lillooet. | Owned by Hurley & McDonald. Two miles of ditching. |
| O K Gold Mining Co. | B.C., West Kootenay. | Not known | Capital $1,000,000. |
| Ophir Mining Co. of Chicago | Tp. Galbraith, Ont. | E. T. Milligan, 1206 N. Y. Life Bldg., Chicago | In liquidation. |
| Paris Belle Gold Mining Co., Ltd. | B. C. | Spokane, Wash. | Organized 1895. |

## OTHER GOLD MINING COMPANIES AND CLAIMS.—*Continued.*

| COMPANIES. | LOCATION OF CLAIM. | HEAD OFFICE. | REMARKS. |
|---|---|---|---|
| Peters' Creek Gold Mining Co. of Cariboo, Ltd. | Peters Creek, Cariboo, B.C. | R. G. Tatlow, Vancouver, B.C. | Capital $25,000. Organized 1895. |
| Phœnix Gold Mining Co., Ltd. | B. C. | Spokane, Wash. | Capital $500,000. Organized 1895. |
| Poorman Gold Mining Co. | B. C. | John A. Finch, Spokane, Wash. | Capital $500,000. |
| Phœnix Land & Development Co. | Uniacke, N.S. | Not known | Milled 50 tons rock, giving 10 ozs. 19 dwts. 9 grs., 1894. |
| Sawmill Flat Co. | Near Lillooet, B. C. | Jas. Scott, New Westminster. | Owned by Scott & Guthrie. Not working. |
| Scum Scum Co. | Bridge River, Lillooet, B.C. | A. S. Bell, Lillooet | River claims. Sluicing. |
| Silverine Gold Mining Co., Ltd. | B. C. | Spokane, Wash. | Organized 1895. Capital $500.000. |
| South Wales Hydraulic Co. | Lightning Creek, Cariboo, B.C. | F. J. Trequille, Stanley | Claim owned by Jones, Price & Trequille. Small force employed. |
| St. Raphael Claim | Granite Creek, B.C. | J.C. McDonald, Granite Creek, B.C. | Bench claim. 20 acres. |
| Swan Hydraulic Claim | Granite Creek, Yale, B.C. | Alex. Swan, Granite Creek, B. C. | Claim contains 40 acres. |
| Waverley Hydraulic Co. | Grouse Creek, Cariboo, B. C. | J. Stone, Barkerville | Being developed. |
| Willow River Hydraulic Co. | Willow River, Lillooet, B.C. | F. C. Laird, Willow River. | 17 persons employed. Owned by Messrs. F. C. Laird & Co. |

# Silver and Lead.

# Silver and Lead.

For many years silver mining has been successfully carried on in the Thunder Bay region on Lake Superior, Ontario. The Silver Islet vein, discovered in 1868, and sunk upon to a depth of 1,260 feet, has yielded ore to the value of $3,000,000 and it is probable that the mine might be working yet but for the mistakes which characterized its management. Several other properties have been operated in the vicinity of Port Arthur. The mines, which were worked until recently, are situated between Rabbit Mountain and Whitefish Lake, south-west of Port Arthur, the first discovery of silver in the district having been made in 1882. The veins are found in the black shales of the Animikie formation, in widths ranging from two to six feet, and at several mines they have yielded large quantities of silver.

In 1886, some British Columbia prospectors in search of gold, happened to camp in a high mountainous region which has since become familiarly known as Toad Mountain, and one of them, in seeking for lost horses, stumbled on an outcrop of ore of which he brought back a specimen. This specimen was afterwards submitted to assay, and the results were such that the prospectors returned and staked out claims on their discovery. The ore, in fact, proved to contain something like $300 to the ton in silver, with a large percentage of copper and a little gold.

In this manner what is now known as the "Silver King" mine was discovered, and, as a consequence of its discovery, the entire Kootanie district, in which it is situated, began to be overrun with prospectors. Hundreds of these men, with experience gained in the neighboring States of Montana and Idaho, as well as others from different parts of the world, turned their attention to Kootanie. The result has been that within about five years a very great number of metalliferous deposits, chiefly silver ores, have been discovered, and claims taken out upon them. Several growing centres and little towns have been established; roads, trails and bridges have been made, steamers have been placed on the Kootanie Lake and on the Upper Columbia river, and a short line of railway has been built between the lake and river to connect their navig-

able waters. The immediate centre of interest in regard to mining development in British Columbia has, in fact, for the time being, been almost entirely changed from the principal old placer mining districts to the new discoveries of silver bearing veins

So far as they have yet been examined or opened up, the metalliferous deposits of the Kootenae district give every evidence of exceptional value. They consist chiefly of argentiferous galena, holding silver to the value of from $40 or $50 to several hundred dollars to the ton. Nelson, Hot Springs, Kaslo, Slocan, Illecillewaet, and Golden are at present the principal recognized centres in the new district, but it would be rash as yet to attempt to indicate its ultimate limits.

The following notes are contributed to THE MANUAL by Mr. J. C. Gwillim, Ba. Sc., M.E., of New Denver, B.C.:—

### SILVER ORES OF BRITISH COLUMBIA.

Although the silver-bearing rocks of British Columbia are of great regional extent, they are practically confined, at present, to the Selkirk ranges, a feature which they have in common with the most extensive deposits of galena in this province.

Enormous bodies of silver-bearing galena exist in the northern and eastern portions of the Selkirks. Such are usually of a low grade in silver, and have been neglected for the smaller but richer combinations of the Slocan and Kootenay lake. Several years before the discovery of the high grade silver lead ores of the Slocan, attempts were made to mine the great galena bodies of Eastern Kootenay, Illecillewaet, and then the Lardeau, all of which have now given precedence to the Slocan.

Samples of ore may be taken from each of the above-mentioned districts. They may have no visible difference in texture and appearance. The difference, however, is that of tens to hundreds in their silver-bearing capacity.

It is at this point that geology comes in to explain the difference, to some extent, for the high grade Slocan ores are found in the Slocan limestones, while the lower grade ores of East Kootenay lake, such as the "Blue Bell," which supplies ore for the Pilot Bay smelter, are found in a series of rocks which are of a different age and lithology. The same is true of the Lardeau country, which is a region of much less disturbed rocks of very varied character.

Having impressed the fact that the ores of these different districts have their own local values for any common variety of galena, such as cubical or steel galena, it becomes interesting to learn that each variety of silver ore in a special district has its own relative value; the Slocan silver ores, now being extensively mined, will bear out this statement as a general rule.

If the galenas are considered, it has been observed that in a mine carrying "cubical," "steel," and "wavey" galena, the amount of silver present increased in order with these varieties respectively. This may not be the rule, but it is a distinction already appreciated by prospectors. Be that as it may, it is nevertheless a fact that it is as rare to find a galena ore carrying less than 100 ounces in the Slocan, as it is to find one carrying over 100 ounces in East Kootenay or Illecillewaet.

The combinations or associations of silver in British Columbia ores are manifold; but when considered as an ore to be mined, for production, these all give place to two principal varieties. These are a wet and a dry ore, the former giving over 90 per cent. of the output, which amounted during 1895 to 10,717 tons, valued at $1,059,400. This is a galena ore, carrying according to customs returns a nominal value of $100 in silver and from 50 per cent. to 80 per cent. of lead. The second variety, the dry ore, occurs principally as "black sulphurets" of the prospector, or silver sulphide. Here again geological conditions have been a potent factor in variation of ore bodies, and these sulphide of silver ores are widely represented in the granitic regions near their contact with the Slocan limestones.

Such ores are found up the North Fork of Carpenter creek, at Ainsworth, and in the granites of the ranges south-east of Slocan lake, where, during last season, this ore was found associated with native silver and gold-bearing pyrites. These latter ore bodies are of small size as a rule, but give exceedingly high returns in gold and silver.

There is another silver ore which is somewhat remarkable in character and extent. This is the copper-carrying silver of Toad mountain in Southern Kootenay, such as is found in the "Silver King," and which is now being worked by an English company, which also has a smelter in connection situated at Nelson. The "Silver King" ore carries 40 to 50 ounces of silver, $2 in gold and 6 to 7 per cent. copper, giving a total value of $42 a ton.

The Ruth lead has a width of from 4 to 10 ft., and strikes S. 70° W., with a dip to the south of 65°. The workings consist of a tunnel 300 ft. in length, from near the end of which an upraise has been made to the surface. One hundred and fifty tons of ore, principally galena, stated to carry 120 ounces of silver to the ton, has been shipped from this mine, and considerable bodies of ore are in sight.

The Ivanhoe, situated high up on the slope of the mountain, shows several nearly parallel veins. Two crosscut tunnels—the upper 50 ft. and the lower 90 ft. in length, connected by an upraise of 70 ft.—have been driven, and drifts have been extended along the lead from the ends of both tunnels for varying distances. The workings have exposed an ore-chute 60 to 70 ft. in length, with a maximum width of 5 ft. of pure and concentrating ore. A contract for a third cross-cut tunnel, 150 ft. below No. 2, had been let at the time of my visit.

The leads on the ridge separating the South from the Middle Fork of Carpenter creek are crowded even closer together than those on Silver Mountain ridge. On the south slope, among others, are the Noble Five group, Last Chance, Goodenough, Reco, Deadman and Bluebird, and on the north slope the Best, Antelope, Rambler, Surprise, Antoine, R. E. Lee and Washington. The Payne, the first mine staked in the district, is situated on the crest of a spur of the same ridge.

The Noble Five group consists of a string of five claims, located on the same lead. The strike is N. 60° E., and the dip is to the northwest at an angle of 45°. The lead has in places the character of a true fissure, and in others that of a crushed and fissured zone filled with masses of the slatey country-rock, quartz, calc-spar and spathic iron. It varies in width from a few inches to 10 ft. or more.

The Bonanza King and World's Fair, two members of this group, have been worked continuously since the spring of 1892. The workings consist of five tunnels, following the lead at various depths, with a number of upraises and intermediate drifts. The three upper tunnels, which have lengths respectively of 120, 240 and 400 ft., pierce an important ore-chute from 60 to 100 ft. in length, and from a few inches to 6 ft. in width. The ore-body widens from No. 1 to No. 2 tunnel and narrows somewhat at No. 3. A fourth tunnel, at a further depth of 350 ft., is now heading towards the chute, but has not yet reached it. The ore consists mostly of galena and blende, with their decomposition-products,

classed locally as carbonates, and some gray copper, native silver and a dark earthy mineral which has not yet been examined, but probably consists largely of argentite. A band of the latter in No. 2 tunnel, 3 to 4 in. in width, is stated to have averaged 1,500 ounces of silver to the ton. A thousand tons of ore, stated to have averaged 135 ounces in silver to the ton, has already been shipped from this mine, and the owners expect to ship a second thousand during the coming winter.

The Deadman, a parallel lead situated 400 ft. east of the Noble Five group, has a somewhat similar character. The ore-body has here a length of 40 to 50 ft. and a maximum width of 5 ft. It has been opened up by two tunnels, each about 200 ft. in length, and a third tunnel 135 ft. lower down has been started towards it. The ore is very high grade in character. The output of shipping ore up to the present is stated to have amounted to about 300 tons.

East of the Deadman, on the same slope, are the Reco and the Bluebird, accounts of which were given in last year's summary. The Goodenough, a small but exceedingly rich lead, adjoins the Reco on the south. The ore-chute, varying in width from traces up to 6 or 7 in., has been followed for a considerable distance on the neighboring Reco claim. The ore consists mainly of galena and carbonates with some ruby silver and gray copper. A shipment of 10 tons of the undecomposed ore from this mine is stated to have averaged 776 ounces, and another shipment of 5 tons 817 ounces of silver to the ton.

The Last Chance is situated above the Noble Five mine. The surface appearance of this lead was somewhat unpromising, but an incline run down on it to a distance of 80 ft. resulted in the discovery of a chute of ore showing from 1 to 3½ ft. of pure high-grade galena, bordered by several feet of carbonates and concentrating ore. The chute was followed for 40 ft., when work was stopped by water, and a tunnel is now being driven toward it at a lower level.

The claims on the northern slope occur mostly near the heads of the various tributaries of McGuigan's creek. The R. E. Lee is situated above McGuigan's lake, near the crest of the ridge. This lead has a width of about three feet and follows a well-defined fissure which cuts sharply through the hardened quartzose slates and granitic dykes which form the country rock. The vein-filling is principally broken slate with some quartz. A tunnel has been driven along the lead for a distance of

In January 1896, the Hall Mines' smelter was blown in for a short run. The ore, a copper-silver one, proved to be almost self-fluxing, with the result that this smelter, built for a capacity of 100 tons a day, can smelt 120 tons. The fluxes used here are limestone, iron, and Swansea coke. A new device which is reported to work well is the granulating flume which carries away the slag. The ore, worth $42, is smelted into a copper matte worth $240 to $280, a reduction of bulk to one-sixth or one-seventh of the original.

This ore is not roasted, but roasters will be put in to treat outside sulphide ores such as are at Trail creek. Iron for fluxing is obtained from the "Iron Hand" mine, west of Kaslo. The oxide ores of iron are rare in West Kootenay, and pyritous ores requiring roasting are mainly used for flux. Otherwise the great variety of ores, wet, dry and pyritous, together with the varied gangue filling and abundance of limestone, make the district a favorable one for the establishment of smelters.

## The Slocan Silver Mines.*

The principal mines in the Slocan district, are situated on the slopes of the long irregular ridge separating Four-mile creek from the South Fork of Carpenter creek, and on the ridge separating the South Fork of Carpenter creek from Seaton creek, or the Middle Fork of Carpenter Creek. The former ridge is known as Silver Mountain, and around it are grouped the Alpha, the Reed and Robertson groups, the Canadian group, the Mountain Chief, the Alamo, Idaho, Cumberland, Yakima, Wonderful, Ruth, Slocan Star, Ivanhoe and many others.

The Alpha is situated on the Four-mile slope of the mountain, about two miles east, and 2,500 feet above Slocan lake. The steep slope near the mine, is overcome by a gravity tramway 1,600 feet in length, from the foot of which a good wagon road leads to the lake. The Alpha lead has the character of a crushed zone, 20 to 40 feet in width, running through shales and limestones. The strike is N. 24° E., and the dip is south-easterly at an angle, near the surface of 35°. The ore occurs mostly in large pockets, one of which yielded 800 tons, and two others about 200 tons each. It consists principally of rich galena, with some blende, and gray copper. Considerable tunnelling has been done at this mine, and at the time of my visit an incline, following the

*From Mr. R. G. McConnell's Report, Geol. Survey of Canada, 1896.

dip of the lead, was being sunk. Farther to the south-east on the same slope, are the Reed and Robertson claims, situated on a strong lead 20 to 30 feet in width, which is stated to be traceable from Four-mile Creek to the summit of the ridge, a distance of over two miles. Still farther east, on the crest of the ridge, are the Chamblet and Britomarte claims.

Among the more important mines on the northern slope of Silver Mountain, are the Mountain Chief, from which 1,000 tons of ore has already been shipped, and the Alamo, Idaho, and Cumberland, on the head of Hauser creek. The Idaho was idle at the time of my visit, but good forces of men were engaged on both the Alamo and the Cumberland.

The Alamo affords a good type of the leads in this vicinity. It shows a well-defined fissured zone from five to ten feet in width, traversing the slates in an easterly direction and filled with crushed and brecciated slate, calc-spar, spathic iron, quartz and ore. The dip is southerly, at an angle of 75° in the upper levels, but lower down it becomes nearly vertical. The lead is situated on a steep slope, and, like most of the mines in the Slocan district, offers especial facilities for being mined by tunnels, four of which have been driven into it at levels about 100 feet apart, in all of which important bodies of pure and concentrating ore have been exposed. The ore consists principally of galena, with some blende, gray copper, pyrargyrite and pyrite.

A concentrator of 100 tons capacity was erected by the Slocan Mining Company at the mouth of Hauser creek during the past summer to treat the concentrating ores from the Alamo and other mines in the vicinity. A tramway a mile and a quarter in length has also been built up Hauser creek, from the end of which waggon-roads lead to the different mines.

On the north slope of Silver Mountain ridge are the Slocan Star, Ruth, Ivanhoe, Wonderful, and other claims. A description of the Slocan Star was given in last year's summary. The fourth tunnel, which was incomplete at the time of my former visit, reached the ledge at a distance of 500 ft. Drifts—mostly in ore—are now being driven along the lead, and an upraise to connect with No. 3 level, 300 ft. above, is being made. A concentrator of 100 tons capacity, connected with the workings by a tramway 1,900 ft. in length, is also in course of construction in connection with this mine.

Besides these three varieties which are now being mined there exist many curious combinations or associations of silver, which may and usually do occur in company with the main mass of galena. Such are grey copper, a high-grade and much sought after ore, which is very widely distributed over all West Kootenay; zincblende, and other zinc combinations, often rich in silver, and occurring in galena ore bodies; antimonial silver, a dark, fine-grained antimony sulphide, carrying very high values in silver, as found in the "Alamo," "Idaho," and "Slocan Star" mines. Ruby silver, sylvanite, "arsenical silver," are less common, but exist in small quantities in several working mines. Native silver as filaments and stringers is not uncommon nor unimportant in the dry ore belts.

The ore bodies containing the silver ores have in many cases a true fissure origin, giving well-defined slickensided walls to the country rock. There is some tendency in the Slocan district to a north-easterly direction of strike, with a high dip to the south-east. The usual gangue matter is of a limey nature, secondary lime and brecciated matter form the wall rocks, together with less quartz, barite, and spathic iron.

The gangue of the dry ores is usually quartz, both limy matter and galena being rare in granitic belts. Without considering the small output of East Kootenay and Trail Creek, West Kootenay alone is at present shipping over 2,500 tons of silver ore a month, which ore is valued at $250,000, a valuation which considerably underrates it.

Regarding the output of British Columbia silver mines, if the desultory operations conducted in Illecillewaet and the Lardeau are not taken into account, silver mining at the present date may be said to be practically confined to Southern West Kootenay. There is, however, one notable exception in Southern East Kootenay, where the "North Star" mine is now producing some 30 tons a day under the operation of Mr. D. D. Mann, of Montreal. Considering then only the Slocan, Ainsworth and Nelson mining divisions, there was an output during the year 1895 of 10,717 tons valued at $1,059,400, giving to silver more than one-half of the mineral value of the whole West Kootenay output, which was approximated at $1,867,865, from 32,756 tons, showing a rate of value per ton greatly in favor of the silver ores.

This output was the result of thirty-four shipping mines, and to these there have been added some six or seven more since the beginning of the year, chiefly in the Slocan division.

The cost of freight and smelting charges is from $22 to $27, at present, for the common clean galenas, the majority of the ore going to Great Falls, Everett, Tacoma and Omaha smelters; a few shipments only have gone to the local smelters at Pilot Bay and Nelson.

Each of these great United States smelters has a representative in the field buying up the ores they want, and lately Pueblo has also entered the list.

Of all these mines now working there is only one operated and controlled by a Canadian company, in the Slocan division. This is the "Wellington," which belongs to the Kootenay and Columbia Prospecting and Mining Company of Ottawa.

The ore bodies, being usually found in a comparatively soft, calcareous slate, or impure limestone, are easily mined, but wages being at $3.50 a day for miners, such tunnelling as is contracted for is done at $11 to $15 a foot, and is nearly all single-handed work.

Usually short cross-cuts are run in to tap the ledge near its outcrop; thus the mine pays its way from the start, and as time goes on No. 2 and No. 3 tunnels are run in at lower levels, when upraises and overhand stoping are made.

Most of the mines employ during the winter season some 8 to 20 men, but several of the larger companies have 50 or more. The "Slocan Star," the presumed greatest mine in the Slocan, employs about 60 men, taking out about 30 tons of clean hand-picked galena a day, besides the concentrating ore which now goes over the dump. The Alamo Mining Company, operating the "Alamo" mine, tramway and concentrator, has turned out from 40 to 50 tons of ore a day, with as many men This ore concentrates 3 to 1 in most cases and gives a concentrate carrying 140 ounces silver and 55 per cent. lead.

In connection with silver mining, three concentrators with their gravity tramways will run during the summer of 1896 in the Slocan.

Concentrators at Woodbury, Ainsworth, and the Blue Bell mines are now running, or will be very soon. The Pilot Bay smelter runs entirely upon silver ores. It was blown in during March, 1895, and in that year shipped 2,020 tons of lead-silver bullion, valued at $100 a ton. This was not a continuous run, but intermittent, depending upon ore supplies.

100 feet. The first 20 feet proved barren, but beyond that a layer of of ore from three to six inches in thickness resting on the foot-wall, was followed all the way. At the breast of the tunnel ore occurs on both walls. The ore is principally a high grade galena, shipments averaging 133 ounces to the ton in silver and 75 per cent. lead.

North-west of the R. E. Lee is the Washington. This mine has been idle for some time, but will be worked during the present season. The principal openings consist of a tunnel 300 feet in length, from which an upraise of 180 feet leads to a short tunnel above. An ore body was struck 140 feet in from the mouth of the tunnel, and followed for 120 feet, from which 1,500 tons of shipping ore and about 5,000 tons of concentrating ore have already been taken. A third tunnel, 146 feet lower down, has been driven in 300 feet, and will be continued to the ore chute and connected with No. 2 by an upraise, during the present reason. A tramway 1,500 feet in length and a concentrator of 50 tons capacity are also projected in connection with this mine.

East of the Washington is the Surprise basin, occupied by the Surprise and the Antoine claims, neither of which was examined; and still further east are the Best and Dardanelles basins. The ridge between the last two basins is formed by a fine-grained granitic boss about half a mile in diameter, on which are situated the Best, Rambler, Antelope, and Caribou claims. The granite is traversed by numerous small faults and seamed with irregular quartz veins of all sizes, which often carry considerable quantities of tetrahedrite rich in silver. A specimen from the Antelope, assayed in the laboratory of the Survey, ran over 3,000 ounces of silver to the ton. Besides the tetrahedrite, some galena, iron and copper pyrites and blende are also usually present. A number of the ledges in this group have been opened up by short tunnels and shafts, but no extensive development work has yet been undertaken.

The North Fork of Carpenter creek runs through what is known as the 'dry-ore' belt. The leads in this district are usually siliceous in character and carry bodies of highly argentiferous tetrahedrite, galena and other silver ores. Most of the claims are situated north of the area examined during the past year. At the Miner Boy, a fairly regular quartz vein, from a few inches to a couple of feet in width, has been followed over 100 feet by a tunnel, and has also been traced west from the face of the tunnel for an equal distance. Some shipments of rich ore

Prospectors en route for Toad Mountain, B C.

have been made from this mine, but I was unable to obtain statistics of these, as the mine was idle at the time of my visit.

At the London group, north of the Miner Boy, the slates and associated quartzites are cut by several ore-bearing quartz seams, ranging in size from stringers up to a foot or more in thickness. The seams have been opened up by a couple of short tunnels, and a long tunnel is now being driven in to intersect them in depth

East of the main Slocan mining camp, numerous claims have been located, both north and south of Kaslo creek, all the way to Kootanie lake, but only a few of these were examined. South-west from Bear lake is the Lucky Jim, situated on what appears to be a faulted line of contact between the slates and a brecciated band of limestone. The ore occurs in large pockets and side fissures penetrating the limestone. About fifty tons have been shipped.

North of Kaslo creek and east of Murray creek, is the Wellington. This lead resembles somewhat that of the Alpha, and may be described as a wide crushed zone, traversing the slates in an east and west direction and dipping to the north. The crushed slates hold stringers and pockets of quartz, spathic iron and calc-spar. A shaft was sunk near the lead to a depth of seventy-seven feet, but was abandoned on account of the water, and the mine is now worked by tunnels. The upper tunnel cross-cuts the slates for 170 feet, and a drift then follows the lead for 100 feet. The drift has exposed an ore chute sixty to seventy feet in length, stated to average two feet in width at the bottom of the tunnel. It was covered at the time of my visit. A second cross-cut tunnel from the surface to the lead, 700 feet in length and 160 feet below No. 1, has just been completed. The Wellington ore consists of a fine-grained galena, with blende and gray copper. One hundred and fifty tons, stated to average 250 ounces in silver to the ton, have been shipped.

Farther east, near the head of Lyell creek, is the Eureka, situated on a well defined fissure cutting the green schists of the Kaslo series. The workings consist of a cross-cut tunnel 150 feet or so in length, from the end of which a drift follows the lead for 300 feet. An ore-chute twenty feet in length, from which some shipments have been made, was passed through, eighty feet from the end of the the tunnel.

On the South Fork of Kaslo creek are the Montezuma, Daisy and Ben Hur, the first on a tributary and the two latter near the main seam.

The Montezuma lead strikes N. 30° E. At the main showing, the lead divides, one branch continuing on in nearly the same direction, while the other bends more to the south. The southern branch has a width of ten feet. The south-western one is somewhat smaller and soon narrows in. A tunnel, following ore all the way, has been driven in for a distance of about 100 feet. The ore consists principally of argentiferous galena and blende, with their decomposition-products. On the Daisy two leads are exposed, about 100 feet apart. They strike N. 60° E. with a dip of 80° to the S.E., and are each from seven to eight feet in width. On the upper lead a shaft, following a short ore-chute adjoining the hanging wall, has been sunk to a depth of twenty-five feet. The ore consists of argentiferous galena, blende, iron- and copper-pyrites, and some native copper. Gold assays up to $4.40 a ton have also been obtained.

The Ben Hur, situated north-east from the Daisy, shows two leads each eight to ten feet in width, which are supposed to be a continuation of those on the latter claim.

In the Ainsworth district, the principal mines being worked are the Highland, No. 1 and Skyline. A short description of the Highland mine, which is situated on a well defined fissure cutting the schists of the Shushap series, was given in last year's summary. The lower tunnel mentioned there, has since been driven in to a distance of 480 feet. Ore was met with 330 feet from the face of the tunnel, and has been followed continuously for 150 feet. An upraise to the surface, along the lead, was also nearly completed at the time of my visit. A large quantity of shipping and concentrating ore is now in sight in the mine.

The Skyline and No. 1 occur in limestone bands, associated with the Slocan slates, and are situated, the former about 200 yards and the latter about half a mile east of the granite area. The deposits worked in these mines are of a somewhat puzzling character, and would require extended study before conclusions of value could be arrived at concerning them. They appear to occupy fractured zones of considerable but unknown width, traversing the limestones and slates in a nearly north and south direction, and dipping to the west. The zones have been silicified and impregnated with ore in a selective manner, by ascending solutions.

The ore occurs in flattened ore bodies, occasionally ten to twelve feet in thickness, which, in the case of the Skyline, according to Mr.

Scott MacDonald, the manager, often cross nearly horizontally from the foot to the hanging wall. The workings on the Skyline include an incline eighty-seven feet deep sunk on the lead, and a shaft farther to the west, 200 feet deep, from the bottom of which a drift 120 feet in length and an upraise of forty feet lead to the incline, and the chambers of ore at present being worked. The Skyline ore consists of a porous siliceous rock, carrying a dark mineral, probably mostly argentite, native silver and galena, along with some gray copper and iron and copper pyrites. It averages from forty-five to fifty ounces in silver per ton. The present output of from ten to fifteen tons per day, is shipped directly to the Pilot Bay smelter, its siliceous character rendering it valuable as a flux for the more basic ores of the district.

The workings on No. 1 are somewhat irregular, owing to the different managements under which they have been carried out. The ore consists of a siliceous matrix, holding argentiferous iron pyrites, native silver, galena and several other minerals which have not yet been identified. The pyrite, when separated from the gangue is stated to assay 700 to 800 ounces in silver per ton, and the galena 200 to 300 ounces. A concentrator of seventy-five tons capacity has been built at this mine, and the output, amounting to about fifteen tons daily, is mostly concentrated before shipment.

Besides the mines mentioned above, some work is also being done in the district on the Highlander, the Lady of the Lake, the claims of the Canadian Pacific Mining and Milling Company at the mouth of Woodbury creek and at other places.

At Hendryx, the Bluebell is in active operation. This mine is situated on a band of crystalline limestone interbedded with the Shuswap schists, which has been fractured in various directions. The ore, consisting mostly of low grade galena and pyrrhotite with some blende, iron and copper pyrites, and their decomposition products, occurs either pure or disseminated through a calcareous and occasionally a siliceous matrix. It occupies irregular chambers in the limestone, some of which are of huge dimensions. The ore-body being worked at present, including some large horses of limestone, measures approximately 70 feet in width by 200 feet in length and 150 feet in height. Forty thousand tons of pure and concentrated ores have been shipped from this mine during the year, and prodigious quantities remain in sight.

## Exports of Silver.

The following table gives the exports of silver ore during the years 1873 to 1895, exclusive of the production of the Capelton mines:—

| Year ended 30th June. | Quantity. | Value. | Year ended 30th June. | Quantity. | Value |
|---|---|---|---|---|---|
| | Tons. | $ | | Tons. | $ |
| 1871 | ..... | 595,261 | 1884 | 37 | 12,920 |
| 1872 | ..... | 1,087,839 | 1885 | 31 | 7,539 |
| 1873 | ..... | 1,379,380 | 1886 | 81 | 25,134 |
| 1874 | 346 | 407,835 | 1887 | 40 | 24,937 |
| 1875 | ..... | 443,443 | 1888 | 543⅛ | 299,420 |
| 1876 | 691 | 584,371 | 1889 | 216½ | 168,265 |
| 1877 | 190 | 122,695 | 1890 | 238 | 201,615 |
| 1878 | ..... | 103,681 | 1891 | 309 | 238,367 |
| 1879 | ..... | 637,000 | 1892 | 325 | 193,441 |
| 1880 | ..... | 149,146 | 1893 | 418 | 65,496 |
| 1881 | ..... | 34,494 | 1894 | 629,655oz | 423,707 |
| 1882 | ..... | 15,110 | 1895 | 1,116,217 " | 651,737 |
| 1883 | 100 | 14,200 | | | |

## Exports of Lead.

The following are the exports of lead ores from 1890 to 1895 (year ended 30th June):—

| Year. | From | To | Quantity. | Value. |
|---|---|---|---|---|
| 1890 | Nova Scotia | United States | .... | $2,000 |
| 1891 | ..... | ..... | .... | .... |
| 1892 | Ontario | United States | 30 tons | 5,000 |
| | Nova Scotia | Great Britain | 1 " | 200 |
| 1893 | Ontario | United States | ..... | 309 |
| | Quebec | | ..... | 20 |
| | British Columbia | | ..... | 2,000 |
| 1894 | British Columbia | United States | 3,312,619 oz. | 65,337 |
| 1895 | British Columbia | United States | 18,058,806 | 333,763 |

## Imports of Lead.

The following are the imports of lead and manufactures thereof during the years 1893, 1894 and 1895:—

| | Quantity. | Value | Duty. |
|---|---|---|---|
| Imports of lead 1893— | | | |
| Scrap and pig | 94,558cwt. | $215,395 | ..... |
| Bars, blocks and sheets | 12,394 " | 32,254 | ..... |
| Pipe | 223,374lbs. | 6,798 | ..... |
| Shot | 42,344 " | 1,796 | ..... |
| Nitrate and acetate not ground | 170,346 " | 7,046 | ..... |
| Other manufactures | ..... | 25,839 | ..... |
| Imports of lead 1894— | | | |
| Scrap and pig | 69,492cwt. | 147,316 | 40c. p. 100lbs. |
| Bars, blocks and sheets | 8,503 " | 20,480 | 60c. p. 100lbs. |
| Pipe | 9,618lbs. | 422 | 1½c. p. lb. |
| Shot | 21,367 " | 731 | 1½c. p. lb. |
| Nitrate and acetate, not ground, to 28th March | 121,829 " | 5,251 | 5% |
| Other manufactures | 27,599 " | 27,511 | 30% |
| Imports of lead 1895— | | | |
| Scrap and pig | 67,261cwt. | 139,290 | 40c. p. 100lbs. |
| Bars, blocks and sheets | 6,739 " | 16,315 | 60c. p. 100lbs. |
| Pipe | 35,187lbs. | 1,284 | 1⅘c. per lb. & 25% |
| Shot | 64,124 " | 1,832 | do |
| Manufactures | ..... | 33,235 | 30% |

## Bounty on Silver Lead Smelting.

In 1895 the Dominion Government enacted as follows:—

1. To encourage silver-lead smelting in Canada, the Governor in Council may, subject to the following provisions, authorize the payment of a bounty not exceeding fifty cents per ton, and not exceeding in all one hundred and fifty thousand dollars, on Canadian silver-lead ore smelted in Canada between the first day of July, one thousand eight hundred and ninety-five, and the first day of July, one thousand nine hundred.

2. The said bounty shall not for any one year exceed the sum of thirty thousand dollars: Provided, that the said sum if unexpended, or any balance thereof unexpended, may be carried forward from year to year and may be paid for any year in addition to the sum of thirty thousand dollars authorized as above for such year.

3. If in any year the quantity of ore smelted is greater than will allow of the payment, out of the sum available for that year, of fifty cents

per ton, then the bounty per ton for that year shall be reduced proportionately.

4. The said bounty shall not be paid on any ores smelted in smelting works which are not established and in operation before the first day of January, one thousand eight hundred and ninety-seven.

5. The payment of the said bounty shall be under the direction of the Minister of Trade and Commerce, subject to such regulations as are made by the Governor in Council.

6. The Governor in Council may make regulations in relation to the said bounty in order to prevent fraud and to insure the good effect of this Act.

7. The said regulations shall be laid before Parliament within the the first fifteen days of each session, with a statement of the money expended in payment of the said bounty, and of the person to whom they were paid, and the places where the ore with respect to which they were paid was smelted, and such other particulars as tend to show the effect of the said bounty.

## ALAMO MINING CO., Ltd.

Registered 1894. Authorized Capital, $500,000. Dividend of $35,000 paid October 1st, 1895.

**Directors:**

A. E. Humphrey. | N. D. Moore. | John Vallance. | W. C. Yawkey. W. H. Yawkey.

**Mines Office: Three Forks, B.C.**

Owns and operates the "Alamo" silver-lead claims at Twin Lakes basin, in the Slocan district, Province of British Columbia. 35 persons employed. In 1895 shipped 1,900 tons of a value of $200,000. Expended on tramway and construction of roads $20,000. Mine opened by 4 tunnels.

## ANTOINE SILVER MINE.

**Owners:**

W. S. Green. | C. H. Green. | J. C. Ryan. | Alex. Smith. | James C. Ryan.

**Mines Office: J. C. Ryan, Superintendent, Kaslo, B.C.**

This mine is situated at Ruby Silver basin, in the Slocan district, British Columbia. Opened by shaft, 60 ft.; two tunnels, 160 ft., and two 40 ft., at date of last report. In 1894 shipped 95 tons to smelter. No returns reported for 1895. Small force employed.

## BADGER SILVER MINING CO., OF GILLIES, ONT.

Reconstructed 1891. Authorized Capital, $250,000, in 50,000 shares of a value of $5.00 each. Two dividends have been paid, amounting in all to $37,500, the first on 5th January, 1890, of 50 cents per share, or $25,000; the other on 5th March, 1890, of 25 cents per share, or $12,500.

**Directors:**

John M. Stowell, *President.*

C. A. Read. | Walter Read.

C. Preusseur.

**Head Office: Walter Read, Secretary, N. E. Corner E. Water and Mason Streets, Milwaukee, Wis.**

Formed to carry on the business of exploring, mining, smelting, manufacturing and refining ores of silver, and other ores or metals in the district of Thunder Bay, Province of Ontario. The property owned and operated at date is known (1) as the Badger mine location, 200 and 201 T, containing 200 acres; and (2) the Porcupine

**BADGER SILVER MINING CO.**—Continued.

location, 96 T, containing 160 acres, all in the Township of Gillies, in the district of Thunder Bay. The mines are situate 28 miles S. E. from the town of Port Arthur, and 2½ miles from Silver Creek Station, on the line of the Port Arthur, Duluth and Western Railway. Official returns gave the shipments of ore and bullion up to 4th August, 1890, of a value of $250,000. Returns of the production of ore in 1891 gave a yield of 3,500 net tons; concentrates and ore shipped, 125 net tons. Plant: one stamp mill, 28 x 92, three stories, with boiler and engine house, 30 x 32; two steel tubular boilers, 4 x 16; "Conway" automatic cut-off engine, 14 x 20; Blake crusher; Strauss "Atmospheric" stamp, of a capacity of 20 tons per diem; four Frue vanners. Average daily capacity of mill, 30 tons. Plant at No. 1: boiler and engine house, 24 x 36 ft.; one 4 x 16 ft. tubular boiler; one 12 x 24 reversible engine, geared to 3½ ft. drum. At No. 2: one double cylinder, 8 h. p. friction drum hoist, supplied with steam from No. 1 plant, 350 ft. distant.

## BEAVER MINING AND MILLING CO.

Organized November, 1887.

**Principal Owners:**

General Russell A. Alger, Detroit, Mich. | Col. Frank J. Hecker, Detroit, Mich.

**Head Office:**

Col. Frank J. Hecker, Detroit, Mich.

**CANADIAN OFFICE: Beaver Mine P. O., Ont.**

This company is the owner of lots 97 T, 141 T, 95 T, 142 T, 155 T, 146 T, 57 T, 149 T, in the Township of O'Connor, and other mining locations in the District of Algoma, Province of Ontario. Engine plant and machinery equipment includes: Burleigh 7 drill air compressor; 7 Rand drills; Lane hoist (drum 51 dia.); 3 winze hoists; sawmill; 10-stamp mill (Fraser & Chalmers), driven by 200 h. p. engine; 1 Blake crusher, 9 x 14; 1 Dodge, 6 x 10, etc., etc. The workings to date comprise: No. 11 shaft (the deepest) 530 ft.; total sinkings of main shafts, winzes and air shafts, 1,700 ft.; drifting on vein, 6,500 ft.; crosscuts, 1,870 ft. Work suspended temporarily while in good ore on 1st November, 1891, and owing to low price of silver has not been resumed. Mines are distant 1¾ miles from Silver Creek station, on the line of the Port Arthur, Duluth and Western Railway; 11½ miles from Murillo station, on the Canadian Pacific; and 29 miles south-west from the town of Port Arthur.

## BEAR LAKE CONSOLIDATED MINING CO., Ltd.

Registered 1894. Authorized Capital, $500,000, in shares of $5.

**Directors:**

George Riley. | Gustav Leiser. | Gordon Hunter.

**Head Office: Victoria, B.C.**

Formed to acquire and work the Snowshoe mineral claim in the Slocan mining district, West Kootenay, B.C.

## BLUE BIRD MINING CO.

**Mines Office: — Taylor, Manager, Kaslo, B.C.**

Owns and operates the Blue Bird silver lead claim on the South Fork of Carpenter Creek, Slocan district, Province of British Columbia, on which a small working force was employed in 1894.

The claim has been worked in an intermittent manner for the past three years, and 340 tons of ore, stated to average 132 oz. silver, and 72 per cent. lead, have been taken out. The ore is galena, partially altered by atmospheric agencies into oxides and carbonates. It occurs in a series of disconnected and often overlapping ore bodies, ranging from a few inches up to a foot or more in thickness. Ore bodies of considerable size also occur interbedded with the slates adjoining the fissure. The 'horses' and country rock of this mine, in common with that of most of the mines in the district, are impregnated to some extent with mineral, assays showing 5 oz. silver per ton and 6 per cent. lead.

## BYRON N. WHITE CO., Ltd.

Incorporated 1893. Authorized Capital, $500,000.

**Officers:**

Angus Smith, Milwaukee, Wis., *President.*
Byron N. White, Sandon, B.C., *Vice-President.*
J. Hoyt Smith, Milwaukee, Wis., *Sec.-Treas.*

**Mines Office: Byron N. White, Vice-President, Sandon, B.C.**

Formed to acquire and work the Slocan Star and other mineral claims in the Province of British Columbia. The Slocan Star is situated on Sandon creek, in the Slocan district, B.C. It was discovered in August, 1891, and has been worked continuously for the last three years. 900 tons of ore had been taken out at last report, which was expected to average 100 ounces in silver and $2 to $3 in gold per ton, besides the lead, which was estimated at 76 per cent. The workings consist of four tunnels. The upper two are short, but the third or main tunnel has been driven in as a cross-cut for 140 feet, and then follows the vein for over 500 feet. Ore occurs all along, but the main ore body was struck at a distance of 130 feet from the end of the cross-cut, and is of extraordinary proportions for such high grade ore. It has a length of 150 feet and a width ranging from a few inches up to six feet or more, of ore entirely pure, with the exception of occasional thin partings of quartz and siderite. The solid galena is besides bordered on both sides by a considerable thickness of concentrating ore. Beyond the main ore body, smaller ones are met with, and at the present end of the tunnel, the vein is four feet wide. The galena occurs both in a fine-grained and a coarse, cubical condition, and in places has a foliated appearance, probably due to pressure. A fourth tunnel has been driven in about 300 feet, about 300 feet below No. 3, but at date of report had not reached the ledge. A concentrator of 100 tons capacity, connected with the workings by a tramway 1900 feet in length, was added to the plant in 1895. On 1st August, 1895, a dividend of $50,000 was paid.

## CARBONATE MOUNTAIN MINING AND MILLING CO., Ltd.

Incorporated 29th August, 1891. Authorized Capital, $100,000.

**Directors:**

E. E. Rand. | H. Abbott. | E. Whetham. | J. McQueen.

**Head Office: E. E. Rand, Managing Director, Vancouver, B.C.**

Owns the "Southern Cross," "Diamond E." and "Number One" claims in the Kootenay district, Province of British Columbia. The ores carry silver, galena and copper. Was not worked in 1895.

## CARIBOO CREEK MINING CO. Ltd.

Incorporated 19th June, 1889. Capital Stock, $50,000.

**Directors:**

David Woolsey | A. J. Smith | Thos. Forrest.

**Head Office: David Woolsey, Illecillewaet, B.C.**

This company owns and operates the "Maple," "Quebec" and "Corona" claims in the Illecillewaet sub-division of the West Kootenay mining district, Province of British Columbia. To be worked in 1896.

## CARIBOO AND KOOTENAY PROSPECTING AND MINING CO.

Incorporated March, 1894. Authorized Capital, $100,000, in 50,000 shares of $2.

**Directors:**

W. H. Kendall | Benj. J. Cornish | E. E. Penzer | F. M. Robertson
John Williams.

**Head Office: Vancouver, B.C.**

Formed to purchase from the Vancouver Lardeau Mineral Syndicate all their rights, title and interest in certain claims or mining locations in the Lardeau District, West Kootenay, Province of British Columbia. Owns 10 silver claims in the Trout Lake district (Lardeau), work on which will be begun in 1895; also a placer claim on Lardeau creek. Small force employed.

## CUMBERLAND MINING CO. Ltd.

Incorporated 1895. Authorized Capital, $500,000, in shares of $10.

**Directors:**

N. D. Moore | W. H. Yawkey | W. C. Yawkey.

**Head Office: Three Forks, B.C.**

Owns and operates the 'Cumberland' silver claims at Twin Lakes Basin, in the Slocan district, British Columbia.

## DARDANELLES MINES.

**Mines Office: A. L. McClaine, Kaslo, B.C.**

This group of silver-lead claims comprises the "Dardanelles," "Antelope," "Cariboo" and "Diamond Cross," at the Dardanelles Basin, Slocan District, Province of British Columbia. Will be worked in 1896.

## EUREKA CONCENTRATING AND MINING CO.

Incorporated 1895. Authorized Capital, $500,000.

**Directors:**

John M. Burke, S. Rosenhaup, | J. B. Jones, H. L. Wilson, G. W. Dickenson. | Ross Thompson, O. D. Garrison,

**Head Office: Spokane, Wash.**

**Mines Office: Kaslo, B.C.**

Formed to carry on mining operations in the Province of British Columbia. No report.

## EUREKA SILVER MINE.

**Owners:**

C. H. Green. | W. S. Green. | J. C. Ryan.

**Head Office: J. C. Ryan, Superintendent, Kaslo, B.C.**

The mine is located at Lyle Creek, in the Slocan district, Province of British Columbia. Small force employed. Shipments, at date of report, in 1895, 100 tons.

## GREAT WESTERN MINING CO.

Incorporated 30th March, 1895. Authorized Capital, $1,000,000.

**Directors :**

John M. Burke, Cœur d'Alene, Idaho.

Chas. Warren, Butte, Montana. | D. M. Drumheller, Spokane, Wash.
Chas. Barr, Rochester, Ill. | Jarvis B. Jones, " "
H. M. Stephens, Spokane. | L. E. Bertonneau, " "

**Head Office: Spokane, Wash.**

Formed to take over and develop the "Great Western" and "Golden Chariot" mineral claims in the Slocan district, Province of British Columbia. Being developed.

## HALL MINES, Ltd.

Registered in London, 5th June, 1893. Authorized Capital, £300,000, in shares of £1, £50,000 in preference and the balance in ordinary. The preference shares rank first for 7 per cent. cumulative dividends, have a priority as to capital, and may be redeemed by the Company at 25 per cent. premium after the expiration of five years from issue. Of the preference capital £25,000 has been subscribed, and £12,500, or 10s. per share, called up; and of the ordinary £250,000 has been subscribed, and £212,500 called up, 175,000 shares (issued to the vendor) being fully paid, and £75,000 having 10s. called. In addition to the ordinary shares as above, the vendors received £40,000 in cash. Director's qualification, £500 of ordinary shares.

**Directors :**

Sir J. W. Crutch, K.C.M.G., *Chairman.*

J. R. Brown. | J. R. Drake. | R. Day. | D. H. Gibb.

Walter Neillson.

**Head Office: F. Ramsay, Secretary, Leadenhall Bdgs., Leadenhall Street, London, E.C.**

**Mines Office: Nelson, B.C.**

Formed to acquire copper and silver mining properties situated in the West Kootenay district, British Columbia.

The property includes the following mining claims, viz.: The Silver King, Kootenai Bonanza, American Flag, and Kohinoor, containing in all about 56 acres, but there is at present excluded a 1-26th interest, the owner of which, however, is under the mining laws of the Province prevented from interference with the majority of the owners from working the property. All of these claims, with the exception of the Kohinoor, are held free of royalty under Crown grant, and this may also be obtained for the last named claim on application. The mines were previously worked under a mining partnership known as the "Kootenai Bonanza Mining Company," merely for the purpose of opening the mines sufficiently to prove the mineral value of the property.

Hall Mines Ltd.—New Hallidie Tramway at Nelson, B.C.

DIRECTORS' REPORT, 30TH SEPTEMBER, 1895.

During the past year development work has proceeded very satisfactorily. In the second or main ore body in No. 4 tunnel, winze F has been sunk to the depth of 135 ft., and is in ore at this depth, and the ledge is being crosscut preparatory to drifting east and west upon it. In the first ore body a shaft G has been sunk to the depth of 65 ft., also in ore, which is likewise being crosscut. A tunnel (No. 5) has been driven from a point 210 ft. below the entrance to No. 4 tunnel and on a line with it, on the main vein of ore, which shows on the surface. This tunnel is now in about 85 ft. on the main ledge, and shows more or less of ore on the whole of its length, and beyond this point good ore has been proved by the diamond drill, leading to the supposition that the ore body is continuous, and extends to the main ore body under No. 4 tunnel; besides this the level between winzes B and F has been completed, and other works.

The prospecting work has also been vigorously pushed forward by diamond drilling, and from the surface on the south of No. 4 tunnel on the Silver King, the existence of two separate ore bodies has been proved. The first ore body was struck at 280 ft. from the surface, and continued to 340 ft., with stratas of barren ground appearing here and there, and the character of the ore shows yellow and grey copper with traces of peacock. The second vein was struck at 416 ft. from surface, and continued to a depth of 449 ft. The ore shows heavy yellow and grey copper and traces of peacock. Another hole was bored to endeavor to prove the depth of the vein, and at a depth of 820 ft. ore was tapped showing grey copper, but at this depth the work had to be suspended till next summer, as this was the extreme length of the boring rods. On the Kootenai Bonanza also the diamond drill boring showed ore at 24 ft. from surface, and continued to 56 ft.; from 82 ft. to 112 ft. another body of mineralized ground was passed through, 20 ft. of which showed a good deal of grey and yellow copper; from 144 to 159 ft., vein showed mineral grey copper chiefly, which may be considered satisfactory.

As intimated to the shareholders by circular in the month of May last, the directors came to the determination to erect a tramway from the company's mine, and to connect this with smelting works at a favorable point close to Nelson, on land belonging to the C. P. R. Co., and in immediate connection with this company's line of railway, *via* Robson, steps were at once taken to secure the land necessary, and the chairman, who was at Victoria, entered into negotiation with the C.P.R. officials, and secured a lease of land for a period of 99 years, together with a block of about two acres on fee simple, on which to erect the smelting works. The chairman also entered into negotiations with the Victorian Government, and in consideration of the works to be erected, obtained from them, as a bonus a free grant of 50 allotments of land in the town of Nelson, and should the town of Nelson develop to be a large mining centre, these allotments may prove later on to be of great value to the company. The chairman further applied to have the company placed on the list of beneficiaries for the grant in aid of the smelting industries, and his application has been favorably received. This will give the company a bonus of about 50 cents per ton on every ton of ore smelted by the company up to the year 1900.

The tramway has now been completed, and, although some hitches occurred at the start, is now in operation and bringing down ore to the bins at the rate of 10 tons per hour.

The smelting works also are approaching completion.

As regards the gold lead discovered on the Daylight claim and mentioned by the chairman at last general meeting, the works have been suspended on account of a large influx of water which would necessitate pumping machinery, the expense of which the directors are not prepared for at present. They, however, think so favorably of this lead, that they have acquired several of the adjoining claims, through which it has been traced.

The reports from both the manager at the mine and the manager at the smelting works have not yet been received, owing to the time of these gentlemen being so much occupied pressing forward the various works under their charge in order to take advantage of the fine weather so long as it lasted, but these reports are expected shortly, and copies will be at once forwarded to the shareholders."

**HALL MINES**—Continued.

INCOME AND EXPENDITURE ACCOUNT TO 30TH SEPTEMBER, 1895.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| To Expenditure at Mine : | | | | | | |
| Mining | 7,481 | 13 | 0 | | | |
| Salaries and management expenses | 1,692 | 2 | 7 | | | |
| Transports | 784 | 12 | 6 | | | |
| Office and general expenses | 487 | 13 | 5 | | | |
| Tools, stores and fuel purchases | 2,147 | 12 | 3 | | | |
| Assay charges | 56 | 6 | 4 | | | |
| Forest fires | 594 | 14 | 1 | | | |
| | | | | 13,244 | 14 | 2 |
| To Expenditure in London : | | | | | | |
| General expenses, including salaries, law charges, cablegrams, travelling expenses, auditors' fees and office expenses | 893 | 19 | 6 | | | |
| Directors' fees | 918 | 7 | 7 | | | |
| Interest | 155 | 16 | 5 | | | |
| Difference in exchange | 11 | 13 | 2 | | | |
| | | | | 1,979 | 16 | 8 |
| | | | | £ 15,224 | 10 | 10 |
| | | | | £ | s. | d. |
| By ore sales | | | | 7,955 | 16 | 11 |
| By transfer fees | | | | 4 | 2 | 6 |
| By balance, being excess of expenditure over income for year, against which there is a further stock of ore in dump at the mines awaiting treatment | | | | 7,264 | 11 | 5 |
| | | | | £ 15,224 | 10 | 10 |

CAPITAL AND LIABILITIES.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| To Share Capital— | | | | | | |
| Authorized—50,000 cumulative preference shares of £1 each | 50,000 | 0 | 0 | | | |
| 250,000 ordinary shares of £1 each. | 250,000 | 0 | 0 | | | |
| | 300,000 | 0 | 0 | | | |
| Issued—25,000 cumulative preference shares, on which 17s. 6d. per share has been paid | 21,875 | 0 | 0 | | | |
| 168,270 ordinary shares, fully paid | 168,270 | 0 | 0 | | | |
| 75,000 do on which 17s. 6d. has been paid | 65,625 | 0 | 0 | | | |
| | 255,770 | 0 | 0 | | | |
| *Less* Calls in arrear | 809 | 5 | 0 | | | |
| | | | | 254,960 | 15 | 0 |
| *Carried forward* | | | | 254,960 | 15 | 0 |

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| *Brought forward* | | | | 254,960 | 15 | 0 |
| To Suspense Account— | | | | | | |
| For value of the one twenty-sixth share of purchase money of mine, to be paid for as follows: | | | | | | |
| Cash | 1,538 | 0 | 0 | | | |
| 6,730 ordinary shares, to be allotted as fully paid | 6,730 | 0 | 0 | | | |
| | | | | 8,268 | 0 | 0 |
| *Note.*—This is subject to the adjustment of the proportion of Income and Expenditure in respect of this one twenty-sixth share. | | | | | | |
| To Calls paid in advance | | | | 256 | 5 | 0 |
| To Loan Account | | | | 3,500 | 0 | 0 |
| To Sundry creditors | | | | 1,831 | 15 | 10 |
| To Contingent Liability— | | | | | | |
| Dividend at 7 per cent. per annum on amounts on 25,000 cumulative preference shares | 2,007 | 8 | 10 | | | |
| | | | | £268,816 | 15 | 10 |

PROPERTY AND ASSETS.

| By Mines Cost Account— | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| As at 30th September, 1894 | 207,376 | 17 | 1 | | | |
| *Add* new claims taken up | 592 | 1 | 4 | | | |
| Prospecting, cost of, during year | 2,962 | 11 | 11 | | | |
| | | | | 210,931 | 10 | 4 |
| By Buildings, plant and machinery— | | | | | | |
| As at 30th September, 1894 | 4,209 | 18 | 5 | | | |
| Additions during year | 993 | 5 | 3 | | | |
| | | | | 5,203 | 3 | 8 |
| By Tramway from mine— | | | | | | |
| As at 30th September, 1894 | 358 | 10 | 2 | | | |
| Expenditure during year | 10,485 | 2 | 7 | | | |
| | | | | 10,843 | 12 | 9 |
| By Smelter Account— | | | | | | |
| Expenditure thereon to date | | | | 2,636 | 4 | 6 |
| By Lands purchased— | | | | | | |
| Farwell's land | | | | 411 | 10 | 5 |
| By Stores and tools on hand— | | | | | | |
| Per inventories | | | | 1,432 | 18 | 0 |
| By Ore in stock— | | | | | | |
| Value of ore in dump when property taken over still unrealized | | | | 7,345 | 16 | 0 |
| By Cash in banks and on hand | | | | 9,205 | 8 | 2 |
| By Suspense bank account— | | | | | | |
| Amount consigned with Messrs. Glyn, Mills & Co., to meet each payment of one twenty-sixth share of purchase price | | | | 1,538 | 0 | 0 |
| By Sundry debtors | | | | 519 | 12 | 7 |
| By Office furniture in London | | | | 82 | 7 | 3 |
| By Income and Expenditure Account— | | | | | | |
| Balance thereof as at 30th September, 1894 | 11,402 | 0 | 9 | | | |
| Added during year | 7,264 | 11 | 5 | | | |
| Against which there is a stock of ore in dump at the mines awaiting treatment. | | | | 18,666 | 12 | 2 |
| | | | | £268,816 | 15 | 10 |

The following is excerpted from circulars issued to the shareholders in 1896 :—

*(1) Dated 17th January, 1896.*

Received on 15th instant :

"The furnace has been blown in today—doing very well."

Received this morning :

"In the 24 hours smelting, 113 tons ore has realized 11 tons matte. Assays average :

| | |
|---|---|
| Copper | 47 per cent. |
| Silver | 300 ozs. |
| Gold | 10 dwt. |

per ton of 2,000 pounds."

*(2) Dated 26th January, 1896.*

For the week ending Saturday, 25th January, at noon—

720 tons of ore were smelted, producing 58 tons of matte, assaying :

| | |
|---|---|
| Copper | 50 per cent. |
| Silver | 287 ozs. |
| Gold | Showing traces |

per ton of 2,000 pounds.

## KOOTENAY AND COLUMBIA PROSPECTING AND MINING CO., Ltd.

Incorporated 1892. Authorized Capital, $40,000, in shares of $100.

**Directors :**

G. P. Brophy, C.E., Ottawa, Ont.
W. A. Allan, Ottawa. | Hector McRae, Ottawa.
S. H. Fleming. " | J. W. McRae. "

**Head Office : Hector McRae, 58 Queen Street, Ottawa, Ont.**

Formed to carry on a general mining business ; to buy and sell and otherwise deal in mines, mining lands and minerals ; to prospect and explore for, quarry, develop, work, extract and mine throughout the provinces of the Dominion of Canada, ores and minerals of every kind, etc. Owns fourteen mineral claims in the West Kootenay district, Province of British Columbia, as follows : (1) *Toad Mountain group :* Comprising the "Buckingham," "Silver Tip" and "Valley of Achor" claims, situate nine miles from the town of Nelson. (2) *Kaslo group :* Comprising the "Wellington," "Ottawa" and "Bolderwood," situate twelve miles from the settlement of New Denver ; and (3) the *Johnson Creek group :* Situate about fifteen miles west of the village of Kaslo, and comprising the "Stanley," "Nip and Tuck," "Morning Glory," "Hidden Treasure" and "Evening Star" claims. The mineral is mainly argentiferous galena. During 1895, 300 tons of ore were shipped to smelter of a value of $21,000. 19 persons employed.

## KOOTENAY GOLD, SILVER AND COPPER MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $100,000, in shares of $25 each.

**Directors:**

F. Cope, *President.*
C. J. Mitchell. | R. Warmington. | W. Ralph. | R. E. McKechnie.

**Head Office: George D. Scott, Secretary, Vancouver, B.C.**

Owns and operates mineral property on Sable creek in the Lardeau district, British Columbia, on which, in 1895, a certain amount of development work was done.

## KOOTENAY MINING AND DEVELOPMENT CO., Ltd.

Incorporated July, 1893, under the laws of British Columbia. Authorized Capital, $1,000,000.

**Directors:**

Willis Baker, *President.*
S. H. Wood. | J. B. Geiser. | R. N. Noble. | J. B. McArthur.
T. J. Lendrum.

**Canadian Office: J. B. Geiser, Secretary, Ainsworth, B.C.**

The company owns three claims, covering about 51 acres each, on Woodbury creek and Kootenay lake, West Kootenay district, Province of British Columbia. Samples of the ore run as high as 120 oz. silver and from 60 to 80 per cent. lead per ton. Was being opened up at date of last report.

## KOOTENAY MINING AND SMELTING CO. Ltd.

Registered 23rd August, 1892. Authorized Capital, $30,000, in shares of $25 each.

**Directors:**

Edwin W. Herrick, *President.*
R. P. Rithet, *Vice-Pres.* | Andrew B. Hendryx, *Treas and Man.*
Edward N. Peck, *Secretary.*

**CANADIAN OFFICE: A. B. Hendryx, Pilot Bay, B.C.**

**Eastern Office: Newhaven, Conn.**

**Recording Office: 243 Washington St., Jersey City, N.J.**

Formed to transact the business of mining, milling, and smelting gold, silver, copper, lead ores, and other ores and minerals in all its branches, at Kootenay lake,

**KOOTENAY MINING AND SMELTING CO.**—Continued.

in Kootenay mining district, British Columbia, and in the Territory of Idaho, and in other mining districts of British Columbia and the United States of America; also to purchase, own, work and develop the mines, mining claims and mining property known as the "Blue Bell," "Silver King," "Surprise" and "Black Hawk" lodes, located at Kootenay lake, in Kootenay mining district, British Columbia; and to purchase, own, work and develop other mines, mining claims and mining property at other places; to own, buy and sell, and deal in gold, silver, copper, lead ores, and other ores and minerals; also to obtain, buy and own the franchise and property of the toll road from Mud Slough to a point on Kootenay river near Bonner's Ferry, Idaho Territory, and to maintain and operate the same; to buy, own and hire steamboats, and other boats, and to operate the same for the transportation of freight and passengers, etc.

The works are situated on a peninsula nearly in the centre of the east shore of Kootenay lake, at Pilot Bay, B.C. They consist of three main buildings: the smelter, the concentrator, and a building which contains the roasting furnaces. These buildings partially enclose a yard in which are situated the bins containing the ores, lime, coke, charcoal, etc. These materials are hauled from the barges, which bring them to the works, up an inclined plane to the top of the concentrator building. From that point they can be carried to any part of the works or to the bins in the yard, as may be required. There is also an elevator by which the concentrates or other material can be raised to any level that is desired. Besides these buildings there are smith's and carpenter's shops; an assay office and a business office. In the concentrator building are two 9 x 15 Blake crushers, four 4-compartment arch jigs, two double column jigs, two double-deck buddle tables and two frue vanners. The capacity of the concentrator is about two hundred tons per day. In the roasting house are four reverberatory furnaces, each 65 x 17 ft., with a capacity of 12 tons each per day. It is probable a mechanical furnace may be added which would practically double the capacity. The smelter at present consists of only one stack. The arrangements, however, will allow for the erection of two more stacks, and there is no doubt, that if the supply of ore will allow of this addition the enlargement of the works would put the enterprise on a still better footing for successful financial operation. The smelter at present can treat 100 tons of ore, with the requisite complement of lime, charcoal and coke, which amount to about 40 tons more. In the first week of operation the output of base bullion averaged about 20 tons a day. Of course the quantity will vary according to the character of the ore treated. The power to operate the concentrators is supplied by a 150 h.p. Corliss engine; an 85 h.p. Rider engine works the blowers, while a 30 h.p. high speed engine drives the dynamo which supplies the electric light, with which all the buildings are fitted. The ore which is at present being smelted comes from the Blue Bell mine, about eight miles up the lake from the smelter, and the No. 1 mine at Ainsworth. The bulk of the ore from the Blue Bell mine is first concentrated and the concentrates roasted. No other flux but lime rock is required, as the ore carries a large percentage of iron. The Blue Bell mine is the oldest discovery in the district. The developments at the mine consist of a tunnel only a few yards from the water's edge, about 1,200 ft. long, and which gives access to the various slopes, crosscuts, uprises, etc. Besides this an open cut has been made at the top of the hill, immediately above the underground workings. This cut has laid bare large deposits of carbonates many feet in width, which turn into galena as they descend. The ore as won from the cut is shot down a shaft into the tunnel and thence carried to the wharf for shipment. The magnitude of the output may be judged from the fact that in January and February it amounted to between 5,800 and 6,000 tons. The ore vein has been traced through the Blue Bell and other claims belonging to the company for a distance of 5,700 ft. Throughout it can be worked economically as regards shipment, as the vein runs almost parallel with the shore. In the driving of the tunnel a seam of copper ore was discovered which gives from 11 to 26 per cent. of copper. The vein is said to be 6 ft. 10 inches in width, and it is probable that the company will add to the smelter special plant to treat this and other copper ores of the district.

New Works of the Kootenay Mining and Smelting Co. at Pilot Bay, B.C.

## LANARK CONSOLIDATED MINING AND SMELTING CO., Ltd.

Incorporated 1891. Authorized Capital, $200,000, in 8,000 shares of $25, of which at date 8,000 shares have been subscribed.

**Directors :**

Thomas Earle, M.P. | W. J. Goepel. | F. S. Barnard, M.P. | N. P. Snowdon.

**Head Office : M. Strouss, Secretary, Victoria, B.C.**

Formed to acquire the rights and interest of the Selkirk Mining and Smelting Co., Ltd., in and to the Lanark mine, the Sutton mine, the Red Fox, the Isabella, the Dorothy and the Sprague mining claims, and all and every the other real and personal property of the said Selkirk Mining and Smelting Co., lying at or near the town of Illecillewaet, West Kootenay district, Province of British Columbia, for the sum of $120,000, to be paid for in fully paid shares of the company. The principal mine, the Lanark, upon which somewhat extensive work has been done, is situate about four miles from the town of Illecillewaet. About 2,000 tons of ore raised to date. Shipments of argentiferous galena reported to have yielded a profit of $65 per ton. No work done in 1895. Value of machinery plant (estimated) $10,000; buildings, $5,000.

## LUCKY BOY MINING, MILLING AND DEVELOPMENT CO.

Organized 8th November, 1895.

**Directors :**

Wm. Palmer. | J. S. Palmer. H. J. Warner. | M. Krackenberg. D. F. Strobeck. | W. W. Warner.

**Mines Office : W. W. Warner, Manager, Ainsworth, B.C.**

Owns and operates 12 mineral claims in the Ainsworth district, Province of British Columbia, upon which development work is proceeding.

## MONTREAL AND KOOTENAY MINING CO., Ltd.

Incorporated 1891. Authorized Capital, $20,000.

**Directors :**

*President :* E. B. Greenshields.

P. A. Peterson. | R. T. Hopper.
F. Fairman. | R. Wilson Smith.
Edwin Hanson. | W. M. Ramsay.

**Head Office and Managing Directors : R. T. Hopper & Co., 314 Board of Trade Building, Montreal, Que.**

**MONTREAL AND KOOTENAY MINING CO.**—Continued.

Formed to acquire and work mines in the Province of British Columbia and elsewhere in the Dominion. The company owns the "Tam-o'-Shanter" and "South Tam" mines situated at Hendryx camp on the east side of Kootenay lake, opposite the town of Ainsworth, B.C. Samples of the ore taken out from the different workings run from 80 to 480 ounces of silver. A sample car-load from the surface workings treated by the Tacoma Smelting Company, ran $82\frac{3}{10}$ ounces to the ton. Operations were resumed in 1895 on completion of smelter at Pilot Bay and a small force of men employed.

## NEOSHO MINING CO.

Incorporated under the laws of the State of Washington, 19th Sept., 1891. Authorized Capital, $50,000, in shares of $10, with power to increase to $1,000,000.

**Directors:**

F. H. Coe. | L. R. Dawson. | J. K. Basye. | I. P. Taylor. | M. W. Wallace.

**Head Office: I. P. Taylor, 210 and 211 Jesler Building, Seattle, Wash.**

This company owns and operates four mineral claims carrying silver and carbonate ores, near Hot Springs, West Kootenay district, Province of British Columbia. Assays of the ore vein worked have given as high as 237 ounces to the ton. Shaft sunk 165 ft.; 235 ft. of drifts to date. Estimated value of machinery, plant and buildings at 31st Dec., 1894, $5,000. No report for 1895.

## NOBLE FIVE SILVER MINES.

**Owners:**

Messrs. McGuigan, Hennessey *et al.*

**Head Office: Kaslo, B.C.**

This property is situated on the south fork of Carpenter creek, in the Slocan district, British Columbia, and comprises the "Noble Five," "Knoxville," "Bonanza King," "World's Fair" and "Maud E." claims. Several hundred tons of shipments are reported to have averaged 150 ounces silver and 69 per cent. lead per ton.

## NORTH STAR MINING CO., Ltd.

Registered 9th May, 1894. Authorized Capital, $100,000, in shares of $100.

**Directors:**

D. D. Mann, Montreal, *President.*

J. M. Browning, Vancouver. | E. P. Davis, Vancouver.

**Head Office: — Macfarlane, Secretary, Vancouver, B.C.**

**Mines Office: R. O. Jennings, Manager, Fort Steele, B.C.**

Owns and operates the North Star mine, near St. Mary's river, about 20 miles north-west of Fort Steele, East Kootenay, Province of British Columbia. About 2,000 tons of ore mined; the output at date of report being about 30 tons per day. The value of the ore as determined by sampling is: silver, 47.43 ounces; lead, 67.50 per cent.; iron, 6.63 per cent.; zinc, 1.90 per cent. A considerable amount of development work has been done and the existence of a very large body of ore proved.

## PETO COMPANY.

**Head Office: Robert C. Adams, Manager, 41 St. Francois-Xavier Street, Montreal.**

**Mines Office: Walter C. Adams, Ba. Sc., Midway, B.C.**

This is a private association of Montreal and Boston capitalists for the purpose of acquiring mineral claims in British Columbia. They own the Mount Adams group of silver mines, consisting of the "Chamblet," "Britomarte," and "Slater," in the Slocan district, and have a half interest in the Bon Ton silver mine in the Kaslo district. They also have the Black Horse group, consisting of eight gold claims in the Okanagan district. In 1894 Crown patents were secured for the Kootenay (Slocan) silver mines. In 1895 work was continued on the Mount Adams' mines, and they will be operated productively. Further development was done in the Okanagan district on two gold claims, "Divide" and "Chickamin," which it is proposed to work with a stamp mill.

## RECEAU SILVER MINES.

**Officers:**

John M. Harris. | S. M. Wharton. | F. T. Kelly.

**Mines Office: J. M. Harris, Superintendent, Kaslo, B.C**

The property comprises seven argentiferous galena claims situated one-and-a-half miles north-east of the town of Sandon in the Province of British Columbia. Opened by six tunnels averaging from 250 to 800 feet in length. The output in 1895 is estimated by the owners to be of a value of $200,000. 40 persons employed.

## ROBERT E. LEE MINING CO.

Incorporated 1895. Authorized Capital $500,000.

**Directors:**

| | | |
|---|---|---|
| John M. Burke. | J. L. Wilson. | C. W. Ide. |
| W. C. Miller. | C. S. Vorhees. | A. P. Sawyer. |

**Head Office: Spokane, Wash.**

**Mines Office: J. M. Burke, Rossland, B.C.**

Formed to acquire and work the "Robert E. Lee" silver claims, situated near McGuigan's lake, Slocan district, Province of British Columbia. A tunnel has been driven along the lode for a distance of 100 feet. The ore is principally a high grade galena. Shipments averaging 133 ounces to the ton in silver and 75 per cent. lead.

## SILVER KEY MINING CO.

Incorporated 1896. Authorized Capital, $100,000.

**Directors:**

Cornelius M. Getting. | Jas. Gilhooly. | George D. Long.

**Head Office: New Denver, West Kootenay, B.C.**

Formed to carry on mining operations in the Province of British Columbia. Being organized at date of report.

## SILVER QUEEN MINING CO.

Authorized Capital, $1,000,000.

**Directors:**

G. W. Stephens. | Wm. Strachen | Wm. Dalby. | F. J. Claxton. | Dr. J. M. Lefebre.

**Head Office: Fred J. Claxton, Secretary, Victoria, B.C.**
**J. E. Boss, Spokane, Wash., Managing Director.**

Owns the "Silver Queen" mineral claim on Toad Mountain, B.C., being the southern extension of the Kootenay Bonanza, operated by the Hall Mines, Ltd. Not worked in 1895, pending completion of Hall Mines' smelter.

## SKYLARK MINE.

**Owners:**

John Douglas. | James Atwood. | Wm. McLean.

**Mines Office: John Douglas, Midway, Boundary Creek, B.C.**

The property is situated at Boundary Creek, B.C. A small force employed in 1894. The output for 1894 was reported to be 68 tons shipped to Everett, U.S.A., of an estimated value of $10,300, in silver and gold. Samples of the output have gone as high as 200 ounces to the ton in silver; 1⅓ ounce gold; and 5½ per cent. lead. Shaft down 100 ft.; vein 2½ to 3 ft. wide with concentrated pay streak from 4 in. to 1½ ft. wide.

## SLOCAN MILLING CO., Ltd.

Incorporated 1884. Authorized Capital, $100,000, in shares of $10.00.

**Directors:**

A. E. Humphreys, Duluth. | N. D. Moore, New Denver, B.C.
W. C. Yawkey, " | John Vallance, " "
W. H. Yawkey.

**Head Office: Three Forks, B.C.**

Formed to work mines and carry on the business of milling ores in the Slocan district, British Columbia. Present capacity, 100 tons daily. Operated in 1895. Added improvements, $20,000.00.

## SUNSHINE MINING CO.

Incorporated 1895. Authorized Capital, $50,000.

**Directors:**

N. D. Moore. | W. H. Yawkey. | W. C. Yawkey

**Head Office: Three Forks, B.C.**

Formed to carry on mining operations in the Province of British Columbia. Claim being developed.

## OTHER SILVER COMPANIES AND MINES.

| Company or Mine. | Authorized Capital. | District and Province. | Name and Address of Secretary or Manager. | Remarks. |
|---|---|---|---|---|
| | $ | | | |
| Algoma Mines Co..... | 100,000 | Tp. of McTavish, Ont..... | J. H. Talbot, Detroit..... | Property near Black Bay, Lake Superior. Not worked, 1894. |
| Alpha Silver Mines..... | ..... | Four Mile Creek, Slocan, B.C. | McNaught & McKenzie, Silverton, B.C..... | 12 persons employed, 1895. |
| Can. Pac. Mining and Milling Co. | 500,000 | British Columbia..... | Minneapolis, Wis..... | Being organized. |
| Columbia American Mining Co... | 500,000 | Hot Springs, B.C..... | F. E. Archer, Spokane, Wash. | Claims include "Kismet," "Hambone," "Dora D." and others. |
| Crown Point Mining Co..... | 600,000 | Silver Mountain, Ont..... | E. A. Tinkham, Duluth, Minn. | Not worked in '94 pending negotiations to sell. |
| Cumberland Silver Claims..... | ..... | Twin Lakes Basin, Slocan... | W. D. Yawkey, 3 Forks, B.C. | Small force employed, 1895. |
| Duluth and St. Paul Mining Co.. | 200,000 | Coffee Creek, B.C..... | F. W. Wilsey, Duluth, Minn. | No report. |
| Falun Mine of British Columbia.. | 500,000 | British Columbia..... | O. G. Seward, Spokane, W.. | Being organized. |
| Fisher Maiden Claim ..... | ..... | Four Mile Creek, Slocan, B.C. | G. W. Hughes, Silverton, B.C. | Being opened. Small force, 1895. |
| Freddie Lee Mining Co., Ltd.... | 500,000 | Slocan District, B.C..... | C. G. Griffith, Kaslo, B.C... | Claim leased to others. |
| Goodenough Silver Claim..... | ..... | Thunder Bay, Ont..... | E. N. Best, N. Y. Life Bldg., Minneapolis ..... | Only exploratory work done. |
| Guaranty Silver Mining Co..... | 500,000 | Silver Mountain, Ont. ..... | Jno. G. Rickel, 4629 Fremont Ave. So., Minneapolis..... | No report. |
| Last Chance Silver Claim..... | ..... | South Fork Carpenter Creek, Slocan, B.C..... | E. H. Tomlinson, 3 Forks, B.C. | Small force in 1895. |
| Minnesota and Lake Manitou Gold and Silver Co..... | 200,000 | Manitou Lake, Ont..... | A. Arneson, Benson, Minn.. | Not working. |
| Mountain Chief Silver Claim..... | ..... | Carpenter Creek, Slocan, B.C. | G. W. Hughes, Kaslo, B.C.. | Small force, 1895. |
| Minnesota Silver Co., Ltd..... | 1,000,000 | British Columbia ..... | New Denver, B.C ..... | Directors: G. J. Atkins, H. Donnally, Jas. Blackaller, W. Marshall. Being organized. |
| Ontario Silver & Antimony Co., Ltd | 300,000 | Barrie, Ont..... ..... | J. C. Cockburn, 71 Victoria St., Toronto. ..... | Not in operation. |

## OTHER SILVER COMPANIES AND MINES—*Continued.*

| Company or Mine. | Authorized Capital. | District and Province. | Name and Address of Secretary or Manager. | Remarks. |
|---|---|---|---|---|
| | $ | | | |
| Payne Group Silver Claims..... | ..... | South Fork, Carpenter Creek, Slocan, B.C. ..... | S. S. Bailey, Kaslo ..... | Small force, 1894. |
| Rabbit Mountain Mining Co. .... | ..... | Thunder Bay, Ont..... | F. W. Wieland, Beaver Mines P.O., Ont..... | Work suspended temporarily. |
| Receau Group Silver Claims ..... | ..... | South Fork, Carpenter Creek, Slocan, B.C. ..... | J. M. Harris, Kaslo..... | Small force, 1894. |
| Silver Centre Mining Co. of Ont.. | 300,000 | Tp. of Lybster, Ont..... | W. H. Hunter, 17 Equity Chambers, Toronto ..... | Not in operation. |
| Silver Lake Mining Co..... | 2,000,000 | Thunder Bay, Ont..... | E. Tinkham, 216 E. 4th St., Duluth, Minn..... | Not in operation. |
| Silver Queen Mining Co..... | 1,000,000 | Toad Mountain, B.C..... | F. J. Claxton, Victoria, B.C.. | Not worked in 1894. |
| Thunder Hill Mining Co..... | 5,000,000 | Golden, B.C..... | W. H. Bainbridge, Vict., B.C. | No report. |
| Toad Mountain Mining Co..... | 1,500,000 | British Columbia..... | Nelson, B.C. ..... | No report. |
| West End Mining Co. of Ontario. | 2,000,000 | Thunder Bay, Ont..... | S. B. McConnel, Port Arthur. | Not in operation. |
| Western Consolidated Mining Co. | 1,000,000 | Hot Springs, B.C..... | A. J. Lynch, Spokane..... | Owns a number of claims. Not worked in 1894. |
| West Kootenay Mining Co..... | 1,000,000 | Hot Springs, B.C..... | W. H. Lancaster, Spokane | Not worked. |
| Vancouver Smelting & Mining Co. | 250,000 | Field, B.C..... | H.T.Ceperley, Vancouver, B.C | Not in operation. |

# Copper, Nickel and Pyrites.

# Copper, Nickel and Pyrites.

Copper occurs in Canada in the forms of native or metallic copper and the sulphuretted ores. The former is confined principally to the rocks of the upper copper-bearing series on Lake Superior. The latter are widely diffused. In Ontario, on the north-eastern shores of Lake Huron, extensive veins of rich copper ores have been mined for years. On Lake Superior, the native copper which has been so extensively and profitably worked on the Michigan shore, exists in large quantities along the Canadian shore. In Quebec and the other eastern provinces, deposits of copper have been found. In British Columbia masses of native copper have been found in various parts of the province.

In 1883 the first discovery of a deposit of nickeliferous pyrrhotite was made while the Canadian Pacific Railway Company was making a cutting through a small hill near Sudbury, in the district of Algoma, Ontario. The first mine opened, that of the Canadian Copper Co., was worked originally for copper, and it was not till a shipment had been sent to be smelted that it was discovered that the areas were nickel bearing to an extent that rendered them far more valuable for that metal than for copper. Operations at present are principally carried on by The Canadian Copper Company, the Dominion Mineral Company and the Drury Nickel Company. All these companies are fully equipped with plant, both for mining and smelting, and ship their product in the shape of matte, averaging for the whole district nearly 30 per cent. of nickel and about 27 per cent. of copper. The character of the ores and the method of treatment are fully described in the notice of the operations of the Canadian Copper Co, on another page.

In no other part of the world are there such valuable nickel mines, and the results of recent experiments in metallurgy have so satisfactorily demonstrated the utility of this metal that we may with confidence regard the Sudbury region as one of the most promising of all the mining regions of Canada, if not the world.

The most important use of nickel so far continues to be as an alloy in the manufacture of steel. The tests made of nickel-steel for armor-plates and other purposes during the past year have confirmed the evi-

dence of previous trials as to the quality of the alloy. In other directions its use has not materially extended, although the demand for it continues to increase slightly. The market cannot be largely extended, however, unless new applications are found for the metal.

The metal sold for $2.25 per pound in 1860; in 1873 to 1875, for $6 to $7 per pound. From that time the price of nickel gradually declined, being $0.65 per pound in 1892, and less than $0.40 at the present time. The exceedingly high prices in 1873 and 1875 were caused by the adoption of a nickel coinage by Germany and some other European nations, causing a sudden demand which exceeded the supply.

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EXPORTS OF COPPER ORE AND MATTE.

| Year. | British Columbia. | Nova Scotia. | Ontario. | Quebec. | Total. |
|---|---|---|---|---|---|
| | $ | $ | $ | $ | $ |
| 1885 | ..... | ..... | ..... | 262,600 | 262,600 |
| 1886 | ..... | ..... | 16,404 | 232,855 | 249,259 |
| 1887 | ..... | ..... | 3,416 | 134,550 | 137,966 |
| 1888 | ..... | ..... | ..... | 257,260 | 257,260 |
| 1889 | ..... | ..... | ..... | 168,457 | 168,457 |
| 1890 | ..... | ..... | 2,219 | 396,278 | 398,497 |
| 1891 | ..... | ..... | 64,719 | 283,385 | 348,104 |
| 1892 | ..... | 100 | 79,141 | 198,391 | 277,632 |
| 1893 | ..... | ..... | 228,932 | 163,037 | 391,969 |
| 1894 | 6,885 | ..... | 67,030 | 14,437 | 88,352 |
| 1895 | 83,770 | ..... | 122,377 | 16,510 | 222,657 |

PRODUCTION OF COPPER IN CANADA.

| — | Pounds. | Valued at |
|---|---|---|
| 1890 | 6,013,671 | $ 902,050 |
| 1891 | 8,928,921 | 1,160,760 |
| 1892 | 7,087,275 | 826.849 |
| 1893 | 8,109,856 | 875,864 |
| 1894 | 8,481,685 | 805,760 |
| 1895 | 8,789,162 | 949,229 |

Canadian Copper Co.--Roasting Nickel Ore at Copper Cliff, Sudbury, Ont.

PRODUCTION OF NICKEL—CALENDAR YEAR.

Reported by Geol. Survey.

| Year. | Quantity. | Value. |
|---|---|---|
| 1890..... | 1,435,742 lbs. | $ 933,232 |
| 1891..... | 4,626,627 " | 2,775,976 |
| 1892..... | 2,413,717 " | 1,399,956 |
| 1893..... | 3,992,982 " | 2,076,351 |
| 1894..... | 4,907,430 " | 2,061,120 |
| 1895..... | ..... | 1,360,984 |

EXPORTS OF NICKEL MATTE—YEAR ENDED 30TH JUNE.

| | | | |
|---|---|---|---|
| 1891..... | $240,499 | 1893..... | $427,557 |
| 1892..... | 617,639 | 1894..... | 808,799 |
| | 1895—$599,568 | | |

DISTRIBUTION OF EXPORTS OF NICKEL—YEAR ENDED 30TH JUNE.

| | Great Britain. | United States. | Germany. |
|---|---|---|---|
| 1891..... | $ 30,180 | $210,319 | ..... |
| 1892..... | 151,122 | 466,517 | ..... |
| 1893..... | 27,600 | 388,257 | $11,700 |
| 1894..... | 113,457 | 695,342 | ..... |
| 1895..... | 69,877 | 529,691 | ..... |

The accompanying table shows the world's production of nickel for the six years ending with 1894 :

THE WORLD'S PRODUCTION OF NICKEL.

(In kilograms.)

| Year. | New Caledonia. | Canada. | United States. | Norway. | Sweden. | Total. |
|---|---|---|---|---|---|---|
| 1889..... | 1,381,482 | 309,701 | 98,731 | 88,500 | ..... | 1,878,414 |
| 1890 ... ... ... | 1,633,214 | 651,239 | 90,870 | 70,500 | 8,050 | 2,453,873 |
| 1891..... | 2,449,306 | 2,098,598 | 54,815 | 91,000 | 12,000 | 4,705,719 |
| 1892 ... ..... | 1,244,000 | 1,888,790 | 43,614 | 97,000 | . ... | 3,273,404 |
| 1893..... ..... | 2,045,000 | 1,811,205 | 11,745 | 90,000 | ..... | 3,957,950 |
| 1894.... ..... | ..... | 2,225,996 | . .. | 90,000 | ..... | ..... |

# CANADIAN COPPER CO.

Organized January 6th, 1886. Capital stock $2,500,000, fully subscribed and paid up.

**Directors:**

Hon. Stevenson Burke, *President*, Cleveland, O.
C. W. Bingham, *Vice-Pres.*, Cleveland | Hon. H. B. Payne, Cleveland,
Geo. G. Allen, Akron, O. | H. P. McIntosh, Cleveland.

**Head Office:**

Rooms 201-202 Perry-Payne Building, 103-109 Superior Street, Cleveland, O.
H. P. McIntosh, *Secretary-Treasurer.*

## CANADIAN OFFICE:

**James McArthur, General Manager, Copper Cliff, Ont.**

*Mine Captain:* Henry Davis.

This company is the owner of mineral lands in the Townships of Blezard, Creighton, McKim and Snider, and has also a controlling interest in the Vermillion mine, in the Township of Denison, in the Province of Ontario, holding in all about 13,000 acres of the richest nickel lands in the Sudbury district.

On this property twelve large deposits of copper-nickel ores are known to exist, three deposits being at the present time developed and worked as producing mines, and nine having been explored by diamond drilling, will be worked as soon as the nickel market warrants such development. At present the three working mines supply enough ore to keep the smelters in constant operation.

All the mines, smelters, general office, etc., are connected by telephone lines to facilitate the transaction of business.

The working mines are known as the Evans, Stobie and Copper Cliff. The ore, in each of these are practically the same mixture of minerals, though varying widely in their general appearance and richness.

The ores may be described as a mixture of nickeliferous pyrrhotite, pentlandites chalcopyrite and diorite. The diorite forms the matrix or gangue, in which the mineral occurs as shots and stringers. On the lower levels of the mines the ore occurs as massive mineral containing very little diorite. The chalcopyrite which is sorted out as copper ore, contains, when pure, about 33 per cent. copper. The pentlandite, which occurs in spots throughout the nickeliferous pyrrhotite, is a pure nickel mineral containing about 35 per cent. nickel, 35 per cent. sulphur and 30 per cent. iron. The nickeliferous pyrrhotite which is the usual nickel ore, may be said to contain 60 per cent. iron and 40 per cent. sulphur, with a portion of the iron varying from 2 per cent. to 10 per cent. replaced by nickel.

The Vermillion nickel ore is a unique mineral, containing about 40 per cent. nickel as sulphide, with about nine ounces of platinum per ton of ore. This platinnm is also found to the extent of 12 to 15 ozs. per ton in the surface sand at the Vermillion mine, where it occurs as sperrylite or arsenide of platinum, a silver white sand or powder containing about 50 per cent. platinum.

The Evans mine is situated in the south east corner of Snider. It is fully equipped with stockhouse, crusher, sorting tables, hoisting engines and boilers, and is surrounded by neat frame houses erected by the company for the use of its employees. The mine is worked both as shaft and open pit. In the main body of the ore an open pit about 80 ft., square and 200 ft. deep has been sunk. This method of ore mining is particularly adapted to the Sudbury mines on account of the strength and hardness of the diorite through which the ore reaches the surface. A vertical shaft about 30 ft. from the open pit follows it and communicates therewith by drifts in the ore body.

Canadian Copper Co.—Pile of Nickel Matte at Copper Cliff Mine, Sudbury, Ont.

The ore is quarried down in the open pit by drilling and blasting, the larger masses are blockholed and broken by small dynamite cartridges, and the ore is trammed through the drifts to the shaft, where it is hoisted by skips to the rock house. Arriving at the top of the shaft the ore is dumped over a grizzley or screen made of heavy rails, whereby the coarse ore is separated from that already broken fine, and the coarse ore is delivered in front of the crushers. These are of the Blake pattern, and crush about 20 tons per hour. The ore falls from the crushers jaws into a hopper which delivers it to a revolving screen. In the upper end of this screen the "fines" or small ore falls through a screen which is perforated with ¾ in. circular holes, and is from this delivered into its respective bins. The medium grade or "raggings" falls through openings 1¾ in. in size in the middle portion of the revolving screen, while the coarse ore passes in pieces about 3 in. square, out of the lower end of the screen to the sorting tables. These tables are of iron about 10 ft. long by 3 ft. wide and are moved horizontally over a three or four inch stroke with a jerking motion, which carries the ore toward the end of these tables. At each side of these tables a number of boys gather the ore from the rock and throw the ore into bins, marked "copper ore," "nickel ore," and "mixed ore," according to the predominance of one mineral over the other in the specimens.

The Evans mine ore, taking the mine as a whole, will average 2.60 per cent. copper and 4 per cent. nickel. The Evans mine ore is readily distinguished from that from other mines by its peculiar appearance, the nickel and copper ore being scattered through the black diorite in small nuggets or globular concretions like water-worn gravel in a conglomerate rock.

The Copper Cliff mine is about a mile and a half north by east of the Evans. The village of Copper Cliff is situated around this mine, and here the company's offices and shops are located. This mine is reached by an inclined shaft about 800 ft. deep. The ore, which, on the surface, was almost pure chalcopyrite has gradually given place to nickeliferous pyrrhotite, of which the seventh level was almost entirely composed. The machinery and rock houses used at this mine are of the same kind as at the Evans and the ore is treated in exactly the same way. The ore or the lower levels of both the Copper Cliff and Evans mines is very interesting from the large proportion of pentlandite contained, the Copper Cliff ore contains about 20 per cent. and the Evans about 16 per cent. of this mineral, and as pentlandite contains 35 per cent. of nickel, the richness of the ores is at once apparent. The Copper Cliff ore may be recognized by its coarse grain and the flattened appearance of the pyrrhotite crystals. The average Copper Cliff ore contains 4.87 per cent. copper and 4.54 per cent. nickel.

The Stobie mine consists of a large open quarry in the face of a hill of ore. Test pits all over the surface of the Stobie hill show the presence of the same ore as is removed in the quarry. An incline shaft penetrates the ore under the quarry and is connected therewith by a cross-cut. This mine, which lies about 3½ miles north of the town of Sudbury, is connected with the town by railway, over which the ore is brought to the roast yard at Copper Cliff. The Stobie ore is very close grained, and does not yield so readily to sorting as the Copper Cliff and Evans ores. It is valuable more for its high iron contents as a furnace flux than for its copper nickel, of which the average ore shows 2.21 per cent. copper and 2.28 per cent. nickel. The crushing and sorting is carried on in the shaft house in the same way as that at the Copper Cliff and Evans mines.

At all of the mines the ore is loaded on flat cars and pushed by an engine to the top of a trestle which runs parallel with the roast yard. This yard is about half a mile long and 100 to 150 ft. wide, and has a capacity of treating about 300,000 tons of ore per annum. On this yard the ore is piled to a height of 8 or 10 ft. on an 18-inch bed of soft wood, each pile being of rectangular oblong shape, and containing from 600 to 2,500 tons ore. The wood being fired, each heap burns from four to six months, the sulphur being lowered to about 7 per cent., and the iron being partially oxidized. When cold the ore is taken to the smelters. These are of Herreshoff pattern, of boiler iron, water-jacketed, about 9 ft. in height, of oval section, 6 ft. 6 in. by 3 ft. 3 in. at the tuyeres, and completely surrounded by a 3-inch water jacket. Two furnaces are in continuous operation. Each furnace uses 110 tons ore and produces 15 tons matte per day. This matte passes from the furnace into an iron-cased, brick-lined, water-jacketed forehearth or well, in which the slag rises to the surface and flows over a

**CANADIAN COPPER CO.**—Contiuued

slag-spout to a water-jet beneath the floor, whereby it is granulated and carried to the dump. The matte is tapped from the forehearth at 20 minute intervals into conical cast-iron pots holding about 800 pounds in which it is sometimes allowed to cool, and at other times poured into thin sheets on a slag floor for greater convenience in breaking up.

The average grade of standard matte contains copper, 20 to 25 per cent.; nickel, 18 to 23 per cent.; iron, 25 to 35 per cent., and sulphur, 20 to 30 per cent. From picked ores matte has been produced direct, containing 52 per cent. nickel, and any grade of matte can be produced to suit the market.

Up to December 1st, 1895, the company had produced about 475,000 tons of smelting ore and 52,100 tons of matte, which is equivalent to about 11,710 tons of copper and 10,680 tons of nickel.

At the refining works in Cleveland an especially fine grade of pure nickel is produced, either in the form of shots, ingots or anodes. An average assay of the nickel produced from the matte shows: nickel, 99 per cent.; copper, .5 per cent.; iron, .35 per cent.; sulphur, .06 per cent.; carbon, none; silicon, 0.1 per cent. This nickel is used for German silver, for nickel plating, and also for the manufacture of nickel-steel armor plates.

## CAPE BRETON COPPER CO., Ltd.

Incorporated 15th January, 1896. Authorized Capital, $2,000,000, in shares of $10.

**Directors:**

Captain Isaac P. Gragg, *President.*

| | |
|---|---|
| Col. Albert A. Pope. | G. T. W. Braman. |
| Henry W. Richards. | M. F. Dickinson, Jr. |

**Head Office: Thos. Mair, Treasurer, 53 State Street, Boston.**

**Mines Office: Col. Brownell Granger, Coxheath, C.B., N.S.**

Formed to acquire and work the copper mining leases and other property in Cape Breton County, N.S., formerly owned by the Eastern Development Co., Ltd. After purchase of the property $1,348,000 worth of stock at par remain in the treasury for working capital.

Plans and estimates for further development of the mines, erection of concentration, smelting and refining works, and building of seven miles of railroad have been completed by Dr. Edward D. Peters, Jr., Copper Metallurgist of Boston, Horace F. Brown, Mining Construction Engineer, of Chicago, and Charles M. Odell, C. E. of North Sydney, and the company expects to be able to commence operations during the present year. Owing to the very favorable conditions in Cape Breton of cheap fuel and direct water communications to all parts of the world, the company expects to produce refined copper and market it at a very low cost per pound. Present developments at the mine include four shafts sunk 325 ft., 176 ft., 100 ft, and 40 ft. respectively, which have developed two strong veins. 50,000 tons of copper ore have been placed in mining sight, which is estimated to average from five to six per cent. copper, with a little gold and silver. The property has been reported upon by George Grant Francis, M.E., Dr. Edward D. Peters, Jr., Metallurgist, and examined by Edwin Gilpin, Jr., Inspector of Mines of Nova Scotia, Mr. Elfric Drew Ingall, of the Dominion Geological Survey, and other well known mining men and experts.

Cape Breton Copper Co. Ltd.—Mines and Works at Coxheath, Cape Breton.

## COPPER CREEK MINING CO.

Incorporated under the laws of the State of Michigan, October, 1892. Authorized Capital, $100,000; subscribed to date, $50,000.

C. M. Swift, *President.*

H. S. Sibley, *Secretary.* | T. H. Trethewey, *Superintendent.*

**Head Office: H. S. Sibley, Secretary, 80 Griswold Street, Detroit.**

**Canadian Office: T. H. Trethewey, Point Mamainse, Ont.**

This company has been developing under option a copper property, covering 11,400 acres, at Mamainse, in the district of Algoma, Province of Ontario. Opened by shaft, 308 ft. and open cuts. The machinery equipment at date comprises one 40 h.p. boiler; one double cylinder hoisting engine (Jenckes), having 4 ft. drum; one Rand 4-drill air compressor; Blake pump, etc.

During 1894 the development of the property was continued by sinking at various points along the vein on which the main shaft is sunk with the most encouraging results, the openings yielding both native and grey copper ore. Also by open cuts and pits upon other contiguous veins running parallel to this vein, the most of which offer a very good surface showing of copper.

## DOMINION MINERAL CO.

Incorporated 16th April, 1889. Authorized Capital, $100,000. By a supplementary Act assented to 24th April, 1890, the capital stock may be increased by the board of directors from time to time, to the sum in all of $500,000, in shares of $100 each, provided that the authorization and consent of all the shareholders of the company are previously obtained, either by their unanimous vote at a special general meeting duly called and held for that purpose, or by an instrument in writing to that effect executed by all the shareholders.

**Directors:**

John M. McIntyre, Montreal, *President.*

James Worthington, Toronto. | D. L. Lockerby, Montreal.
Wm. C. McIntyre, Montreal. | John Ferguson, North Bay.

**Head Office: Sudbury, Ont.**

This company owns and operates certain mineral lands in the Townships of Blezard, Drury and Denison, in the mining district of Algoma, in the Province of Ontario. Mining operations for copper and nickel were begun in the fall of 1889. Equipment comprises: Boilers, one 90 h. p. and one 60 h. p.; Ingersoll compressor and drills; Worthington & Knowles pumps; two Copeland & Bacon hoisting engines; Marsden rock-breaker; also equipped with complete lighting plant furnished by Edison Electric Co. Herreshoff smelters (2) of a capacity of 100 to 125 tons per 24 hours. Mines, 25 miles from the town of Sudbury on the line of the Canadian Pacific Railway, connected by branch line.

# EUSTIS MINING CO.

**Directors:**

W. E. C. Eustis, Boston, *President.*

John Blue, Capelton, Que. | Hugh Cochrane, Boston.

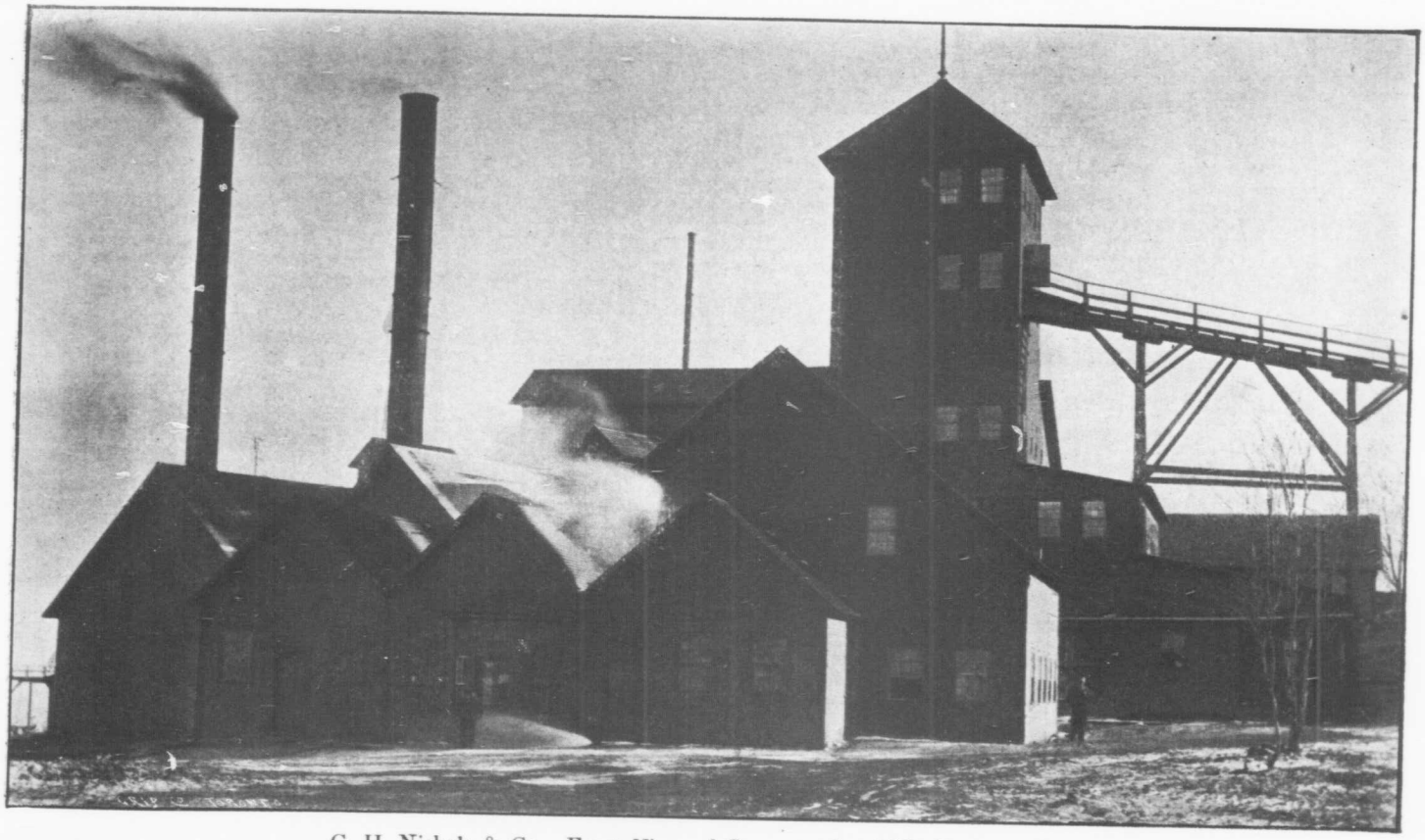
**Head Office:**

55 Kilby Street, Boston.

**CANADIAN OFFICE:**

**John Blue, C. & M. E., Capelton, Que.**

This company owns and operates the Eustis mines on Lot 9, in the II. Range of Ascot and situate at Capelton station, on the Boston and Maine Ry., Que. The mine was formerly worked by the Orford Nickel and Copper Co., and then by the Orford Copper and Sulphur Co., being transferred to the present owners in 1878. The ore bed is an immense deposit of chalcopyrite, with much iron pyrites, yielding an average of 4 to 5 per cent. copper, some of the ore being very rich, and in addition contains an appreciable amount of silver; the lode varies in width from four to over fifty feet. From numerous assays of the ore the quantity of sulphur averages 40 to 45 per cent. No. 1 shaft, 2,200 feet deep; No. 3, 2,300 feet, each, from surface and measured on incline. The mine was originally opened on the top of the hill, at a height of 600 ft. over the Massawippi river. Work was begun, starting from shaft No. 5, and at a level of 400 ft. lower a cross-cut or tunnel, 1,000 ft. long, was run in to strike the lode, the development of which has been continued by means of the two shafts already mentioned and by leaving standing between them ore masses of 60 to 70 ft. These masses are from 50 to 120 ft. high and constitute an important reserve, which can be drawn upon and removed at will. Mining work is carried on by means of compressed air drills, and supports are provided for the mine by leaving pillars and putting up timbers; a single pump keeps down the water. As for the total output of the mine since its first working, it is difficult to estimate it, but it is believed that it cannot be far from 400,000 tons, and for the last ten years the annual output has been from 25,000 to 30,000 tons. A part of the ore extracted is treated by the company, and the remainder is shipped to different points in the United States, for the manufacture of sulphuric acid, for which it is admittedly well adapted. At the works near the mine, there are 50 roasting ovens with a capacity of 1,000 tons per month, and two smelting furnaces for the reduction of the ore into matte. In addition a portion of the crude ore is roasted in the open air in piles containing as much as 250 tons and the combustion of which is kept up for two months and upwards. About 200 persons employed. Six boilers with total of 450 h. p.; 2 air compressors; (1 Ingersoll, 20 x 30, 12 drill, and 1 Rand compound, 14 x 22, 12 drill capacity); 12 3 in. steam drills; Deane steam pump, 8 in. cyl., 3 in. suction, 2 in. discharge (about four hours pumping done weekly in mine), 1 Cameron duplex, 6 in. suction, 4 in. discharge, used for pumping water from river to dressing house to supply jigs; 2 winding engines (coupled on same shaft at opposite ends), each 14 in. dia., 26 stroke and 6 ft. 6 in. drum; 5 double jigs for small ore, etc.



G. H. Nichols & Co.—Front View of Concentrating Mill, Capelton, Que.

## NICHOLS CHEMICAL CO.

Incorporated under the laws of the State of New York. Capital paid in, $2,500,000.

**Officers:**

W. H. Nichols, *President.*
J. B. F. Herreshoff, *Vice-President.* | E. R. Nichols, *Treasurer.*
Geo. Martin Luther, *Secretary.* | Geo. G. Teller, *Auditor.*

**Head Office: 45-9 Cedar Street, New York.**

**CANADIAN OFFICE:**

**S. L. Spafford, Manager, Capelton, Que.**

W. H. Nichols, Jr., *Mining Engineer.*
A. W. Elkins, *Superintendent Chemical Works.*

This company's property contains about 5,000 acres, and is situate in the Township of Ascot, Sherbrooke County, and the Township of Bolton, Brome County, Province of Quebec. It operates at Capelton station on the line of the Boston and Maine railroad, the Albert pyrites mine and the Capelton Chemical and Fertilizer works, employing in all about four hundred persons. The annual output of ore from the mines ranges from 30,000 to 40,000 tons, a portion of which is utilized at the works and the remainder shipped to New York.

The workings consist of shafts Nos. 1, 2, 3 and 4. The present depth of No. 1 is 2,100 feet on the slope of the vein, which averages about 30 degrees from the horizontal. No. 3 shaft is about 400 feet deep and No. 4 is about 700 feet deep. The longest level in the latter is a little more than 650 feet, following a productive vein all of that distance, except for about 50 feet, where a cross course disturbed the lode.

The method of mining is by sinking the shaft about 8 by 12 feet in advance of the other workings. Levels are then extended on the vein and the ground is blocked out by sinking winzes or raising from a lower level to one above it. In distance apart these levels are from 65 to 100 feet, thereby giving very high and long stopes.

In No. 1 shaft the deposit has a length of about 300 feet, and varies in width from 2 feet at the ends to 45 feet at the widest place. Slides have been met with in different places. These faults merely caused displacement of the vein, the most prominent being an upthrow of 20 feet. The vein is also crossed by a very large trap dyke, which does not in any way disturb or affect the vein.

The selvage being wavy causes irregularity in the width of the vein. The dip, which is to the south-east, is very irregular also. In some places it is almost perpendicular, while in others it is nearly horizontal.

Large pillars of ore are left standing in suitable places to support the roof of the mine. Usually the ground is firm, but occasionally the heavy blasting loosens bands of slatey rock which are kept in place by heavy and very large timbers.

The bottom part of the mine is very free from water. The surface water is caught in large cisterns near the surface. The pumps used were manufactured by Guild & Garrison of New York. The water being strongly charged with copper in solution, which is very destructive to iron, it is necessary to have the water end of the pumps made of bronze, and the piston, piston rod, etc., made of brass. Three inch cast iron pipe is used for conducting the water to the surface.

The battery of tubular boilers at No. 1 shaft consist of seven set parallel with each other. Four of them are 80 horse power each, one 60 horse power and two 50 horse power each, making a total of 480 horse power. For steam purposes bituminous coal is used entirely.

**NICHOLS CHEMICAL CO.**—Continued.

Two air compressors, one a compound Norwalk, main 20 x 24 in. cylinder, the other an English duplex 16 x 36 in. cylinders, furnish the compressed air for drilling. There are three large air receivers, the largest being 6 feet by 30 feet, and the air is carried from them down the shaft in 5 inch and 4 inch pipes, where it is at different points diverted in smaller pipes to the many different workings where power drills are in operation. Ingersoll-Sergeant and Rand power drills are used.

The hoisting engine is a double friction winding engine, 20 x 24 in. cylinders, 250 horse power, speed 700 feet per minute, with two drums 6 feet in diameter, each drum has a powerful spur wheel keyed on drum shaft, which meshes the driving pinion on engine shaft. The hoisting rope used on these drums is made of the best plough steel, breaking strain 30 tons. It is 1 in. diam., has 6 strands with 19 wires in each strand and hemp centre.

Automatic dumping hoisting skips are used, which are made of heavy steel plate, and have a capacity of 3 tons.

The machinery in the concentrating plant is driven by an 18 in. x 24 in. single straight line engine, having a driving wheel 24 in. by 10 feet.

The plant has also 400 h. p. surface condenser, the circulating water being supplied by a compound pump, having an 8 in. suction and a 6 in. discharge.

The head house is 75 feet high. The ore discharges out of the skips on to a series of bar screens, after which the very largest pieces pass through a 15 in. x 30 in. ore breaker. The ore of proper size for hand picking passes from the screens on to a travelling picking table, 4 ft. wide by 32 ft., which is driven by an 8 in. belt. A few boys stand on each side of the table and pick out the rock while the table is in motion conveying the ore and discharging it into two 6 in. x 20 in. ore breakers, and these break it down to proper size for transportation. The fines, which include all that pass through a one-inch screen, is conveyed by elevator to a revolving screen, which separates the fines from the half inch and larger. The latter for further sizing down is put through the Cornish rolls which are 15 in. x 30 in., and it is then conveyed to the last revolving screen, delivering each size to their own jigs. The concentrating plant produces three sizes of ore, viz:—lumps, smalls and fines.

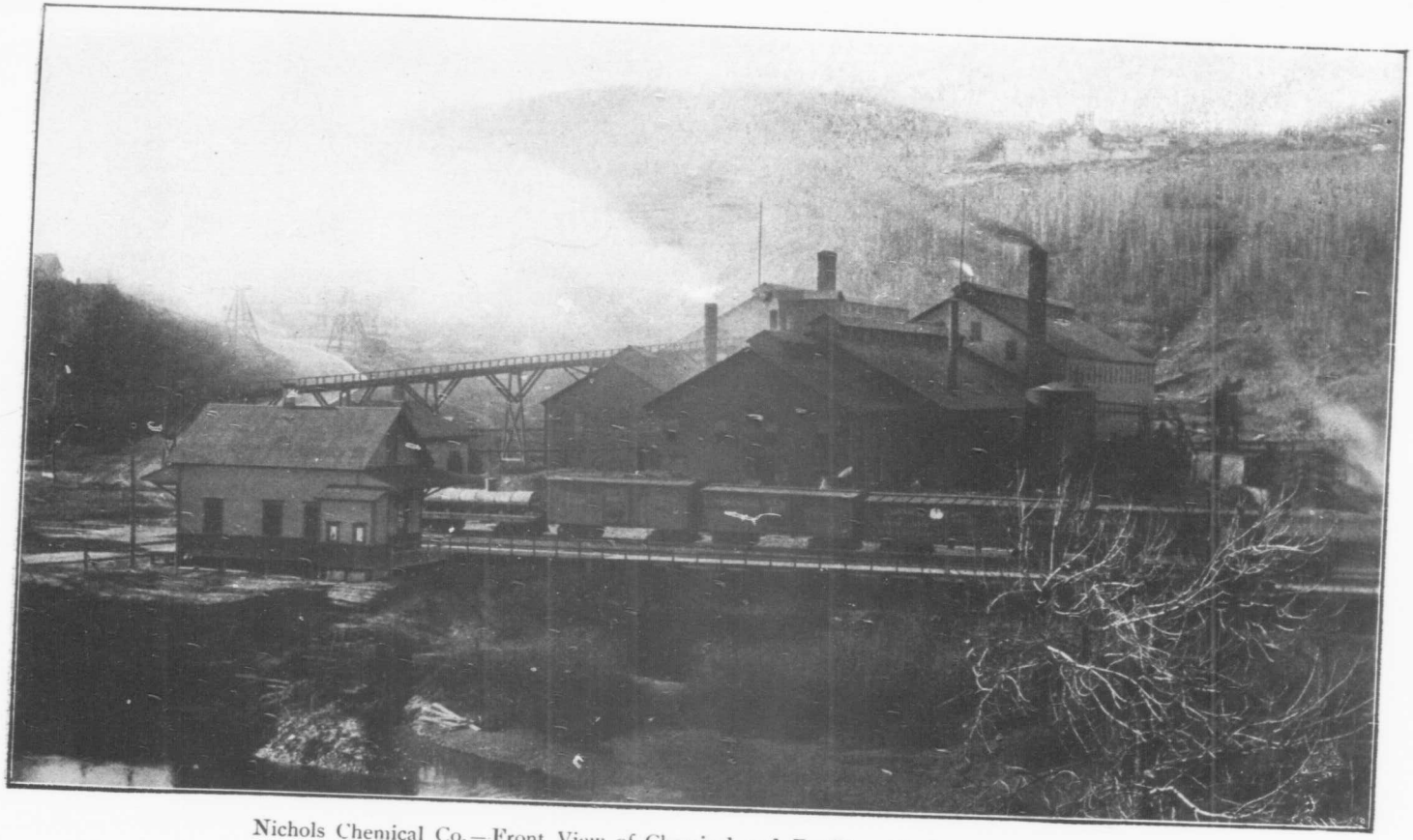
Shafts Nos. 3 and 4 are each equipped with two 75 horse power tubular boilers, and each has a 75 horse power friction drum winding engine. The two air compressors at No. 1 supply all of the compressed air required. The distance between No. 1 and No. 4 is about 1,500 feet.

The ore is transported from the mine by wire rope tramway to the stock sheds near the Boston and Maine siding. The tramway in use was patented by Mr. Hodgson. Its construction consists of an endless wire rope, one inch diameter, and 9,400 ft. long, running on grooved sheaves, 24 in. diameter, which are secured on the cap piece of the bents or supports. In order to make the grade as regular as possible the bents are from 15 ft. to 50 ft. high and they are 100 feet apart. At each end of the line there is an 8 ft. sheave, around which the rope runs. The buckets in which the ore is carried are made of wrought iron and each holds 350 lbs. At each terminal there is a fixed rail. The box heads or saddles which carry the buckets, have two small wheels on the side, and when the bucket arrives at either end the wheels ride on the fixed rails and the bucket can be filled or dumped while the rope keeps in motion. The buckets are hung on a wrought iron hanger which is secured to the box heads. The loading end of the line is about 500 feet higher than the discharge end. The speed is controlled by a 15 h.p. engine, which is geared to the pinion or driving sheave shaft. The capacity is 200 tons in ten hours. The coal consumed at the mine is also conveyed by this tramway.

The owners of the mines have always utilized the whole ore product, the first treatment being the conversion of the sulphur contents into sulphuric acid.

Chemical works were first constructed at Capelton in the year 1887. The works were designed by Mr. J. B. F. Herreshoff of New York City. The main buildings are 175 feet long by 75 feet wide and three stories high. The buildings being very wide made it necessary to use the truss roof, which is covered with slate supplied from the quarry near Richmond, Que.

The kilns are constructed of fire bricks and have cast iron fronts, each burner being independent of the other. The percentage of sulphur in the ore controls to quite an extent the quantity of ore which can be burned per superficial foot of grate surface. Usually the results are from 30 to 45 pounds per square foot in 24 hours.



Nichols Chemical Co. — Front View of Chemical and Fertilizer Works, Capelton, Que.

The Glover Tower, which in its special structure is patented by the Nichols Chemical Co., occupies an intermediate position between the kilns and chambers. It is a rapid and economical concentrator, besides being valuable for denitrating.

Pans are used for concentration of the sulphuric acid. The final products are oil of vitrol and extra concentrated, or 98 per cent. acid. The former comes largely into use for refining oil, and the latter for mixed acid making is an important factor.

To suit the requirements of the trade the product is shipped either in carboys, iron drums or tank cars. To retain its transparentness oil of vitriol must be kept free from dirt.

Canadian phosphate, which comes from the Buckingham district is used at the works for manufacturing fertilizers.

The phosphate is first dried, then ground into a fine powder in the Griffin mill. This mill employs in its construction the principle of a rigid roll, on a suspended shaft running against a ring or die. This rigid roll on a revolving shaft has freedom to swing outward against the die by the use of a universal joint. By centrifugal pressure there is a great force brought to bear on the material being pulverized between the roll and die. This mill will grind about two tons per hour. After being ground the apatite is dissolved with sulphuric acid, after which ammonia and potash is added to make the complete fertilizer. It is then put through the disintegrator, and then screened again.

Five different brands or grades of artificial fertilizers are made. The Capelton and No. 1 brand as superphosphates, and the Reliance, Victor, and Royal Canadian are complete fertilizers. The goods are shipped in sacks 200 pounds each, and in conformity with the law the brand and guaranteed analysis is plainly printed on each sack. The Herreshoff water jacket smelting furnace is used for extracting the copper in the burned cinders. The capacity of the furnace is 50 tons per day. The matte produced is shipped to Laurel Hill, Newton Creek, L.I. The buildings are lighted by electricity; the mines and the chemical works each have their own dynamo.

## PYRITES CO., Ltd.

Registered 3rd April, 1891. Authorized Capital, £300,000, in 60,000 shares of £5, of which 30,000 are preference shares. There have been issued and fully paid seven preference; and 24,000 and 30,000 ordinary have been allotted, credited as fully paid.

**Directors:**

F. H. Forwood, *Chairman.*
Fred Levick. | Jas. Parker. | O. F. Waterfield.

**Head Office: T. H. Carlton Levick, 13 and 14 Abchurch Lane, London.**

Formed to acquire and work the Standard Pyrites Company's mines at Pilley's Island, in the Colony of Newfoundland. No report of operations received.

*Transfers*—Common form. Fee, 2/6.

## TILT COVE COPPER CO., Ltd.

Registered 4th April, 1888. Authorized Capital, £200,000, in shares of £2, £160,000 being ordinary, and the balance 10 per cent. preference. All the ordinary and £13,878 preference, have been issued and paid. There are also 5½ per cent. debentures for £80,000, redeemable only at the option of the company. In 1888-9 there was a deficit, after providing for debenture interest of £15,575, and in 1889-90 this debit was increased to £25,991; in 1890-91, £34,379 8s. 5d.;

**TILT COVE COPPER CO.**—Continued.

1891-2, £34,909 12s. 8d.; 1892-3, £36,408 4s. 1d.; 1893-4, £37,276 3s. 9d. In June, 1890, the properties were leased for 99 years to the Cape Copper Co., Ltd., at a rental of £4,400 per annum—sufficient to cover the debenture charges—the Cape Copper Co. has power to determine the lease at any time on giving twelve months' notice. The Cape Copper Co. were to advance £15,000 by way of loan to the Tilt Cove Co. at 5 per cent. interest, and the whole of this amount has been paid; the loan is to be repaid out of profits, surplus profits thereafter to be divided equally between the two companies.

**Directors:**

J. R. Francis. | J. C. Lever.
John Reeves. | John Taylor.
Col. J. W. Young.

**Head Office: E. C. Leaver, Secretary, 9 Queen Street Place, London, E.C.**

## NEWFOUNDLAND OFFICE:

**F. J. Williams, Tilt Cove, Newfoundland.**

Formed to acquire certain copper and other mineral properties at Tilt Cove, Twillingate district, Newfoundland.

The following is excerpted from the annual report presented to the shareholders November 13th, 1895:—

"Owing to the improved means of treating the ores at Tilt Cove, considerable savings have been effected. This fact, aided by the better prices obtained for a portion of the ores raised during the past year, has resulted in a gross profit of £8,824 0s. 2d. being obtained from the East Mine, as compared with a loss of £3,864 8s. 6d. on the previous year. The gross profit obtained has been sufficient to meet the rent, and to leave a balance of £4,552 12s. 8. towards meeting the interest charged against the Tilt Cove account. The amount of such interest, £5,163 12s. 11d., together with the further sum of £9,137 5s. 5d., has been transferred to the "Tilt Cove Suspense Account," bringing that amount up to £45,000. The Cape Copper Company has again derived considerable advantages from the treatment of the Tilt Cove ores at their smelting works in Wales, and in the operations of the Briton Ferry Chemical and Manure Company.

The Directors, recognizing the desirability of re-starting operations upon the West Mine, from which it is stated that considerable profit was at one time obtained, have made arrangements by which the debenture holders of the Tilt Cove Copper Company provide the necessary funds for that purpose. Operations there have accordingly been commenced. The pumping engines and general machinery have been put into repair and greatly improved. The mine has been completely unwatered, and the further sinking of the main shaft is being carried out. Some of the upper levels have been cleared, and the re-driving on them started. Small quantities of ore of a superior quality to that obtained from the East mine have already been extracted."

### Mine Reports, 1895.

*East Mine.*—Work here has gone on steadily, and the output is nearly up to that of last year. The reserves are estimated at about 148,000 tons, but at the two points mentioned in the Mine Agent's Report, viz., Nos. 7 and 9 stopes, we may hope for an extension of the ore ground. The roofs of the upper chamber may also be reckoned on as from 35,000 to 40,000 tons.

At the outcrop of ore on surface on the east of the mine, appearances are encouraging. The ore is similar in character to that in the mine, but at present rather softer and carrying small leaders of copper pyrites and a little blende.

Output for the twelve months: 64,470 tons 5 cwt. of 3.84 per cent. wet assay.

Nichols Chemical Co.—No. I, II and III Shafts, Albert Mines, Capelton, Que.

| | |
|---|---|
| Mining costs | $88,334.57 |
| Cost per ton raised | 1.37 |
| " per unit | .35 |

*West Mine.*—This mine has now been unwatered, skip road laid, etc., details of which work appear in the mine agent's report. Large quantities of ore were extracted during the former working of the mine, as the large excavations in the upper adit and 10-fathom levels show. In the 20, 30 and 40-fathom levels big deposits of ore were got, but the ground here has not been worked nearly to the extent of the upper workings, and there is every chance of striking deposits of ore as good.

Young's shaft is now down to the 40-fathom, and in cutting plat there preparatory to sinking another 10 fathoms, a bunch of ore was cut which promises to make well.

In the 20-fathom level, driving from under Bropty's winze towards the Flookan, the ground is very promising, being mixed throughout with ore.

*Smelting.*—Work at the new Beaver Cove furnaces was commenced on January 1st, and has continued steadily with but few stoppages, owing to smoke, etc. As the tramway from stone breaker to cupolas is under cover, there was no stoppage from snow during the winter. Details of work appear in the smelting manager's report.

*Shipping.*—Navigation opened early this year, the first boat, the "Duchess of Roxburghe," arriving here on May 20th. The weather has been fine throughout the summer, and steamers have had good despatch. Total shipments for the year, 30,927 tons, details of which are in the wharf master's report.

*Traffic Over Tramways.*

| | Tons. |
|---|---|
| Ore delivered to steamers | 20,150 |
| Regulus " " | 10,777 |
| Green ore to cupolas | 7,747 |
| Coals, Coke, Clay, etc., to east side | 3,000 |
| | 41,674 |

*Engines.*—The air compressor engines have been removed to the west mine, where, with the addition of reversing gear, etc., they are now employed in pumping and hoisting. The boiler of the Robey engine at the east mine is leaking badly, and crown plate is giving way. I expect we shall have to replace it with a new boiler, as it will not stand requisite pressure for pumping and hoisting purposes.

(Signed) FRAS. J. WILLIAMS, *Superintendent.*

MINE AGENT'S REPORT.

*East Mine*—Our working for the past year has been driving and stoping, back and underhand, through the ore mass, leaving pillars and arches to support the levels and backs of the chambers.

16-fathom level :—

No. 10 stope. Driving by the north wall through the ore continuing on west.

10-fathom level :—

No. 13 stope. Back stoping here by the north rock wall. This will be finished this month.

No. 11 stope. Back stoping here by west rock wall, continuing on. These backs will be finished in about four months' time.

No. 9 stope. This stope is a shoot of ore, from 18 to 20 feet wide, leading off by the western rock wall. About 90 feet from the main mass of ore, the ore became mixed with black iron, and poorer for copper. We stopped driving and came back to the point where this stope shot off from the body of ore, and sunk in the ore until we connected with the No. 10 stope at the 16-fathom level, and are now stoping out the bottoms to a level with the 16-fathom level bottoms. The ore is still going down, and is a little softer than the main body of ore.

Upper chambers, 5 fathoms above the adit level, Nos. 4, 6 and 14 stopes. Driving in the ore mass in the west part of the mine. Still continuing westerly.

**TILT COVE COPPER CO.**—Continued.

Nos. 5 and 7 stopes, in the east part of the mine. No. 7 stope was driven south about three months ago. We cut the south rock wall, running east and west, the ore making a turn to the east through the wall, and we are now driving east in ore, leaving ore south running off at right angles to the rock wall running west.

No. 5 stope driven south, cut the rock wall in the east corner of the stope, and at present we are blasting the ore from the rock wall.

No. 2 stope has been driven S. S. W. in the mass, but has been stopped as the ore was poor.

On the hill at surface we have unearthed an outcrop of ore mixed with rock, about 100 feet east of present end of No. 7 stope, which we are now prospecting on, the appearances are very encouraging, and I am of opinion that it is the outcrop of the ore that we are driving on in No. 7 stope. If it is, it is capped over by a layer of rock between the two points, but we shall soon prove that as No. 7 is still advancing, and we will sink on the outcrop, and then drive in the direction of No. 7.

### Reserves.

I have considered very carefully the amount of ore that can be seen standing in the mine, and my estimate of reserves is as follows:—

| | Tons. | Tons. |
|---|---|---|
| Adit chambers, old No. 2 stopes, back | 2,718 | |
| " " " bottoms | 2,600 | |
| | | 5,318 |
| 10-fathom level west of shaft | 14,920 | |
| " east of shaft | 2,000 | |
| " No. 9 bottoms | 2,700 | |
| " No. 1 backs | 8,900 | |
| " No. 11 backs | 3,500 | |
| | | 32,020 |
| 16-fathom level west of shaft, back and breast | 14,000 | |
| " east " " " | 2,000 | |
| | | 16,000 |
| Upper chambers, No. 7 stope, breast | 4,060 | |
| " No. 4, 6 and 14 stopes, breast | 20,400 | |
| " " " " floors | 70,000 | |
| | | 94,460 |
| Total | | 147,798 |

### Report of Smelting Works.

The new Beaver Cove works started on January 1st, and the cost of smelting was considerably reduced.

With the exception of a few short stoppages, caused by the exceedingly dry summer, stopping our water supply, and the strong sulphur smoke which adverse winds blew into the works, the cupolas have worked well and regularly throughout the year.

The tonnage of ore smelted and regulus produced during the year is as follows:—

| | Tons. | cwt. |
|---|---|---|
| Green ore | 35,193 | 0 |
| Calcined regulus | 650 | 15 |
| Calcined ore | 30 | 5 |
| Total smelted | 35,874 | 0 |

Regulus produced, 16,582 tons 17 cwt. 39 lbs. at 7·64 per cent.

The reverberatory furnace for smelting green ore fines is completed, and will start as soon as the furnacemen arrive from Briton Ferry.

## OTHER COPPER, NICKEL AND PYRITES COMPANIES.

| Company. | District. | Head Office. | Remarks. |
|---|---|---|---|
| Algoma Copper Mining Co. | Tps. Gould and Gladstone, Dist. Algoma. | Thessalon, Ont. | Incorporated, 1896. Capital, $1,000,000. Being organized. |
| Commercial Mining Co. of Algoma | Tp. Navin, Ont. | 166 N. St., Boston | Property contains 139½ acres, not in operation. |
| Consolidated Electrical Mining Co. of Canada | West Broughton, Que. | Dr. Reed, Reedsdale, Que. | Property includes well-known Harvey Hill Copper mine which will be worked in 1896 |
| Craig Syndicate | Tp. of Craig, Algoma, Ont. | 18 King W., Toronto. | Not in operation. |
| Drury Nickel Co. | Sudbury, Ont. | Whitefish P.O., Ont. | In liquidation. |
| Fairbanks Consolidated Mining Co. of Ontario | Tp. of Creighton, Fairbanks and Trill, Ont | J. L. Nichols, 17 Yonge St., Toronto. | Property contains 1152 acres. Not worked in 1895. |
| Grasselle Chemical Co | Tp. of Ascot, Que. | Cleveland, Ohio | Owns the Moulton Hill and Howard Mines; worked several years but not in operation at date of report. |
| Memphremagog Mining Co. | Tp. of Potton, Que. | C. C. Smith, Sherbr'ke | Capital $50,000. Property contains 150 acres |
| Spanish River Talc and Nickel Mining Co. | Tp. of May, Algoma Dist., Ont. | H. Dreamy, North Bay Ont. | No report of operations in 1895 received. |
| Sudbury Mining Co | Tp. of Denison, Ont. | G. Dunstan, 106 Bay st., Toronto. | Capital $90,000. No report received. |
| | | | Property contains 160 acres. Authorized capital $100,000. No mining done yet. |

# Chromic Iron.

# Chromic Iron.

—

This valuable mineral is found at many points thoughout the serpentine belt of the Eastern Townships of the Province of Quebec, from the boundary of the State of Vermont to the Shickshock mountains in Gaspé. It was first described in the report of the Geological Survey of Canada, 1847-8, as occurring in the Township of Bolton, on Lot 26, VII Range, in a vein said to be 1 ft. thick, a sample of which gave Dr. Sterry Hunt an assay 45.90 oxide of chromium In 1863, Sir William Logan mentions a shipment to Glasgow of 11 tons of over 50 per cent. chromic oxide, which realized $52.00 per ton.

In 1894 considerable interest was excited by the discovery of valuable deposits in the Township of Coleraine, and at other points on the line of the Quebec Central Railway, the shipments for the twelve months amounting to 915 tons.

For the year ended 31st December, 1895, the shipments were :—

| | | |
|---|---|---|
| To Philadelphia ..... | 807 | tons. |
| " Baltimore ..... | 725 | " |
| " Pittsburg ..... | 810 | " |
| " Liverpool ..... | 400 | " |
| " Glasgow ..... | 41 | " |
| " Nova Scotia ..... | 54 | " |
| Total shipments in 1895. | 2,837 | " |

There were also about 1,200 tons delivered at the Q. C. Railway and at the mines ready for shipment.

The chief use of chromic iron is in the chemical industry for the manufacture of potassium and sodium bichromates, for the preparation of basic furnace hearths, and for the manufacture of ferro-chromium, which is used in the making of chrome steel. Much the greater part of the mineral produced is employed in the chemical industry and for this purpose the best ores are required. In the manufacture of ferro-chromium the low grades of ore can be advantageously used.

The average selling price for potassium bichromate for the year 1893 was about 10 cents per pound—from 9 9/16 cents to 10 1/16 cents. It sold for the same price in the first part of 1894, but in consequence of the change in import duty the Scotch competitors threw such a large quantity of the article on to the American market that the price went down to 8¾ cents and even 8½ cents, and it is at these figures that it has been selling for the last twelve months. There is little prospect of a change in the price. The difference of 2 cents a pound between bichromate of potassium and bichromate of sodium has been retained, the latter selling now for about 6½ to 6¾ cents per pound.

PRICES OF BICHROMATE OF POTASH IN THE UNITED STATES FROM 1845 TO 1895.

| Years. | Cents per pound. | Years. | Cents per pound. |
|---|---|---|---|
| 1845 | 19 7/8 | 1871 | 16 5/8 |
| 1846 | 18 3/8 | 1872 | 20 1/16 |
| 1847 | 17½ | 1873 | 20 9/16 |
| 1848 | 16 3/8 | 1874 | 18 1/8 |
| 1849 | 13¾ | 1875 | 18 5/16 |
| 1850 | 22 5/8 | 1876 | 15 5/8 |
| 1851 | 17 | 1877 | 13 |
| 1852 | 15 5/8 | 1878 | 12 7/16 |
| 1853 | 15 | 1879 | 12 7/16 |
| 1854 | 15 1/16 | 1880 | 13 7/8 |
| 1855 | 14 11/16 | 1881 | 15 3/8 |
| 1856 | 16½ | 1882 | 15½ |
| 1857 | 18¾ | 1883 | 14 9/16 |
| 1858 | 20¾ | 1884 | 11 1/8 |
| 1859 | 19 | 1885 | 10 |
| 1860 | 20¾ | 1886 | 9 7/8 |
| 1861 | 20¾ | 1887 | 10 |
| 1862 | 20 3/8 | 1888 | 10½ |
| 1863 | 23 1/8 | 1889 | 11 3/8 |
| 1864 | 26¼ | 1890 | 10½ |
| 1865 | 25½ | 1891 | 9 13/16 |
| 1866 | 23 7/8 | 1892 | 10½ |
| 1867 | 19 3/8 | 1893 | 10 |
| 1868 | 18 5/8 | 1894 | 9 3/8 |
| 1869 | 16 7/8 | 1895 to July 1 | 8¾ |
| 1870 | 14 1/8 | | |

## Chromic Iron Producers in 1895.

| Operator. | Location. | Principal's Address. | Remarks. |
|---|---|---|---|
| Anglo-Canadian Asbestos Co. | Township of Coleraine. | Bd. Trade Bdg., Montr'l | Output about 100 tons in 1895. |
| Beaudoin, L... | do do | Thetford | No returns. |
| Dumais & Sons. | do do | Thetford | Output 160 tons; shipped 125 tons. |
| Frechette & Co. | do do | St. Ferdinand d'Halifax | 100 tons shipped in 1895. |
| Gardner, Mr... | St. Ferdinand d'Halifax | | |
| Halifax Chrome Co | Newfoundland | T. R. Gue, Halifax, N.S. | Capital $60,000; Organised 1896. |
| Hall, G. B. & Co | Township of Coleraine. | Quebec | Output in 1895, 75 tons. |
| Lake Caribou Mining Co... | do do | D. Wilson, Black Lake. | Output 400 tons. |
| Lambly, W. H. & Co | do do | Inverness | Output 1,400 tons; 1,200 tons ship'd. |
| Lemelin, J. & Co | do do | Black Lake | Output 430 tons; 300 tons shipped. |
| Leonard & Morin... | Garthby | Garthby | Output 300 tons; 236 tons shipped. |
| Nadeaux, J. & Co | Township of Coleraine. | Black Lake. | |
| Nayes, F. | do do | Black Lake | Output in 1895, 35 tons. |
| Roberge, Blondeau & Co.. | do do | J. Blondeau, Black Lake | Output 200 tons; shipped 120 tons. |
| Topping, R. & Co | do do | D. M. Poirier, St. Ferdinand d'Halifax | Output 50 tons. |
| Vaillancourt, P. & Co | do do | Black Lake. | |
| Victoria Chrome Mine | do do | P. P. Hall, Quebec | Output 220 tons; shipped 146 tons. |

# Gypsum

# Gypsum.

Gypsum, the production of which is steadily increasing, is at present produced in Ontario, New Brunswick and Nova Scotia, though deposits have been found in Manitoba and the Territories

## Nova Scotia.

The extraction of gypsum in Nova Scotia attracts little attention, but this mineral forms an important item in her resources. It occurs, associated with the carboniferous limestones, and is equally widespread. It is reported from all the counties, except those bordering on the Atlantic, and is especially abundant in Hants, Colchester, Antigonish, Cape Breton, and Inverness counties. Its mode of formation by some union of lime and sulphuric acid in the immediate vicinity of the readily decomposed beds of limestone has been a bone of contention among scientists and is not yet settled.

The gypsum may be divided into hydrous and anhydrous, or as they are locally known, into hard and soft plaster.

The soft or hydrated variety contains

| | Per cent. |
|---|---|
| Lime | 32.55 |
| Sulphuric acid | 46.51 |
| Water | 20.94 |
| | 100.00 |

The hard or anhydrite plaster contains no water or crystallisation. These two minerals and intermediate mixtures, probably making steps toward a state of total hydration, occur together in alternating beds or masses, forming enormous deposits of great commercial value, and readily accessible for the cheapest quarry methods owing to their frequent outcrops.

In places the run of the plaster deposits may be traced for miles, and they show a corresponding development in thickness. Maitland, Ogdenslake, Port Hastings and other localities present cliffs upwards of 200 feet in height.

Hard plaster has not received much attention, and awaits the work of the experimentalist to take its place among our useful minerals. The soft-plaster is again sub-divided into blue and white. The blue plaster, which is abundant at Windsor, is valued chiefly for agricultural purposes It is shipped as "rock" to New York, Jersey City, etc., and there ground and used as a dressing for cotton, peas, etc.

White plaster, while equally adapted for agricultural purposes, is specially valued for yielding, when heated, a soft, white powder, the water being driven off. This, when mixed with water, "sets" and becomes hard. This property makes it valuable for "plastering," making casts, cornices, ornaments, etc. The crystalline variety, known as selenite or "mica,' is often found in the quarries in masses or irregular veins, and is in demand as a filler for paper.

The export trade to the United States is chiefly supplied from Windsor, Cheverie, Walton and Hantsport, on the Basin of Minas, and a little is sent from the Victoria gypsum quarries, near Baddeck. The last named quarries supply the trade of the Gulf of St. Lawrence. As the uses of this mineral increase numerous other points may be relied on to furnish it cheaply and of good quality. A small amount is burned for local uses in architectural work, or ground for use in fertilizers, etc., but the bulk of the plaster is shipped as "rock" to the States, where large factories work it up. Did the duty on this article allow the manufactured product to enter the States, it would be ground in Nova Scotia and the value of the export would be over $500,000 per annum.

The shipments from Windsor from 1832 to 1867 amounted to 1,404,376 tons, the price varying from 58 to 98 cents, and averaging 73 cents per ton. From that date until the close of 1895 about 2,000,000 tons more have been shipped, the price last year being returned at $1 per ton. In addition for many years past large quantities have been shipped from Cheverie, Walton, etc., the total provincial shipments reaching in some years 160,000 tons. The price of some of the Basin of Minas plaster is returned as low as 50 cents per ton. Even at these low figures fair profits are stated to be made, and this can be believed when the quarries are seen, above water level, close to shipping, and readily drilled and blasted.

The following table shows the Nova Scotia shipments for the past six years:—

| | 1895. | | 1894. | | 1893. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Arichat, C. B... | 1,510 | $ 1,510 | .... | ..... | 5,025 | $ 5,025 |
| Baddeck, C.B ... | 15,610 | 14,052 | .... | ..... | 13,706 | 13,706 |
| Windsor.... .... | 96,035 | 96,035 | 80,006 | $80,006 | 62,901 | 62,901 |
| Cheverie ..... | 14,045 | 7,407 | 18,205 | 10,287 | 9,868 | 6,634 |
| Walton..... | 6,100 | 5,763 | 7,010 | 6,336 | 4,555 | 4,437 |
| St. Anne, C.B... | .... | ..... | 950 | 900 | .... | ..... |
| Port Hood, C.B.. | .... | ..... | .... | ..... | 1,542 | 1,156 |
| Mabou, C.B..... | ... | ..... | .... | ..... | 11,700* | 11,000 |
| Parrsboro..... | .... | ..... | .... | ..... | 650 | 650 |
| | 133,300 | $124,767 | 106 171 | $97,529 | 98,247 | $95,509 |

*Add Mabou 27,000 bags ground plaster.

| | 1892. | | 1891. | | 1890. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| Arichat, C.B..... | 1,660 | $ 1,500 | 510 | $ 510 | 470 | $ 470 |
| Baddeck, C.B.... | 11,784 | 10,386 | 16,000 | ..... | .... | ..... |
| Parrsboro..... | 30 | 30 | .... | ..... | .... | ..... |
| Arichat, C.B..... | 1,030 | 1,030 | .... | ..... | .... | .... . |
| Windsor .... .... | 124,531 | 124,531 | 118,969 | 116,479 | 112,264 | 112,264 |
| Cheverie ..... | 15,891 | 11,722 | 17,330 | 13,433 | 26,071 | 19,533 |
| Walton.. ..... | 7,165 | 6,519 | 7,125 | 7,001 | 6,300 | 5,750 |
| Halifax..... | 120 | 390 | 1,200 | 1,312 | 346 | 1,688 |
| Mabou..... | .... | .... | 800 | ..... | 298 | 298 |
| | 162,285 | $156,108 | 161,934 | ..... | 145,749 | $140,003 |

The above are shipments and do not include plaster used in Nova Scotia.

## New Brunswick.

Gypsum is one of the most abundant of the economic minerals of New Brunswick, occurring in beds of great extent and thickness near the top of the lower carboniferous formation, especially in Albert, King's and Victoria counties.

The deposits which have been longest known and most extensively worked are those near Hillsboro, in Albert county, being the property of the Albert Manufacturing Co. The total area occupied by the plaster beds in this vicinity is not accurately known, but from the position and relation of several quarries it seems certain that this is quite large, while the exposed thickness of the bed varies from 70 to 100 ft. Of this, however, a portion is anhydrite or hard plaster, the associated gypsum being mostly a pure white or slightly clouded alabaster, which is occasionally translucent, but more generally opaque. Small crystals of selenite occur in some portions of the mass, but are comparatively rare. The rock is distinctly stratified, and usually accompanied by limestones.

For some years the Hillsboro plaster was employed only for exportation in the raw state, but in 1861 works were erected for its calcination, and since that time have been kept pretty steadily in operation, supplying both the burned and unburnt product. The productive capacity of these quarries and works (in 1895) was 56,572 tons, giving employment to 165 persons.

Of other localities containing workable beds of gypsum, one occurs upon the North river, a few miles from Petitcodiac station on the Intercolonial Railway It is remarkable in contrast with that of Hillsboro, in being highly crystalline, nearly the whole mass, about 40 rods in breadth, being granular or fibrous, while a vein of coarsely crystallized selenite, from 6 to 8 ft. in diameter, is traceable through the mass for a distance of a mile or more. A large quantity of gypsum has been removed from this locality, but has not been subjected to calcination. Large and valuable beds of gypsum also occur upon the Tobique river, in Victoria county.

## Ontario.

The gypsum quarries of the Grand river valley, in the counties of Brant and Haldimand, have been worked for more than forty years. Two grades of gypsum are found in the district, the white and the grey;

the latter occurs at Paris, and both in the beds lower down the river The grey gypsum is used chiefly as a fertilizer, it being unsuitable in color for alabastine, stucco or any kind of ornamental work ; the white answers for any purpose, but should the demand increase it will doubtless be used chiefly in the arts.

The gypsum deposits on the Grand river occur with layers of dolomite and shale, and are usually in the form of mounds or hillocks of diameters ranging from a few yards to half a mile, from 3 to 7 ft. in thickness at the centre and gradually thinning off towards the circumference. The overlying strata rest conformably upon these mounds, so that the presence of a gypsum deposit in locality may be determined by the mound-form of the surface. The beds are never continuous for long distances, the gypsum being found almost always in lenticular masses

Mills for grinding the rock have been erected at different points, and about 6,000 tons of land plaster are manufactured annually. Within the last three or four years calcining works have been established at Paris and near Cayuga, where the manufacture of calcined plaster and alabastine is carried on. In Toronto it is manufactured into material for plastering the walls of houses, for which there is a growing demand. The production of gypsum in the Province in 1892 was 3,870 tons of a value of $14,100; in 1893, 2,818 tons of a value of $7,363; in 1894, 3,253 tons of a value of $9,760.

## Commercial Uses.

The mineral is used in two different forms of preparation : (1) as land ground plaster, unburned ; (2) as plaster-of-paris or stucco, ground and burned. There is also a small amount of the massive mineral used for the manufacture of ornamental articles, which are turned from it. The mineral is usually, however, too soft and friable to be valuable for such purposes.

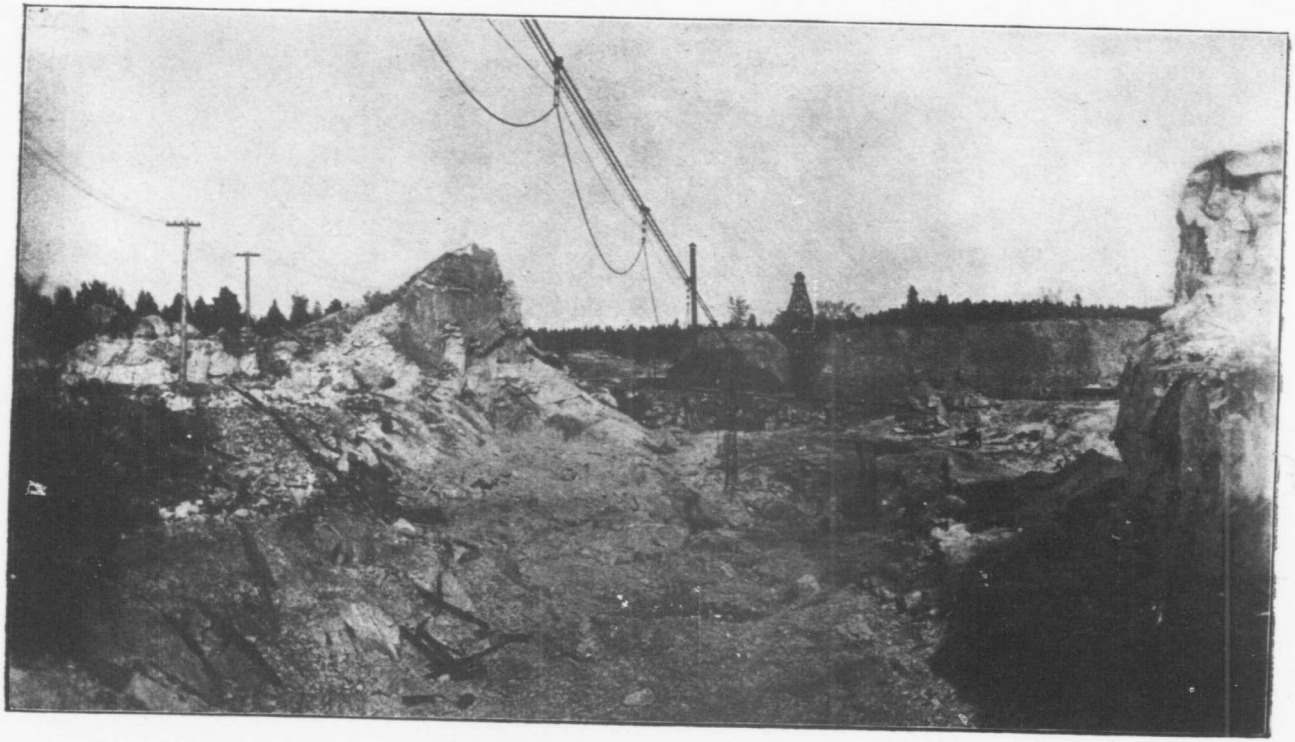
Land plaster has among others the following applications, of which its largest use is an agricultural one : Manufacturers of artificial fertilizers consume large amounts of it in weighting their products, while its absorbent properties enable them by its use to improve the mechanical condition of the other constituents of the fertilizers. It is also largely used as an adulterating material for the cheaper grades of flour, for coloring materials under the name of terra alba and for various chemical

preparations. It has some use in the manufacture of ammonium sulphate from ammonium carbonate, and it is employed as a cement for repairing

Plaster-of-Paris is used for a great variety of purposes. Among numerous others the following are mentioned: It is used as a filling for fireproofing purposes; and as the material for making molds in the manufacture of many articles. Potters make the molds for their white and porcelain ware from it, and makers of terra cotta employ it for a similar purpose. The molds used in making elbows, curves, etc., in the sewer-pipe manufacture are made from it. It is used for taking casts of natural objects and works of art, for sculptors' models, lay figures, etc. Surgeons employ it to confine the parts of a broken limb, and dentists to take casts of the mouth for false teeth. It is largely used in plastering walls and ceilings—as an ingredient in alabastine, which is a preparation for finishing interior house walls—and in making cornices and other work of interior house decoration. It is one of the ingredients of blackboard crayons; it is used as a cement in various manufactures; and, mixed with infusorial earth, as an absorbent for drying purposes. It is sometimes used by miners and quarrymen as a material for tamping blasts, and for this use its great advantage is that no tamping bar is needed and consequently there is little danger of premature explosions. It is added, in small quantities, to light wines in order to retard fermentation and prevent them from becoming acid; and is also added to strong wines to absorb the water that they contain and thus increase the amount of alcohol in them.

PRODUCTION AND EXPORTS OF CRUDE GYPSUM, 1886–1894.

| YEAR. | Production. | | Exports. | |
|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. |
| | Tons. | $ | Tons. | $ |
| 1886 | 162,000 | 178,742 | 107,237 | 114,736 |
| 1887 | 154,008 | 157,277 | 148,533 | 166,514 |
| 1888 | 175,887 | 179,393 | 124,515 | 133,238 |
| 1889 | 213,273 | 205,108 | 176,875 | 189,491 |
| 1890 | 226,509 | 194,033 | 175,111 | 193,899 |
| 1891 | 203,545 | 192,096 | 172,496 | 184,977 |
| 1192 | 226,568 | 225,260 | 175,518 | 194,304 |
| 1893 | 192,568 | 196,150 | 176,489 | 178,979 |
| 1894 | 223,631 | 202,031 | 162,412 | 160,082 |



Wentworth Gypsum Co.—View of Quarries.

EXPORTS OF CANADIAN GYPSUM, 1890–1895.

| Fiscal Year. | To United States. | To British Guiana. | To Newfoundland. | Total. |
|---|---|---|---|---|
| 1890 | $191,623 | $2,276 | ..... | $193,899 |
| 1891 | 183,679 | 1,298 | ..... | 184,977 |
| 1892 | 193,170 | 1,134 | ..... | 194,304 |
| 1893 | 178,979 | ..... | ..... | 178,979 |
| 1894 | 159,662 | ..... | $420 | 160,082 |
| 1895 | 156,897 | ..... | ..... | 156,897 |

EXPORTS BY PROVINCES, 1890–1895.

| Fiscal Year. | By Ontario. | By Nova Scotia. | By New Brunswick. | Total. |
|---|---|---|---|---|
| | Tons. | Tons. | Tons. | Tons. |
| 1890 | 168 | 142,168 | 32,167 | 174,503 |
| 1891 | 210 | 145,173 | 27,113 | 172,496 |
| 1892 | .... | 153,193 | 25,325 | 178,518 |
| 1893 | .... | 146,880 | 29,609 | 176,489 |
| 1894 | .... | 127,399 | 35,013 | 162,412 |
| 1895 | .... | 121,201 | 39,697 | 160,898 |

## ADAMANT MANUFACTURING CO. OF AMERICA.

Authorized Capital, $500,000.

**Officers :**

E. W. Parmelee, *President.* | G. G. Ruston, *Sec.-Treas.* | C. G. Root, *Vice-President.*

**Head Office : 309 East Genesee Street, Syracuse, N.Y.**

This company owns and works for gypsum, an area comprising 65 acres at North Cayuga, in the County of Haldimand, Province of Ontario. Small force employed. The works at Syracuse, N.Y., are supplied with gypsum, chiefly obtained from Nova Scotia and New Brunswick.

*Superintendent :* J. A. Nellis, North Cayuga, Ont.

## ALABASTINE CO., Ltd.

Incorporated 1885. Authorized Capital, $50,000, in shares of $100 each, of which to date, $34,000 have been subscribed and paid up.

**Directors :**

M. B. Church, Grand Rapids, Mich.
J. M. Wheeler, Paris, Ont. | Abram B. Knowlson, Grand Rapids, Mich.
David S. Hopkins, Grand Rapids, Mich. | Chas. R. Haire, Holyoke, Mass.
R. E. Haire, Paris, Ont.

**Head Office : J. M. Wheeler, Secretary, Paris, Ont.**

This company operates extensive white rock gypsum mines in the County of Haldimand, and owns and works in Paris, Brant County, the only grey plaster mines in Ontario. It has recently added to the works at Paris a calcining plant for making plaster of Paris. Seventeen persons employed. Estimated value of machinery plant and buildings owned by the company, $15,750.

## ALBERT MANUFACTURING CO., Ltd.

Incorporated 1854. Authorized Capital, $350,000.

**Directors :**

James G. Lindsley, *President.*
J. T. Tomkins. | Walter Tomkins. | Calvin Tomkins. | C. J. Osman.

**Head Office : C. J. Osman, Superintendent, Hillsborough, N.B.**

Operates four gypsum quarries and a plaster mill at Hillsborough in Albert County, Province of New Brunswick. The returns for 1894 show an output of 40,000 tons, of which 30,000 tons rock plaster were shipped together with 45,000 bbls. of plaster. In 1895 the shipments of rock plaster amounted to 50,046 tons, while 6,526 tons were manufactured into 50,000 barrels of calcined and land plaster. 165 persons employed in 1895.

## GRAND RIVER PLASTER CO.

Authorized Capital Stock, $50,000, divided into shares of a value of $100 each, the whole of which have been subscribed and fully paid.

**Directors:**

Dr. Coles.
Geo. S. Coutant. | Ernest R. Ackerman.
M. Albert Scull. | Wm. Hamilton Merritt.
Marion S. Ackerman, *Secretary*, 67 William Street, New York.

**Head Office: Cayuga, Haldimand Co., Ont.**

This company controls the gypsum underlying 300 acres of land known as the Huff Tract, and 116 acres known as the Jones Tract, at North Cayuga, in the County of Haldimand, Ontario, upon which are situated the Merritt and Glenny gypsum quarries. The former has been worked for a period of forty-five years, and the latter some twelve years. Average yearly output, 500 tons. The company also manufactures calcined plaster, white and grey land plasters, etc. Twelve men employed.

## NEWPORT PLASTER, MINING AND MANUFACTURING CO., Ltd.

Incorporated 1892. Authorized Capital, $40,000, in 400 shares of $100.

**Directors:**

C. H. Dimock, *President.*
E. N. Dimock, *Sec.* | J. B. King.

**Head Office: E. N. Dimock, Secretary, Windsor, N.S.**

The company's property contains 156 acres, upon which is operated gypsum quarries at Newport, Hants County, Nova Scotia, within half-mile from Newport station, on the Windsor & Annapolis Railway and six miles from shipping wharf at Windsor. In addition to the white plaster mines at Newport, the company controls the output of quarries at Meller's Creek and Walton, and a land plaster quarry known as "Grants," at Summerville.

*Superintendent:* E. Shaw, Walton.

## NOVA SCOTIA GYPSUM CO., Ltd.

Incorporated 1894. Authorized Capital, $2,000,000, in shares of $20.00.

**Directors:**

Vincent King, New York. | J. E. Peters, Port Greville, N.S.
J. Taggart, Parrsboro, N.S.

**Head Office: J. Taggart, Parrsboro, N.S.**

Formed to quarry gypsum in the Province of Nova Scotia. Being organized.

## TOBIQUE GYPSUM CO., Ltd.

Incorporated 1893. Authorized Capital, $200,000, consisting of $150,000 of "A" stock, being ordinary stock of the company divided into 1,500 shares of $100 each, and $50,000 of "B" stock, divided into 500 shares of $100 each, being preference stock, having preference and priority as respects dividends, at the rate of six per centum per annum thereon, and in the distribution of assets, with the provision that the holders of such preference shares shall have the right to select two directors if the board consist of five directors, and three directors if the board consist of seven directors. The amount of capital stock actually subscribed is $104,000, being $18,000 of preferred and $86,000 of common or ordinary stock.

**Directors:**

Fred. H. Hall, Woodstock, N.B. | John Connor, St. John, N.B. | J. Stratton, St. John.

**Works: Parish of Gordon, Victoria County, N.B.**

Formed to operate gypsum properties in the Parish of Gordon, Victoria County, Province of New Brunswick. No report for 1894-95.

## TOBIQUE VALLEY GYPSUM MINING AND MANUFACTURING CO., Ltd.

Incorporated 18th August, 1893. Authorized Capital, $50,000, in 500 shares of $100 each.

**Directors:**

G. P. Brophy, *President.*

Hon. John Costigan. | Hon. H. A. Connell. | John Heney. | J. B. Lynch.

**Head Office: John P. Dunne, Secretary-Treasurer, Ottawa.**

Formed to acquire and work the Arbuckle plaster mine. The property contains 150 acres, owned outright, together with a mining lease of an area extending one square mile in the Parish of Gordon, Victoria County, Province of New Brunswick. In 1893, 30 persons employed. Value of machinery, plant and buildings, $14,000.

## VICTORIA GYPSUM MINING AND MANUFACTURING CO., Ltd.

Incorporated by an Act of Nova Scotia Legislature, assented to 15th April, 1890, and amended by an Act dated 19th May, 1891. Authorized Capital, $100,000, divided into 2,000 shares of a value of $50 each.

**Directors:**

Wm. Gibson, Williamsport, Pa., *President.*

J. C. Fender, Chester, Pa., *Treas.* | Hon. Gardener G. Hubbard, Washington, D.C.

W. F. McCurdy, Baddeck, C.B.

Wentworth Gypsum Co.--Cable Towers and Hoisting Plant at Quarries.

**Head Office: W. F. McCurdy, Resident Manager, Baddeck, C.B.**

Formed to mine and quarry gypsum on the Island of Cape Breton and elsewhere in the Province of Nova Scotia. The properties, a portion of which is held under lease, are all situate in Victoria County, N.S., and comprise the following parcels of land:—

730 acres at North Gut, St. Ann's; 725 acres at South Gut and Munroe's Point; 1,300 acres at Goose Cove; 1,400 acres at Port Bevis; 400 acres at Red Head; 400 acres at Gillies Point; 800 acres at Grand Narrows; 808 acres at Jamesville; 419 acres at Little Narrows; 400 acres at McAskill's Rear; 200 acres at Washabuck River.

In the fall of 1891 the company opened an extensive deposit of gypsum on its Port Bevis property, at a point about eight miles east of the town of Baddeck, and operations were carried on vigorously since. There has been built a line of railway two miles from the quarries to wharf, equipped with locomotives, cars, etc., the whole estimated to have cost in the vicinity of $30,000. The wharf at Port Bevis can accommodate vessels drawing 23 ft. of water.

The company has also at North Gut, St. Ann's Harbor, two fine quarries, almost at the water's edge; two good wharves, at one of which there is a depth of 15 ft. of water at low tide, and at the other 21 ft. These quarries are situate about eight miles from the quarries at Port Bevis. Both the harbors of St. Ann's and Port Bevis are very easy of access and may be called perfect harbors for large or small vessels. Capacity for shipping at Port Bevis wharf, 400 tons per day.

## WENTWORTH GYPSUM CO., Ltd.

Incorporated by an Act of the Legislature of Nova Scotia 19th May, 1891. Authorized Capital, $200,000, in 200 shares of $100 each.

Clarence H. Dimock, *Manager and Treasurer.*

E. Norman Dimock, *Secretary.*

**Head Office: Windsor, Nova Scotia.**

Formed to search and prospect for, to quarry, mine, work, win, manufacture and prepare for use and sale by any process, and carry, move, sell, ship and deal in gypsum, plaster-of-paris, lime, limestone, building stone, etc., in the Province of Nova Scotia and Island of Cape Breton. Owns a property containing about 1,000 acres at Wentworth, in the township of Windsor, Hants county, Province of Nova Scotia. Two hundred persons employed. Owns and operates a line of railway, locomotives and rolling stock, connecting with shipping wharves about two miles distant from quarries. The equipment comprises two cable derricks, each having a span of 1,025 ft. and of a capacity of 500 tons per day, electric rock drills and other plant. The annual output is about 100,000 tons.

# Mica Mining

# Mica Mining.

The occurrence of mica in economic quantities is now known at various points over a very extended area. Thus in Ontario the mines of Burgess and the adjacent townships yield large quantities, generally of the phlogopite variety. Along the Ottawa river it is found from a point nearly 100 miles west of Ottawa, to the township of Grenville, 60 miles east of that city; while on the Gatineau river, which flows into the Ottawa at the city of Ottawa, mines have been located and worked for 80 miles north from its mouth, and the mineral is reported from points many miles farther north along that stream. To the east of Quebec it is known on the branch of the Saguenay called the Manonan, and in the townships of Escoumains, Bergeronnes and Tadousac, situated east of the mouth of that river, as well as at several other places along the River St. Lawrence. The mica found in this district is chiefly muscovite. Discoveries of workable deposits are also reported from British Columbia on the Canoe river and Téte Juan Cache districts.

The principal areas where the mineral is at present worked are in the belt which extends from North Burgess in Ontario, into the territory adjacent to the Gatineau and Lievre rivers, Ottawa County, Que.

## Preparation for Market.

Care is taken in mining to avoid drilling through the mica crystals, or to break them unduly. The blocks hoisted from the mine are sent to the stripping room where extraneous matter, as pieces of quartz, feldspar, wall rock, and fragments of mica are removed. It is then taken to the "mica shop," where it is split with knives into sheets of the required thinness, and afterward sheared into sizes. The workman has on his bench a stationary pair of shears and a large number of blocks or templates of the sizes to be cut. An experienced mica cutter can tell at a glance the largest size which can be cut from a given piece of split mica; he selects the proper template, holds it on the mica, and shears the four sides, using each edge of the block as a straight-edge. Each size sheared is set away by itself. The sheets are sheared by further scaling, if necessary, and finally packed in paper in pound packages.

One hundred pounds of good block mica may yield 33⅓ pounds cut mica ; an inferior block may yield only 5 pounds ; the average is 10 to 12 pounds. In the *Mineral Resources of the United States* it is stated that a 100 pound block from the Flat Rock mine, gave 75 pounds of cut mica. This is a record yield, and is very far above the average.

At the factory of the Lake Gerard Mica Mining System in Ottawa, this hand labor is greatly reduced and a great saving effected by the use of patented cutting machines operated by electricity. This company has twenty-three power presses for cutting irregular shaped dies and segments. They are of American manufacture ; twenty of them from the E. W. Bliss Co. Ltd., of Brooklyn, N.Y., two made by the Ferracute Machine Co., of Bridgeton, N.J., and the other manufactured by the Long and Allstatter Co., of Hamilton, Ohio. Eighteen of the Bliss machines are the well known Bench presses and especially suitable for cutting patterns most in demand at the present time. The dies used in this factory are the most complete at present in use for this purpose, and include some sixteen different patterns, ranging in size from 5¼ x 10 in. to ⅞ x 3 in., and with a few exceptions, are all made in Ottawa. In addition to the cutting presses already mentioned, there are in use ten cutting shears for two-siding and cutting material of unusually large size The production of merchantable sheets is usually from 4 to 5 per cent. of the block mica brought from the mine, and may run as high as 8 or ten per cent.

### Prices of Canadian Mica.

The following are the standard prices for Canadian mica, as adopted by agreement by the producers in 1895, on lots of not less than one ton of 2,000 lbs.

Rough split, edges untrimmed. Run of the mine, to cut :—

| Inches. | Per lb. |
|---|---|
| 1x3 to 2x4 | $0.06 |
| 2x4 to 3x5 | 15 |
| 3x5 to 4x6 | 25 |
| 4x6 to 5x7 | 60 |

Rough split, trimmed, to cut :—

| Inches. | Per lb. |
|---|---|
| 1x3 to 2x4 | $0.10 |
| 2x4 to 3x5 | 25 |
| 3x5 to 4x6 | 50 |
| 4x6 to 5x7 | 1.00 |
| 5x7 and up | 1.50 |

IMPORTED BY THE UNITED STATES.

| Years ending. | Value. | Years ending. | Value. |
|---|---|---|---|
| June 30, 1869 | $1,165 | June 30, 1882 | $5,175 |
| 1870 | 226 | 1883 | 9,884 |
| 1871 | 1,460 | 1884 | 28,284 |
| 1872 | 1,002 | 1885 | 28,685 |
| 1873 | 498 | Dec. 31, 1886 | *56,354 |
| 1874 | 1,204 | 1887 | *49,085 |
| 1875 | ..... | 1888 | *57,541 |
| 1876 | 569 | 1889 | *97,351 |
| 1877 | 13,085 | 1890 | *207,375 |
| 1878 | 7,930 | 1891 | 95,242 |
| 1879 | 9,274 | 1892 | 218,938 |
| 1880 | 12,562 | 1893 | 147,927 |
| 1881 | 5,839 | | |

*Including mica waste.

The following statement, kindly furnished by the Treasury Department, at Washington, D.C., shows the countries from which the United States imported mica in 1895:—

| | Lbs. | |
|---|---|---|
| France | 1,315 | $481 |
| Germany | 1,544 | 1,999 |
| England | 110,491 | 33,979 |
| Scotland | 359 | 207 |
| Quebec | 546,905 | 36,401 |
| B. E. Indies | 148,056 | 48,731 |
| Japan | 12,000 | 2,194 |
| British Australasia | 312 | 292 |
| Total | 820,982 | $124,284 |

EXPORTS OF CANADIAN MICA FROM 1891.

| Fiscal Year. | To United States. | To Great Britain. | To Newfoundland. | To Germany. | Total Exports. |
|---|---|---|---|---|---|
| 1890 | $26,865 | $42 | $25 | .... | $26,932 |
| 1891 | 21,762 | 550 | .... | .... | 22,312 |
| 1892 | 67,961 | .... | 25 | $480 | 68,466 |
| 1893 | 86,871 | 10,024 | .... | 5 | 96,900 |
| 1894 | 26,484 | 58 | .... | 11 | 26,553 |
| 1895 | 43,023 | 3,921 | .... | 525 | 47,469 |

## Production.

(Geological Survey Returns.)

| | | | |
|---|---|---|---|
| 1886 | $20,008 | 1891 | $71,510 |
| 1887 | 20,816 | 1892 | 104,745 |
| 1888 | 30,207 | 1893 | 69,622 |
| 1889 | 28,718 | 1894 | 50,000 |
| 1890 | 68,074 | 1895 | 65,000 |

Note—All the above returns, it is quite evident, are underestimated, the system of making customs entries, upon which these figures are based, being of the loosest character.

## Industrial Uses.

The peculiar physical properties of the micas have secured for these minerals very widely extended uses in the arts—the size of the crystals, their highly perfect cleavage, their flexibility and elasticity, transparency and athermancy, chemical stability and imperfect powers of conducting electricity and properties which no other mineral can combine, and which cannot be readily or cheaply imitated by artificial means.

*Electrical Appliances*—Mica has been used for vibrating plates in the photophone. Edison has employed it also for vibrating plates in the telephone, and as a substitute for glass in the reflectors of electric lamps. The great factor in increasing the consumption of the mineral has been its demand for use in dynamos, electric motors and other electrical machinery. The insulating power of mica is superior to that of any other substance applicable to armatures. An advantage peculiar to itself is its even laminated structure. A piece of ordinary writing paper is about .005 inch; mica layers have been obtained of a thinness of .00003 inch. Mechanical difficulties prevent its being split thinner. By passing it upon a hard surface and splitting it off as much as possible, the remaining fragments are so thin as to become beautifully irredescent. The builders of armatures can therefore split the sheets into any desired and uniform thickness with great ease and accuracy. A valuable property of mica in connection with commutator insulation is its proper degree of hardness, whereby it does not wear away too rapidly under the action of the brushes. If rubber was used for example, even if it did not burn, yet it would wear off and sparking result, because the commutator surface would not be truly cylindrical. The brushes would be set into vibration. Again, mica is capable of the finest pulverization, so that any wearing which does take place does not result in the liberation of gritty particles, which would cause sparking. Mica is probably the best

Wallingford Mica Mine, Templeton, Que.

material for use in armatures, if it is desired to obtain not only efficient electric insulation, but also durability under the influence of heat

Mica for electrical purposes, must be flexible and non-conductive, color does not matter, but perfect cleavage is of the highest importance, as "electrical mica" must be of uniform thickness, and is often guaged to the thousandth part of an inch. The size of the sheets vary greatly, 450 different patterns being called for. The price is from 10c to $2.50 and upwards per lb, and varies with the size of the sheet and difficulty of cutting the pattern.

Canadian mica, on account of its superior cleavage, is preferred by electricians, and after gaining a foothold in the United States, it has more than held its own against the local and foreign product.

An instance of this may be cited in the following communication to the Geological Survey of Canada (see *Annual Report Mineral Statistics, 1890*), which says: "The bulk of mica used by us is Canadian mica, which is known in the market as 'amber mica,' being of amber color and clear. It is essential that the mica should be smooth, free from wrinkles and crevices, it must split readily and must be flexible, so much so that a piece of mica .010 inch thick would bend to a curvature of about 3 in. diameter without cracking. Mica that has dark spots or spots similar to rainbow colors, or what is known as smoky mica, is not at all suitable for electrical purposes. Mica must also stand a flame of intense heat without crumbling up or showing any disintegration. We give you below the principal sizes of mica used by us, and would say that at the present time, we have orders out for some of sizes ranging from 200 to 600 pounds. Commutator mica: 1½x4 in., 1¼x6⅝ in., 1⅝x4¼ in., 1⅜x6½ in., 1⅜x8 in., 1¾x8 in., 2x5 in., 2½x5 in, 2x7 in., 2x12 in., 2½x12 in., 4x4 in., 5x8 in. Binding mica: 1¼ in. wide.

*Micanite*—One of the most recent uses to which mica is commercially applied, is the manufacture of micanite, by which large quantities of scrap or inferior qualities are utilized, and by means of a patented process small pieces of waste mica are built up into sheets 40 inches square, and larger if necessary. The product can also be made in any desired form, and is largely supplied to the electrical trade for insulating purposes.

*Stove Panels*—No artificial transparent substance has, however, been devised to replace the mineral where high degrees or sudden changes of temperature take place. It has, therefore, considerable use

in stoves, where it is desirable to obtain the cheerful glow of the fire without the direct heat. Its transparency is little affected by the repeated and alternate heating and cooling, and it is not readily attacked by the gases and vapors, although it does not so effectually resist the gases from a bituminous coal and is moreover, so quickly blackened by the soot, that it soon loses its transparency. Its use, therefore, is confined to anthracite, or to gas asbestos stoves. For this purpose it has to be clear, free from spots, and of a uniform color through the sheet.

*Lamp Chimneys*—Chimneys for oil and gas lamps with round burners are sometimes made of mica, especially those outside shop windows, where glass would not stand rain drop splashes and sudden changes of temperature, while a breakage would involve considerable risk from fire.

*Fire Screens*—In consequence of its transparency for light and its capacity for radial heat, we find mica employed as fire screens, in the peep holes of furnaces, and as screens in the laboratory and workshops for observing the processes in a highly heated furnace without suffering from the intense heat.

*Glasses and Spectacles*—The best employment of the immense quantities and fragments of waste mica which suggests itself as worthy of a wider field than it now possesses, is the substitution of mica for glass in spectacles worn by workmen, especially stone and metal workers, to protect their eyes from chips and splinters. As already made in Germany these mica glasses are concaved in the shape of watch glasses, and are about one-twenty-fifth of an inch in thickness. The advantages gained by this utilization are greater than would at first sight be imagined. Mica spectacles cannot be broken. Pounding with a sledge hammer merely flattens them; nor does molten metal poured on the mica affect it. The shower of pointed iron particles which issue from lathes merely rebound from the elastic mica glasses.

*Paints, Wall Papers and Ornamental Uses.*—Another use for mica is its application, where previously colored or metalized, to ornamental purposes. From its unalterable nature the material preserves gilding, silvering or coloring from deterioration; and from its diaphanity, the articles so treated will preserve all their brilliancy. Finely ground mica or colored gelatine, also shows handsome effects, and when mixed with a solution of gumarabic, it makes a good silver ink. The gelatin com-

bination is used for inlaying buttons, and this beautiful application of mica is the production of bronze-like colors which bear the names brocades, crystal colors and mica bronzes. Among the advantages of these are that they are indifferent to sulphurous exhalations, are very light in weight, and in some colors are even more brilliant than the metal bronzes. When small particles of mica silver are spread over articles coated with asphalt varnish, the result is a good imitation of granite. The crystal colors are also suitable for calico printing, and the fabrics to which they are applied surpass in brilliancy the heavy bronze and glass dust fancy fabrics of Lyons. Such colors have been used to decorate porcelain and glassware, the articles undergoing a second heating up to the fusing points of their glazing. By suitable dyes the material is colored to a variety of hues.

In India mica is used extensively for decorative purposes, either in its natural state or artificially colored. In the days of ancient Rome the powdered material was scattered over the surfaces of the amphitheatre to obtain a brilliant glistening effect. In India it is used at native festivals, marriages, and in the Mahommedan maharam for processional ornaments, as lamps, and for ornamental pottery, on curtains and cloths, in calico printing, and by the *dhobi* (washerman) to give a sparkle to cloth, to which the fine particles easily adhere. Colored micas have also been suggested as a substitute for colored glass, but its use in this direction must be limited, and as the colored micas contain larger proportions of iron, they are more susceptible to destruction when exposed to weather. There seems no reason, however, why the quantities of amber colored biotites, as well as muscovites, with inclusion of magnetic oxide in regular patterns, should not be so exposed in unexposed places. Natives in the Trichinopoly district of the Madras Presidency, and elsewhere, sell a large number of pictures and portraits painted on mica sheets of various sizes. Mr. Edgar Thurstan, reporter on economic products to the Government of India, states that the mica used in that district for painting pictures on, etc, is purchased by the painters from the Marakoyers (class of Musselmen) of Negapatam, who purchase large quantities of mica every year from ships arriving there from Calcutta and other sea-coast towns, for making the big taboots for the Kauthiri festival, and retail some to the painters.

*As a Lubricant.*—The mineral is somewhat extensively used in the manufacture of mica grease. As a lubricant for railroad purposes its value lies in the fact that it is absolutely anti-friction, and it is claimed with its use hot boxes or journals are impossible.

*Other Uses.*—Mica has been used on board men-of-war in localities where glass would be broken by the concussion due to the firing of heavy guns It is made into reflectors, sea-compasses, inlaying for wood instead of enamel. It is also used for roofing purposes, and in several patented processes forms a water and fireproof covering for strata of rubber, tar, candles, felt and similar materials. Its most recent application in a powdered state is to the so-called wax printed cloths. These are made by applying melted wax to the cloth with a stick in free-hand designs, and before the wax is dry powdered mica is sifted over it. Under certain circumstances mica would be a convenient substitute for glass plates or celluloid films in photography if perfectly polished and even plates could be obtained.

## BLACKBURN MINES.

**Owners:**
The Blackburn Estate.

**Mine Office: Hugh C. Baker, Perkins' Mills, Que.**

This property, at present being mined for mica, contains 1600 acres of land in the Templeton district, County of Ottawa, Province of Quebec. 30 persons employed in 1895. Equipped with one 30 and one 80 h.p. return tubular boiler; four Ingersoll and one Rand rock drills; four hoisting engines, three pumps, and other plant.

## CANONTO MICA AND MINERAL MINING CO., Ltd.

Incorporated 1894. Authorized Capital, $22,000.

**Directors:**

George Taylor, Village of Weston, Ont. | Arthur Clayton, Lambton Mills, Ont.
Thos. Pier, Lambton Mills. | F. P. Brazie, Toronto.

**Head Office: F. P. Brazie, Toronto, Ont.**

Formed to carry on mining in the Counties of Frontenac, Peterborough, Hastings, Addington and Lanark, Province of Ontario, and in particular a lease of the mining rights of certain lands in the Township of South Canonto, in the County of Frontenac.

Blackburn Mine—Main Pit, Templeton, Que.

## CASCADES MICA MINE.

**Owners:**

Lt.-Col. J. Wright, Hull. | W. A. Jamieson, Ottawa. | Thos. Kenny, Ottawa.

**Head Office: W. A. Jamieson, 524 Wellington Street, Ottawa, Ont.**

The property owned and operated contains 70 acres, and is situated on lots 22 (CI), and 22 (CII), in the 15th range, Township of Hull, Ottawa County, Province of Quebec. An average of 12 men employed. About 80 tons of amber mica mined in 1893. No report for 1894 and 1895.

## CLEMOW & POWELL.

**Head Office: W. F. Powell, Sparks Street, Ottawa.**

This private partnership has a controlling interest in a number of mica properties situated in the Townships of Hull, Templeton, Portland and elsewhere in the County of Ottawa, Province of Quebec. A factory for cutting and dressing the mica is in operation at Ottawa, Ont.

## LAKE GIRARD MICA MINING SYSTEM.

Organized 1891.

T. J. Watters, *Owner.* | Don. C. Watters, *Manager.*

**Head Office: 504 Besserer St., Ottawa, Ont.**

This company owns some 3,200 acres of mineral mica lands in Ontario and Quebec.

The principal mining has been done on the Lake Girard in the township of Wakefield, Que., the Nellie and Blanche in the township of Hull, the Martha mine at North Burgess, Ont., and the 'Phosphate King' mine in Templeton, Que., all of which are equipped with suitable buildings and an excellent working plant. In 1892 and 1893 an average daily output of 5 tons merchantable mica was obtained.

The cutting and dressing works at Ottawa are equipped with twenty-three power presses, operated by electricity, for cutting irregular dies and segments, and employed in 1893 about 80 persons.

The following are the official returns of output from the commencement of operations, to August, 1893, on which date the great business depression and consequent cessation of demand for mica rendered it necessary to suspend active operations on most of the properties then being worked:

| | |
|---|---|
| Total from June, 1891, to December 31st, 1891.... | 288,000 lbs. |
| Total from January, 1892, to December 31st, 1892. | 2,454,448 " |
| Total from January, 1893, to July 31st, 1893..... | 1,909,562 " |
| Total block mica as raised from the shafts.... | 4,652,010 " |

In 1894 and 1895 a considerable quantity of phosphate and mica was produced, returns of which are not obtainable.

## SYDENHAM MICA AND MINING CO.

Incorporated 10th May, 1889. Capital Stock, $250,000.

**Directors :**

Isaiah Smith, Sydenham, Ont., *President.* | Dr. R. L. Burrage, Newark, N.J.
J. P. Lacey, Sydenham, Ont. | J. L. Armitage, Newark, N.J.
H. S. Dunn, Newark, N.J.

**Head Office: Jonathan P. Lacey, Secretary-Treasurer, Sydenham, Ont.**

This company acquired the mineral properties formerly owned and operated by Messrs. Isaiah Smith & Co., of Sydenham, and now carry on the business of miners, shippers and dealers in mica, phosphate and other minerals. The company operates the Eel lake and other mines in the township of Loughboro', Ont.

## VAVASOUR MINING ASSOCIATION.

T. F. Nellis, Metcalfe Street, Ottawa, *President.*

The property is situated on Lot 10 in the 12th range of Hull, near the village of Cantley. Operated since May, 1891, and has produced over 300 tons of merchantable mica. Several hundred tons of phosphate of high grade are on the dump, awaiting an improvement in market. There are four veins of calcite, pyroxene and apatite running in a north north-easterly direction with a dip of 45° east, one of which has been followed for a distance of 1,646 ft., the size varying from 3 ft. to 15 ft. Considerable work has been done, consisting at date chiefly of an opening 200 ft. and shafts of 90 ft. and 70 ft. respectively into a gallery of 80 ft. The principal vein has been opened for a length of over 400 ft. There is a cutting shop at the mine. A small force employed.

## VILLENEUVE MICA MINE

**Owner :**

S. P. Franchot, Buckingham, Que.

The property upon which this mine is situate, contains 160 acres, on lots 30 and 31, Township of Villeneuve, County of Ottawa. Is three miles distant by road from the mica mine landing on the Lievres river, and about 25 miles from the town of Buckingham, Que. Formerly owned and worked for Muscovite of a superior quality, by the British and Canadian Mica and Mining Company and acquired by the present owner in 1888. Equipped with one 60 h.p. boiler, Ingersoll steam drills, Knowles pump and other plant, and has excellent accommodation for a large force. Worked by open cuts and shaft 60 feet.

Vavasour Mining Association—Open-Cast Mica Workings, Township of Hull, Que.

## WALLINGFORD MICA CO.

Organized 1st September, 1893 Invested Capital, $30,000.

**Owners:**

Edward Wallingford. | N. A. Belcourt, Q.C. | T. G. Coursolles.

**Head Office: T. G. Coursolles, Managing Owner, Ottawa.**
**Edward Wallingford, Perkins' Mills P.O., Que., Mine Manager.**

Owns and operates a property containing 200 acres of mineral land, situate W½ of lot 16A and lot 16B, and lot 17B, in the 8th Range of the Township of Templeton, County of Ottawa, Province of Quebec. 30 persons employed. The output of all grades was: in 1894, 150 tons; 1895, 225 tons.

OTHER MICA PRODUCERS.

| Name. | Address. | District Operated. |
|---|---|---|
| Anglo-Canadian Phosphate Co.. | R. C. Adams, Montreal.. | Tp. of North Burgess, Ont. |
| Chown, J. E..... | Kingston ..... | " " " |
| Chubbick, C..... | Ottawa..... | Wakefield, Que. |
| Dugas, Judge..... | Montreal ..... | Templeton, Que. |
| Hall, P. P..... | Quebec..... | Saguenay, Que. |
| Levett & Davis... | Perth, Ont ..... | Burgess, Ont. |
| McLaurin, L. K..... | East Templeton, Que... | Templeton, Que. |
| McMartin, D. G..... | Perth ..... | Burgess, Ont. |
| Smith, J. F..... | Kamloops, B. C..... | Téte Juan Caché Dist., B.C. |

# Graphite

# Graphite.

While this mineral has been found in many localities throughout the Dominion, but little mining has been done and the production has been insignificant. During the year 1895 a number of companies were formed and operations were carried on in the following districts :—

Walker Mining Co., Township of Buckingham, Que.
N. Am. Graphite Co., Ltd. " "
Ontario Graphite Co., Ltd., Tp. of Brougham, Ont.
Canada Paint Co., St. John County, N.B.

The output in 1895 amounted to 220 tons of a value of $6,150 and will be materially increased during the ensuing year.

The late Mr. Vennor, in his report (Geo. Survey of Canada 1873-4) points out that the graphite is found in three distinct forms. (1) as disseminated scales or plates in the limestones, gneisses, pyroxenite, quartzites, and even in some of the iron ores (as at Hull) ; 2nd, as lenticular or disseminated masses, embedded in the limestone, or at the junction of these and the adjoining gneiss and pyroxenite, and 3rd, in the form of true fissure veins, cutting the enclosed strata." Of the relative importance of these different deposits he says : "The first form is that most commonly met with, and it is in the limestone that the graphite is most abundantly disseminated, oftentimes to such an extent as to constitute deposits of great economic value. The second form, viz., that of embedded masses, is of common occurrence, and in a number of localities in Buckingham, Lochaber and Grenville, such deposits have been met with and worked to a small extent. The third, or last form, that of fissure veins, is not so common, and does not appear to be of as great importance as the bedded deposits, although many such veins exist and have been worked to some extent in the townships already named. In these veins the graphite is very brilliant, often lamellar and of great purity." Of these three modes of occurrence, Mr. Vennor inclines to the belief that the first will prove of the greatest economic importance.

In 1876 the Dominion Government authorized an extended survey and investigation of the comparative merits of the Canadian and Ceylon varieties. The following table is given by Mr. G. C. Hoffman in his report of the Geological Survey of Canada ;—

ANALYSES OF CANADIAN AND CEYLON GRAPHITES.

| Locality. | Specific gravity. | Volatile Matter. | Carbon. | Ash. |
|---|---|---|---|---|
| | | Per cent. | Per cent. | Per cent. |
| Canada, Buckingham ; vein graphite ; variety, foliated | 2.2689 | 0.178 | 99 675 | 0.147 |
| Canada, Buckingham ; vein graphite ; variety, columnar | 2.2679 | 0.594 | 97.626 | 1.780 |
| Canada, Grenville ; vein graphite ; variety, foliated | 2.2714 | 0.109 | 99.815 | 0.070 |
| Canada, Grenville ; vein graphite ; variety, columnar | 2.2659 | 0.108 | 99.757 | 0.135 |
| Ceylon ; vein graphite ; variety, columnar | 2.2671 | 0.158 | 99.792 | 0.050 |
| Ceylon ; vein graphite ; variety, foliated | 2.2664 | 0.108 | 99.679 | 0 213 |
| Ceylon ; vein graphite ; variety, columnar | 2.2546 | 0.900 | 98.817 | 0.283 |
| Ceylon ; vein graphite ; variety, foliated | 2.2484 | 0.301 | 99.284 | 0.415 |

These analyses prove that Canadian graphite is equal to the best Ceylon.

## ORE DRESSING.

Several methods (both wet and dry) of dressing the ore have been attempted. In Vol. IX., page 732, Transactions American Institute of Mining Engineers, Professor Fraser, of Philadelphia, gives a description of the process adopted in the Pickering valley. The process used by the Dixon Company at Ticonderoga owes its success to careful supervision. It is a wet process in which the ordinary practice is reversed, the "tails" being the useful product, while the "heads" are thrown away. All attempts at dry concentration have failed.

## USES.

From the fact that very common and useful utensils known as lead pencils are made from graphite, the name of black lead has been popularly bestowed upon the mineral Until a comparatively recent date the use of graphite has been confined to this purpose, to the manufacture of crucibles, and to various preparations for stove polishing, etc. Of late, however, other qualities have been observed, which have opened to the mineral entirely new and extensive fields of usefulness, prominent among which is its consumption as a lubricant. For the bearings of heavy machinery it makes a superior lubricant to oil, is clean, leaves no dripping grease, and one proper application will last as long as the bearings themselves. When the discovery was first made that graphite could

be so utilized, some difficulty was encountered in keeping the lubricant in place. As originally employed it was mixed with oil and applied to smooth-surfaced bearings; but, though answering the purpose excellently for awhile, it would creep out and escape, and required constant renewals. This was obviated by the introduction of grooved bushings, the grooves being filled with a composition 75 per cent. graphite. The box requires no refilling, and the bearings need no new application until the box is worn out. Graphite bushings of this kind were first applied in 1883 and are growing in favor, being now in very general use. Graphite is also used to a considerable extent for foundry facings and washes, also as a substitute for red lead in making joints and connections, having an advantage over red lead in that it does not harden, making a perfectly tight joint, that opens easily when the pipe tongs are applied. It is also said to make a good, durable paint for the covering of smokestacks, boilers, tin roofs, and other metal surfaces.

GRAPHITE IMPORTED INTO THE UNITED STATES FROM 1867 TO 1893.

| Years ended— | Unmanufactured. | | Manufactured. | Total. |
|---|---|---|---|---|
| | Quantity. | Value. | | |
| | Cwt. | $ | $ | $ |
| June 30, 1867 | 27,113 | 54,131 | ..... | 54,131 |
| 1868 | 68,620 | 149,083 | ..... | 149,083 |
| 1869 | 74,846 | 351,004 | ..... | 351,004 |
| 1870 | 80,795 | 269,291 | 833 | 270,124 |
| 1871 | 51,628 | 136,200 | 3,754 | 139,954 |
| 1872 | 96,381 | 329,030 | ..... | 329,030 |
| 1873 | 157,539 | 548,613 | ..... | 548,613 |
| 1874 | 111,992 | 382,591 | ..... | 382,591 |
| 1875 | 46,492 | 122,050 | ..... | 122,050 |
| 1876 | 50,589 | 150,709 | 17,605 | 168,314 |
| 1877 | 75,361 | 204,630 | 18,091 | 222,721 |
| 1878 | 60,244 | 154,757 | 16,909 | 171,666 |
| 1879 | 65,662 | 164,013 | 24,637 | 188,650 |
| 1880 | 109,908 | 278,022 | 22,941 | 300,963 |
| 1881 | 150,927 | 381,966 | 31,674 | 413,640 |
| 1882 | 150,421 | 363,835 | 25,536 | 389,371 |
| 1883 | 154,893 | 361,949 | 21,721 | 383,670 |
| 1884 | 144,086 | 286,393 | 1,863 | 288,256 |
| 1885 | 110,462 | 207,228 | ..... | 207,228 |
| 1886 | 83,368 | 164,111 | ..... | 164,111 |
| 1887 | 168,841 | 331,621 | ..... | 331,621 |
| Dec. 31, 1888 | 184,013 | 353,990 | ..... | 353,990 |
| 1889 | 177,381 | 378,057 | ..... | 378,057 |
| 1890 | 255,955 | 594,746 | ..... | 594,746 |
| 1891 | 212,360 | 555,080 | ..... | 555,080 |
| 1892 | 233,540 | 667,775 | ..... | 667,775 |
| 1893 | 288,740 | 795,379 | ..... | 865,379 |

## NORTH AMERICAN GRAPHITE CO., Ltd.

Incorporated February, 1896. Authorized Capital, $250,000, in shares of $100.00.

**Directors:**

N. C. Sparks. | A. Lumsden. | G. H. Perley. | W. R. Askwith.
H. P. H. Brummell.

**Head Office: H. P. H. Brummell, Manager, Ottawa.**

Owns and operates a property containing 219 acres and situated on Lot 28, R. VI., and Lots 23 and 28, R. V., Township of Buckingham, Ottawa County, Province of Quebec. Equipped with Raymond mill and other plant, including electric lighting. 30 persons employed in 1895.

## ONTARIO GRAPHITE CO., Ltd.

Incorporated 1896. Authorized Capital, $200,000, in shares of $100.00.

**Directors:**

G. P. Brophy. | J. P. Brophy. | S. H. Fleming. | J. W. McRae. | Hector McRae.

**Head Office: Hector McRae, Managing Director, Ottawa.**

Owns and operates a property, comprising lots 16, 17, 18 and 19, at White Fish Lake, Township of Brougham, Province of Ontario. Worked by open cuts. 25 persons employed in 1896. Output shipped *via* Calabogie station on the Kingston and Pembroke Railway, to Ottawa, where it is proposed to erect a milling plant in 1896. At 15th April, 1896, about 450 tons has been shipped.

## WALKER MINING CO.

Capital invested to date (acquisition of lands, erection of plant and works, and mining to date) estimated at $350,000.

**Head Office: W. H. Walker, 5 Central Chambers, Elgin Street, Ottawa.**

**Mines Office: Graphite City, via Buckingham, Que.**

Property formerly owned and operated by the Dominion of Canada Plumbago Co., contains 1,250 acres, as follows:—N½ of lot 19, N½ lot 21, lots 23 and 24, in the VII. range; S¾ of lot 19 and S½ of lots 20 and 21, in the VIII. range; S½ 19 and lot 21, in IX. range; all in the Township of Buckingham, County of Ottawa, Province of Quebec. Mines situated one and a half miles from McCullough's Landing on the Lievres river, and six miles by road from the village of Buckingham. 50 men and boys employed. The quality of the graphite mined by the company is excellent. From experiments made in the laboratory of the Geological Survey, Mr. G. C. Hoffman, F.C.S., considers that in respect to incombustibility it may claim perfect equality with that of Ceylon, and that it is in no wise inferior to the latter as a material for the manufacture of crucibles. Mill building 120 x 70, 3½ storeys, contains a battery of 20 stamps (weight, 850 lbs.; drops to min, 90), driven by an engine of 100 h.p. capacity; eight separating and dressing buddles, drying furnace, dryer, 6 runs of stones for grinding, besides blowers, mixers, bolts and accessories, the whole of a capacity of 40 tons per 24 hours. The company owns a saw-mill, barrel-making shop, etc.

# Phosphate

# Phosphate.

Apatite (phosphate of lime) is found in many parts of the world, but nowhere equal in richness or purity to that variety discovered more than thirty years ago and worked up to the present day in Canada.

Its chief economic value is for the phosphoric acid contained in it, and its chief use is in the manufacture of superphosphate fertilizers or plant food used in agriculture to restore to exhausted soils those elements of fertility taken from it by continual croppings.

As might be expected from the high character of apatite it is found, says an eminent authority,* to be a most excellent material for conversion into superphosphate. When treated with acid it yields a higher percentage of phosphoric acid, soluble in water, than any other raw phosphatic material with, perhaps, the exception of Curaçoa phosphate. The first quality dissolved in acid of 140 deg. gives a superphosphate with 18 to to 20 per cent. of phosphoric acid, equal to 40 to 45 per cent. soluble phosphate of lime. The condition, although dampish at first, becomes in a month's time very friable, and everything that could be desired.

In 1890, the world's production of phosphates † aggregated as follows:—England (coprolites), 20,000 tons; France (Somme deposits), 170,000 tons; other deposits, 200,000 tons; Belgium (Mons district), 150,000 tons; (Liege district), 50,000 tons; Germany, 30,000 tons; Norway, 10,000 tons; Canada, 26,000 tons; South Carolina (land deposits), 300,000 tons; South Carolina (river deposits), 237,000 tons; Florida, 40,000 tons; West Indian Islands, 50,000 tons; other sources, 20,000 tons; in all, about 1,303,000 tons.

The occurrence of workable areas of apatite is known to cover a very extensive area in the Laurentian system of the Provinces of Quebec and Ontario, but those which have been worked to date are confined to Ottawa county, in the Province of Quebec, and in Ontario to the counties of Lanark, Leeds, Frontenac and Renfrew.

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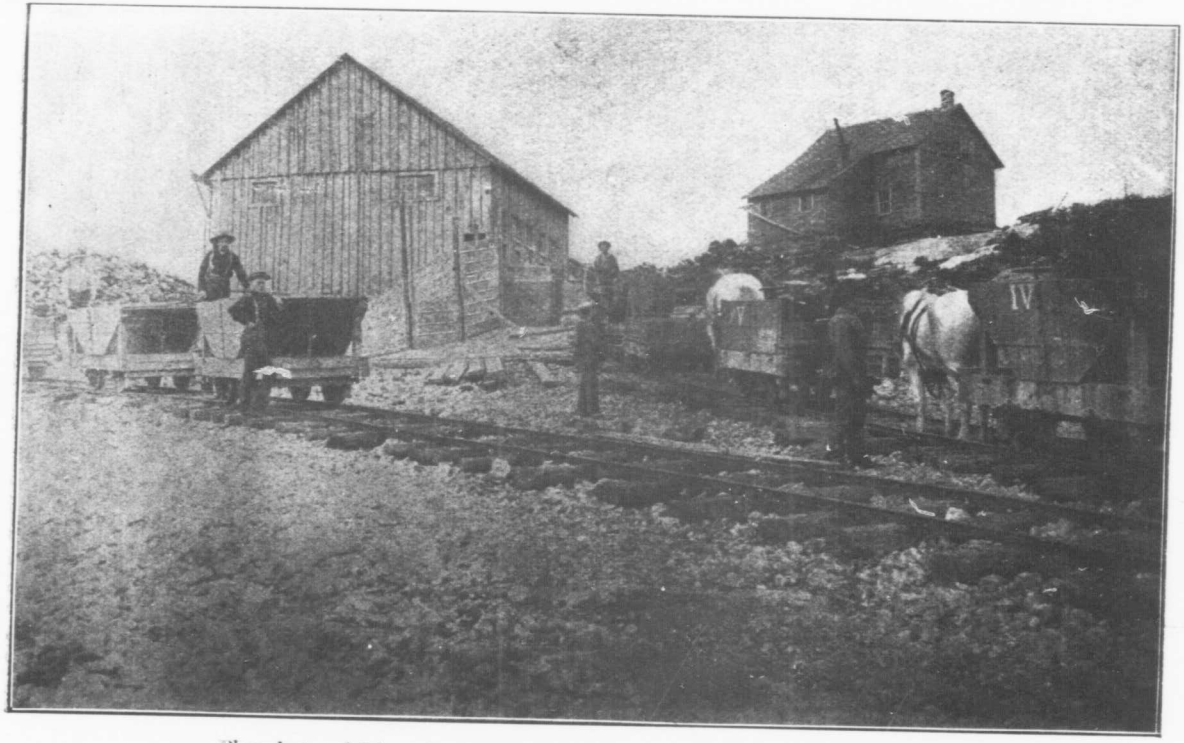
* Mr. W. H. Hutchison, in a paper read before the Chemical Manure Manufacturers' Association, London, 1890.

† C. C. Hoyer Miller's Florida, South Carolina and Canadian Phosphates, 1892.

The first mining was done in the township of North Burgess, Lanark county, and about the year 1863 extensive investments were made in lands in that township, near the Rideau canal, as high as $300 per acre having in some cases been paid. In 1872 mining was begun on the Lievre river (Ottawa county, Que.) and gradually increased until 1880, when English and American capitalists embarked in the industry and prosecuted work on a large scale. Several of these companies sustained annual outputs of from 3,000 to 8,000 tons each, and the total yearly production rose until 1889, when it realized nearly 30,000 tons. Transportation from the mines to the river bank was performed by means of tramways, and barges and steamboats were placed upon the Lievre river. A branch line was built by the Canadian Pacific Railway to the landing stage at Buckingham, and by these means cheap transit was afforded to the ship at Montreal.

The large profits, as in most mining industries, have fallen rather to the land speculator than to the mine operator. One block of about 1,600 acres, purchased from the Government for less than $5,000, was sold for $16,000, then re-sold in two portions for $160,000, one of which was afterwards "capitalized" in a stock company at $450,000. Another property of 100 acres, bought at sheriff's sale for $15, was finally sold for $125,000 in cash.

In the years 1883, 1884 and 1885 the mines were as a whole doing remarkably well and earning large profits. In 1888 there arose a feeling among British and European chemical manufacturers that the prospects of their future supplies of raw phosphatic material were not so reassuring as could be wished, and this feeling found expression in a paper by Mr. Hermann Voss, President of the British Chemical Manure Manufacturers' Association. This paper attracted considerable attention and served to stimulate enquiries and search after phosphate throughout the world. Canada participated strongly in this awakened feeling. Phosphate lands came rapidly into active demand, and passing from hand to hand rushed up in value. New enterprises were started, new mines were opened up, and interest was awakened in such kindred Canadian interests, as the mining of pyrites, the local manufacture of sulphuric acid, and the utilization of low grade or waste phosphates by transforming them into manufactured fertilizers. The excitement culminated in the formation in London of the General Phosphate Corporation



Phosphate of Lim Co. Ltd.—Tramming Phosphate at High Rock, Que.

(Ltd.), with an authorized capital of £1,000,000 sterling. Several thousands of acres of virgin lands were acquired by the syndicate at the enormous cost of £98,863. High salaried and inexperienced officials were appointed, and money spent lavishly in London and at the mines. The bubble soon burst. Discoveries in Florida of large areas of high grade phosphates, capable of being easily and cheaply mined, and the heavy shipments which came from that State into the European market resulted in a drop in the price of Canadian mines. The mines were compelled either to suspend operations or materially reduce the number of employees, and the shipments in 1895 were reduced to something like 1822 tons.

While the industry may be considered in a state of complete callapse, and old-time activity may not be resnmed in the immediate future, the outlook is not without hope. The expansion of the phosphate business in Europe goes on uninterruptedly, and one would be rash to predict that the end of the century will not find us nearly abreast of supply, if we do not overlap it. Mr. David Boyd, a Glasgow authority, writing in the American *Fertilizer*, says :

" Besides the gregarious follow-my-leader element in the increase of the use of new fertilizers, it has been wonderfully stimulated by the abnormally low prices of rock which have now ruled for some time. The experience of the past 25 years is likely to hold good again—every cycle of low prices is succeeded by a stronger reflex current, which affects a much larger area, and does its best to make the ends of supply and demand meet but not overlap. Such confidence in the future may appear a little extravagant, in view of the enormous amount of rock now being mined on both sides of the Atlantic, but " enormous " is really a relative quantity, and the chances are that, while that word may be correct for today, it will have a totally different meaning when viewed from the standpoint of 1900. So long as money is abundant and cheap, so long will the enterprise representing lasting industries find favor, even if these for a time tax the patience of investors for adequate returns."

The world must have phosphate; Canada possesses the highest quality known, scattered over a wide area; human ingenuity will surely devise means to make these deposits available for the world's needs. Even though at present there may in some cases be disappointment in the result of phosphate enterprises, as there will be in all mining ventures,

we may feel assured that a great and prosperous future awaits this industry, and that it is destined to fulfil an important part in the economic development of the country.

PRODUCTION.

| Year. | Quantity. | Value. | Year. | Quantity. | Value. |
|---|---|---|---|---|---|
| | Tons. | $ | | Tons. | $ |
| 1878 | 10,743 | 208,109 | 1887 | 23,152 | 433,217 |
| 1879 | 8,446 | 122,035 | 1888 | 18,776 | 298,609 |
| 1880 | 13,060 | 190,086 | 1889 | 29,987 | 394,768 |
| 1881 | 11,968 | 218,456 | 1890 | 28,457 | 499,369 |
| 1882 | 17,153 | 338,357 | 1891 | 17,271 | 384,661 |
| 1883 | 19,716 | 427,668 | 1892 | 11,482 | 153,764 |
| 1884 | 21,709 | 424,240 | 1893 | 8,198 | 70,942 |
| 1885 | 28,969 | 496,293 | 1894 | 7,290 | 43,940 |
| 1886 | 20,440 | 343,007 | 1895 | 1,822 | 9,565 |

PRICES REALIZED FOR CANADIAN PHOSPHATE.

| Year. | 80 per cent. | 75 per cent. | 70 per cent. | 60 per cent. |
|---|---|---|---|---|
| 1882 | 16d. with $\frac{1}{8}$ rise. | 15d. | 14½d. | — |
| 1883 | 15d. " | 13d. | 12d. | — |
| 1884 | 14d. " | 12d. | 10d. | 9d. |
| 1885 | 14d. " | 11½d. | 10d. | 8d. |
| 1886 | 11d. | 12¼d. | 9½d. | 9d. |
| 1887 | 11¼d. | 10d. | 8½d. | — |
| 1888 | 11½d. | 9½d. | 8½d. | — |
| 1889 | 12½d. | 11d. | 10¼d. | 8¾d. |
| 1890 | 16½d. | 13d. | 12d. | 9½d. |
| 1891 | 14d. | 10d. | 9d. | 8d. |
| 1892 | 10½d. | 8½d. | 7d. | 5½d. |
| 1893 | 9d. | 7½d. | 6½d. | 5½d. |
| 1894 | 7d. | — | 6¼d. | 5¼d. |

The figures from 1892 are c. i. f. ; add ½d. if f. o. b.

## CANADIAN PHOSPHATE COMPANIES.

| NAME. | DISTRICT. | CANADIAN OFFICE. | REMARKS. |
|---|---|---|---|
| Anglo-Canadian Phosphate Co. | Ottawa Co., Que., and Bedford, Ont. | R. C. Adams, 41 St. Francois Xavier Street, Montreal | Work suspended. |
| Blackburn Mines | Templeton. | H. C. Baker, Perkins' Mills, Que. | Produce as by-product in mica mining |
| British Phosphate Co | Tp. Buckingham, Que | J. B. Smith, Glenalmond, Que. | Work suspended. |
| Canadian Phosphate Co | Tp. Portland, Que | 155 Fenchurch St., London, Eng. | Suspended. |
| Dom. Phos. and Min. Co., Ltd. | Portland E., Que. | North Star Mines, *via* Buckingham, Q. | Ship small quantities to Capelton Chemical Works. |
| Electric Mining Co | Templeton. | H. McRae, Ottawa | Suspended. |
| Emerald Phosphate Co | Tp. of Buckingham. | S. P. Franchot, Buckingham. | Work suspended. |
| Foxton Phosphate Co | Sydenham, Ont | Sydenham | Suspended. |
| Lake Girard Mica System | Templeton, Ont | D. C. Watters, Ottawa | Produce as a by-product of mica mining. |
| Lake Opinicon Phos. Co | Kingston | J. Swift, Kingston | Suspended. |
| Little Rapids Mining Co | Tp. of Portland | W. A. Allan, Ottawa | Work suspended. |
| McGregor Lake Phosphate and Mining Co | Templeton. | J. Cooper, Montreal | Suspended. |
| MacLaurin Mine | Templeton. | L. K. McLaurin, East Templeton. | Produce as a by-product in mica min'g |
| Phosphate of Lime Co | Portland W., Que | High Rock P. O., Que | Work suspended. |
| Templeton and North Ottawa Mining Co | Templeton, Que | A. P. Paterson, Montreal | Work suspended. |
| Vavasour Mining Association | Tp. Hull, Que. | T. F. Nellis, Ottawa | Produce as a by-product of mica mining. |
| Wallingford Bros. & Co | Templeton. | Perkins' Mills P. O., Que. | Produce as a by-product of mica mining. |

# Iron and Steel.

# Iron and Steel.

The iron ores of the Dominion have a wide range both geographically and geologically. From Cape Breton in the east to Vancouver in the west they are found in abundant variety in almost every Province, and the sections of the country which have not coal have an abundance of timber suitable for the manufacture of charcoal. Hoffman * in his Annoted List classifies the occurrence of ores in Canada as follows :—

*Bog Iron Ore*—Occurs in great abundance at numerous localities in the Provinces of Quebec and Ontario. In the former the most important sites are in the Three Rivers district, or between the rivers St. Maurice, Batiscan and St. Anne. Other deposits occur in the townships of Stanbridge, Farnham, Simpson, Ascot, Ireland, Eardley, Hull, Templeton ; the seigniories of Vaudreuil, Lotbinière, Lauzon, St. Vallier, and elsewhere. In Ontario it is met with in greater or less quantity in the townships of Charlotteville, Middleton and Windham (Norfolk Co.), Cambden (Kent Co.), Bastard (Leeds Co.), &c.

*Magnetite*—Is found, often beautifully crystallized, in viens of triassic trap of King's, Annapolis, Colchester, Cumberland and Cape Breton counties, in the Province of Nova Scotia. Occurs massive, or disseminated in crystals in dolomite and chloritic slate (sometimes contributing 56 per cent. of the mass) in the metamorphic strata of the Eastern Townships of Sutton, Bolton, Ascot, Leeds and Orford ; in the Laurentian in the township of Hull, etc.; also in the form of black sand on the north shore of the Gulf of St. Lawrence, in the Province of Quebec. Forms deposits frequently of very great extent, among the Laurentian rocks in the counties of Frontenac, Hastings, Haliburton, Lanark, Leeds, Peterborough, Renfrew, etc., and is also met with in certain localities on lakes Superior and Huron, Province of Ontario. Further west, important deposits occur in crystalline rocks, supposed to be of carboniferous age in the vicinity of Gillies' bay, south side of Texada island, Province of British Columbia.

* Geol. Survey Report, 1888-9.

*Hematite.*—Important deposits of red hematite are met with at several localities in Pictou and other counties in Nova Scotia. It occurs, in association with specular iron ore, among the Huronian strata of the Quaco hills, and more abundantly in those of West beach and Black river, St. John county, Province of New Brunswick. Forms an extensive bed in the township of McNab (Renfrew Co.), and is further found in the townships of Dalhousie and Beckwith (Lanark Co.), Palmerston (Frontenac Co.), Madoc (Hastings Co.), Leeds (Leeds Co.), etc.; at Gros Cap, north side of Michipicoten harbor, and other localities in the lakes Superior and Huron region, Province of Ontario.

*Siderite.*—A bed of spathic iron, varying in thickness from 6 to 10 ft., occurs in sandstones of the millstone-grit formation, near Sutherland's river, Pictou county, Province of Nova Scotia. Occurs in thin veins in Huronian rocks in the Nerepis valley, and is also diffused to a considerable extent through rocks of Devonian age in the northern part of Charlotte county, in the Province of New Brunswick. Is found in quantity, in beds, on Flint, Daview's, and other islands of the Nastapoka group, eastern coast of Hudson bay; and is also met with in quantity in the township of McIntyre, Thunder bay, Lake Superior, Province of Ontario.

*Specular Iron*—Amongst other localities is met with in tabular crystals at Sandy Cove, Digby Neck (Digby Co.), Province of Nova Scotia; in tabular crystals, or thick plates, in the township of Leeds (Megantic Co.), also in thick plates in the township of Shefford (Shefford Co.), in the Province of Quebec.

*Limonite.*—Important deposits of this mineral are met with in Pictou and Colchester counties, Province of Nova Scotia. As there met with it occurs in the form of lustrous botryoidal or mammillary and stalactitic masses, which exhibit a fibrous structure when broken; also compact and lustreless, and at other times earthy

## History of Iron Making.

**1737. St. Maurice Forges, Que.**

This, the oldest blast furnace in Canada, if not in America, dates as far back as 1737, when La Companie des Forges was empowered by Louis XV., to erect iron works on the Seigneurie of St. Maurice, in the Three Rivers District, Province of Quebec, the King advancing 100,000 livres and exempting the enterprise from rents or dues. The

construction was done under the direction of a French artizan, but lack of capital led to failure, and finally in 1743, the Crown took possession and proceeded to carry on the work in name of the King and on his account. Skilled workmen were brought from France and Sweden to improve the furnace, rebuilding it in part at least (about 1752) and producing the blast furnace as it now stands with Walloon hearth in use until as late as the summer of 1883.

In 1767 the Crown leased the land and works to Christopher Pellisier and others, at a rental of £25 per annum. In 1775 the American invasion occurred when it appears that Pellisier helped the invaders with goods and money; he also cast shot and shell for them to be used in the siege of Quebec, and finally, the night before the battle of Point du Lac, when the invaders were beaten by the English, he fled to the United States, taking with him all the funds, as also the vouchers for the money advanced to the Americans, about $2,000, got them cashed and sailed for France. This crippled the company, but by dint of hard work they managed to recover and continued operations till the expiration of their lease.

In 1783 Conrad Gugy secured the lease for sixteen years at £18 15s. stg. per annum. He sold the balance of his lease on the 10th March, 1787, to Alexander Davidson and John Lees for the sum of £2,300 currency. This partnership was subsequently dissolved, and on the 6th of June, 1793, Alexander Davidson sold the balance of his lease to George Davidson, David Munroe and Matthew Bell, for £1,500 currency. Their term expired in 1799, but on the 30th May in that year they were granted an extension to the 1st April, 1801, at the same rental. A new arrangement was now made by Munroe & Bell into a five years' lease, and paying an annual rental of £850 sterling. This lapsed in 1806, but they continued to hold it on suffrance till 1st of January, 1810, when they secured a lease for 21 years at £500 per annum. From year to year the place had grown. In Bouchette's Lower Canada, 1832, the following description is given:— "The establishment is furnished with every convenience necessary to an extensive concern, the furnaces, the forges, the foundries, workshops, etc., with houses and other buildings, present the appearance of a tolerably sized village. The principal articles manufactured are stoves of all kinds used in the Province, large potash kettles, machines for mills and various kinds of cast and wrought iron

also a great quantity of pig and bar iron for exportation. The number of men employed is 250 to 300. The overseers and persons employed in the construction of models are English and Scotch. The workmen are generally Canadians."

The Hon. Matthew Bell, Seigneur of St. Maurice, held the lease until 1846, but dying insolvent, shortly afterwards it reverted to the Crown.

In 1846 the property was purchased at auction by Henry Stuart, Montreal, who leased it to James Ferrier, of Montreal, who worked it from 1847 to 1851. In 1861 the forges passed into the hands of M. Haroux, of St. Barnabé, who acquired the works together with a farm attached, for $7,000, and he in turn disposed of them to John McDougall, of Montreal, for £1,700 currency. This price included the furnaces, works, house, cottages, water privileges, etc. All the land pertaining to the forges was sold to the squatters and settlers who supplied ore and wood to the works. The product was chiefly used in the manufacture of car wheels.

Dr. Harrington in report 1873-4* gives the internal dimensions of the furnace :—

| | | |
|---|---|---|
| Height | 30 | feet. |
| Diameter of hearth | 2½ | " |
| Diameter of boshes | 7 | " |
| Diameter of throat | 3½ | " |

The charge consisted of :—

| | | |
|---|---|---|
| Bog ore | 600 | lbs. |
| Limestone | 45 | " |
| Charcoal | 16 | bushels (French)† |

The daily production averaged 4 tons, of which 10 per cent. was white and 10 per cent. mottled iron. In addition to the cast iron from the blast furnace a small quantity of iron was also produced direct from the ore by the old-fashioned hearth finery. This was employed in the manufacture of axes and was found to be of excellent quality, not at all cold short and showing only traces of phosphorous.

The furnace ultimately fell into the hands of Mr. George Macdougall, of Three Rivers, who operated it more or less continuously until 1883, when, owing to the ore and fuel becoming exhausted, it was finally closed.

*Geological Survey of Canada 1873-4.

†The Freneh bushei weighs two pounds more than the English.

**1798. Batiscan, Que.** The Batiscan iron works were erected about 1798, comprising a blast furnace, casting house, two forges, mills and other buildings, on the east side of the Batiscan river, about six miles from its mouth in the seigniory of the Batiscan, Champlain Co., Que. They were similar to those of St. Maurice, and were in operation for several years till the death of the proprietor, when they were closed.

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**1800. Gananoque Falls, Ont.** The first blast furnace in Ontario was built by a company at Lyndhurst, then called Furnace Falls, in Leeds county at the falls of the Gananoque river. It was an old fashioned stack and in connection with it was a forge for the manufacture of bar iron. But the location was too far from ore deposits having regard to the difficulties and cost of transportation at that early period in the history of the country, and as the ore used was of inferior quality and had to be drawn a considerable distance, the venture was abandoned after a trial of two years.

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**1815. Normandale, Ont.** The next attempt was made in Western Ontario, at Normandale, township of Charlotteville, Norfolk county, in the year 1815, when Mr. John Mason, an Englishman, undertook to manufacture iron and in two years' time he had a blast furnace in operation which was "of a rude and primitive description, entirely the labor of his own hands, with the exception of the machinery for the blast. The bellows were formed out of two hollow whitewood trees." In 1820 the property was purchased by Mr. Joseph Van Norman, and in 1821 he formed a partnership with Mr. Hiram Capron, late of Paris, and Mr. George Tilson, late of Tilsonburg, and built a blast furnace, which was completed and put in blast in 1822, after an expenditure of $8,000. The iron turned out from the bog ores of the district was of excellent quality. The furnace was in blast about eight or nine months of the year, running night and day and producing 700 to 800 tons of iron with an annual consumption of fuel equal to 4,000 cords of hardwood made into charcoal in the usual way. In 1830 the works were burnt down, but were rebuilt on an extended scale. Of the product of their works Bartlett* says: "In the early stage

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*The Manufacture, Consumption and Production of Iron, Steel and Coal in Canada.

of the enterprise all the iron made was converted into various kinds of castings, there being no market for pig iron, and as a consequence the wants of the country at that time becoming overstocked, some were exported to Buffalo, and a vessel load of stoves and castings sent to Chicago. The wares produced were disposed of along the shores of Lake Erie from Fort Erie to Amherst Bay, and taken into the interior of the county by teams. Before the opening of the Welland canal, stoves, kettles and other iron-ware were sent very long distances by teams, particularly in winter, going as far as Chatham, Waterloo and beyond St. Catherines. After the opening of the Welland canal (the first vessels passed through in the year 1829) places on the canal and Lake Ontario were accessible by water, and accordingly two vessels were employed and kept busy during the summer. Hamilton, Toronto, Port Hope, Kingston, etc., were thus supplied and from these centres the wares were distributed into the back country. Some of them were sent as far as Montreal. The business seemed to be the right thing for the country and started at the right time to be of use to the new settler, to furnish him his sugar kettles, his kettles for boiling the ashes gathered from the burning of his log heaps, as at that time the potash made from these ashes was the only exportable article which could be shipped to foreign countries and for which money could be obtained."

About the year 1847, ore and fuel being pretty well exhausted, the furnace was abandoned.

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**1820 Marmora, Ont.**

In 1820 Charles Hayes commenced the manufacture of iron at Marmora, Hastings County, and a furnace which was erected to smelt hard, magnetic ores, had the ill fortune to ruin or cripple three of four successive owners in the course of forty years, although for the greater part of that time it was out of blast.

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**1825 Moose River, N.S.**

The first iron making in Nova Scotia appears to have been made at Moose River in Annapolis County. In 1825 an association was formed for the manufacture of iron, called the Annapolis Mining Company, with an authorized capital of £10,000, the Government offering two bounties of £600 each for the manufacture of hollow-ware and bar iron. The works

were erected on the eastern bank of the Moose river, ore being supplied from deposits in the locality and from Nictaux. Haliburton in his History of Nova Scotia, says:—"They have already (1828) manufactured a quantity of hollow-ware and are now engaged in laying the foundations of forges for making bar iron. To carry these objects into effect, they have increased their capital to more than twice its original amount. The quality of the ore has now been ascertained, and the only part of the experiment yet to be decided is, whether they can compete with the English ware, or whether the cost of production will not exceed the value of the article when manufactured, a result which must depend very much upon the economy and skill with which the establishment is managed." The works were only a short time in operation when, according to the Mines Report 1877, they were suddenly suspended owing to political causes, but not before excellent iron had been produced, both pig iron for foundry purposes and refined bar iron. Bartlett says:—"For thirty-three years the works were closed, and when operations were resumed it was for a short time only, to be again neglected for ten years more. In 1872 one hundred and sixty tons of pig iron were made and shipped to Boston."

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**1828 Albion Mines, N.S.**

In 1828 when the General Mining Association obtained the mineral concessions granted the Duke of York, the coal pits at the Albion mines, now called Stellarton, in Pictou County, Nova Scotia, were opened on a greatly extended scale and the sum of £1,000 was put aside for the purpose of experimenting in iron making.

Mr. H. S. Poole* describes the works as follows:—"A furnace was erected on the north side of the foundry in front of the archway, now bricked up, that led into the casting house. It was probably about forty feet high and eight feet in diameter at the boshes. It was lined with special brick a foot thick, made key shape to suit the circle and backed with a course of stretchers, between which and the casing there was a space of four inches filled with sand. The casing was eighteen to twenty inches thick, built with a batter and hooped. The hearth was built of special brick set on end. This furnace was not pulled down until 1855. An inclined way laid with iron rails led to the top of the

*Proceedings Mining Society of Nova Scotia.

furnace for charging purposes. The season of 1829 was spent in experimenting with the several ores of the district. A small quantity of limonite was obtained from the Fraser Saddler property at Bridgeville, but the bulk of the ore tried was red hematite brought down McLellan's brook from the locality now known as Iron Mines Post Office, where it is naturally exposed and was easily got by open quarrying. The clay ironstone nodules which occur in the coal were also carted down from the pits to the foundry and roasted in open heaps. The blast for the furnace was got from the foundry engine erected in 1828, and which continued in use until 1871, when new machine shops were put up. The engine was condensing and the pressure of steam carried was about five pounds, regulated by a tank of water placed at the necessary height. When in the course of time leaks in the boiler occurred, temporary repairs were effected by a layer of horse manure covered by a plate of iron. Besides the plant referred to preparations were made for operating on an extended scale and a blowing engine was imported.

It is said that in all some 50 tons of metal were made, but of a quality that was useless for foundry purposes. It was hard white iron, pieces of which still lie about the yard. Of what was made part was used as ballast for the slip at Shipyard Point on the East river. Weights about the colliery were made of it. The 'baby' on the rope used in the Foord pumping pit is still on hand, and current reports confirm Professor How's statement that stamps of a quartz mill at Waverley made of it had been pronounced to be ten times more durable than Belgian iron."

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**1831. Clementsport, N.S.** At Clementsport, in Annapolis county, a charcoal furnace was erected as early as 1831 to smelt the magnetite ore of the vicinity, and continued in blast somewhat irregularly for over thirty years. "The furnace," says Harrington,* "is built of stone, and is 35 ft. high, 4 ft. in diameter at the hearth, 9½ ft. at the boshes, and 7 ft. at the throat. There are three tuyeres, and the blast, which is hot, and has an average pressure of from 1¾ to 2 lbs. to the square inch is produced by water power at the wheel —a breast wheel—being 30 ft. in diameter. The blowing cylinders, three in number, are of cast iron, 4 ft. in diameter and 5 ft. stroke of

* Report Geological Survey of Canada, 1873-4.

piston. The blast is heated by burning the waste gases from the furnace in a hot blast oven containing 17 siphon pipes through which the air is made to pass. The oven is on a level with the top of the furnace and is built with brick and bound with iron. The charge consists of from 750 to 800 lbs. of ore, 120 lbs. of limestone or sometimes less, and 16 bushels of charcoal."

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**1831. Essex County, Ont.**

A furnace to smelt bog ore was erected in 1831 by Messrs Cahoon & Field, at what is now known as the hamlet of Olinda, in the township of Gosfield, Ont. The height of the stack was about 30 ft and the furnace is said to have been driven by a cold blast through one tuyere, but its daily capacity is not known. Sufficient quantities of ore were obtained within a radius of five miles, being chiefly of a variety known as shot ore, and it was smelted with a mixture of hardwood and charcoal. Stoves, plows, potash kettles, etc., for the needs of settlers were made at a foundry in connection with the furnace, but the principal market for the pig iron was found in the United States. After having been in operation six years it was blown out in 1838, tradition says "for want of funds."

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**1837. Madoc, Ont.**

A furnace for smelting iron ore with charcoal fuel was built at Madoc, in Hastings county, Ont., in 1837, but was in blast only a short time when it was abandoned, one of the proprietors having been killed in the mine and the other not having sufficient means to carry on operations. The ore smelted was from the Seymour ore bed in the 11th lot of the 5th range, Madoc, and is said to have produced iron of a very superior quality.

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**1848. Woodstock, N.B.**

About 1848 "The York and Carleton Mining Company" obtained a subsidy from the Provincial Government of 10,000 acres of picked lands and expended altogether about $30,000 in erecting a blast furnace, two blowing engines, a helve hammer, operated by a small engine, boilers, buildings, etc. The ores were hematites from Jacksontown. The furnace was in blast at intervals until 1862, when it passed into the hands

of W. E. Smith, of Sheffield, England. In 1863 it was again blown in and kept in blast at intervals for several years. The whole time during which the furnace was actually in blast was only about eight years. Mr. Smith also erected a small cupola furnace in 1866, which, however, was only used for about a year. The blast furnace is (according to measurements published by Prof. Bailey in 1864) 39 ft. high and 9¾ ft. in diameter at the boshes. According to Prof. Hind, 3.33 tons of ore and 126 bushels of charcoal were required to make a ton of pig iron.

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**1849. Acadia Iron Works, N.S.** The Acadia Iron Works at Londonderry, N.S., were commenced in 1849 and the first iron was made by a Catalan forge in 1850. In 1852-3 a charcoal blast furnace was erected for the manufacture of pig iron, the Catalan forge being abandoned. Mr. E. A. Jones, then manager of the works, writing to Dr. How, says:* "Up to the time of my arriving in the Province, in the summer of 1857, there had been made altogether about 1,000 tons of iron from about 4,000 tons of ore. Since that time to the present (1861) we have made about 4,000 tons of iron, using about 9,000 tons of ore. Our present make of bar iron is at the rate of 1,200 tons, of an economic value of about £24,000 per annum. The ores we use are a hematite yielding about 48, and a brown and red oxide yielding about 40 per cent. of iron. It requires about 160 bushels imperial of charcoal and 200 bushels of limestone (this is found in the vicinity) used as a flux, to smelt one ton of pig iron, and about 3½ cords of wood to convert the pig into bars." In 1865 Dr. How stated there were 250 men and boys and 25 horses employed on a daily average. The following statement shows the make of pig and bar iron for several years:—

| Year. | Pig iron made. | Bar iron made. |
|---|---|---|
| 1862..... | 1150 Tons. | 945 Tons. |
| 1863 ..... ..... | 1251 " | 911 " |
| 1864..... | 1663 " | 1198 " |
| 1865..... | 1784 " | 1633 " |
| 1866..... | 2124 " | 1093 " |
| 1867..... | 2068 " | 421 " |

The furnace continued in blast until 1874 and is estimated to have produced about forty-five thousand tons of pig iron.

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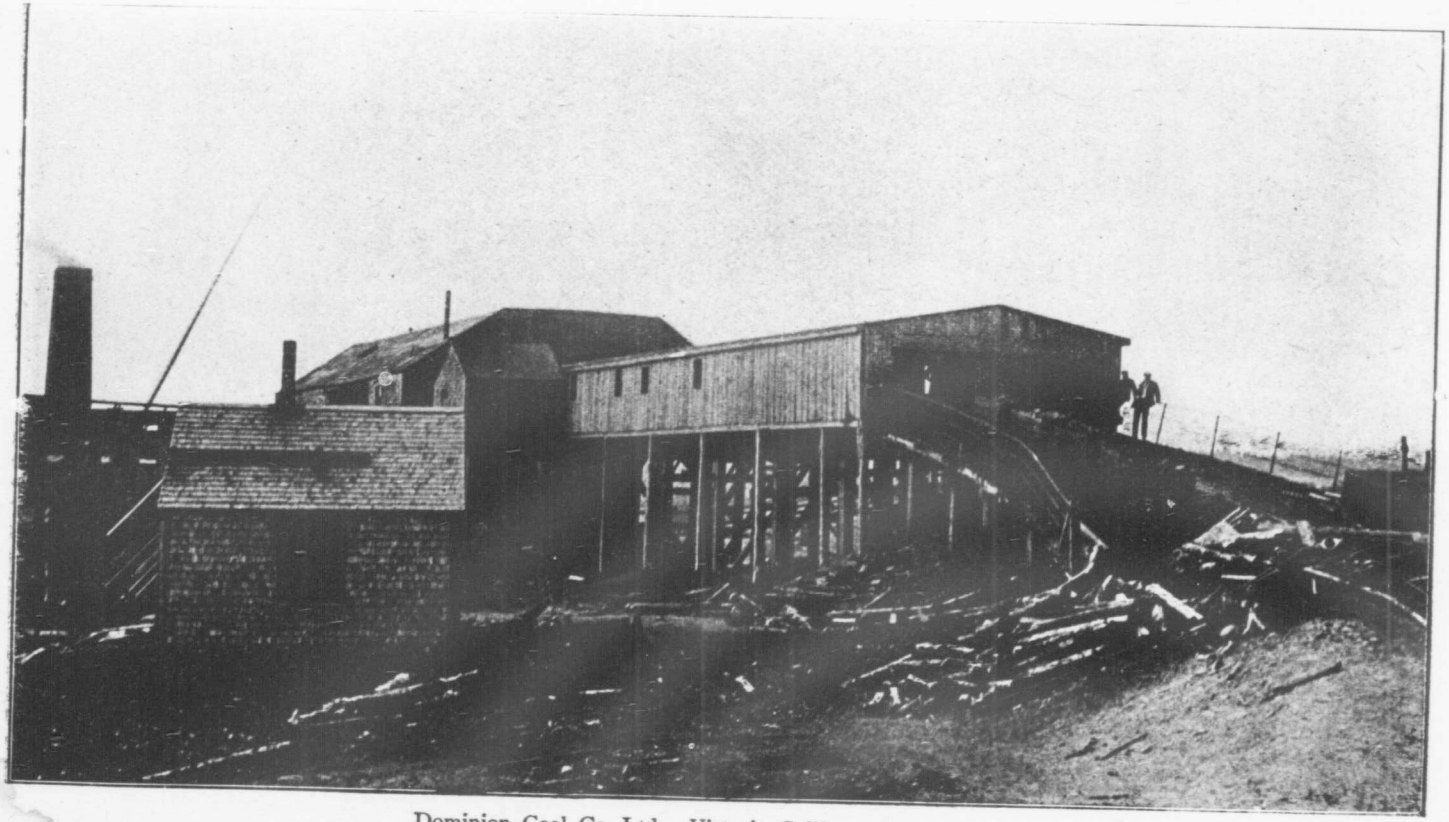
* Mineralogy of Nova Scotia, 1868.



Dominion Coal Co. Ltd.—Victoria Colliery, Cape Breton.

In October, 1873, the furnace was acquired by the Steel Company of Canada, particulars of which are given later on.

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**1856 Nictaux, N.S.**

Two blast furnaces were built at Nictaux, (one in 1856) Annapolis County, N.S., but they did not remain long in blast, and the iron produced is said to have been of poor quality on account of the phosphorus in the ores. In 1874 the furnaces were "in ruins," having been partly torn down by the people in the neighborhood to obtain bricks.

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**1860 Bloomfield, N.S.**

About 1860 a blast furnace was put in operation at Bloomfield to smelt the bog ores of that district, and it has been in blast several times since then.

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**1860 Radnor Forges, Que.**

About the year 1860 Messrs. Larue & Co. established not only a blast furnace, but forges, rolling mills, and car wheel foundry (the latter located at Three Rivers.) In addition to this they had 40,000 acres of freehold lands. From 200 to 400 men were employed, and the works were carried on for some time with a product of 4 tons of pig iron per day. A pair of car wheels together with an axle manufactured at these works were sent by Messrs. Larue & Co. to the International Exhibition of 1862, and attracted much attention, as the wheels had actually run 150,000 miles. Still, better results have been obtained in later years from the same iron. The wrought iron produced at the establishment was used largely for the manufacture of scythes and nail rod iron, and was much prized by consumers, who considered it equal if not superior to the very best Swedish iron. In the establishment of the works over one million of dollars was sunk, and the greater part of it was lost through disastrous fires, and, it is said, "bad management." There is no doubt, however, that the lack of railway facilities, which prevented supplies being taken from a greater radius than seven miles, handicapped the proprietors in their attempts to find a market for their product, and had as much to do with the failure as anything else. This disadvantage is now entirely overcome.

**1867 Moisie River, Que.** On the beach of the Moisie river there are great deposits of iron sand interstratified with beds of nearly pure silica. Bloomary furnaces were erected in 1867, which continued in operation for several years, being finally dismantled in 1876 or 1877.

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**1867 Hull, Que.** In 1867 the "Canadian Iron Mining and Manufacturing Co.," of Montreal, built a charcoal furnace at Hull, near Ottawa, and for a time in that and the following year produced a superior quality of pig iron, but the "economic results not being satisfactory" the working was stopped, and the furnace being much injured by a forest fire, a few years afterwards, was abandoned. The dimensions given by Dr. Sterry Hunt* were:— Height, 38 feet; boshes, 10 ft. 6 in., and throat, 4 ft. 5 in.

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**1869 St. Francis, Que.** The St. Francis furnace, near Riviere aux Vaches, in Yamaska county, Que., was completed in 1869. The dimensions were:— Height, 30 ft.; boshes, 7 ft. 2 in.; hearth, 6 ft. x 2 ft. 2 in.; depth of hearth, 1 ft. 8 in. The furnace was in operation until 1873, making at that time 5,520 tons of charcoal pig. It was then sold to Messrs. John McDougall & Co., of Montreal, who worked it till 1880, when it was closed owing to the exhaustion of the ores in the vicinity.

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**1871. Quebec.** In 1871, the Steel Company of Quebec was formed for the purpose of manufacturing steel directly from the magnetic sand of the north shore of the St. Lawrence by a process invented by the late Mr. Labreche Viger. The furnace, a well Siemens regenerative furnace, with five gas producers, charcoal kilns, etc, were built at the "Point au Livre" in Quebec city. In the winter of 1871-72 Mr. Labreche Viger died, being succeeded in the management by Dr. Larue. The company made several experiments until 1873, and then, having spent about $50,000, went into liquidation.

Bartlett says: "In making steel, the sand which had been purified by Dr. Larue's magnetic machine was mixed with tar and charcoal pow-

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*Report Progress Geological Survey, 1866-69.

der in a box containing revolving knives or beaters, and the mixture was then pressed into square blocks by means of a hydraulic press. The blocks were then piled upon the furnace hearth and melted down to steel which was finally tapped off into ingots containing about 200 lbs. The cause of failure I was not told, but the difficulty was probably experienced in obtaining a regular and homogeneous product."

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**1872. Hull, Que.** In the winter of 1872-3 the Haycock iron mine, located about eight miles north-east of the city of Ottawa, in the Province of Quebec, was opened and about 5,000 tons of ore raised. The works consisted of a steam saw mill, bloomary forge, engines, pumps, steam hammer. Blooms were made and exported to England ; the iron was of a very fine quality, but the enterprise was not commercially successful and the works were closed.

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**1873. Baie St. Paul, Que.** In 1873 "The Canadian Titanic Iron Co." erected two charcoal furnaces at St. Urbain, Charlevoix county, to work an immense bed of titanic iron, having a thickness of 90 ft. In spite, however, of the great quantity of ore at this point, it has never been found possible to carry on smelting operations with any measure of success and the furnaces were only in blast for a very short time, being dismantled in 1880.

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**1873. Londonderry, N.S.** In October, 1873, The Steel Company of Canada, Ltd., purchased the Acadia iron mines, the consideration being £82,000 in cash and £120,000 in fully paid founders' shares. £8,000 was also paid to Dr. Siemens for the "right to use free of royalty his patented processes for the production of iron and steel and their subsequent working into merchantable form." Bartlett, in his paper before the American Institute of Mining Engineers, says : "The accidental location of the little charcoal blast furnace seems to have given rise to the choice of the situation for the new works. It would be very difficult to account for the selection in any other way. Works specially designed for making steel by the new process, with rotators, regenerative melting furnaces with gas producers, two blast furnaces, branch lines connecting with the Intercolonial

Ry., etc, were built. The scale upon which the expenditures were made can be best understood by reference to the item of cost for the manager's house which came to $40,000.

The works were completed and got into operation, probably at a further expenditure of about $1,250,000 The new process did not succeed. Tons of expensive machinery had to be broken up and the melting furnaces and gas producers were pulled down. A second-hand rolling mill was purchased, puddling furnaces were built, an axle forge with a foundry for car wheels and general castings were added and the products of the works changed from steel to pig iron, bar iron and castings. The place was not now self-contained as before; charcoal was no longer the fuel used, so the trees were of little use except for timbers in the iron mines. What was wanted was coal and coke. The Pictou coal fields lay 51 miles to the eastward, that of Cumberland 34 miles to the westward. Limestone was obtained from Brookfield, 25 or 50 miles to the eastward. When after having paid freight on all these materials, there was no outlet for the iron but by the Intercolonial Railway, the distance by rail being 773 miles.

This condition of affairs was bad enough, but the situation was made much worse by the fact that the company had never built any coke ovens of its own, and that at this time only one colliery mined a coal suitable for coking, and also owned the only coke ovens in the county.

An explosion closed the colliery and for a time coke was not to be had at any price. The blast furnace had to be shut down, and the loss from this cause alone can be better imagined than described. After this experience some coke ovens were built. Finally a colliery was purchased and fully equipped; but upon practical trials the coal was found to be to a considerable extent unfitted for the company's uses.

It is not surprising that after all the vicissitudes, and in view also of the fact that until 1880 imported pig iron was admitted free of duty into the Dominion, the company failed.

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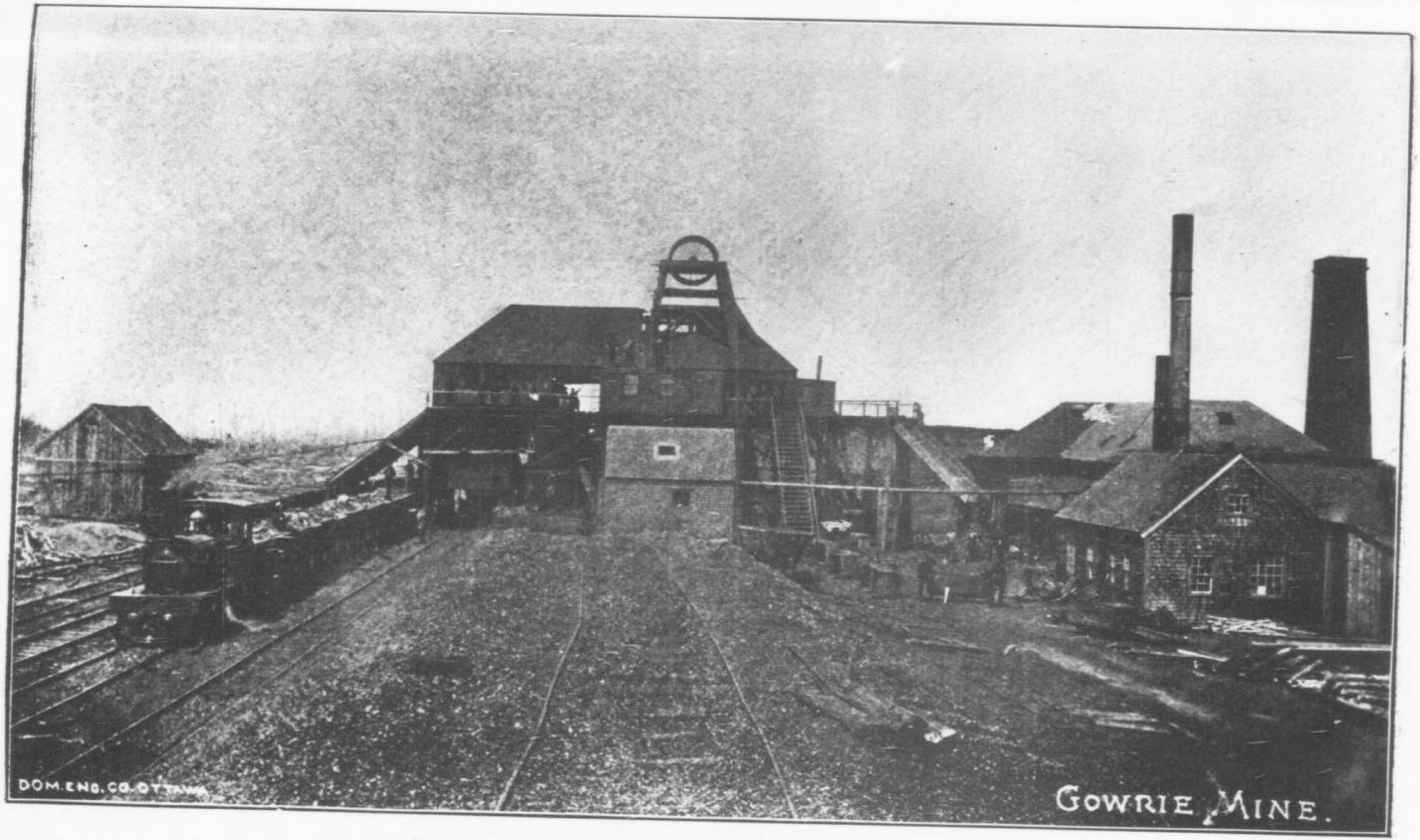
**1880 Drummondville, Que.**

In 1880 and 1881 Messrs. John Macdougall & Co., of Montreal, built two charcoal furnaces at Drummondville, on the River St. Francis, in the Township of Grantham, Drummond county, Que. These are still




Dominion Coal Co. Ltd.—Gowrie Colliery, Cape Breton.

in operation. The furnaces are each 34 ft. high, with boshes of 8 and 10 ft. respectively, worked with hot and cold blast, and the air pumps are driven with water power from the river St. Francis. The fuel used is charcoal and the bog ore which contains about 40 to 45 per cent. of iron is obtained in the vicinity of the works. The annual capacity is 4,000 tons, and the product charcoal pig iron for car wheel purposes.

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**1881 Hochelaga, Que.** The Canadian Iron and Steel Co., of Montreal, at Hochelaga, attempted to manufacture iron directly from the ore, with an invention of Dr. George Duryees, of New York, and by using petroleum as fuel. The experiments were continued about twelve months, and iron ores from Hull, Baie St. Paul, Moisie sand and bog ores were tried with limestone, clay and quartz as flux, but although a small quantity of iron was produced, the experiments, after an expenditure of $70,000 or $80,000, were stopped.

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**1883 New Glasgow, N.S.** Nova Scotia Steel and Forge Co., Ltd., completed their works at New Glasgow, N.S., the first cast being made on the 25th July, 1883. (See notice of the Nova Scotia Steel Co., Ltd.)

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**1887 Londonderry, N.S.** Londonderry Iron Co., Ltd., incorporated in 1887 to take over the mines, furnaces, works and other property of the Steel Company of Canada, Ltd. (See notice elsewhere.)

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**1888 Ferrona, N.S.** The New Glasgow Iron, Coal and Railway Co., Ltd., incorporated in 1888. Works constructed at Ferrona, Pictou County, N.S., and blown in 1892. Since amalgamated with the Nova Scotia Steel and Forge Co., Ltd. (See notice of operations elsewhere.)

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**1889 Radnor Forges, Que.** Canada Iron Furnace, organized 29th November, 1889, to take over the furnaces and other property at Radnor Forges, Que. (See notice of operations elsewhere.)

**1891 Bridgeville, N.S.** Pictou Charcoal Iron Co., Ltd., constructed a charcoal furnace plant at Bridgeville, Pictou County, Nova Scotia. (See notice elsewhere.)

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**1893 Hamilton, Ont.** Hamilton Blast Furnace Co., Ltd., incorporated to smelt ores at Hamilton, Ont. Furnace of a capacity of 200 tons constructed and blown in January, 1896. (See notice elsewhere.)

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BOUNTY ON PIG IRON.

For the purpose of stimulating the iron industries, the Dominion Government, in 1883, authorized the payment of a bounty of $1.50 per ton on all pig iron manufactured in Canada. This bounty was continued until 1st July, 1889, when the rate was made $1.00 per ton. A further change was made on 1st July, 1892, when the rate was increased to $2.00 per ton until 1st July, 1897. The following are the amounts paid to the companies under this authorization:

| | |
|---|---|
| 1884 | $44,090 |
| 1885 | 38,655 |
| 1886 | 39,270 |

| Furnace. | District. | 1887. | 1888. |
|---|---|---|---|
| | | $ | $ |
| Steel Company of Canada | Londonderry, N.S. | 31,164.01 | 18,642.62 |
| " withheld pend'g settl't with I.C.Ry | ..... | 22,033.09 | |
| John McDougall & Co | Drummondville, Que | 5,239.19 | 5,756.25 |
| George McDougall | " | 1,139.87 | 1,214.01 |
| Londonderry Iron Co., Ltd. | Londonderry, N.S. | ..... | 7,701.53 |
| | Totals | 59,576.16 | 33,314.41 |

| Furnace. | District. | 1889. | 1890. |
|---|---|---|---|
| | | $ | $ |
| John McDougall & Co. | Drummondville, Que | 5,498.24 | 3,588.14 |
| George McDougall | " | 1,109.03 | 523.49 |
| Londonderry Iron Co., Ltd. | Londonderry, N.S. | 30,626.35 | 21,585.64 |
| | Totals | 37,233.62 | 25,697.27 |

| Furnace. | District. | 1891. | 1892. |
|---|---|---|---|
| | | $ | $ |
| Londonderry Iron Co., Ltd. | Londonderry, N.S. | 15,849.81 | 26,066.24 |
| McDougall & Co., John. | Drummondville, Que | 2,926.58 | 2,077.42 |
| McDougall, George | " | 1,376.66 | ..... |
| Canada Iron Furnace Co. | Radnor Forges, Que | ..... | 2,150.71 |
| | Totals | 20,153.05 | 30,294.37 |

| Furnace. | District. | 1893. | 1894. |
|---|---|---|---|
| | | $ | $ |
| Londonderry Iron Co., Ltd. | Londonderry, N.S. | 49,906.13 | 49,043.10 |
| McDougall & Co., John | Drummondville, Que | 3,725.68 | 5,654.88 |
| Canada Iron Furnace Co. | Radnor Forges, Que. | 12,973.39 | 15,677.51 |
| New Glasgow Iron, Coal and Ry. Co. | Ferrona, N.S. | 25,871.28 | 55,269.00 |
| Pictou Charcoal Iron Co., Ltd | Bridgeville, N.S. | 1,420.00 | ..... |
| | Totals | 93,896.48 | 125,044.49 |

| Furnace. | District. | 1895. |
|---|---|---|
| | | $ |
| Canada Iron Furnace Co. (11 months to 1st June, 1895) | Radnor Forges, Que. | 12,581.60 |
| Londonderry Iron Co. (11 months to 1st June, 1895) | Londonderry, N.S. | 13,045.98 |
| McDougall & Co., John (3 months to 1st October, 1894) | Drummondville, Que | 621.37 |
| New Glasgow Iron, Coal and Ry. Co. (8 months to 30th Jan., 1895) | Ferrona, N.S | 33,695.00 |
| Pictou Charcoal Iron Co. (5 months to 2nd Nov., 1894) | Bridgeville, N.S. | 3,440.00 |
| | Totals | 63,383.95 |

| Returns for 9 months only, to 31st March, 1896. | District. | Tons. | Amount Paid. |
|---|---|---|---|
| | | | $ cts. |
| McDougall & Co., John (9 months to 31st March, 1896) | Drummondville, Que | 664 | 1,328.97 |
| Nova Scotia Steel Co. | Ferrona, N.S. | 16,263 | 32,527.40 |
| Canada Iron Furnace Co. | Radnor Forges, Que | 4,963 | 9,926.16 |
| Londonderry Iron Co. | Londonderry, N.S. | 14,979 | 29,959.54 |
| | Totals | 36,871 | 73,742.07 |

## Bounty on Steel Billets.

On the 22nd June, 1895, it was enacted by the Dominion Government:

1. A bounty of $2.00 per ton shall be paid on all steel billets manufactured in Canada from pig iron (made in Canada from Canadian ore) and such other ingredients as are necessary and usual in the manufacture of such steel billets: provided, that in computing the bounty no payment shall be made with respect to foreign ores used in the said product.

2. The proportion of such other ingredients may be as follows, viz.: —Not more than fifty per cent. of the total weight and may consist of ferro-manganese, speigil, ferro-silicon, scrap iron or scrap steel, and such other ingredients, and in such proportions as are necessary and usual in the manufacture of steel billets.

3. The manufacturer shall not be entitled to receive such bounty unless and until he shall have furnished to the Controller of Customs satisfactory evidence that in the manufacture of such steel billets, the last preceding regulation has been complied with; such evidence shall be taken upon oath, before a collector of customs or a justice of the peace, and may be in the form and to the effect set forth in the form of affidavit in the annexed schedule. Further corroborative evidence may be required by the Controller of Customs if in his opinion it appears requisite.

4. The affidavit, the form of which is given in the annexed schedule, shall be made by the proprietor or one of the proprietors operating the furnaces (or smelting works, as the case may be), at which such billets shall have been manufactured, or in case such furnaces or smelting works are being operated by an incorporated company, then the affidavit shall be made by the manager or managing director, and the accountant, of such incorporated company.

5. The claim for bounty upon all steel billets made up to the first day of March, 1895, shall be made and substantiated to the satisfaction of the Controller of Customs within four months of that date. The claim for bounty upon all steel billets made on or subsequent to the first day of March, 1895, shall be made and substantiated to the satisfaction of the Controller of Customs, within three months after the completion of the manufacture of the steel billets on which such bounty is claimed.

6. From and after the first day of July, 1895, the manufacture of such billets shall be made under customs supervision and the cost of such supervisions shall be paid by the manufacturers.

In accordance with the above there has been paid the Nova Scotia Steel Co., Ltd., a bounty of $56,925.26 on 28,462$\frac{1}{2}\frac{1}{2}\frac{1}{2}\frac{1}{2}$ tons of steel billets manufactured at New Glasgow, N.S., between 1st March, 1895, and 1st March, 1896.

BOUNTY ON PUDDLED BARS.

By Order-in-Council under date of 24th February, 1896, the Dominion Government enacted:

That the following regulations for the governing of the payments of bounty on iron puddled bars made in Canada from Canadian pig iron manufactured from Canadian ore, be established under the authority of 57–58 Vic., Chap. 9.

1. A bounty of $2.00 per ton shall be paid on all iron puddled bars made in Canada from Canadian pig iron manufactured from Canadian ore.

2. The manufacturer shall not be entitled to receive such bounty unless and until he shall have furnished to the Controller of Customs satisfactory evidence that such iron puddled bars were made in Canada from Canadian pig iron manufactured from Canadian ore; such evidence shall be taken upon oath, before a collector of customs or a justice of the peace, and may be in the form and to the effect set forth in the form of affidavit in the annexed schedule. Further corroborative evidence may be required by the Controller of Customs if in his opinion it appears requisite.

3. The affidavit, the form of which is given in the annexed schedule, shall be made by the proprietor or one of the proprietors operating the furnaces (or smelting works, as the case may be) at which such iron puddled bars shall have been manufactured, or in case such furnaces or smelting works are being operated by an incorporated company, then the affidavit shall be made by the manager or the managing director, and the accountant of such incorporated company.

4. The claim for bounty upon all iron puddled bars made on or subsequent to the 1st day of March, 1895, shall be made and substantiated to the satisfaction of the Controller of Customs, within three months after the completion of the manufacture of the iron puddled bars on which such bounty is claimed.

5. From and after the first day of July, 1895, the manufacture of such iron puddled bars shall be made under customs supervision and the cost of such supervision shall be paid by the manufacturers.

In accordance with the above there has been paid to the Londonderry Iron Co., Ltd., a bounty of $3,348 91 on 1,674$\frac{9}{2240}$ tons of puddled bars manufactured at Londonderry, N.S., between 1st January and 31st March, 1896.

### Ontario Iron Mining Fund.

In 1894 the Ontario Legislature, having in view the encouragement of Iron mining and smelting in that Province, enacted as follows:

"That a sum not exceeding $125,000 shall be and is hereby appropriated and set apart from and out of the surplus moneys forming a part of the Cousolidated Revenue Fund of this Province, for the purpose of encouraging miners to open up and work the iron ore deposits of the Province; and such sum of $125,000 shall be designated and known as the Iron Mining Fund.

"The Treasurer of the Province may, with the authority of and under such regulations as may be made from time to time by the Lieutenant-Governor in Council, pay out of the said fund to the miners or producers of ore upon all iron ores which shall be raised or mined and smelted in the Province for a period of five years from the first day of July, 1894, the equivalent of one dollar per ton of the pig metal product of such ores; but no sum or part of said moneys shall be so paid until the said regulations governing payments shall be approved by the Legislative Assembly.

"Should a larger quantity of ore be raised or mined and smelted in any one year than the sum of $25,000 will be sufficient to meet the payments at the rate and as provided in the foregoing sections, then payments to the miners or producers thereof shall be made on a *pro rata* basis, so that no more than $25,000 shall be paid for the produce of ores in any one year.

"It is declared and provided that payments out of the foregoing appropriation of $125,000 shall cease and determine with the payments of any sum or sums which shall have been earned during the said period of five years, and any part or balance of said sum remaining thereafter shall be returned to and become part of the Consolidated Revenue Fund of the Province."

### Progress of the Industry.

It is over eight years since the advance in customs duties on iron was made in Canada, and the question may now be fairly asked if the

Dominion Coal Co. Ltd.—Reserve Colliery, Cape Breton.

results of our experience, during these eight years of the manufacture of iron, are such as to warrant us in saying that the policy then inaugurated has been successful.

In dealing first with the manufacture of pig iron it is absolutely necessary to bear in mind the conditions under which the smelting of iron is carried on in Canada. The chief deposits of iron ore and coal, in close proximity to each other, are found in the Province of Nova Scotia, while the principal markets for the sale of pig iron are the Provinces of Quebec and Ontario, separated from the furnaces by many hundred miles of railway. In this country, too, all the work in connection with mining the ores, making the coke, or charcoal, as the case may be, requires to be done by the smelting company, entailing the expenditure of a very large capital in comparison with the value of the iron when smelted. In the United States, on the other hand, the smelting of iron in blast furnaces is comparatively a simple operation. The blast furnace proprietor purchases his ore of a specified analysis from the owners of the mines, his coke or charcoal from other sources, and all he has to do is to smelt them in such a way that he knows exactly the quantity and quality of the iron he will produce. The Canadian smelter has to explore the whole country for iron suitable for his work. He has to keep mining plants in operation at different places, chemists analyzing the various qualities of ore produced, and very often he has to abandon mines yielding large quantities of ore, for the reason that the percentage of manganese, phosphorous, sulphur or titanium contained in it is altogether too high to admit of its being used profitably in his furnace. This has been the actual experience of Canadian furnacemen, and the work they have done and the difficulties they have overcome, and which still confront them, are such as might well daunt the most enterprising. This has been fully appreciated by the Liberal Government of the Province of Ontario, which has granted a bonus equivalent to $1.00 per ton on pig iron smelted from ore raised in the Province of Ontario, and which will doubtless have the effect of bringing into the market a large quantity of Ontario ore which has hitherto not been available for use.

In the case too of charcoal furnaces, the great question of the supply of charcoal has to be faced. For this purpose it is necessary to keep a lumber camp of choppers in the woods, and to cut every log that is used for making charcoal. Compare this with the charcoal iron furnace-

men in the United States, where the supply of charcoal can readily be supplied by those who manufacture it for the sake of the chemical bye-products. Taking all these things into account, and many other difficulties which might be mentioned, it is gratifying to note that the domestic production of pig iron has increased from 24,373 tons in 1889-90 to 62,522 tons in 1893-94. The consumption of pig iron, both imported and domestic, in the years mentioned, is as follows :—

111,986 tons in..... 1889-90
107,804 " ..... 1893-94

From these figures it will be seen that the proportion produced in Canada of the total consumption of pig-iron was 21.76 per cent. in 1889-90 and 58.00 in 1893-94.

When we consider the fact that the ruling price of American iron during the past two or three years has been altogether below the average of previous years, and in a great many cases confessedly below the cost of production, it is almost surprising that the imports have not been larger. This brings up another point of great interest in connection with the imports of iron. Ten years ago the bulk of our supplies came from Great Britain, and pig iron, bar iron, etc., formed the principal part of the heavy weight brought over by the ocean steamers. This state of affairs no longer continues, and the ocean liners find it hard work to get sufficient dead weight. Any attempt, however, to interfere with the tariff now would not have the effect of restoring the former condition of things. It would simply mean that the place now occupied by Canadian manufactures would be filled by American instead of British goods. The development of the iron trade of the United States has been such that, as the result of the most liberal protection within its own borders, iron and steel are now produced at prices as low, or nearly so, as similar products in Great Britain and the continent of Europe. Such a state of affairs we fully hope will be the result of the present policy in this country. It is folly, however, to imagine that the few years that have elapsed since this policy was introduced have been sufficient to set on a firm basis an industry requiring such a large investment of capital.

### Coke Pig Iron.

The Londonderry Iron Co., Ltd., succeeded in 1887 to the property of the old Steel Co. of Canada, and has operated its plant

since that year. Its output has generally run from about 50 to 85 gross tons per day. The annual output since 1888, according to the published returns, are about as follows :—

| | | | |
|---|---|---|---|
| 1888..... | 15,600 tons. | 1892... .... | 24,750 tons. |
| 1889..... | 19,000 " | 1893..... | 21,200 " |
| 1890..... | 16,500 " | 1894..... .. | 8,100 " |
| 1891..... | 18,300 " | 1895..... | 16,000 " |

For the first five years of its existence this company also turned out a large quantity of puddled bars, and rolled them into bar iron. The "Siemens" brand of bar iron was then recognized as of fine quality, especially as regards strength, and compared very favorably in this respect with ordinary imported irons. Owing to the fact, however, that the duty on imported wrought scrap was at a very low rate, leading to its use almost entirely in the manufacture of bar iron in Canada, this branch of the company's operations was stopped about 1891. Last year, however, the duty on scrap was increased to its present rate of $4.00 per ton, and the company has again started its puddling furnaces, which have a capacity of about 500 tons per month. The product of these furnaces has been placed, to a very large extent, for the year, and the quality of the puddled bars has been found of the most satisfactory nature. As will be seen from the yearly output, the furnace had its best runs during the years 1889 to 1893. In the year 1894 it was shut down for the greater part of the year, owing to the lowness of water and other causes, which accounts for the small output that year. The quality of "Siemens" pig iron was for many years of a very high character, and the iron was able to compete favorably with imported Scotch brands. It was a very strong iron and formed an excellent mixture with the best brands of Scotch iron, such as "Summerlee," "Gartsherrie," "Langloan" and "Calder," these brands being of a more fluid and open nature than "Siemens." For many years the company's mines, operated by themselves, supplied all the necessary ore, which gave the iron a uniform character. Duirng the last two or three years, however, they have drawn a certain proportion of their supply from another source, the result being that the iron has been of a more open and silicious nature. The great drawback in connection with iron making in Nova Scotia has been the uncertain nature of the ore supply, and this, more than anything else, has rendered the product somewhat uncertain in its character.

The prices that have prevailed during these eight years have been to a large extent influenced by the competition of foreign iron imported either from Great Britain or from the United States. From the year 1888 down to 1891 or 1892 the competition was almost entirely from Great Britain, but during the past three or four years British imports have been seriously curtailed, the competition coming from the United States. This reached a climax last year, when the imports of British iron for the fiscal year ending 30th June, 1895, were only 5,666 gross tons, compared with 24,600 gross tons imported from the United States.

Although it is difficult to give anything like accurate prices for Canadian iron, the following may be considered as an indication of the average figures realized at the furnace during the past eight years.

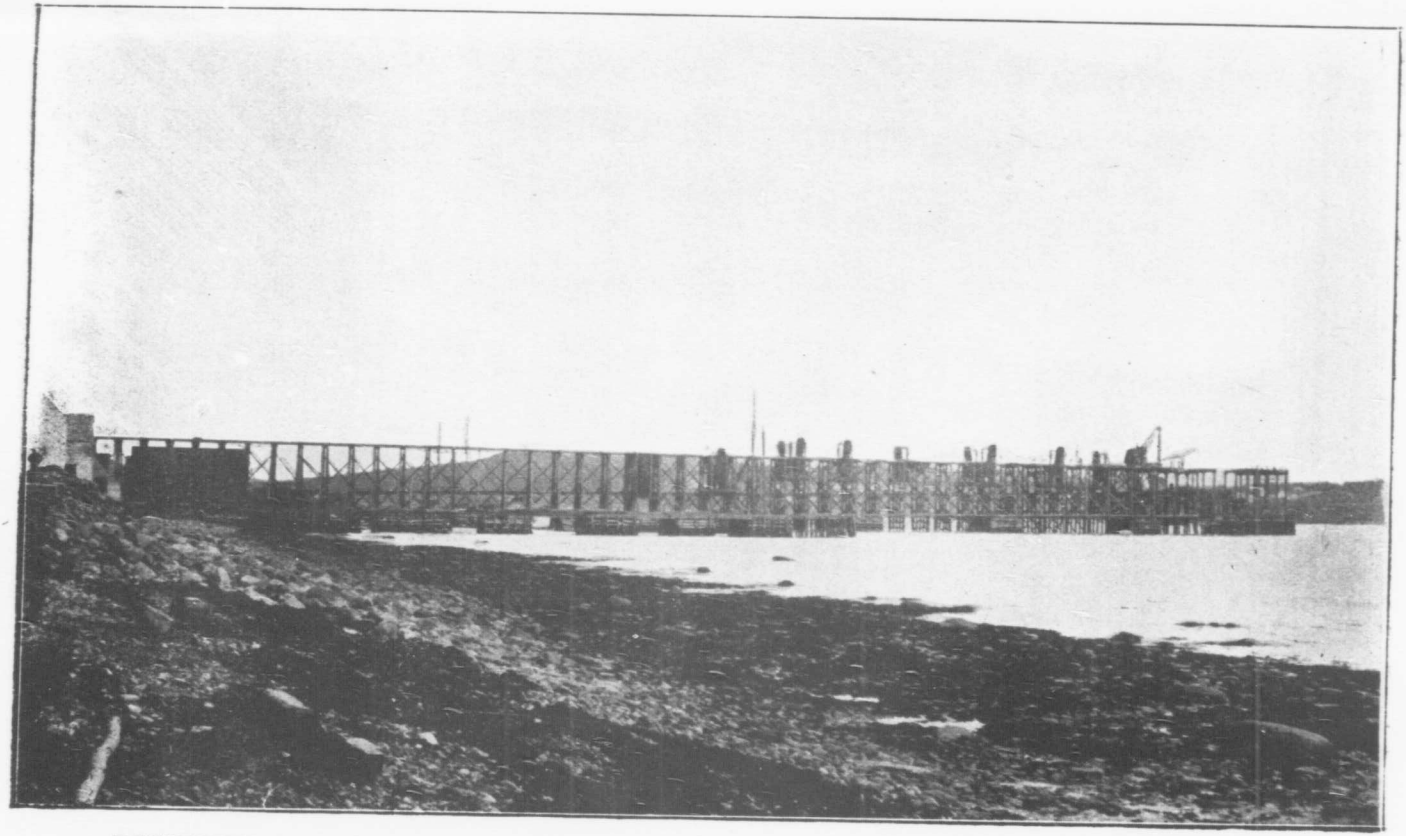
The highest year was 1890. During that year American No. 2 iron rose to $19.50 at Chicago, but quickly subsided after the temporary boom was over. Scotch iron, too, was much excited at the same time, and sales of "Summerlee" were made as high as $25 00 in Montreal.

About the year 1892 the competition of Southern American furnaces began to be felt, and prices declined considerably, reaching their lowest ebb about April, 1895, when it is said Southern No. 2 was actually sold at about $6.50 at the furnaces in Alabama and Tennessee, a price which was certainly below cost. Immediately afterwards a strong demand set in, and prices rose generally in the United States from $5.00 to $8.00 per ton, according to the quality of the iron.

COMPARATIVE PRICES OF AMERICAN AND CANADIAN IRON.

| Year. | Canadian Iron at the Furnace in Nova Scotia. | American Iron in Chicago. |
|---|---|---|
| 1888 | $16.00 to $18.00 | $17.20 |
| 1889 | 17.00 to 18.00 | 15.80 |
| 1890 | 18.00 to 19.00 | 16.75 |
| 1891 | 16.00 to 17.00 | 15.00 |
| 1892 | 15.00 to 16.00 | 14.00 |
| 1893 | 13.00 to 14.00 | 13.00 |
| 1894 | 12.00 to 13 00 | 10 50 |
| 1895 | 11.00 to 15.00 | 9.50 (lowest.) |

The figures given for American iron are the average of the monthly prices, except in the year 1895, when the lowest price only is given.



DOMINION COAL CO. Ltd.—NEW SHIPPING PIER AT LOUISBURG, CAPE BRETON.

During the same years the fluctuations of Scotch iron have not been of a very serious nature. The following average prices are official for Scotch "warrants," in store at Glasgow :—

| | | | |
|---|---|---|---|
| 1888..... | 39/11 = | $9.71 | NOTE.—The price of warrants is usually about $1.25 to $1.50 under the price of shipping brands, such as "Summerlee," "Gartsherrie" etc. |
| 1889..... | 47/ 9 = | 11.60 | |
| 1890..... | 49/ 6 = | 12.04 | |
| 1891..... | 47/ 1 = | 11.45 | |
| 1892..... | 41/10 = | 10.18 | |
| 1893..... | 42/ 3 = | 10.28 | |
| 1894..... | 42/ 8 = | 10.38 | |
| 1895..... | 44/ 5 = | 10.80 | |

During the latter half of 1895 the prices realized for Canadian iron were very much better than those current during the previous eighteen months.

The following prices of No. 1 "Summerlee" pig iron, delivered on dock, Montreal, duty paid, will also be of interest. They are of course approximate, but will be found near the mark :—

| | |
|---|---|
| 1889..... | $20.50 to $24.00 |
| 1890..... | 25.00 to 21.00 |
| 1891..... | 21 00 to 21 50 |
| 1892..... | 19.00 to 18.25 |
| 1893..... | 19.00 to 18.00 |
| 1894..... | 19.00 to 20.00 |
| 1895..... | 18.50 to 20.00 |

The coke furnace of the New Glasgow Iron, Coal and Railway Co., Ferrona, was put into blast in 1892. Its output is much larger than that of the Londonderry Iron Co., and it has been able to exceed 100 tons per day. The quality of ores around New Glasgow are manganiferous, and for some time this company was troubled by an excess of manganese in their iron, which rendered it unsuitable for most descriptions of foundry work. About one-half, however, of the output of the furnace was taken up by the Nova Scotia Steel and Forge Co., for making into steel in their Siemens-Martin furnaces. For this purpose a high percentage of manganese is necessary, so that the iron gave excellent results for steel making. In order, however, to obviate the trouble in the foundry iron, the company use a certain quantity of ore brought from a distance, by means of which they have been able to overcome the high manganese in their own ore, bringing the percentage down to suitable proportions for a good foundry iron.

The output of the Ferrona furnace since 1893 has been as follows:—

| | |
|---|---|
| 1893 | 22,500 tons. |
| 1894 | 28,142 " |
| 1895 | 17,331 " |

The prices that have ruled for "Ferrona" iron are very largely the same as those quoted for the "Siemens" brand of the Londonderry Iron Co. The two brands to-day have a great deal in common, as both furnaces have drawn a large part of their ore from the same district to mix with their own local supply. For the past year the Ferrona Co. have been investigating some large iron properties owned by them in Newfoundland, and shipments of this ore have already been brought over to Pictou. It has not yet been demonstrated, however, at what price this can be laid down at the furnace, but if the quality is as satisfactory as the quantity appears to be large, there is no doubt that the company will not require to trouble itself about its ore supply for a long time to come. It must at the same time be taken into account that the bounty paid by the Federal Government is only on iron produced from Canadian ores, so that a loss of the bounty on the proportion of Newfoundland ore must be taken into account in figuring out its cost to the furnace.

Early in the year 1895 the New Glasgow Iron, Coal and Railway Co. was amalgamated with the Nova Scotia Steel and Forge Co., under the name of the Nova Scotia Steel Co., Ltd. The steel department has always been a very paying concern, and it is to be hoped that the amalgamation of the two will have good results to both companies.

The only other coke furnace in Canada is that of the Hamilton Iron and Steel Co. at Hamilton, Ont., but as it was only put into blast about the beginning of the present year, nothing definite can be said regarding it as yet. It proposes to draw its supply of ore largely from the Lake Superior region about Port Arthur, and for this purpose large wharves are being built on the company's property at Hamilton to facilitate the handling of the ore brought down in summer by water from Port Arthur. In view of the present undeveloped condition of Ontario ore it is difficult to say what quantity of it can be used. It appears to be uncertain in its character, and a great deal of experimenting will have to be done before its value can be demonstrated.

The combined product of these three furnaces ought to provide for all the consumption of pig iron in Canada. It is a well known fact,

however, in foundry practice, that a mixture of several irons gives better results than the use of one brand alone, and there is no doubt that there will always be a certain quantity of foreign iron, either Scotch or American, imported into the country to mix with Canadian brands. This was the experience of furnacemen in the United States, but American iron has now got past that stage, and the various qualities produced have altogether taken the place of the imported Scotch irons, which, in spite of the high protection, were brought in large quantities to the country down to a very recent period.

### Charcoal Pig Iron.

If there is one enterprise more than another that Canada is fitted by nature to sustain, it is the manufacture of special grades of charcoal pig iron, approximating in quality that of Sweden. Everywhere throughout the provinces of the Dominion, maple, birch and other hard woods, most suitable for making charcoal fuel of the highest standard, abound, and this, so far as Quebec, Ontario, and Nova Scotia are concerned, in close proximity to iron ore and limestone, and also to railways and the market.

Until quite recently the tendency in all iron producing countries was towards cheap material, hence the great increase in the output of iron smelted with mineral fuel. The depletion of the forests in most countries accounts in part for the decline in the production of charcoal metal.

The experience of engineers the world over in attempting to use cheap material in high class work, has resulted, within the past year or two, in a great change, and the prospects now are that there will be a greater field in the near future for high-class charcoal iron than there ever was before. The demand will come from various directions. Charcoal metal must continue to be used in the manufacture of railway car and electric car wheels, upon the safe quality of which human life depends. Even a greater use for it will probably be found in the building of land fortifications and redoubts, armor plate and projectiles, the manufacture of special grades of wrought iron, where great strength is demanded, bicycle tubes, electrical dynamos, etc.

In charcoal iron the tendency will be more and more towards the very highest quality, regardless of price, whereas in coke iron the ten-

dency will probably still continue in the direction of cheaper grades, for work of inferior quality.

As pointed out, Canada possesses all the natural advantages for the production of charcoal pig iron, not only for her own wants, but for export. Her only possible rivals, at least in the immediate future, are the United States and Sweden. The importance of the Swedish iron industry to that country should point capitalists in the direction of a similar development in Canada. The history of the manufacture of charcoal iron in Canada in the past is very similar to that of the same industry in other countries Here, as elsewhere, the first iron produced was smelted with charcoal, but the work was attempted under most adverse circumstances, at a time when the country was absolutely without railway facilities, and the furnaces were run intermittently and on small outputs, making it next to impossible to succeed, especially in competition with inferior mineral-fuel iron imported free of duty from other countries, and at a time when the inferior iron met all the simple requirements of the colony. Now that the reaction has set in, and the requirements of the closing days of the 19th century are such that there is a large market opening up for the superior qualities of metal, it is a happy thing that Canada possesses at least the nucleus of a great industry. That the present development, moderate though it be, is due to the protective duties and encouragement granted by the Dominion Government in 1887, is beyond question. At that time Canada possessed only two charcoal iron furnaces, one at Drummondville, Que., with a capacity of about 1500 tons of charcoal metal per annum, and the other at Radnor Forges, with a capacity of about 1,000 tons per annum. The work done at Radnor Forges was in almost direct continuance of the work started 225 years ago, in the earliest days of New France, at the St. Maurice forges, and the metal produced then and now from the famous ores of the Three Rivers district is unexcelled in quality by anything made in rival markets. The protective policy of 1887 resulted in the purchase and re-construction of the works at Radnor Forges by the Canada Iron Furnace Co., Ltd., and the modern furnace now in operation there was built in 1891. Since that date 25,000 tons of the very highest class of charcoal metal has been successfully produced and has found a market not only at home, in competition with American charcoal iron, but

Dominion Coal Co. Ltd.—Glace Bay Mine, Cape Breton.

the product ("C.I.F." Charcoal Pig) has found its way into foreign markets, where it has attracted unusual attention from leading engineers.

A new furnace was erected in 1891 at Bridgeville, N.S., by the Pictou Charcoal Iron Co., and within the past year a puddling plant has been established there by the same company, wherein almost, if not all their output of upwards of 5,000 tons per annum, will be converted into puddled bars for shipment to the various rolling mills of the Dominion.

The work of the past few years, when all the difficulties of establishing such industries are considered, has been very satisfactory indeed. It has heen amply demonstrated that Canadian made charcoal metal ranks in quality with the very best metal made in Sweden, and that it is now securing a market as against the Swedish product.

That the progress of the industry has been tardy, in comparison with that of other Canadian enterprises, is largely due to natural causes. It must be remembered that in the initial years the establishment of a charcoal iron industry in this country means not only a large outlay for plant, but also for exploring and developing ore fields, forests and other sources of supply. Not the least of kindred difficulties in this new country is the training of labor, so as to attain the standard of efficiency existing in the various departments of this work in other countries. While the Canadian producer of charcoal iron is undoubtedly at a disadvantage in regard to cost of production in the initial years, by being forced to explore and make his own raw material, yet this very fact guarantees the consumer a more uniform grade of iron than he is likely to get from American iron masters, the latter being governed in their purchase of supplies from miners by the price of the material, quite as much as by the quality of the material itself.

In the case of the charcoal iron made by the Canada Iron Furnace Co., Ltd., in the Province of Quebec, the company controls large areas of bog and lake ore deposits, which are consistent in quality, and the product therefore is bound to be of the same good quality from year to year. This has been well attested by actual results secured by this company, and by their predecessors, in work extending over almost two centuries.

One of the most important developments in connection with the manufacture of iron has been the great increase in the quantity of mer-

chant bars of iron and steel rolled in this country In iron it is true that the great bulk of bars have been rolled from scrap, which makes at the best an uncertain product, due to the variable quality of the scrap used in its manufacture. At the same time it is right to bear in mind that this quality is quite good enough for the great bulk of the purposes for which it is required in Canada.

The increase in the duty on wrought scrap iron, which came into operation in 1894, has not so far made much difference in the quantity of scrap used, but this may be traced to the unprecedentedly low prices for this material which prevailed in the United States during 1894 and part of 1895.

Owing, however, to the re-opening of the puddling furnaces at Londonderry, N.S, it is hoped that their puddled bars will supplant scrap to the extent of their output, and thus help to improve the quality of the iron rolled in this country.

Previous to the increased duty on bar iron, the Ontario Rolling Mill Co. in Hamilton, and the Rolling Mills of St. John, N.B., were the only concerns rolling merchant bars. To-day there are no less than four large rolling mills employed in their manufacture in Montreal alone. The result has been that the importations of bar iron have fallen off considerably, and the bulk of it is now made in this country. These importations, too, have been mostly of special sizes of common iron, and special qualities, such as "Lowmoor," "Bowling," "Netherton," and other fine qualities not rolled by the local mills. A special feature in connection with this branch of the iron trade has been the rolling of a fine quality of charcoal bar iron, made out of the "C.I.F." brand of Three Rivers charcoal pig iron, from Radnor Forges, Que. The result has been a specially fine quality of bars, quite equal to the best brands of Norway iron. Samples of this product have been tested by the authorities of McGill college, with most satisfactory results.

Taking a general view of the progress of the iron trade, therefore, during the past eight or ten years, it is safe to say that considerable progress has been made, but it will also be safe to say that ten years is too short a time to develop an industry of such magnitude as the manufacture of iron and steel. A very large amount of capital has been invested in this work, and it is to be hoped that the country will appreciate the efforts which have been made by private individuals to develop the min-

Londonderry Iron Co. Ltd.—Pipe Foundry and Pipe Yard.

ing resources of the country, and that every encouragement will be given to carry these efforts to a successful issue, which we need hardly say will tend very much to the general prosperity of the country.

## Imports of Pig Iron, 1885–1895.

(Compiled from Trade and Navigation Returns.)

| 1885. | Great Britain. | | United States. | | Total from all sources. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| **Charcoal Pig :** | | $ | | $ | | $ |
| Ontario | .... | .... | 466 | 11,618 | 466 | 11,618 |
| Quebec | .... | .... | 597 | 14,365 | 597 | 14,365 |
| Nova Scotia | .... | .... | 56 | 1,350 | 56 | 1,350 |
| **All other Pig :** | | | 1,119 | 27,333 | 1,119 | 27,333 |
| Ontario | 15,598 | 179,556 | 4,853 | 98,507 | 20,451 | 278,063 |
| Quebec | 16,464 | 180,605 | 1,427 | 29,460 | 17,997 | 211,448 |
| Nova Scotia | 1,077 | 15,666 | ..... | ..... | 1,077 | 15,666 |
| New Brunswick | 897 | 10,261 | 950 | 17,075 | 1,858 | 27,516 |
| British Columbia | 726 | 8,670 | 159 | 3,917 | 885 | 12,587 |
| Prince Edward Island | 11 | 146 | ..... | ..... | 11 | 146 |
| | 34,773 | 394,904 | 7,389 | 148,959 | 42,279 | 545,426 |

| 1886. | Great Britain. | | United States. | | Total from all sources. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| **Charcoal Pig :** | | $ | | $ | | $ |
| Ontario | .... | .... | 2,808 | 51,743 | 2,808 | 51,743 |
| Quebec | .... | .... | 279 | 6,283 | 279 | 6,283 |
| Nova Scotia | .... | .... | 98 | 2,060 | 98 | 2,060 |
| **All other Pig :** | | | 3,185 | 60,086 | 3,185 | 6,086 |
| Ontario | 11,289 | 129,672 | 4,702 | 91,016 | 15,991 | 220,688 |
| Quebec | 21,101 | 221,101 | 685 | 14,730 | 21,955 | 237,898 |
| Nova Scotia | 1,000 | 12,864 | 25 | 400 | 1,025 | 13,264 |
| New Brunswick | 1,498 | 17,365 | 1,390 | 31,051 | 2,888 | 48,416 |
| British Columbia | 468 | 5,283 | 69 | 2,167 | 537 | 7,450 |
| Prince Edward Island | 67 | 767 | .... | .. . | 67 | 767 |
| | 35,423 | 387,052 | 6,871 | 139,364 | 42,463 | 528,483 |

IMPORTS OF PIG IRON—*Continued.*

| 1887. | Great Britain. | | United States. | | Total from all sources. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| **Charcoal Pig:** | | $ | | $ | | $ |
| Ontario | ..... | ..... | 3,697 | 72,544 | 3,697 | 72,544 |
| Quebec | ..... | ..... | 222 | 4,876 | 222 | 4,876 |
| | ..... | ..... | 3,919 | 77,420 | 3,919 | 77,420 |
| **All Other Pig:** | | | | | | |
| Ontario | 11,731 | 130,502 | 4,331 | 88,433 | 16,062 | 218,935 |
| Quebec | 25,465 | 256,486 | 337 | 7,611 | 25,811 | 264,177 |
| Nova Scotia | 1,233 | 18,244 | ..... | ..... | 1,233 | 18,244 |
| New Brunswick | 989 | 9,807 | 1,344 | 33,778 | 2,333 | 43,585 |
| British Columbia | 687 | 6,883 | 91 | 1,750 | 778 | 8,633 |
| P. E. Island | 78 | 814 | ..... | ..... | 78 | 814 |
| | 40,183 | 422,736 | 6,103 | 131,572 | 46,295 | 554,388 |
| 1888. | | | | | | |
| **Pig, Kentledge, and Cast Scrap:** | | | | | | |
| Ontario | 9,501 | 106,136 | 9,971 | 206,619 | 19,472 | 312,755 |
| Quebec | 23,648 | 235,485 | 1,042 | 22,808 | 24,690 | 258,293 |
| Nova Scotia | 2,074 | 21,604 | 141 | 2,056 | 2,228 | 23,787 |
| New Brunswick | 290 | 3,192 | 1,881 | 44,918 | 2,171 | 48,110 |
| British Columbia | 412 | 5,067 | ..... | ..... | 412 | 5,067 |
| | 35,925 | 371,484 | 13,035 | 276,401 | 48,973 | 648,012 |
| 1889. | | | | | | |
| **Pig, Kentledge, and Scrap:** | | | | | | |
| Ontario | 21,112 | 228,052 | 10,785 | 203,070 | 31,897 | 431,122 |
| Quebec | 32,515 | 317,931 | 1,205 | 23,925 | 33,720 | 341,856 |
| Nova Scotia | 3,408 | 37,768 | ..... | ..... | 3,408 | 37,768 |
| New Brunswick | 515 | 4,963 | 1,419 | 33,724 | 1,934 | 38,687 |
| British Columbia | 872 | 9,345 | 273 | 5,823 | 1,145 | 15,168 |
| P. E. Island | 11 | 151 | ..... | ..... | 11 | 151 |
| | 58,433 | 598,210 | 13,682 | 266,542 | 72,115 | 864,752 |

IMPORTS OF PIG IRON—*Continued.*

| 1890. | Great Britain. | | United States. | | Total from all sources. | |
|---|---|---|---|---|---|---|
| | Tons. | Value. | Tons. | Value. | Tons. | Value. |
| **Pig, Kentledge, and Scrap:** | | $ | | $ | | $ |
| Ontario | 22,855 | 258,455 | 20,986 | 370,150 | 43,869 | 628,829 |
| Quebec | 35,942 | 405,113 | 968 | 15,854 | 36,910 | 420,967 |
| Nova Scotia | 4,155 | 53,617 | 67 | 1,013 | 4,476 | 55.981 |
| New Brunswick | 399 | 8,059 | 1,049 | 22,594 | 1,501 | 31,367 |
| British Columbia | 745 | 8,489 | 100 | 2,275 | 845 | 10,764 |
| P. E. Island | 11 | 161 | ..... | ..... | 12 | 170 |
| | 64,107 | 733,894 | 23,170 | 411,886 | 87,613 | 1,148,078 |

| 1891. | By Provinces. | | From | Tons. | Value. |
|---|---|---|---|---|---|
| | Tons. | Value. | | | |
| **Pig, Kentledge, and Scrap:** | | $ | | | $ |
| Ontario | 34,767 | 524,346 | Great Britain | 52,627 | 629,783 |
| Quebec | 37,437 | 446,379 | B. Guiana | 226 | 1,331 |
| Nova Scotia | 7,032 | 81,704 | B. W. Indies | 689 | 5,316 |
| New Brunswick | 1,071 | 18,965 | Newfoundland | 52 | 436 |
| British Columbia | 1,005 | 14,465 | Brazil | 1,373 | 9,189 |
| P. E. Island | 5 | 70 | Norway | 2 | 44 |
| Total | 81,317 | 1,085,929 | St. Pierre | 52 | 425 |
| | | | United States | 26,296 | 439,405 |

| 1892. | By Provinces. | | From | Tons. | Value. |
|---|---|---|---|---|---|
| | Tons. | Value. | | | |
| **Pig Iron, Kentledge, and Scrap:** | | $ | | | $ |
| Ontario | 32,321 | 439,721 | | | |
| Quebec | 30,105 | 361,725 | Great Britain | 43,727 | 501,286 |
| Nova Scotia | 4,646 | 53,280 | B. W. Indies | 81 | 1,235 |
| New Brunswick | 620 | 13,296 | United States | 25,110 | 383,964 |
| British Columbia | 1,226 | 18,463 | | | |
| | 68,918 | 886,485 | | 68,918 | 886,485 |

IMPORTS OF PIG IRON—*Continued.*

| 1893 | By Provinces. | | From | Tons. | Value. |
|---|---|---|---|---|---|
| | Tons. | Value. | | | |
| **Charcoal Pig :** | | $ | | | $ |
| Ontario.. | 3,443 | 49,811 | Great Britain.... | 840 | 8,318 |
| Quebec | 2,501 | 34,547 | United States.... | 5,104 | 76,040 |
| Total | 5,944 | 84,358 | Total | 5,944 | 84,358 |
| **All other Pig :** | | | | | |
| Ontario.. | 32,927 | 413,438 | Great Britain.... | 31,312 | 347,817 |
| Quebec | 19,287 | 213,529 | Germany | 20 | 171 |
| Nova Scotia | 3,311 | 39,224 | St. Pierre | 11 | 102 |
| New Brunswick | 122 | 2,171 | United States.... | 25,360 | 332,570 |
| Manitoba | 88 | 1,086 | | | |
| British Columbia | 968 | 11,212 | | | |
| Total | 56,703 | 680,660 | Total | 56,703 | 680,660 |

| 1894 | By Provinces. | | From | Tons. | Value. |
|---|---|---|---|---|---|
| | Tons. | Value. | | | |
| **Charcoal Pig :** | | $ | | | $ |
| Ontario | 1,981 | 23,170 | Great Britain.... | 73 | 821 |
| Quebec | 885 | 11,598 | B. W. Indies.... | 40 | 200 |
| Nova Scotia | 40 | 200 | United States.... | 2,793 | 33,947 |
| Total | 2,906 | 34,968 | Total | 2,906 | 34,968 |
| **All other Pig :** | | | | | |
| Ontario | 25,623 | 296,770 | Great Britain.... | 18,314 | 203,027 |
| Quebec | 13,983 | 151,125 | Germany .. | 35 | 407 |
| Nova Scotia | 1,182 | 15,903 | United States.... | 23,434 | 272,485 |
| New Brunswick | 144 | 1,777 | | | |
| Manitoba | 17 | 203 | | | |
| British Columbia | 823 | 10,000 | | | |
| P. E. Island | 11 | 141 | | | |
| Total | 41,783 | 475,919 | | 41,783 | 475,919 |

IMPORTS OF PIG IRON—*Concluded.*

| 1895. | By Provinces. | | From | Tons. | Value. |
|---|---|---|---|---|---|
| | Tons. | Value. | | | |
| **Charcoal Pig:** | | $ | | | $ |
| Ontario | 2,537 | 28,165 | United States | 2,780 | 31,171 |
| Quebec | 243 | 3,006 | | | |
| Total | 2,780 | 31,171 | | | |
| **All Other Pig:** | | | | | |
| Ontario | 22,593 | 237,030 | Great Britain | 6,399 | 73,897 |
| Quebec | 7,585 | 84,734 | B. W. Indies | 48 | 240 |
| Nova Scotia | 1,193 | 16,476 | United States | 25,151 | 266,888 |
| New Brunswick | 54 | 572 | | | |
| Manitoba | 13 | 144 | | | |
| British Columbia | 149 | 1,922 | | | |
| P. E. Island | 11 | 147 | | | |
| Total | 31,598 | 341,025 | | | |

IMPORTS OF STEEL RAILS.

| 1885 | Great Britain. | | United States. | | Total. | |
|---|---|---|---|---|---|---|
| | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. |
| Ontario | 83,974 | $119,110 | 49,051 | $67,558 | 133,025 | 186,668 |
| Quebec | 408,397 | 531,516 | ..... | ..... | 408,397 | 531,516 |
| Nova Scotia | 17,700 | 23,160 | ..... | ..... | 17,700 | 23,160 |
| New Brunswick | 216,303 | 218,382 | ..... | ..... | 216,303 | 218,382 |
| British Columbia | 7,830 | 11,552 | 1,670 | 4,479 | 9,500 | 16,031 |
| | 734,204 | 903,720 | 50,721 | 72,037 | 784,925 | 975,757 |
| 1886 | | | | | | |
| Ontario | 72,240 | $101,618 | 283 | $263 | 72,523 | 101,881 |
| Quebec | 539,170 | 617,860 | 257 | 316 | 539,427 | 618,176 |
| Nova Scotia | 13,778 | 17,082 | ..... | ..... | 13,778 | 17,082 |
| New Brunswick | 139,677 | 161,844 | 2,160 | 3,240 | 141,837 | 165,084 |
| British Columbia | 800 | 1,236 | 1,072 | 1,666 | 1,872 | 2,902 |
| | 765,665 | 899,640 | 3,772 | 5,485 | 769,437 | 905,125 |
| 1887 | | | | | | |
| Ontario | 24,170 | $36,686 | 32,980 | 30,281 | 57,150 | 66,967 |
| Quebec | 1,449,501 | 1,140,602 | ..... | ..... | 1,449,501 | 1,140,602 |
| Nova Scotia | 28,597 | 27,507 | ..... | ..... | 28,597 | 27,507 |
| New Brunswick | 116,644 | 114,972 | ..... | ..... | 116,644 | 114,972 |
| Manitoba | 8,868 | 10,331 | ..... | ..... | 8,868 | 10,331 |
| British Columbia | 1,501 | 2,049 | 50,000 | 69,364 | 51,501 | 71,413 |
| | 1,629,281 | 1,332,147 | 82,980 | 99,645 | 1,712,261 | 1,431,792 |

| 1888. | Great Britain. | | United States. | | Total from all sources. | |
|---|---|---|---|---|---|---|
| | Cwt. | $ | Cwt. | $ | Cwt. | $ |
| Ontario | 21,867 | 20,663 | 24,496 | 26,698 | 46,363 | 47,361 |
| Quebec | 724,944 | 834,120 | ..... | ..... | 724,944 | 834,120 |
| Nova Scotia | 67,167 | 62,224 | ..... | ..... | 67,167 | 62,224 |
| New Brunswick | 252,385 | 282,055 | ..... | ..... | 252,385 | 282,055 |
| Manitoba | 2,480 | 3,535 | ..... | ..... | 2,480 | 3,535 |
| BritishColumbia | ..... | ..... | 2,838 | 4,209 | 2,838 | 4,209 |
| Total | 1,068,843 | 1,202,597 | 27,334 | 30,907 | 1,096,177 | 1,233,504 |
| 1889. | | | | | | |
| Ontario | 71,977 | 76,262 | 53,358 | 70,058 | 125,335 | 146,320 |
| Quebec | 1,170,671 | 1,242,516 | ..... | ..... | 1,170,671 | 1,242,516 |
| Nova Scotia | 155,033 | 186,464 | ..... | ..... | 155,033 | 186,464 |
| New Brunswick | 176,680 | 210,576 | 17,097 | 24,178 | 193,777 | 234,754 |
| Manitoba | 30,421 | 36,531 | 23,511 | 33,882 | 53,932 | 70,413 |
| BritishColumbia | 15,936 | 27,049 | 1,948 | 2,975 | 17,884 | 30,024 |
| P. E. Island | 8,964 | 9,494 | ..... | ..... | 8,964 | 9,494 |
| N.W.Territories | ..... | ..... | 1,738 | 1,947 | 1,738 | 1,947 |
| Total | 1,629,682 | 1,788,892 | 97,652 | 133,040 | 1,727,334 | 1,921,932 |

1888.—In addition to the returns for this year there were imported free by the Canadian Pacific Railway, 30,341,240 lbs.; and by Esquimalt and Nanaimo Railway, 28,213 lbs.

| 1890. | Great Britain. | | United States. | | Total from all sources. | |
|---|---|---|---|---|---|---|
| | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. |
| Ontario | 6,163 | $7,724 | 67,759 | $112,385 | 73,922 | $120,109 |
| Quebec | 1,455,671 | 1,730,950 | 862 | 1,454 | 1,474,496 | 1,756,773 |
| New Brunswick | 20,160 | 27,192 | ..... | ..... | 20,160 | 27,192 |
| BritishColumbia | ..... | ..... | 10,763 | 14,963 | 10,763 | 14,963 |
| Nova Scotia | 156,650 | 226,447 | ..... | ..... | 156,650 | 226,447 |
| Manitoba | ..... | ..... | 43,431 | 54,207 | 43,431 | 54,207 |
| N. W. T | ..... | ..... | 2,500 | 4,394 | 2,500 | 4,394 |
| | 1,638,644 | 1,992,313 | 125,315 | 187,403 | 1,781,922 | 2,204,085 |

In addition to the above returns there were also imported :— 1885—Canadian Pacific Railway, 2,.65,391 lbs. 1886—Canadian Pacific Railway, 37,878,054 lbs.: Esquimault and Nanaimo Railway, 5,751,026 lbs. 1887—Canadian Pacific Railway, 70,781,930 lbs.; Esquimault and Nanaimo Railway, 1,344,000 lbs.

## Steel Rail Imports by Countries, 1891–5.

| Year. | Great Britain. | | United States. | | Belgium. | | Germany. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. |
| | | $ | | $ | | $ | | $ | | $ |
| 1891 | 2,234,375 | 2,767,468 | 286,935 | 429,812 | ..... | ..... | ..... | ..... | 2,521,310 | 3,197,280 |
| 1892 | 1,495,963 | 1,539,449 | 158,972 | 199,212 | ..... | ..... | ..... | ..... | 1,654,935 | 1,738,661 |
| 1893 | 1,911,170 | 1,846,750 | 103,358 | 138,445 | 8,440 | 8,024 | ..... | ..... | 2,022,968 | 1,993,219 |
| 1894 | 1,643,050 | 1,608,967 | 72,468 | 109,029 | 24,825 | 23,052 | 9,005 | 7,612 | 1,749,348 | 1,748,660 |
| 1895 | 947,809 | 813,078 | 14,157 | 15,093 | 10,612 | 9,973 | ..... | ..... | 972,578 | 838,144 |

## Steel Rail Imports by Provinces, 1891–5.

| Provinces. | 1891. | | 1892. | | 1893. | | 1894. | | 1895. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. | Cwt. | Value. |
| | | $ | | $ | | $ | | $ | | $ |
| Ontario | 191,906 | 270,594 | 165,052 | 191,799 | 209,832 | 226,299 | 109,765 | 146,120 | 8,722 | 8,644 |
| Quebec | 2,119,413 | 2,592,805 | 1,433,573 | 1,474,963 | 1,677,164 | 1,639,229 | 1,438,102 | 1,283,693 | 864,294 | 728,577 |
| Nova Scotia | 27,576 | 32,623 | 31,310 | 33,607 | 127,184 | 118,978 | 52,939 | 50,031 | 64,215 | 63,166 |
| Manitoba | 19,729 | 35,441 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| New Brunswick | ..... | ..... | ..... | ..... | 8,788 | 8,713 | 524 | 667 | ..... | ..... |
| British Columbia | 71,608 | 114,726 | 25,000 | 38,292 | ..... | ..... | 129,706 | 248,149 | 1,000 | 810 |
| P. E. Island | 11,202 | 13,721 | ..... | ..... | ..... | ..... | 17,900 | 19,200 | 13,547 | 16,263 |
| N.-W. Territories | 79,876 | 137,370 | ..... | ..... | ..... | ..... | 412 | 800 | 20,800 | 20,684 |
| Total | 2,521,310 | 3,197,280 | 1,654,935 | 1,738,661 | 2,022,968 | 1,993,219 | 1,749,348 | 1,748,660 | 972,578 | 838,144 |

## Consumption of Steel Rails.

The following shows the mileage of Canadian Railways since 1867 :— In 1876 the range of the weight of the steel rail then laid was from 56 to 60 lbs. per yard. In 1895 the range was from 56 to 80 lbs., the St. Claire tunnel being laid with rails weighing 100 lbs. per yard.

| Year ended 30th June. | Mileage in Operation. | Annual Increase. | Steel Rails. | | Mileage of Iron Rails. | Mileage of Sidings. |
|---|---|---|---|---|---|---|
| | | | Mileage. | Increase. | | |
| 1867..... | 2,218 | .... | ..... | ..... | ..... | ..... |
| 1868..... | 2,390 | 172 | ..... | ... | ..... | ..... |
| 1869..... | 2,460 | 70 | ..... | ..... | ..... | ..... |
| 1870..... | 2,608 | 148 | ..... | ..... | ..... | ..... |
| 1871..... | 2,679 | 71 | ..... | ..... | ..... | ..... |
| 1872..... | 2,928 | 249 | ..... | ..... | ..... | ..... |
| 1873..... | 3,478 | 550 | ..... | ..... | ..... | ..... |
| 1874..... | 4,100 | 622 | ..... | ..... | ..... | ..... |
| 1875..... | 4,826 | 726 | 2,054.75 | ..... | 2,746.75 | 655.50 |
| 1876..... | 5,157 | 331 | 2,373.75 | 319 | 2,758.00 | 637.00 |
| 1877..... | 5,574 | 417 | 2,765.25 | 391.50 | 2,783.50 | 688.00 |
| 1878..... | 6,143 | 569 | 3,583.08 | 817.75 | 3,258.25 | 747.75 |
| 1879..... | 6,484 | 341 | 3,813.80 | 230.72 | 3,177.25 | 743.57 |
| 1880..... | 6,891 | 407 | 4,049.53 | 235.73 | 3,157.44 | 783.26 |
| 1881..... | 7,260 | 369 | 4,935.15 | 885.62 | 2,660.66 | 878.47 |
| 1882..... | 7,530 | 270 | 6,085.41 | 1,150.26 | 1,983.53 | 952.89 |
| 1883..... | 8,726 | 1196 | 7,340.67 | 1,255.26 | 1,725.30 | 1,099.80 |
| 1884..... | 9,577 | 851 | 7,975 | ..... | 1,602 | 1,165 |
| 1885..... | 10,273 | 696 | 9,045 | 1,070 | 1,228 | 1,197 |
| 1886..... | 10,773 | 500 | 9,553 | 508 | 1,220 | 1,316 |
| 1887..... | 11,793 | 1020 | 10,618 | 1,065 | 1,175 | 1,462 |
| 1888..... | 12,184 | 391 | 11,146 | 528 | 1,038 | 1,532 |
| 1889..... | 12,585 | 401 | 11,799 | 653 | 786 | 1,576 |
| 1890..... | 13,151 | 566 | 12,486 | 687 | 665 | 1,679 |
| 1891..... | 13,838 | 687 | 13,074 | 588 | 764 | 1,666 |
| 1892..... | 14,564 | 726 | 13,956 | 882 | 608 | 1,923 |
| 1893..... | 15,005 | 441 | 14,568 | 612 | 437 | 2,013 |
| 1894..... | 15,627 | 622 | 15,227 | 659 | 400 | 2,017 |
| 1895..... | 15,977 | 350 | 15,631 | 404 | 346 | 2,055 |

## Imports of Free Mining Machinery, 1890–94.

(Being Mining and Smelting Machinery, which, at the time of its importation, was of a class or kind not manufactured in Canada.)

| Fiscal Year. | Ontario. | Quebec. | New Brunswick. | Manitoba. | British Columbia. | Nova Scotia. | Total. |
|---|---|---|---|---|---|---|---|
| 1890..... | $473 | $2,555 | ..... | ..... | $740 | ..... | $3,768 |
| 1891..... | 26,134 | 25,378 | $2,583 | $4,895 | 4,864 | $14,578 | 78,432 |
| 1892..... | 25,824 | 12,096 | 2,030 | 6,364 | 1,750 | 13,784 | 61,848 |
| 1893..... | 27,889 | 18,519 | 30 | 9,166 | 9,585 | 22,019 | 87,208 |
| 1894..... | 39,198 | 13,683 | 940 | 1,322 | 5,282 | 26,610 | 87,035 |
| 1895..... | 50,540 | 17,338 | 1,064 | 1,575 | 47,519 | 51,713 | 169,749 |

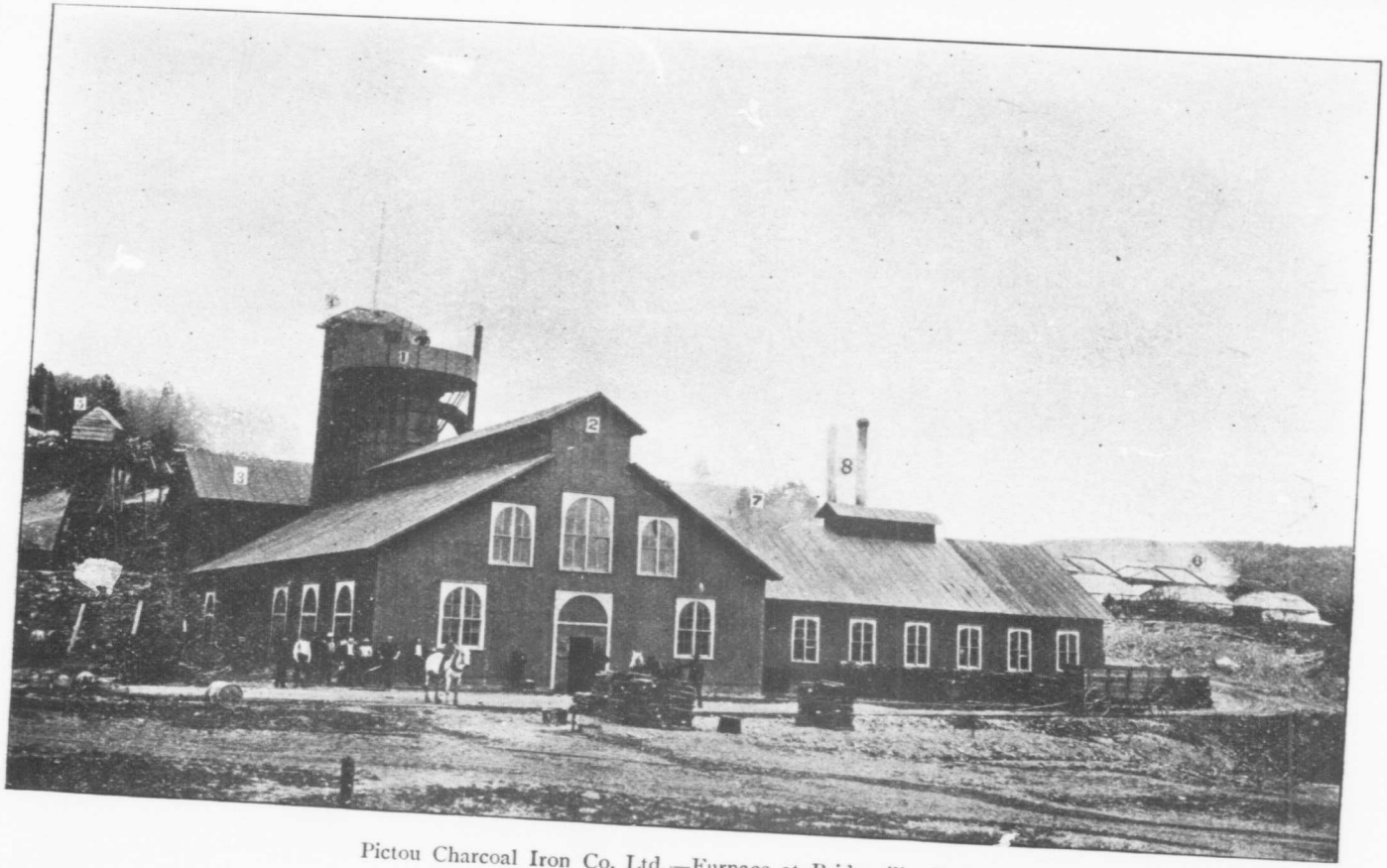
## Some of the Principal Imports of Iron and Steel and their Manufactures during the Year 1895.

(Compiled from Trade and Navigation Returns.)

| — | Great Britain. | | United States. | | Value from all Sources. |
|---|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. | |
| | | $ | | $ | $ |
| Angles, channels, &c., weighing less than 35 lbs. per lin. yard. Cwt. | 14,813 | 15,645 | 13,343 | 17,216 | 33,857 |
| Angles, channels, &c., not less than 35 lbs. per lineal yard... Cwt. | 60,707 | 74,935 | 24,899 | 31,412 | 156,458 |
| Axles, car..... " | 3,548 | 9,398 | 1,958 | 5,314 | 17,140 |
| Axles, other..... Lbs. | 9,431 | 445 | 229,946 | 11,056 | 12,128 |
| Bar iron..... Cwt. | 41,972 | 80,190 | 53,735 | 82,886 | 170,331 |
| Bars, puddle..... " | 65,210 | 56,219 | 13,383 | 11,062 | 67,321 |
| Bars, steel..... " | 43,319 | 87,264 | 74,096 | 133,458 | 223,021 |
| Beams, joists, girders and other structural sections weighing not less than 25 lbs. per lin. yd Cwt. | 12,374 | 13,964 | 18,340 | 24,189 | 59,312 |
| Beams, plates, angles, &c. for ships, &c.... Cwt. | 3,531 | 5,090 | 19,463 | 17,372 | 22,462 |
| Bolts and rivets.... Lbs. | 67,059 | 2,100 | 799,692 | 29,207 | 31,307 |
| " " less than 3/8 of an inch in dia.. Lbs. | 3,885 | 176 | 112,736 | 8,035 | 8,211 |
| Bridges and structural iron..... Lbs. | 1,450 | 39 | 376,205 | 13,401 | 13,440 |
| Canada plates, &c.. Cwt. | 304,535 | 622,157 | 49,071 | 81,303 | 707,974 |
| Cast iron pipe ..... " | 35,323 | 36,883 | 17,918 | 23,526 | 60,409 |
| Castings, malleable iron, ..... Cwt. | 62 | 176 | 22,860 | 71,959 | 72,264 |
| Chains, 1/8 of an inch dia. and over..... Cwt. | 15,227 | 41,495 | 3,822 | 9,842 | 51,432 |
| Chains, N.E.S..... " | 1,385 | 3,702 | 623 | 2,810 | 6,659 |
| Chrome steel. .... " | 110 | 549 | 479 | 2,557 | 3,106 |
| Engines, locomotive. No. | ..... | ..... | 20 | 146,211 | 146,211 |
| " fire. ..... " | 2 | 3,809 | 6 | 1,694 | 5,503 |
| " portable... " | ..... | ..... | 89 | 17,299 | 17,299 |
| " ship's..... " | ..... | ..... | ..... | 10,176 | 10,176 |
| " other, and boilers..... No. | ..... | 133 | ..... | 30,000 | 30,133 |
| Fish plates.. .... Tons. | 2,084 | 47,580 | 73 | 2,692 | 50,412 |
| Forgings, iron and steel, lbs. ..... | 31,265 | 3,191 | 479,407 | 18,522 | 21,713 |
| Hardware..... | ..... | 28,899 | ..... | 262,669 | 297,360 |
| " N.E.S..... | ..... | 2,688 | ..... | 1,348 | 4,036 |
| Hoop and band, 8 in. and less in width, No. 18 gauge and thicker. Cwt. | 6,450 | 10,294 | 12,385 | 15,812 | 26,233 |

PRINCIPAL IMPORTS OF IRON AND STEEL, 1895—*Continued.*

| — | Great Britain. | | United States. | | Value from all Sources. |
|---|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. | |
| | | $ | | $ | $ |
| Hoop iron, not exceeding ⅜ of an in. width . Cwt. | ..... | ..... | 22,105 | 23,811 | 23,811 |
| Ingots, steel, blooms and slabs in other forms less finished than steel bars, ..... Cwt. | 16,492 | 14,796 | 4,236 | 3,849 | 18,645 |
| Mining and smelting machinery ..... | ..... | 25,141 | ..... | 144,608 | 169,749 |
| Nails and spikes, cut. Lbs. | 85,646 | 1,849 | 343,239 | 6,965 | 8,814 |
| " " wrought. " | 127,713 | 4,465 | 316,719 | 11,799 | 16,264 |
| Pipe fittings..... " | 168,080 | 1,967 | 1,092,812 | 49,281 | 51,384 |
| Plates, steel ..... Cwt. | 51,897 | 45,039 | 134,560 | 54,806 | 99,845 |
| " plough ..... " | 308 | 1,068 | 5,063 | 18,424 | 19,492 |
| " cast iron..... | ..... | 1,390 | ..... | 20,655 | 22,089 |
| Rails, iron & bars.. Tons | 3,565 | 71,800 | 1,095 | 23,058 | 94,858 |
| " steel..... Cwt. | 947,809 | 813,078 | 14,157 | 15,093 | 838,144 |
| Railway switches and frogs ..... Cwt. | ..... | ..... | 741 | 3,230 | 3,230 |
| Rolls, chilled steel.. " | 421 | 1,676 | 794 | 3,176 | 4,852 |
| Scrap, cast..... Tons | 10 | 55 | 582 | 3,992 | 4,347 |
| " wrought ... Cwt. | 111,637 | 67,550 | 316,382 | 148,124 | 216,615 |
| Sheet steel, crucible. " | 3,396 | 11,216 | 1,223 | 2,624 | 13,840 |
| Steel for files ..... " | 342 | 959 | 2,432 | 8,293 | 9,252 |
| " hammers.. " | 1,433 | 2,887 | 516 | 1,096 | 3,983 |
| " saws ..... " | 2,615 | 19,587 | 5,359 | 51,805 | 72,530 |
| " skates .... " | 274 | 1,435 | 1,620 | 4,709 | 6,144 |
| Steel, rolled rods... " | ..... | ..... | 229 | 752 | 752 |
| Steel, No. 20 gauge and thinner, but not thinner than 30 gauge... Cwt. | 1,674 | 5,768 | 1,033 | 8,880 | 16,753 |
| Steel, No. 12 gauge and thinner ..... | 260 | 1,207 | ..... | ..... | 1,207 |
| Steel Sheets, No. 24-17 gauge, in sheets 63 in. long and from 18 to 32 in. wide.... ....Cwt. | 56 | 89 | 273 | 675 | 764 |
| Steel tires, locomotive and car wheel .....Cwt. | 2,731 | 8,827 | 1,414 | 4,773 | 24,947 |
| Swedish rolled iron rods. | ..... | ..... | ..... | ..... | 4,887 |
| Swedish rolled rods for horse-shoe nails..Cwt. | 2,329 | 3,935 | 1,244 | 1,823 | 21,348 |
| Tubes, boiler ..... ft. | 500,973 | 25,077 | 732,074 | 48,474 | 86,257 |
| " lap welded.. ft. | ..... | ..... | 379,569 | 20,053 | 20,053 |
| " not welded.. ft. | 57,512 | 5,727 | 160,129 | 18,093 | 23,820 |
| Tubes, wrought iron or steel, over 2 inches in dia..... lbs. | 376,607 | 6,628 | 1,393,817 | 177,992 | 184,816 |
| Tubes, other..... lbs. | 621,422 | 13,043 | 6,123,349 | 130,335 | 156,508 |



Pictou Charcoal Iron Co. Ltd.—Furnace at Bridgeville, N.S.

PRINCIPAL IMPORTS OF IRON AND STEEL, 1895—*Concluded.*

| | Great Britain. | | United States. | | Value from all Sources. |
|---|---|---|---|---|---|
| | Quantity. | Value. | Quantity. | Value. | |
| | | $ | | $ | $ |
| Wire, Nos. 10, 12 and 13 gauge..... | 826 | 2,541 | 1,850 | 5,651 | 8,192 |
| Wire, covered..... lbs. | 57,286 | 10,905 | 562,325 | 39,259 | 50,652 |
| " fencing barbed. lbs. | 66,071 | 1,372 | 760,228 | 15,901 | 17,273 |
| " buckthorn, &c..... | 36,352 | 1,317 | 10,217 | 241 | 1,558 |
| " galvanised.. . cwt. | 9,394 | 15,138 | 46,190 | 72,262 | 88,147 |
| " nails..... lbs. | 6,730 | 242 | 368,523 | 7,830 | 8,072 |
| " for wire work. cwt. | 193,079 | 239,042 | 159,321 | 293,937 | 567,032 |
| " rigging ..... " | 2,386 | 10,973 | 184 | 994 | 13,777 |
| " rope..... " | 2,845 | 20,389 | 1,451 | 11,829 | 32,228 |
| " other..... " | 11,777 | 16,514 | 955,35 | 81,992 | 110,759 |

## CANADA IRON FURNACE CO. Ltd.

Incorporated by Dominion charter under date of 29th November, 1889. Authorized Capital, $200,000. Increased 13th August, 1893, to $300,000.

**Directors:**

P. H. Griffin, Buffalo, N.Y., *President.*
G. E. Drummond, Montreal, | J. T. McCall, Montreal,
T. J. Drummond, Montreal, | Robert Schott, Sheffield, Eng.
Hon. T. Guilford Smith, Buffalo, *Vice-President.*

**Head Office:**

G. E. Drummond, Managing Director and Treasurer, Canada Life Building, St. James Street, Montreal.

**Works: John J. Drummond, M.E., General Supt., Radnor Forges, Que.**

Formed to acquire and work mineral and wood lands in the Province of Quebec and elsewhere in the Dominion of Canada, and to manufacture special high-class charcoal iron, similar to and competitive in quality to that of Sweden.

*Ore Deposits*—The company at present owns an area of 100,000 acres of bog ore rights in the districts of Champlain, St. Maurice, Three Rivers, Vaudreuil, Joliette, St. Ambrose de Kildare, Point du Lac, Gentilly and Becancour, including the important deposits, (supposed to be the largest of like nature in the world) of lake ore in Lac-a-la-Tortue and Lac-au-Sables.

Lake ore is raised principally at Lac-a-la-Tortue, where a steam dredge of a capacity of 50 tons per day is employed. The deposits vary somewhat in analysis; some of the bog ores used by the company being as low as .080 sulphur and .042 phosphorus.

The lake iron ore is found scattered over the bottom of the lake in an unctuous light colored mud made up of decayed vegetable matter. The ore does not appear to be found deeper than 12 or 18 in. below the surface of the bottom and is most plenti-

**CANADA IRON FURNACE CO.**—Continued.

ful in the upper parts of the mud. It occurs in the form of porous, flat, rounded, concretions, very irregular in color. The concretions vary from ¼ to 12 in. in diameter, and from ¼ to 2 in. in thickness, and closely resemble the dried excrement of cattle. The country surrounding Lac-a-la-Tortue is almost flat, being a great sandy plain underlain by stratified clays, and covered in many places by extensive swamps. The underlying sands are highly impregnated with oxide of iron derived from the decomposition of the rocks of the neighborhood which are highly charged with titaniferous iron ore. The iron in these sands is leached out by the action of acids formed, and fresh ore is being constantly formed, so much so that paying quantities of ore have been obtained from parts of the lake bottom which had been worked over thoroughly only a few years previously. As the lake is quite shallow and the depth increases slowly from the shore, the whole bottom can be worked over by the dredge belonging to the company. This dredge is of the endless chain pattern, with two rows of buckets. The buckets bring up the ore mixed with large quantities of mud, which they empty into a long cylindrical sieve, having rows of water jets inside. The sieve is slowly rotated and the ore tumbling through is washed clean and discharged on scows moored alongside, and then towed to the railway at the west end of the lake. The company has lowered the level of the water several feet, exposing a wide margin of the deposit, which is worked by hand. This is shovelled into round iron sieves and the ore washed out and made into heaps along the shore. The bog iron ore found all over the country on either side of the St. Lawrence about Three Rivers, was formed in the same manner as those of Lac Tortue, and are often of great extent. It is found in patches near the surface of the soil, and varies in thickness from a few inches to several feet.

*Furnace Stack* (at Radnor Forges, Que.)—Height, 40 feet; bosh, 9 feet diameter; crucible, 5 feet diameter; height of bosh line from hearth, 13 feet; 4 tuyeres of 3½ inch diameter; crucible and bosh from mantle ring down is encased and protected with a Russell Wheel and Foundry Co. water jacket; furnace top is provided with a bell and hopper, capacity of which is twenty-five bushels.

*Hot Blast Stove*—This is of the pipe pattern, with a combustion chamber below. Dimensions are: length, 24 feet; height, 18 feet; width, 9 feet 6 inches; 68 openings between combustion chamber and pipe chamber above.

*Steam Power*—Consists of four steam boilers, each 4 feet diameter by 25 feet long with two 18-inch flues; shells are of ⅜-inch plate and double rivetted; all boilers connected with a brick chimney 75 feet high, and all are bricked separately, and arranged to fire with either wood or gas; gas connections are made so that boilers can be worked in batteries of two each or more, and one or two can be laid off for repairs or cleaning at any time.

*Water Power*—This consists of a head of 24 feet, with a "New America" wheel, affording a valuable auxiliary power.

*Blowing Engines*—New Weimer blowing engine, size 16x48x30, set up on a solid stone foundation, which rests on a limestone bottom. This engine is provided with a patent water heater and a Scanlan patent wind receiver and heater, capable of raising the temperature of wind to about 200 degrees Fah. before entering the hot blast stove.

*Auxiliary Blowing Engines*—These are of the horizontal type, with two cylinders, each 40 inch diameter by 46 inch stroke, and are geared to be driven either by a horizontal steam engine of 14x20 inch cylinder or by water power. These engines are complete with their own wind receiver and pipes, and are so arranged that they can be used in case of an accident to or a shut down of the Weimer engine. They deliver about 2,100 cubic feet of air per minute, with a pressure of 4½ pounds. The whole is set up in an engine house entirely separate from the Weimer, and is isolated from the latter and the boiler house.

*Steam Pumps*—One Blake Duplex pump, 12 x 7 x 12; one Holly boiler feed pump, one Niagara boiler feed pump, one Northey volume pump.

*Force Pumps*—One horizontal force pump, one double-acting plunger force pump. All the above steam and force pumps are so connected that they can be used either on the furnace water jackets, tuyers, for general fire purposes, or for boiler feed. All the

suction pipes in connection with the new engine house are laid through a stone tunnel, which leads from engine house to river, and are always beyond the action of frost, and so arranged that alterations or repairs can be made at any time, as the tunnel is large enough to allow a man to pass or work.

*Hoisting Power*—This consists of a crane pattern double cylinder hoisting engine; size of cylinders, 8 x 10 inch. This engine is connected with two hoisting cages, having a lift of 15 feet from floor of weigh house to floor of top house.

*Charcoal Kilns*—Radnor forges battery consists of: Eight rectangnlar kilns, capacity, 55 cords each; three beehive pattern kilns, capacity, 55 cords each. Grandes Piles battery consists of: Fourteen beehive pattern kilns, capacity, 55 cords each. Others in course of construction. Charcoal also made and supplied from pits in the Swedish manner. The buildings and real estate in connection with the entire plant is the property of the company in fee simple.

*Wood Lands*—Freehold and royalty rights on hard wood lands extending throughout the country north of Radnor Forges, and comprising some thonsands of acres. The supply of wood is practically inexhaustible. The company's location for charcoal kilns at Grandes Piles securing to them the "key" of the St. Maurice river, and practical control of most valuable hard wood lands on either bank of the river for 70 miles of the navigable waters of the St. Maurice. The wood is principally hard maple, birch and beech. Assembly Bill No. 21, session 1895, Quebec Legislature, entitled: "An Act respecting Colonization in certain parts of this Province, and for promoting the Mining industry therein," reserves for the sole purposes of the Canada Iron Furnace Co. Ltd., 30,000 acres (part of a township) of hardwood lands, thus further guaranteeing the company a sure constant supply of fuel.

*Limestone for Flux*—The furnace is located on one of the best limestone quarries in the Province of Quebec, and the company is thus assured of a constant supply of this necessary material at the minimum of cost.

### Output in 1893.

| | |
|---|---|
| Total ore raised | 18,848 tons. |
| " charcoal | 2,000 lbs. |
| " charcoal iron man'f'd (value at furnace, $185,575) | 750,000 bushels. |
| " ore charged | 7,422 $\frac{1430}{2000}$ tons. |
| " fuel charged | 16,700 tons. |
| " flux charged | 750,000 bushels. |
| " persons employed | 1,680 tons. |
| | 600 |

### Output in 1894.

| | |
|---|---|
| Total ore raised | 20,648 tons (short). |
| " charcoal made | 756,000 bushels. |
| " charcoal iron manufactured (value, $190,000) | 7,900 tons. |
| " ore charged | 17,500 tons. |
| " fuel charged | 750,000 bushels. |
| " flux charged | 1,750 tons. |
| " persons employed | 600 |

### Output in 1895.

| | |
|---|---|
| Total ore raised | 16,203 net tons. |
| " charcoal made | 654,361 bushels. |
| " charcoal iron man'f'd (value $158,357.04) | 6,598 $\frac{420}{2000}$ tons. |
| " flux charged | 1,500 $\frac{417}{2000}$ tons. |
| " persons employed | 600 |

## COLONIAL IRON, COAL AND RAILWAY CO., Ltd.

Incorporated 1895. Authorized Capital, $1,000,000.

**Directors:**

R. G. Leckie. | W. E. Vroom. | R. M. Thompson. | R. G. E. Leckie.
B. F. Pearson. | A. G. Blair, Jr.

**Head Office: R. G. Leckie, Managing Director, Newcastle, Grand Lake, N.B.**

Formed for the purpose of acquiring and working coal areas in the Grand Lake district, Queen's County, New Brunswick, connecting the same with the city of Fredericton by a line of railway 30 miles in length, and establishing a blast furnace in the city of St. John, N.B. The property contains 40 square miles of coal areas, held under lease from the Government of New Brunswick, and 2,500 acres of freehold property not subject to royalty. The property is being opened up at date of report.

## GLEN IRON MINING CO, Ltd.

Incorporated 1891. Authorized Capital, $50,000, in 500 shares of a value of $100.

**Directors:**

J. W. Mackay, *President.*
J. A. Mara. | E. A. Nash.
J. O. Grahame. | F. J. Fulton.

**Head Office: Frederick J. Fulton, Manager, Kamloops, B.C.**

Formed to prospect for, acquire and work mineral claims and coal lands; the erection of the necessary plant; the operation of railway and steamship service. The property owned by the company consists of 165 acres in sections 19 and 30, Township 20, Range 19, west of the 6th meridian, B.C. Small force employed. Since operations were begun in 1891, 3,000 tons raised; 1894, about 1,200 tons. Ore worked is magnetite, and the works, which are situated contiguous to the line of the C.P.R., are supplied by a chute 300 ft. long and a Pickett aerial tramway of a length of 1,300 ft. The plant and buildings at date of last return were valued at $9,000. Estimated value of machinery and engine equipment at date, $5,000.

## HAMILTON BLAST FURNACE CO., Ltd.

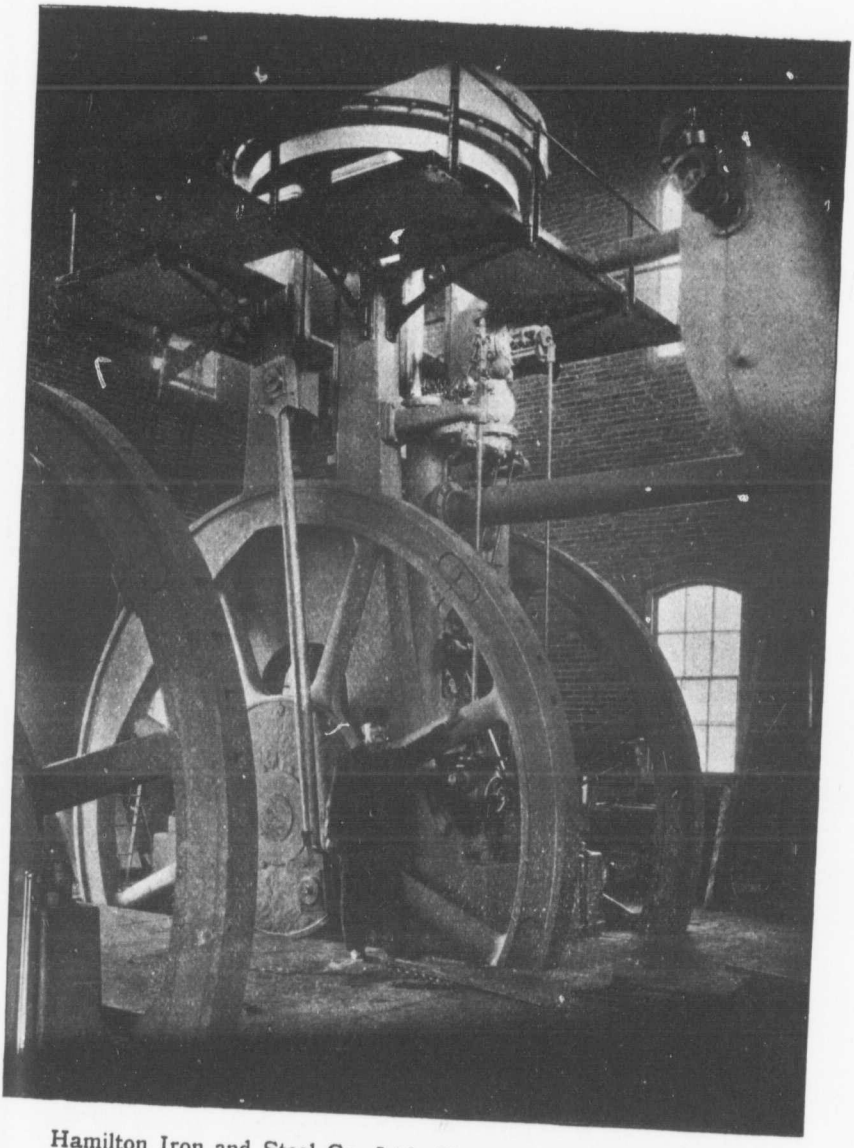
Incorporated under Ontario Statute, 1893. Authorized Capital, $1,000,000.

**Directors:**

J. H. Tilden, *President.*
J. T. Milne. | C. V. Birge. | G. Hope. | A. T. Wood. | W. Southam.
R. R. Morgan. | A. E. Jarvis.

**Head Office and Works: E. Dowd, General Manager, Hamilton, Ont.**

On 24th July the city of Hamilton passed a by-law granting a bonus of $75,000 for the establishment of iron smelting works in or immediately adjacent to the city,



Hamilton Iron and Steel Co. Ltd., Hamilton, Ont.—One of the Blowing Engines

and a further bonus of $60,000 for the erection of steel works. The provisions demanded that the plant be in operation by December 31st, 1894, capable of turning out, at least, 150 tons of pig iron per day, and that the sum of $400,000 shall have been expended on the plant (bonus to be arranged as follows): The city agrees to purchase lands to the value of $35,000 for the erection of plant, and to give a cash bonus of $40,000 in city debentures payable on completion of plant.

The lands transferred to the company contain 75 acres and immediately adjoin the city limits, on Burlington Bay, in the township of Barton. The company has the right to fill in and occupy the water front out to a line of 8 ft. of water. It is estimated that this will add at least 75 acres more to the property and will also make an excellent cinder dump.

On the 28th of October, 1893, the contract for the erection of a complete plant was given to the Philadelphia Engineering Company, of Philadelphia, Pa.

Work on the foundations was started in November, 1893, but was not completed until October, 1894. Cast house, walls, shell of furnace and stoves, were erected during the winter.

Extensions of time to complete plant were given to the company from 31st December, 1894, to 1st July, 1895, from then until October 1st, and again to 31st December of last year.

These extensions were necessitated by many unfortunate and unavoidable delays, also possibly by the extreme depression in the iron trade during 1894 and part of 1895. Work was again resumed during the summer of 1895 and pushed through to completion. The fires to dry out stack and stoves were lit on December 30th, 1895.

Furnace was blown in February, 1896, and is now making iron daily.

The following description will be of interest:

"Contract calls for a furnace and plant to be in all respects thoroughly good and substantial, with all modern improvements, capable of turning out 200 tons with 60% ore and Connellsville coke, constructed in all respects to obtain very best economy in fuel consumption and handling of materials."

Starting with the furnace, the foundations consist of:—(1) Limestone blocks laid in bridge bond, upper portion 5 ft. from hearth of well burned bricks, underneath hearth capped with hand-burned fire brick. Constructed on this the furnace is 75 ft. high, 16 ft. in the boshes, and 10 ft. hearth.

Seven cast iron columns support the upper portion of the furnace. Shell is 21 ft. in diameter at bottom, and 19 ft. at top; thickness of plates ranges from $\frac{7}{16}$ to $\frac{5}{16}$ in., and all perpendicular seams are double-rivetted.

The furnace is built and lined with best hard-burned fire brick, made to proper sizes for different portions of furnace.

Top consists of regular plate platform and bridge to hoist tower, with guard rail 3 ft. 6 in. high.

Hopper is 11 ft. 6 in. in diameter and 3 ft. deep. Bell, 8 ft. 4 in., swung by two links attached to lever with counterweight box, operated by a 12 in. steam cylinder, piston steam-cushioned top and bottom to guard against rough and careless handling of lever.

Downtake is 5 ft. in diameter, lined with 3½ in. fire brick; has one bleeder 20 ft. high and 2 ft. in diameter, lined with 2½ inch brick.

Dustcatcher at foot of downtake is 12 ft. x 11 ft., provided with bottom and side cleaning and explosion doors.

The general piping, bustle, waste and feed water trough are very well arranged so as to allow quick work to be done in removing tuyeres, also any other repairs to and around bottom portion of furnace. Water fittings are all brass, inlets to tuyeres are fitted with brass elbows and ball unions. Feed-water connections have 3-way cocks, with attachments for cleaning out and where hose may be connected for convenience in cooling furnace.

Bustle pipe 33 in. diameter, lined with 7 in. brick, connections for 6 tuyere pipes; these pipes have a clear diameter of 8 in. when lined, and are provided with Gordon patent ball joints.

There are 6 bronze tuyeres and blocks. Blocks are 26½ in. long, 26¼ in. at butt and 19 in. at nose. Tuyeres are 6 in. Hearth jacket, steel, 1 in. thick, 6 ft. 4 in. high, and 16 ft. in diameter. Strengthened at cinder arches.

**HAMILTON BLAST FURNACE CO.**—Continued.

Cinder arches 22 in. long, 13¼ in. at butt, and 11 in. at nose. Monkey is 4¼ in. long, 1¾ in. diameter. Hearth wall is 3 ft. thick and 4 ft. 4 in. high; from this bosh wall is 27 in. thick and contains 5 complete circles, double thick 1 in. pipe cooling plates. There are also 2 coolers between each tuyere arch. Bosh is strengthened by 5 bands 8 in. x 1 in., with two 2½ in. expansion bolts at each joint.

Stock is raised to top in wrought-iron trestle-work hoist tower, supported on solid stone foundations, roof is covered with corrugated iron to bridge floor level. Automatic safety cages, double 1 in. wire rope, operated by an automatic hoist engine, cylinders 12 x 12 in., built by Crane Mnfg. Co. Engine is placed in a brick building situated at foot of hoist tower.

Cast house is 50 ft. x 160 ft. from centre of furnace to end-wall and surrounds back of furnace in octagonal form. Foundations are solid limestone, walls red brick, roof corrugated iron and fits furnace casing, has ventilator running full length on apex of roof, is 6 ft. wide 4 ft. high. Roof frame is strong enough to support two overhead trollies, running over pig beds to remove the iron. The hot blast arrangements consist of three stoves constructed after the Gordon Cowper Whitwell patents, a 3-pass stove which has been well recommended by all furnace masters who have had experience in their use.

They are capable of sustaining a regular blast temperature up to 1600° F. Each stove is 60 ft. x 19 ft., surmounted by a conical casing, topped by a 40 ft. chimney 36 in. diameter in the clear. A circular platform 24 in. wide with hand rail at convenient height surrounds top of each stove, these coming together form a bridge from stove to stove. Valves are all of the Gate type (except air valve) and worked with rack and pinion.

Gas valves and hot blast valves are water cooled. In chimney valve the arrangement of valve and seat is such that the draft of the chimney induces passage of a strong current of air through them, protecting them from the heated gases.

These chimney valves are operated from the ground level by means of a ½ in. wire rope with the necessary mechanical connections.

Flues in checker work are 9 x 9 in. clear. To a certain extent the stoves are self-cleaning, as every time stoves are released, compressed air will carry out a certain amount of dust with it. As to arrangements for general cleaning, a small crane pivoted on a truck travels around platform at head of stoves; jib of crane is long enough to reach the cleaning doors on conical top. These six holes are 12 x 20 in. Chain on crane has scraping-weight at one end and counter-weight at other end. At bottom of stove are a set of steam blowers and three 20 in. cleaning doors. From dust-catcher a 40 in. gas main runs across the face of the stoves; from this main are three down pipes 30 in. diameter, ending in conical balanced explosion and cleaning doors; attached to these down pipes are 18 in. gas connections (provided with expansion and ball joints), which extend to gas valve of each stove.

Hot blast main is 60 ft. long, 40 in. diameter, and lined to 24 in.

Cold blast main is 24 in. in diameter, thickness of plate $\frac{3}{16}$ in.

Boilers built by Brownell & Co., Dayton, Ohio, are 12 in number, situated in a brick building 50x80x18 ft. to the square. 13½ in. brick wall (and corrugated iron roof) provided with the necessary doors, ventilating arrangements, etc. They are 59 in. by 24 ft., with five 12 ft. lap welded flues. Running across each pair of boilers is a 30 in. by 9 ft. steam drum, connected with two 12 in. legs 3 ft. long. Each pair of boilers constitute a battery, and are set in one setting so any two may be thrown out while the rest are working.

A down pipe from dust catcher goes to underground flue running across face of boilers. Flue has an area of 14 sq. ft., lined with 9 in. fire brick, sustained by retaining walls and provided with necessary cleaning and explosion doors.

Gas from flue enters burner of the Gordon, Strobel and Lareau patents, that are situated to one side of the front of boilers. There is only one firing arrangement for each pair of boilers.

Discharge main for gases from boilers runs along top and front. It is 48 in. in diameter, lined with 2 in. circular fire brick. At either end in a 60 in. connection to draft stack, lined in same manner. Draft stack is steel, brick lined, 125 ft. high and 7 ft. in the clear.

Hamilton Iron and Steel Co. Ltd., Hamilton, Ont.—View showing portion of Cast House, Down-take, Dust-Catcher, General View of Stoves, Gas Main to Boilers and Cold Blast Main.

The blowing engines, manufactured by the Philadelphia Engineering Company, consist of two vertical poppet valve engines, steam cylinders 42 in., blast cylinders 84 in. with a common stroke of 60 in. They are independent of each other and can be operated singly or together. Each engine has two fly wheels 18 ft. in diameter. Total weight of each engine is 100 tons; horse power each, 1,200.

Foundations for engines are of hard burned brick, laid in hydraulic cement and flushed solid.

Engine house brick with corrugated iron roof. In the same building are the circulating and boiler feed pumps. Circulating pumps consist of two duplex steam pumps, steam cylinders 14 in., water 14 in., stroke 18 in. Water comes from lake through a 700 ft. line of cast iron pipe, well out in the lake and will be free from all shore troubles. From pumps water is discharged into stand pipe 60 ft. high by 12 ft. diameter, plates $\frac{5}{16}$ and $\frac{3}{16}$ in., well sustained by angle iron bracings. From here water is distributed to all parts of plant and all waste water is returned to lake by special connections.

Boiler feed pumps, (two in number) duplex steam plunger, steam cylinder 8 in. water plunger 5 in., stroke 10 in.; and they are so arranged that either can be taken out while the other is working. Feed water heater contains 500 sq. ft. solid drawn brass tubing.

Blacksmith, machine shop and office are in a brick building to the south of boiler house. Consists of one building, but solid wall separates office from shops. This office will also be used as a laboratory *pro tem*, the works as yet being deficient in this respect.

Stock house is a good substantial building, but is already proving rather small and will have to be enlarged. It is 70 ft. span by 232 ft.; posts are 10x10 in., and 30 ft. high, strongly framed; main rafters are 8x8 in. trussed together and bound by iron bolts; 4 in. purlins 2 ft. 8 in. apart are fastened to rafters; sheeted with 1 in. board and all covered with corrugated iron.

Flooring is 2½ inches pine, laid on 5x5 in. stringers.

Scales are Fairbanks latest locked beams, four posts with clear way to hoist tower. There are two railway trestles of easy grade in stock house for dumping supplies. Switch to G. T. R. is something over half a mile long.

All work is covered with a good substantial coating of red metallic paint.

## LONDONDERRY IRON CO., Ltd.

Incorporated 1887, under special charter from the Dominion Government. Capital Stock, Preferred, $400,000; Ordinary, $600,000.

**Directors:**

Lord Mount Stephen, Montreal.
Sir Charles Tennant, Glasgow. | A. T. Paterson, Montreal.
A. S. McClelland, Glasgow. | John Turnbull, Montreal.
J. J. Greenshields, London. | R. McD. Paterson, Montreal.

**Head Office:**

**James Phymister, Secretary, 35 St. Francois Xavier Street, Montreal.**

**Works Office: C. A. Meissner, General Manager, Londonderry, N.S.**

Formed to acquire the property, mines, telegraph lines, machinery, plant, materials and other assets of the Steel Company of Canada, Limited, for the sum of $300,000 of preferential shares, and such amount, not exceeding $400,000 of ordinary shares, to be used in paying off the bond holders and ordinary creditors of that company, as may be necessary for that purpose, together with such undertaking for the payment of the indebtedness incurred by the liquidator of the said Steel Company of

**LONDONDERRY IRON CO** —Continued.

Canada, and such minor arrangements as to details as may be finally agreed upon by the company and the liquidator of the said Steel Company of Canada, with the authority of the proper court; and upon the completion of the arrangements for such acquisition, to issue as paid-up shares such preferred and ordinary shares as shall be required for the performance of the obligations to be assumed by the company; and as a means of providing for the expense of completing the said arrangements and of procuring the means of carrying out the same, of remunerating divers agents and others who have been engaged in negotiating the same in Canada and in England, and generally of relieving the company from all liability in respect of any and all preliminary proceedings and arrangements, the company is authorized to make and use a further issue of paid-up ordinary shares, not exceeding in all the sum of $80,000; also to construct and operate such other roads and additions to the said railway, tramway and telegraph lines, in connection with the said mines and properties, or the rights they may have acquired, as are needed for their business; also to acquire, charter and operate vessels, steamers and other suitable craft for the transportation of the products of their business to ports in Canada, or to any foreign port or ports. Annual meeting held on the second Wednesday in February of each year, at which the affairs of the company are submitted to the 31st December preceding. The company's property covers about 36,000 acres freehold. Machinery, plant, etc., valued at $150,000. Mining has been carried on since 1849. A charcoal furnace was erected in 1853, which was in blast at short intervals for some years. At date the plant consists of:—

The blast furnace, calcining kilns, coke ovens, ore sheds and the various engines, boilers and pumps necessary to their operation.

2nd. The rolling mill, machine shop and foundry, with the various furnaces, tools and appliances.

3rd. Rail connections, tramways and rolling stock.

4th. The four ore mines, Cumberland, West, Old Mountain, and East mines.

5th. The right of way to and shipping facilities at Great Village.

6th. The Maccan coal areas.

7th. Various timber lands and other real estate.

*1. Blast Furnace, etc.*—In 1876, when the change was made from charcoal to coke as fuel, furnaces Nos. 1 and 2 were built on the high land close to the main road of the village; these furnaces were 65 ft. in height, 16 ft. bosh and 14 ft. stock line, and 10 ft. diameter of hearth. They were built by the Truro firm of Brown & Pitblado from English plan. Three Cowper stoves were built at the same time, and both furnaces were put in blast. The furnace was relined early in 1895 and blown on March 10th of the same year. The present dimensions of No. 1 furnace are 75 ft. high, 14 ft. stock line, 18 ft. bosh and 9 ft. hearth; the inside of the furnace is in comparatively good condition. No. 2 furnace has not been altered and has been idle for a number of years. It has been proposed to convert it into a Cowper stove at an expense of about $6,000 (mainly for fire brick). The blowing engines are two in number, built by D. Adamson & Co., of Manchester, England, in 1876. They are of the condensing, vertical, direct inverted type, with the air cylinder and the crank and steam cylinder, the air pump being worked from the cross head. Diameter of steam cylinder, 34 in.; air cylinder, 72 inches, with 60 in. stroke; the valve is a single cylindrical one of Corliss type. These engines take steam at 55 pounds, and run from 22 to 30 revolutions, the larger amount of air being required for the company's brown ore. The blast is heated by the stoves to about 1,200° centigrade, and is furnished to the furnace at from 5 to 6 pounds pressure. Steam is supplied from 6 Galloway boilers, of Galloway's own manufacture, and have been in use since 1876; they are fired from the waste gases from the furnace, and just enough fine coal on the grates to fire the gas; they are 7 ft. in diameter and 30 ft. long, and the whole six are set in one setting; they are fed from the small Cameron pump. Water for the furnace is pumped by a duplex Worthington pump, with an auxiliary Cameron in case of break down.

The furnace charges are hoisted to the top in a double elevator, power being furnished by a fairly good hoisting engine of Londonderry make. The ore sheds are just behind the furnace and are in fairly good repair, being capable of storing a four months' supply of ore, although large quantities of this are stored outside,

Londonderry Iron Co.—Coke Ovens.

The coke ovens are 67 in number, of the ordinary bee-hive type, 11 ft. in diameter and are built in one battery. The time of coking with Drummond or Springhill slack is about 40 hours and they furnish about 70 tons of furnace coke per day. They were built in 1876.

*The Rolling Mill* includes the rolling mill proper, the axle and car-wheel plant, the machine shop with pattern shop and foundry, and pipe foundry. In the rolling mill are three double and one single, and one scrap furnaces of standard form and dimension. These furnaces have been idle for about five years, but were repaired and started running about the 1st of January of this year. One heating furnace for finished iron is also in a workable condition, and the two other heating furnaces can be put into good condition at small expense. There are three trains of rolls, a 16 in. puddle bar train, an 18 in. finished bar train, and a 9 in. train for small sections. The plant also contains a medium sized steam hammer for shingling the blooms, a rotary squeezer, a hot saw, two pairs of shears—one for puddle bar and one for smaller sizes, an ore crusher for the ore used for fettling, with a set of tumbles and an ordinary rock breaker. Steam for this plant is furnished by boilers heated by the waste gases from the puddling and heating furnaces.

The air blast for the furnace is furnished by a small engine and blower, with an almost new auxiliary vertical boiler. There are two or three other small engines in the mill, used for driving various parts of the machinery. The capacity is about 700 tons per month.

There are also rolls and complete fittings for a plate mill for rolling nail plate, and the company at one time did considerable work in this line.

In the machine shop are three long bed lathes swinging about 60 in., one wheel lathe, double ended, which is good for 72 in. A good sized slotting machine, a boring mill for car wheels, a radial drill, a 4 ft. planer and a 2 ft. planer, a 10 in. railroad shaper, all of English make. There are also two lathes for turning rolls, a hydraulic wheel press and two small machine lathes of American make, a pair of 8 in. shears and a power punch complete the list of tools. Power is furnished by Rider cut-off automatic engine. In the foundry are two melting cupolas, a large one for the pipe shop, and a small one for use when the pipe shop is not run. The shafting is also in good shape; a new main shaft has been purchased and will be put in place soon. There are also two furnaces for melting brass, two core ovens for ordinary work and two large ones for the pipe shop. There are three large hand cranes in the moulding shop, and three hand and one steam crane in the pipe shop. The capacity of the pipe shop is about 20 tons per day, and in the matter of flasks and patterns the plant is very well provided. The plant also includes a mixer, two hay rope machines, a heating furnace and kettle for tarring pipe and a hydraulic testing machine. There is a 50 x 80 storage building for patterns. Steam is furnished for this plant from two horizontal, single flue boilers, 5 ft. in diameter and 27 ft. long.

*Railroads, Tramways and Rolling Stock*—The company owns a broad gauge branch line, from the Londonderry station of the I. C. R. to the plant about three miles in length, with about a mile of sidings. All of the sidings and the broad gauge tracks around the furnaces and plant are provided with a third rail for the three-foot-six narrow gauge road which connects the plant with the mines. There is a broad gauge branch which connects East Mines station on the I. C. R. with East Mines, a distance of about four miles and a quarter. There is a narrow gauge line from the plant to the West mines, 3 ft. 6 in. gauge, and about 2½ miles long, with about half a mile of sidings at Old Mountain and Martins Brook. From West Mines to Cumberland, a distance of a mile and three quarters, a 30 in. tramway laid with the pit rails is in use. There is also about two miles of tramway around East Mines.

*Locomotives*—The company own a broad gauge Baldwin locomotive, built in 1879, with 17x24 in. cylinders and 48 in. drivers. There is also a broad gauge Scotch locomotive, built about 1876, with 14x24 in. cylinders and 48 in. drivers. The company also own two narrow gauge locomotives, a Baldwin, and a Scotch locomotive. For rolling stock there are eight platform cars for handling pig iron, and 17 coke cars, all of the 30 ft. standard pattern. The ore cars, of which there are about 40, are all narrow gauge, and are of the side dumping type.

*Iron Mines*—The iron mines are all in the same belt or seam, which runs in an east and west direction about half a mile north of the base line road, which runs

**LONDONDERRY IRON CO.**—Continued.

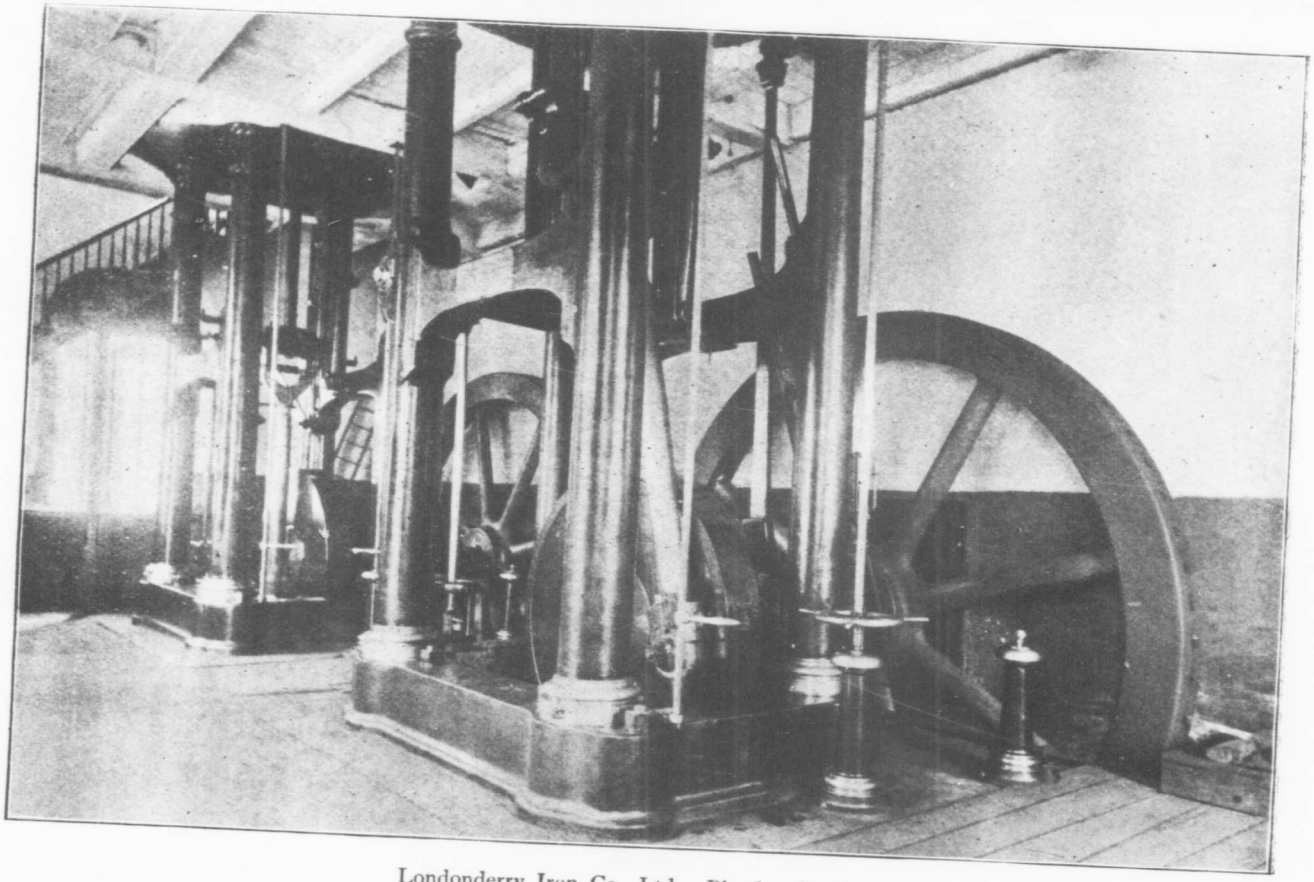
through the centre of the village. The company owns about 12 miles of this vein, which varies in width from five or six hundred feet from the widest portion down to zero in others. The general dip of the vein is from 75 to 80 degrees south. The mine has been worked in various places along the whole length, the principal section being named from the brooks, which flow across the outcrop at the principal points of working. From these brooks the various levels have been driven in to the seams in a general east and west direction, while in some places open quarries have been used where the outcrop is on the summit of the hill. In most cases the outcrop may be considered as the top of the second set of foot hills north of Minas Basin; the third range of hills dividing the isthmus into northern and southern slopes. The main workings are the Cumberland mines at Cumberland Brook, four miles west of the village; West mines at Martins Brook, 2½ miles west from the village; Old Mountain Mines on the top of west bank of the ravine at the village; and East mines at Slacks, Coreys, Weatherbys and Pine Brook, about seven miles east of the village. There are about 100 adits in all of these localities, and at least 30 open quarries, from which ore has been taken. The main body of ore is a limonite, which yields as high as 57 per cent. of metallic iron, and will probably average 53 or 54 per cent. This is mixed in a greater or less degree with the ochre, or paint as they call it here. This reduces the yield of iron at times materially. Spathic ores are found to some little extent, and run about 40 per cent. in metallic iron. Formerly these ores were calcined in the calcining furnaces, but to-day they are charged into the furnace direct and partially supply the place of limestone fluxes. A great deal of specular ore of varying compositions is also obtained. This specular is generally found in small veins in spathic ore, but frevuently large pocket shaped deposits are struck, notably at Coreys brook in the East mines. Ankerite is found in large quantities at all of the mines, and is frequently used as a limestone flux.

*Cumberland Mines*—These mines have been open about sixteen or eighteen years. At present only two levels are worked, No. 7, intermediate on the east side of the brook, and No. 12 on the west side. Nos. 7 and 8 are under water, and the two or three levels above No. 7 are crushed. At present the mine is being worked on a contract. There is known to be good bodies of ore in all of these levels, and when money can be obtained to keep them open and clear of water much more can be expected of this mine.

*West Mines*—At least five main levels have been worked here, but the main part of the working, including about 300 feet of the hoisting shaft, are under water, and a good deal of it probably crushed, as very little work has been done there for the last five years. Some of the best ore the company has ever worked has come from these mines. The old miners that worked there formerly say that when the crush took place there was probably three years' ore in sight.

*Old Mountain Mines*—Here the vein of ore runs largely to ankerite, with veins of white ore and brown hematite intermingling. A great deal of ochre is also met with. The company works this mine on the ordinary system, paying the men various prices for the ore as determined by the analysis. An inclined plane worked on the gravity system takes the cars from the mouth of the main entrance down to the railroad level, in the bed of the canon. This whole section, covering probably ¾ of a mile on the top of the hill, has been duly gone over searching for ore, and a great many tons have been taken off the top. There are a number of open ankerite quarries of considerable extent also.

The first working at East mines was in the neighborhood of Coreys Brook. Early a tramway was built from Coreys Brook to Slacks Brook and beyond nearly to Folly river, where an outcrop of the vein occurs. These workings from Coreys Brook west to Folly river have been nearly all worked out and the entries and adits allowed to crush, very little high grade ore being obtained. At Coreys Brook the big ankerite quarry is located. This has not been worked for a long time, as enough ankerite has been obtained mixed with good ore in the other workings. Here also was the largest pocket shaped deposit of specular ore, which was about 40 ft. thick, and covered a space of 300 ft. by 50 or 60. At Coreys Brook is situated the end of the East mines branch railway, and from here the tramway lines to Weatherby's Brook and the anker-



Londonderry Iron Co. Ltd.—Blowing Engines.

ite quarry radiate. A gravity inclined plain runs from the mouth of Coreys Brook to this terminus.

At Weatherbys Brook is the best body of ore at present worked. The mine consists of an adit about a half a mile long, at a level about 100 feet higher than the terminus of the branch railway. From this level two shafts sloping at an angle of 75 ft. are sunk along the bed wall of the vein to the other level about 70 ft. below. At the foot of these shafts four short levels have been started, and the men are at work on the brown ore, which seems to grow better as they get down. Two upright boilers which are placed underground on the adit level, furnish the steam for the pump and the hoisting engine, and the old workings above the level furnish an exit for the smoke. This brown ore is the best which the company mines now, and is used for fettling in the puddling furnaces. At Totten Hill, about ½ mile further east, there are open quarries of white ore and ankerite. The hanging wall of the vein in almost every case is ankerite. The company uses in the furnaces generally a mixture of about half Torbrook ore and half of their own ore, the Torbrook ore containing about 1½ per cent. phosphorous. The company owns a limestone quarry at Brookfield, about 8 miles from Truro, but this has not been worked.

The company owns a very fair wharf site at Great Village and Cobequid Bay, and a survey for a line of railway connecting Londonderry with that place has been made and some little grading done. The company owns the right of way. The company also owns a wagon road along the line of the river.

*Maccan Coal Property*—This property consists of about 2,200 acres of land, 52 miles from Londonderry, and within easy distance of Amherst. The seam of coal which has been worked consists of about 6 ft. of bottom coal, 3 in. of slate, and about 12 in. of top coal. There are 4 or 5 thin unworked seams lying above this on the company's property. They do not increase to a workable thickness; the coal lies at an angle of about 50 degrees. It has been worked at a number of places along the outcrop. The seam was not fiery at all, very little gas being encountered and naked lights were used. About 50,000 tons of coal have been taken out.

*Other Property*—The company owns a great deal of land in the neighborhood of Londonderry, some of which contains a great deal of hardwood lumber. Around the plant and the various mines are a collection of company houses, probably from 100 to 150 in all, some of which are in good repair.

FURNACE OUTPUT.

| | 1893 | | 1894 | |
|---|---|---|---|---|
| | Long Tons. | Valued at Furnace. | Long Tons. | Value at Furnace. |
| Pig Iron made | 21,203 | $275,366 | 10,252 15/2000 | $173,033 |
| Ore charged | 50,933 | 127,179 | 22,299 | 56,243 |
| Coke | 25,933 | 88,849 | 11,475 | 43,501 |
| Raw Coal | 5,214 | 11,419 | 4,282 | 8,857 |
| Flux | 12,198 | 11,954 | 7,639 | 8,102 |

| 1895 | Gross Tons. | Value at Furnace. |
|---|---|---|
| Pig iron made | 15,843 | $205,959.00 |
| Ore charged | 37,105 | 81,166.93 |
| Flux charged | 12,780 | 12,650.67 |
| Raw coal | 2,758 | 5,396.34 |
| Coke | 22,557 | 69,646.66 |

Ore raised, 1895 ..... 37,105 tons.
Limestone " ..... 12,780 "
Total employees ..... 425

## McDOUGALL & CO.

Estate late John McDougall.
Robert Cowans, Montreal.

**Head Office: Imperial Building, Place d'Armes Square, Montreal.**
**Works: Drummondville, Que.**

Own an extensive area of bog iron ore territory and operate a charcoal furnace plant at Drummondville, Que. Two furnace stacks, both built of stone, 35 ft. high; capacity, about six tons per day each. At present the whole of the output is used in the manufacture of car wheels at the company's works in Montreal.

## NOVA SCOTIA STEEL CO., Ltd.

Reconstructed 1895, being an amalgamation of the New Glasgow Iron, Coal and Railway Co., Ltd, and the Nova Scotia Steel and Forge Co., Ltd. Authorized Capital, $5,000,000 in shares of $100; issued, $2,030,000.

**Directors:**

Graham Fraser, New Glasgow, *President.*

John F. Stairs, M.P., Halifax.
Adam Burns, Halifax.
John McNab, Halifax.
J. W. Allison, Halifax.
J. D. McGregor, New Glasgow.
J. M. Carmichael, New Glasgow.
E. F. McKay, New Glasgow.
Frank Ross, Quebec.

**Head Office and Works: T. Cantley, Secretary, New Glasgow, N.S.**

**Mine Manager: R. E. Chambers, M.E.**

Formed to take over the business, franchises, undertaking, property rights, privileges and assets of the Nova Scotia Steel and Forge Co., Ltd., and the New Glasgow Iron, Coal and Railway Co., Ltd.

*Blast Furnace*, at Ferrona, connected with the mines, limestone quarries and Intercolonial Railway by company's own railway, at present completed for a distance of 13 miles. It is of modern design and fitted up with the most approved appliances. The clear lines inside the brick work are: Height, 65 ft.; bosh diameter, 15 ft.; crucible diameter, 9 ft. 6 in. There are eight tuyeres and two cinder notches. The casting house is 50 by 153 ft., constructed of iron. The furnace has two down-comers (gas flues), one carrying gas to the hot blast stoves, the other leading to the boilers. There are three hot blast stoves, of the 3-pass Massick and Crook type, each stove being 16 ft. 6 in. in diameter, inside of the shell, and 60 ft. in height. There is also a chimney on each stove 35 ft. high. Each stove is lined with 160,000 fire bricks. The blast is produced by two blowing engines, each weighing about 90 tons, having steam cylinders 36 in. in diameter, air cylinders 84 in. in diameter, and a 4 ft. stroke. The engines are placed in a brick building designed for strength, and 35 by 60 ft. Steam is generated in a battery of eight boilers, set in pairs, tubular, and designed to carry a pressure of 100 lbs. Each boiler is 6 ft. in diameter, 20 ft. long, and contains 52 tubes each 4½ in. in diameter. The fuel used is waste gas from the furnace, the draft being produced by an iron chimney 125 ft. high and 7 ft. 6 in. in diameter, and lined with fire brick 4 in. in thickness. The water supply is pumped from the East river into a

Shipping Pier, Bell Island Iron Mine, Newfoundland.

stand pipe 10 ft. in diameter and 80 ft. high. There is a large ore shed, hoists, scales, etc.

*Coal Washing Plant* was put into successful operation in May, 1892, and is the first of its kind erected in Canada. The coal is elevated, screened and the large coal crushed. The resulting fine coal is separated into three sizes: Nothing to one-eighth inch, one-eighth to one-quarter, one-quarter to three-eighths. The coal is washed on two compartment feldspar jigs arranged with variable stroke. The washed coal is removed by elevation to a storage tower, and the refuse led to a convenient dumping place. The water used is raised by a centrifugal pump and after performing its round of work returns again to the pump. The entire plant works automatically, requiring the services of three men.

The coal washed contains from 17 to 35 per cent. of ash, besides 2½ per cent. of sulphur. The washed coal contains on the average 10 per cent. of ash, or 1 per cent. more than the fixed ash, 9 per cent. of the coal. This is a remarkably good showing, and seldom surpassed. The fixed ash, of course, cannot be reduced. The sulphur is reduced by washing to 1.35 per cent., that being partially organic and partially fixed with lime or alumina. The total capacity of the plant is 300 tons of washed coal in ten hours. The average cost of washing, winter and summer, is put at 7½ cents.

*Coking Plant.*—This is situated near the coal washer and contains 54 retort coke ovens of the Bernard system (improved Coppée), of the following dimensions: Length, 33 ft.; height, 6 ft. 6 in. (under roof); medium width, 23½ in. Each oven is charged with about 7 tons of washed coal (all below ⅜ in. mesh), every 40 or 48 hours; the 54 ovens produce every 24 hours between 115 and 120 tons of first-class large coke, which is all used in the blast furnace of the company. The coal used yields 73 or 74 per cent. of large coke right along; the same coal only yields 60 per cent. max. in the bee-hive oven. Each oven can supply 130 to 150 square ft. of boiler surface for steam raising if desired. Each two ovens work together, and for this reason the ovens are charged alternately; one day the ovens 1, 3, 5, 7, 9, etc., uneven numbers are pushed; the next day the even numbers, 2, 4, etc., are discharged; this arrangement makes it possible to work a hot and cold oven together, utilizing the surplus heat of the hot oven to heat the cold (freshly charged) oven. After the process of coking is finished the doors at both ends of the respective ovens are lifted by means of windlasses and the ram now pushes the whole cake of coke out of the retort, landing it clear of the ovens on the discharge side, where it is water-cooled. As soon as the coke is pushed out by the ram of the coke-pushing machine, the oven doors are re-closed and sealed air-tight with ordinary clay; the coal to be charged is now dumped into the oven through the charging holes 15, 15, 15, and levelled in the usual way.

The main advantages of these retort ovens, without saving of tar and ammonia, over the bee-hive oven are as follows:—

1st. A larger yield, 12 to 15 per cent. at least.

2nd. Considerable lower cost of coke making (labor—expenses).

3rd. All coke produced is large and strong, there is less than 3 per cent. of fine coke (braise).

4th. Larger production per oven.

5th. Fewer repairs, etc.

6th. Owing to the high temperature carried and to the high and narrow column of coal (6 ft.), inferior coking coals can be successfully coked, also a mixture of coking and non-coking coal.

*Ore Deposits.*—The ore occurs at the junction of the carboniferous and silurian formations, in bodies of large size, which are opened at different points in the East river, extending over a distance of five miles. The ore is won by shafts or inclines according as the pitch of the ore is more or less inclined. During the past year the ore used has come principally from the McDonald and Grant mines.

There has also been used in the furnace during the last few months a red hematite, which occurs in the lower silurian formation as bedded deposits. It occurs in large beds in Pictou county, and also at Arisaig, in Antigonish county. So far this ore has been won from open cuts, no systematic mining having been done. The amount of ore mined is about 4,000 tons per month, including both brown and red hematites.

During 1894 this company acquired and now operates a mine of iron on Bell Island, Conception Bay, Newfoundland.

**NOVA SCOTIA STEEL CO.**—Continued

*Ore Washing Plant.*—The principal impurity in the ore is clay, which is easily and cheaply separated by washing. The washer used is a section of a conical revolving drum with inclined blades or fins on the inside, which work the ore from the large to the small end; while the water (from a Cameron pump) enters at the small end of the drum, washing the clay from the ore which it meets in its descent, and discharging it in spouts, which lead to the settling pond. The ore is discharged from the small end of the drum into a bin, and from thence into the cars.

FURNACE OUTPUT.

| — | 31ST DECEMBER, '93. | | 31ST DECEMBER, '94. | | 31ST DECEMBER, '95. | |
|---|---|---|---|---|---|---|
| | Tons. | Value at Furnace. | Tons. | Value at Furnace. | Tons. | Value at Furnace. |
| | | $ | | $ | | $ |
| Pig iron made.... | 22,500 | 270,000 | 28,142 | 295,500.90 | 17,331 | 181,975.50 |
| Ore charged ..... | 44,856 | ..... .... | 60,817 | 121,634.00 | 34,628 | 95,000.00 |
| Fuel " ..... | 30,846 | ..... | 42,378 | 104,516.50 | 25,094 | 51,000.00 |
| Flux " ..... | 12,890 | ... ..... | 22,928 | 22,928.00 | 14,558 | 15,000.00 |
| Persons employed. | 480 | ..... | 450 | . ..... | ..... | ..... |

LABOR EMPLOYED, 1895.

| | | |
|---|---|---|
| Ore production..... | 100 | persons. |
| Furnace and works..... | 250 | " |
| Steel works..... | 450 | " |
| Total employees..... | 800 | |

*Steel Works at New Glasgow.*—The plant comprises three Siemens melting furnaces; two of these have a capacity of 20 tons each and the other a capacity of 35 tons. These three melting furnaces are served by one of Chaplin's pat. 3-cylinder 50-ton steam cranes, having a clear span of 50 ft. with traverse, longitudinal, and hoisting motions, and will lift 50 gross tons; three gas heating furnaces; five reverberatory heating furnaces; 26 in. reversing cogging mill, with train of live rolls and hydraulic ingot manipulators; heavy vertical hot billet shears, with live rolls; one 20 in. plate mill; one 16 in. bar mill; one 12 in. bar mill; one 9 in. guide mill; 12 pairs shears, 40 tons and smaller; one 5 ton steam hammer, with 15 ton hydraulic crane; four smaller steam hammers; machine shop, 175 ft. x 75 ft., with 30 ton travelling crane commanding whole shop, equipped with 30 in. slotter, 6 drills (one a 9 ft. radial, 5 in. spindle), 9 lathes, one of which will take in 50 in. over carriage, and 8 ft. x 10 ft. in the gap, will take 37 ft. between centres; also 6 large gap and other lathes, small shapers, etc. Power is supplied by some 50 steam and 10 hydraulic cylinders. Entire works are lighted by arc and incandescent light plant. Output, 150 tons of steel ingots per day, all of which is worked up into bars, sheets, axles and other forgings. Over 100,000, axles of this company's make have been supplied to Canadian railways.

DIRECTORS' REPORT, 1895.

Your directors herewith submit the first annual report, balance sheet and revenue account for the year ended 30th June, 1895, and have satisfaction in reporting that the sale of this company of the franchises, property and assets of the Nova Scotia Steel and Forge Company, Ltd., and the New Glasgow Iron, Coal and Railway Company, Ltd., as authorized by the shareholders of said companies, at the special general meetings called for that purpose, has been confirmed by Acts of the Dominion and Provincial Legislatures respectively.

Acting on the resolutions of the special general meeting of shareholders held 18th February last, six per cent. first mortgage twenty year gold bonds to the amount of $600,000.00 have been issued and are now being offered to the public, a portion of them having been sold.

The extreme depression of the iron industry, particularly in the United States during the past year, had the effect of reducing prices so much below former years, that profits were greatly decreased.

Owing to the large accumulation of unsold pig iron, and the necessity of a partial relining, the furnace was out of blast during five months of the year.

The output of the steel works was largely curtailed during the month of July, 1894, owing to the Cogging mill engines having broken down, involving a large loss through the stoppage of the works and cost of repairs.

As to the future,—prices have improved considerably during the past three months; orders for a large quantity of steel have been received. Pig iron during the past two months is being sold as fast as the blast furnace is producing it, and we enter the new year with very fair prospects.

The accounts herewith submitted deal with the operation of the amalgamated companies for the twelve months ended 30th June, 1895.

---

| | |
|---|---|
| The profits of the year ended 30th June, 1895, were | $22,578 35 |
| To this must be added the balance at credit of Profit and Loss account Nova Scotia Steel and Forge Co., Ltd., 1st July, 1894 | 3,886 75 |
| Also balance at credit of Profit and Loss account New Glasgow Iron, Coal and Railway Co., Ltd., 1st July, 1894 | 90,814 59 |
| | $117,279 69 |
| Your Directors recommend that the amount be distributed as follows:— | |
| Reserve for insurance against bad debts | $ 2,436 22 |
| Reserve for blast furnace renewals | 3,361 25 |
| Reserve for general depreciation | 20,000 00 |
| Leaving a balance to be carried forward to credit of Profit and Loss | 25,797 47 |
| | $91,482 22 |

New Glasgow, N.S., 14th August, 1895.

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ACCOUNTS YEAR ENDED 30TH JUNE, 1895.

*Assets.*

| | | |
|---|---|---|
| Mining properties | $1,173,497 93 | |
| Blast furnace plant | 320,477 76 | |
| Railway and rolling stock | 201,897 68 | |
| Real estate, plant, &c | 580,452 05 | |
| Mining machinery | 14,143 32 | |
| | | $2,290,468 74 |
| Pig iron, coke, &c., &c | $156,618 24 | |
| Scrap steel, scrap iron, &c., &c | 42,706 17 | |
| Supplies, furnace sand, fire brick, oils, &c | 11,459 69 | |
| Steel, manufactured and partly manufactured | 208,166 06 | |
| Coal | 1,742 87 | |
| | | 420,693 03 |
| Ledger accounts | | 75,776 40 |
| | | $2,786,938 17 |

**NOVA SCOTIA STEEL CO.**—Continued.

*Liabilities.*

| | | |
|---|---|---|
| Capital Stock, Preference | $1,030,000 00 | |
| do Ordinary | 1,030,000 00 | |
| | | 2,060,000 00 |
| Union Bank for cash advances and unpaid accounts | 407,515 76 | |
| Bills payable | 103,964 87 | |
| | | 511,480 63 |
| Depreciation | 107,436 93 | |
| Furnace renewals | 3,420 78 | |
| | | 110,857 71 |
| Reserve for bad debts | 13,117 61 | |
| Profit and loss | 91,482 22 | |
| | | 104,599 83 |
| | | $2,786,938 17 |

ABSTRACT OF PROFIT AND LOSS ACCOUNT.

*Assets.*

| | | |
|---|---|---|
| To Reserve for bad debts | | $2,436 22 |
| " " furnace renewals | $ 3,361 25 | |
| " " depreciation | 20,000 00 | |
| | | 23,361 25 |
| To Balance | | 91,482 22 |
| | | $117,279 69 |

*Liabilities.*

| | | |
|---|---|---|
| By balances carried over from last year, viz :— | | |
| New Glasgow Iron, Coal and Railway Co., Ltd | $90,814 59 | |
| Nova Scotia Steel and Forge Co., Ltd | 3,886 75 | |
| | | 94,701 34 |
| By profits for the year ended June 30th, 1895 | | 22,578 35 |
| | | $117,279 69 |
| By Balance | | $91,482 22 |

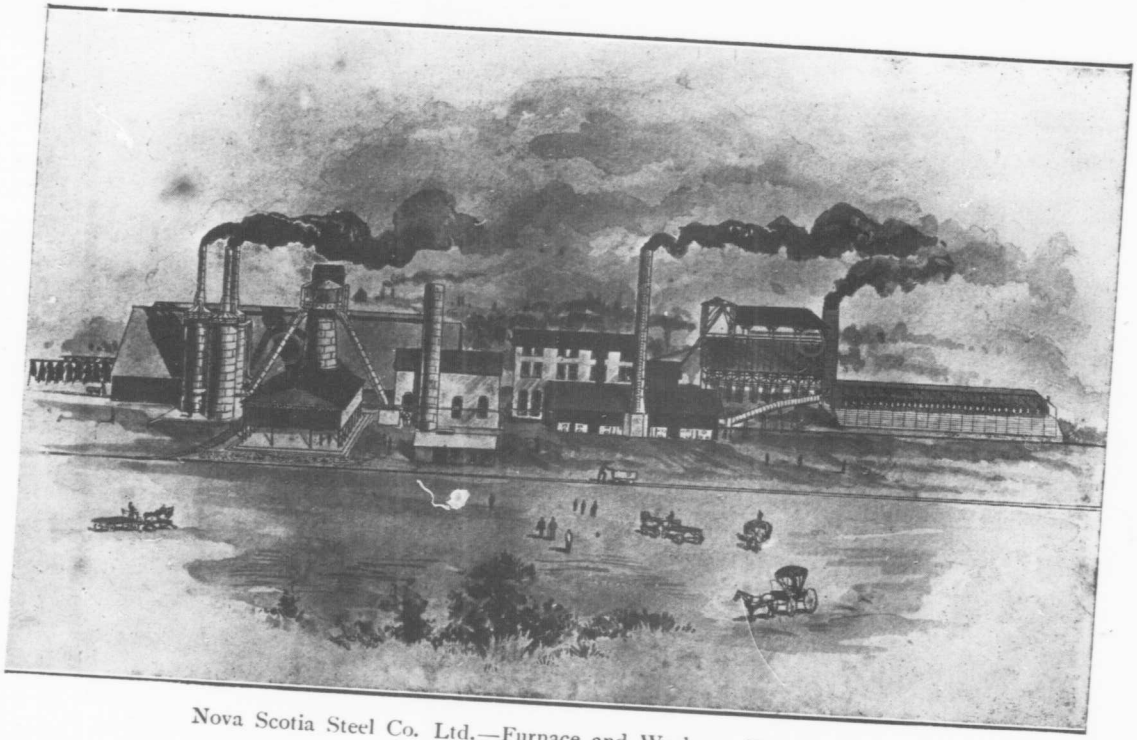
ABSTRACT OF RESERVE ACCOUNT.

*Assets.*

| | |
|---|---|
| To bad debts written off during the year | $ 2,436 22 |
| To balance | 13,117 61 |
| | $15,553 83 |

*Liabilities.*

| | |
|---|---|
| By balance carried over from last year N. S. Steel & Forge Co., Ltd. | $13,117 61 |
| By profit and loss | 2,436 22 |
| | $15,553 83 |
| By balance | $13,117 61 |



Nova Scotia Steel Co. Ltd.—Furnace and Works at Ferrona, N.S.

# PICTOU CHARCOAL IRON CO., Ltd.

Incorporated under the laws of Nova Scotia, in November, 1891. Authorized Capital, $200,000, divided into 2,000 shares of $100 each.

**Directors:**

J. D. McGregor, *President*, New Glasgow, N.S.

Jas. D. McGregor, New Glasgow. | M. H. Fitzpatrick, New Glasgow
A. C. McDonald, Pictou. | Alf. Markham, St. John, N.B.
W. B. Moore, New Glasgow.

**Head Office: A. C. McDonald, Sec.-Treas., Pictou, N.S.**

**Works: E. A. Sjostedt, M.E., General Manager, Bridgeville, N.S.**

Formed to manufacture charcoal pig iron on the East river of Pictou, Pictou county, Nova Scotia, and to transact any other business in connection therewith, etc. The company controls a valuable deposit of brown hematite on the Grant farm at Bridgeville; also some 8,500 acres of heavy old-growth hardwood timber land, situate within fifteen miles of furnace site.

The buildings consist of offices, stables and store houses, carpenter and blacksmith shops, a coal shed (with a capacity of 40,000 bushels), carting house, stack house, and engine house. The shops and furnace buildings are all covered, roof and sides, with corrugated iron, painted on both sides with mineral paint. The working plant proper consists of the following structures: The furnace stack is 50 ft. high with an 11 ft. bosh and 7 ft. diameter under the hill. The conventional iron shell has been dispensed with and substitued by a crinoline strapping and red brick shell. This, together with the 15 in. fire brick lining, is supported by six cast iron columns, and the bosh is surrounded by a boiler plate mantel, and the hearth by a water-cooling cast iron jacket. The tuyeres, 6 in number, are of bronze and set in water coil breasts. The down comer has a diameter of 36 in., and the bustle pipe 15 in. The top of the furnace is provided with a Weimer patent friction winch and gas seal for facilitating an even distribution of the stock, and to prevent waste of gas. The hot blast is a modified Cooper-Durham cast iron stove, with 30 V-pipes, built in two sections and provided with two combustion chambers side by side, and so arranged that the cold inlet and the outlet of the heated blast, as well as the two combustion chambers, are placed in the same end of the stove. This arrangement was successfully adopted by the manager some years ago at Katahdin Iron Works mine. Besides economizing space and blast and gas connections, it facilitates maintaining the blast at a high temperature with a small amount of fuel gas, the 2,000 ft. of heating surface sufficing to keep the 3,000 cubic ft. of air per minute (engine measure) up to 750° to 800° F. The boilers are 4 in number (30 ft. x 36 in.), made of best $\frac{5}{16}$ Dalziel steel, and built in sets of two with separate draft stacks, and independent steam and water connections, and provided with gas valves and combustion chambers similar to those in the hot blast, besides separate grates for wood or coal in case of shortage of gas. The blowing engine consists of two horizontal blowing cylinders of 5 ft. diameter and 5 ft. stroke, and a pair of horizontal steam engines, 18 in. x 36 in. each, capable of performing the work in case of necessity.

The elevator comprises a double Whitney hoisting machine and two Wood & Co's safety cages. These, as well as the limestone breaker (a Forster "crusher and pulverizer"), are run by belt from a horizontal steam engine of about 15 h.p. capacity. For the handling and weighing of the stock and the pig iron, Weimer patent steel charging barrows and Richle's furnace charging and pig metal scales are used.

Water supply has been provided for by building a 25 ft. dam on the Mill brook, from which the water is conducted 700 ft. through 3 in. wooden pipes to the furnace,

**PICTOU CHARCOAL IRON CO.**—Continued.

besides which a reservoir is built (at an elevation of 75 ft. above the foundation level of the furnace) for collecting the spring water from the hills above, as well as the water pumped from the river; in case of lack of water from the above mentioned sources, a Northey duplex steam pump (7½ in. s. c. x 4½ in. w. c. x 10 in. st.), is performing this work and a series of iron pipes are laid to the reservoir, and to different parts of the work, and fitted with valves, hydrants and hose connections in case of fire.

For the carbonization of the wood, 19 brick kilns have been erected at different places. These are of the round (bee-hive) type, each holding 50 cords of wood, and capable of carbonizing 1,200 cords per annum, which will produce 5,000 bushels of coal. Those built in the woods are of the Plattsburg (conical) type, each holding about 30 cords, with an annual capacity of 700 cords of wood, or 3,000 bushels of coal. The present coaling capacity is, therefore, about 500,000 bushels per annum, requiring about 1,300 cords of wood. Three more kilns were built in the spring of 1893, making the total capacity about 600,000 bushels of charcoal, which is the estimated requirement for producing 5,000 tons of pig iron a year.

The wood used for the charcoal making is principally yellow birch, also beech and maple.

The iron ores on the north side of the East river of Pictou have been opened up in several places between Springville and Sunny Brae and are at present worked by the company in two places on the Grant farm at Bridgeville, and by the New Glasgow Iron, Coal and Railway Company, both at Bridgeville and at Black Rock. They are contact deposits between the carboniferous limestones and the upper silurian measures, and consist of brown hematites, "residual precipitated found from the disintegration of the older Silurian rocks above, more or less mixed with pyrolusite in form of nodules and mosses, mostly in the hanging wall, but also as veins or crystals in the deposits themselves." On the south side of the river there are the Weaver and Watson specular ores, but these have as yet not been worked.

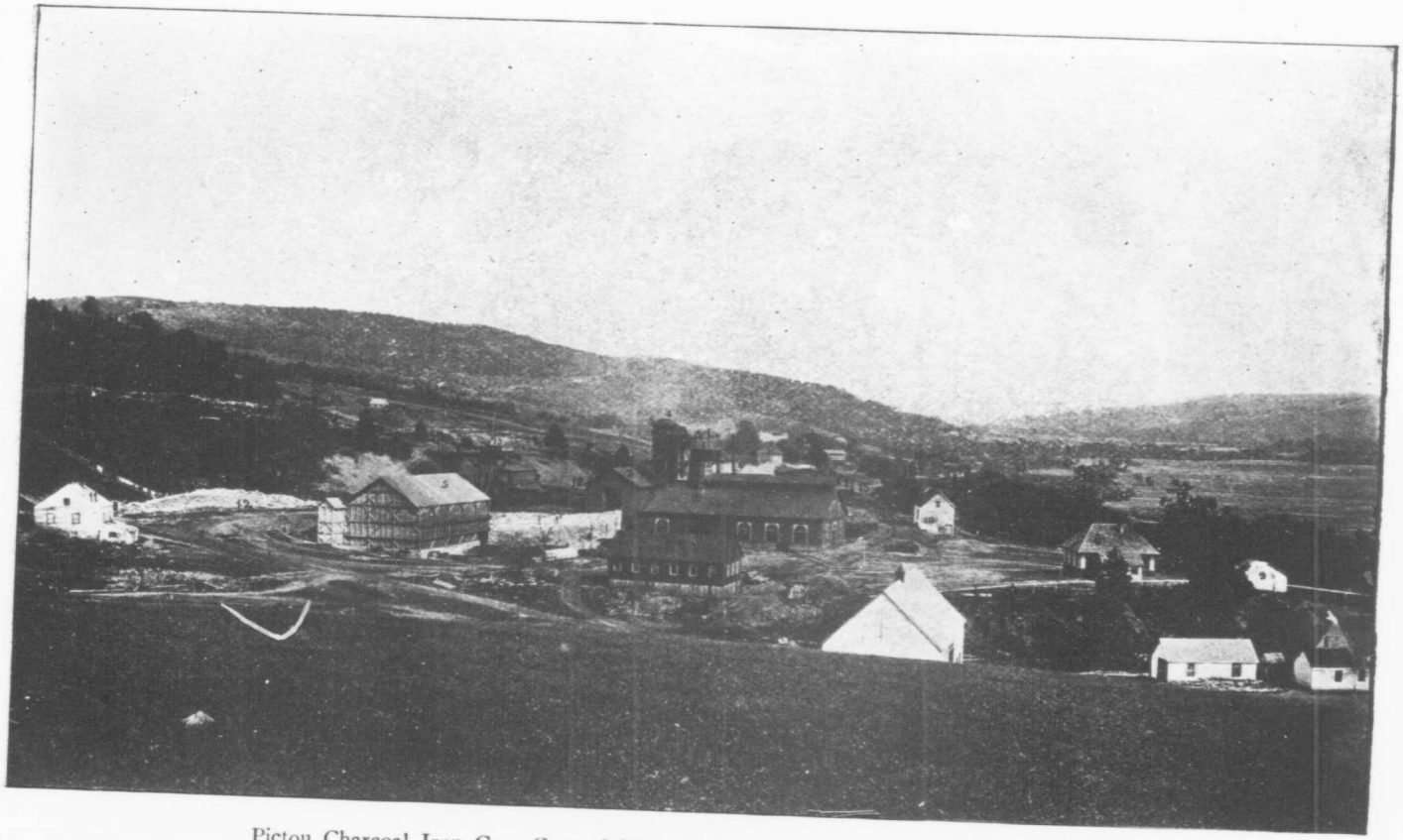
The ore deposits worked by the company being situated but a few hundred feet from the furnace, on a hillside of an elevation of about 100 feet above the same, the mining and handling of the ore is rendered especially easy. Two tunnels have been driven, one on the east and one on the west side, back of the furnace. The latter, or "A" tunnel, goes through a seam or vein of gravel ore easily mined, and 10 to 15 ft. in width. After being driven in about 300 ft. a slope was driven up through the ore, at an incline of about 45° south-west, to the surface 60 ft. above, which showed up a large body of ore, in some places 18 ft. wide.

The ore in No. 2 tunnel is of an entirely different character, being fibrous and compact, and requiring blasting. It is besides richer in metallic iron, nearly free from manganese. This ore was first worked by an open cut on the top of the hill, as it displayed a remarkable deposit of solid limonite, yielding 58 per cent. metallic iron, and three to four thousand tons were removed. About 60 ft. below this cut the company has now driven a tunnel about 200 ft. in the same kind of ore, besides an air shaft (at an incline with the dip of the ore of about 60° south) and three different levels, all in ore from 10 to 15 ft. wide.

The following analyses will serve to give an intelligent idea of the above mentioned ores:

| | Gravel ore from No. 1 Tunnel. | | | Gravel ore from No. 2 Tunnel. | |
|---|---|---|---|---|---|
| Insoluble matter | 12.80 | 6.75 | .... | 8.58 | 5.58 |
| Metallic iron | 45.02 | 53.41 | .... | 54.83 | 56.57 |
| Metallic manganese | 1.56 | 1.88 | .... | 0.20 | 0.20 |
| Comb water | 9.45 | 11.02 | .... | 10.00 | 10.90 |
| Sulphur | 0.05 | 0.04 | .... | 0.41 | 0.09 |
| Phosphorous | 0.12 | 0.02 | .... | 0.03 | 0.21 |

The variation in manganese and sulphur is, however, even more marked than the above figures indicate, as crystals of pyrolusite and barite are met with here and there among the ore, without any regularity or warning. The intention of the company is to wash and roast the ore before using it in the furnace; but at present it is simply heap roasted, with wood and charcoal braise at the end of the tunnel track. From here it is afterwards carried on the tramway tracks to the chute above the stock-house;



Pictou Charcoal Iron Co.—General View of Furnace and Works at Bridgeville, N.S.

and being here dumped on iron rails, placed about 2 in. apart, and broken sufficiently to pass through these, it falls in a wire netting (10 gauge, 3 x 3 mesh) down in the stack-house, whereby the dry clay to a large extent is screened through the ore.

The limestone used for flux is quarried at Springville, and is hauled (3 miles) to furnace, costing about 85 cents per gross ton delivered. It contains about 94 per cent. carbonate of lime; 2.5 per cent. carbonate of magnesia; 2.0 per cent. insoluble matter.

| — | Output in 1893. | Output in 1894. |
|---|---|---|
| Total quantity of iron manufactured .. | 498 tons. | 1,720 tons. |
| " ore charged..... ..... | 853 " | 3,600 " |
| " fluxing material .... ..... | 124 " | 440 " |
| " fuel charged ..... | 68,220 bush. charcoal. | 200,000 bush. charcoal. |

One hundred persons employed.

OUTPUT IN 1895.

The quantity of hematite mined in 1895 amounted to 8,506 tons; no pig iron was made, the intention being to convert the product into puddle bars.

## TORBROOK IRON CO., Ltd.

Incorporated by Act of the Legislature of Nova Scotia, assented to 19th May, 1891.
Authorized Capital, $100,000, in 10,000 shares of $10, with power to increase the same to $250,000.

**Directors:**

Hon. Alexander Macfarlane, Wallace, N.S., *President.*
Chas. E. Stayner, Halifax, N.S. | R. G. Leckie, Torbrook, N.S.
J. Medley Townshend, Amherst, N.S. | R. G. E. Leckie, Torbrook, N.S.

**Head Office: J. Leckie, Manager, Torbrook, N.S.**

The company holds in fee simple and under lease an area containing 2,000 acres of mineral land, traversed by beds of iron ore, in Annapolis County, Province of Nova Scotia.

Operates the Torbrook hematite mines at Torbrook; connected by branch line with the Windsor and Annapolis railway at Wilmot station.

OUTPUT.

| | |
|---|---|
| 1891..... | 10,000 Tons. |
| 1892..... ..... ..... ... | 18,000 " |
| 1893..... | 30,000 " |
| 1894 (idle for two months). ..... | 21,590 " |
| 1895..... | 35,073 Long Tons. |

The machinery equipment comprises:—

Boilers—Three 75 h. p. and one 20 h. p.

Compressors—One Ingersoll-Sergeant, four drill, and one Rand, five drill capacity.

Hoisting engines—Four drum (each 2 ft. 2 in.) friction hoisting plant; one single drum winding engine.

Pumps—Three Blake, 2 in. water col., discharging 52 gals. per min.; one Worthington duplex, 6 x 4 x 6, discharging 90 gals, per min.; two Cameron, 5 in. water col.

Air drills—Six Rand and one Ingersoll.

Eighty persons employed in 1895.

## COMPANIES OWNING IRON LANDS NOT KNOWN TO BE IN OPERATION IN 1894.

| Company. | Authorized Capital. | Head Office. | Location of Property. |
|---|---|---|---|
| Anglo-American Iron Company.... | $ 5,000,000 | H. P. McIntosh, Secretary, 103-109 Superior St., Cleveland, Ohio..... | Owns a ¾ int. in 80,000 acres in timber and mineral lands along the line of the Central Ontario Railway, and about 3,000 acres of copper-nickel lands in Dennison T., Ont. |
| Bancroft Iron Company..... | 1,000,000 | C. J. Pusey, Irondale, Ont..... | Owns 1,000 acres at Irondale, Hastings Co., Ont. |
| Belmont Bessemer Ore Co..... | 600,000 | R. L. Major, 29 Broadway, New York..... | Controls an int. in W½ Lot 19, Con. Belmont, Peterborough County, Ont. |
| Bristol Iron Company, Ltd..... | 100,000 | E. McMahon, Russell House Block, Ottawa.. | 400 acres. Bristol Tp., Pontiac Co., Que. Worked for several years under lease by Ennis & Co., Philadelphia. |
| Ennis & Co..... | ..... | 420 Walnut St., Philadelphia..... .... | Operates under lease lands of Bristol Iron Co. |
| Kingston and Pembroke Iron Co... | 5,000,000 | George Osborne, Sec., Kingston..... | Owns the freehold and leasehold iron properties of the Kingston and Pembroke Iron Mining Co., about 4,000 acres, and 1,700 acres at Gun Flint Lake; 13,200 in the Township of Moss, Ontario. |
| Nova Scotia Midland Rail & Iron Co. | 1,000,000 | 52 Broadway, New York..... ..... | Has an interest in some 30 sq. miles of iron, coal and other mineral lands in Pictou and elsewhere in the Province of Nova Scotia. |

Surface Works, Torbrook Iron Mine, Nova Scotia.

# Miscellaneous

## ALGOMA COPPER COMPANY.

Incorporated 1895. Authorized Capital, $1,000,000.

**Directors :**

E. S. Drake. | E. H. Peters. | D. W. Payne. | S. J. Hall.
J. W. Call. | Geo. McCann. | P. F. McLaren. | H. S. Ressey.
J. B. Coy Kendall, (all of Elmyra, N.Y.)

**Head Office: Thessalon, Algoma District, Ont.**

Formed with the object of exploring for, developing, mining, smelting, refining and treating, gold, copper and other ores or mineral substances, and erecting, maintaining of buildings and machinery necessary for the proper working of said mines and the reduction and assaying of ores as a smelting furnace or furnaces. Operations of the company are to be carried on in the Townships of Gould and Gladstone, in the District of Algoma and elsewhere in the Province of Ontario.

## ANTLER CREEK MINING CO., Ltd.

Incorporated 1896. Authorized Capital, $1,000,000.

**Directors :**

David Oppenheimer. | R. G. Tatlow. | Thomas. Dunn.

**Head Office : Vancouver, B.C.**

Formed to acquire the placer mining claims held under leases, or for which leases have been applied for in the district of Cariboo, in the Province of British Columbia, by the following :— On Cunningham creek, D. Patterson; in Cunningham Pass, Thomas Dunn, R. G. Tatlow, I. Oppenheimer and D. Oppenheimer; on Antler creek, J. Patterson, D. Oppenheimer, I. Oppenheimer, R. G. Tatlow, T. Dunn, D. Patterson, S. Oppenheimer, L. Doucet, W. H. Kennedy, C. F. Barker, H. Miller, K. Miller, R. McLelland and W. D. Burdis; on Little Valley creek, D. Patterson, T. Dunn and R. G. Tatlow; on French creek, I. Oppenheimer; on Canadian creek, D. Oppenheimer; either for money or fully paid up shares of the company.

## ARMSTRONG LIME CO., Ltd.

Incorporated under the laws of New Brunswick, 1894. Authorized Capital, $60,000, in shares of $100.

**Directors :**

J. Armstrong. | F. Armstrong. | F. W. Armstrong. | J. A. Armstrong.
J. G. Armstrong.

**Head Office: Green Head, Parish of Lancaster, St. John Co., N.B.**

Formed to purchase from the owners all rights in the trade mark "Green Head Lime," and to take over and carry on the business of manufacturing lime, etc,

## BEAMSVILLE PRESSED BRICK CO.

Organized 1870. Capital invested, about $50,000.

**Owners :**

Wm. Tallman. | W. F. Tallman.

**Head Office : W. F. Tallman, Superintendent, Beamsville, Ont.**

The quarries and works operated by this company are situated on Lot 23, in the 1st Concession, Township of Clinton, Province of Ontario, about 1½ miles west from the village of Beamsville. Sixty men employed. The yearly output is estimated at 6,000,000 brick, and 500,000 drain tile. The works were erected in the spring of 1890, and were opened about the beginning of June in that year. The main building is 30 x 40 feet, the engine room 30 x 24, and the clay shed 60 x 102. There is also a building 30 x 72, two storeys, for making terra cotta and roofing tile. The engine is 70 h. p., and the pressing machine is of the Simpson patent, with a capacity each of 15,000 per day of ten hours. The clay is prepared for the press by grinding and sifting it in a machine which has a capacity of 40,000 per day. The crusher is a revolving disc nine feet in diameter, in which runs two wheels with 14-inch face. Into this the clay is shovelled in a semi-dry state, and being crushed under the wheels it is elevated to a sieve of 16-inch mesh, through which it falls into a hopper and thence into the press, where it is moulded into shape under a pressure of fifty to one hundred tons. From the press the bricks are taken direct to the kilns, which are seven in number, and are there burnt to the required hardness. The works are situated alongside the Grand Trunk railway, where cars are loaded on a switch to be conveyed to Hamilton, Toronto, Montreal, or other markets.

## BRAS D'OR LIME CO., Ltd.

Incorporated 17th July, 1888. Authorized Capital, $50,000, in shares of $10 each, all of which has been subscribed and paid.

**Directors :**

C. F. Fraser, *President.*

W C. Delaney, Halifax. | Hy. Sanders, Halifax.
H. H. Read, M.D., Halifax. | E. G. Smith, Halifax.

**Head Office : A. Milne Fraser, Secretary, 161 Hollis Street, Halifax, N.S.**

The company owns 6,200 acres freehold and under lease. Quarries at Marble Mountain, Cape Breton, N S., and Bedford Basin, Halifax Co. Forty men and boys employed.

*Quarrymaster :* D. MacLachlan, Marble Mountain, C.B., N.S.

## BRAS D'OR MARBLE CO., Ltd.

Incorporated 12th June, 1890. Authorized Capital, $200,000, in shares of $10 each.

**Directors :**

Roderick McDonald, *President,*

G. E. Francklyn.
H. Saunders.
R. Uniacke.
S. Mosher.

**Head Office: G. Hattie, Secretary, Sackville Street, Halifax.**

Formed to acquire, work and further develop marble deposits situated at Marble Mountain, Bras d'Or Lake, near West Bay, Cape Breton, Nova Scotia. The purchase consideration to the former owners was $55,000 in cash and 8,000 shares in the present company. The quarries have been equipped with an excellent working plant, including Wardwell channeler, portable engine and boiler, gadder, derricks, etc. The deposit is extensive, of excellent quality, and is now being developed.

*Quarrymaster:* D. MacLachlan, Marble Mountain, C.B., N.S.

## BRITISH COLUMBIA POTTERY AND TERRA COTTA CO.

Incorporated October, 1890. Authorized Capital, $60,000, divided into 1,000 shares of a valne of $60 each.

**Directors:**

C. A. Vernon.
S. C. Burris.
J. H. McLaughlan.
B. W. Pearse.
Joseph Hunter.

**Head Office: W. H. Bainbridge, Secretary, Vancouver, B.C.**

Formed to manufacture all kinds of pottery, brick, drain pipes and terra cotta, fire brick wares, etc. Property covers three acres, and is situated about 1½ miles from Victoria. Forty men employed; yearly turnout of an estimated value of $100,000. Estimated value of machinery, plant and buildings at first January, 1894, $58,000.

## BRITANNIA MINING CO., Ltd.

Incorporated 2nd October, 1895. Authorized Capital, $150,000, in shares of $10.00.

**Directors:**

D. W. McVicar, Walton, N.S.
E. Churchill, Hantsport, N.S.
E. Shaw, Walton, N.S.
A. E. Shaw, Windsor, N.S.

**Head Office: Windsor, Nova Scotia.**

Formed (*a*) to acquire by purchase, location or otherwise, and at one time or from time to time as may seem best, a tract or tracts of mineral land in the Province of British Columbia and elsewhere in the Dominion of Canada, and to work and develop the resources of the same; (*b*) To carry on the business of exploring for, mining and gathering gold, silver, lead, iron and other metals, minerals and ores in such form as the same may be found throughout the Dominion of Canada and elsewhere,

## CANADA PAINT CO., Ltd.

Incorporated 2nd March, 1892. Authorized Capital, $750,000, in shares of $100.

**Directors:**

S. F. McKinnon, *President.* | Wm. Bell, *Vice-President.*
Rob. Munro, *Managing Director.* | Thos. Walmsley. | S. Trees. | H. M. Pellatt.

**Head Office: No. 572 William St., Montreal.**

This company operates certain mineral properties containing iron oxide at St. Malo, Champlain County, Province of Quebec. Fifteen men employed in mining. Estimated value of machinery, plant and buildings, etc., $25,000.

They also operate certain graphite properties in St. John County, New Brunswick.

## CANADA COMPANY.

Incorporated 1826. The capital originally consisted of 8,915 shares with £32,105 paid, but by repayments and purchases it has been reduced to 8,319 shares of £1, on which there is no liability. Accounts made up annually to 31st December and presented in March; but the dividends are declared half-yearly at meetings held at the end of June and December, and are payable on the 10th July and 10th January. The dividends paid in 1883 and 1884 amounted to £4 each year; in 1885, to £3 10s.; in 1886, to £3 10s.; in 1887, to £4; in 1888, to £2 10s.; in 1889, to £2; in 1890, to £1 10s.; in 1891, to £1 17s. 6d.; in 1892, to £2 2s. 6d., and in 1893, to £1 17s. 6d. On 31st December, 1892, the value of the lands leased (being the price at which the lessees had the option of purchasing) was £140,736, and the value of the lands undisposed of, according to the valuation of December 31st, 1886, was £453,721. By the Company's Amendment Act of 1881, all income in excess of £4 per share per year is to be applied to the purchase of shares for cancellation, the number of shares not to be reduced, however, below 4,457, which is half the original number. In 1881 60 shares were purchased; in 1882, 323; in 1883, 130; in 1884, 76; in 1885 and 1886, none, and in 1887, 7, the capital thus being reduced to 8,319 shares of £1.

**Directors:**

Sir Robert Gillespie, *Governor.*

J. P. Currie. | Wm. Unwin Heygate.
Hon. F. S. A. Hanbury Tracey. | J. C. Weld.

**HEAD OFFICE:**

**No. 1 East India Avenue, Leadenhall Street, London, E.C.**

**CANADIAN OFFICE:**

**Imperial Bank Building, Wellington Street E., Toronto,**

**Hon. G. W. Allan, Commissioner. | Alfred Willson, Commissioner.**

The company issues, and is prepared to issue, licenses to prospect, or to work, the minerals over a large area of land in Eastern Ontario.

Application may be made either to the Commissioners, or to Andrew Bell, C. E., D.L.S., Almonte, Ont., *Mining Inspector.*

## CANADIAN GRANITE CO.

Incorporated 23rd February, 1885. Capital, $50,000, fully subscribed and paid up.

**Directors:**

A. Maclean, *Managing Director*, Ottawa.
J. C. Roger, Ottawa. | Macleod Stewart, Ottawa.

**Head Office: Ottawa, Ont.**

Formed to carry on the trade or business of carriers by water of granite and other freights from, to and within Canada; to work, quarry, raise, make merchantable, sell and produce granite, etc.

The company's granite quarry is situated on the east cove of Kingston Harbor. The stone obtained varies somewhat in character, sometimes having a gneissic structure, but elsewhere being quite massive. The color is generally some tint of red with grey wavy marking. It is claimed to be peculiarly adapted for decorative purposes, and is much in demand for buildings and monuments. Large quantities of paving blocks are now being prepared at the quarry. In 1885 the company established works in the city of Ottawa. These are located on the basin of the Rideau canal, which affords easy and cheap transport by water to the Kingston quarry. The mill has been fitted up with all the most improved machinery, including a granite turning lathe capable of turning columns, etc., up to a diameter of 3 ft. and length of 20 ft.; two large double polishing lathes; one marble turning lathe; two granite polishing jennies; one vertical polishing machine; double pendulum polishing machine; large granite polishing machine with carriage, with a surface capacity of about 84 superficial feet; one basin hole cutter and boring machine; Shortsleeve's patent gang saw, capable of sawing blocks 11 ft. long by 9 ft. wide, fed by one of Shortsleeve's automatic sand feed machines; rubbing bed 11 ft. in diameter with marble machine; Shortsleeve's new patent marble-moulding and counter-sinking machines, etc. The company also owns and operates a marble quarry at Renfrew, Ont. Estimated value of machinery, plant at quarries and works, $30,000. Average men employed, 30.

*Manager:* J. C. Roger, Ottawa.

*Quarrymaster:* Wm. Davey, Kingston. | *Foreman of Works:* M. Shields, Ottawa.

## CHANDOS MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $199,000, in shares of $100.

**Directors:**

J. A. Handway, New York. | J. Robinson, Montreal. | R. H. Green, Toronto.
James Pearson, Toronto.

**Head Office: Toronto, Ont.**

Formed to carry on mining in the Province of Ontario. No report.

## CINNABAR MINING COMPANY OF BRITISH COLUMBIA, Ltd.

Incorporated 10th July, 1895. Capital, $100,000.

**Directors:**

A. G. Ferguson. | R. G. Tatlow. | F. C. Innes.

**Head Office: C. C. Bennett, Secretary, Vancouver, B.C.**

The company owns five claims on the north shore of Kamloops lake, Province of British Columbia, at a point about five miles north-east of Savonas, on the main line of the Canadian Pacific Railway. Mining for cinnabar was begun in July, 1895, a force of 25 persons being employed. The high grade ore is reported to contain from 15 to 25 per cent. quicksilver. Equipped with two retorts and fittings complete, capable of reducing about two tons of high grade ore per day. Output at date of report, 100 flasks of quicksilver.

## CLIFF GOLD MINE.

**Owners:**

S. M. Wharton. | G. C. Wharton. | J. R. Cook. | E. T. Late.

**Head Office: Trail, B.C.**

This mine is located in the Trail district, Province of British Columbia. Two tunnels show large ore bodies. The lower, or No. 1 drift, runs 210 ft. in solid ore; cross-cuts show the ore body to be 15 ft. wide. Tunnel No. 2 runs for a distance of 170 ft. in a chute of ore. Two shafts, 20 and 33 ft. deep, respectively, are in solid ore. Two veins, varying in width from 4 to 16 ft., can be traced the full length of the claim. The ore is described as a rich chalcopyrite. Fifteen carloads have been sent to the smelter. The average of the smelter returns was: gold, $35; silver 5 oz.; copper, 15 per cent. to the ton. The copper returns are the highest obtained so far in the camp. No stoping has been done. A seven drill compressor has been purchased and will soon be in operation.

## COLERAINE MINING CO., Ltd.

Incorporated 20th November, 1891. Authorized Capital, $120,000 in 1,200 shares of $100 each

**Directors:**

Hon. J. A. Chapleau.
Hon. A. Desjardins. | A. L. DeMartigny.
Hon. A. Lacoste.

**Head Office: Hon. A. Desjardins, Managing Director, Montreal.**

Formed for the purpose of buying, selling, dealing in, and working mines and minerals, etc. The company owns a large block of asbestos chromic iron, and other mineral lands in the Township of Coleraine, in the Province of Quebec, a portion of which are being worked on royalty.

## COMMANDER AND WORLD GOLD MINES.

**Owners:**

D. O'Neil. | Wm. Lynch. | W. D. McFadden.

**Mines Office: Trail, B.C.**

These claims, now being developed, are located in the Trail mining district, Province of British Columbia. On the Commander there is 200 ft. of surface cross-cutting and a 55 ft. shaft. Over 6 ft. of ore, but walls are not yet found. On the World, a 22 ft. shaft. Shipments to smelter of test lots of 400 and 500 lbs. yielded $4.00 to $40.00 gold, and 5 to 33 per cent. of copper. There are about 60 tons on the dump.

## CREDIT FORKS MINING AND MANUFACTURING CO., Ltd.

Incorporated 1896. Authorized Capital, $200,000, in shares of $100.

**Directors:**

R. Carroll. | J. B. Vick. | J. H. McKnight. | F. J. Beharriell.

**Head Office: Toronto, Ont.**
**Works: Credit Forks, Ont.**

Formed to purchase and acquire the business and assets of the firm of Carroll & Vick, quarrymen, limeburners and contractors; to purchase, manufacture, sell and deal generally in lime, cement, brick, terra cotta, etc.; to mine, quarry and generally deal in stone of all kinds, at the Credit Forks, in the Province of Ontario. office at Toronto, Ont.

## CROWN PRESSED BRICK CO., Ltd.

Incorporated 1894, with an authorized capital of $100,000.

**Directors:**

H. L. Corbett. | G. W. McCullough. | H. H. Williams. | G. J. Butterworth.
J. G. Butterworth. | M. S. McCullough.

**Head Office: G. W. McCullough, Ottawa, Ont.**

Formed to manufacture brick, terra cotta, tiles, drain pipe and other building materials,

## DELTA MINING AND DEVELOPING CO., Ltd.

Incorporated 1895. Authorized Capital, $100,000.

**Directors :**

John Clark. | A. C. McArthur. | J. W. Jackson.

**Head Office: Vancouver, B.C.**

Formed to acquire and work mineral claims on Lulu Island, B.C., and recorded as "The Setting Sun," "The Diablo," and "The Valkyrie." Being organized.

## DOMINION DEVELOPING AND MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $500,000.

**Directors :**

G. L. Milne, Victoria, B.C.
John McQuinlan, John J. Banfield, Jonathan Miller and J. P. Carroll, all of Vancouver, B. C.

**Head Office: Vancouver, B.C.**

Formed to carry on mining in British Columbia. Being organized at date of report.

## DOMINION LIME CO.

Incorporated 1889. Authorized Capital, $400,000, in shares of a value of $100 each, the whole of which has been subscribed and fully paid.

**Directors :**

Hon. Frank Jones, Portsmouth, N.H., *President.*

Hon. J. G. Robertson, Sherbrooke, Que.
Hon. W. B. Ives, M.P., " "
F. P. Buck, Sherbrooke, Que.
T. J. Tuck, " "
R. H. Pope, M.P., Cookshire, Que.
Chas. A. Sinclair, Boston, Mass.
Chas. B. Gafney, Boston, Mass.
Geo. Van Dyke, Lancaster, N.H.

**Head Office: Sherbrooke, Que., F. P. Buck, Managing Director and Treasurer. J. R. Woodward, Secretary.**

This company owns some 2,000 acres of land in the Township of Dudswell, in the Eastern Townships of the Province of Quebec, and carries on the business of producers of lime, lumber, etc. The company's quarries are situated in the Township of Dudswell, at Lime Ridge on the line of the Maine Central Railway, and yield an annual production of 42,000 tons of lime. The limestone is obtained from large ledges of a dark or greyish rock, in places crystalline, which, in the upper quarry presents a nearly vertical face of 90 ft. This is situate in close proximity to the kilns, of which there are ten in all, six in the upper or older works, and four in the lower and newer

works, about half a mile distant. Each of these kilns is said to have a daily capacity of 300 barrels of lime. The lime manufactured is remarkable for its purity, the foreign matter in the rock averaging not more than one or two per cent.

The company also turns out yearly some 2,000,000 feet of lumber and 40,000 barrels from its cooperage. Estimated value of machinery, plant and buildings, $300,000. One hundred and twenty-five men and boys employed.

*Superintendents :* J. H. Barker and O. C. Bickford, Dudswell, Que.

## DON VALLEY PRESSED BRICK WORKS.

Capital invested, $160,000.

**Owning Partners :**

John F. Taylor. | Geo. A. Taylor. | Wm. T. Taylor.

**Head Office : W. F. Tasker, Manager, 60 Adelaide Street, Toronto.**

Own 1,150 acres on lots 13, 14 and 15 in the 2nd, 3rd and 4th Concessions, Township of York, Province of Ontario. Quarries and works are situated directly on the lines of the Grand Trunk and Canadian Pacific Railways. Experiments made with the clays of the locality resulted in showing that pressed brick of superior quality could be produced from the shale of the Hudson river formation which outcrops at the base of the bank at several points along the river Don, and early in 1891 the company started to erect works and fit them with plant of the best and most modern description. This consists of two power presses having a capacity of moulding 30,000 bricks daily, one with a capacity of 10,000, and a fourth of 4,000, or a total of 44,000 per day, together with grinding and screening machinery in which the clay is prepared for the presses. These machines are driven by two engines, one 175 h. p. and one 50 h. p.

Several buildings have been erected on the premises for burning the bricks, 23 kilns, which have an aggregate capacity of 1,750,000. The period of burning depends on the size of the kiln, and ranges from four or five days to three weeks. 175 men employed. Estimated value of machinery, plant and buildings, $160,000. Value of manufactured product in 1891, $24,000 ; in 1892, $50,000 ; 1893, estimated at about $120,000.

## EASTERN DEVELOPMENT CO., Ltd.

Incorporated 1883. Authorized Capital, $3,500,000, in shares of $10.00 ; issued, 152,215 ; amount called in per share, $6.60.

**Directors :**

Isaac P. Gragg, *President.*

Samuel K. Hamilton. | J. W. Green. | Jonathan Dorr.

**Head Office : Thomas Mair, 27 School Street, Boston, Mass.**

Company owns ten square miles of coal rights on Little River, Richmond County, Cape Breton, N.S. Main shaft 8 x 13 ft., down 200 ft., at which depth a crosscut connects the shaft with two seams of coal 156 ft. apart, which have a vertical dip of 82° at that depth ; the northerly seam is 5 ft. in width and the southerly seam 7 ft. About 10,000 tons of coal were mined and shipped under former owners. Sir William Dawson reported on the 5 ft. seam in 1868 as follows :

**EASTERN DEVELOPMENT CO.**—Continued.

| | |
|---|---|
| Volatile matter | 30.25 |
| Fixed carbon | 56.40 |
| Ash | 13.35 |
| | 100.00 |

"Compared with the coals of Pictou and Sydney, the Little river coal is more bituminous than either or contains more volatile matter and less fixed carbon. It contains about the same quantity of earthy matter with Pictou coal, but in quality and color the ash resembles that of Sydney. Practically, it will be found to be a serviceable coal for domestic fires, well adapted for smith's use and from the large quantity and high illuminating power of its gaseous matter probably a good gas coal. There should be little waste in its extraction and it will suffer little by being banked or kept in the open air."

In 1882, Charles Tennant Lee, chemist, of Boston, made following report on samples from the same seam :—

| | |
|---|---|
| Coke | 55.00 |
| Ash | 13.60 |
| Sulphur | 6 08 |
| Moisture | 0.86 |
| Volatile | 24.46 |
| | 100.00 |

"This is an excellent steam coal on account of its highly bituminous character, coking quality and freedom from moisture. It burns freely, giving a fine ash free from clinker."

Boring operations in 1894 cut the vein at depth of 380 ft.; at that depth the dip was still about 82°; at 1,000 ft. depth it is expected these seams will basin out. Company owns complete set of coal boring apparatus, and other machinery; also, 900 acres of land in fee simple.

## ELARTON SALT WORKS CO., Ltd.

Incorporated 2nd July, 1895. Authorized Capital, $10,000, divided into 100 shares of a value of $100 each.

*President:* C. V. Morris.

**Head Office: T. G. Morris, Sec.-Treas., Warwick West, Ont.**

This company owns and operates a property $7\frac{9}{10}$ acres in extent, and known as the north-east corner of the east half of Lot 6, in the 3rd Concession, Township of Warwick, Lambton County, Ontario. Depth of wells, 1,200 feet. Annual output about 1,000 tons. A small force of men employed.

## ENGLISH PORTLAND CEMENT CO.

Incorporated 15th January, 1890. Capital, £25,000, issued and paid.

**Directors :**

Richard Morris, J.P.

Sir Henry Bennett, J.P. | A. Lindsay Lister.
John Wightman. | Paul Ewens.

R. T. Hopper.

**Head Office: 15 Poultry Chambers, London, Eng.**

**CANADIAN OFFICE:**

**Messrs. R. T. Hopper & Co., Board of Trade Bdg., Montreal.**

Owns a property containing 200 acres at Marlbank in the County of Hastings, Ontario, and has erected a works for the manufacture of Portland cement. Fully equipped with plant for manufacturing by both wet and dry process. Capacity, 40,000 to 50,000 bbls. per annum.

## GEORGIA GOLD MINING CO., Ltd.

Incorporated 1896. Authorized Capital, $1,000,000.

**Directors:**

H. H. R. Chapman. | J. L. Warner. | Joshua Davis.

**Head Office: Trail, B.C.**

Formed to purchase the Georgia mineral claims in the West Kootenay district, Province of British Columbia.

## GEORGIAN BAY PORTLAND CEMENT CO., Ltd.

Incorporated 1894. Authorized Capital, $95,000.

**Directors:**

Wm. Taylor. | W. B. Harrison. | Wm. Masson.
A. E. L. Malone. | N. P. Horton. | A. J. Frost.
J. Lemon.

**Head Office: A. E. L. Malone, Secretary, Owen Sound, Ont.**
**N. P. Horton, Managing Director.**

Formed to manufacture Portland cement, bricks, drain and other tiles, etc. Not in operation at date of report.

## GIBSON STONE QUARRIES.

**Wm. Gibson, M.P., Owner, Beamsville, Ont.**

The property upon which these quarries are located contains 75 acres and is situate in the Township of Clinton, County of Lincoln, Province of Ontario. The quarries were opened by the present owner in 1884 and have been worked continuously since, an average number of 150 men being employed. They are one and a half miles from the village of Beamsville and three miles from the station of that name on the Grand Trunk Railway, being connected with a tram line. Equipped with six boilers (35 h. p., 24 h. p., three 18 h. p. and one 14 h. p.); four steam drills (three Ingersoll); five steam derricks, (Beatty) etc. The stone is all cut by hand, and is used largely for the construction of bridges, culverts, tunnels and buildings on the line of the Grand Trunk Railway.

## GOOD HOPE MINING AND MILLING CO., Ltd,

Incorporated 1895. Authorized Capital, $500,000, in shares of $100.

**Directors :**

F. Gusé, *President.*

E. L. Hooper. | G. Mackie. | P. Steep. | W. Townsend. | J. Maxwell.

**Head Office : Spokane, Wash.**

Formed to carry on mining in the Province of British Columbia. Being organized at date.

## GRIMSBY QUARRY CO., Ltd.

Incorporated 1891. Authorized Capital, $20,000, in shares of $100.

**Directors :**

S. Webster, Grimsby. | Frank L. Webster, Grimsby.
F. T. Webster, London.

**Head Office : F. L. Webster, Secretary, Grimsby, Ont.**

Formed to acquire, lease and sell lands for quarrying purposes in the County of Lincoln, working quarries, etc., in the Province of Ontario. The property owned by the company covers thirty-two acres, and is situate on lots 9 and 10 of North Grimsby. Shipments by rail and water. About 25 persons employed.

## HYNES TERRA COTTA AND BRICK CO., Ltd.

Incorporated 16th April, 1888. Capital, $200,000.

**Directors :**

Michael J. Hynes.

William J. Hynes. | George W. Banks.

**Head Office : H. W. Smith, Treasurer, Toronto.**

Greenhow Banks, *Secretary*, Toronto.

This company owns and operates 100 acres, containing a red clay deposit, situate in the County and Township of Toronto, Province of Ontario. It also manufactures terra cotta and brick in the city of Toronto. Twenty-five men employed. Estimated yearly turnout of a value of $25,000. Machinery plant valued at $12,000.

## JUMBO GOLD MINE.

**Owners:**

John A. Finch. | M. R. Galusha.

**Mines Office: Trail, B.C.**

This claim, now being developed, is located in Trail mining district, Province of British Columbia. At 4th of March, 1896, the tunnel had 22 ft. of ore in width with no hanging wall. From the tunnel to the surface there is 150 ft. of stoping ground. Another tunnel can be drifted giving 240 ft. of additional stoping ground, or a total of 400 ft., without shafts, hoists or pumps. The ore runs from $16 to $18 per ton and is steadily improving. There are 800 ft. of continuous croppings on the surface averaging 75 ft. wide.

## KAMLOOPS MINING AND DEVELOPMENT CO., Ltd.

Incorporated 1895. Authorized Capital, $30,000, in shares of $100.

**Directors:**

Harold E. Forster. | C. C. Woodhouse. | F. M. Wells. | H. Symons.

**Head Office: Kamloops, B.C.**

Formed to carry on mining in the Province of British Columbia.

## LA PRAIRIE PRESSED BRICK AND TERRA COTTA CO.

Registered 8th September, 1892. Authorized Capital, $150,000, in 1,500 shares of $100.

**Directors:**

Hugh Cameron, Toronto. | Dr. T. A. Brisson, La Prairie.
A. D. Taylor, Montreal. | Peter Lyall, Montreal.
J. W. Lister, Montreal.

**Head Office: Montreal, Que.**

Formed to manufacture bricks, tiles and all other articles made from clay or shale, etc. Works at La Prairie, Que. Estimated value of product in 1893, $20,000; 30 persons employed.

## LIGHTNING CREEK GOLD GRAVELS AND DRAINAGE CO., Ltd.

Incorporated 1896. Authorized Capital, $1,000,000.

**Directors:**

R. G. Tatlow. | W. D. Burdis. | Thomas Dunn.

**Head Office: R. G. Tatlow, Vancouver.**

Formed to acquire and work certain mining leases on Lightning Creek, Cariboo district, B.C.

## LILY MAY GOLD MINE.

J. F. Bowles. | James Raymond.

**Mines Office: Trail, B.C.**

This claim, now being opened up, is located in the Trail mining district, Province of British Columbia. The tunnel, about 50 ft. long, shows an ore body about 18 in. wide, assaying from 60 to 75 ounces in silver and $2 in gold. A shaft on this vein exposes more of the same character and value. The other shafts are on another vein. Assays up to $60 in gold have been obtained. There are indications of several ledges on the claim, and it is supposed that the largest ore body lies to the north of the work described. The owners intend to push development.

## MINERVA MINING AND MARBLE CO.

Benj. Raper, *President.*

Alfred Raper. | James Raper. | Elijah Priest, C.E.

**Head Office: (Drawer 2) Nanaimo, B.C.**

The company's property consists of 160 acres, containing a large deposit of black and white streaked marbles, also eight mineral claims, two 1,500 ft. x 600 ft., and four 1,500 ft. x 1,500 ft. Development work is being pushed forward, a small force being employed. The gold deposits are reported to be showing up highly satisfactorily, and a mill may be erected in 1896.

## MILNE, COUTTS & CO., Ltd.

Incorporated 1896. Authorized Capital, $25,000, fully subscribed.

**Directors:**

Alex. Milne. | Wm. Coutts. | Chas. Johnson, Jr.

**Head Office: St. George, N.B.**

Formed to carry on the business of quarrymen in the Province of New Brunswick. The land owned by the company is in area about sixteen hundred acres.

The quarries (now in active operation) are situated about three miles from the town. Easy access to them is obtained by the turnpike road, which passes directly in front of the western quarries, and connects with a road leading to the other quarries. In addition to the road there is a navigable river (Maguadavie), within an eighth of a mile of the western quarry, which is also the outlet for the waters of the lake. The main portion of the company's property borders the lake.

On the north bank of the river, and adjacent to the road, the company has built a wharf with the necessary derricks, etc., from which the granite for the works at the town is loaded in boats constructed for the purpose, towed down the river to the dock at the company's works.

The works are situated a short distance from the main street of the town on the eastern bank of the river, immediately over the falls (from which is derived the motive power), and cover an area of over an acre. The workshops form a quadrangle, divided into sections as follows: 1st, the polishing shop; 2nd, the granite cutting shop; 3rd,

blacksmith, machine and pattern shops; 4th, offices, etc. The inner area of the quadrangle is covered by a large "traveller," that is used for carrying the granite from the cutting to the polishing shop, and for loading and unloading the granite as it arrives from the quarries and when completed for shipment.

The workshops are 30 ft in height (one storey). The polishing shop has shafting extending through its entire length, supported by transverse beams upheld by 18 in. square posts, sunk 8 ft. in the ground, resting on granite blocks.

The machinery was imported from Scotland, and has all the late improvements; it consists of six Jenny Lind polishing machines, column cutter for circular work, four pendulums, one boring machine, four lathes, etc. In addition to these machines, the company has contracted to duplicate all of them and extend the shops to receive them. The present machinery will polish over 200 superficial feet per day, exclusive of mouldings.

The motive power is derived from the adjacent falls, the shafting extending from the shops to a flume built from the lower level of the falls to level of river, and is 10 ft. square by 30 ft. deep. The water is conveyed to the flume by a penstock, a Leffell turbine wheel (48 in. diameter), at the bottom of the flume, giving a motive power equal to 200 horses, sufficient to drive four times the quantity (at present employed) of machinery, and can be used night and day thoughout the entire year.

The business done in 1890 amonnted to $34,000; 1891, $32,000; 1892, $33,000; 1893, $35,000, and in 1894, $37,000. 60 to 70 persons employed.

## MILTON PRESSED BRICK AND SEWER PIPE CO., Ltd.

Incorporated 7th January, 1891. Authorized Capital Stock, $50,000, divided into fifty shares of $1,000 each.

**Directors:**

E. Harvey, *President*, Guelph.
Dr. David Robertson, Milton. | William Booth.
Walter Macdonald, Toronto. | J. S. McCannell, Milton.

**Head Office: J. S. McCannell, Managing Director, Milton, Ont.**

Clay beds and works are situated on the main line of the Canadian Pacific Railway, near Milton, in the County of Halton, Province of Ontario. 25 persons employed. The machinery is in a large brick building 40 x 50, and the four kilns, with a capacity of over 700,000 brick, are enclosed in a shed 50 x 260. The brick press has a capacity of 20,000 brick in 10 hours. On the fancy press all kinds of ornamental brick are made. On the property there is a large quarry of fine freestone, near to the siding; also an abundance of limestone. Machinery, plant and buildings estimated at $50,000.

## MOIR GRANITE CO.

Incorporated 1891. Authorized Capital, $100,000, in shares of $25.

**Directors:**

D. W. Moir, Stanstead, Que.
G. H. House, Beebe Plain, Que. | D. W. Davis, Derby Line, Vt.
S. Stevens, Stanstead Plain, Que. | John T. Foster, Derby Line, Vt.

**Head Office: George H. House, Secretary-Treasurer, Beebe Plain, P.Q.**

**MOIR GRANITE CO.**—Continued.

Formed for the purpose of quarrying and dealing in granite and other stone, etc. The company's property at date contains 200 acres on lot 1 in the 4th range, and 80 acres (on lots 3, 4 and 5) in the 5th range of Stanstead, Que. 30 to 40 men employed. Quarries situate 2½ miles from Beebe Plain and Stanstead Junction, on the line of the Boston and Maine Railway.

Seventy persons employed. At date a branch line is being constructed to connect the quarries with the B. & M. Ry. Machinery equipment comprises two 50 h.p. boilers, Rand steam drills, eight derricks, six steam polishing machines, one turning lathe, etc.

*Superintendent :* David W. Moir, Beebe Plain, Que.

## MONCTON FREESTONE CO., Ltd.

Incorporated 1892. Authorized Capital, $10,000, of which $5,000 had been subscribed at date of last returns.

**Directors :**

Theo. B. Leblanc, Moncton, N.B.
T. Fitzsimmons, Moncton, N.B. | R. A. Borden, Moncton, N.B.
Matthew Lodge, " " | Philip D. Bourque, Moncton, N.B.

**Head Office : Moncton, N.B.**

Formed to quarry, manufacture and deal in stone and freestone. Quarry to be operated by company is situated at Notre Dame, in Kent County, N.B. ; being equipped with a working plant at last report.

## MONTREAL AND BRITISH COLUMBIA PROSPECTING AND PROMOTING CO., Ltd.

Registered 1894. Authorized Capital, $20,000, in shares of $5.

**Directors :**

F. C. Innes, *President.* | S. O. Richards, *Vice-President.*
J. M. Browning.

**Head Office : C. C. Bennett, Secretary, Vancouver, B.C.**

Being organized to operate in British Columbia. The company has several claims in Cariboo and Kootenay districts, on which development is now being done.

## MONTREAL QUARRY CO., Ltd.

Being organized 1895. Authorized Capital, $200,000, in shares of $100.

**Directors :**

Ald. Peter Lyall. | P. A. Peterson. | W. G. McCaskill. | W. G. Reid.
George McDougall.

**Head Office : George McDougall, 75 Osborne St., Montreal.**

Formed to acquire for $152,000 certain quarry properties in St. Denis Ward, Montreal, and to carry on the business of quarrying and selling stone. The quarries are fully opened up, having a working face of 2,000 feet, and are well equipped with the requisite plant for working purposes.

## MOUNT ADAMS MINING CO.

Incorporated 1896. Authorized Capital, $150,000.

**Trustees :**

Capt. R. C. Adams. | R. B. Kerr. | W. C. Adams.

**Directors :**

Peter Lyall. | A. W. Stetson. | J. C. Haynes.

**Head Office : Walter C. Adams, Sandon, B.C.**

Formed to acquire and work the Mount Adams group of claims, comprising the "Mammon," "Chamblet," "Slater," "Bretomarte" and "Midnight," situated on Mount Adams in the Slocan district, Province of British Columbia. The property is seven miles from the town of Three Forks and three miles from the town of Sandon. Dr. R. A. Penrose, Jr., the Chicago well known authority, who inspected the property last year, writes :—

"The ore consists of silver-bearing galena, varying from 50 to 130 ozs. per ton in silver, and from 50 to 80 per cent. lead. So far as the assays at present in hand go, it is probable that the pure ore will average 100 ozs. or more of silver per ton, and about 70 per cent. lead. These estimates, however, are derived from only three samples taken by myself. A large number of samples taken by your son, Walter C. Adams, are now on the road, and when assayed will give a much closer average of the value of the ore than the few now available.

An ore of the quality mentioned is of extremely high grade, and is one very much sought after by smelters, so that it always finds a ready market.

Its value would average approximately $100.00 per ton, and if future explorations show it to be in large quantities, a net profit of $50.00 a ton or more should be made over rnd above all costs of mining, hauling, freight, duty into the United States, and smelter charges.

Much of this ore could be shipped direct to the smelter without previous concentration, but in mining such ore, a large amount of lower grade ore would be produced, which could be concentrated and then shipped.

The ore occurs in veins intersecting a series of interbedded slates, limestones and quartzites, and occupying well-defined fissures dipping steeply and traceable on the surface for very considerable distances. The main vein has been opened on the south side of Mt. Adams on the Chamblet claim, and has been traced thence over the summit and down the north slope, through the Slater, Britomarte, and on to the Midnight claim—a distance of about a thousand feet. More or less ore is found throughout this outcrop, and in some places it is several feet in thickness. Frequently the ground along the outcrop of the vein is honeycombed by interlacing seams and irregular bodies of ore ; and in a number of places branch veins, varying from a few inches to a foot or more in thickness, radiate from the main vein, and could be made a profitable source of ore aside from the main vein.

The main vein and same of the branch veins have been thoroughly prospected on the surface throughout the property, though but little underground work has been done. The largest underground work is a tunnel about 200 ft. long, on the Chamblet claim, run in on the main vein. Ore was not found here until the tunnel had entered the hill for about 150 ft., when it appeared and gradually increased in thickness to the end of the tunnel, where it now measures between one and two feet in thickness. Besides this tunnel, several other smaller tunnels and cuts have been made, most of which show promising outcrops of ore."

## NANAIMO-ROSSLAND MINING CO, Ltd.

Incorporated 1895. Authorized Capital, $500,000.

**Directors:**

C. U. Westwood, Nanaimo, B.C. | Jas. McGregor, Nanaimo, B.C.
A. Jenkins, Nanaimo. | W. K. Leighton, Nanaimo, B.C.
Thos. Kitchin, Nanaimo, B.C.

**Head Office: Nanaimo, B.C.**

Formed to carry on mining in British Columbia. Being organized at date of report.

## NAPANEE CEMENT WORKS, Ltd.

Capital, $20,000.

**Directors:**

E. W. Rathbun. | F. S. Rathbun. | E. Walter Rathbun. | H. B. Rathbun.
C. A. Millener.

**Head Office: F. S. Rathbun, Secretary, Deseronto, Ont.**

The company owns a property containing 200 acres and operates cement works thereon, situate at Napanee Mill, a station on the line of the Bay of Quinte Railway. The capacity of the works is 200 bbls. of native cement, 160 bbls. Portland cement; cooperage, 300 bbls. per day. Since our last report two new Deitsch continuous burning kilns have been put up. 75 persons are employed. Three kilns have been erected for Portland and three for natural rock cement.

## NELSON ISLAND GRANITE CO., Ltd.

Incorporated 16th October, 1889. Authorized Capital, $30,000, divided into thirty shares of a value of $1,000.

**Directors:**

E. J. Thain. | James C. Prevost. | Robt. L. Fox.

**Head Office: Edward J. Thain, Secretary, P. O. Box 654, Victoria, B.C.**

Formed to acquire and work the Nelson Island granite quarry. Property contains 320 acres, and is siuate on Nelson Island, Province of British Columbia. Twenty to thirty men employed,

## NEW ROCKLAND SLATE CO.

Capital, $150,000, fully subscribed and paid up.

**Directors:**

Hon. G. A. Drummond, *President.*
James Ferrier. | F. R. Redpath.
Sutherland Stayner. | A. Dunbar Taylor.

**Head Office: T. P. Bacon, Secretary-Treasurer, 377 St. Paul Street, Montreal.**

This company owns lots 21, 22, 23 of the 4th range of Melbourne, and operates the large slate quarry situate (lot 23) at New Rockland in the Province of Quebec. Two hundred men employed. Average yearly production, about 6,500 tons. The manufactures include roofing slates, billiard table tops, mantels, wash tubs, hearthstones, tiles, etc. Quarries and works, equipped with an excellent plant, with first-class water power from the Salmon river, transmitted to the works by cable, and an outfit of travelling derricks, etc. The quarry has at present a depth of over 200 ft., and is connected with the main line of the Grand Trunk Railway, 4 miles distant, by a narrow gauge railway, by which a great saving in the cost of transportaion is effected.

*Quarrymaster:* Thos. Torrance, New Rockland P. O., Que.

## NICKEL PLATE MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $500,000, in shares of $1.00.

**Mines Office: Wm. Fitzwilliam, Superintendent, Trail, B.C.**

Formed to acquire and work the Nickel Plate and other gold claims in the Province of British Columbia. A shaft has been sunk and, at the 100 ft. level, drifts have been run along the vein in both directions and a cross-cut, after passing through several small seams of good grade ore, has at last tapped a 6 ft. ledge. On this vein drifts are being run both ways showing two pay streaks each about 20 inches wide, separated by comparatively barren ledge matter. Several average samples have gone as high as $275.00 to the ton in gold. The drifts on the main vein show good bodies of solid ore, averaging from $80 to $100 per ton in gold. About 150 tons of shipping ore are on the dump. A steam hoist and a sinking pump are used.

## NORTHUMBERLAND STONE CO., Ltd.

Incorporated 1895. Authorized Capital, $10,000.

**Directors:**

James Frier. | B. B. Tweed. | W. C. Milner.
N. LeBlanc. | Foster Packard.

**Head Office: Shediac, Westmoreland County, N.B.**

Formed to carry on the business of quarrymen in the Province of New Brunswick.

## O. K. MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $1,000,000.

**Head Office: 509 Traders' Block, Spokane, Wash.**

**Mines Office: J. L. Warner, Manager, Trail, B.C.**

Formed to acquire and work the O. K. mine in the Trail district. Province of British Columbia. The development work at the end of January, 1896, was about 1,000 ft., summarized as follows: Level No. 11, 70 ft. drift, ore 3 ft., average width of vein 5 ft. Level No. 12, 400 ft. drift, ore 4 ft., average width of vein 7 ft. The first stope presents 300 ft. of continuous ore, the winze and cross-cut 60 ft. Level No. 13, cross-cut tunnel 275 ft., stoping distance between Nos. 12 and 13, 80 ft. The extension of level No. 12 to the boundary of the O. K. ground will give a stoping height of 1,000 ft. Beside native gold, both metallic silver and copper occur. The stopes of No. 12 level have been described as follows: The ledge has widened out to 7 or 8 ft. with solid ore between the two well defined walls. Quite a large chamber has been opened out by the stopers and the entire roof and one side are bedecked with quartz carrying many beautiful colors. The metals carried in this quartz are native gold, native silver, native copper, both shot and flake, galena, arseno-pyrite, bornite or peacock copper and chalco-pyrite, with the alteration products of malachite or green copper carbonate, azurite or blue copper carbonite, black copper oxide, with here and there bunches of crystalized azurite. Mineralogists and mining men can easily understand what a dazzling array this would make. A small stamp mill has heretofore extracted the free gold. A portion of the ore is concentrated and a portion of it, in the form of pure iron sulphide, is shipped to the smelter. The yield from the stamp mill is $20.00 per ton in free gold. The concentrates run all the way from $50.00 to $250 per ton. A new 10 stamp mill is being placed in position which will treat about 25 tons of ore every 25 hours.

## OLD IRONSIDES MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $1,000,000.

**Directors:**

S. A. Rigg. | C. W. Ritchie. | J. P. Greaves. | H. P. Palmerston.
R. E. Strathearn.

**Head Office: Midway, Boundary Creek, B.C.**

Formed to operate mineral claims at Boundary Creek, B.C. Being organized.

## ONEIDA QUARRY CO., Ltd.

Incorporated 1892. Authorized Capital, $50,000, in 500 shares of $100, of which at 1st November, 1893, $24,900 had been issued and taken.

**Directors:**

George H. Wilkes, *President.*

A. D. Hardy. | W. Bowman. | Frank Wilson.
C. De Cew. | W. R. Hobbs. | W. E. Winskell.
C. A. Birge.

**Head Office: A. D. Hardy, Secretary, Brantford, Ont,**

Formed to acquire and work stone quarries in the Province of Ontario. Owns what was formerly known as the De Cew quarries in the Township of Oneida, County Haldimand. The product is sandstone, limestone, lime and marble. Quarries located 1¼ miles from Nelles Corners, on the Air Line of the Grand Trunk Railway, with which they are connected by tramway. Operated under lease of Mr. J. R. McIntosh, Nelles Corners, Ont. Small force employed in 1894.

## ONTARIO PEAT FUEL CO., Ltd.

Incorporated 1892. Authorized Capital, $300,000, in shares of $100.

**Directors:**

A. A. Dickson, *President.*

A. Jardine. | W. B. Bayley. | Hon. R. M. Wells.
W. A. Allan. | George H. Perley. | J. R. Silliman.

**Head Office: J. R. Silliman, Sec'y Treasurer, Room 29, Bank of Commerce Building, Toronto.**

This company has purchased the right to take and remove all the peat, clay, earth and other material from 5,000 acres of peat land in the County of Welland, paying therefor the sum of $1,580 per annum for fifteen years and thereafter a rental of 25 cents per ton. Peat moss covers the whole area to a depth of about two feet and the company has already cut from an area of about 3 acres, something like 2,000 tons. This moss litter is of a very superior quality for stable bedding, and we understand a contract has been made with an American firm to purchase not less than 1,000 tons for the first year and to increase the purchase thereafter by not less than 5,000.

## OTTERVILLE BRICK AND TILE MAUFACTURING CO., Ltd.

Incorporated 11th April, 1894. Authorized Capital, $15,000, in shares of $25.

**Directors:**

A. B. Moore. | C. B. Purves. | J. Wyatt. | S. Smiley. | T. J. Pennington and Robert Paxton.

**Head Office: Otterville, Oxford County, Ont.**

## OWEN SOUND PORTLAND CEMENT CO., Ltd.

Authorized Capital, $100,000, in 200 shares of a value of $500, of which at date $88,000 have been taken.

**Directors:**

H. B. Harrison, *President.*

John Lucas. | Wm. Manders. | John Corbet.
R. P. Butchart. | S. Loyd. | W. H. Pearson.

**OWEN SOUND PORTLAND CEMENT CO.**—Continued.

**Head Office: John Corbet, Secretary, Owen Sound, Ont.**

This company, originally known as the North American Chemical, Mining and Manufacturing Company, was organized in 1889. The deposit of clay owned by the company extends over an area of 500 acres and is known as Shallow Lake, in Keppel Township, County of Grey, Ontario, occupying lots 6, 7, 8 and part of 9 in the 7th Concession. The bed of the lake is covered with shell marl to depths ranging from one to six feet, the average being about four feet. Underlying the marl is a bed of clay two feet in depth, which by experiment has proven to make a strong Portland cement when mixed with the marl in definite proportions. The marl and clay used in the manufacture of cement are taken out during the dry season and carted to the works. The main building of the works is constructed of rubble stone, 270 feet by 40 feet, and was erected in 1889. They are 9 miles from Owen Sound and 2½ miles from Parkhead Station on the Grand Trunk Railway. The wet process was first adopted in the manufacture of cement, the mixture being burnt in a Ransome cylinder, but it did not prove satisfactory. Operations were also delayed for some time on account of litigation between the company and the owner of the location, and when matters were finally settled it was decided to remodel the works according to the English system. For this purpose the manager of the company, Mr. Butchart, visited England and spent some time in examining a number of the best works there. He secured the services of three experienced men to have direction of the works, and after his return the improvements were commenced and carried on to completion. Kilns have been substituted for the cylinder, a new mixing machine has been constructed and an engine of 250 h. p. has been put in to drive all the machinery of the works except that used in the manufacture of heading and staves for barrels. 40 persons employed.

R. P. Butchart, *Manager*, Shallow Lake, Ont.

## OWEN SOUND STONE CO.

Incorporated March, 1888. Authorized Capital, $30,000, in shares of $100.

**Directors:**

S. T. Parker, *President.*

George Inglis. | P. W. Sabiston.
W. B. Stephens. | Jas. Douglas.

**Head Office: W. B. Stephens, Secretary, Owen Sound, Ont.**

This company owns and operates sandstone quarries at Owen Sound, Orangeville and Inglewood, and also in the Township of Mono, County Dufferin, and Township of Caledon, County of Peel, Province of Ontario, all favorably situated for shipment. Output in 1893, about 200 cars; 30 persons employed; estimated value of machinery, plant and buildings, $10,000.

P. W. Sabiston, *Manager*, Orangeville, Ont.

## PROSPECTING SYNDICATE OF BRITISH COLUMBIA.

Incorporated 1895. Authorized Capital, £10,000 stg., in shares of £1.

**Directors:**

Edward Mahon. | J. W. McFarland. | Gilbert Mahon.

**Head Office: G. G. Scott, Secretary, 519 Hastings St., Vancouver, B.C.**

Formed for the purpose of acquiring gold and other mineral properties in that Province. The functions of this company will be not only the acquiring of suitable properties, but the working up of connections with the London market for their disposition. Quoting from the prospectus, we learn: "There will be no charge for promotion money, underwriting, commissions or brokerage in connection with the formation of a company, except a sum of £100, being actual cash out of pocket for lawyers' fees, expenses incurred in England and British Columbia, including registration, and a small commission in case any shares are placed through English brokers, which commission will be payable to them."

## QUADRA MINING AND MILLING CO., Ltd.

Incorporated 1896. Authorized Capital, $500,000.

**Directors:**

G. A. Kirk. | Thos. Shotbold. | John Bryden.

**Head Office: Victoria.**

Formed to acquire within the Alberni mining division, on Vancouver Island, the mineral claims known as the "Ophir" and "Last Chance." Being organized at date of report.

## QUEENSTON CEMENT QUARRIES.

Capital invested, $20,000.

**Owners:**

Messrs. Isaac Usher & Sons, Thorold, Ont.

The quarries are located on a property containing ten acres near the village of St. Davids, Township of Niagara, County of Lincoln, Province of Ontario. Sixteen men employed. Average yearly turnout estimated at 24,000 bbls.

The quarry was formerly worked for building stone, but a bed of cement rock underlying the blue limestone having been exposed by the removal of the latter it was found that a new industry could be profitably established. Tho cement bed varies in thickness from 2 ft. on the west to 6 ft. on the east side of the quarry, but the proportion of lime is too great in the upper part of it, so that care has to be taken to cull it out. Messrs. Usher & Sons are lessees of the quarry, but the works are carried on by Mr. Edwin Tyler, who manufactures for them at a fixed price per barrel. The plant is maintained by Usher & Sons and consists of two burning kilns and a mill of two run of stones to grind the rock. After being ground it is run through a cylindrical screen of rolled steel of 55 mesh for which Mr. Tyler has obtained a patent. This screen has a capacity of 150 barrels per day, but is run at 100 barrels. The kilns and grinding mill have a capacity of 600 barrels per day.

## RATHBUN COMPANY.

Incorporated by Dominion charter, 1883. Authorized Capital, $2,000,000, of which $1,500,000 has been subscribed and paid.

**Directors:**

F. S. Rathbun. | E. W. Rathbun. | H. B. Rathbun.

**Head Office: E. W. Rathbun, Managing Director, Deseronto, Ont.**

While extensively engaged in other lines of business, this company operates works for the manufacture of porous and ornamental terra cotta, pressed brick, drain tile and other products at Deseronto, Ont. Clay is furnished from the properties of the Napanee Cement Works, at Napanee, (a branch of the same company). Sixty persons employed. The average yearly output is estimated at: 5,000,000 pressed brick; 7,500 tons terra cotta; 250,000 drain tile.

## RICHMOND DEVELOPING AND MINING CO., Ltd.

Incorporated 1895. Authorized Capital, $120,000, in shares of $10.00.

**Directors:**

Alex. McLeod. | Chas. Barney. | John T. Errington.

**Head Office: Vancouver, B.C.**

Formed to adopt and carry into effect, with or without modification, an agreement dated the 29th October, 1895, between Alex. McLeod, Charles Barney, and John T. Errington, and to carry on mining in British Columbia.

## R. J. DOYLE MANUFACTURING CO. OF ONTARIO, Limited.

Incorporated 1892. Authorized Capital, $100,000, in 2,000 of $50 each.

**Directors:**

R. J. Doyle, *President.*

R. J. Doyle, Jr. | Robert A. Stark. | J. D. Morgan. | D. C. McDonald.

**Head Office: R. A. Stark, Secretary, Owen Sound, Ont.**

Operates certain clay silicate beds in the Township of Keppel, County of Gray, Ontario, and a works for the manufacture of cement and fire-proof paint, near Parkhead station, on the line of the Grand Trunk Railway. (For description of beds, see Owen Sound Portland Cement Co.)

## ROCHE PERCEE COAL CO., Ltd.

Incorporated 1896. Authorized Capital, $50,000, in shares of $100.

**Directors :**

H. E. Mitchell. | C. H. Cordingly. | T. G. Gilmour.
Clifford B. Deacon. | Robert Rogers.

**Head Office : Winnipeg, Man.**

Formed to carry on coal mining in the Province of Manitoba.

## ROSEDALE PRESSED BRICK AND TERRA COTTA CO., Ltd.

Incorporated 1892. Authorized Capital, $30,000, in 300 shares of $100 each.

**Directors :**

L. Hine.
W. P. Jennings, C.E. | D. C. Ridout.
Thos. Parker. | J. D. Edgar.

**Head Office : Thos. Parker, Managing Director, Toronto.**

No information as to operation obtainable at date of going to press.

## SAANICH LIME CO., Ltd.

Incorporated April, 1890. Capital, $50,000, in shares of $100 each.

**Trustees :**

Joseph Wriglesworth. | Wm. Fernie. | Peter C. Fernie.

**Head Office : J. Wriglesworth, Victoria, B.C.**

Formed to acquire by purchase, operate and carry on, and extend the lime kilns situate on Tod Creek and Highland district, now being carried on at the above named places, and the purchase of other lands on Vancouver Island, or in the Province of British Columbia. Capacity, 120 barrels per day, or 480 bushels. 20 persons employed.

## SARNIA SALT CO., Ltd.

Incorporated 28th July, 1892. Authorized Capital, $20,000, in 400 shares of $50 each.

**Directors:**

Harrison Corey, Petrolia.
Martin J. Woodward, Petrolia. | F. B. Wilkinson, M.B., Sarnia.

**Head Office: F. B. Wilkinson, M.B., Sarnia, Ont.**

Formed to acquire the plant, premises, business, stock in trade, credits and assets of every kind and description of the Sarnia Salt Co., and to carry on the business of the said company in the production and manufacture of salt and all other articles that may be made therefrom. Operates at Sarnia a well 1,600 feet at date.

## SAW BILL LAKE GOLD MINING CO., Ltd.

Incorporated 1896. Authorized Capital, $100,000, in shares of $1.00.

**Directors:**

John H. Tilden, Hamilton, Ont.

| | |
|---|---|
| Wm. Southam, Hamilton. | H. N. Kitson, Hamilton. |
| F. C. Bruce, " | H. Beckett, " |
| G. T. Marks, Port Arthur. | John Hoodless, " |
| H. A. Wiley, " | F. S. Wiley, Port Arthur. |

W. H. Plummer, Sault St. Marie.

**Head Office; F. S. Wiley, Managing Director, Port Arthur, Ont.**

Formed to acquire mining locations 313X and 314X, situate on Saw Bill lake, an arm of the Seine river, in the Rainy River district, Ontario, and for the further purpose of fully equipping the property with mining and milling machinery for its development. Being opened up at date of report.

## STANSTEAD GRANITE CO., Ltd.

Incorporated in 1893 by Dominion Charter. Authorized Capital, $100,000, in shares of $100.

**Directors:**

| | | |
|---|---|---|
| Hugh W. Elder. | C. H. Kathan. | Wm. Hanson. |
| Wm. Farwell. | D. W. Davis. | J. Brunet. |
| | H. P. Woodbury. | |

**Head Office: G. P. Butters, Secretary, Beebe Plain, Que.**

Formed to acquired and work granite or other quarries in Canada. Owns the quarrying rights over 200 acres in Stanstead County, Que., and are producers of rough, dimension and cut granite.

## TEMISCAMINGUE LITHOGRAPHIC MINING CO., Limited.

Incorporated 1896. Authorized Capital, $100,000, in shares of $100.

**Directors:**

Dr. R. P. Pattee. | Bernard Kelly. | John Mode. | Donald McLeod. | N. McCallum.

**Head Office: Vankleek Hill, Prescott County, Ont.**

Formed to acquire by grant, purchase, lease or other legal title, and to hold, alienate, sell, lease or exchange and develop or otherwise deal in mines or minerals in the Province of Ontario; and to quarry, mine, smelt, etc., or otherwise dispose of lithographic stone, gold and silver concentrates, gold and silver ores, and to purchase and sell ores, crude, refined or otherwise; to manufacture electricity, electric power and appliances, compressed air or other power, and to carry the same to the quarries, mines and works of the company. The operations of the company are to be carried on in the Township of Jarvis, in the District of Nipissing and elsewhere in the Province of Ontario.

## TENNYCAPE MANGANESE CO., Ltd.

Incorporated by an Act of the Legislature of Nova Scotia in January, 1894. Authorized Capital, $300,000.

**Directors:**

Duncan C. Fraser, M.P., New Glasgow, *President.*

W. A. French, Upper Musquodoboit, N.S | J. T. Burgess, Halifax, N.S.
George E. Boak, Halifax. | W. F. Jennison, Walton, N.S.

**Head Office: Windsor, Hants County, N.S.**

Formed to acquire and operate all the properties formerly owned by the Tennycape Manganese Co., and the Provincial Manganese Co. at Tennycape, Province of Nova Scotia. A small force working in 1894, but owing to depression in market the shipments during the year were only 100 tons of 2,000 lbs.

## TEXADA LIME CO.

Incorporated 9th July, 1889. Authorized Capital, $20,000, divided into 400 shares of a value of $50.

**Directors:**

Donald Menzies. | Thos. H. Lee. | D. J. Campbell.

**Head Office: Thos. H. Lee, Vancouver, B.C.**

Formed to erect and maintain kilns, wharves and store-houses on Texada Island; and to quarry limestone, and the making, composing, preparing, selling and disposing of lime and cement, etc. Property situate on the N.W. end of Texada Island, in the Province of British Columbia. The output in 1890 was 6,000 bbls.; in 1891, 9,000 bbls.; 1892, 12,000 bbls.; 1893, 11,000 bbls.; 1894, 4,000 bbls. An average force of twelve men employed. Estimated value of buildings, $5,000.

## TORONTO LIME CO., Ltd.

Incorporated 1885. Authorized Capital, $70,500, in shares of $100.

**Directors:**

Thos. Gowdy. | John Damp. | Fred. D. Brown.
George Farquhar. | John Moore. | William Bell.

**Head Office: W. L. Scott, Secretary, 118 Esplanade Street, Toronto.**

Owns and operates a property containing 58 acres at Limehouse township, county of Halton, Ontario. Small force employed. Equipped with machinery and buildings of an estimated value of $30,000.

## TORONTO PRESSED BRICK AND TERRA COTTA CO.

Incorporated 1888. Authorized Capital, $200,000.

**Directors:**

Huson Murray, Q.C., Toronto, *President.*

R. C. Dancy. | Hon. G. C. McLindsey. | H. N. Dancy. | A. C. Macdonell.
C. B. Murray.

**Head Office: E. W. Wyatt, Mgr., Room 12, Yonge Street Arcade, Toronto.**

This, the oldest company of its kind in Ontario, carries on operations near Milton, on the line of the Credit Valley Railway, Ontario. The company has an extensive plant, consisting of an engine and a boiler of 105 h. p. grinding and refining machinery, three power presses, five hand presses for fancy brick and tile, pug mills to prepare clay for terra cotta work, and seven kilns with a total capacity of 750,000. The average capacity of the presses is 30,000 per day of ten hours.

The product of the work is chiefly pressed brick, red, brown, buff and white in colors; but a specialty is also made of moulded and ornamental brick, terra cotta in pattern for walls and interior decorations, and tile for roofing, including in the latter finals, hips, valleys and angles. 60 men employed.

## VICTORIA GRANITE CO., Ltd.

Incorporated 1896. Authorized Capital, $5,000.

**Directors:**

Caleb C. Hennessey.
Stephen Conley. | O. F. Bogue. | J. R. O'Rrien. | J. H. Frauly.
H. F. McDougall.

**Head Office; St. George, Charlotte County, New Brunswick.**

Formed to carry on the business of quarrymen in the Province of New Brunswick. Being organized,

## VICTORIA TRIPOLITE CO., Ltd.

Incorporated 1896. Authorized Capital, $7,000.

**Directors:**

J. D. Copeland. | Frank T. LeMoine. | W. J. B. Bingham.

**Head Office: North Sydney, Cape Breton.**

Formed to mine tripolite in the Province of Nova Scotia. Being organized at date.

## WESTERN PROSPECTING & PROMOTING CO., Ltd.

Incorporated 1895. Authorized Capital, $100,000.

**Directors:**

R. E. Leonard. | T. H. Tracey. | George Geary. | A. A. Smith. E. C. Taylor.

**Head Office: Vancouver, B.C.**

Formed to carry on the business of mining in British Columbia.

## WESTMINSTER SLATE CO.

Incorporated 18th March, 1891. Authorized Capital, $100,000 in shares of $100 each. By its charter the company has power to increase the amount to $250,000. At date of report 5,500 shares were fully paid.

**Directors:**

H. E. Edmonds, *President.*

C. E. Woods. | John H. Webster.
A. G. Gamble. | H. Finnes Clinton.

**Head Office: A. G. Gamble, Secretary, 538 Columbia Street, New Westminster, B.C.**

The property of the company is situated on Deserted Bay, Jervis Inlet, B.C., and is distant from New Westminster about 100 miles; from Vancouver, 90 miles; from Victoria, 140 miles. It consists of (*a*) 340 acres of land under lease from the Superintendent of Indian affairs of the Dominion Government of Canada for 45 years, at a rental of $234.50 a year, with promise of extension to 99 years on the same terms, a lease for which is now under preparation; (*b*) a Crown grant of 144 acres from the Provincial Government of British Columbia adjoining the lease-hold property; (*c*) one undivided half of 240 acres on the north shore of the bay.

## WINDSOR SALT CO., Ltd.

Incorporated 1895. Authorized Capital, $200,000, in shares of $100.

**Directors:**

Sir William Van Horne, Montreal.
Thos. H. McGraw, Poughkeepsie, N.Y. | Thos. Craney, Bay City, Mich.
Ernest G. Henderson, Windsor, Ont. | Robert F. Sutherland, Windsor, Ont.

**Head Office: E. G. Henderson, Manager, Windsor, Ont.**

Owns and operates the Windsor salt works at Windsor, Ont. Two wells of a depth of 1,265 ft. Works opened June, 1894. Capacity, 800 bbls. per day; vacuum system, Craney's patent. Connected by siding with C. P. Ry. and located along the Detroit river with dock accommodation and shipping facilities to all lake ports. Forty-five persons employed.

## WOLF HILL MINES CO., Ltd.

Incorporated 1895. Authorized Capital, $100,000.

**Directors:**

James Dunsmuir. | Wm. Ralph. | T. Lubbe. | C. E. Pooley.

**Head Office: C. E. Pooley, Victoria, B.C.**

Formed to purchase certain mineral claims on Wolf Creek, in the district of Sooke, known as the "War Horse" and "Empress," for the sum of $25,000, to be paid for in fully paid shares of the company, and for carrying on the business of miners.

## OTHER MINING COMPANIES OF WHICH ONLY LIMITED INFORMATION HAS BEEN RECEIVED.

| Companies. | Head Office. | Authorized Capital. | Year of Formation and Place of Operation. |
|---|---|---|---|
| Abraham Lincoln Gold Min. & Mill. Co. | Boston | $ 1,000,000 | Formed in 1896. To mine at Gold River, Lunenburg Co., N.S. |
| Boundary Creek Mining Co | Spokane | 1,000,000 | Formed in 1895. To operate in Brit. Columbia |
| Caledonia Con. Mining Co | Spokane. | 500,000 | Formed in 1895. To operate in Brit. Columbia |
| Canadian Exploration Syndicate | London, Eng | £2,000 stg. | To operate in Canada. |
| Crown Point Mining and Milling Co | Spokane | $ 1,000,000 | Formed in 1895. To operate in Brit. Columbia |
| Dixie Mining and Milling Co | Spokane | 500,000 | Formed in 1895. To operate in Brit. Columbia |
| Eureka Con. Mining Co | Spokane | 500,000 | Formed in 1895. To operate in Brit. Columbia |
| Evening Star Mining Co | Spokane | 1,000,000 | Formed in 1895. To operate in Brit. Columbia |
| Finch Mining Co | Pittsburg, Pa | 6,000 | Formed in 1895. To operate in Brit. Columbia |
| Kootenai Mining and Milling Co | Spokane, Wash | 1,000,000 | Formed in 1895. To operate in Brit. Columbia |
| Ontario Miners' Development Co | 11 Quebec Bank Chambers, Toronto | 75,000 | Formed in 1896. To acquire mining properties in Ontario. |
| Rochester Gold Mining Co | Spokane | 500,000 | Formed in 1896. To operate in Brit. Columbia |
| Spokane Ore Co | Spokane | 5,000,000 | Organized in 1895. To operate in Brit. Columbia |

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| INDURATED FIBREWARE . | 800 Articles |
| WOODENWARE | 3,000 Pails and Tubs |
| WASHBOARDS . | 600 |
| PAPER . . . . . | 40 Tons |
| PAPER BAGS . . | 500,000 |

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| Alfred Powis, - - - | Hamilton, Ont. |
| J. A. Hendry, - - - | Kingston, Ont. |
| Schofield Bros., - - | St. John, N.B. |
| John Peters & Co. - | Halifax, N.S. |
| Tees & Persee, - - | Winnipeg, Man. |
| James Mitchell, - - | Victoria, B.C. |

PERMANENT AGENTS ARE NOT YET APPOINTED FOR

St. John, Newfoundland.
Sydney, Australia.
Melbourne, Australia.

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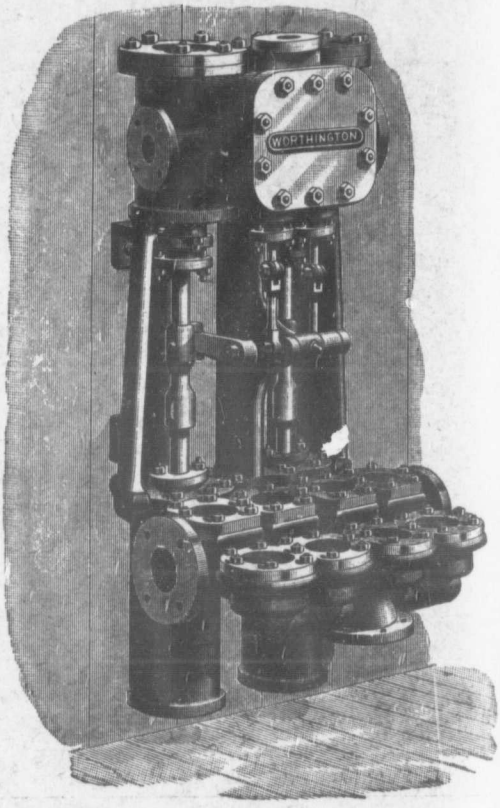


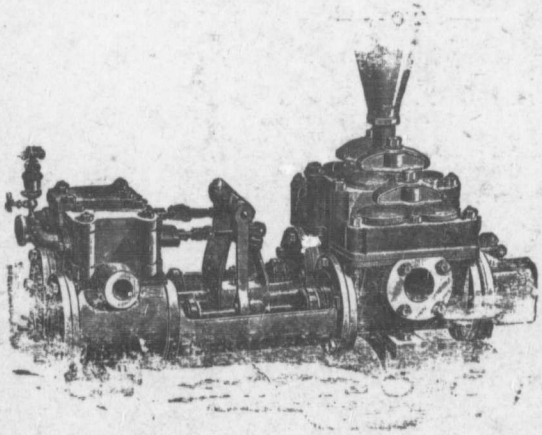

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