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# The Canadian Mining Review

Established 1882

Vol. VI.—No. 7.

1888.—OTTAWA, JULY—1888.

Vol. VI.—No. 7.

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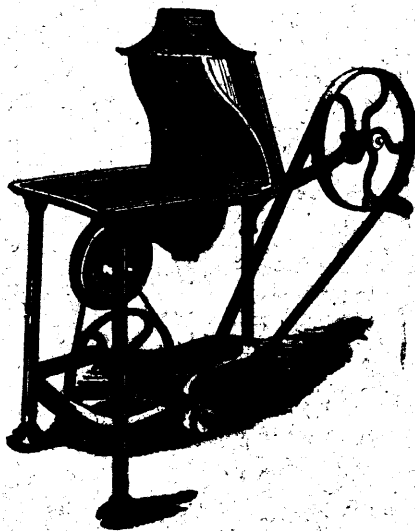
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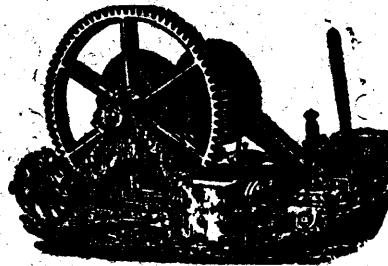
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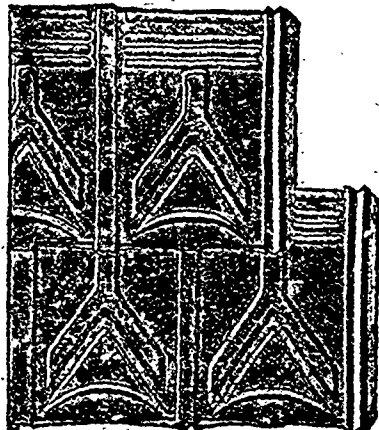
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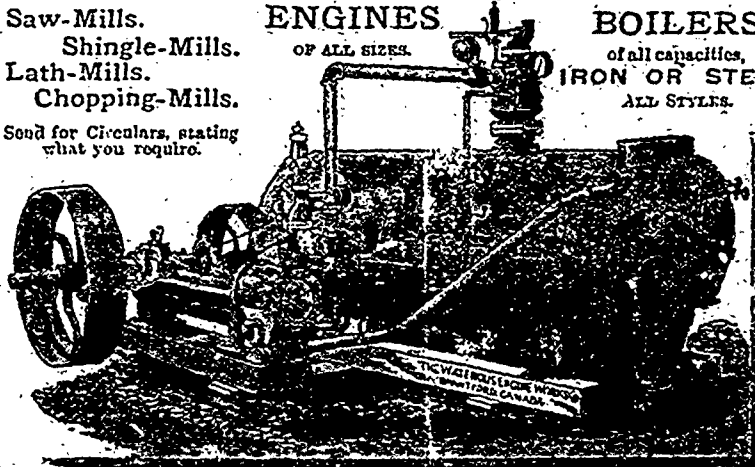
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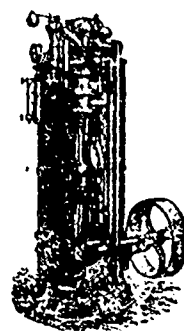
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Rubbing it in. How many years does this progressive and Liberal Government of Ontario intend to allow to pass before Fraser in Brockville, Hardy in Brantford, Mowat in England, and the Rosses going to the States or elsewhere, will learn what is transpiring in the Ontario mining country? How long a time is to be lost before this Government will issue the proclamation and open up the country to the poor man? From Sudbury, southwest along the Canadian Pacific, we have as rich a country in mining wealth as California. Instead of it being open to the inhabitants, it is reserved for capitalists and friends of the Government. Look at the names of those who are the owners in the township of Denison? Is there one working man on the list? Yet in California the discoverers received what they found. In Canada they only prospect other people's land. The law is good enough if the Government would put it in force, but they are either so neglectful or so ignorant that they do not know enough to proclaim it.—Empire.

The Recovery of Gold from Refractory Ores.—A new process for the recovery of gold from refractory ores has been patented by Mr J. H. Pollok, assistant to the Professor of Chemistry at the University of Glasgow. It is said to be cheaper than other processes, the comparison being that while by older processes the extraction is only 80 per cent., and the cost 20s per ton, by this process the cost is put at 6s 6d per ton and the extraction at 97 per cent. A great many experiments have been made in the Glasgow University, in the presence of Principal Caird, Sir William Thomson, Professor Ferguson, Dr. Stewart and others; and most favourable opinions have been expressed by scientific and practical men as to the value of the patent. In one experiment 9,000 grams of tailings were treated, and out of 330 grains of gold present 320 were extracted, the residue containing only 10. Samples of ore from New Zealand, South Africa, Queensland and Victoria have been successfully treated. Professor Ferguson writes that the process is specially applicable to "light" gold, is a rapid one, that the apparatus is of the simplest kind, and there is nothing about it to get out of order; that the cost of materials for the extraction runs from 4s 6d to 6s per ton; and that the gold is almost entirely extracted.

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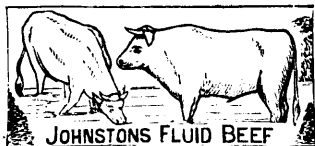
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THE SUBSCRIBER begs to inform those interested in Mining Properties that he is about to go to England, and will be glad to effect sales of any properties that are really good, having unequalled facilities for disposing of same. FRED. J. PENFOLD, Coaticooke, Que. Cab'e Address, "Ouvrage," Folkestone, or Folkestone, Kent, England.

**Solid Petroleum as Fuel.**—Experiments are being carried on in Russia with the view of finding a process, at once practical as well as desirable, on the score of economy and cleanliness, of solidifying the petroleum used as fuel. According to the report made to the Russian Government by Dr. Kauffmann, who has had the principal charge of these experiments, a successful method of accomplishing the desired result consists simply of heating the oil, and afterwards adding from 1 to 3 per cent. of soap. The latter dissolves in the oil, and the liquid on cooling, forms a mass having the appearance of cement and the hardness of compact tallow. The product is hard to light, burns slowly and without smoke, but develops much heat, and leaves about 7 per cent. of a hard black residuum.

**A Mining Mystery.**—In the whole history of coal mining never has so strange a bit of news as the following been printed. "A short time ago a Goole firm commenced to work one of the thin seams of coal at Worsbro' Dale, a short distance from the Edmunds Main Colliery, by means of a dry-hole. In the course of their work the men were surprised to find they had no water to contend with. For some time it was conjectured that the workings connected with the Barnsley seam at the Edmunds Main Colliery were taking this water. This, however, turned out to be not the sole cause, for much to the surprise of the miners, they broke into some old workings, and found that the same seam had been got. The most singular part of the story is that there were no indications on the surface that the coal had been won at any time, and no person living can remember coal being got there. At the same time nothing is known by the owners of the minerals that they had been got at that place. Much interest is being evoked by the incident.—*Sheffield Independent.*

**Business Principles Essential to Success.**—The mining for gold and silver, copper and lead, can be, should be, nay, must be put and maintained upon the same footing or business management as the best managed of the railroads and the best managed of the coal mining enterprises of Pennsylvania. But mining enterprises worthy of consideration must start upon the basis of meritorious mineral properties more or less developed, with a valuation, in the outset, to those investing money in their exploitation, honestly or equitably adjusted between all the parties interested. Mere prospect holes should not be so incorporated, and the shares thereof floated upon the market at a price which gives a money value of from one hundred thousand to five hundred thousand dollars to 1,500 by 600 feet of barren scoria and other rock rubbish. There is an abundance of good mineral properties to be had by proper seeking, at reasonable prices, the development of which to a profitable stage is an assured business matter if the same care, judgment, energy and earnestness of purpose shall be brought to bear to that end which are regarded essential for success in any other business enterprise. And while this is the absolute fact, at the same time, it can be rightly claimed for mining enterprise that in

no other undertakings is there such chance for making a great deal of money upon a comparatively small investment as from mining ventures.—*Financial Record.*

**New Method of Controlling the Pressure of Natural Gas.**—Mr. C. N. Payne, manager of the Buffalo Natural Gas Company, has invented a method of controlling the pressure of natural gas that appears likely to prove a complete success. From the main that supplies the city he had constructed a pipe of equal strength and size which connects with and penetrates a boiler six feet in height and six feet in diameter to within eight inches of the bottom. Into this enough water has been poured to cover the mouth of the pipe, which is open, with twelve inches of water, which corresponds with a pressure of 4 7-10 ounces. From the boiler a pipe similar to a smoke stack also extends and any pressure in excess of the 4 7-10 ounces immediately forces the gas through the water and it escapes through the pipe smoke stack into the air. A water gauge on the outside of the tank shows the exact amount of water in the tank. Evaporation of course lessens the amount of pressure; for without any water in the tank the gas would nearly all escape. A local paper also describes another device that is being exhibited and tested there by Dr. G. A. Scroggs, of Beaver, Pa., of the Beaver Manufacturing Company. Its arrangement is said to be of the most simple nature, controlling a cut off which completely closes both when the pressure gets too low or too high. It is regulated so that it closes when the pressure falls below two ounces or goes above six ounces, the latter being the highest pressure used in houses burning the gas in Buffalo. In this way there is almost absolute safety, as it does away with the danger of escaping gas in either event. The device, however, can be fixed so that it will control the gas at a pressure running up into the pounds. It is automatic of course and Dr. Scroggs says it meets with the entire approval of Mr. Payne, who has ordered a number of them for use in Buffalo.—*Progressive Age.*

**Recognition of Bravery.**—On the 5th ult. the Masonic fraternity of British Columbia unveiled a handsome monument to the memory of Samuel Hudson, a member of the order, who lost his life in an attempt to rescue the miners in No. 1 Shaft, Nanaimo, after the disastrous explosion of May 3rd, 1887. The monument was erected in the Nanaimo Cemetery, and is ten feet high. It consists of a broken pillar firmly set on a double base, and is an imposing structure. On the base is the following inscription:

"Erected by the Masonic Brethren to the memory of Samuel Hudson, aged 37 years, who died May 3rd, 1887, in a brave attempt to rescue coal miners after the terrible explosion in the No. 1 Shaft, Nanaimo."

Mr. Hudson heard of the disaster, hastened from Wellington, and formed one of the searching and rescuing party that went into the burning mine. Venturing too far from the air current, he was overcome and suffocated before he could be taken to the surface by his comrades. Such instances of bravery and philanthropy are worthy the highest honors, and the Masonic fraternity of British Columbia has fittingly bestowed on him a deserved honor.

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# The Canadian Mining Review

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## Asbestos and Its Uses.

Asbestos has been aptly described as a physical paradox. It has been called "a mineralogical vegetable; it is both fibrous and crystalline, elastic yet brittle; a floating stone, which can be as readily corded, spun, and woven into tissue as cotton or the finest silk." In general terms it may be said to be a fibrous variety of serpentine, closely allied to the hornblende family of minerals, the Canadian variety of which is called by mineralogists "chrysotile." In the local vernacular of the mining districts this is *pierre-à coton* (cotton-stone), perhaps as expressive a term as can be found. Its constitution and properties have been known for ages. The ancients, we are told, believing it to be a plant, made a cere-cloth of it, in which they were accustomed to wrap the bodies which were to be burned on the funeral pyre, so that the ashes might be retained, separate and intact, for preservation in the family urn. It is related of Charlemagne, that having a cloth made of the material, his one day after dinner astonished his rude warriors by throwing it in the fire, and then withdrawing it cleansed and unconsumed. For centuries asbestos was regarded merely as a mineral curiosity, and, in spite of its indestructibility by fire, it is only within recent years that it has developed into a valuable article of commerce, the first modern experiments in the use of it practically extending no further back than 1850. Now, however, it is put to many important uses, as in the manufacture of different kinds of packing for engineering work, millboards, felts, lubricants, paints, fireproof cloth, roping, etc., etc. These are fully and ably described in an interesting little work, "Asbestos and Its Uses," recently published by Crosby, Lockwood & Co, London. The author, Mr. R. H. Jones, resided for some time in the Eastern Townships, and it is evident from a perusal of his book that he possesses an extensive knowledge of the mineral, and is fully conversant with the many uses to which it is now being put, while his interesting descriptions of our mines is a feature of excellence which will be appreciated by all interested in the growth and advancement of the industry in this country. Discussing the relative merits of the Canadian and Italian varieties of the mineral, Mr. Jones says: "I think we may safely conclude that both possess undeniably good qualities, and that there is an ample field for both, inasmuch as the peculiar properties which render one kind unsuitable for some particular purpose are often precisely those which best adapt it for another. Each variety will assuredly make its own way and take its proper place in public estimation, as

"further experiments and greater experience in the use of it shall bring its special value more prominently to light. Ample proof has been given of the valuable qualities of Italian asbestos; and if any proof were needed of the intrinsic value of its Canadian competitor, nothing more would be required than to point to such houses as that of John Bell & Son, of London; of Wertheim, of Frankfort; or of the John's Manufacturing Company, or of the Chalmer's-Spence Company, of New York, whose world-renowned manufactures are made of Canadian asbestos alone. The essential characteristics of both sorts are alike in this respect, that they are absolutely indestructible by fire, or even when exposed to the action of any known acid; the Canadian variety possessing in addition, in a very high degree, that strange peculiarity (which is also claimed for one of the Italian sorts), and is common also to plumbago and soapstone, of being a self-lubricator. Good Canadian fibre is known at once by its soft, greasy, soapy feeling, and one of the leading New York firms claims for its products, made entirely of Canadian asbestos, that they will resist even the flame of the blowpipe; and further asserts that this mineral transcends all previously thought of materials for fire-roofing, in that it is not only absolutely indestructible by fire, but that its power of resistance cannot be worn away or diminished by lapse of time or hard usage, as invariably happens in the case of such applications as tungstate of soda."

Regarding its use, Germany is a very large consumer. In France the consumption is not so great, although manufacturers in that country are now beginning to stir themselves, especially in regard to some very valuable kinds of paper, which they are making entirely out of Canadian fibre; and Paris has now set the world an example by the adoption of the Chevalier Albin's plan of clothing firemen in a dress of asbestos cloth. America, however, is the country where the most rapid strides are being made in the development of every branch of this new industry, and there also the Canadian fibre is alone used. A considerable quantity of it is made use of in England in the arts and manufactures, but, Mr. Jones thinks, England lacks in some degree the readiness which is found on this side of the ocean in the adaptation of new materials and new methods of work.

**Carbo-Dynamite.**—This is the most recent addition to the already lengthy list of explosive compounds. Carbo-dynamite is not hygroscopic, water apparently having no action upon it. This freedom of exudation points to its use in fiery mines. It is claimed that the large volume of steam generated at the moment of explosion not only extinguishes any flame which might have been produced, but also adds considerably to the effect of the shot. It does not produce any fumes of a deleterious nature. It is further claimed that the explosive force can be regulated, that its manufacture is simple and inexpensive, and that the price does not exceed ordinary dynamite.

## LETTERS TO THE EDITOR.

We invite Correspondence upon matters consistent with the character of the REVIEW. Be as brief as possible. The writers name in all cases required as a proof of good faith. One dozen copies of the issue containing his communication will be mailed free to any correspondent on request. We do not hold ourselves in any way responsible for the opinions expressed in this section of the REVIEW.

### The Mineral Resources of Canada.

OTTAWA, 21st June, 1888.

The Editor

THE CANADIAN MINING REVIEW:

SIR,—The statement in the *Engineering and Mining Journal* of New York, 9th June, to the effect that "Canadians are ignorant of most of the vast mineral riches their country contains, and comparatively indifferent to what they do know," is incorrect and misleading, and the person who penned such a statement can only be regarded as measuring the knowledge of others by his own.

I have no hesitation in saying, considering the area of the country, the limited population, and the difficulties of access to large portions of it, that the minerals of Canada, and where to seek them, are as well, if not better, known than are those of any similarly situated and equal area of country in the world.

That many of these deposits are not yet developed is quite natural, and is due neither to "ignorance" nor "indifference," but arises chiefly from the circumstances above referred to.

Those who, without knowledge, write such articles as have recently appeared in some of the papers, and been quoted in others, do not seem to see that their statements are self-contradictory.

The late Senate Committee made no investigations in the country, and was, therefore, entirely dependent on existing knowledge for any facts it may have adduced. Its function was, however, not the less useful in the direction of giving wider publicity to these facts, most of which, however, had already been ascertained through the explorations of the Geological Survey, and can be gathered, by anyone desirous of doing so, from the reports and maps that have been published by the Survey, or in special cases by personal or written application to the Director.

The mineral resources of Canada, though great, are not exceptional, and, except in some minor details, do not differ from those of other countries.

They are being steadily explored, and gradually developed *pari passu* with the opening up and settlement of the country.

To attempt to do so in advance, or under manifestly adverse circumstances, results in large outlay and no immediate return, and from this rule, in every new and unsettled country, gold, precious stones, and a few other minerals, in which small bulk represents large value, alone are an exception.

The indifference referred to, so far as it exists, arises from the knowledge and keen appreciation of these facts possessed by Canadians, and in many instances it is the outcome of experience generally dearly bought by following the advice of the practical miner, instead of that of the scientific and not less practical geologist. Yours, &c,

ALFRED R. C. SELWYN,  
Director of the Geol Survey of Canada.

## The Dominion Mining Laws.

OTTAWA, 14th July, 1888.

The Editor

THE CANADIAN MINING REVIEW :

I have read your valuable journal with a good deal of interest. In your issue of February there appears a letter by "Canadian"—who, by the way, seems to speak with a good deal of authority—on this question. On his statement, whoever he may be, I would like to know how he explains the following case if there are no "speculators, or land sharks, etc." interfering with the rights of discoverers. Having made a discovery of a mineral substance used in manufacture or trade not known to have hitherto existed in Canada, I had the claim surveyed and plan furnished by a Dominion Land Surveyor, also affidavits testifying to the facts of the discovery, and the claim approved of by the Hon. Sir D. L. Macpherson, the then Minister of the Interior, as contained in Department File Reference No. 6583 T. and M. How does it come that this claim is not settled if there are no "speculators or land sharks" interfering with the rights of discovery in this case since the 21st of May, 1883?

I am, yours respectfully,

PETER MACGREGOR.

## Phosphate of Lime in the Chazy Formation about Ottawa.

By Henry M. Ami.

In the "Report of Progress" for 1851-52, published by the Geological Survey of Canada, under Sir Wm. Logan's administration, the last named eminent authority describes (p. 28) the occurrence of nodules at the base of the calcareous strata in the Chazy formation, and points out several localities along the Ottawa River where these 'phosphatic nodules' may be found. An analysis made by Dr. Sterry Hunt of the Hawkesbury nodules gave the following results:—

Phosphate of lime (bone earth).....	44.70
Carb. of lime.....	6.60
“   magnesia.....	4.76
Per ox. of iron and trace of alumina....	8.60
Insoluble silicious residue.....	27.90
Volatile matter.....	5.00

97.56

The following notes are given by Sir Wm. Logan respecting their mode of occurrence:— "Small black phosphatic nodules are mentioned by Mr. Murray as occurring at the base of the Chazy limestone. On the 33rd lot of the 7th concession of Lochiel, where they were sparingly disseminated in the rock, they occur in precisely the same stratigraphical place, on the rear of the 10th lot of the 1st concession of West Hawkesbury, where they are rather larger, but still in sparing quantity. As the nodules, however, when separated from the rock, hold, according to the analysis of Dr. Hunt, a large amount of phosphate, they would probably render the limestone beds in which they occur of more than ordinary value, to be burnt for agricultural application when lime is required, as the phosphate can scarcely fail to be of additional service. Small black phosphatic nodules exist also in their sandstone beds interstratifying green slates at Grenville. \* \* \*

"Brown nodules of the same description, but larger in size, occur in a conglomerate, supposed to be of the same age as the Grenville beds, at Allumette Falls on the Ottawa."

Similar nodules have been found in different formations, and were formed at different periods

in the earth's history. They are not unfrequently met with in shales holding abundance of Lingulæ, and the fact that the shells or hard parts of those creatures were phosphatic in composition evidently accounts for the prevalence of phosphatic materials in the beds which hold their remains in abundance.

In examining the series of the geological formations, as they are developed at Ottawa, no one can fail to recognize the dark brown or chocolate coloured shales, which crop out at Aylmer, the Hog's Back, Skead's Mills, Lower Gatineau Ferry, Hemlock Lake, Green's Creek and elsewhere, as constituting a well-defined series of strata, whose position is intermediate between a calcareous or limestone formation above and a sandy or arenaceous formation below. Looking closely into these shales they are seen to teem with the remains and fragments of Lingulæ, which, as stated above, are pre-eminently phosphatic in their chemical composition.

The great abundance of these fossil shells and their nature leads one naturally to arrive at the same conclusion that Sir Wm. Logan arrived at, viz: that such beds as hold these might afford a fertilizer.

Prof. Saunders, of the Central Experimental, has already kindly expressed his desire to have these shales analyzed at the 'Laboratory' in order to ascertain their real and practical value as a fertilizing agent. Experiments might also be made on crops, and the result would be looked forward to with no small interest.

It may thus appear that 'phosphate of lime' may be found in tolerable abundance and quite at hand, but belonging to a series of strata essentially different in origin and mode of deposition from those rocks which are well-known to afford the mineral *apatite* or phosphate of lime in the Templeton and Buckingham districts, north of the Ottawa. There is no doubt, however, in the case of the phosphate in the phosphate bearing shales of the Chazy formation, that they are purely of organic origin. That mineral having been secreted and deposited in the usual manner round the outer edge of the creature's mantle, as has been nicely pointed out by various writers on the subject. Whether or not the *apatite* from the Laurentian system is of organic origin is a doubtful and open question; sufficient to say, that previous to the deposition of the Chazy formation phosphate of lime existed in solution and otherwise, so that one of the oldest genera of shells—the genus *Lingula*—found abundant material wherewith to build its skeletal parts, which are to a great extent composed of phosphate of lime, and the presence of these *Lingulæ* makes the shales of undoubted value.

## Mineral Resources of Nipissing and Hudson Bay.

In connection with the projected Nipissing and James Bay Railway, a few notes may be interesting on what is already known of the varied mineral resources of the country between Lake Nipissing and the salt water which lies at a moderate distance due north of it, and also as to the great mineral wealth of Hudson's Bay itself.

It is well known to geologists that the Huronian rocks constitute the great metaliferous system of Canada, as well as of the States of Michigan, Wisconsin and Minnesota. Their equivalents in other countries likewise produce a variety of metallic ores. On the other hand, the Laurentian rocks on the Hudson's Bay side of the watershed, at all events, have not yet af-

forded any indications of useful minerals. So that the Huronian areas of a geological map are those in which alone we may look for mineral wealth in the region in question.

With the exception of one interruption, the Huronian rocks extend all along the north shore of Lake Huron from the St. Mary's River to Killarney, and it was from their extensive development in this region that they derived the name Huronian. From this shore line, as a base, has traced these rocks continuously to the north-eastward as far as Lake Temiscaming and thence, beyond the watershed to the country lying northeast of Grand Lake on the Upper Ottawa, whence they are continued in the wide belt of similar rocks which reaches to the south end of Lake Mistassini. A great area of igneous rocks belonging to this system lies to the south of Lake Abitibi. The late Mr. Walter McOwat of the Geological corps showed that the Huronian rocks also extended to the northward of this lake, and in 1877 Mr. A. S. Cochrane traced the same rocks for a long distance down the Abitibi River.

Starting from Lake Nipissing, the line of the projected railway would run for a short distance on the Laurentian rocks, but it would enter on the great Huronian area before reaching Lake Temagami. Thence it would continue upon these rocks past Lakes Temiscaming and Abitibi and to a point midway to the south extremity of James Bay, or for nearly two thirds of the entire distance. The last few miles would be upon the level Devonian rocks near the commencement of the extensive basin of this formation which occupies a vast tract of the westward of James Bay.

The gold bearing rocks of the Township of Denison constitute a belt of the Huronian system, and as these rocks have a uniform northeast strike in this region they pass about Lake Temagami, where gold and silver are also known to occur, and they no doubt cross the Montreal River and run far to the northeast. A very large deposit of argentiferous galena is now being worked on Lake Temiscaming. Between Lake Temagami and Montreal River is a lake, about twenty-five miles long, which Dr. Bell surveyed last summer, and to which he gave the name of Lady Evelyn Lake. Here a vein of argentiferous galena, and veins of copper with more or less gold and silver, were discovered. Asbestos was also found in the same neighborhood. Iron ore was reported by Mr. McOwat at the Quinze Rapids, and although the quality at this place was not very good its occurrence there is interesting, as showing that the Huronian rocks maintain their iron-bearing character in that direction, and richer deposits may be confidently looked for. Roofing slates of fair quality are found in abundance on the Mata-betchewan River and Lake Temagami.

The copper strata of Sudbury begins at the old Wallace mine on Lake Huron, and after passing through Sudbury and Lake Temagami, reaches the Montreal River, where deposits of richer ore have lately been found on Bay Lake. It has been met with again on the Blanche and is known to exist near the height of land east of the canoe route between Lakes Temiscaming and Abitibi. Further to the northeast, it was found, still rich in copper, by the late Mr. Richardson of the Geological Survey, a short distance southwest of Lake Mistassini. Among the minerals most in demand at the present time is the fine silky asbestos, such as that of Coleraine and Thetford in the Province of Quebec. Last year this valuable substance was discovered near the head waters of the Montreal River.

If Moose Factory were the objective point on James' Bay, the line would pass near the large iron ore deposits of the Mattagami River and not far from the lignite and gypsum beds of the Misinaibi and the main Moose River. In any case it would be easy, in that level country, to construct a short branch line to the iron deposits.

When the line once taps the salt water, the shores of a vast sea, which Dr. Bell has happily styled the Mediterranean of the New World, are at once rendered accessible. The east and west shores of this sea each measure about 1,000 miles in length. Those of Roe's Welcome, Fox Basin and the Southampton group of islands, would make at least 2,000 miles, and the two sides of Hudson's Straits another 1,000, or a total of upwards of 5,000 miles of coast line. It is impossible to imagine that the varied resources of this great length of seashore would not afford a considerable traffic. Confining our attention, however, for the present to the mineral resources, Dr. Bell has already pointed out the existence of undoubted wealth of that character in these regions. He has found gold and silver at two places on the east main coast and upon what he named the Ottawa Islands of Mosquito Bay, a thick band of lead-bearing limestone at Richmond Gulf and inexhaustible deposits of fine manganiferous iron ore on a number of the islands near the coast beyond Whale River. Indications were also found of copper, zinc, molybdenum, asbestos and other useful minerals. Anthracite is also known to exist, but Dr. Bell does not think it is in large quantities.

On the northwest side of the bay, the Huronian rocks are very extensively developed all the way from Eskimo Point to Chesterfield Inlet, and Dr. Bell has enumerated a long list of the various rocks to be met with in that region. Large veins of auriferous iron pyrites and deposits of copper ore, of which, however, little is known, have been found nearly opposite to Marble Island, and free gold in quartz has been discovered at Repulse Bay. Sheet mica is said to exist in great quantities at Chesterfield Inlet, and it was reported some years ago that an American vessel carried a cargo of it to New York. Indications of fine clay ironstone have been noticed by Dr. Bell in many places as derived from the rocks of the immense Devonian basin west of James Bay, which is more extensive than the whole western peninsula of Ontario.

In Hudson's Straits, the geologist whom we have so often quoted has found traces of gold in quantity on the south side, and on the north shore large quantities of a very fine variety of mica in wide sheets, plumbago and pyrites; and the Eskimos report the existence of iron ore in several places in that region.

With such an array of facts it is evident that the projected line of railway has the prospect of a large traffic in minerals. Indeed we know of no line which, in proportion to length, at all equals it in this respect. And it must be borne in mind that the discoveries we have enumerated have been made after only a comparatively small amount of exploration. Very much more is naturally to be expected when a thorough search shall have been made.

**Rock Drills Run by Electricity.**—Electricity has been successfully applied, as a motive power, to rock drills. The advantage claimed is, that by using it at the heading, the long lines of steam or compressed air pipes usually employed are entirely avoided, and that the stoppages in the work are less frequent.

### The Utility of Waste Sawdust as Fuel for Roasting and Smelting our Iron and Other Ores.

The Report of the Select Committee of the Senate appointed to enquire into the extent of the sawdust and refuse deposits from the saw-mills and their effect upon the Ottawa river is before us. This blue book is mainly of interest to the mining community on account of the evidence given before the Commission bearing on the economic importance of the waste produce of the lumber industry as a fuel for roasting ores. Mr. John Stewart, of Ottawa, a mining engineer of wide experience in this and other countries, was examined closely on this important question, and as his evidence contains some valuable information, we reproduce it in full for such of our readers as may not have an opportunity of reading the Report for themselves:

BY HONOURABLE MR. CLEMOW:

Q. What is your profession? A. I am a mining engineer.

Q. How long have you been in this section of the country? A. Three and a-half years.

Q. Are you conversant with the saw dust question on the Ottawa? A. I understand a little about the uses to which it might be applied.

Q. Will you give the Committee the benefit of your knowledge of that subject? A. It might be utilized in a small way for the manufacture of paper pulp, and making compressed vessels—pails, tubs and vessels of that kind—and for making brick. It has been utilized for those purposes in Canada; but the large application, almost a Dominion one, as it applies to all the Provinces, it can be used for the manufacture of gas by treating it in proper furnaces, for the roasting of ores and re-heating of iron. The heavy matter from the mills could be made into charcoal, and the products of distillation in the process of making the charcoal will pay for the carbonization of it. That could be used in blast furnaces. The sawdust or fine material can be either manufactured into gas or into charcoal, and compressed into bricks if necessary. It has been done on a small scale. It has been experimented on and proved to be practicable, but not to any large extent as yet. It has been used in the manufacture of gas for the last 20 years in Sweden, and the Swedish association of iron merchants presented the inventor of those furnaces with the sum of \$10,000 for his ingenuity. The Michigan lumbermen utilize their sawdust in the manufacture of salt. They live in a salt region, and they bore wells and get salt springs, and evaporate the brine by burning the sawdust and converting the brine into salt.

Q. Do you know how Mr. Rathbun disposes of his sawdust? A. He uses it all in that way. He makes gas and lights the town of Deseronto, and he makes charcoal, which he sells. There is nothing wasted from his mills.

Q. As an engineer, do you think this sawdust could be utilized profitably? A. I can see no difficulty in it, any more than in the handling of the same number of tons of iron ore, not so much, because you can elevate the sawdust in elevators. You can convey it in a traveller, but you have got to shovel or handle iron ore. Even the sawdust that is now in the river, some of it could be taken out and could be used in a furnace; because sawdust coming direct from the saw, from wet logs containing 45 per cent. of water, can be utilized in that way. That was pointed out in the report of the Geological Survey by Dr. Sterry Hunt, I think, in 1870.

Q. Then in your opinion there is no practical difficulty in those sawmill men utilizing their sawdust and preventing it from going into the river? A. If they make sufficient arrangements for it, there is not.

BY HONOURABLE MR. SMITH:

Q. Did you ever see a sawmill driven by water-power from which the sawdust did not go into the river? A. I do not remember seeing it on the St. John River.

BY THE CHAIRMAN:

Q. Did you ever see it anywhere? A. Yes, the Miramichi sawmills burn their sawdust, but I cannot say that they are driven by water. It is not sufficient to destroy sawdust; the lumbermen ought to make use of it. It is putting it to a wrong use even to burn it. They ought to make it into charcoal.

BY HONOURABLE MR. BOTSFOORD:

Q. To make sawdust into charcoal? A. Yes.

Q. Would that not be an expensive process? A. They can do so. They can compress it into bricks in the same way as is done with fine coal dust. In Belgium and the north of France the coal is a poor lignite. It slacks itself or is slacked with water to wash out the sulphur, it is then dried and compressed in brick machines under strong pressure and formed into solid bricks. I have seen a piece of charcoal compressed from refuse cedar and pine at Deseronto, and to a person who did not know, it is like a piece of cast iron.

Q. Would not that be an expensive process? A. No. Senator Archibald can give the expense of that process. It would not be any more expensive than compressing coal dust, which is done down in Cape Breton with the dust from the refuse of the coal mines of that part of the Province.

BY HONOURABLE MR. MACDONALD (B.C.):

Q. What do they mix with it? A. They take a little pitch, but a better means of cementing it is the refuse from the starch factory. Instead of letting it go into the river, they use the refuse from a starch factory, one per cent. of which is sufficient to form a good bond mixed with charcoal.

Q. Would not earth do? A. A clay containing silica would not be desirable; it would need to be a clay containing lime, which would form a slag. The iron which would be manufactured in this way is just the same as the Swedish iron, the finest quality made in the market. If the market of Canada was not large enough—if we manufactured more than the market would take, we could export it, because the United States have to import that quality of iron from Sweden. In fact, charcoal iron has been exported from the Province of Quebec in years past. I think, on a rough estimate, the amount of refuse from the mills here might be put down at something like thirty thousand tons of coal per annum.

BY HONOURABLE MR. BOTSFOORD:

Q. Would not the process of making that refuse in to coal be greater than the value of the coal after it was manufactured? A. No, it is not an expensive process, because it burns itself. The sawdust is fed from a large hopper, and falls down on a furnace bed, and that is passed off into gas into chambers; thence it passes off into a reservoir where it would be either brought to the furnaces for the roasting of ore or furnaces for re-heating iron. It is only in the expense of handling. Of course you have got to handle fuel of any kind if you are to roast ores or heat iron, so that the expense is not any greater than coal. Then in the manufacture of charcoal the products of distillation would pay for the expense of it, so that you would have the charcoal for nothing. One of the products is pyroigneous acid, wood spirit, etc., and there are several other products, the result of distillation and carbonization. It is not iron ores alone to be roasted by that gas, the sulphur ores, the large deposits of which we have in this country can be very economically treated with the gas made from sawdust, because gas is a better roasting agent than fuel. That could be used for the manufacture of sulphuric acid for the treatment of our phosphates in the manufacture of superphosphate so that instead of shipping the crude apatite to England, we would manufacture it in this country and ship it in a manufactured state.

BY HONOURABLE MR. HAYTHORNE:

Q. And we could use it on our farms? A. Yes, and use it on our farms.

BY HONOURABLE MR. BOTSFOORD:

Q. Do you reside in Ottawa? A. Yes.

Q. Have you seen the explosions which take place under the ice? A. I have seen them in summer—small explosions, never any large ones—when I have been out boating.

BY HONOURABLE MR. CLEMOW:

Q. You have been on the river often and seen the deposits of sawdust in the river? A. Yes.

Q. Have you seen deposits of any extent? A. Yes; I have seen large banks of sawdust.

Q. What is the effect of that on the navigation of the river? A. If it continues it will certainly obstruct navigation; the river will have to find a new channel. The bays are being filled up now and afterwards the channel will get filled up and the river will eat in on the banks.

Q. Have you observed the effect of the sawdust on the fish? A. It covers the spawning beds and it gets into the gills of the fish and of course they will not come up the river.

Q. Have you observed the effect of the decomposing sawdust on the health of the community? A. The gas that comes from it is much the same as the nasty marshy gas which comes from the swamps of ague malarial districts. It is produced from the same cause—the decomposition of vegetable matter.



Q. It is poisonous in its nature? A. It is, in excess. It is light carbonated hydrogen gas, and when it mixes with oxygen from the atmosphere it is explosive.

By HONOURABLE MR. HAYTHORNE:

Q. You think this mill refuse can be removed by the proprietors of these mills without incurring any extra cost to them? A. To some it would involve more cost than others, but I cannot see any more difficulty in handling it than in handling the same amount of iron ore. I do not think that the majority of the lumbermen are against the utilization of it; the thing is to get them all harmonious—of one mind.

Q. Does it require united action? A. It requires united action to make it a success—to get them all to unite and have it utilized in the way I have referred to.

Q. Supposing they united, would the result be a profit to them or a loss? A. It would be a profit. If they will give all the waste from the mills, I can get a company to take hold of it, that is to say, as soon as they work their mills, if they will give all the product of their mills to a company.

By THE CHAIRMAN:

Q. You mean in the way of sawdust? A. In the way of sawdust and slabs; if they will give all the waste from the mills, I can get a company that will take it away and use it.

By MR. CHRISTIE (Counsel for Lumbermen):

Q. Have you not been sometime engaged trying to get the lumbermen to go into a company? A. Yes, I have spoken to them.

Q. In that case, giving a company, you would be interested in getting the sawdust not put in the river of course; can you tell me any place on this continent where sawdust has been used for smelting iron? A. I said Rathbun had utilized it and had compressed it—charcoal has been made.

Q. I mean the sawdust? A. It does not matter whether you make charcoal from wood that has come from the sawmills or not, it is charcoal.

Q. Do you know any place in the world where sawdust has been used in smelting iron, directly or indirectly? A. I can say for sawdust—not in this country, but it has been used in Sweden.

Q. Will you tell me the places in Sweden where it has been used? A. It has been used all over Sweden and Norway.

Q. Tell me one place? A. Carlstadt and Monkfords. Q. Tell me any one person that has ever used it? A. It has been used by M. Lundin, the inventor of the furnace.

Q. Does he not smelt the iron from gas? A. He uses the sawdust to make gas to roast the iron ore and to re-heat it. Charcoal is used in the blast furnace.

Q. Has it been used for smelting iron here at all? A. Gas has been tried in the United States. It is not impossible to do it, but it has never been done so far—not with natural gas.

Q. I mean gas from sawdust? A. Not in the blast furnace, but in the heat ng, roasting and re-heating of iron it is better than any fuel.

Q. Can you tell me any place where sawdust of this quantity has ever been used at all for, say, a pulp mill? A. I can say that in Michigan it has been used to a very large extent for the boiling of brine.

Q. You mentioned a pulp mill? A. I said there were the small applications.

Q. I suppose the output of the mills at the Chaudiere for one week would supply all the pulp used in Canada in a year; would it not supply all the paper required in Canada for ten years? A. I do not know the paper industry, but that is a small matter compared with the iron.

Q. You say that the sawdust produced each season at the Chaudiere is equal to 30,000 tons of coal; can you give us an idea of what it would cost to convert that into charcoal—from actual experience I mean, not theory—can you tell us anything? A. It depends on machinery. I think it costs two and a half cents a bushel.

Q. Do you know that from experience? A. Yes.

Q. Where is it done at two and a half cents a bushel? A. It has been done in Canada here.

Q. Where? A. In the Province of Quebec.

Q. At what place? A. At the St. Maurice, and Drummondville Forges, near Three Rivers.

Q. In any quantity? In large quantities.

Q. What would you call a large quantity? A. Thousands of bushels—that is for the burners—the cost of manufacturing.

Q. What would be the cost of handling and manufacturing, say in Ottawa here—it would have to be removed a distance from the mills I suppose? A. That is a matter of detail that it is not necessary to go into.

Q. You could not tell the Committee what it would cost, A. I can tell them if they wish.

Q. But you do not know now what it would cost? A. I have not got all the figures, but I have the papers at home that will show it.

Q. To manufacture this sawdust for anything useful that you mention, would it not be necessary to convey it at least half a mile from the mill? A. In transporting it on a railway if you move it a few hundred feet it would not cost much more to move it a mile.

Q. How much would it cost to move it from the mills? A. When it is lifted by an elevator into a little car, and that is dumped into a bin which is higher than the railroad track, the bin doors open and the railroad car is filled. The car has a false bottom. The train comes along and takes the waste. The cars with false bottoms run over other bins at the smelting works, the bottom is opened and the refuse is dropped into a series of bins that will hold fifty or one hundred thousand tons. Then that is conveyed to the kilns or to the sawdust furnace by small cars. There is not any more difficulty—not as much as in handling iron ore.

Q. Can you tell me what would be the cost per ton of moving it a mile? A. Freight on the Intercolonial Railway and other railroads—

Q. I do not mean that; what would it cost per ton to move this material a mile? A. It is like any other freight, one cent a ton per mile.

Q. So you think the mill owners could move it from their mills at one cent a ton per mile? A. Yes.

Q. Moving it a mile you would estimate the rate the same as if it were carried 100 miles? A. Yes, that is the rate on the Intercolonial Railway.

Q. Do you think the railway would take it at that rate for that distance? A. I think so.

Q. But you could not give me an idea what it would cost per ton to manufacture this—the absolute cost? A. I do not think it is necessary to go into all the details of it here, because I would be giving away information that has cost me a great deal of time and labor to find out, and if I am giving it away to the public I am giving it to people who will not thank me for it.

Q. Then you are interested in having the sawdust utilized? A. Yes, deeply interested.

By HONOURABLE MR. SMITH:

Q. Supposing this change was absolutely necessary, how long would it take, a year or more, to get all the necessary apparatus in working order? A. It would take one winter at least—this summer and one winter.

Q. Could it be all done in a year or 18 months? A. I should say it could.

By MR. CHRISTIE:

Q. Would it require any alteration in the mills? A. It might take a little longer, because you have got to erect your furnaces and smelting works.

Q. That could only be done in summer? A. It would take perhaps two years before it could be all in operation.

Q. Would it require any change in the mills at the Chaudiere? A. Yes, some more and some less.

Q. But it would require some change in all of them? A. No, not all; it would not require to change the mills, but it would be necessary to put in additional machinery.

Q. Do you know any experience that has been had in roasting iron ore with sawdust at the Gilmour mill? A. That was a family matter which was mismanaged.

Q. But it was tried, was it not? A. Yes.

Q. Was it a failure? A. That has nothing to do with the matter, it has been successful in the United States and other countries where it has been tried.

Q. As a matter of fact was it not a failure when it was tried here? A. That has nothing to do with the case in point.

Q. Do you know as a fact that it resulted in a failure there? A. I know that some lumbermen have failed in business, but the gentlemen who are conducting the business here now are not failing.

By HONOURABLE MR. HAYTHORNE:

Q. You say the supply of mill refuse is greater than would be required for paper making? A. Yes.

Q. Is it not a fact that pulp is used for a great many purposes besides making paper? A. Yes.

Q. And that these purposes are increasing day by day and year by year? A. Yes, but the use of it that way is so small compared with the quantity that would be required for roasting and heating ores and smelting that it is hardly worth taking into account. It is a very small industry.

**Deep Coal Mining.**—The total depth of the André Shaft of the Poirier Company in the Charlevoix district is 3,133 feet. The maximum daily output is 500 tons. Hoisting is done in one lift. The ascent is made in 80 seconds. Ventilation is effected by an Guibal fan, delivering 30 cubic meters per second.

## The Untimbering of Stalls.

By Andre Dumont, Professor of Mining at the University of Louvain.

(Continued from June issue.)

**Methods of Untimbering.**—After having described the system of supporting the roof, it is now necessary to explain the method of untimbering. There are three methods suitable for different circumstances, which can be described and brought to bear on the three following cases:

1. Good soil in embanked stalls, only requiring head props, without lengthening bars or ashler pieces.

2. Bad soil in embanked stalls, requiring strong support and careful casing.

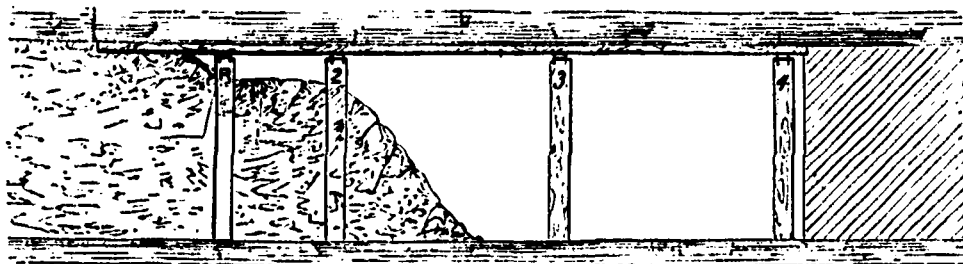
3. Soil of all descriptions in stalls not embanked or only incompletely so.

**First Case.**—We will take for example the working of an upright stall with the way in the middle. We will suppose that the width of the stall comprised between the way of the air passage corresponds to the length of a lengthening bar (about 4 metres). The miners have advanced 3-4 (Figs. 1 and 2) of 1-20 metres and placed the larger of lengthening bars (4) in front of the stalls.

The support allows the filling up to be pursued a greater distance, and we have therefore four courses of lengthening bars, 1, 2, 3 and 4. Before retiring, the day shift of miners set a course of lengthening bars in the last section which is not embanked. At the following "shift," the way cutters having made the wall prepare to fill up the section 1-2. In order to do that they must knock down the timber intervening between the lengthening bars 1 and R; then they prepare the filling-up just below the lengthening bar, 1; they fell down the end props of this lengthening bar, and draw out immediately props and bar. They then finish the filling-up firmly as far as the vicinity of the lengthening bar, R; prepare it under this one, then take it away in the same manner, and lastly continue the filling-up as far as the lengthening bar, 2, which will become lengthening bar 1 for the next shift. The different phases of the work are represented by figs. 2 and 3. In reference to the first case the method of untimbering is based on the following rule: Never take away a lengthening bar before the filling-up has been properly done up to that bar and has been prepared below it. The operation of untimbering conducted in this way cannot fail. Besides, the security of the miners is complete, for the distance which separates the lengthening bars 1 R and 2 being 0-60 metre at the most, the miners are never exposed to a portion of roof which has been deprived of support.

**Second Case.**—This is one that is met with most frequently. The work of the miner is the same as in the first case, with the exception that he will have to put a casing to the roof. At the night "shift" of miners, fillers-up commence to take away the immediate props of 1 and R. Nevertheless, if the ground is too bad they will not take away the props of R until the second phase of the work. Next, they prepare the filling-up as far as below lengthening bar R. They knock down the end timbers of 1, complete the filling-up as far as the vicinity of R. Figs. 4 and 5 give the first phase of the work.

They next prepare the filling up as far as below 2 (the intermediate props of R having been taken away) then they take away R as before, and fill up firmly as far as the vicinity of No. 2.

FIG. 5. SCALE  $\frac{1}{10}$ .

At the next shift when taking away 2, it is possible to pull out the greater part of the ashler pieces which rest on Nos. 1 and 2. In this case the rule to observe is—never take away a lengthening bar before having filled up as far as this bar, and having prepared to fill up as far as underneath the following lengthening bar.

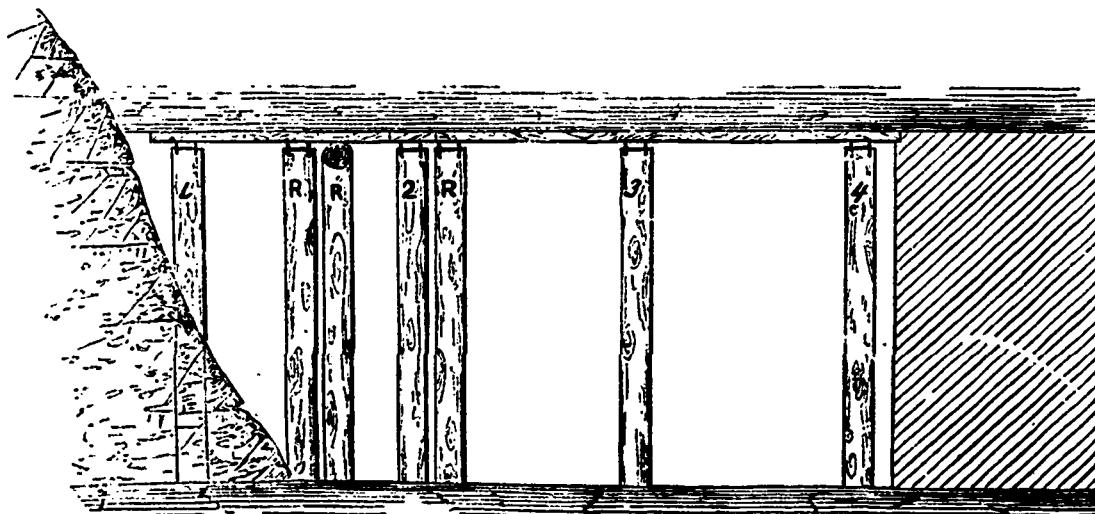
*Third Case.*—When the opening of the bed is such that the cutting of the way is of no use or furnishes soil in insufficient quantities, and which, moreover, cannot be supplied by earth used for keeping in repair, one is obliged, in order to fill up the stalls, to bring down, at great expense, earth from the surface. Then the work of untimbering is of the same character as in one of the cases which we have just described. But, if circumstances will not allow the owner to work profitably by means of embanked stalls, then he has recourse to cutting out the coal so as to leave behind gaps made by working. This is usually called working by blasting. The Baily method has the advantage of immediately causing the blasting, and of not leaving behind immense open spaces, which are the cause of many inconveniences well-known to the miner.

The work of the miner is still the same as in the preceding cases. As for the untimbering, it is done by a company of special workmen. This work evidently demands a certain dexterity. The men engaged in untimbering first place before No. 2 a double lengthening bar R supported by five props (fig. 6). This lengthening bar is not indispensable, but the placing of it is so rapid that it is best to use it. The object of this lengthening bar is to limit the breaking of the earth at the moment of blasting; besides, after taking away No. 2, it will sustain the ends of the following section. They next place the wooden lengthening bars R 2, 50 metres and supported by three props. The last named and the corresponding lengthening bars are provided with small cords, which hang down in the stall. The men then knock down the intermediary props, 1 R and 2: then, standing in the ways, they bring down the end props and pull out all the pieces quickly. For several instants the wooden lengthening bars will sustain the roof of the whole section. In order to avoid this last support being broken and lost in the crush or fall, they hasten to bring it down by means of tools with long handles, and seek to save the timber by pulling the small cords. This last operation often succeeds, but M. Baily does not consider the untimbering a failure if several pieces are lost in the falling of the earth. The rule for security in this third case is that the pulling down of the iron lengthening bars and their props may not be proceeded with until an immediate fall of the roof is provided against by means of a secondary form of support in timber. Also in certain kinds of ground it would be well to limit the breaking of the roof by a double metallic lengthening bar strongly propped. We have taken for an example the work in an upright stall. The methods followed in the inclined stalls are the same with the

exception that in steep inclinations the embankment is graduated in the plane of the bed, making it at the bottom of the stall the width of the whole of the section. The stability of the embankment is in this way better assured. It is seen by this description that the support which was formerly lost may now be drawn out. The stalls produce, however, a little loss. For instance the wood will break under the pressure. The lengthening bars will crack to the right of the wood. In the last case they are cut and made to serve as lengthening bars for the way. For all that, the loss is but small. The stall ways will demand but little repairing, thanks to the resistance of the lengthening bar, and to the rule prescribed by M. Baily to shave off the bottom of the timber diagonally. This method of untimbering has been applied for nearly six months in the coal mines of Marles, and has there yielded splendid economical results; and what is also of importance wherever the Baily system of support has been adopted, they have had neither accident nor falling-in where previously they were rather frequent. This seems at first sight paradoxical, and yet it is only natural. In stalls filled up by the old method, the ground always gives way before the complete collapse of the supports, which are buried there. The consequence is that it leaves several sections behind, between the roof and the embankments, an open space which occasions at first loss of air, and is then the cause of falls reaching as far as the front of the stall. By the complete untimbering the fall of the roof on the embankments is occasioned immediately; the settling down is more complete; the loss of air and the subsequent falls are avoided. It is not surprising, then, as we have seen at Marles, that ground which has formerly been known as very bad no longer bears that character in the stalls which are worked according to the Baily method. For instance, the Rosalie seam 0.90 metres in thickness, was absolutely unworkable, as the roof of it was so shifting. Thanks to the Baily

system, several working places have been established there, which are regularly worked, and the support of which only costs 0.30 fr. per ton. The use of this method is advantageous in cutting the coal. In the Therese seam, which is 1.60 metres in width, and which is worked by blasting, the price of cutting, which previously was as high as 0.60 fr. per truck, has gone down at the three last payments to 0.40 fr., 0.41 fr., and 0.42 fr., or 32 per cent. reduction. In the embanked stalls, the price of cutting has diminished generally 10 per cent., or about 1.25 fr. per ton. This abatement is explained first by the suppression of the working and transport of the timber. Next, by greater facility in the work of the miner. In reality, he feels more secure in the stall, and slightly forces the progress of it; he is less inconvenienced by the propping, which is reduced to two-thirds, and has greater facility for hewing the coal. He is not compelled to leave his work a dozen times in order to strengthen the support which is giving way, and his task is more easily achieved. The price for the cutting of the ways has not changed. If, on the one hand, the untimbering is an additional trouble, on the other hand the embanking following the face of the work at greater intervals, is no longer limited by carefully constructed openings. The price of placing the frames for the way has diminished from 1.20 fr. to 0.95 fr. It is not to be doubted that increase of production procures economy in the other services of the mine. But the greatest economy results from the untimbering and from the decrease in the cost of repairing the ways. It varies with the nature of the surrounding ground and the thickness of the seams. In good ground there will always be economy, but it may be very small; nevertheless in such a case the Baily system of support would not be the less to be recommended. In reality, less woodwork is put to good ground, and the miner is often surprised by accident. The Baily lengthening bar will prevent these, and it is therefore a great advantage. What does it matter if the system of support be rather more complicated than the simple head props when the former may be drawn out while the latter are lost? In bad ground, on the contrary, a saving of 70 to 90 per cent. may be made, as has been the case at Marles in certain stalls. Generally it may be estimated at 50 per cent. At the St. Enile Pit all the stalls are actually provided with the Baily form of support.

The following comparative table shows the consumption of wood at this pit both before and

FIG. 6. SCALE  $\frac{1}{10}$ .

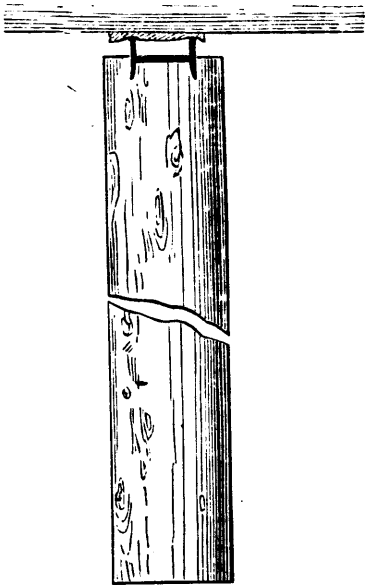


FIG. 7. SCALE  $\frac{1}{10}$

after the adoption of this method of untimbering:

Years.	Consumption per ton extracted.		
	Wood.	Iron.	Total.
1883 .....	0.87	....	0.87
1884 .....	0.85	....	0.85
1885 .....	0.95	....	0.95
Average .....	0.89	....	0.89
1886 .....	0.67	0.05	0.72
1st to 15th January, 1887..	0.72	....	0.72
16th to 30th January, 1887..	0.73	0.13	0.86
1st to 13th February, 1887..	0.50	0.24	0.74
14th to 27th February, 1887..	0.45	0.40	0.85
1st to 13th March, 1887....	0.43	0.37	0.80
14th to 27th March, 1887....	0.40	0.10	0.50
28th Mar. to 10th Ap'l, '87..	0.44	0.01	0.41
11th to 24th April, 1887....	0.40	....	0.40

The average for 1883 to 1885 amounted to 0.89.

The Baily method was introduced at the end of 1886 in a certain number of stalls only. Just after the middle of January, at the end of the trial, all the stalls were successively fitted up. During this period the total consumption was but little reduced, owing to the fact that the working was entirely destitute of the necessary material, and that an iron lengthening bar naturally costs much more than a wooden one. The consumption of iron will remain relatively important, for some time yet, for the ways absorb a good deal. Nearly all the stalls are upright, and when several have reached a certain height, and their ways can be untimbered, then the expense in iron will be minimized. At present the expense is no more than 0.50 fr., in spite of the use of a form of support, which is at first rather costly. It is estimated that in the making of new stalls the total cost would not go beyond 0.30 fr. or 0.35 fr. We consider these estimates as well founded.



**Markets.**

The English and Continental markets are fairly firm, and sales could no doubt be made at the moment at 11½d. per unit, with one-fifth of a penny rise for 80% guaranteed, 9½d for 75% and 8½d. for 70%, ex-ship Thames, Mersey or Clyde. Charleston River phosphate is at present being quoted at 8d. per unit, which is 1d. better than a few months ago. We do not look for any great change in the above figures.

**Freight.**

Freights are at present about 7s. to 7s. 6d. to London, and 6s. 3d. to Liverpool by regular liners, but less would no doubt be accepted by the "tramps." Tonnage to Hamburg is quoted from 10s. to 12s.

**Shipments.**

The following are the phosphate shipments from Montreal for month ending July 10th, 1888:—

Date.	Ship.	Destination.	Shippers.	Tons.
June 15	Wandraham	Hamburg	Wilson & Green	168
" 22	Tovino	London	Lomer, Rohr & Co	481
" 23	Lake Winnipeg	Liverpool	....	300
" 30	Femon	London	Millar & Co	318
" 30	Lake Superior	Liverpool	Lomer, Rohr & Co	110
" 3	Grassbrooke	Hamburg	Wilson & Green	149
July 4	Oxenholme	Liverpool	....	657
" 6	Cynthia	Barrow	Lomer, Rohr & Co	150
" 1	Circe	Glasgow	....	150
Total .....				2,472

**RECAPITULATION.**

**SHIPPERS.**

Lomer, Rohr & Co.....	1180
Wilson & Green .....	974
Millar & Co.....	318

**DESTINATIONS.**

Liverpool .....	1,057
London .....	798
Hamburg .....	317
Barrow .....	150
Glasgow .....	150

**In General.**

Dr. Saunders, Director of the Central Experimental Farm, writes to us as follows regarding the experiments at present being made by the Government in the matter of phosphatic manures:—"The experiments with phosphates consist of tests of the fine ground apatite applied to plots of wheat and corn, the apatite in its crude state being used alone on some plots, on others apatite mixed with nitrate of soda, and on others with nitrate of soda and wood ashes. Similar experiments and combinations are being tried with the treated phosphate, that is to say, superphosphate, made from mineral phosphates. It is proposed that these experiments should be continued year after year on the same plots of land with the same fertilizers, and it is to be hoped that a few years' trial will suffice to determine with some measure of accuracy the actual benefit to be derived from each application to the crops under treatment. Another year we shall apply these fertilizers also to experimental plots of grasses, roots, clovers, etc., and also endeavor to test the value of these fertilizers by such other methods as may suggest themselves. I shall be glad at any time to give you any further information you may desire on this subject, and regret that I have been unable to furnish you with this information earlier."

South Carolina's mineral production consists chiefly of phosphates, and the output of the mines last year was more than three times as great as the value of all the precious metals produced in the Southern States for the same period. Phosphate mining was unknown in 1860. In 1870 the production of rock was 19,989 tons, in 1880, 150,162 tons, and in 1887, 432,757 tons. About 200,000 tons of this rock was manufactured into fertilizers in the United States, and the consumption of fertilizers in South Carolina has increased from 70,000 tons in 1880 to 96,000 tons in 1887, and it will doubtless reach 120,000 tons in 1888.

From Bulletin No. 4 recently issued by the Department of Inland Revenue it is evident that the trade in fertilizers is steadily increasing

in this country, as 40 samples have been sent in for analysis. In 1886 the number was 27, in 1887, 31. In spite of the 20 per cent. import duty levied on fertilizers it appears that foreign manufacturers have furnished 17 of the 40 samples for 1888. These come chiefly from the States, and are imported into the Lower Provinces. From this it is plain that the farmers there are not particular to local manufacturers. The fertilizers offered by the latter are just as high in price as those from the States, but do not test nearly as high in ammonias, phosphoric acid and potash. On the other hand the Ontario manufacturers offer goods of much better quality, generally superior to those imported from the States, and at lower prices. It would consequently appear that an excellent market for the fertilizers made in Ontario might be opened up in the Lower Provinces if the manufacturers would only send their travellers there.

The Fertilizers Act requires that every ammoniated superphosphate shall contain at least 5 per cent. of soluble phosphoric acid and 2 per cent. of ammonia, and that every acid phosphate or dissolved bone shall contain at least 8 per cent. of available phosphoric acid. An inspection of the figures in the table given shows that five fertilizers do not come up to the standard, and consequently their sale at any higher price than \$10 per ton is illegal. One of these five is made in Ontario. In a former report, dated 20th December, 1886, attention was called to the large amount of money which farmers pay for the ammonia in these fertilizers, and which might be saved if sufficient care were taken to preserve that contained in barnyard manure.

A rumour that judgment had been given in the case of Fraser versus the Queen is untrue. Judge Burbridge's verdict will not be made public until September.

**Du Lievre.**

Everything is going along very well and great progress is being made with the improvements at the Canadian Company's mines. The tramline is nearing completion, and will be in working order by 1st August. The steam tug "River Belle" has been purchased, and fitted up with new machinery will commence hauling in a few days. The construction of the large new cobbing house is also completed, and the new machinery for it will be in place and in full working order by the end of the present month. The output from the pits has increased considerably, and Messrs. Millar & Co. inform us that the weekly average output may be fairly stated as 140 tons per week. About 80 men and boys are employed.

Mr. T. Lanson Wills, who has been sent out from England to manage the mining branch of the Company's business here, has taken up his residence at the mines. He is a chemist who has had much practical experience in phosphate mining at Bordeaux and the West Indies.

The Government Geological Survey is making rapid progress with the topographical work of this district. Mr. White and his party are now located as far up the river as the High Rock mines.

Mr. S. P. Franchot has some thirty men working on the Central Lake Mines. A number of pits have been opened, and the output of ore is fair.

Development work at the Little Rapids Mines continues with very favorable results. A new show of high grade ore is reported to have been uncovered since our last.

The Phosphate of Lime Company have already shipped close upon 4,000 tons from their High Rock Mines. A little over 3,000 tons of this has been "firsts," shipped on contract to Europe, while the remainder has been forwarded to U.S. points. 160 men and boys are employed. The large tunnel (No. 11) continues to yield a large output. No. 29, an open cutting made this season, has also proved very productive. Some half dozen new shows are also being worked on a small scale, but insufficient machinery at these places greatly hinders the work of development. The tram line has undergone much improvement since last year, and at the terminus a "cutoff" and pier has been constructed to facilitate the handling of their second quality output. A large number of new buildings have been erected for the accommodation of the miners and their families, a new storehouse is being built, the general offices rearranged, and altogether many improvements are apparent at these ably managed and well conducted mines.

We regret to state that an accident, which resulted fatally to one of the miners, occurred this month in No. 29 pit. The unfortunate man was struck on the head by a piece of rock being hoisted by the derrick and died a few days later. This is, we believe, the first fatal accident at High Rock.

The North Star Company have some extensive improvements in contemplation, including the construction of a tramine from pits to the landing, and the erection of a crushing mill at the latter point. A fair average output is being maintained.

The Emerald is still yielding good ore, but the output is comparatively small. A rumor is current in Buckingham that these mines have passed into the hands of the High Rock people, but so far we have been unable to get any confirmation of the statement.

The water in the river has fallen to such an extent that only lightly laden scows and small steamers can get over the Little Rapids. It would appear that navigation at this point (L. R.) has been somewhat impeded by the work constructed last summer. As yet no re-commencement of the work has been made, but it is said operations will be resumed in two or three weeks.

#### Templeton District.

Mr. Jackson Rae is working in a small way on his property.

The Templeton & Blanche River Company continue to meet with an encouraging output at their mines. Mr. Trimble, the Managing Director, is now in Great Britain, it is said, with the object of placing the property in the hands of a larger syndicate.

The Blackburn Mine is working briskly with a large force. Several thousand tons of ore have been shipped. An inclined shaft, to be operated by wire rope plant, is in course of construction. Mr. Blackburn states that he is well pleased with the appearance of the mines, and regards the daily output as very satisfactory.

#### Perth District.

Work on the Anglo Canadian Co.'s Mines at Bobb's Lake and Otter Lake is being vigorously pursued upon the contract system, and considerable quantities of ore are being taken out.

The Foxton mine is looking very well. The shaft is down about 94 feet, and the vein continues to improve in size and quality. From 3 to 5 tons per day is being taken out with a force of about ten men.

#### Kingston District.

The Storington Mining Company have shipped 376 tons of No. 1 to Hamburg. The operations of the Company have been seriously retarded by the recent destructive fire which completely destroyed their boarding, clogging and engine houses and office.



We shall be greatly obliged to mine owners and superintendents for such authentic reports of their operations as may concern share holders and the public.

#### Nova Scotia.

There is a good prospect of recovering No. 2 Slope at the Albion Mines, where the explosion took place in January last. A pit was sunk 40 feet on the cross-cut between No. 1 and 2 slopes and the roof blown down; an exploring party descended No. 2 slope and for a short distance into No. 1, encountering heavy falls in No. 2, some of them 30 feet high. No. 1 is very hot, and is no doubt still on fire. A permanent stone wall between the two slopes has been built, and the work of cleaning up and retimbering No. 2 is being proceeded with. A small winding engine has been erected in place of the one lost at the fire. It is thought that coal will be coming out of No. 2 pit by the beginning of the year.

At the Ford pit pumping is still going on. Cages are now down to the rubbish at the bottom of the shaft, and the pumps will now have to be set to work there in order to remove the balance of the water. It will be a long time yet before any coal can be mined in this pit.

At the new "English" slope operations are proceeding fairly well. The sinkers have got through the "stop" which proved to be a downthrow of some 22 feet, and the coal is recovered on the other side. Considerable bottom will have to be taken up for a distance of one hundred feet on the angle of the slope in order to get below the stop. The slope is down some 150 feet, but the total depth when finished will be in the neighborhood of 1,300 feet.

Work has only been fair of late at the Drummond Colliery, mainly owing to want of tonnage, but when pits did work a very large quantity of coal was shipped. Some large "Time" boats are used this season by the company, but it is found that the smaller boats are more profitable and convenient.

Scarcity of tonnage to carry coal for Upper Province orders has also had a depressing tendency on work at the Vale Colliery. The management employ very large boats—some of them over 3,000 tons—to forward their output. The new sinking in the McBean slope is going

down well, and the coal maintains its usual good quality. The company are now supplying the St. John Mills, as well as the Steel and Forge Companies at Trenton. At the "Six Feet" seam work is progressing as usual.

The Black Diamond Colliery is working full blast, and 75 tons a day are being raised. Sufficient orders have been obtained to keep these mines busy all season. We understand that some 20,000 tons of Intercolonial Railway contract have fallen to the share of this company.

At the Acadia Mines work has not been up to the usual standard, and about three-quarter time only is made.

The Intercolonial contract for 200,000 tons of coal has been let, but little or nothing is known here about the awards, beyond the fact that very little of it has come to the Pictou County Collieries. In a district where so many people are dependent upon the coal industry for their livelihood, this result is much to be regretted and will be keenly felt.

The following are the official returns for the month of June, so far as received at the Mines Office:—

District.	Mill.	Tons Crushed.	Oz. Gold.
Sherbrooke.....	Miners.....	200	41
Salmon River.....	Duffin G. M. Co's....	850	220
Waverley.....	McClure.....	118	47
".....	Wallace.....	65	10½
Lake Catla.....	Oxford G. M. Co. ....	144	226
".....	" (Anderson).....	33	23
Whiteburn.....	Whiteburn G. M. Co. .	61	112
Fifteen Mile Stream.	Egerton G. M. Co.....	220	102
Oldham.....	Oldham G. M. Co.....	95	62
Caribou.....	Moore River G. M. Co. .	162	79½
".....	D. Tomquoy.....	444	218
Stormont.....	Hurricane Tributaries..	152	190½
Leinfrew.....	Empress.....	100	42
Wine Harbour.....	Napier.....	70	55

The Edgerton gold mine is looking up. 102 ounces was brought in last month for 15 men. This is a very good showing. There are lots of other equally good properties awaiting development. All that is wanted is good honest practical management and a little capital.

At the "Board Camp," Sheet Harbor, prospecting is being pushed forward with vigor. A crusher will shortly be added to the plant. Some very rich leads have been found in this locality, but parties are very reticent about their finds. New Glasgow people have taken up one hundred acres in the district, and four good leads are reported on the property. If this is so a boom may be looked for at "Board Camp."

The new crusher at Moore River gives every satisfaction. Mr. D. Tomquoy has brought to Halifax three bars containing 332 ounces from about 400 tons of quartz, the produce of four months' work.

Mr. McKam and his syndicate are expected in a few days to look over the iron ore deposit at East River. Considerable work has been done uncovering the leads and making a good show of the different beds. The quality of this ore is unsurpassed, being brown Hematite, carrying over 70 per cent. of metallic iron. Report says that Mr. Bennett, of New York, is one of the principals of the syndicate.



At the Gowrie Mines, C. B., work is not so brisk as in recent years; only four boats are kept running as against six last year, and consequently the men are losing between five and six days in a month.

The Nova Scotia Steel Company, with headquarters at New Glasgow, are applying for supplementary letters patent increasing their capital stock from \$300,000 to \$1,000,000, and extending their power so as to enable the company to manufacture steel and iron in all their branches, and articles consisting of iron or steel, in whole or part; and changing the name to the "Nova Scotia Steel and Forge Company (Limited)."

The *Critic* states that "the recent forfeitures of gold-mining properties made by the Hon. Commissioner of Mines has caused quite a brightening up of titles, and many owning property in other districts are looking to see if their districts are to be called up soon. Many are saving themselves from the stroke of the lash by surrendering their old leases and taking out new titles. Let the cleaning-up process go briskly, and have the anxiety over."

#### New Brunswick.

Manganese mining is being prosecuted with considerable success by the Manufacturing Mining Company of St. Martins, N. B. Good pockets are being discovered in the various drifts opened, and the ore is of first-class quality and considerable in quantity. It is believed this is one of the most valuable manganese deposits in the Maritime Provinces, and its owners intend energetically prosecuting its development.

#### Quebec.

Mr. H. A. Church, of Chelsea, is doing some development work on his mica property.

On that portion of the Bell Company's property known as the Hayden Estate, in Coleraine, roads are being made and a large number of buildings are being erected. A gang of miners will be at work in a few days. The Belmina portion of the estate will not be touched this year. Altogether the prospects of the Bell Company are most favorable.

The Johnston Co., Wards, Ross Co., and King Bros. are all doing a good business, shipping large quantities of ore by Boston to United States and European points.

The new crushing and cobbing machinery erected by the Scottish Asbestos Company is now in complete working order, and a test on an extensive scale is to be made this week. If successful similar machinery will be put up at the Thetford Mines. All the large dumps there will then be worked over, and it is thought that a very large quantity of asbestos, which at present does not pay to cob by hand, will be reclaimed.

The Scottish Canadian, Anglo Canadian, Frechette, and Danville Mines are all busy and making a fairly good output.

The Harvey Hill Copper Mines in Leeds are being more systematically worked, and are yielding a fair quantity of first-class ore, some of it assaying 70 per cent. metallic copper with a good proportion of silver. English experts, who examined the mines during the past month, say that they are well pleased with the appear-

ance of the property. Our correspondent adds that it is understood that several hundred men will be immediately put to work to open up the property on a large scale.

The rumour that Mr. J. N. Greenshields, of Montreal, and other capitalists, had sold their copper property in the Eastern Townships is premature. Negotiations, however, are in progress for a transfer of the property, and full particulars will be given when the transaction is complete.

Captain Bothwell has resumed the developing of his gold property on the Du Lievre. A gang of men are at work in the pit, which has now attained a depth of twenty feet. The present appearance of the mine is very promising. Further assays will be made by Dr. Donald in a day or two.

By a fall of rock at the New Rockland slate quarries, on the 14th instant, one man was killed and two others slightly injured.

A new find of asbestos is reported to have been made in the Township of Portland, near the High Falls. The indications point to an abundant supply of the mineral. Samples before us show a fine silky fibre, from a half to two inches in length. Mr. W. A. Allan, of Ottawa, has secured the mining rights to what, to all appearance, is a very valuable find. A number of men are presently at work developing the property.

An important discovery has been made in Garthby, on the property of Mr. Wm. Farwell, Manager of the Eastern Townships' Bank, Sherbrooke. The large deposits of iron pyrites and copper found on Lot 22, 1 Range, North, and so favourably reported on by Sir Wm. Logan (*Geol. of Canada*, 1853), has been traced for nearly two miles in a south-westerly direction to the Township of South Hann. This is most important, showing as it does that a true vein exists at this point. Eleven openings have been made on the strike of the lode, all showing rich ore.

The greatest activity prevails at the various asbestos mines. The demand for the mineral continues good. Parties are buying up all the small lots of "seconds" and "thirds" as they cannot get any of the first quality, all of which was contracted for last winter.

The Bell Asbestos Company (Limited), of London, England, are taking out of their Thetford Mines, on an average, sixteen tons of "Firsts" per day. About one hundred men and boys are employed. A large number of new buildings are in course of construction, and the mines are being equipped with an extensive plant and machinery, which is expected to be in full working order by the 15th of August.

#### Ontario.

The Thornbury Oil and Mining Company, which was formed in November, 1886, by seven of the business men of Thornbury, Ont., commenced boring about four miles from there a couple of weeks ago, and are now down about 500 feet. A very strong flow of natural gas has been struck, and it is estimated that at least 2,000,000 cubic feet escapes every 24 hours, or enough to supply a town of 20,000 inhabitants with light and fuel. It is the intention of the company to sink a well for gas in Thornbury immediately where the formation

is the same as where operations are now being carried on. The present well is on the grounds of a summer resort, and the gas can be utilized to light the hotel and grounds and greatly enhance the beauty and value of the property. The company have the exclusive right to bore over a large tract of country where the indications seem to be of the best.

The Grand River Plaster Company having decided to establish calcine works in connection with their business at the gypsum mines, two miles from Cayuga, a kettle is to be put up capable of turning out from seventy-five to one hundred barrels of calcine per day.

The Terra Cotta Company is a new concern recently formed at Milton, Ont., with a capital stock of \$20,000, for manufacturing terra cotta, pottery and other goods, of a new kind of clay recently discovered near that place. This clay is of two colors, and is said to become almost as hard as stone when exposed to the atmosphere.

Nothing in the way of mining is being done at the Bristol Iron Mines, pending the construction of a branch railway from the Pontiac P. J. Railway from Wyman's Station to the mines. The engineers have located the road, and this week about seventy men have commenced grading. Next week about 300 men are expected to be on hand. It is thought that in about six weeks the road will be ready for rails.

The *World* is our authority for the following: A wealthy syndicate of Milwaukee and Chicago capitalists have purchased over a thousand acres of mining lands near Goulais Bay, and about fifteen miles west of Sault Ste. Marie. They commenced exploratory work last fall. They encountered a vein of mineral and have gone down on it for about ten feet and an average sample of the rock taken from it at this depth assayed \$47 in gold to the ton. The rock is of such a soft character that it can be crushed with proper machinery and the mineral separated, on a large scale, at from \$3 to \$4 a ton. Gold has also been found in a rich silver vein at Gros Cap and in the copper ore of the Korah mountain mine, both near the Soo. Silver ore seems to be the predominant mineral of the district. At Gros Cap a very large vein can be traced for a mile or more, which carries a large percentage of silver.

*Progressive Age* states that Mr. C. A. Ashburner, the Pittsburgh geologist, has gone to Ontario to explore a natural gas field for a Canadian company. He will locate the wells, and they will be drilled under the direction of the Fuel Gas Company of Pittsburgh.

#### Sudbury District.

Work at the Vermillion Mining Co.'s property is progressing at both shafts. At No. 2, or the shaft in quartz, a depth is attained of about fifty feet, and some drifting has been done at the forty feet level. Many beautiful specimens have been taken out at all depths, and the general output carries a good value in gold. No addition has been made as yet to the three stamps. The shaft known as No. 1 is now over thirty feet deep, and of very large proportions. At the bottom a very peculiar ore, or rather mixture of ores, is found. Lying side by side are good chalcopyrite, a mineral that appears to be half way between millerite and pyrites; and a peculiar deep purple ore, containing 30 per



cent. copper. This latter carrying a little gold and some rare metals of the platinum group, besides Tellurium.

Mr. McKenzie is here at present, and among other duties will examine Lot No. 7 of Con. 4, in Denison. He is not yet prepared to develop veins on this property, but before long will have men at work there. The veins of the Vermilion Mining Co. cross this lot.

The McConnell copper belt, we regret to say, lies idle, the owners, instead of developing this promising property, and proving its value, preferring to sit and wait for some one to pay them a big figure for it undeveloped.

In Lorne your correspondent has washed gold from quartz in two lots, and found an average sample from one vein to carry about four ounces of gold per ton. From another vein he selected stuff yielding over one hundred ounces of gold per ton. This was taken from the crevice between vein and hanging wall.

The Canada Copper Co. have twenty five men at work at the Stobie Mine. They are clearing the hill, and will quarry from the level of the track, removing the hill for some distance.

At the Copper Cliff and Eyre Mines work progresses as usual, and a fine stock of good ore is being accumulated for the smelting plant. Ground is being cleared for the smelting plant, and everything points to an early start.

A mile and a half from the Stobie Mine, to the north, is a most promising copper mine, which your correspondent had the pleasure of visiting recently. The body of copper appears to be of great extent and appears at the surface throughout the length and breadth of the hill, for 250 by 400 feet.

#### Port Arthur District.

News from this quarter for the past month has been of a most encouraging nature.

The Beaver mine has just placed in position a new hoisting apparatus of an improved pattern, and everything is working in a most orderly and satisfactory manner. The ore being taken out at present is of a low grade, with occasional rich streaks. Improvement is visible everywhere, both inside the mine and out.

The Badger Mine, about one mile from the Beaver, is at present taking the lead as regards rich ore. The output is almost all bonanza ore.

\$10,000 to the ton is quite common. The silver generally occurs as a sulphide, but some of the choice pieces are fairly saturated with native silver. The management have just completed a good waggon road to connect with the Beaver Mine. The mill will probably be complete in six weeks—considerably in advance of the requirements of the mine, which is not by any means in shape to keep a mill supplied.

The "Shuniah Weachu" or Silver Mountain East End Mine is now turning out good milling ore from the four hundred foot level in No. 3 shaft, where the vein is now twelve feet wide. Under the able management of Capt. Thos. Trethewey the company have at last succeeded in finding the extension eastward of their main vein on the lower ground near the eastern boundary of their property. Where found it was being augmented by another vein running north-easterly, each vein being about four feet wide, and carrying ore ranging from \$40 to \$500 to the ton. The vein carries a large percentage of zinc blende associated with galena and iron pyrites. The junction of the two veins, it is expected, will give a large quantity of very rich ore, and as the vein is easily accessible and in the vicinity of the compressor, it is likely that development will be pushed vigorously, the cost of extraction being inconsiderable.

The "West End" Silver Mountain Mine is being put in shape with vigor and skill. The principal work consists as yet in the erection of suitable buildings for a large force. What little work has been done in the vein, where a bed was being prepared for the shaft house, has revealed very rich ore. This shaft is a continuation of a pit from which a ten ton test gave \$160 to the ton. As the vein is well situated in a side hill a great work will be done so soon as mining is in full swing.

The last candidate for publicity is the Caribou Mine under Capt. Rothwell. The vein has been struck in the lowest tunnel on the side hill and some very fine ore extracted at the first shot. The management are enthusiastic over the strike, and the growth of this new but most promising mine will be watched with much interest. It is situated a short distance southwest of the Beaver Mine.

A good waggon road has been built from Whitefish Lake to 261 T, which is worked by the West End Silver Mountain Co. Development is not yet begun; buildings are being put up and material collected.

#### Manitoba and North-West Territories.

Prospecting for coal is being conducted on the banks of the Assiniboine, a short distance west of Minnedosa.

At the Lake of the Woods work is still being carried on at the Sultana Mines. It is reported that an offer has been accepted for the claim, through Mr. A. Pugh, St. Paul, by which a company has been formed with a capital of \$2,000,000, and that half a million is to be paid to the present owners in cash, and that they are to be given another half million stock in the company.

A number of mining men are out making a survey of Quarry Island, which is immediately opposite the Sultan Island. They think the rich vein extends to it and are now at the necessary work preparatory to sending down an application for it.

St. Paul dispatches state that Mr. A. Pugh has returned from the Lake of the Woods, where he went to investigate the gold discoveries on an island in the upper part of the lake. In an interview he exhibited specimens of the ore he collected while there. In these specimens the gold is easily seen by the unaided eye, and the rock is free milling ore, none other being in sight. Other specimens taken from different parts of the island were sent to the State university, where they were assayed and found to contain \$286, \$162 and \$160 of gold to the ton of ore respectively, and a small per cent. of silver. This is very rich, the cost of reducing it being very small. Gold was discovered here several years ago, but until within a few weeks the land has been part of an Indian reservation, and consequently nothing could be done with it. But now the Indians have released it, and fourteen capitalists from Manitoba have obtained possession of 400 of the 450 acres in the island, and value the property in its undeveloped state at \$2,000,000. Mr. Pugh, Dennis Ryan, and other St. Paul capitalists, are now conducting negotiations with the owners of the property with a view to uniting with certain Chicago parties in the purchase of a half interest in the property and working it. Some years ago gold was discovered in the vicinity of the Lake of the Woods and a stamp mill was erected to reduce the ore. But after excavations had been extended below the water level refractory ore was found, which could not be reduced in this country, and was not rich enough to pay for shipping abroad. Even if this should prove to be the case with the island

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mine there is enough rock above the water line to make the fortunes of a hundred men, if the richness shown in these specimens continues. These are the words of Mr. Pugh. The rock on the island rises to a point of 100 feet above the water line.

A special general meeting of the shareholders of the Medicine Hat Railway and Coal Company will be held at Toronto on the 18th of August, for the purpose of authorizing the directors of the company to issue bonds of the said company, pursuant to section 93 of the Railway Act of last session, and also of the Act of incorporation of the said company, and ratifying any contract made for the construction of the said railway.

**British Columbia.**

At a meeting of the Selkirk Mining Company, it was decided to immediately proceed with the construction of an aerial wire tramway from the Lanark mine to the Canadian Pacific Railway, a distance of 1 1/4 miles. This tramway will be capable of delivering 60 tons of ore in 12 hours.

Exports of coal from the Nanaimo coal district for May were 26,946 tons, valued at \$134,730. One shipment of 1,415 tons was for Honolulu.

It is said that miners in the Yukon country, while working the placers, find large quantities of platinum, which they throw away, believing it to be of no value. Mr. K. Valentiue, of Juneau, has been authorized to purchase a large quantity for an eastern firm, as a test of its quality. He will pay \$2 an ounce. Upon being tested and found to be equal to the best quality, a higher price most certainly will be paid.

From the accounts of the Vancouver Coal Mining & Land Company, Limited, it appears that the gross profit for the year 1887 was £15,461, and the expenditure £26,269, leaving a net loss of £10,808. The report to be submitted on the 29th instant states that the direct financial loss to the company from the explosion at the mine in May last was £11,066, which was less serious than the directors had anticipated. The contracts existing at the time of the disaster have nearly all been carried out, the purchasers having granted extra time for delivery.

**New Process for Reducing Iron Ores.**

—A process of reducing iron ores has been patented by Mr. Gustaf M. Westman, of Stockholm, Sweden. In addition to the reducing furnace, regenerating or carburizing furnaces are employed, with a circulating blast engine, affording means for reducing the ores by means of carbonic oxide, by passing the carbonic oxide through a charge of ore, drawing off the gases from the charge, and passing them over glowing coke, cooling the gases, and then superheating them, after which they are again passed over or through the ore to be reduced, thus saving fuel without injuring the quality of the product.

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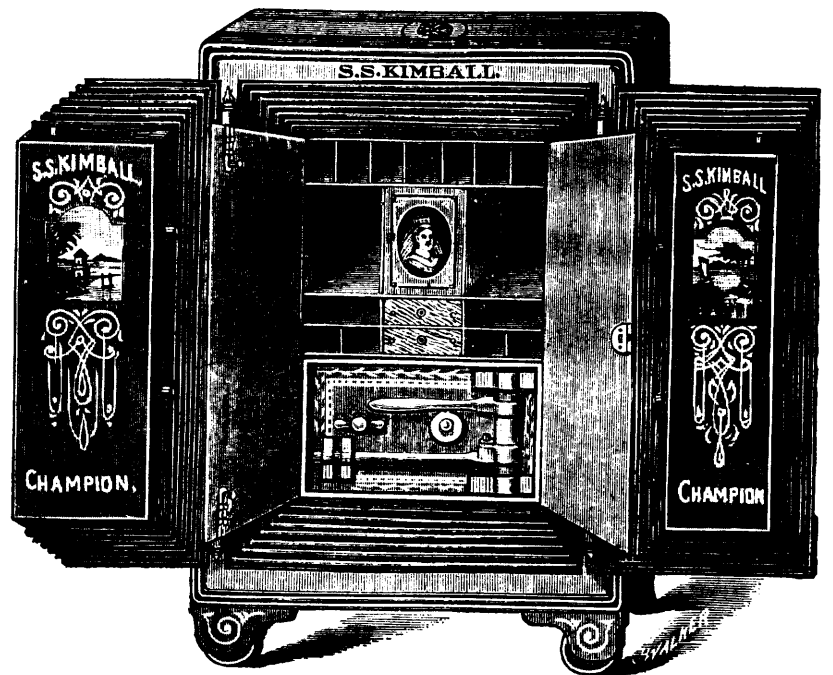
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2nd.—North half of lot 23, in the 5th range, containing 100 acres.

3rd.—Nine acres of lot No. 28, in the 5th range, with water privileges thereto appertaining, being site of mill dam, etc., etc.

The property formerly belonged to the Montreal Plumbago Mining Company, and was worked successfully for several years, until the company's mill was destroyed by fire, but the mill dam remains almost uninjured, and there are on the property several houses, sheds, etc., built for various purposes when mining operations were carried out.

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upon the property are regarded as amongst the richest and most extensive in the Dominion. As to the quality of the Plumbago, it has been extensively used in the manufacture of crucibles, lubricating leads, stove polish, etc., etc., and given unbounded satisfaction. This is established by the experience of consumers, and by a certificate from the celebrated Battersea Crucible Works, London, England, a copy of which is open for inspection.

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has also been discovered in quantities.

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- 2nd. Sherbrooke Mine, part Lots 12 and 13,  
R. 7 Township of Ascot..... 329 "
- 3rd. Belvidere Mine, part Lots 9 and 10, R.  
9 and 10, R. 8 Ascot ..... 292 "
- 4th. Mining Rights in same vicinity on..... 250 "

All of the above properties lie within 1½ miles of the Village of Lennoxville, at the junction of the Grand Trunk, Canadian Pacific and Passumpsic Railways, and have been developed to a considerable extent, and veins opened 6 to 20 feet in width, yielding 3 to 5 per cent. of copper, also silver, and 35 to 40 per cent. of sulphur. These mines are only 2½ to 3 miles distant from the City of Sherbrooke, and evidently are of the same class of ores found at Copelton, only four miles distant, owned and worked by the Orford Copper and Sulphur Company, and by Messrs. G. H. Nichols & Co., of New York, which have proved so remunerative.

### TOWNSHIP OF ORFORD.

- 5th. Carbuncle Hill Mine, Lots 2 and 3 R. 14, and  
2, 3, 4 R. 15, 718 acres. Same class of ore as is found in the Ascot properties above described, but yielding a higher percentage of copper.

### TOWNSHIP OF CLEVELAND.

- 6th. St. Francis Mine, ¼ Lot 25 R. 12, 50 acres, with dwelling houses, smith's shop, ore sheds and office, large winding and pumping steam engine, with boiler, winding and pumping gear, and about forty fathoms Cornish lifting pumps complete, railway tracks, ladders, etc., situated three miles from Grand Trunk Railway. A considerable amount of mining work has been done at this mine. A well defined vein richly charged with vitreous purple and yellow sulphurets of copper traverse the entire length of the property, five feet in thickness, yielding 8 to 40 per cent. metallic copper.

### TOWNSHIP OF GARTHBY.

- 7th. Fifty-six lots of land, 2,938 acres. This property for the most part is unexplored, but copper is found on the greater part of the property. On one of the lots a vein about twenty feet in width has been found. Samples of the ore have yielded as much as 22 per cent. of copper, being also rich in sulphur. Other samples of pyrites from the same property, free from copper, have yielded as high as 48 per cent. of sulphur. The only drawback to this property is in its distance from the railway, it being about four miles from Garthby Station, Quebec Central Railway. A new line is chartered, however, which, when built, will run directly through the property.

### TOWNSHIP OF ACTON.

- 8th. The Acton Mine, 100 acres, with engine, boiler, pumps and appliances. Within three years after this mine was first opened it produced nearly \$500,000 worth of copper. It is situated about half a mile distant from the stations of the Grand Trunk and South Eastern Railways.

- 9th. Brome Mine, part Lots 2 and 3 R. 4, 50 acres.
- 10th. Bolton Mine, two miles from Eastman Station, Waterloo & Magog Railway, 400 acres.

The above properties formerly belonged to the Canadian Copper and Sulphur Company, and were acquired by the present owner at sheriff's sale, giving an indisputable title thereto.

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—OF THE—

**Ohio Valley and Central States,**  
**CINCINNATI,**  
July 4th to Oct. 27th, 1888.

The Province of Ontario will be represented at this great Exposition with an exhibit of its Minerals and Mining Products, embracing the

**Precious Metals, Economic Minerals, Building and Monumental Stones, etc., etc., etc.**

All expenses of freight and exhibition will be borne by the Government, and as the time for making a suitable collection of articles is short it is hoped that persons interested in the display of the Province will co-operate in making it as large and full as possible.

Owners or managers of mines, quarries and reduction or manufacturing works are invited to communicate with the undersigned at Toronto, by whom full instructions respecting the exhibits will be given.

Articles intended for the Exposition should reach Toronto not later than the 20th of June, when they will be examined and classified for shipment to Cincinnati.

A. BLUE,  
Commissioner for Ontario.

Department of Agriculture,  
Toronto, 8th May, 1888.



## INDIAN LANDS

LANDS IN THE UNDERMENTIONED localities are offered for sale to actual settlers through the following Indian Agents: On the Great Manitoulin Island, Lake Huron, Ontario; Mr. J. G. Phipps, of Manitowaning, is the Agent for the sale of lands in the following Townships on this Island: Assiginack, Bidwell, Howland, Shequandah, Billings, Campbell, Carnarvon, Allan, Tehkummah and Sandfield, and in the Townships of Shequandah, Manitowaning and Shaftsbury (commonly called Little Current). Mr. B. W. Ross of Cockburn Island, is the Agent for the sale of lands on that Island and in the Townships of Gordon, Mills, Burpee and Barrie Island, and in the Township of Gore Bay as well as for those in the Townships of Robinson and Dawson, on Manitoulin Island. Leading roads have been constructed throughout the Great Manitoulin Island.

On the Saugeen Peninsula, Ontario, the land in the Townships Amabel, Albemarle, Keppel, Eastnor, Lindsay and St. Edmunds; as well as several Townships in the Peninsula, are offered for sale through Mr. William Simpson, Indian Lands Agent at Warton, County of Bruce, Ontario.

On the Garden River Reserve, Ontario, Mr. William Van Abbott, of Sault Ste. Marie, is the Agent for the sale of lands within this tract, and which are situated in the Townships of Macdonald, Laird and Meredith; also for lands within the tract commonly known as the Batchewana Bay Indian Reserve, and comprised in the Townships of Aweres, Fenwick, Kars, Pennefather, Dennis, Herrick, Fisher, Tilley, VanKoughnet, Tupper and Archibald. There is a leading road through these lands which affords ready communication with other parts of the country to intending settlers.

The condition of sale in respect to the lands within the Townships above described can be ascertained on application to the respective Agents.

(Signed) L. VANKOUGHNET

Deputy Supt. General of Indian Affairs.

Department of Indian Affairs,  
Ottawa, February, 1887.

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Department of Inland Revenue.

## An Act Respecting Agricultural Fertilizers.

The public is hereby notified that the provisions of the Act respecting AGRICULTURAL FERTILIZERS came into force on the 1st of January, 1886 and that all Fertilizers sold thereafter require to be sold subject to the conditions and restrictions therein contained—the main features of which are as follows:

The expression "fertilizer" means and includes all fertilizers which are sold at more than TEN DOLLARS per ton, and which contains ammonia, or its equivalent of nitrogen, or phosphoric acid.

Every manufacturer or importer of fertilizers for sale, shall, in the course of the month of January in each year, and before offering the same fertilizer for sale, transmit to the Minister of Inland Revenue, carriage paid, a sealed glass jar, containing at least two pounds of the fertilizer manufactured or imported by him, with the certificate of analysis of the same, together with an affidavit setting forth that each jar contains a fair average sample of the fertilizer manufactured or imported by him; and such sample shall be preserved by the Minister of Inland Revenue for the purpose of comparison with any sample of fertilizer which is obtained in the course of the twelve months then next ensuing from such manufacturer or importer, or collected under the provisions of the Adulteration Act, or is transmitted to the chief analyst for analysis.

If the fertilizer is put up in packages, every such package intended for sale or distribution within Canada shall have the manufacturer's certificate of analysis placed upon or securely attached to each package by the manufacturer; if the fertilizer is in bags it shall be distinctly stamped or printed upon each bag; if it is in barrels, it shall be either branded, stamped or printed upon the head of each barrel or distinctly printed upon good paper and securely pasted upon the

head of each barrel, or upon a tag securely attached to the head of each barrel; if it is in bulk, the manufacturer's certificate shall be produced and a copy given to each purchaser.

No fertilizer shall be sold or offered or exposed for sale unless a certificate of analysis and sample of the same shall have been transmitted to the Minister of Inland Revenue and the provisions of the foregoing sub-section have been complied with.

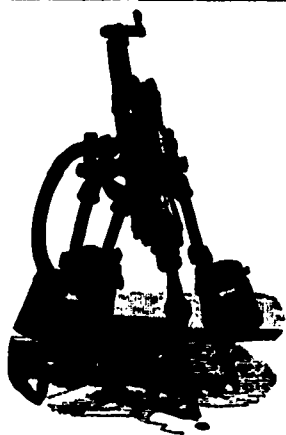
Every person who sells or offers or exposes for sale any fertilizer, in respect of which the provisions of this Act have not been complied with—or who permits a certificate of analysis to be attached to any package, bag or barrel of such fertilizer, or to be produced to the inspectors to accompany the bill of inspection of such inspector stating that the fertilizer contains a larger percentage of the constituents mentioned in sub-section No. 11 of the Act than is contained therein—or who sells, offers or exposes for sale any fertilizer purporting to have been inspected, and which does not contain the percentage of constituents mentioned in the next preceding section—or who sells or offers or exposes for sale any fertilizer which does not contain the percentage of constituents mentioned in the manufacturer's certificate accompanying the same, shall be liable in each case to a penalty not exceeding fifty dollars for the first offence, and for each subsequent offence to a penalty not exceeding one hundred dollars. Provided always that deficiency of one per centum of the ammonia, or its equivalent of nitrogen, or of the phosphoric acid, claimed to be contained shall not be considered as evidence of fraudulent intent.

The Act passed in the forty-seventh year of Her Majesty's reign, chaptered thirty-seven and entitled, "An Act to prevent fraud in the manufacture and sale of agricultural fertilizers," is by this Act repealed, except in regard to any offence committed against it or any prosecution or other act commenced and not concluded or completed, and any payment of money due in respect of any provision thereof.

A copy of the Act may be obtained upon application to the Department of Inland Revenue, as well as a copy of a Bulletin which it is proposed to issue in April, 1888, concerning the fertilizers

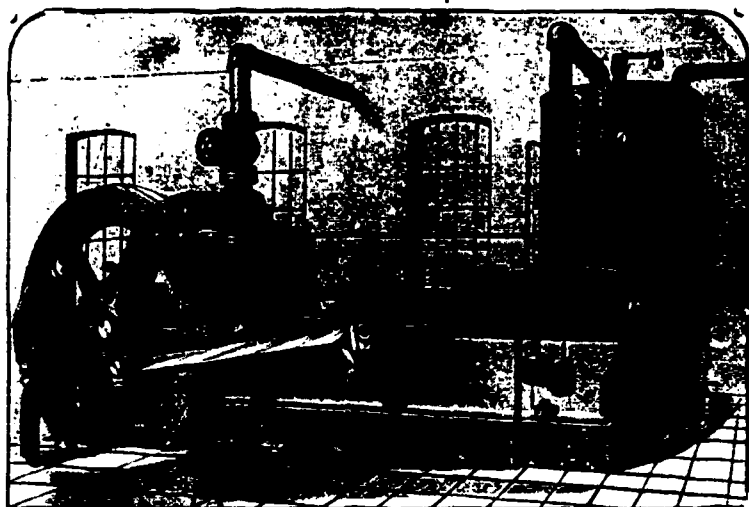
E. MIALL,  
Commissioner.

15th Dec., 1887.

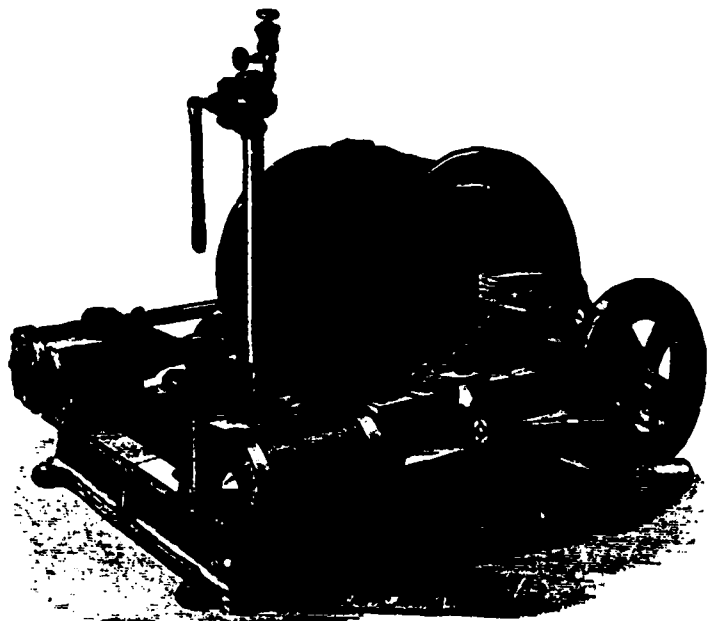


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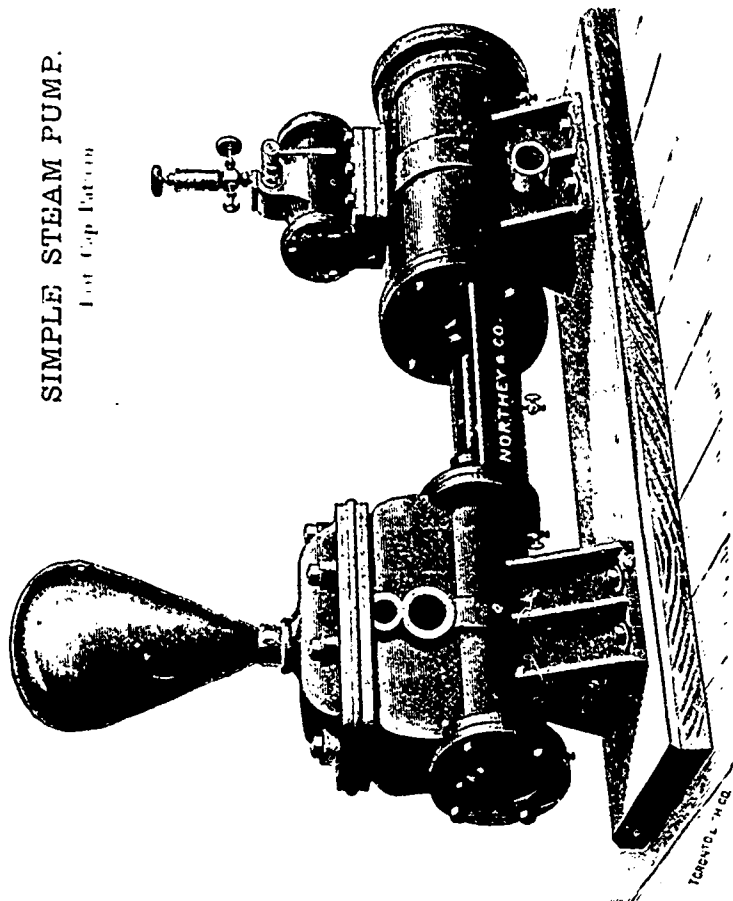
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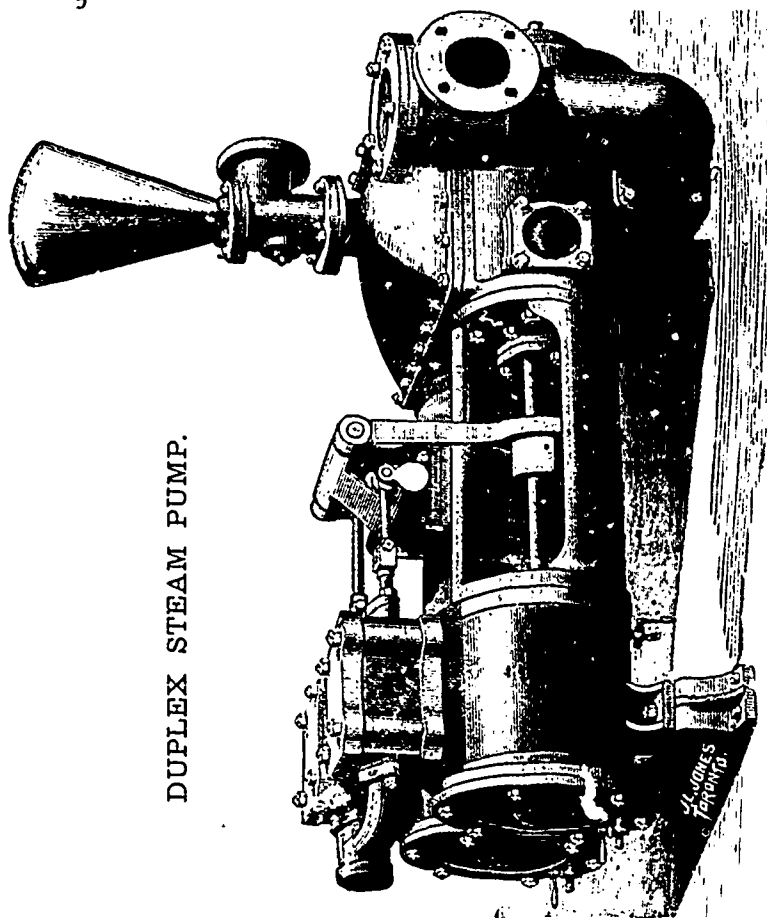
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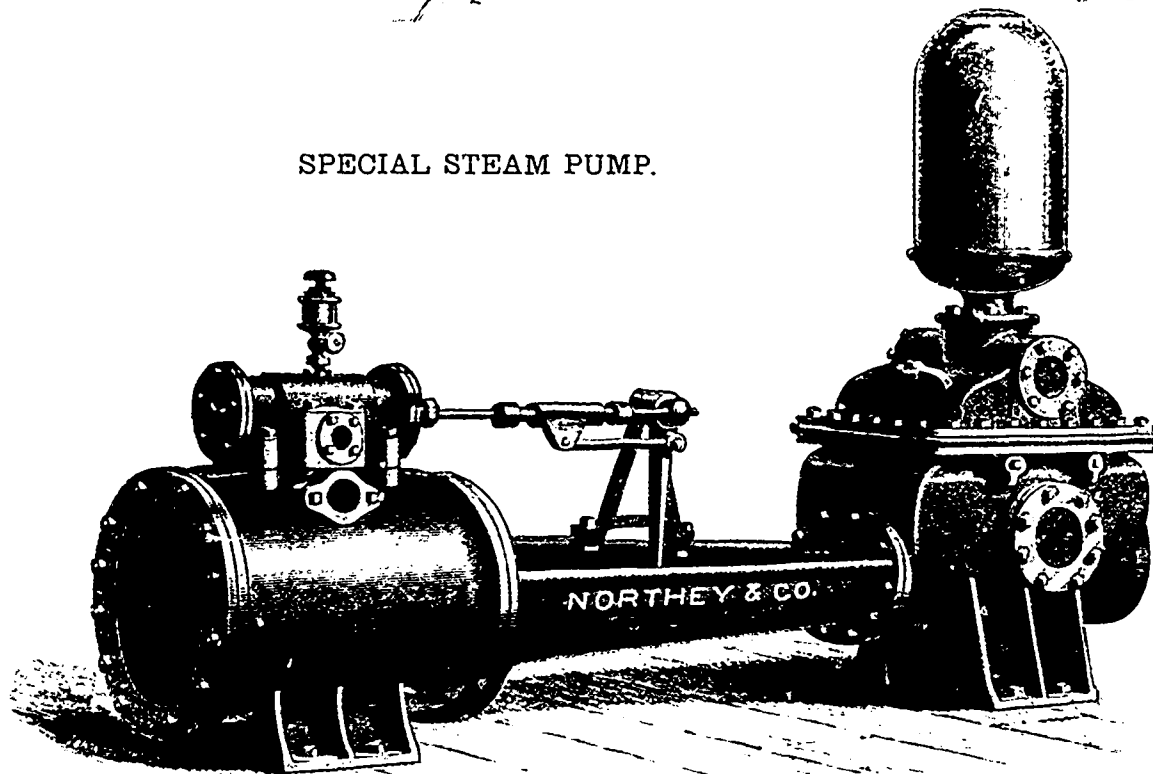
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# Mining Regulations

TO GOVERN THE DISPOSAL OF

## Mineral Lands other than Coal Lands, 1886.

THESE REGULATIONS shall be applicable to all Dominion Lands containing gold, silver, cinnabar, lead, tin, copper, petroleum, iron or other mineral deposits of economic value, with the exception of coal.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein, either by surface or subterranean prospecting for mineral deposits, with a view to obtaining under the Regulations a mining location for the same but no mining location or mining claim shall be granted until the discovery of the vein, lode or deposit of mineral or metal within the limits of the location or claim.

### QUARTZ MINING.

A location for mining, except for iron on veins, lodes or ledges of quartz or other rock in place, shall not exceed forty acres in area. Its length shall not be more than three times its breadth, and its surface boundary shall be four straight lines, the opposite sides of which shall be parallel, except where prior locations would prevent, in which case it may be of such a shape as may be approved of by the Superintendent of Mining.

Any person having discovered a mineral deposit may obtain a mining location therefor, in the manner set forth in the Regulations which provides for the character of the survey and the marks necessary to designate the location on the ground.

When the location has been marked conformably to the requirements of the Regulations, the claimant shall, within sixty days thereafter, file with the local agent in the Dominion Land Office for the district in which the location is situated, a declaration or oath setting forth the circumstances of his discovery, and describing, as nearly as may be, the locality and dimensions of the claim marked out by him as aforesaid; and shall, along with such declaration, pay to the said agent an entry fee of FIVE DOLLARS. The agent's receipt for such fee will be the claimant's authority to enter into possession of the location applied for.

At any time before the expiration of FIVE years from the date of his obtaining the agent's receipt it shall be open to the claimant to purchase the location on filing with the local agent proof that he has expended not less than FIVE HUNDRED DOLLARS in actual mining operations on the same; but the claimant is required, before the expiration of each of the five years, to prove that he has performed not less than ONE HUNDRED DOLLARS' worth of labor during the year in the actual development of his claim, and at the same time obtain a renewal of his location receipt, for which he is required to pay a fee of FIVE DOLLARS.

The price to be paid for a mining location shall be at the rate of FIVE DOLLARS PER ACRE, cash, and the sum of FIFTY DOLLARS extra for the survey of the same.

No more than one mining location shall be granted to any individual claimant upon the same lode or vein.

### IRON.

The Minister of the Interior may grant a location for the mining of iron, not exceeding 160 acres in area, which shall be bounded by north and south and east and west lines astronomically, and its breadth shall equal its length. Provided that should any person making an application purporting to be for the purpose of

mining iron thus obtain, whether in good faith or fraudulently, possession of a valuable mineral deposit other than iron, his right in such deposit shall be restricted to the area prescribed by the Regulations for other minerals, and the rest of the location shall revert to the Crown for such disposition as the Minister may direct.

The regulations also provide for the manner in which land may be acquired for milling purposes, reduction works or other works incidental to mining operations.

Locations taken up prior to this date may, until the 1st of August, 1886, be re-marked and re-entered in conformity with the Regulations without payment of new fees in cases where no existing interests would thereby be prejudicially affected.

### PLACER MINING.

The Regulations laid down in respect to quartz mining shall be applicable to placer mining as far as they relate to entries, entry fees, assignments, marking of localities, agents' receipts, and generally where they can be applied.

The nature and size of placer mining claims are provided for in the Regulations, including bar, dry, bench creek or hill diggings, and the RIGHTS AND DUTIES OF MINERS are fully set forth.

The Regulations apply also to

### BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

The GENERAL PROVISIONS of the Regulations include the interpretation of expressions used therein; how disputes shall be heard and adjudicated upon; under what circumstances miners shall be entitled to absent themselves from their locations or diggings, etc., etc.

### THE SCHEDULE OF MINING REGULATIONS

Contains the forms to be observed in the drawing up of all documents such as:— "Application and affidavit of discoverer of quartz mine." "Receipt for fee paid by applicant for mining location." "Receipt for fee on extension of time for purchase of a mining location." "Patent of a mining location." "Certificate of the assignment of a mining location." "Application for grant for placer mining, and affidavit of applicant." "Grant for placer mining." "Certificate of the assignment of a placer mining claim." "Grant to a bed rock flume company." "Grant for drainage." "Grant of right to divert water and construct ditches."

Since the publication, in 1884, of the Mining Regulations to govern the disposal of Dominion Mineral Lands the same have been carefully and thoroughly revised with a view to ensure ample protection to the public interests, and at the same time to encourage the prospector and minor in order that the mineral resources may be made valuable by development.

COPIES OF THE REGULATIONS MAY BE OBTAINED UPON APPLICATION TO THE DEPARTMENT OF THE INTERIOR.

**A. M. BURGESS,**

Deputy Minister of the Interior.

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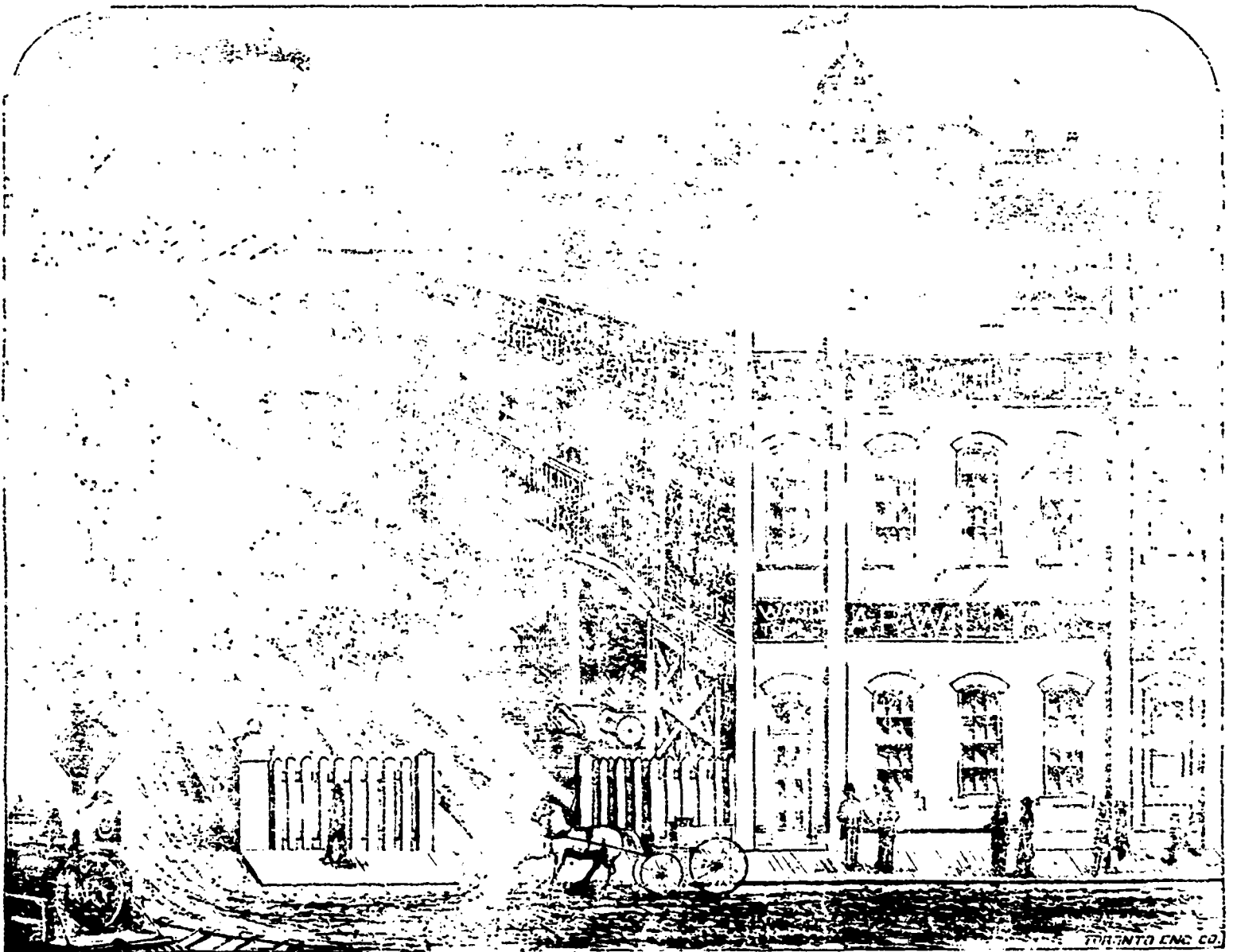
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