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The Canadian Mining Review

Established 1882

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ONTARIO

Mining Regulations.

The following summary of the principal provisions of the General Mining Act of the Province of Ontario is published for the information of those interested in mining matters in the Algoma District, and that part of the Nipissing District north of the Mattawan River, Lake Nipissing and French River.

Any person or persons may explore for mines or minerals on any Crown Lands surveyed or unsurveyed, not marked or staked out or occupied.

The price of all lands sold as mining locations or as lots in surveyed townships is two dollars per acre cash, the pine timber being reserved to the Crown. Patentees or those claiming under them may cut and use such trees as may be necessary for building, fencing or fuel, or for any other purpose essential to the working of mines.

Mining locations in unsurveyed territory shall be rectangular in shape, and the bearings of the outlines thereof shall be due north and south, and due east and west astronomically, and such locations shall be one of the following dimensions, viz: eighty chains in length by forty chains in width, containing 320 acres, or forty chains square, containing 160 acres, or forty chains in length by twenty chains in width, containing 80 acres.

All such locations must be surveyed by a Provincial Land Surveyor, and be connected with some known point or boundary at the cost of the applicant, who must file with application surveyor's plan, field notes and description of location applied for.

In all patents for mining locations a reservation of five per cent. of the acreage is made for roads.

Lands patented under the Mining Act are free from all royalties or duties in respect to any ores or minerals thereon, and no reservation or exception of any mineral is made in the patents.

Lands situated south of the Mattawan River, Lake Nipissing and French River are sold under the Mining Act at one dollar per acre cash.

Affidavits showing no adverse occupation, improvement or claim should accompany applications to purchase.

A. S. HARDY,

Commissioner

Department of Crown Lands, Toronto.

Limestone Quarries Near Birmingham, Alabama.—The limestone quarries belonging to the Birmingham Mining and Manufacturing Company have only been recently opened up. In quarrying the stone compressed-air rock-drills are used. Holes are bored 30 feet in depth; they are then charged with dynamite, and blasts are made regularly twice a month, electricity being used to explode the dynamite. Each blast usually dislodges 10,000 tons.

Safety Dynamite.—One of the most fruitful sources of accident in the use of dynamite is the thawing process which has to be resorted to in cold weather, as dynamite solidifies and becomes frozen at a comparatively high temperature. Miners and quarrymen are, or should be, always provided with simple apparatus for safely thawing frozen dynamite, but, unfortunately, they are greatly addicted to the reprehensible practice of placing it on the hob of a fireplace or in the oven, in order to save time and trouble. The result of these malpractices are but too frequently premature explosion and loss of life. If, therefore, dynamite could be rendered uncongealable by removing the freezing point, the thawing process would not have to be resorted to, and accidents from dangerous and prohibited methods of carrying it out could not occur. This is exactly what Herr von Dahmen has done in the safety dynamite invented by him. By the addition of a very simple substance, itself an explosive, he has succeeded in rendering dynamite uncongealable, and therefore in causing it to remain permanently plastic; and this is effected without diminishing its explosive force after having been subjected to exceedingly low temperatures. Safety dynamite is slightly more powerful than ordinary dynamite, owing to the ingredient which prevents it from freezing being an explosive. In some experiments lately carried out with the two kinds of explosives, cartridges of each were exposed to a temperature of minus 15.° to 20.° Centigrade for twenty four hours—minus 15.° Centigrade corresponding to zero Fahrenheit, or 32 degrees below freezing. At the moment of use the two explosives had a temperature of minus 15° Cent. The ordinary dynamite was frozen as hard as a piece of wood, so that the capped fuse could not be inserted in it, but was tied to the bare dynamite. Only the detonator exploded, scattering the inert dynamite about in fragments The safety dynamite, the same temperature, remained perfectly soft and plastic, and the capped fuse was easily inserted in the body of the cartridge. The explosion and its results were similar to those of similar charges of safety dynamite which had not been subjected to the action of the freezing apparatus. A cartridge of safety dynamite taken from the freezing apparatus and having the capped fuse tied to it (as in the case of the ordinary dynamite when frozen hard) was exploded with perfectly satisfactory results. These experiments prove that Herr von Dahmen has succeeded in eliminating the freezing point from dynamite, or at least in so far lowering it that it cannot at present be reached. By so doing he has greatly enhanced its safety and practical value. Time will not have to be expended in thawing it, nor will dangerous practices have to be resorted to by the thoughtless and foolhardy in carrying out that process in the rash hope of saving a little of that time. In addition to this, safety dynamite can be used with full useful effect at temperatures at which ordinary dynamite is inert and useless.—*Times.*

Compressed Fuel.—We are informed that a machine has been designed and patented to make coal dust into fuel in an entirely novel form, and at a very low cost. The first machine, which is the property of a strong Liverpool syndicate, is now in process of construction, and it is computed that it will compress and turn out ready for use about 30 tons of fuel per day. It is intended to form a limited company to work the invention, and they anticipate a very large sale, both for the machines and for the fuel, which, it is stated, will be considerably cheaper than ordinary coal.—*Colliery Guardian.*

British Boiler Explosions.—It can hardly be regarded as satisfactory that, notwithstanding the combined efforts of legislation, and of inventors of safety-promoting appliances and improvements in boiler construction, the number of boiler explosions and the consequent loss of life which took place during the statistical twelve months embraced in the period (1887-1888) just reported upon by the Secretary of the Board of Trade upon the working of the Boiler Explosion Act of 1862, shows no improvement, but what can be only regarded as retrogression. During the 12 months referred to the number of boiler explosions was 61, and the number of lives lost thereby 31. In the five twelve months previous the figures were :—

Year.	Cases.	Lives lost.
1882-83.....	45	 35
1883-84.....	41	 18
1884-85.....	43	 40
1885-86.....	57	 33
1886-87.....	37	 24

Of the past year's disasters the chief cause has again been the practice of using boilers which are either worn out or are seriously defective; 31 out of the 61 explosions were attributable to this, while of the remaining 30, 17 were due to defective designs and fittings, or undue working pressure, seven to ignorance or neglect of the attendants, and six to miscellaneous causes.

Improvements in Safety Appliances in Pit Shafts. The most recent invention for securing safety while raising or lowering men and materials in mine shafts is an apparatus patented by Mr. Henry James Warrington, mining engineer, and Mr. Albert Mayer, mechanical engineer, at the Berry Hill Collieries and Ironworks, near Hanley, Staffordshire. Pairs of gates are fixed at the entrance of roadways or insets in mines or in any place where cages, lifts, or hoists, or other means of raising or lowering persons or things acted by suspended ropes or chains. The gates communicate by means of levers with a lever slightly projecting into the pit shaft or inset. As the cage, litt or hoist passes up and down, it comes into contact with and presses against the projecting lever in such a way as to move the levers communicating with the gates, which are thereby kept open while the cage, lift or hoist remains in position to receive wagons or men, and to reclose the gates as soon as the cage, lift or hoist has passed above or below. The projecting lever can be pulled back and prevented from working if desired, still leaving the gates closed. Levers are attached to the bottom of the gates, which, by means of connecting rods, block the line of rails when the gates close, and leave the rails clear when the gates are open. What Messrs. Warrington and Mayer claim for the patents is the arrangement and construction of mechanism for automatically opening and closing the gates fixed at the entrance of roadways or insets of mine shafts, consisting of levers attached to the gate-posts and connected through rocking shafts and connecting rods to a lever, one end of which is made to project into the pit shaft, so that the passing cage presses it up or down and opens the gates, which, after the passing of the cage, are automatically closed by means of the counter-weight on one of the rocking shafts; also the arrangement of blocking apparatus, consisting of a sliding bolt or bar for blocking the rails, which sliding bolt or bar is actuated by an arm on one of the gate-posts acting through a rocking-shaft and connecting rods. The apparatus will soon be brought into practical operation at Berry Hill. Meanwhile, we have had an opportunity of inspecting a large model. The arrangement seems easy of application, and renders next to impossible an accident in consequence of any one falling down the pit mouth or into the sump from the pit bottom or from any intermediate workings. One of her Majesty's inspectors of mines, and also other scientific gentleman, have seen the model, and pronounced the apparatus to be admirable for the saving of life and property. There is at the same works a model of an adaption of the same principle for warehouses, hotels, or any other large buildings where hoists are needed, one, two, or more stories high. It is undoubted that the application of this system would greatly reduce the number of accidents.—*Colliery Guardian.*

Carbonic Acid Gas In Mines.—The fact that a few days ago three men were suffocated in an ironstone mine at Cleator Moor by carbonic acid gas, shows how necessary it is that all mines should be ventilated to such an extent as to prevent accumulation of gases in them. In all mines, it may be stated, carbonic acid gas is produced in more or less quantities, by the breathing of the work people, by putrid fermentations, by the combustion of lights, and that it is generated by fire, as was the case at Cleator Moor. When the gas is inhaled it acts as a poison, and combined with atmospheric air in a greater proportion than 8 per cent. there is danger of suffocation. Even when inhaled in small quantities, as no doubt it is in almost every mine, its effect is injurious, yet there is no difficulty in keeping the quantity down to such a proportion that it will not affect those who have to spend many hours daily underground and where it accumulates. The great antidote is fresh air, and this under ordinary circumstances there should not be the slightest difficulty in providing. Yet carbonic acid gas can be utilized for various purposes, even in connection with mining. When the air contains only one-tenth part of it a fire can be extinguished by its means, and water dissolves a volume nearly equal to its own by atmospheric pressure, whilst notwithstanding the peculiar properties which all gases possess of mixing with each other, the carbonic acid, owing to its great specific gravity, is always found accumulated in the lowest parts of our mines—hence the necessity of making the air permeate every portion of underground workings, so that the gas can do no injury to the men whilst following their employment. At Cleator Moor, however, a fire had taken place causing the men to be suffocated by the gas given off. Yet carbonic acid gas is the most effectual extinguisher of fire, and there is no doubt that it is the principal ingredient used by certain of those who invent fire extinguishers. In Germany, carbonic acid gas is compressed into a liquid state and placed in a receiver of sufficient strength to bear a pressure of 250 lbs. to the square inch, and is then by means of pipes sent into a receptacle made for the purpose of receiving it, and in this state it has become an article of considerable commercial value, for when a fire takes place the liquid can be taken direct to it, and being thrown on to it combustion becomes impossible, and the flames are speedily put out. Instead, therefore, of the gas being allowed to remain in a mine to the injury of all concerned, there does not appear to be any reason why it should not be drawn off, made of some value, and by this means render mines healthy. Carburetted hydrogen, or firedamp, as it is generally termed, the greatest foe hitherto known to the coal miner, has been rendered harmless, and instead of being looked upon as dangerous and destructive, has been utilized. At the Wurm Mines, near Aix-la-Chapelle, long noted for the large quantities of firedamp given off, the director of the mines has been able to draw away the damp by means of a suction pump and of a conduit, wire gauze being placed in the latter leading to a gasometer, from which pipes lead to two generators, which are heated by steam. If this can be done with firedamp—the lightest of all gases (it is always found in the roof where it is given off in the mine)—there should be even less difficulty with carbonic acid gas, which in all mines accumulates at the bottom.—*Colliery Guardian.*

A Motor for Coal Hauling Purposes.—This motor, which has been designed by Mr. J. B. Corey for use in hauling coal from the pit, is mounted on a truck 16 feet long. The boiler is horizontal, with working cylinders attached to its side. The rope used in hauling is coiled round a grooved wheel which has cogs on either side. These cogs mesh with a small gear-wheel on the engine shaft. The slack of the rope is taken up by levers which regulate the tension. The machine is in successful use.

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The Springhill Coal Trouble.

Much has been said and written of late with reference to the injustice of the Intercolonial railway in having suddenly and without notice sprung upon the coal companies a rise of one-tenth of a cent per ton per mile on the freight rate on coal from the Nova Scotia collieries to the upper Provinces, which precipitate action has, it is alleged, seriously embarrassed the operations of these collieries. To us it did appear surprising that the Intercolonial authorities should act in so hasty a manner in such an important matter, giving no warning whatever to the managers of the mines that it was in contemplation to raise the rate. We have, however, made enquiry into this matter, and are informed that in June, 1883, notice was given that a rate of three-tenths of a cent per ton per mile would be fixed on coal going to the upper Provinces, which rate would remain in force for three years from that date At the expiration of this period, in June, 1886, it was intimated to the managers of some of the collieries that it was the intention to raise the rate to five-tenths of a cent. The manager of the Springhill colliery pleaded that the companies had made contracts for the year on the old basis, and that it would be very prejudicial to the coal interests if the increased rate was put in force, and it was agreed to postpone it a year. It thus ran on until January, 1888, when the Springhill Coal Company wrote stating that they were about to tender for the supply of large quantities of coal to the Grand Trunk Railway. They were informed that it was in contemplation to raise the rate of freight over the Intercolonial railway to five-tenths of a cent per ton per mile, and other colliery companies were also notified the same spring of the intention to raise the rate five-tenths. The colliery companies after this entered into large contracts presumably based on the increased rate of freight, and therefore had the benefit of the delay in raising the rate until 1st December last. In the meantime the Springhill Company's directors had intimated that the five-tenths of a cent was too heavy a rise, that four-tenths would be acceptable, and on the 1st of December this rate went into force.

These are the facts as they have been related to us, and if they are as stated, the colliery companies appear to have been treated with more consideration than we had supposed,

The Ontario Mining Commission.

The Royal Commission on the Mineral Resources of Ontario having finished its field work and the recording of evidence at the mines, we propose to give a short sketch of the progress which the Commissioners have made up to the present time. Short accounts of their movements and of the evidence taken appeared from day to day in some of the Toronto papers, in the form of letters from their own correspondents with the Commission.

The object the Government had in view in appointing this Commission was "to inquire into and report upon the mineral resources of the Province and the best means for their development." It, therefore, became necessary for the Commissioners to visit the principal mines or mining districts in order to inspect them personally and to ascertain what is being done. While on their visits they took evidence, on oath, both verbally and in writing, from the different classes of mining men. After seeing for themselves and obtaining the opinions of those most familiar with the various mining properties, they are, no doubt, in a good position to form a sound judgment regarding them. They also obtained plans, sections and photographs of mines, quarries, machinery, etc., and as all the evidence was sworn to and recorded on the spot where the Commissioners had the means of checking it when advisable, it is much more reliable than if obtained in any other way.

They appear to have succeeded in ascertaining the views of all classes interested in mines or mining property from the wealthy capitalist to the poor prospector and explorer. In addition to the large amount of information which seems to have been gathered as to our mines and minerals, the witnesses examined were allowed to express their opinions or make any statements they wished on such subjects as the existing mining laws of Ontario and other countries, trade relations affecting our mineral resources, the difficulties or advantages, the aims or the hopes of mining men in Ontario. They had also submitted to them a variety of proposals regarding schools or courses of instruction for miners and prospectors, geological surveys, assay offices, stamp mills, smelting works, &c., with Government aid.

It will be remembered that the Commission consists of five members, John Charlton, M.P., chairman; Dr. R. Bell, the Assistant Director of the Geological Survey, W. H. Merritt, A.R.S.M., Wm. Coe, Esq., and A. Blue, Secretary. In order to save time and the better to cover the ground the Commissioners were seldom all employed in one section of the country at the same time. Messrs. Charlton, Blue and Merritt began work at Grand Manitoulin and La Cloche in the end of July. At Sault Ste. Marie they were joined by Dr. Bell, when the Garden River and Echo Lake regions were examined. A visit to the native copper mines of Maimanse and Michipicoten Island was next on the programme, but had to be postponed. The party then proceeded to the township of Denison and thence to the Sudbury copper district, where much valuable information was obtained, a report of part of which has already appeared in these columns. The Commission then moved west to Port Arthur, where several sessions were held, and a visit was paid to the silver mines. After this the members separated, Messrs. Blue, Merritt and Coe going on to Lake of the Woods and afterwards by rail, via Winnipeg and Duluth, to the iron region which is now being worked at Tower in Northen Minnesota, for the purpose of comparing it with our own iron districts. In the meantime Dr. Bell, assisted by Mr. Donald McKellar, proceeded by canoe with a party of Indians to examine the gold-bearing veins of the Partridge Lake region and the great iron beds of the Antler River, about 150 miles west of Thunder Bay. Dr. Bell also explored the lead district lying beyond the township of Dorion, north of the Pacific Railway, and opposite the head of Black Bay, or considerably north of the lead mines previously reported on. Later in the season, Messrs. Blue, Merritt and Coe, visited the Bay of Quinte region, the route of the Kingston and Pembroke Railway and Ottawa city; and finally Dr. Bell and Mr. Merritt made a tour of the salt and gypsum regions and, along with Mr. Blue, the same gentlemen took evidence in the Enniskillen oil-field. A full meeting for taking evidence was held in Toronto in December, and when it adjourned Messrs. Charlton and Blue paid a visit to Washington and Pittsburg in the United States, in order to collect information on the working of mining laws and on iron smelting and natural gas, which will give additional value to the Report of the Commission.

This Report will be presented to the Legislature during the present session and will doubtless prove an interesting document, and we trust it will not be the last from the same source. The appointment of this Commission by the Ontario Government has given great satisfaction to all classes as a step in the right direction, and we hope it will be continued, and its field of usefulness enlarged, since a single season must have proved too short a time to complete the task it has undertaken. The public has manifested a lively interest in its labors, which have already demonstrated the necessity that existed for such a Commission, as well as the wisdom of our Provincial Government in appointing it.

Investments in England.

Extraordinary activity has prevailed in monetary circles in England during the past year. It was supposed that the many failures that had occurred among our limited companies and the stringent legislation concerning them would hinder their promotion; but we learn from published accounts that the very opposite has occurred.

"The returns of joint-stock enterprises at Somerset House for the year just ended are re-

garded as phenomenal. The aggregate capitals amounted to over £400,000,000, as against £168,000,000 in 1887. The returns for the month of December give capitals in the aggregate of £12,232,030, which amount accounts for 162 companies."

A private letter states: "One remarkable feature is the fact that so many of the large companies brought out are paying the investors. The result of all this floating of companies and arranging foreign loans has helped to make money dear and to tie up the funds of large financial houses in the City."

A late English paper says that the limited liability companies are corporations that have ability to lie without limit. But though this may be so, the investing public are beginning to profit by experience, and a good proportion of the companies they now sustain are worthy of existence.

In the United States capital is plentiful at present and money is to be had in New York at two per cent. per annum, but it is said that "capitalists are timorous and nothing less than a good electrical process of sugar refining will be able to tempt them."

Phosphate Prospects.

The prices of phosphate abroad are tending upward. mainly owing to the advance in ocean freights; but as Canada has as good a chance as ever of securing low ballast rates in the lumber vessels that need phosphate for "dead weight," it appears as though our miners might secure the benefit of the rise, which in case of phosphate carried from other countries goes mainly to the shipowners.

As regards the demand for Canadian product the prospect appears brighter than ever before. It is authoritatively stated that the deposits in the district of Somme, France, which have been so formidable a competitor of late will be exhausted in about two years, and there are even reports that the Carolina output is likely to become less. When it is considered that these deposits in the Carolines are usually only from 12 to 18 inches thick lying in a horizontal layer, it can be believed that the output of half a millon tons yearly must ere long begin to tell upon even the vast area through which they extend.

During the past few days we have had cables from London which show that this state of things is having an effect in our favour. The agricultural editor of the London *Times*, Mr. Henry F. Moore, who visited Canada last fall and took particular interest in the subject of our phosphates during his stay in Ottawa, makes this important reference:

"In the discussion which has followed the publication of these facts it has been pointed out that in taking such a pessimist view of the situation Mr. Hermann Voss, the author of a paper read before the Chemical Manure Manufacturers' Association, probably did not allow for the fact that in Canada the phosphate industry is in its infancy; or for the extent of the phosphate lands and the richness of the deposits. This is a matter well worthy of attention, not only from the fact that it appeals to our patriotism, but also because of the interests involved. One of the greatest sources of the future wealth of Canada probably lies in the development of such mineral deposits as are found in the phosphate lands in the valleys of the Lièvre. There are as yet but very small spots tapped, and these are, as a rule, worked by Americans. It has been only within the past few years that a few fore-seeing Canadians have realized the value of these deposits, and even now the chemical manure manufacturers do not seem to be alive to the question. But, in view of the scarcity of, and increasing demand for, phosphates, it may be well to point out that in our nearest large colony we have a source of supply which ought to be worked by British capital, for the benefit of British agriculture. It is impossible to avoid a reference to the *furore* now going on in connection with nitrates, and the large amounts of money now being sent out to South America. It is impossible to see any agricultural demand for nitrates to warrant this, and it must not be forgotten that, as a plant food, nitrates are mere stimulants whose effect is evanescent, and that, if not immediately made use of, they are washed away and lost to agriculture and lost to wealth, whereas the equally essential, but more substantial, phosphates add absolutely to the fertility of the soil, where they remain as safe as a cash balance at one's bankers. To adopt a homely simile, the nitrate is like a glass of spirits, while the phosphate may be compared to a plate of beef. The cry of the manure manufacturers should be answered by attention being directed to the rich phosphate deposits of Canada."

In the *Morning Post* Dr. Fream also has much to say on the subject. As to the value of the deposits, he remarks:

"The extensive deposits of apatite in Canada, occurring in Ottawa county and along the banks of the Lièvre River, are familiar enough to geologists. These deposits have for some years been the seat of a quietly progressive industry, and freight trains laden with the apple-green mineral are no unusual sight in this region of the Provinces of Ontario and Quebec. These extensive beds of one of the best known of the mineral phosphates of lime are likely to undergo great development in the near future, and thereby our supply of raw phosphates should be for a long time secure, unless, as is certainly not improbable, the local demand in Canada, as in South Carolina, should compel us again to look elsewhere."

Another very noticeable feature is the prominence given to our phosphate industry in the report just issued by our own Minister of Agriculture. After reviewing in an interesting manner the work done at the mines in 1888, the Minister says:

"I continue to hope that the time is not far distant when our own farmers will see the advisability of using this fertilizer at home, which would have the effect of largely increasing this mining industry. Latest advices from Great Britain show that Canadian phosphate is prominently engaging the attention of superphosphate manufacturers in that country, and the enormous deposits in this vicinity may be expected to receive thereby still more attention than has been the case in the past. I am informed that British agriculturists have been discussing of late the present position of their supplies of phosphate, that most essential element of plant food * * * * At this moment, therefore, special attention is being drawn to our Canadian deposits."

Other phosphates may work out but the Canadian phosphate like Tennyson's brook may sing, "I go on for ever." Though phosphate seams are irregular and often disappointing, still they persist downward, and on those properties where a good number of seams exist, so that several pits can be worked, a good result is probable, for when one seam is pinching another expands, and the average of all furnishes a good result. Occasionally a single pit is found to be sufficient for successful work, but as a rule a multiplication of chances is desirable in this as in other undertakings.

An English letter dated December 22 says, "Trade here on the whole is better; the manure manufacturers are energetically looking into their business and have had a large meeting in London. The question of supplies is being talked of and it is particularly noted that all the Somme phosphate that is at present known of will be worked out in three or four years On the whole things seem to indicate a further outlook for deposits of good stuff, such as exist in Canada, and land sales should become possible at remunerative figures."

The Ontario Land, Timber and Mining Regulations.

We have received from Messrs. Carswell & Co., Toronto, a very handy little volume containing a complete set of the Acts respecting land, timber, mining, game, streams, etc., for the province of Ontario, carefully compiled, and with explanatory notes by Mr. H. R. Hardy, barrister-at-law, Toronto. The book is neatly gotten up and should be of great value to miners, lumberman locaters, and settlers on free grant lands; we can also commend it to the attention of the legal profession to whom it will serve as a convenient hand-book. The notes on the various Acts are explicit and comprehensive. The price of the book is one dollar.

"He Never Will Be Missed?"

We learn upon very good authority that C. M. De Tracey Dobson, an individual styling himself a mining expert, and who has recently been posing very prominently in this capacity in the Toronto press, has departed to a more congenial clime. The many and varied peculiarities which have so distinguished this party's career since he first made our acquaintance some three years ago, would prove most interesting reading had we space to give it in detail. It is sufficient to add that his departure from Canada is a positime gain to the mining community. Chicago papers please copy.

LETTERS TO THE EDITOR.

Natural Gas in Canada.

PITTSBURG, February 4th, 1889.

The Editor

THE CANADIAN MINING REVIEW:

Sir,—I see from a copy of the REVIEW for the month of November, '88, in which Prof. Alfred R.C. Selwyn calls attention to a reported interview with myself, published in the *American Manufacturer* of this city. I was in Colorado the last three months of last year and did not receive the REVIEW until the first of this year, and sickness in my family for the past month has prevented my replying until now.

I did not see the *American Manufacturer* of August 24th, '88, nor was I ever interviewed by a reporter of that publication that I am aware of. In July last I visited the province of Quebec, Canada, and after my return I was visited by a reporter of the press of this city, and in the interview I said that I did not think it was possible for the Trenton formation to produce gas or oil in paying quantities in the Province of Quebec, where the Trenton limestone out-

crops at the surface, or where the Trenton limestone had but a slight covering above it; but I expressed no opinion in regard to Canada. I know of no reason why gas and oil should not be found in the Province of Ontario, and in the North-West Territory in paying quantities, as Prof. Selwyn suggests. I am,

Yours, etc.,

E. C. BEARDSLEY.

The Springfield Coal Trouble.

NEW GLASGOW, N. S., 20th Feb., 1889.

The Editor

THE CANADIAN MINING REVIEW:

SIR,—The Intercolonial railway has increased its freight rates on coal to such an extent that it virtually closes the Montreal market for rail shipments, and will enable the Americans to lay coal down in Montreal by rail at a lower rate even than the Springhill collieries, which are the nearest mines to that city. Our former rate from New Glasgow to Montreal was $2.80 per ton of 2,240 lbs. This has now been increased to $3.46 per short ton of 2,000 lbs., which, I think you will admit, is a very large advance. For instance, a car of 20½ tons, say from Stellarton to St. John, Que., used to cost $60.88; the new rate makes it cost $81.65, or a difference of $20.87 per car, or about $1.00 per ton.

That the management of the Intercolonial has made a very great mistake in this matter, is admitted by everyone, but mismanagement on this line is no uncommon thing, and it ever will be so, as long as the business of the road is conducted as it now is.

I am, etc,

COLLIER.

Mining Economics.

VANCOUVER, B.C., 10th Feb., 1889.

The Editor

THE CANADIAN MINING REVIEW:

SIR,—I think I may state, without fear of any contradiction, that mining consists in producing the greatest possible results at the smallest expenditure of time, labour or money, as the results are effected by these factors. In respect to industrial or any active pursuit time implies labour, otherwise suspense, both of which conditions relatively influence results in one direction or another. What would be a satisfactory return of an investment for one year would be very unsatisfactory if the same investment only aggregated as much in ten years, and just as great a difference may eventuate, and often does, from the exercise of rigid economy, and, *vice versa*, from the neglect of it. Economy is much more frequently hackneyed in expression than it is honoured in practice. It is one of the prudential virtues, or one of the virtues of prudence, or the prudence of virtue itself, whose principles are not generally well understood. Niggardliness is no part of it, conduces not to it; but, rather to the contrary, tacitly opposes itself to its proper action, impedes its progress, and vitiates, if it does not utterly exclude, its beneficial purposes and designs. True economy embraces the salient feature of opposite extremes. It is liberal and conservative, but judiciously so in each regard—liberal when generous subscriptions to one end will proportionately accomplish greater and better results than if a sparing hand had been exercised and the essential aid to its accomplishment withheld or curtailed; on the other hand, it is conservative where doubt is implied and where it is not evident that a suspension or abridgment of generosity means the conservation of so much money. In respect to mining it pertains to purchases, including the mine itself, or the rights acquired in regard to it; the adaptability, utility and application of mechanism, material and manual employments. Also of its produce—its conservation when required in the crude state, the cost and completeness of its reduction, whether to the metallic state or approximately by concentration or other mechanical manual appliances. There is latitude here for laxity and waste, but equal scope for economy and gain, apart from the detail of practical proceedings, which I do not propose to enter into on this occasion; but I will merely state in passing that there is nothing more pernicious or fatal in the exercise of economy in the underground department of mines than the working them on day work, that is, to pay so much per day, as is prevalent on this continent, whatever the qualifications of the men may be, their skill and general competency. The emulation is retrograde and downwards, the best and most experienced hands trying "how not to do it," in order to equalize the efficiency of their services with that of the unskilled, unpractical and unequal co-miners. Their remuneration being alike, why should not the amount and value of their labour and service (in irony of reason) be equal? Any superintendent of mines or railroads has made this observation. I have no hesitation in stating that until this pernicious system and custom is abolished, economy in one of the most vital departments of practical and profitable mining can never prevail. It came, without doubt, I think, from the employment of practically incompetent and ignorant superintendents in the first place, and agreeing with the majesty of labour on this continent was readily and generally adopted, stereotyped and established—not permanently; it is to be hoped that can and never will be. It can easily be dispensed with and relegated to the limbo of inconsistencies, and be superceded by a method more manly, rational, consistent and profitable. Let all underground work, or so much of it as can, as in Germany and England, in fact all over Europe, be done on contract, and for a time, at least until the system becomes recognized and understood, be open to all competitors. It would soon be found that, from the affinity which skilled labour has for its kind, an evolution would ensue from the process of such rational and natural selection as patent and potent as the development of species according to the Darwinian theory ("which would be good and true if the missing link was found") by which the fittest would survive. Each then would soon find his proper place and level, as experienced men are never willing to share the proceeds of their labour with incompetent partners, and emulation would be rife in different sections of the mine, each one trying to outvie with others in the despatch of work, prompted by the laudable ambition of superior excellence and its consequent pecuniary advantages. Of the auxiliary sciences pertaining to mining the two most important are mechanical philosophy, engineering, and experimental chemistry. There can be no doubt but that mechanical engineering is equal to all the requirements of modern mining, to whatever extent or depth it has been or may be prosecuted; it is only a question of adaption—its proper application and economy. But experimental chemistry, in its relation to the practical reduction and value of ores—that is, on a commercial, workable scale—of the precious and other metals, appears until recently to have been, if not totally inactive, very much neglected. It seems strange, from what is now known of the humid process recently introduced on this continent, that experimentation in respect of it should not have been rife a quarter or more of a century ago, seeing that thousands of tons of good ore were excluded from reduction by amalgamation by heavy charges, a serious percentage of loss demanded for and incident to the working by that method. The new process has caused an entire revolution in silver mining, and silver and gold associated. In a country like this, where we have all kinds of ores, ranging from a few dollars to fifty and hundreds per ton—the higher grade value considered medium—as a less value would not ordinarily be remunerative to the miner essaying to mine his own ores in such districts where as yet there is no ready railroad communication, and having reduced them at a Customs mill, the difference between which and the profitable working of ores of considerably less that half of the minimum value as above, say ten to twenty dollars per ton, is a *desideratum* to both companies and miners of incalculable value, not to be over-rated or likely to be fully appraised at its true worth until taught by experience, so great is the change. Companies will realize more largely than private individuals by the improved method, as they may be premised to qualify and provide for every utility of economy and gain by providing their own reduction works, as conveniently arranged and suitably adjusted as possible, which very few, if any, independent prospectors or individual miners are able to do. A twenty stamp battery will reduce for the leeching process thirty tons per day, the cost of which and its further reduction to the metallic state, together with the higher average percentage at which the ores can be worked, will amount to from ten to fifteen dollars per ton, and, as in this province for that kind of work Chinese and Indian labour can be employed, to even much less than that sum, as compared with the best appointed amalgamating appliances, or a difference on the lowest calculation on a capital of $500,000 of $100,000 per annum, equal to a profit of 20 per cent. difference between the two methods. I am convinced that I neither overrate nor exaggerate the difference or the result, and when it is remembered that immense quantities of ores which will not begin to pay by the old prevalent method of their reduction by amalgamation will be profitably available by the leeching process, it is not too much to affirm that a new era has dawned upon mining in this province as soon as the leeching and Russell methods are introduced here, and that what heretofore were regarded as profitless enterprises, in many instances even worse than profitless, may now be hailed and regarded with almost unerring confidence as prolific sources of wealth, amply sufficient to remunerate their patrons and supporters and creditably figure in the annals and prestige of any state or province. Besides which, recently undeveloped fields of mineral wealth will burst into prominence, because hitherto unregarded from the customary cost of reducing the ores added to the almost prohibitory intermediary charges; the entire proceeds of much more than good average ores were very frequently engulfed. As a producer from the raw material from which the metals of commerce are extracted—in other words, a miner largely interested in the results of economics of this or any other kind—I hail the advent of the above mentioned new processes, as it has already revolutionized silver mining over the greater part of this continent, and should

be adopted everywhere, transposing the principal terms of a trite dictum, and render success in mining the rule instead of the exception. I am fully convinced that it is the province of economy, and within its legitimate scope, to effect changes in mining the result of which, if prosecuted to its normal limits, would not only perfect the revolution referred to, but eliminate from it the stigma of being, as in its preliminary stages it is supposed to be, a haphazard enterprise. I have already stated that economy presupposes prudence, and so no industry has greater scope for its exercise from beginning to end than that of mining. It is not one but a many sided system—a system of many parts, from some of which outlets are necessarily open, which, if not properly guarded, exhausting and exhaustive life-blood may both exude and be drawn from its veins, its currents vitiated at the fountain head, its procedure encumbered, and achievements lamentably disappointing. It is most unaccountable, from a rational point of view, that correct business principles upon which so much depends, are so sedulously excluded and so generally ignored in respect of this great industry. It is not the hot haste betrayed for dividends—dividends at any sacrifice, at any cost, regardless of the consequences which so much precipitancy may entail. Investment is lost sight of, supplanted by speculation of the wildest and most reckless kind—stockboard enterprises, the result of which pro and con are set down to the credit or debit of mining, to its debit most frequently. But, *nil desperandum*, the case is not hopeless; order from such confusions of the past will be adduced, and is so to some extent. The solid things in mining are the most permanently impressive, productive and lucrative, and, however agreeably and fascinatingly the similitude of truth may be usurped by fiction, it is but a resemblance of and (within rigid limitations) an imitation of its stern, eternal features and superficial parts. In mining, as in everything else, the fittest will survive, and the time will and has come, hastened by the force of events, chiefly from the realization of intrinsic values, augmented by successive improvements in the applied mechanism of practical purposes and the equally important improvements and economics introduced for converting our ores into metals, the effect of which will be to testify and prove that mining on its merits is more satisfactory and profitable than gambling in stocks, influenced by excitements ranging from blood to fever heat.

W. BREDEMEYER, M.E.,

Cost of Timber in Mining.—How enormous the item of expense for mine timber may become is well known by the reports of the Comstock mines. This proposition is confirmed by Mr. S. F. Parrish, who states that the Crysolite Mine at Leadville, a locality where the Nevada system of square timbering has been perhaps unavoidably followed, during twelve years has used 19,890,864 feet b.m. of timber, 200,000 fect having been used above gronnd and the vast remainder under ground. This has been largely in logs 12 feet long and 12 inches square. It has cost at the mine $135,135. It is certainly the duty of mining engineers to study this subject thoroughly, and to reduce to a minimum the burial of timber in mines.

On the 15th instant the Director and Staff of the Geological Survey gave a most delightful Conversazione in the Museum at Ottawa. Lord and Lady Stanley and suite and many distinguished persons were present.

PHOSPHATE.

In General.

We have it on the authority of Mr. W. J. Poupore, M.P.P., that the proposed bill by the Provincial Legislature to tax the output of phosphate has been withdrawn.

We repeatedly hear complaints from the miners on the Lievre that the facilities at present provided by the Canadian Pacific Railway is wholly insufficient to meet the demands of their important industry, and the construction of raised storage bins at the Buckingham landing is urgently needed for the accommodation of the rapidly increasing traffic at this point. A prominent miner has suggested that the railway authorities would do well to send one of their recently purchased steam cranes, so as to handle the mineral expeditiously.

B. L. Nowell, of the Fertilizing Company, 93 Common street, Montreal, charged at the instance of James Macfarlane with obtaining money, aggregating upwards of $1,200, under false pretences, was on 19th inst. committed for trial trial to the Court of Queen's Bench.

Market.

Advices from England give the following interesting and valuable information:

"Manufacturers in this country have been able to sell superphosphate for export to a very large extent; in fact they have latterly been declining orders or they would have been short of supplies for their own home customers, and consequently, orders for supers for spring delivery are getting somewhat difficult to place; this means that as spring comes on manufacturers will be bare of stuff and large buying will probably take place.

"Farmers pretty generally have had concessions made to them, while stocks on their hands have increased in value twenty to thirty per cent, and agricultural produce is selling freely at good rates; consequently, farmers are likely to be in a better position to pay their manure accounts than they have been for some time.

"Charleston Rock Phosphate which was selling last year at this time for 7½d. per unit, went up till sales were made at 9½d, but latterly business has been done at 9d. As this rock yields much more to the manufacturers than Canadian phosphate, per centage for per centage on allowance has to be made in calculating relative prices, and it is thought to be fair to add about ten units. Thus, if Charleston 55 per cent. is worth 9d., Canadian 65 per cent ought to be worth 9d., and this gives 10d. for 70 per cent.

"The firm that has been working the syndicate which controls the French phosphates from the district of Somme is finding it exceedingly difficult to make deliveries, owing to high freights, and scarcity of tonnage, and in consequence have put their price up to a prohibitory point and asks 13d. which nobody pays.

"The position for the coming season must largely be determined by the question of freight. If freight rates are maintained or no serious reduction takes, place we would expect to get 10d. for 70 per cent, 11½d. for 75 per cent. and 13d. for 80 per cent, and we think it is quite possible that ½d. more than this may be obtainable as there is generally in Canadian phosphate about a halfpenny difference between a market when buyers are enquiring for it and a market when no enquiries are being made and you have to go to the buyers to sell the stuff.

"Charleston freights went up from 12s. 6d. to 27s. 6d. and if the supply of Charleston and Somme is restricted in the spring by high freights, it would be a great help in selling Canadian phosphate.

"At present it appears that the bulk of the increased prices paid in this country will go into the shipowners pockets, but as manufacturers are getting bare of stocks we may manage to get a share of the farmer's money and if tonnage at a reasonable rate could be secured the result to sellers of phosphate in Canada ought to be better than it has been for years. But if owing to the large amount of new tonnage, and other causes, freights should fall in the spring, the prices we have indicated for phosphate here will probably not be procurable."

Freight.

Cable offers have been received from England of 2,400 tons of freight for next season at 10s. per ton. But in view of the large fleet expected to load lumber, which will require phosphate for ballast, much lower rates are expected to prevail.

Sales.

About 500 tons of 80 per cent phosphate have been sold to Germany at 12½d. and several thousand tons of 65 to 70 per cent phosphate have been sold to England on the basis of 8½d. for 65, 2,000 tons of ground phosphate have been sold to the United States and further quantities will be taken in that market.

Latest quotations to hand quote offers at 8d. for 65 per cent, and 9d. for 70 per. cent. with 5d. risk. Sellers offering at a farthing advance.

Lievre District.

Some important developments during the month are announced from the Little Rapids mines. A body of high grade ore has been exposed in an abandoned pit showing a vein six feet in width at the bottom. A large quantity of reserve high grade mineral is to be seen at these mines.

Mr. W. W. Pickford informs us that an endeavour is being made this month to increase the output at High Rock to one thousand tons, and at time of writing there is every prospect of this being accomplished. When the shortness of the month is considered (24 working days) this will be remarkably good work, and a record for these mines. As it has been found that the present fleet is inadequate for the work of the mines, a new scow 70 feet long with a capacity of 85 tons is being constructed.

Templeton District.

Mr. Robert Blackburn states that the new cut at his mines is looking well and work thereon is making rapid progress. The product from these mines for the winter will be fully up to the average of former years. From fifteen to twenty teams are daily employed hauling phosphote to the river.

Kingston District.

Capt. Boyd Smith of Washington, and the proprietor of the well known Blessington mines, sailed for Europe on 30th ult. on business in connection with his phosphate interests. A large business in mining and lumbering is contemplated at his properties in this district. The sawmill is nearly ready for work, and a large number of logs are now banked ready for opera-

tions. Little mining has been done since winter began, but a reopening of the pits is to take place shortly, and a large force of miners is to be employed.

At the Foxton mines work is going on vigorously. A blast fired on the 12th threw down 20 tons of high grade. About 400 tons of the mineral are ready for hauling, and the mine still continues to improve.

Mr Hibbard has found phosphate at the Ell Lake Tunnel.

Mr. Spalding reports favorable prospects on his property, and states that he has recently crossed some small seams that look well.

Mr. Trenholme has struck a paying vein at Mud Lake.

MINING NOTES.

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

Nova Scotia.

The chief topic of conversation among the coal mining communities of Cumberland and Pictou counties has been the increase in freight rates on coal from these counties to Montreal *via* Intercolonial and Grand Trunk railways, which came into force on the 1st of February. There can be little doubt that this increase in the tariff will affect the principal collieries, and especially those at Springhill, where over 1,000 men and boys are already thrown out of employment. The old rate from Springhill was $2.40 per *long* ton, while the new tariff is $3.05 per *short* ton, or an increase of 86 cents per ton. How the matter will be met and dealt with remains to be seen. For the sake of the unfortunates' families—numbering close upon 4,000 persons—who are thus deprived of the means of earning a living, it is to be hoped that some arrangement satisfactory to both parties will be made. The Pictou county collieries have not as yet felt the increase so keenly as those at Springhill.

Work at the Pictou mines continue to be fairly good, and up to the middle of the month there has been no snowstorms to interfere with railway traffic and cause stoppage at the mines.

The Black Diamond colliery pursues the even tenor of its way, working steadily, although with not a very large output. Very slow progress is being made with the drift, which is being driven to test the underlying seam of coal; it is reported that the rock so far encountered is exceedingly hard, much more so than was expected.

At the Drummond colliery, work may be said to be almost steady, but the output, although far above the average for the winter months, is far short of the capacity of the pits; preparatory work is being rapidly pushed forward in the new Lift, and an extensive body of coal will soon be opened there ready to meet the summer demand. Coal has been banked occasionally during the winter, and already quite a large quantity has accumulated. Mining has for the present been suspended in the Scott pit, but it is hoped that on the opening of navigation operations will soon be in full blast again. Work will also, it is expected, then begin at their No. 4 slope, at which, in view of future requirements, some repairs are at present being made to the hoisting engine.

At the Acadia colliery, work is exceptionally good; very little time has been lost except that required in consequence of repairs to some of the machinery.

The reopening of the valuable pits at the Albion collieries is being vigorously pushed forward; at the Foord pit, despite many difficulties and obstacles, good progress is still made, and it is expected that the owners will soon be reaping a substantial and well merited reward for their indomitable perseverance and the enormous outlay entailed. At the No. 2 slope a new pump has been put in position; the handsome new Bank-house has been completed, and it is likely that operations upon an extensive scale will shortly be resumed.

At the Vale colliery nothing is being done by way of mining in the Sixfoot, or Greener seam, but in the old pit, the McBean seam, a very large force is employed, and at no mine in Pictou county has work during the winter been steadier. The output, in consequence, is probably greater than that of any winter since the opening of the mine.

There is no new discovery worthy of note to report as yet from Five Islands, Colchester county. The enterprising Americans carrying on prospecting operations there have, however, met with several small seams of coal in the drifts made. They are now sinking a trial shaft which at last reports was said to be giving very encouraging indications.

A party of Nova Scotia capitalists are doing some prospecting for coal at Economy, in Colchester county, and have, it is said, been rewarded by the discovery of a three feet seam.

The annual general meetings of the shareholders of the Cumberland Railway and Coal Company and the Londonderry Iron Company were held at Montreal on the 13th inst.

The following figures of the shipments of coal by rail west of Chaudere for the past 10 years have been furnished from official sources: 1879, 570 tons; 1880, 10,246 tons; 1881, 30,629 tons; 1882, 35,089 tons; 1883, 54,891 tons; 1884, 112,898 tons; 1885, 165,791 tons; 1886, 175,512 tons; 1887, 198,643 tons; 1888, 184,662 tons.

The falling off in shipments for last year from Spring Hill is due principally to a heavy flow of water in the slopes, which mastered the pumps, throwing the pits idle for a considerable period. In the early part of the year a fire occurred in the south slope, which may have retarded operations some.

The opening of the Joggins railway has given an impetus to the work at this mine, and the shipments show a gratifying increase. Under its present management it is expected to greatly increase the output at this mine. Sinking will be proceeded with at once. The total shipments were 43,255, of which 36,854 tons were round, and 6,501 tons slack. This is the largest output yet recorded by us for this mine, and it is expected to double it this year. The pit worked 277 days. the average number of cutters on the roll was 82, the average number at work daily 52.

The Chignecto Colliery fell a little short in its shipments for 1888 as compared with former years. The capacity of the mine is limited, and no great efforts are being put forth to do a big business. The management is content to do a sure if small business.

Under the management of Mr. Joseph Hudson, the Victoria mine is going ahead. Work will be prosecuted vigorously this year, and the banking of coal will proceed immediately. Of the total shipments 5,712 tons were slack.

The shipments from the Gowrie colleries for 1888 consisted of 87,935 tons round, 20,437 tons slack, and 1,065 tons coke.

The shipments from the Caledonia mines are thought to have been some 500 tons in excess of 1887.

From the Reserve mines the shipments up to 1st January this year, were 94,690 tons round, and 17,211 slack.

Mr. J. H. Bartlett, of Montreal, well known in connection with the Canadian iron trade, has been at Pictou in the interest of the Pictou Coal and Iron Company of Montreal, and has obtained from the County Council a cash subsidy of $20,000, as well as remission of all taxes for twenty years. Mr. Bartlett has made a contract with R. G. Reid, of Montreal, for the construction of a branch railway, ten miles long, leading to the iron mines, and the Dominion Government have arranged to operate the branch as a part of the Intercolonial and provide all the rolling stock. It is estimated that over ten million tons of iron ore can be easily and cheaply mined from the Pictou Coal and Iron Company's mines, which are only seven miles from the Pictou coal mines and ten miles from Atlantic tide water. The prospects of this company are splendid. The location of the blast furnaces has not yet been definitely settled.

The Glace Bay Mining Company have declared a 5 per cent. dividend. An offer of D. J. Kennedy on behalf of the American syndicate, to buy out the company at 75 cents on the dollar, per value of shares was declined; the Glace Bay Company refuses to be swallowed up by the monopoly that seeks to control the Cape Breton coal mines.

Senator Archibald, Messrs. McDougall (Cape Breton), McKeen, McDougall (Pictou), and other Maritime Province members have had an interview with the Ministers of Customs and Finance relative to the duty on bituminous coal. It appears that by the completion of the Massena Springs short Line, Pittsburg and the Pennsylvania coal regions have been brought within 640 miles of Montreal, and the Maritime Province coal men are apprehensive that they will suffer in competition with the American coal fields. The delegation urged that the duty on bituminous coal, which at present is 60 cents a ton, should be increased in order to enable the coal producers of the Maritime Provinces to compete on fairly equitable terms with the Penn-

sylvania coal fields for the Montreal market. The deputation pointed out that since the introduction of the N. P. the coal output in Nova Scotia had increased by 500,000 tons.

The Dufferin Gold Mine, situated on the Atlantic Coast, about 90 miles east of the City of Halifax, Nova Scotia, is advertised to be sold by auction at that city on March next. We are informed that this property is one of great value, and has never been properly worked owing to a want of harmony between the partners. It is not subject to any rent-charge except municipal taxation (which it is stated would not exceed 50l. per annum), and a royalty to the Government of 2 per cent. on all the value of the gold produced. According to reports from experts the mine is only in its infancy at present, and these state that there is sufficient quartz now in sight to keep the present crusher running to its full capacity for more than 10 years. They also add that there is 40 to 50 feet between the veins which dip on each side of the anticlinal and cross cuts have been made through this space. About one-half of the material lying between, it is stated, is composed of milling ore which it would pay to crush.

A deputation from the Gold Miner's Club of Nova Scotia, will wait upon the Dominion Government early next month to urge the advisability of the establishment of an official Assay office and a school of mines. The attention of our readers is directed to the able advocacy of the claims of the gold mining community in this regard, in the paper by Mr. J. H. Townsend, published in another portion of the REVIEW.

Quebec.

Mr. Ed. Wertheim has left Germany to superintend his father's recently acquired asbestos property in Coleraine. Reports of the work so far accomplished under Capt. Larmouth are satisfactory.

All the Thetford mines are working full time this winter, in order to fill large orders for the mineral.

We understand that an English syndicate is now being formed in London, with a view to the extensive development of asbestos lands in the Eastern Townships.

The Johnstone asbestos Company shipped from the 15th of April until 31st December, 500 tons. Work at the mines last year was greatly retarded by wet weather.

The spar products of the Villeneuve mica mine are being successfully manufactured into porcelain ware. Mr. S. P. Fanchot, Buckingham, has some samples which, for excellence in quality, cannot be excelled.

Mr. W. H. Walker has recently added a number of substantial new buildings to his plumbago property on the Lievre.

The mines of the Excelsior Copper Company at Broughton continue to yield a good average output of excellent percentage.

Work at the new Rockland slate quarries is active, and in the spring an additional number of hands will be put on. The demand is constantly increasing, so much so that the company cannot overtake the orders.

The Memphramagog Mining Company is making application for incorporation. The object is the mining for gold, silver, copper or other metals or ores, or for fuel, plumbago, or other minerals, in the townships of Potton and Bolton, in the county of Brome and elsewhere in the Province. The principal place of business and the head office of said company will be at the Village of Eastman, in said county of Brome. The capital of the company will be fifty thousand dollars, being five hundred shares of one hundred dollars each, with power to increase the capital stock of the company to two hundred thousand dollars. The names, address, and calling of the applicants are William Warne, mining engineer; Charles Chester Smith, contractor; George Edgar Smith, contractor; Corles Corydon Eldridge, manufacturer, and John Eades, miner, all of the Village of Eastman, in the county of Brome; James Clark, farmer, of Saint Etienne de Bolton; Leander Libly, farmer, and Lyman Libly, farmer, both of Dillinton, in said county of Brome; Wm. Jamieson, farmer, of the village of Magog, in the county of Stanstead; Clarles Albert Nutting, esquire, advocate, and Thomas Anson Knowlton, trader, both of the village of Waterloo, in the county of Shefford. And said Charles Chester Smith, William Warne, Leander Libly, William Jamieson and Thomas Anson Knowlton are to be the first or provisional directors of said company.

Public notice is given that the persons herein mentioned intend petitioning the lieutenant-governor of the Province of Quebec to obtain letters patent constituting the said persons and all others who may become shareholders in the company thereby created into a body politic and corporate for the purpose hereinafter mentioned. The name and style of said company will be "La Société Canadienne d'Etudes minières" The object of the company is to facilitate the development of mining industries in Canada generally and more particularly in the Province of Quebec, by having studies and analyses made by its engineers and by opening mines and quarries. The company intends, besides, to buy mines and quarries and to interest itself in mining business by participation, limited or otherwise. The chief place of business of the company will be in Montreal. The proposed amount of the capital stock is one hundred thousand dollars. The number of shares will be one thousand, each being of one hundred dollars. The first shareholders of said company are: MM. Schwob Moïse, trader, French vice-consul at Montreal; Dugas Calixte Aimé, judge of sessions, of Montreal; Grant. Charles Henry Albert, trader, of Montreal; Hall, John S., lawyer, member of Provincial Legislature, Montreal; De LaVallée Poussin, Ludovic, civil engineer, of Montreal; Werner, Edouard, of Montreal; Duquet, Cyrille, trader, of Quebec. Messrs. Schwob, Dugas and Grant will be first directors of the said company.

Notice is given that under "The Companies Act" letters patent have been issued under the Great Seal of Canada, bearing date the ninth day of January, 1889, incorporating William Thomas Costigan, merchant; Edward Kirke Greene, merchant; George Bull Burland, president British American Bank Note Company; James Cooper, merchant; George Durnford, chartered accountant, and David Hislop Ferguson, merchant, all of the City of Montreal, for the purposes of pulverizing, grinding, disintegrating, reducing and screening all animal, vegetable and mineral substances, and all refractory materials of every nature; the acquiring, holding, working, vending and leasing of mineral lands and mineral deposits, and the manufacturing, selling and leasing of mills, plant and machinery of every description, the operations of the company to be carried out throughout the Dominion of Canada—by the name of "The Canada Pulverizing Company" (Limited), with a capital stock of fifteen thousand dollars divided into five hundred shares of one hundred dollars

Ontario.

Application will shortly be made to the Lieut.-Governor in Council for the grant of a charter of incorporation by letters patent, under the provisions of the Ontario Joint Stock Companies "Letters Patent Act" by the Fuel Oil Company of Petrolia. The objects for which incorporation are sought are: to manufacture from crude petroleum oil, fuel oil, illuminating oil and other products thereof; to tank, pipe and warehouse crude petroleum oil and its products; to act as warehousemen, shippers and carriers of crude petroleum or other articles; to buy, sell, lease or acquire lands with power to sink artesian wells and to produce petroleum, salt or other substances, and to buy, sell, and deal in petroleum and its products and other articles of substances; to enter into contracts for any of the purposes aforesaid and to do all such matters and things as may be needful and useful in carrying on the business contemplated. The operations of the company are to be carried on in the Town of Petrolia. The amount of capital stock of the company is to be fifty thousand dollars.

"The test well,' says the *Canada Manufacturer*, sunk about midway between Brantford and Paris to ascertain the probabilities of getting natural gas, reached a distance of 1,700 feet before operations were suspended. The drills pierced a bed of white rock about 300 feet down, which tested them severely, and twenty-four hours' work in it showed but few feet of progress. Lower down, however, a great depth of shale rock—about 125 feet—was bored in one day's work. The hole is now plugged and the machinery removed. It is believed by geologists that the rock formation farther north on Grand river, in the county of Waterloo, is such that better results can reasonably be expected. But it is believed that the chances are infinitely better still nearer Toronto. Four thousand dollars would pay all expenses of a test well, and it seems strange that the thing has not been undertaken in this city, where so much enterprise is exhibited in other directions."

Messrs. Smith & Lacey have their fine new plant, consisting of steam hoist, pumps etc. all in place and ready for work.

Natural gas has been struck at Kingsville, and the story that the well yields eight million feet a day reads as if it had absorbed a good amount of the actual outflow.

Sudbury District.

Accurate information as to the mining industries is often best obtained by questioning the miners who have worked upon the properties. An intelligent miner who has worked in the celebrated Copper Cliff Mine makes the following statements:—The property is now doing very well, and smelting works are erected to reduce the ore on the spot. The copper bearing ore occurs in large masses, sometimes 40 to 50 feet wide, and after working one of

these out perhaps 60 or 70 feet of barren rock will have to be worked through before another mass is struck. A shaft was sunk 100 feet in poor ground, and a drift was then made for 150 feet without results, when an immense mass of paying ore was found. The shaft is being sunk another 100 feet, and a drift will be run from the 200 feet level. The ore yields about 12 to 17 per cent. of copper and contains some nickel.

Since this was written we have received another report from the district announcing that the smelting works are running regularly, and will and are making large quantities of matte to be shipped to the United States. Mr. H. T. McIntosh, Cleveland, the secretary-treasurer of the company, and Mr. G. Allen were recently at the mines, and we understand that both these gentlemen were so pleased with what they saw that it is not improbable that another smelter will be added at once.

Port Arthur District.

Nothing of special moment has occurred at the working mines during the past month. As before intimated, the stamp mills at the Beaver and Badger mines are being put in readiness for work so soon as the waters of Silver Creek begin to run. Another small pocket of extraordinary rich ore was recently encountered in the Shuniah Weachu mine.

The lead district east of Port Arthur is being examined by Mr. Peter McKellar, the most experienced geologist of the district, who will report more especially on some recent finds of argentiferous galena north of Black Bay. It is understood that a prominent western editor has engaged this gentleman to examine, when no objections, all promising locations and select average specimens, which will be submitted to eminent assayists in London and New York, and the result of report and specimens made public, in order that investors may know the solid facts on good authority. This will help to keep under those schemers who may attempt to float locations which are not deserving of the puffs which, unfortunately, some who know better, are apt to lend their name to. A few such deals may be the means of filling a few pockets, but the final result is always ruinous to a district.

A few sales of low-priced properties have recently taken place.

Large tracts of iron lands are still being taken up by shrewd speculative Americans north of Arrow and Whitefish Lakes, along the line of the located Port Arthur, Duluth and Western Railway, as well as in the vicinity of the Canadian Pacific Railway, near the Kaministiquia River, at which latter place several mining gangs are at work testing the ore deposits for Pittsburg parties.

The newly established tri-weekly mail stage to Silver Mountain is a great boon to that section and a petition has been forwarded to the provincial government to have the wagon road extended around the north shore of Whitefish Lake.

Port Arthur is justly concerned at present about securing for that town the promised mining school. Such an institution in the vicinity of so many and varied working mines would be well patronized and be of incalculable benefit, saving much loss and failure from unskilled efforts.

There is much talk of a smelter, but this would be premature until the railway to the mines is in operation. A small bonus from the Ontario Government would secure the immediate construction of this urgent necessity.

British Columbia.

The directers of the British Columbia Smelting Company, have decided that they would not wait any longer for a supply of water from the Vancouver Water works, but arrange to obtain the necessary quantities from other sources. The company has either in its ore bins or on the track in its yards, nineteen car loads of ore, and as soon as it can name the day when it actually commences smelting operations, other shipments will be sent forward. It is therefore now to be hoped that all the difficulties which have so much delayed this important enterprise have been overcome.

The annual meeting of the British Columbia Milling and Mining Company was held in their offices at Victoria on 7th inst. The directors of 1888 were unanimously re-elected for the current year, and they will meet in a few days to elect officers. The directors' and auditor's reports and the annual statements were presented and were adopted. Several amendments were then made to the constitution which will greatly facilitate the disposal of stock by the board. A discussion in regard to the general interests of the company occupied the balance of the time of the meeting, and satisfaction was expressed at the position of affairs. The company expect to find in 1889 a year of unrivalled prosperity.

The foreign coal shipments for the month of January from the different mines were as follows:—Vancouver Coal Company, 31,285 tons; Wellington mines, 10,400 tons; East Wellington, 2,180 tons; making a total foreign shipment for the month of 43,865 tons. Iron ore from Texada iron mines, 1,000 tons.

A joint stock company has been formed at Nanaimo embracing a number of gold mines in Texada, and is composed of Messrs. J. E. Jenkins, Richard Prowse, C. R. Miller, Alexander Esson, George Tippett and Wm. Fee. Messrs. C. R. Miller, J. E. Jenkins and Richard Prowse are the directors of the company.

Mr. J. L. Mudge, Assistant General Manager of the Anthracite Company, states that the work of development is being pushed forward at the mines with gratifying results. A new lead has been opened up about ten miles east of the present one, and a colliery will be established there. The further operations are extended the more certain it becomes that the deposits of coal are practically unlimited. It is expected that by May the output will be 350 tons daily, which will give employment to about 250 miners. The objective output is about 1,000 tons per day, and this will be reached several months before the end of the year. Machinery with this capacity is now being placed in position at the mines. Large orders have been received from San Francisco and Pacific Coast towns which are being filled as rapidly as the present facilities will permit.

The strike at the Wellington Collieries is at an end, and the miners have resumed work.

The New Vancouver Coal Mining and Land Company (Limited) was registered on the 30th ult., with a capital of £185,000 in £1 shares, to take over as a going concern the existing Vancouver Coal Mining and Land Company (Limited), incorporated in 1862. The number of directors is not to be less than four nor more than six; qualification, £1,000 in shares or stock. The first are Messrs. John Galsworthy, F. Tendron, F.C.A.. E. J. Woodhouse, W. Needham and J. Fry.

Bell's Asbestos Company (Ld.)

A 22½ per cent. Dividend.—Large growth of business.—Even better prospects for the current year.

The first ordinary general meeting of shareholders was held on Wednesday, 30th ult., at the Cannon street Hotel, London.

Mr. John Bell (the chairman of the company) presiding).

The notice calling the meeting was read by Mr. R. Lander McLaren.

The report and accounts were taken as read.

The Chairman said that when they considered that they had to take stock, and to balance the accounts in two places in Canada, and five places in the United Kingdom, he thought it was creditable especially to the accountant and managing director, and to the staff who had served under him, that the directors were able to meet the shareholders at what they might fairly consider an early date. (Hear, hear.) In alluding to the staff he could not but say, with very great satisfaetion, that the zeal which had always distinguished the staff had not abated since the commencement of the company, and every man had done his work as heartily and zealously as in former years before the business was taken over by the company. The manager at Manchester, Mr. Putz, had worked up that branch of the business to a high state of prosperity, and had never worked harder than last year. The manager of every department had been zealous and efficient, and the customers of the company had shown their satisfaction with the work done by continued orders. The continuation of the prosperity they enjoyed was mainly due to the managing director, to whom, although his son, he would say, that to his business capacity and his unceasing labor during many years, and never more than during the past year, the prosperity they enjoyed was in a special sense due. (Cheers.) At first sight the accounts might look somewhat meagre, but when accounts were to be printed and circulated beyond the range of the shareholders, business men could not give those details which they could give in a family circle, because trade rivals would avail themselves of too minute details. (Hear, hear.) Therefore they must not ask for too much detail, but the accounts were not meagre—in the true sense, they showed the true position of the business and its progress. With regard to the share capital, the shares were held by about 230 members, and the money raised by the sale of debenture stock was held by about 100 persons. On the other side of the accounts the bills receivable on hand £3,695, were accepted by firms of undoubted responsibility. The item of "Debtors £35,167," appeared a large item, but it was really one of the healthiest indications of the business. It was really a bank note. Before that figure was put in the accounts all allowances were made, and the discount which had been and has to be allowed had been taken off, and allowed for before the profit was ascertained, and several thousands was the number of people who made it up. The directors could bear with calmness the failure of 1000 persons. On the credit side of the account the the figures represented the ordinary purchase of the concern, with the exception of £5,200 unpaid to the vendor. The stock in trade was taken at the exact cost price. They would recollect that it was stated in the prospectus that unsaleable stock was to be eliminated and that stock was to be taken at cost price, and so it stood at the present time. All the stock that was obsolete was taken out and counted for nothing, the rest was real, genuine stock which the company required in its business. The £845 worth of stocks at the asbestos estate in Canada was small. They had only £845 worth of sold but undelivered asbestos when the accounts were made up. The plant, machinery, fittings, fixtures and furniture at London and branches stood at £4,986, which was the exact cost less the amount written off for depreciation during a series of years. In the prospectus it was stated that the machinery and plant were to be taken as they stood in the books of the vendors, subject to an independent valuation to ascertain whether it was fair or not, and the valuers valued it at 40 per cent. above what it wa taken over at. (Cheers.) The asbestos estates in Canada stood at the figure they cost, plus the small amount of machinery, and the premises, patents and good will stood at exactly the price paid for them. They could not write anything for depreciation oft a property which was

increasing in value, and he believed they could now sell the estates for half as much again as the company gave for them. The directors had made more money for the shareholders than before, they placed to reserve fund £5,000, they retained £9,000 of the profits, which would meet any amount of depreciation they might wish to meet in future times. They would have a big sum by-and-bye from which to take any depreciation. Then he had to refer to a figure which was an agreeable figure, and that was the net profit of £34,421 6s. 9d. In arriving at this profit the stock was taken at the exact cost, and everything which could be written off for bad debts and so on had been done, and every writing down had been done, and this was the genuine and proper profit really and regularly arrived at. In the prospectus the anticipation of a 15 per cent. dividend was held out, but the dividend now proposed was in excess of that figure. But this was not startling to him—it was what he expected and no more. It was the natural outcome of years of labor and thought. This business had been based upon infinite painstaking for many years, and of work which thoroughly considered all the circumstances, and the outcome brought before the shareholder was the natural outcome of careful thought. (Hear, hear.) He had looked forward to this great advance, and he was not surprised at it. The more they looked at it the handsomer it became, and the more important it became. They dealt with many thousands. The business was made up of infinite painstaking in small matters, and they made a small revenue from a constantly extending area. The directors did not wish to startle the shareholders by the announcement of unexpected miracles, but he might say the directors confidently believed that during the year 1889 there would be a very much larger profit than in the year gone by. (Cheers.) With regard to the visit of himself and second son to the property in Canada in February last, he might mention that one object was to see if they could increase the output of asbestos; from the Thetford property alone they could meet the present demand, and payment for a largely increasing dividend from that property alone, and in the meantime the other companies were being brought into working order. The other object of the visit was to examine into the state of the asbestos business in the United States, and see to what extent this company could profitably work part of it. They found that the best way to participate in trade was to supply manufacturers with raw materials as they wanted it. He stated out in Canada that the company would not compete with any manufactured article, but made an arrangement to supply the raw material. Last year he stated that the Canadian property would give a profit of £10,000; the actual figure was £11,000; and the actual profit of the Canadian properties for 1889 would not be a penny less than £10,000. He was sorry to say that Mr. Hartley through failure of health had retired from the board, and in his place the board had elected Mr. R. S. Guinness, of Guinness, Mahon & Co. In conclusion the Chairman moved the adoption of the report and accounts.

Mr. Rhodes Cobb seconded the motion. He said the Chairman had made a most straightforward statement. In the prospectus they were promised 15 per cent.; as a matter of fact they had earned over 30 per cent., of which they had divided 22½ per cent.

The resolution was put and carried.

The Chairman moved a dividend of 15s. per share, payable on the 4th February next.

Mr. Arthur Julian Burnett seconded the motion, which was carried.

The Chairman said that two of the directors retired by rotation, namely Mr. T. B. Lightfoot and A. H. Bell. Those gentlemen had worked well during the year, and offered themselves for re-election.

Mr. Macnair proposed that Mr. Lightfoot be re-elected a director.

Mr. Bird seconded the motion, which was carried.

Mr. W. A. Sparrow moved the re-election of Mr. A. H. Bell as a director. He said he had known Mr. Bell for many years, and knew him to be a most able and capable man. (Hear, hear.)

Mr. Clement seconded the motion, which was carried.

Mr. Elwin proposed the re-election of the auditors, Messrs. Cooper, Brothers & Co., with a remuneration of 50 guineas.

Mr. Clement seconded the motion, which was carried.

A Shareholder proposed a cordial vote of thanks to the directors for the way in which they had conducted the business during the past year, and he would also connect with that the name of Mr. F. C. Bell (managing director), to whom the shareholders owed much of the success of the operations during that time. He had known Mr. Bell for a long time, and he could see nothing but success so long as the management remained in the hands of a gentleman like Mr. Bell. (Cheers.) He congratulated the directors on having secured the services of Mr. Guinness on the board, for that gentleman was one of the most important men in Ireland in regard to his social and political position.

The resolution was seconded and carried.

The proceedings then terminated.

The Relative Importance of the Mining Industry- A Plea for the Gold Miner and His Calling.

[A Paper Read by J. H. TOWNSEND, before the Gold Miner's Association, Halifax, 2nd Feb., 1889.]

Since the day when the fateful mandate went forth, "In the sweat of thy face shalt thou eat bread," the methods by which mankind has sought to provide for his daily sustenance, or to add to his worldly store, have been as varied as have been his needs, real or fancied, in the different degrees of civilization to which he has attained. Amid all the multifarious avocations, the product of the complex civilization of the present age, there stands out prominent before all creative industries the occupation of the miner and the husbandman.

Contrary to the usual custom I place the miner first in a creative sense, because the husbandman calls nature to his aid in that transforming process by which the inutile elements of earth and air are converted into the useful grain and herb, fitted for the best uses of mankind; while the miner by the application of his own brain and brawn brings up from the recesses of the earth the inert ore, releases it from the vice-like grip of its hidden matrix, and converts it into a potent factor in the progress of civilization

Those intermediary avocations which take the crude products of the mine and farm, and convert them to higher structural forms and make them applicable to more varied uses, add immensely to the sum of the world's comfort and happiness; but it is reserved for the miner and the farmer to add directly to the sum of the world's wealth.

It goes without saying that these two industries lie at the very base and foundation of the social fabric, and furnish the motive power for the continual advancement of the race towards a higher civilization. Whatever may have been the case in those predatory ages of the world's history when might prevailed over right, and brute force was the accepted standard of excellence, it is certain that no race or people have in these later days attained to any exalted position among the nations of the earth unless their social superstructure was underlaid by a great mining or a great agricultural industry. It is only necessary to cite the cases of England and the United States of America in general, and the phenomenal growth of California, Australia and the Cape in particular to establish the correctness of this proposition, while instances are constantly multiplying in our own province of the vivifying effect upon contiguous territory of the prosecution of the mining industry in our midst.

Under these circumstances we should naturally expect to find these two industries held in that high esteem by mankind in general which their importance demands. We would expect to see them fostered and encouraged in every way by statesmen and philanthropists, and that those engaged in them should have so exalted a conception of the dignity of their calling, as to demand and compel the respect of others both for themselves and their industries.

Instead of this happy condition of affairs (to go no further afield than our own province) what do we find to be the case?

Since the publication of the memorable letter of "Agricola," in our early colonial days, there has been a perceptible growth in the appreciation of the business of agriculture, and successive provincial governments have in response to the demands of public opinion, aided in various ways the dissemination of useful agricultural knowledge, but even in agriculture much remains to be done, and in mining there has yet to be created a healthy public sentiment.

While we have schools of literature, of law, of medicine, of divinity, of art and design, abundantly established and sustained in our midst, schools of agriculture are but in embryo and schools of mines are non-existent; and this, in the very face of the fact that but for the operations of these two industries all others would find their occupation gone, and that in this province the mining industry is the one elastic source from which the Provincial Government may expect a constantly increasing revenue.

The cause of the lack of appreciation of these two great fundamental industries is not far to seek. We can only command that amount of respect from others which we accord to ourselves; true self-respect is the first step necessary towards appreciation by the world.

Farmers and miners as a rule are not proud of their calling, and have no high conception of the value of their work or the relative importance of their industry. The homespun apparel and its hayseed garnishing is regarded by the young men of this generation with a feeling of aversion which is working much ill to themselves and the country, and unhappily the term of "miner" and especially "gold miner" has become, for reasons best known to all of us, a bye-word and reproach.

While these two cognate industries stand in much the same position as regards the strength of their claims for recognition and appreciation, this paper is concerned only with the case of the miner in general and the gold miner in the Province of Nova Scotia in particular.

It is usually easier to discover a want than to suggest a remedy, but in the case of the gold-mining industry in this province there are several schemes which have been attempted or proposed of late, looking to the advancement of the business to a higher status and compelling for it a more enlightened appreciation to which it would be well to advert in this connection.

First in order of these is the Gold Miner's Club, the offspring of several unsuccessful attempts to establish a general gold-mining association. The Club has now completed the first and most trying year of its existence, has proved itself a potent engine for good, and should commend itself to the enthusiastic support of everyone interested in the industry. It can, if well supported and with honest intent, do much to abolish that stigma of reproach, to remove that aroma of suspicion, under the burden of which the gold industry of the Province has staggered on to its present position and standing. If it becomes, as it ought to become, the the recognized exponent of the gold miners of the Province, it can do much to assist wise legislation and to prevent hasty or crude tinkering with the Mining Act.

There is also a comprehensive scheme afloat, which has received the endorsement of the Club, looking to the recognition by the General and Provincial Governments of the importance and value of the mining industry here, by the establishment of an official assay office at Halifax, which would give an impetus to the pioneer work in every branch of mining and would especially relieve the gold industry from many burdens with which it has long been freighted. Those who have this scheme in hand are entitled to and should receive the assistance and moral support of all who properly value the great mining resources of this Province.

There is yet another scheme which has only been mooted, but which needs immediate ven-

tilation and development; the establishment of a school of mines in embryo.

Amidst all the difficulties against which the gold industry of this Province has made a successful struggle, the greatest has been incompetency. Fraud has unquestionably been a large factor in the depreciation of the gold mines of Nova Scotia as in every gold producing country; but for every dollar of capital wasted in this connection ignorance and incompetence are responsible for seventy-five per cent. of the loss.

The importance of the mercantile marine having long been recognized, facilities are provided by means of which any bright young sailor can fit himself for a master or mate's position, thereby elevating himself and increasing the efficiency of the service. It is passing strange that until very lately no such step as this has ever been thought necessary in connection with the great business of mining in this Province. Probably the greatest need that exists to-day in connection with mining generally and gold mining in particular in Nova Scotia, next to the lack of capital, for a fuller development, is the want of honest, intelligent and capable overmen. This is a statement that will be fully concurred in by anyone having experience in the management of mines here during the past ten or fifteen years. Why is it that the young intelligent miner, who having learned the A, B, C, of his calling (how to break rock properly), desiring to fit himself for a higher position finds no avenue open to him, no such facilities provided?

The Government that will provide the means whereby the miner, who has proved himself capable and intelligent, can superadd to the practical knowledge acquired underground a rudimentary knowledge of arithmetic, surveying and mensuration, so that he can keep time, take measurements and estimate quantities, some idea of mechanics so that he can look after machinery, and so much of geology as will enable him to watch intelligently the constant changes in the formations, will entail upon the Province a lasting debt of gratitude, and will do more to place the business of mining upon a practical and business-like footing than by any other conceivable expenditure.

While these agencies here referred to, which have been attempted or proposed, have in them much power for good to the gold mining industry there is nothing that can so vitally affect the calling for good or ill as the conduct of those directly engaged in it.

"Providence helps those who help themselves," and neither providence nor anyone else will accord to the Gold Mining Guild of this Province an honorable position among provincial industries unless the persons engaged in prosecuting the business are actuated and governed by that code of commercial honor which, in all other callings, furnishes the groundwork for mutual faith and confidence. The Gold Miner's Club has in this respect a great field for usefulness before it, and if it succeeds in establishing a stricter code of mining ethics it will do more than it can in any other way to establish a lasting claim upon the fraternity, and to demonstrate its right to a continued existence.

Haulage in Mines.—At a recent meeting of the Engineers' Club, of Philadelphia, Mr. A. W. Shaefer stated that the cost per ton—mile of haulage in Pennsylvanian anthracite mines was as follows:—

Mules.....	3·64d.
Steam locomotives....	1·20d.
Electric motors.....	0·80 to 1·34d.

A Visit to a Charcoal Iron Furnace.

(WRITTEN FOR THE REVIEW BY SAML. D. MILLS, SUPT. MARTEL FURNACE CO., ST. IGNACE, MICH.)

Popular ideas of blast furnace work being generally of a somewhat vague and misty nature, it may interest some of your readers if a plain and simple description of the work at a furnace making charcoal iron is placed before them. The writer had the pleasure of reading a paper upon the subject before the Canadian Institute last year, and this is to some extent a rescript of the same.

The charcoal furnace has been chosen instead of the coke or anthracite furnaces because it is more suited to Canada, and although there are charcoal furnaces to be found where the entire plant as well as the general management are of the crudest possible description, more nicety of arrangement and more exact attention to details is reqnired in this kind of furnace, more especially where "car-wheel iron" is the product sought for, than in either of these.

Let us imagine ourselves visiting a charcoal furnace of the best type, with free permission of the owners to examine all the *minutiæ* of daily work. As we have not time to examine into the mining of the ore, or the manufacture of the charcoal, we will presume that both have been delivered from a distance by rail.

Before entering the Stock-house our attention is directed to the very favourable position of the furnace to railway connection, the contour of the ground being such as to allow the furnaces being placed about 20 feet below the level of the main track, so that the ore cars, by entering the Stock-house that height above the floor, have every facility for "dumping" the ore. On entering we find that there are three parallel tracks, about ten feet apart, traversing the building overhead from end to end, and under these are six large compartments or bins, each of sufficient capacity to hold a six months' supply of the variety of ore for which it is used. The partitions which separate these bins run only part way across the building, leaving a passage of sufficient width to admit a horse and cart for the carriage of the ore from the respective bins to the crushers. The crushers, which are very powerful machines, with a capacity of 50 tons of hard ore per day of 10 hours, are provided with elevator belts which convey the crushed ore up into the ore pockets, from whence it is charged into the ore buggies. These pockets are six in number, and are heavily framed together, forming a hexagonal structure rising about 30 feet above the floor of the Stock-house; the bottom of each pocket is about 9 feet from the floor, and is fitted with a spout having a charging spout at the end worked by a lever which serves to cut off the supply at will. We are next shown the method by which the ore is weighed. We notice that the floor beneath the spouts of the pockets is occupied by a platform scale upon which one of the "stock weighers" has just wheeled an odd looking machine like a bucket on wheels. This buggy is about 2 feet in diameter and 2 ft. 6 inches in depth. Its bottom is formed in the shape of a low cone hanging by its apex to a short perpendicular bar supported by a lever which lifts the cone till it closes the bottom of the buggy, and when necessary allows it to drop again so as to discharge the contents equally all around its circumference. When the bottom is to be kept closed the lever is held tight by a peculiar latch. The stock weigher now proceeds to fill his buggy. He drops the moveable spout beneath one of the pockets and allows the ore to run till the upper indicator of the scale shows that he has the correct weight. He then drops a latch which releases the next beam of the scale, and repeats the operation from another ore spout, which in its turn is followed by a third, and again by a fourth spout. Then comes a small quantity of limestone and the charge is complete. We observe that there are two more beams to the scale, and are informed that they are not in use at present, as the furnace is running on a mixture of only four ores, though sometimes, we are told, the full set of ore pockets and scale beams are needed. Some of the party having expressed a little curiosity regarding the use of the limestone, as "it will not make any iron," are informed that it is indispensable, as the ores now in use are very pure, but contain some silica (quartz) and alumina, and the addition of the lime causes these substances to melt more easily and form a good fluid slag or cinder, as it is commonly called; also that it has an important influence on the quality of the iron produced and on the working condition of the furnace. We also learn that some ores, being deficient in alumina, require the addition of a little clay (silicate of alumina) to keep the furnace in good working order. If this were neglected the slag would be viscid and "sticky" when hot, and would "build" on to the walls of the furnace, eventually causing scaffolding in the furnace, or, in other words, stopping the descent through it of the mingled ore and fuel, a state of things which is very troublesome for those about the furnace and very unprofitable to the owners. Meanwhile the ore buggy has been wheeled off the scale and round to the hoist or elevator, which takes it up to the top of the furnace. As we have yet to see the charcoal weighed we proceed to the coal-house, next the Stock-house. This building we find to be a mere shed, very lightly framed, and covered only with light sheet iron. In it are standing three box cars, in one of which two men are at work forking the coal on to a large screen, which is so supported as to admit a large sheet iron buggy about 4 feet square and 5 feet in height being run under its end in order to catch the coal as it falls from it. The fine coal and dust (braize, as it is termed) falls through the screen and forms a heap on the floor behind, which is removed from time to time. When this buggy is filled it is taken by the "coal weigher" through the door at the end of the "Stock-house" to the coal scales near the "hoist." Here the weight is adjusted so as to agree with that marked on the beam of the scales, and the car is then run on the "skip" or platform of the elevator. This elevator has two skips, one of which ascends while the other descends. After the loaded buggy has gone up we take our places on the empty skip, and the elevator lands our party safely at the top of the furnace. One of our party immediately exclaims, "But where is the furnace? I don't see any fire," showing that to some of the party a closed top furnace is a novelty. As soon as the charge in the "hopper" has been lowered and the gas has cleared off we step forward to take a look at the fittings by which the charging is accomplished, and looking down into the furnace perceive that it is closed by a circular iron "hopper," with a conical bell in the centre, exactly like the cone in the iron ore buggy, only a great deal larger, and worked in a similar way, except that it has two heavy iron rods to hold it up, and the great cast-iron beam which takes the place of the lever on the buggy requires a powerful winch to move it. We now begin to understand some-

thing of the *modus operandi*, and stepping back we watch the filling in of the next charge. First of all a buggy of ore which has just come up is run over the mouth of the "hopper," the wheels of the buggy straddling the opening. The "top-filler" takes care to get it centred exactly, so that the apex of the buggy cone is perpendicularly over that of the furnace cone. He then releases the lever of the buggy and the ore falls down very evenly all round. Then another buggy of ore goes in in like manner, followed by two buggies of coal, the latter are carefully levelled, and then the cover or "seal," (a heavy cast iron lid) is let down over the hole The "top filler," having ascertained that there is room for another charge (he does this by means of a light iron rod which he passes down into the furnace through a hole in the iron plate surrounding the mouth of the cover), gives the handle of the winch a couple of turns, then reverses it, raising the "bell" or cone again, and the hopper is ready for another charge. On learning that it is near time for casting we descend and proceed to the Casting-house. We have, however, a little time to spare before this operation begins, and decide to "take in" the bottom of the furnace, blowing engine, etc. The engine-house is a substantial brick structure about 30 x 35 feet and 30 feet high, surmounted by an iron tank 5 feet deep and the full size of the building. Here we find the blowing engine and a small engine used for driving the crushers, lathes and other plant in the machine shops, also two powerful steam pumps. The blowing engine is of the upright type, with the steam cylinder directly under the air cylinder—the former being about 32″ diameter, the latter about 72″; the stroke about 48″, delivering 226 cubic feet of air to the furnace at each revolution. We then pass out and note the direction the wind pipe takes to the "ovens," and on our way back pass through the boiler house. Here there are six tubular boilers, 4 feet in diameter by 35 feet in length, set in pairs, one furnace heating two boilers. Only four of these are in use at present, the others being held in reserve in case of repairs being needed upon any of those in use. They are also "changed off" from time to time to permit them being thoroughly cleaned and "scaled." There is but little solid fuel used, as the gases from the furnace are generally more than sufficient for all requirements. The wind-pipe passes behind a lofty cylindrical structure, composed externally of large sheets of boiler plate rivetted together, forming a sort of tower, probably 15 feet in diameter and 60 feet in height. This stood rather to the rear of the furnace and next to the elevator, on the other side of which was another of the same construction, the wind-pipe being carried on behind it also, and connected with a branch pipe. We were shown the valves at the rear by which the wind or "blast" can be shut off. There was also an outlet leading from the bottom of the wind-pipe (also with a valve) where it turned into the "oven" and down into a flue communicating with the large draught stack. This stack was a fine structure, about 12 feet in diameter at the base and over 150 feet in height. Passing round to the side of the "oven" nearest to the "stack," as the furnace itself is generally called, we found a similar branch pipe with the upper part connected with a large pipe which ran completely round the furnace. This and the branch from it to the oven were much larger than the blast pipe on the other side of the oven. The downward portion of the branch had also a valve connected with the "gas flue," leading underground from the "down corner" (a large pipe extending from the side of the furnace near the top down to the ground, at about 10 feet from the side of the furnace, which serves to lead the gas from the top of the furnace down to the underground flues, by which it is then led off to supply the boiler furnaces and three ovens.) In answer to an enquiry how and why it was used to heat the ovens, we were informed that on opening the valve leading up from the gas flue, and also that leading down to the draught stack flue—the other two valves to the "stack" and those from the blast pipe being first closed—the gas passes into the oven, and coming into contact with the heated brickwork inside takes fire and burns with an intensely hot flame. The ovens are lined with fire-brick, and the space is sub-divided into perpendicular flues, so arranged that the flame, and intensely heated gases resulting from the combustion of the furnace gas, have to pass up and down twice the entire height of the oven before finding their way out past the valve to the draught stack. This is allowed to continue for two hours, then the gas is shut off; the valve leading to the pipe round the furnace (the "bustle" pipe) and also that leading from the blast pipe are opened; the blast passes in at the back of the oven and up and down through the now intensely hot flues, and then passes into the "bustle" pipe at a temperature of 1200° F., or up to 1800° F. if so desired; it then passes in the opposite direction to that followed by the gas, so that it leaves the oven at the hottest point. On reaching the "bustle-pipe" the blast passes from it down through branch pipes ("belly pipes") to the "tuyeres," and by them into the furnace. The connections from the "oven" to the "bustle pipe" and the "belly pipes" are all lined with fire-brick to enable them to withstand the tremendous heat to which they are exposed. The ovens are used alternately—one heating while the other is in use.

One of our party having enquired how it was that there was any combustible gas given off by the furnace, the action was described to be of the following nature:—The ore, in passing down through the furnace, undergoes two separate and successive changes, viz., reduction and then fusion. All iron ores—that is, all ores used for the production of iron—consist of combinations of iron with oxygen. Associated with these oxides of iron there are a great number of other substances, notably silica, alumina, lime, magnesia, sulphur, phosphorus, etc., all combined with each other, or with a small amount of iron. With the exception of the lime, which frequently occurs as carbonate, and the silica, which often occurs as free silica or quartz, it has been proved that the reduction, or the separation of the iron from the oxygen, takes place at a temperature far below that required for the fusion either of the iron or of any of the combinations of the associated bodies. Simultaneously with the reduction another action takes place, viz., carbonization or absorption of carbon by the ore. This mysterious action, by which the carbon is absorbed and fixed in the pores of the ore, so as to disintegrate it, much in the same manner in which frost disintegrates soft brick that has formely been moistened, can only take place in an atmosphere of gas containing carbon, mon-oxide (C.O.), in the proportion of two or more parts to 1 of carbonic acid ($C.O_2$.); reduction also requires the same condition. This action commences almost immediately after the ore has been placed in the furnace, although the temperature at the top immediately under the "bell" is not more than 350° to 400° F. In order to understand this clearly it is best to take first into consideration the action at the "tuyeres," and follow the gases in their passage upward through the mass of ore and fuel. At the "tuyeres" we have the air blown in at a temperature of say 1200° F., composed of about 23 parts of oxygen to 77 of nitrogen by weight, leaving out the small quantity of carbonic acid and moisture always present. The nitrogen may be regarded as inert, as it merely carries in 1200° F. of heat, leaves 800° F. to be utilized, and passes off unchanged at 400° F. The oxygen attacks the highly heated fuel, burns it, forming carbonic acid, which is again immediately reduced to carbon mon-oxide as it passes up through the heated charcoal. Owing to the constant addition of fresh supplies of cold ore and fuel the furnace is naturally colder towards the top, so this carbon mon-oxide (C O.) gas passes up unchanged until it reaches a point in the furnace where the temperature is so low that carbonic acid ($C.O._2$)cannot be decomposed by the carbon in the charcoal. But, as we have already seen, the action of the carbon mon-oxide on the ore still continues, so that the ore absorbs some of the carbon (C.) from the C.O., so forming some $C.O_2$., and at the same time giving up its oxygen to combine with some more of the C.O., making more $C.O_2$. This action can continue until the proportion of $C.O_2$. to C.O. is about as 1 : 2, after which it appears to cease. Now, as you know that carbon mon-oxide burns with great evolution of heat, you can understand how we heat our stoves and boilers by utilizing the waste gasses that in former days were allowed to escape unheeded.

(To be continued.)

SEALED TENDERS, addressed to the undersigned, and endorsed "Tender for Ice, Public Buildings," will be received at this office until Thursday, the 28th inst., for filling the Government ice house at the Rideau Canal Basin, Ottawa.

Sealed Tenders, endorsed "Tender for Ice, Rideau Hall, &c., will also be received at the same time for filling the ice house at the Governor-General's Residence, Rideau Hall.

Tender to state price per block of the following dimensions: viz.,—3 ft. by 1 ft. by 1 ft., which price must include cost of packing and of the sawdust required for that purpose.

All sawdust on premises to be removed; only new sawdust to be used.

The ice to be measured before being packed in the ice house and payment to be made accordingly.

N.B.—The ice must be taken from above the Railway Bridge, crossing the Ottawa River above Chaudiere Falls.

By order,

A. GOBEIL,
Secretary,

Department of Public Works,
Ottawa, 16th Feb., 1889.

88, 90, 92, 94 Rideau, 15 to 23 Mosgrove and 186 Sparks Sts.

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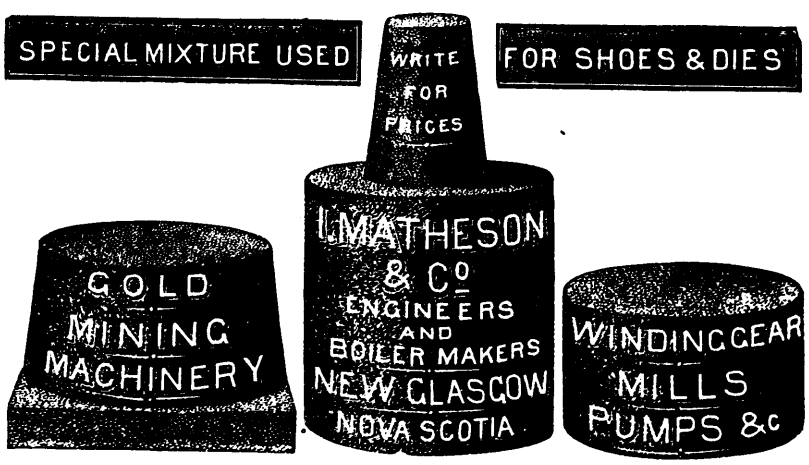

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1st.—Lot 28, in the 6th range, containing 100 acres, in addition to the salina of the lake.

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.

The Plumbago Deposits

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.

MICA

has also been discovered in quantity

The lands are in the Phosphate region, and recent prospecting has disclosed a rich and extensive deposit of this mineral. There are unrivalled facilities for transporting the ore to and from the mines by the Ottawa River and C. P. Railway. Distance from mines to Railway Station 6 miles. Good road.

All that is required to make these valuable mines handsomely remunerative is a little capital and enterprise.

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160 Waller St., Ottawa.

H. E. DICKSON,
Russell House, Ottawa.

OR TO THE OFFICE OF

THE CANADIAN MINING REVIEW

OTTAWA.

DEPARTMENT

OF

Inland Reveuue.

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.

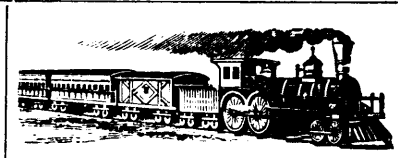
Every person who sells or offers or exposes for sale any fertilizer, in respect of which the provisions of this Act have not been complied with—or who permits a certificate of analysis to be attached to any package, bag or barrel of such fertilizer, or to be produced to the inspectors to accompany the bill of inspection of such inspector, stating that the fertilizer contains a larger percentage of the constituents mentionod 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.

January, 1889.



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Nov. 20th, 1888.

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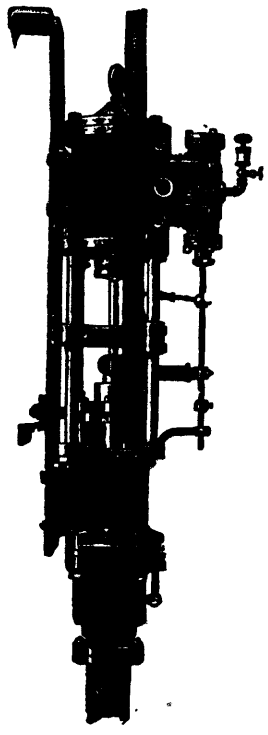

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MONEY ORDERS.

MONEY ORDERS may be obtained at any Money Order Office in Canada, payable in the Dominion; also in the United States, the United Kingdom, France, Germany, Italy, Belgium, Switzerland, Sweden, Norway, Denmark, the Netherlands, India, the Australian Colonies, and other countries and British Colonies generally.

On Money Orders payable within Canada the commission is as follows:

If not exceeding $4				2c.
Over $4,	not exceeding	$10		5c.
" 10,	"	"	20	10c.
" 20,	"	"	40	20c.
" 40,	"	"	60	30c.
" 60,	"	"	80	40c.
" 80,	"	"	100	50c.

On Money Orders payable abroad the commision is:

If not exceeding $10				10c.
Over $10,	not exceeding	$20		20c.
" 20,	"	"	30	30c.
" 30,	"	"	40	40c.
" 40,	"	"	50	50c.

For further information see OFFICIAL POSTAL GUIDE.

Post Office Department, Ottawa.
15th Sept., 1888.

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 it 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 fradulently, 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 by 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 quarts 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 Dominian 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 miner 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.