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The Canadian Mining Review

Established 1882

Vol. XI.—No. 12. 1892—OTTAWA, DECEMBER—1892. Vol. XI.—No. 12.

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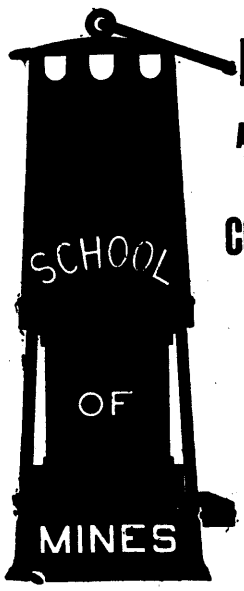

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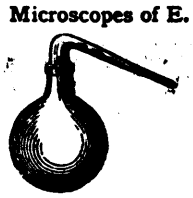

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CANADIAN MINING MECHANICAL REVIEW

CONDUCTED BY . . . . . B. T. A. BELL.

THE OFFICIAL ORGAN

—OF—

THE GOLD MINER'S ASSOCIATION OF NOVA SCOTIA,

THE UNITED MINING SOCIETY OF NOVA SCOTIA,

THE ASBESTOS CLUB, QUEBEC,

THE GENERAL MINING ASSOCIATION OF QUEBEC.

THE following Resolutions of Council indicate beyond a peradventure the status of THE REVIEW as the exponent of the Canadian Mineral Industries:—

The Gold Miners' Association of Nova Scotia.

"At the annual meeting of the Gold Miners Association of Nova Scotia, held at Halifax on 6th March, 1889, THE CANADIAN MINING REVIEW was adopted the official organ of this Association.

(Signed), R. C. WILSON, *President*.
G. J. PARTINGTON, *Secretary*.

The Mining Society of Nova Scotia.

"Moved by Mr R G Leckie, seconded by Mr C A Dimock, That the thanks of the Society be tendered to Mr. B. T. A. Bell for his kind offer placing the columns of THE REVIEW at the disposal of the Society; and that THE CANADIAN MINING REVIEW is hereby appointed the official organ of the Society"

(Signed), H. S. POOLE, *President*,
H. M. WYLDE, *Secretary*.

The Asbestos Club. (Quebec.)

"Resolved: That THE CANADIAN MINING REVIEW is, by authority of the Members and Council, hereby appointed the official organ of the Asbestos Club."

(Signed), D. A. BROWN, *President*.
A. M. EVANS, *Secretary*.

The General Mining Association of the Province of Quebec.

At a meeting of Council held at Montreal on Friday, 6th May, 1891, it was moved by Captain Adams, seconded by Mr. R. T. Hopper, and resolved: That THE CANADIAN MINING REVIEW be the official organ of the Association.

(Signed), GEORGE IRVINE, *President*.
B. T. A. BELL, *Secretary*."

OFFICES:

Victoria Chambers, 140 Wellington Street,

OTTAWA.

Vol. XI. DECEMBER, 1892. No. 12.

The Accountant of the S. and L. Co. was not a Party to the Sale of Areas.

In our charges against the Canadian management of the Sydney and Louisburg Coal and Railway Company, published in the October issue of the REVIEW, the name of the accountant was mentioned as being a party with certain other officials in the sale of coal areas to the company. We withdraw this official's name from our statement and hasten to express an apology for its publication. The REVIEW desires to do no one an injustice.

The Canadian Asbestos Mining Industry in 1892.

Mining in the Province of Quebec, as a whole, has been extremely dull during the past year. Though asbestos was not quite so badly neglected as phosphate (the two minerals representing, next to copper and mica, the most important mining industries of the Province), the beginning of the year found all the asbestos mines, with one or two insignificant exceptions, shut down since November or December, 1891—the fact being due as much to the necessity of re-establishing a proper relation between the output of the mines and demand of manufacturers, as to a very obnoxious mining legislation, taxing instead of encouraging mining, and, at that, taxing on the gross value of the product irrespective whether or not the same be profitable. At the end of the year we may confidently say we have been successful in both objects—the market has assumed a brighter outlook, the mining law has been changed, and the tax clauses as well as certain issues respecting the mining right, eliminated.

Work was resumed in the month of April by the Bell's Asbestos Company, King Bros., Beaver Asbestos Company in Thetford, and by the Glasgow and Montreal Asbestos Company, United Asbestos Company and Anglo-Canadian Asbestos Company, at Black Lake. The Johnson's Company started up their Thetford mines about the end of May. Altogether closed, remained the Ward Ross Company's mines at Thetford, the Johnson Company's mines on Lot 30, Range B, Coleraine, the Central mines on Lot 32, Range B, Coleraine, and partially, the American Asbestos Company's mines, the latter working exclusively on a stock of cobbing stones from the previous years.

Prospecting and developing was continued after snow on the following properties: Reed's mines (Lots 27, 28 and 29, Range A, Township Coleraine, County Megantic,) with a small force of men, aided by a well equipped plant of machinery, and carried on through the summer, we understand, with satisfactory results.

H. W. Johns Manufacturing Company's mine (Lot 26, Range A, Township Coleraine, County Megantic), encouraging the owners to change their horse-power hoisting plant into a steam power plant in the fall of the year, for speedier development; on Lot 13, Range 6, Township Broughton, County Beauce, (Walsh & Mulvena proprietors); on Lot 14, Range 8, Township Broughton, County Beauce, Williams Mining Company; on W. H. Lambley's mine in south west part of mining block A, Coleraine, County Megantic, not been operated since autumn of 1890. Lots 10 and 11, Range 8, Township of Templeton, County of Ottawa, Templeton Asbestos Company. Lot 10, Range 3, Township Shipton, County Richmond, St. Cy Mining Company.

Prospecting was also done on Lot 16, Range 8, Township Thetford, County Megantic; Lot 6, Range 5, Township Thetford, County Megantic; Lot 15, Range S, Township Broughton, County Beauce; Lot 12, Range 4, Township Broughton, County Beauce; Lots 27 and 28, Range C, Township Coleraine, County Megantic; Lot 32, Range A, Township Coleraine, County Megantic.

The shipments of asbestos during the year up to the time of going to press, have been about 5,565 tons, estimated on an average load of 15 tons per car, and 371 cars. Full returns are not receivable before February next.

The production of all the mines combined for the running year is estimated at from 5,500 to 6,000 tons of all grades, which shows a decrease of about 3,000 tons against 1891, and nearly 4,000 tons against 1890, in which year the highest figure in the history of the asbestos industry had been reached.

This decrease, however, is not at all due to an inferior quality of working ground, but to the endeavour of the miners to re-establish as quickly as possible a proper relation of the output and the demand on the part of manufacturers of crude asbestos, which had been somewhat disturbed, chiefly by the enormous increase of the output during the two preceding years, with which the manufacture held no equal steps. There is no doubt that up to 1890, the manufacturers consumed the output of the mines as fast as it was produced, which shows that the manufacturing business increased yearly since 1884, between 1,100 and 1,700 tons a year, and consumed in 1889 something like 6,000 tons or a little over—the quantity was then all the mines were able to produce. Through the introduction of modern and most efficient mining machinery at most of the mines (American Asbestos Company, United Asbestos Company, King Bros., Bell's Asbestos Company, Thetford Asbestos Company, Reed's mine, W. H. Jeffrey and others) at nearly the same time, (between 1889 and 1890), this output was suddenly raised about 3,800 tons in 1890, and about 3,000 in 1891, compared with 1889, which naturally left a considerable surplus of crude asbestos on the market. We may, however, take it for granted that the use of manufactured asbestos goods has continued to increase, at least at the same rate as in the period from 1884 to 1890, viz: at an average of about 1,500 tons a year, and this leads to the conclusion that the demand in the coming years will be up again to the capacity of all the mines combined, which capacity, considering that there are no new discoveries of any importance made, has pretty near reached the top with an output of between 10,000 and 11,000 tons a year; and while it may be advisable to continue mining in the coming year on conservative lines, the outlook is bright and a steady and profitable business may be expected. It is, therefore, clear that prices during the year, have remained very firm, probably with the exception of a few small parcels in hands of third parties. Average price quotations are about $200 for No. 1, $100 for No. 2, $50 for No. 3, with due allowance for superior and inferior grading. No. 3 found throughout the year a ready market, and anything not promptly taken by American manufacturers could be sold on the European market—a feature in the trade which is well worth the close attention of the miners. No. 1 was firm with limited demand, owing to above-stated facts. No. 2 somewhat neglected. Freight rates were high all the year round: New York, 28 cents per 100 lbs.; London, 32·86 to 36·08; Liverpool, 32·86 to 36·08; Rotterdam, 42·52 to 44·23.

Of important improvements at the mines, the following deserve mention: The Bells Asbestos Company of Thetford, as well as the United Asbestos Company of Black Lake, have earnestly approached the dump question, that is, the further disposition of waste rock,

which became a vital question to both of these companies, the former having reached with their dumps the line of the Quebec Central Railway, the latter the village built up on the westerly end of their property. The Bells Asbestos Company, under the superintendence of Mr. George R. Smith, successor to the late Mr. Thomas Sheridan, solved their problem, by connecting all their works by a railway which crosses, by means of an overhead bridge, the Quebec Central Railway track. Side dumping cars, of about four tons capacity, have been put in use, and a locomotive runs the cars over above mentioned bridge out on a new dumping ground about 1,200 feet from the working places or pits, towards the Thetford river. The pits as well are connected by rail with a series of new cobbing or store-sheds, the railway station, etc.

The United Asbestos Company has adopted the plan of their manager, Mr. John J. Penhale, in building an inclined single track tramway along their southerly line, by means of which the loaded trucks will be taken up the hills, a distance of about 3,800 feet, and dumped on the northerly slope of the hill, towards the Cariboo Lake. A 12 x 15 Copeland & Bacon reversible winding engine has been put in place for the purpose, and the whole will be in running order at the beginning of next season.

The H. W. Johns Manufacturing Company on their Lot 26, Range A, Coleraine, have put in an efficient boiler and hoisting plant (supplied by Messrs. Copeland & Bacon, of New York,) which will greatly facilitate the development of the property.

The Beaver Asbestos Company has built a large cobbing shed and steam dryer alongside the track of the Quebec Central Railway, the latter having provided them with a siding.

The St. Cyr Mining Company, of Danville, has put in a number of crushers, we understand, to carry out a contract with Mr. W. H. Jeffrey, to overwork the dumps of his mines on Lot 6, Range 3, Shipton, County Richmond.

The Williams Mining Company, of Broughton, has put up horse derricks to aid the development of their property on Lot 13, Range 8, Broughton, County Beauce.

Changes in management of mines took place at the Bell's Asbestos Company, by the deeply lamented death of Mr. Thomas Sheridan, succeeded, as already mentioned, by Mr. George R. Smith; at the mines of the Anglo-Canadian Asbestos Company, Mr. Wm. Clerihue, superintendent, resigned and was succeeded by Capt. Wm. Prideaux; while the American Asbestos Company, Ltd., loses the services of Mr. E. Wertheim who resigns his position as Managing Director of the Company at the beginning of the year.

At the time of going to press all the mines have shut down for the winter, with the exception of those of Mr. W. H. Jeffrey and the Thetford Mining Company, at Thetford. The Bells Asbestos Company have shut down their pits, but keep a gang of men and boys to clean up their cobbing stones and do some other work around the mines. The Beaver Asbestos Company retain a small gang of men to do some stripping work. The Anglo-Canadian Asbestos Company are continuing work with about twenty men. Messrs. King Bros. on Lot 26, Range 6, township of Ireland, County of Megantic (near Black Lake Station), will also carry on exploration work during the winter.

L. A. KLEIN.

Another Strike at Springhill.

On 18th instant the miners at the collieries of the Cumberland Railway and Coal Company went out on strike. The immediate cause of the trouble is a revival of the grievance respecting short weight and docking, which occasioned the last lock-out. At the time of the former strike an agreement was made between the representatives of the men and the late manager, Mr. Swift, which was in part superseded by another agreement made between the committee and Manager McInnis, on November 11th, 1891, as follows :—

Memorandum of agreement entered into between Alexander McInnis, manager, as representing the Cumberland Railway and Coal company, on the one part, and Malcolm Blue and E. B. Paul, representing the mine employees of said company, on the other part :

First. It is agreed that the standard measure for boxes sent from the various slopes shall be an average of six inches less than level full, when said boxes reach the surface, that is to say, the fillers of any box of coal, or the parties responsible for sending out the coal, shall be liable to no fine or other punishment should the coal in the box not be lower than six inches from being level full.

Second. Should the coal in any box be lower than six inches from being level full, the filler or party responsible for sending out the same said box, shall be told and warned.

Third. Should on the following day the party responsible for sending out a short or light box the previous day repeat the offence he shall be liable to a fine of half the price paid for said box.

Fourth. Should an offence be committed by the same party three days in succession, then the offender shall be dealt with by the manager, provided always that if objection be taken by any party accused to the judgment or finding of the manager in any case of shortage that may arise, or of alleged shortage, whether it be a first, second or third offence, or alleged offence, the party accused may appeal from any decision to a board of arbitrators, one of whom shall be appointed by the manager, one by the appellant, or pioneer lodge acting in his behalf, these two to appoint a third in case of failure to agree on any matter submitted. The appellant shall have the privilege of presenting evidence on his own behalf, the manager having a like privilege in support of his decision.

This agreement or arrangement shall apply to the west slope until the proposed scales are in position, or until such time as the agreement is cancelled.

The agreement shall terminate at the expiry of fourteen days after notice has been given by either party of its desire to terminate the agreement.

The agreement shall apply to east and north slopes until the agreement is terminated in the manner above mentioned, or until another agreement is entered into.

The foregoing agreement, the men allege, was in full force up to last Wednesday, when Manager McInnis, without giving the necessary notice of fourteen days, issued the following general circular to underground officials and petty bosses :—

MANAGER'S OFFICE,
December 14th, 1892.

You are hereby notified that in future it will be part of your duty to see that boxes are properly filled at the face, and should you find any box or boxes not filled level full you are hereby instructed to send the set or sets of men out of the pit immediately whose tally is on the box and refer them to the underground manager, who will deal with them. Your prompt attention is required to the above.

Acting under these instructions the officials sent several miners out of the pit, who were told they could return to work by agreeing to pay a fine of $2 each. The men appealed to the union, and Pioneer lodge remonstrated with Manager McInnis and General Manager Cowans, but failing to agree the strike was ordered.

Sydney Whitewashers and the Canadian Mining Review.

(The North Sydney Herald.)

The Sydney papers are vieing with each other in the task of whitewashing Mr. Kennelly from the references made to him by the Ottawa MINING REVIEW, in its October and November issues. It is refreshing to see the "down town sheet" and the "up town fakir sheet," as they playfully term each other during the progress of their fratricidal encounters, varying the monotony of their interminable squabbles over civic matters. The Herald does not share in its Sydney contemporaries' suddenly acquired admiration for Mr. Kennelly. More than this we do not desire to say anything further about him here, situated as he is at present. But at the same time we cannot help feeling that something is due to the MINING REVIEW in this matter, and that false statements published with a view to deceive the local public as to the attitude of that paper should be shown up in their proper light. The REVIEW is evidently acting in this matter from disinterested and highly commendable motives, and in pursuance of a public spirited policy adopted by the editor some time ago, having no material advantage beyond an enhanced public reputation to reap therefrom, and having everything to risk from a hasty and ill-matured line of action.

In an obviously inspired article in its last week's issue, the reporter informed the public that Mr. Bell, the editor of the MINING REVIEW, had "unintentionally or otherwise—principally otherwise"—suppressed correspondence between his own and Mr. Kennelly's solicitors, in which the former made overtures for a compromise, which were promptly declined. The inference that the public were intended to draw from this is very evident; but anyone who read what the REVIEW wrote on this matter in its November issue, published after dire threats of legal proceedings had been fired at the editor by Mr. Kennelly's lawyers, must have come to the conclusion that there was no tendency on the REVIEW's part to take back water, but that the efforts for a compromise emanated from the other side. We certainly came to that conclusion, but we have since made assurance doubly sure, and are now in a position to state authoritatively that there is not an atom of truth in the Sydney paper's statements; and that, furthermore, so far from seeking to avoid a law suit, the editor of the REVIEW has been *twice* notified that if an apology was made proceedings would be dropped, so that the "boot seems to be altogether on the other foot."

It is not manly to hit an opponent when he is down, but neither is it sportsmanlike for the recumbent one to try to improve his position by telling what is contrary to fact about his adversary.

In conclusion we offer our opinion that the overdone adulation showered upon his new client by the astute little potentate who is said to control the Advocate, is not likely to enlist sympathy for the martyr whose cause he is championing. His, however, is the consoling reflection that it will be all paid for in the "sweet by and by."

EN PASSANT.

On and after the first of the year all new subscriptions and renewals will be charged at the rate of three dollars. Readers please note this.

A deputation from the General Mining Convention of Quebec was appointed at a recent meeting, to interview the Quebec Government with reference to the obnoxious and burdensome nature of the Powder License Tax. This must be removed or ameliorated if mining is to prosper in the Province.

The Mining Society of Nova Scotia held a most successful meeting on Thursday, 8th instant. As usual a full report of the proceedings will be found in this issue. The Society will hold a special session at Montreal in February, during the sessions of the International Mining Convention.

Arrangements for the International Mining Convention, at Montreal, in February, are going ahead satisfactorily. The programme, subject to revision of course, may be stated in outline as follows: On Tuesday evening, 21st February, the formal opening will take place at McGill University, when it is hoped addresses of welcome will be delivered by His Excellency tha Governor-General, Sir John S. D. Thompson, the Hon. E. J. Flynn, Sir William J. Dawson, and others. On Wednesday morning and afternoon the American Institute of Mining Engineers, the General Mining Association of Quebec, and the Mining Society of Nova Scotia, will hold separate sessions for the transaction of business. In the evening visiting engineers and their lady friends will be conducted in sleighs to the Mount Royal Toboggan Slides, and thereafter to an entertainment in the M.A.A. club house, given by the Montreal and St. George's Showshoe Clubs. On Thursday morning and afternoon a combined convention of all mining men will open, when papers on Canadian mining legislation, our mining industries, mining practice, mineral resources, and other subjects of interest and importance to Canadian mining men will be discussed. In the evening an invitation will be extended by the Governors of McGill to attend a conversazione and the formal opening of the Engineering Buildings, now completed and fully equipped for the training of civil, mechanical, and mining engineers. The Governor-General and the Premier are expected to deliver addresses on the occasion. On Friday morning visitors will be the guests of the Canadian Society of Civil Engineers, under whose direction excursions will be made to some of the principal engineering and industrial establishments in Montreal and vicinity. In the afternoon a final session of the Convention will take place. It is hoped to be able to arrange a fancy dress carnival at the Victoria Skating Rink for the evening. On Saturday the party will leave by special train (C.P.R.) for Radnor Forges, Que., where a visit will be made to the improved furnace plant recently built by the Canadian Iron Furnace Co. (Ltd). Visitors will be the guests of the Company. There will also be a drive on Lac-a-la Tortue, visiting the curious bog-ore deposits worked by the company, and other features of interest in the vicinity.

The syllabus of papers is large and representative. Among those who have promised to contribute may be mentioned:—*Nova Scotia:* H. S. Poole, F.G.S., A.R.S.M., Stellarton; C. Fergie. M.E., Westville; John Rutherford, ex-Inspector of Mines, Stellarton; John E. Hardman, Oldham, N.S.; Dr. E. Gilpin, Halifax, and others. The various features of the Mining Law of the province will be discussed by Messrs. Geo. Stuart, B. C. Wilson, John Hardman, C. Archibald, J. R. Lithgow, R. G. Leckie, R. H. Brown, H. S. Poole, and others. *New Brunswick*:—Mr. W. McInnes, of the Geological Survey, will read a paper on the Mineral Resources of the Province. *Quebec*:—Dr. R. W. Ells, Ottawa; A. P. Low, Ottawa; J. Burley Smith, Glen Almond, Que.; P. H. Griffin, Buffalo; Prof. B. J. Harrington, Montreal; J. Obalski, M.E., Quebec; Dr. W. T. Gibbs, Buckingham; J. T. Donald, M.A., Montreal, and others. *Ontario:*—W. Hamilton Merritt, M.E., C. G. Richardson. Toronto; J. Bawden, Kingston; T. D. Ledyard, Toronto; George Mickle, Sudbury, and A. Blue, Director of Mines, Toronto. *British Columbia:* — J. McEvoy, Ottawa; George Atwood, M.E., F.G.S, Vernon, and Capt. R. C. Adams, Montreal.

Mr. R. G. E. Leckie, manager of the Torbrooke Iron Company, desires to correct a statement that the Clementsport iron ores are high in sulphur and iron. Since his paper was published in the REVIEW he finds from various analyses that, in some of the properties at least, the ores are very low in these deleterious constitutents.

The troubles in the Foord pit, owned by the Acadia Coal Company at. Stellarton, N.S., have again become public. Lost in 1880 by explosion and fire, it remained untouched until 1886, when the work of unwatering began. This accomplished, after many difficulties, in 1890, brought out from England an expert selected by the English Directors of the Company to develop and equip it. Familiar with underground fires and broken ground, he did not hesitate to promise success under his management. A free expenditure followed. A "fire-stink" declared to be but local spontaneous combusion, though venal ignorant natives did suggest that the fire from "the rise" had travelled with the water towards the deep. Time went on; no evidence of fire was seen, and confidence begetting confidence expenditures went on. Not entirely though was suspicion allayed. "A burnt child dreads the fire," and many miners shook their heads; it was even said the management were not unanimous. With November came the "fire-stink" in a new quarter—another spot of spontaneous combustion, it was said. Whether or no, it soon showed near the pit bottom, and then it was evident the pit must be closed for a time at any rate. This was done and water allowed to rise.

The Kingston Mining Company, East Templeton District Phosphate Mining Syndicate, McLaurin Phosphate Mining Syndicate, Foxton Phosphate Mining Company, The Phosphate Mining and Shipping Company, and other properties controlled by the syndicate represented in this country by Messrs. Lomer, Rohr & Co., Montreal, are now being amalgamated under the management of one concern. We hope to give particulars of the new arrangement in a future issue.

Rumor hath it that Mr. William Mackintosh, of Buckingham, has been appointed a Mining Inspector for the Eastern Townships. The REVIEW cannot congratulate the Government on the appointment. This gentleman may possess a certain amount of knowledge and experience in the quarrying of phosphates, but we have yet to learn that he comes up to the standard of the Act which enjoins (section 1513) that "Inspectors must be *mining engineers* possessing sufficient knowledge of mineralogy and metallurgy." The miners of Quebec insist upon the appointment of thoroughly qualified engineers to supervise their operations.

Owing to a much depressed market the ocean shipments of Canadian phosphates during the past season have been the lowest for many a year. Returns show an export of:—

	Tons.
To Liverpool	3,642
London	1,573
Other British ports	1,690
Hamburg	1,636
Total European export	8,541

The shipments have been distributed as follows:—

	Tons.
O. M. Harris	3,937
Lomer & Co	2,249
Wilson & Green	1,942
Capt. R. C. Adams	413
	8,541

Towards the end of the season a fairly good market developed for the lower grades in the United States, and about two thousand tons of ground have been forwarded to Buffalo, Chicago and Detroit. Messrs. Lomer, Rohr & Co. at date of writing, have still important shipments to make. A few hundred tons of ground have been used by the chemical works at London, Ont., and at the superphosphate works at Smith's Falls and Capelton. Advices from Europe are hopeful of an improvement in prices before next year's shipping begins.

The value of the exports of minerals from the port of Ottawa for the past eleven months is:—

Ground Phosphate	$10,791 30
Asbestos	800 00
Iron ore (Bristol mines)	16,846 50

"The London Mica Importers, Limited," is the designation of a new syndicate just formed in London, England, with a capital of £70,000, to purchase mica properties and deal generally in the mica business.

At a public meeting held in Kingston, Ont., on 8th instant, subscriptions amounting to $13,800 were announced for the establishment of a School of Mining and Agriculture in that city

Judge Malhoit has delivered judgment in a case, at Aylmer, which declares the tax in Quebec imposed by the Government of 1½ per cent. on all sales of properties illegal. The case arose out of the sale of the Brock mica mine to T. P. Coffee, a solicitor in Guelph. Mr. Sims, an agent of the Quebec Government, took action against Mr. Coffee for the amount of the tax on the price of the property. It is likely that an appeal will be taken against the judgment

The following table gives the shipments of petroleum (crude, refined and crude equivalent) from the Petrolia district, Ont., for the first eleven months of 1891 and 1892 :—

	1891			1892		
	Crude.	Ref'd.	Crude. Equiv.	Crude.	Ref'd.	Crude. Equiv.
January	19,910	20,974	70,749	17,441	24,751	79,218
February	14,577	18,073	59,759	16,341	23,993	76,324
March	15,617	16,227	56,084	16,570	19,409	65,217
April	16,615	15,665	57,850	12,542	13,145	51,704
May	17,077	15,071	56,754	15,045	8,665	61,897
June	15,071	15,547	53,885	15,225	17,510	58,000
July	15,725	16,308	56,484	13,289	19,562	62,193
August	15,296	16,910	81,570	15,370	18,072	85,562
September	20,329	33,720	109,629	17,261	39,736	117,605
October	21,627	39,632	120,710	220,507	44,010	130,542
November	18,966	26,898	86,211	21,787	39,005	129,269

An Ontario correspondent writes: Have you noticed how much money the Ontario Government is squandering upon the Chicago Exhibit. Some $16,000 were voted to defray all expenses, and this amount distributed among some eight other departments in amounts ranging from $1,600 to $2,000 for each. The result is that the whole exhibit has been collected (mainly through private means) from a few districts of the Province, leaving others such as Temiscamingue, Wahnapitæ, Georgian Bay, North Shore of Lake Superior (except a few samples of building stone there are nothing from the latter.) Sudbury is represented by copper, nickel and some platinum sand, but no gold. The Commissioner informed me (pointing to some samples of marble), "These are from Senator Sandford's marble quarry. They cost us (the Government) $250 to get out and polish. At the same time the Government would not pay such a man as Peter Mackellar his expenses incurred in making a collection from the Port Arthur district, the exhibit from that section being obtained as a personal favor to the gentleman, who is at present engaged in arranging and cataloguing the exhibit. Perhaps you can do something."

On enquiry we find that the statement of our correspondent anent the appropriation is very misleading, as a number of Departments to be represented have not as yet called for more than a trifling expenditure.

We are informed by the Commissioner, Mr. Awrey, that fully one-third of the amount so far expended has been for the collection of minerals. Of course, the $16,000 was only a preliminary vote, and it will necessarily be supplemented by a much larger one. The collection of minerals is yet by no means complete, and samples are being received daily. The complaint of the inadequate representation of the northern country will not be justified by the facts, except perhaps in so far as the Temiscamingue and Wahnapitæ districts are concerned. The mineral value of these districts is practically unknown, and the only way by which samples could be obtained would be by exploring for them, which the Government could hardly be expected to do. There are, however, some samples of gold from Wahnapitæ, and more are looked for.

As to the representation from the north shore of Georgian Bay, our correspondent is very much mistaken, for we are informed, in addition to the very large collection of minerals from that district, including gold, nickel, copper and iron ores, large lots will be shipped direct. Among these latter are three and a half tons of copper-nickel ore from the Stobie mine, six tons from the Evans, and three from Copper Cliff, each sample in the mass; besides a trophy of matte of 6,000 pounds and a pyramid of refined nickel weighing 3,500 pounds. There will be in addition specimens in all stages of production, from the raw ore to the refined metals. These will be exhibited in six fine cases nickel-plated with nickel taken from the mines. Half a ton of gold ore is promised from the Ophir mine in Galbraith Township, a large exhibit of rich native copper from Point Mamainse, and many other specimens which need not be enumerated.

The Lake Superior region is represented by a very choice collection which has been placed at the disposal of the Commissioner by Messrs. Wylie & Co. of Port Arthur. It was not possible to obtain samples from the mines, owing to the fact that these are now closed and all ores shipped. Mr. Awrey tells us that the reference to Mr. McKellar is altogether untrue, as there was no question of remuneration or expenses; the only reason why Mr. McKellar was not employed being his own statement that the mines were closed down.

A letter from Mr Boyle, the gentleman referred to in latter portion of our correspondent's complaint, disclaims any credit for the exhibit obtained from the Port Arthur district, and from information received from other sources we believe that this statement is strictly true. At the same time we do not see any reason why the Commissioner should hesitate to take a collection coming from any source, through any person's influence, if obtained in an honest and honorable way.

With reference to the Barrie marbles, Mr. Awrey states that five quarries are represented in this collection, and that the total cost was nothing like the sum stated by our correspondent. It may occasionally happen that an exhibit costs more than it should, owing to the peculiar circumstances, but any one who has had experience in the making of a collection will have the sense to allow for such cases.

While by no means favorable to the disposition of Canada's exhibits by Provinces, Dr. Selwyn, Director of the Geological Survey, expresses himself as much pleased with the excellence and thoroughness of the mineral collection to be sent by Ontario to the World's Fair.

Mr. F. J. V. Skiff, Chief of the Division of Mines and Mining, contributes, in a recent article, an interesting outline of the plan of the great mining exhibit at the World's Fair. The subject of coal will be treated on very broad lines. It would be impossible to accept for exhibition purposes all the really meritorious specimens of coal that can be secured, for the purpose of demonstrating the resources of the country in this great fuel. The treatment must be comprehensive and sweeping, and the display based upon the distribution of the great coal fields that stand out prominently in the geology of the country. The coal industry is of gigantic proportions, involving the investment of many millions of dollars and the employment of hundreds of thousands of people. The display of coal at the Exposition will be qualitative rather than quantitative. The different varieties of coal produced by the different localities will be shown, together with the chemical analysis of each, and the results of tests determining economic value and adaptability to various uses. The coal resources of countries, states and sections will be shown by geological maps and drawings, exhibiting the stratification, cross-section, etc., which will render apparent the extent and accessibility of the vast number of coal beds and veins which underlie the earth's surface. In the mining machinery section will be shown every species of apparatus, simple and complex, employed in working a mine from the lowest drift to the dump. Methods of timbering, ventilating and lighting the various slopes, levels and galleries will be shown by examples. Trams, hoists and automatic dumps, engines for pumping, rock-breakers, screens, grizzlies and other sizing appliances will attract the inspection of the visitor and instruct in the greatest of all industries. Improved diamond drills and contrivances for loading and unloading ores and for their storage, automatic stevedores for transference on the surface, patent self-emptying cars, wire ropeways with their outfits of buckets, etc., coal tipples, steam shovels, belt conveyors, etc., etc., will complete the methods by which the stupendous mining operations of the present age are conducted. For the purpose of practical study, the division of history and literature of mining and metallurgy will be unsurpassed. To this end college faculties and professional men are already pledged. Every facility will be afforded for examining in detail the geology and distribution of minerals and ore-bearing rock. The rich literary stores, maps, models, etc., of the leading educational institutions of the land will present to the student who visits this great repository at the Columbian Exposition an unexampled opportunity for considering the entire subject of historical and statisical mining. Mine engineering will be adequately represented by surveys and plottings, by projections of under-

ground work and models, and by literature descriptive of the methods of running shafts, tunnels, construction of mine workings and the handling of ores. An elaborate and accurate reproduction of the ancient and unique mining and metallurgical methods, appliances, tools and processes as illustrating the evolutions in the industry, will attract the attention of all classes, and teach fruitful lessons in the advance of science, invention and general civilization. When the exhibits in the department of mines, mining a. ' metallurgy shall have been properly collected, classified and arranged, the department will be a comprehensive and complete exposition of all the great mineral treasures of the earth, and the methods employed in their search, their treatment and their usage.

Referring to the accident on 7th instant at the Drummond colliery, Mr. C. Fergie, M.E., manager of the Company, writes, under date of 15th instant:—

"In addition I may say we last night completed a second dam some 232 feet outside of the first, which will hermetically seal the tunnel and remove beyond doubt the existence of fire. That roburite fired the shot there is not the slightest doubt; the shot hole was some 30 feet long and well prepared and stemmed, which is proven by the shot doing its work. The detonator was properly imbedded in the explosive mixture, and the whole was fired by electricity; in fact everything was done as per instructions given by the manufacturers, and a man having considerable experience with the use of the explosive fired the shot. The manager and men have hitherto had the greatest confidence in roburite; it is, however, needless to say that that confidence is now shaken, and the manager will be most careful in future as to where he introduces it.

"I am sorry I have not now time to write you a more detailed description of the affair, but I am preparing a lot of facts in connection with it and will let you have them with a section of the tunnel showing dam. I am sending samples of the roburite away to-day for analysis."

Until more information is available it would be unwise to wholly condemn roburite as an unsafe explosive in collieries. The Explosives Commission advised the same caution respecting its use as the law required in the case of black powder. In this instance, it is stated that one shot-firer declined to explode the shot which his successor on the next shift did fire, and as the firing was attended by a small explosion, it is clear there was some gas present; there was no dust about, the tunnel being damp. We are satisfied that while roburite is not absolutely safe under all circumstances, it is much safer than black powder.

The Bethlehem Iron Company has recently been investigating the qualities of nickel steel with the object of ascertaining whether it might not prove valuable as a material for certain parts of machinery. The results have not yet been made public, being in the possession of Commodore Welville, engineer in chief of the U. S, Navy. The carbon steel generally employed for propeller shafts has a tensile strength of 65,000 pounds, and an elongation of 20 per cent. Nickel steel has a tensile strength of 90,000 pounds, with the same elongation. It has now been decided to make a section of the propeller shafting of the Brooklyn and the seagoing battleship No. 1, of nickel steel in order to test, on a practical working scale, whether it really has the advantages that it promises. The shafting of the two materials will be of the same diameter, and a hole will be bored through the nickel steel shaft with a view to equalizing the strength of the two, while the weight of the nickel steel will be less, this being a very important factor in all marine machinery. It is also proposed to try nickel steel for boiler plate.

A new firedamp detector has been devised by M. Chesnau, secretary of the French Firedamp Company, which will indicate proportions of gas in the air as low as 0·1 per cent. The apparatus takes the form of a safety lamp, in which alcohol is burnt, and the difference in brightness between the halo or ring due to the fuel and the alcohol flame is rendered more perceptible by the addition to the alcohol of a small quantity of chloride of copper, which tinges the flame with green, while it gives the rings a greenish-blue colour. In point of security the indicator is said to be on a par with the best safety lamps.

The question of lighting coal mines is one which has for many years received the attention of experts, and the number of patents that have been taken out for lamps of every description is one of the best indications that many are engaged in trying to solve the difficult problem. One of the first of what may be called the modern type of lamp is the Wolff, which is used in some of the continental mines, and has many advocates, although, in this country, the use of benzine as a luminant will never be acceptable. The next lamp that has gained considerable favour among miners is the "Thornebury." In this lamp only heavy mineral oils are used, and it has the advantage of combining strength and lightness with good light-giving powers. The tests made with this lamp under the direction of Sir Frederick Abel are said to have been highly satisfactory, the light being above the average, and when placed in position where dangerous gases prevailed their presence was at once noted by the change in the flame. With the advance made in the manufacture of secondary batteries, the construction of an electrical miner's lamp became possible, and from the cumbersome affair that was devised by Swan some ten years ago a great change has been wrought, and there are several now in the market that have many points to commend them. Among others we may mention the "Stella" lamp, which weighs only three and one-half pounds, and is capable of giving seven-tenths of a candle-light for twelve hours. The Bréquet lamp, weighing nearly six and one-half pounds, gives one candle power for eighteen to twenty hours, and the "Bristol," weighing five and one-quarter pounds, one candle power for eight to ten hours. The one great difficulty in connection with electric mining lamps is the unreliability of the lead plates of the accumulators, which, in time, warp, and become short circuited. This trouble, however, should not be very difficult to overcome, as it means that the plates must be specially arranged so as to prevent the warping and contact. The experience with electric lamps has not been very satisfactory. It was found that owing to the corrosion of the connections they became practically useless after about six months at work. The fact that the electric lamp does not indicate the presence of dangerous gases or inflammable vapour should not be reckoned against its use, for it would be far better to have in each working one or more of the Clowse detector lamps by which the amount of dangerous vapour could be noted from time to time, than to depend upon the miner whose attention is directed to his work more than to testing for gas. One or two men could constantly visit the lamps, and, if necessary, warn the men that the mine was dangerous. There are many lamps that will detect large amounts of fire damp, but for quantities below two per cent. a special arrangement is necessary, and the person making the test must understand his business thoroughly, for, if dust is present when even a small percentage of fire damp is indicated, the danger is almost as great as if the gas was present in larger quantities. It should not be difficult to arrange the accumulators for the miner's lamps in the shape of a small knapsack, and lead the wires to the cap, where a small lens could be fixed to throw the light directly upon the work. By this means the trouble of handling the lamp would be avoided, and the weight so distributed that it would not be felt.

In a paper on the subject of wear and tear of steam boilers due to expansion and contraction strains, before the Midland Institute of Mining, Civil and Mechanical Engineers, Mr. J. Clark Jefferson referred to the connection between rise of temperature, the linear expansion or contraction thereby produced, and the reserve force which is brought into play when either of the latter is opposed by excessive rigidity of construction. The elongation or contraction was given as $\frac{1}{799000}$th of the original length per degree Fahrenheit, and as representing a reserve force of 208 lb. per square inch of section per 1 degree Fahrenheit rise or fall of temperature, or in the case of an ordinary Lancashire boiler, a reserve thrust on the ends of the boiler of 340 tons under ordinary working conditions. The mode in which this thrust causes grooving in the end plates over the flue angle irons was explained in detail and illustrated by drawings; as also the manner in which differential expansion at lap seam joints caused leakage at and between the rivet holes in internal flues. The differential expansion in the lap circular seams in the mid and side flues, and, in the case of externally-fired boilers, was shown to produce a movement of the outer lap away from the inner lap at least eighty times the longitudinal expansion of the rivet, and this explained the liability of externally-fired boilers to leak in the lap seams directly exposed to the fire. The transmission of heat from the fireside to the water depended mainly on the surface conductivity of the plates, the internal resistance being comparatively negligible when compared with the surface resistance, and hence the advisability of having

all joints near to the fire-water covered. The expansion of the firebox in the case of vertical and locomotive boilers caused grooving in the outer plates analogous to the grooving in the end plates of Lancashire boilers. The proper direction in which the draught should be carried round the flues was described, that for Lancashire boilers from the internal flues to the mid-flue, and then split to return down the sides, whilst the contrary direction along the side flues and to return by the mid-flue for Cornish boilers was recommended as most advisable. The defects produced by an opposite course, especially where the attempt was made to get up steam rapidly, were pointed out. The molecular deterioration of the plate of fireboxes, which were the most severely tried parts of a boiler, was also referred to, and the paper concluded by drawing attention to the above defects as showing the importance of keeping the working temperature at any part of a boiler uniform for that part, and of raising or lowering the temperature as gradually as possible.

A late despatch announces the termination of the strike at Springhill.

Professor Ahn.

(Written for the CANADIAN MINING REVIEW, by Stephen H. Emmens, Youngwood, Pa.)

In adopting the above title for this article I am not conscious of doing anything unjustified by fact or more severe than the circumstances of the case call for. I may even add that I do not feel unkindly towards the Professor, and that I regard him as a product of hard fate rather than of any inherent depravity. If, in the future, I can do him any good turn I shall not be indisposed to do so; but just at present the good of the mining community is uppermost in my mind.

I first made the Professor's acquaintance in October, 1891. He was introduced to me by the officials of the Imperial Trusts Company of Canada at their Toronto office. He stated that he controlled a mine, (Lot 12 of the 3rd concession of Denison Township, in the Algoma mining district) where a brilliant discovery of gersdorffite had been made and which was virtually sold to some Rochester (N.Y.) parties. He volunteered to accompany me to Sudbury and show me that famous nickel district, concerning which he impressed me with the belief that his knowledge was, like Sam Weller's of London, "extensive and peculiar." I thankfully accepted his offer and found him an agreeable and useful travelling companion, very courteous, very good-humoured and fairly well posted as to the Sudbury mines and doings; though a little conversation soon showed that his claim to be an expert was founded upon a peculiar rather than extensive knowledge of chemistry, mineralogy, metallurgy and mining. Altogether I considered him superior to and somewhat more truthful than the ordinary run of claim-sellers in new mining districts. He did not, however, attempt to sell me any claim, and did not show me the gersdorffite discovery, but contented himself with accompanying me about, and even braved the redoubtable Mr. Merry, senior, at the Murray mine, on my behalf—a feat of no mean order, as the Sudbury world well knows. When I was afterwards told that the choleric old gentleman in question has an amiable weakness for jumping on his hat, when troubled by the cares of life, and when I remembered that I had innocently replied "I am a nickel refiner taking notes" to his question of "who are you, and what the devil are you doing here?" (N. B.—I had made proper application at the mine-office and had received permission to visit the works.) I shuddered at my narrow escape; for, incredible as the story may appear, the Professor and I were allowed to go intact from the Murray Mine.

The Professor returned with me to Toronto where we parted; and I have not seen him since.

On January 11 of this year he wrote saying that his sale of the Gersdorffite property was "an accomplished fact and we start to work on or before the 20th inst." He sent me some samples of ore and wished to arrange for selling the output of the mine to the Emmens Metal Co. Among the samples was one thus described "No. 3, a piece of Millerite and Perryhotite (*sic*) as found on either side of the vein of Gersdrophite (*sic*)."

On February 6th he wrote me saying that his deal had fallen through and inviting me to take up the mine. In this letter he stated his belief that the mine was "a finer and richer property than the Worthington," and added "I have so much confidance (*sic*) in this property that I would undertake to mine and deliver ore without any charge for my services until satisfactory results were obtained or would undertake to work it, participating in the profits made for my services, with a capital of $5000 I do not hesitate to say I could take hold of this property and purchase it from the proceeds of the ore mined without any outlay by the parties investing." To this letter I replied on February 15th saying, "I think it will be worth while for you to send me your reports and plans relative to the Gersdorffite mine; as, if the details be satisfactory and if a common-sense bargain can be struck I am disposed to work the property." I then added that I had just received a letter from an English mining expert who wrote "I did not think very much of Sudbury, and on my return to England I advised my people not to complete their purchase of some Ni., mines on which they had an option as the samples I took myself were very low in Ni., and I considered cost of manufacture would be high;" and I went on to say, "This incident is but one more added to those I have not noted in mining matters during the last twenty-five years, and which have taught me to attach no practical importance to *samples*, unless, indeed, they be fairly taken from large parcels of ore. I should no more think of buying or working a mine on the faith of a sample than I should of buying or renting a house on the faith of a brick, In the Sudbury district especially is this caution indispensable. The quantity of ore there existing is, in the aggregate, very considerable; but the surface indications of any individual deposit are not to be relied upon. *Development* alone can determine whether the deposit is or is not of a character to justify the sinking of capital. Hence you will understand that the only proposition I should consider acceptable would be one based upon development."

On the same date I also wrote to the Professor as follows: "Referring to my separate letter about the Gersdorffite mine I may explain that in the event of my finding your report satisfactory and a lease being entered into as suggested, I shall be willing, if you so wish, to entrust the working of the mine to yourself on contract, at the price of $5 per ton for ore placed on cars on the C.P.R. This should leave you a very considerable profit, sufficient not only to represent good renumeration for your services, but also to enable you to accumulate capital out of the working of the mine."

On March 4th the Professor sent me his report and wrote: "As regards your propisition to place the working of the mine in my hands at the price you name, this would be perfectly satisfactory to me and I would undertake to do same, receiving payment on the cars being weighed in Sudbury."

The principal passage in the report was as follows: "This property is situated north-west (*sic*) of the Worthington mine, the second richest in the district, and is distant but one mile, the same lode which starts at the Worthington is clearly traced right into the Gersdorph (*sic*) property, where the ridge carrying the deposit seems to culminate in the largest body of mineral, and it is at the north-easterly extremity of this ridge where the mineral was first discovered and where developments have shown a rich and extensive body of ore to exist together with what appears to be a true vein of the mineral Gersdoffite (*sic*) and Nickelite (*sic*) samples of which have been assayed as high as 63%, the assays being made by the Geological Department of the Dominion Government at Ottawa. This is the only mine so far that has exhibited nickel in these forms and the only one in the district that exhibits anything in the way of a vein of nickel—in this opinion I am borne out by Mr. A. E. Barlow, M.A., of the Geological Department. The vein matter starts at the surface about six (6) inches wide, but rapidly and steadily widens to about thirty inches at a depth of eight (8) feet where it enters into the side of the shaft, which is sunk to a depth of eighteen (18) feet on the side of the hill. The vein is cutting this hill at an angle of about forty-five (45). *The hill in question is almost a solid body of Millerite, Nickeliferous Pyrrhotite and Chalcopyrite all of a high grade as has been shown by assays made by Sperry and others.*"

The result of these representations was that the secretary of the Emmens Metal Company finally met the Professor in Toronto and two agreements were entered into, one with the owners of the mine for a working option, and the other with the Professor whereby he undertook to work the mine in accordance with the option, receiving from the Emmens Metal Company, $5 per ton for all ore placed on cars, an advance being made to him at the outset (against ore to be afterwards delivered) to enable him to prepare a road and erect a shanty for sheltering the miners.

Work then commenced but it soon became evident that no speedy supplies of ore would be forthcoming, and on June 16th I wrote to the Professor indicating the disappointing features of the situation and stating that the Company would probably not care to continue the matter without some radical change in the terms of the option. To this the Professor replied on June 18th in a letter from which I will quote the following passage:

"There is a body of Nickeliferous ore on the surface though, according to your tests, not as high-grade as I was led to believe from a number of assays made by other assayers, copies of which are embodied in my report, that this surface deposit is not so extensive as I at first supposed, is but one of the contingencies of mining, but while this has to some extent diminished yet the high grade ore has exceeded my anticipations, when speaking of high grade ore I mean the Gersdorffite and Nickelolite (*sic*), and of this ore I consider it possible to mine enough to pay the expenses of the development."

This deliberate statement was made after practical development had continued for some time and after the receipt of various cautionary letters from myself. It was a hard thing to regard a statement made under such circumstances as being untrue or to regard the Professor as an ignoramus, incapable of forming a correct judgment. Accordingly after consultation with the secretary of the Emmens Metal Company I wrote to the Professor on June 23rd as follows:

"Mr. Landale is here, and we have carefully considered your letter of the 18th inst. We have decided to rely upon your deliberate expression of opinion that, with reference to Gersdorffite and Niccolite, you consider it possible to mine enough to pay the expenses of the development, by which we understand you to mean that we may reasonably expect to receive by August 31st, sufficient high grade ore to amount, at $5 per ton, to the total of our advances. Upon this understanding we forward herewith a cheque for $400 as an advance on account of ores to be shipped at the rate of $5 per ton, or else to be taken over by us on the mine at $3 per ton. Please therefore sign and return the enclosed form of receipt. In view of this decision, I do not think it necessary to enter upon any technical discussion in reply to your letter. I will merely say that in acting on your advice *we entrust our interests to your professional ability and good faith.*"

The Professor signed and returned the receipt without a word to qualify or modify the understanding on which the $400 was advanced. Yet at that time (June 25th) the condition of the mine was such as to preclude any reasonable expectation of the promised ore being produced during the next two months. This will be evident upon a consideration of the following passages from a report made on August 13th to the Emmens Metal Company by Messrs. Rickett and Banks, of New York, who were engaged to inspect the mine:—

"The surface of the Greenstone dyke has been stripped at several places on the property, and an inclined shaft sunk 37 feet at an angle of about 45 degrees to the south-east, upon a mineral vein in the diorite near the southeast contact of the dyke, which latter having a steeper dip southeast is cut diagonally by the vein. The ore lens has a nearly parallel trend to that of the dyke. The seam or vein of ore at the collar of the shaft is about six inches thick, it pinches to about three inches at the depth of 20 feet, and then gradually thickens to the bottom of the shaft, where on the south-west side it is 13 inches thick. The vein filling is largely a changed diorite with some little quartz and feldspar, carrying several irregular seams and scattered bunches of chalcopyrite and pyrrhotite with admixture of nickel minerals. In the bottom of the shaft in the north-east side the seam has pinched to about an inch." [N.B. This is the vein of which the Professor reported, "The vein-matter starts at the surface, about six (6) inches wide, but rapidly and steadily widens to about thirty inches at a depth of eight (8) feet, where it enters into the side of the shaft which is sunk to a depth of eighteen (18) feet."]

"There was at the mine in barrels and in piles on surface sufficient materials from which to select, say, ten tons of ore for shipment. Ore in sight cannot be estimated owing to the very irregular distribution of the sulphurets and limited development work."

On reading this report I wrote to Messrs. Ricketts and Banks asking them various questions, among which were the following:—

1. "Mr. Ahn says, speaking of the ridge in which the shaft on the vein is sunk, 'The hill in question is almost a solid body of Millerite, Nickeliferous Pyrrhotite and Chalcopyrite, and of a high grade.' Is this statement true, or is it a preposterous lie?"

The reply made by Messrs. Ricketts and Banks to this question was, "We think the statement is not verified by existing developments."

2. "Does a true vein of Gersdorffite and Niccolite exist?"

The reply made by Messrs. Ricketts and Banks to this question was, "The vein cannot be called a vein of Gersdorffite and Niceolite."

It is hardly necessary to add that on receiving the report from Messrs. Ricketts and Banks, the Emmens Metal Company threw up their option of acquiring "the hill of solid Millerite, nickeliferous Pyrrhotite and Chalcopyrite, all of a high grade."

A Large Coal Breaker.—The Lehigh and Wilkesbarre Coal Company has broken ground at Ashley, Luzerne county, Pa., for the largest breaker in the United States. One year ago the company began sinking the Maxwell shaft, and this breaker will be used to prepare the coal from it for market. The shaft, like the breaker, is said to be the largest in the world. It is 13 by 54, and 4 carriages will be used to hoist coal from the 2 immense veins—the Baltimore, 640 feet deep, and the Red Ash 940 feet deep—which it will tap.

The new breaker will be 127x150, and will have a capacity of 3000 tons per day. It is located 1000 yards from the foot of the Jersey Central planes, over which all coal mined in the valley and shipped over this road passes on its way to city markets, so that a vast sum will be saved annually in the matter of transportation. The works will necessitate an expenditure of $250,000 before a ton of coal can be despatched to market from it, and will furnish employment to 2000 men and boys.

Quarterly General Meeting of the Mining Society of Nova Scotia.

The December Quarterly Meeting of the Mining Society of Nova Scotia was held in the rooms of the Society at Halifax, Thursday, 8th instant. Proceedings commenced at ten in the forenoon. Mr. H. S. Poole, F.G.S., A.R.S.M., President, in the chair. There were present: John E. Hardman, S. B. Oldham, R. G. Leckie, M.E., Londonderry Iron Co., Londonderry; George W. Stuart, Truro Gold Mining Co., Truro; Duncan McDonald, Truro Foundry and Machine Co., Truro; James Baird, Canada Coal and Railway Co., Maccan, Wm. Smaill, Londonderry Iron Co., Londonderry; Charles Archibald, Gowrie Coal Co., Cow Bay, C.B.; R. H. Brown, General Mining Association, Sydney Mines; J. R. Lithgow and Wm. Lithgow, Glace Bay Mining Co., Halifax; Dr. E. Gilpin, Jr., Inspector of Mines, Halifax; J. M. Reid, Oxford Gold Mines, Musquodoboit; C. E. Willis, Halifax; G. J. Partington, Whiteburn; Howard Clarke, the *Critic*, Halifax; B. C. Wilson, Waverley; J. H. Austen, Halifax; F. Taylor, Lowell, Mass.; Capt. George McDuff, Waverley; T. R. Gue, Halifax; G. E. Franeklyn, General Mining Association, Halifax; W. H. Huggins, Halifax, and H. M. Wylde, Secretary.

The Secretary read the minutes of the previous meeting which were confirmed. The rules of the Society being suspended the following were duly elected to membership: —. Thomas, Montague Mines, proposed by Capt. McDuff, seconded by T. R. Gue; John S. Kennedy, Ferrona, N.S., proposed by Wm. Smaill, seconded by H. M. Wylde. Associate members:—James Purvis, Cape Breton, and Geoffrey Morrow, Halifax, proposed by R. G. Leckie, seconded by Charles Archibald.

THE MONTREAL CONVENTION.

THE SECRETARY read correspondence from Mr. B. T. A. Bell, Secretary General Mining Association of Quebec, with reference to the International Mining Convention and meeting of the American Institute of Mining Engineers to be held in Montreal during the week commencing 21st February, 1893.

THE PRESIDENT—Mr. C. Fergie, M.E., is preparing a paper describing the methods of mining at the Drummond Colliery; also Mr. B. C. Wilson, on the subject of leasing gold properties in Nova Scotia.

MR. JOHN E. HARDMAN—Has it been determined whether we shall attend this Convention officially or only as individuals, in other words is the Mining Society going to send delegates to represent the Society, or are we going simply as individuals.

THE SECRETARY—This question has been considered by the Council and referred by it to this regular meeting.

MR. T. R. GUE—I believe that nearly every member intends going to Montreal, and I suggest that perhaps this society should have a special meeting there. We could have a better meeting in Montreal at that time than we could have here, and I am strongly in favor of a special session of this Society during the convention If the meeting is well attended we may conclude to dispense with the next Quarterly General Meeting. I, personally, would like to go very much, and most all of the members have expressed their willingness to attend on that occasion.

MR. JOHN HARDMAN—Such a meeting as proposed by Mr. Gue would come under the third paragraph of the fifth section of the By-Laws. It could very easily be convened as a special meeting.

On motion it was voted to hold a special meeting of the Society in Montreal during the third week in February.

THE PRESIDENT said he had no doubt that the papers which would be prepared by the members of the Society would be of a character which would reflect credit not only upon the members, but also upon the Society

DR. E. GILPIN—Would papers be read at the meeting of the Society or before the Convention?

THE SECRETARY—The Convention.

The following subjects on legislation in Nova Scotia were allocated for papers and discussion at the Convention.

(*a*) That portion of the Mines and Minerals Act relating to gold, by Messrs. Stuart, Wilson and Hardman.

(*b*) That portion of the Act relating to mines other than gold, by Messrs. C. Archibald and J. R. Lithgow.

(*c*) The Mines Regulation Act, by Messrs. R. G. Leckie, R. H. Brown and H. S. Poole.

MR. R. G. LECKIE, referring to the suggestion contained in Mr. Bell's letter that an excursion might be made during the Convention to Nova Scotia, said he thought the time of the year most unfavorable. It was the very worst period to visit the province and to examine its varied and excellent resources. He therefore moved: "That while acknowledging with pleasure the interest entertained by the General Mining Association of the Province of Quebec in the mining industries of this Province, and also expressing our most cordial desire to entertain the American Institute of Mining Engineers in Nova Scotia at a suitable and convenient season of the year, be it resolved: That in the opinion of the members of this Society the month of February would be a most unfavorable season to view the varied resources of this Province, and also that the difficulties and uncertainties of travel are great at that period of the year: Further that the representatives of this Society to the Montreal Convention be and are hereby requested to consult with the officials of the American Institute of Mining Engineers with a view to holding an autumn meeting here next year (1893)."

MR. JOHN HARDMAN, in seconding the resolution, said he could not add anything to what Mr. Leckie had said. At that season of the year we would not be likely to get representative mining men and capitalists to visit the Province, particularly after a protracted session in Montreal.

DR. GILPIN said he had had something to do with the autumn part of the last excursion in 1885 of the American Institute to Cape Breton. He remembered two stormy days when they had the greatest difficulty in preventing the excursionists from taking the next train home. He thought the Institute should visit Nova Scotia at a time of the year not later than the middle of September.

The resolution carried.

The Secretary was instructed to send a copy of the resolution to Mr. Bell and also to Dr. Raymond.

THE PRESIDENT invited discussion on the papers read at previous meetings.

DISCUSSION ON MR. POOLE'S PAPER, "NEW EXPLOSIVES FOR COAL GETTING IN NOVA SCOTIA."

MR. T. R. GUE—I am preparing a paper for a future meeting fully criticising Mr. Poole's paper.

DR. T. GILPIN—The Explosives Committee is to meet again and prepare a final report. Parties who had tendered one explosive claimed that they had since introduced a slight improvement. We have a small supply of ammonite. Perhaps Mr. Brown could tell us how he succeeds with this explosive at his mine.

MR. R. H. BROWN—We tried ammonite for a short time, but our men were prejudiced against it and would not give it a fair trial. We fired a few shots and it acted the same as roburite. It seemed to blow out two or three cubic feet and would not bring the shot down. The cartridges are made in metallic cases and you cannot alter them in diameter or length.

DR. E. GILPIN—I do not think any of the new explosives introduced on the continent are better. They have some new explosives in France and Germany which I suppose we cannot get here. So far as I know the roburite and other powders have worked fairly well. I believe that there were one or two cases of sparking—I think one in the Acadia Company—but as far as I can see in the literature on the subject I do not see anything better. The question which I think is important before the Commission, although it is a little on one side, is that in regard to detonators. I see they have been using the compressed detonator, which seems to be safer in its action.

THE PRESIDENT—Broadly speaking, you are of the opinion that the so-called flameless explosives used in Nova Scotia are much safer than common powder for work in mines where gas is produced?

DR. GILPIN—There is no question about that.

DISCUSSION ON MR. HARDMAN'S PAPER, "RECENT GOLD MILLING PRACTICE IN NOVA SCOTIA."

THE PRESIDENT called on Capt. G. McDuff for some remarks on Mr. Hardman's paper.

CAPT. MCDUFF—I think the paper a very good one, and I do not see how it could be improved on. The only point I can question is the extremely low costs given.

MR. JOHN HARDMAN—I came here cocked and primed with explosives, one pocket full of dynamite and the other full of roburite, and with seven-fold exploders in my vest pocket, prepared to defend my paper, but as no criticism is forthcoming I fear the ammunition will have to be thrown away. Since I wrote that paper we have had considerable experience in the "Waverley Mill." In regard to costs, the cost of running the Oldham Mill was very low because water power was used, but there will not be so very much more difference in a steam mill. The percentage of gold recovered was just as favourable running the Waverley Mill at about 100 drops per minute, as in the Oldham Mill which ran from 85 to 88 per minute. I expected this particular point would be criticized by members present. We still continue to use the same form of mortar, and recover 92 per cent. of all the gold obtained inside the mortar.

MOTION TO APPOINT AN OFFICIAL TO REPRESENT NOVA SCOTIA AT THE MONTREAL CONVENTION.

It was moved by Mr. J. E. Hardman and seconded by Mr. Chas. Archibald, as follows: "In view of the importance of the February meeting at Montreal in the matter of legislation affecting mines, this Society deems it wise and expedient that the Provincial Government should be represented at that meeting, therefore be it resolved that the secretary is hereby instructed to communicate with the Honorable Commissioner of Public Works and Mines and to request, on behalf of the Society, that Dr. Gilpin be appointed the official representative of the Province at that meeting."

The said motion upon being put was passed unanimously.

The meeting then adjourned to meet at 2.30 p.m.

AFTERNOON SESSION.

The Society met at 2.30. Papers on "Late Modification of Coal Mining in Nova Scotia" were read by Mr. Chas. Archibald, manager Gowrie Coal Mining Company, Cow Bay, C.B.; Mr. James Baird, manager Canada Coal and Rail Company, Joggins' Mines, N.S., and by Mr. H. S. Poole, for J. G. Rutherford, Acadia Coal Company, Stellarton, N.S., and for Mr. Maxwell, also of the Acadia Coal Company. All of the above papers will be printed in the Society's Transactions.

On motion a vote of thanks was passed to each of the gentleman who had contributed a paper.

After discussion it was resolved that these papers, descriptive of late Nova Scotia practice in coal mining should be consolidated and presented as a joint paper at the special meeting of the Society to be held in Montreal during the session of the International Mining Convention.

There was an informal meeting of the Society at the Halifax Hotel in the evening, at which mining matters were freely discussed.

Special Meeting of the General Mining Association of Quebec—The Powder Tax Condemned—The Arrangements for the International Mining Convention.

On the call of the Council a Special Meeting of the General Mining Association of the Province of Quebec, was held in the office of the Treasurer, Mr. A. W. Stevenson, C.A., at 17 St. John street, Montreal, on Friday, 9th instant. There was a good attendance. Among others present being noticed: Mr. James King, M.P.P., (King Bros.) Quebec; Mr. L. A. Klein, (American Abestos Co.) Black Lake; Mr. John J. Penhale, (United Abestos Co.) Black Lake; Mr. W. H. Jeffrey, (Jeffrey's Asbestos Mine) Montreal; Mr. S. P. Franchot, (Emerald and Central Lake Mining Companies) Buckingham; J. Burley Smith, (British Phosphate Co.) Glen Almond; Hector McRae, (Electric Mining Co.) Ottawa; C. Circkel, (Templeton Abestos Co.) Templeton; J. Lainson Wills, F.C.S., Ottawa; W. A. Allan, (Little Rapids Mining Co.) Ottawa; George R. Smith, (Bell's Abestos Co.) Thesford; W. H. Irwin and R. T. Hopper, (Anglo-Canadian Asbestos Co.) Montreal; T. P. Bacon, (New Rockland Slate Co) Montreal; Prof. C. H. McLeod, Secretary, Canadian Society of Civil Engineers, Montreal; Prof. B. J. Harrington, McGill University, Montreal; A. W. Stevenson, C.A., Montreal, Treasurer; B. T. A. Bell, Ottawa, Secretary; and Col. Lucke, (Beaver Asbestos Co.) Sherbrooke. In the unavoidable absence of the Hon. George Irvine, Q.C., President, Mr. James King, M.P.P., Vice-President, was called to the chair.

ANOTHER KICK AGAINST THE POWDER TAX.

THE SECRETARY having read the minutes of the previous meeting and the notice convening the members, explained that as several members of the Association had been served with notices threatening immediate execution of the law for non-payment of the $150 license tax on powder magazines in the province, it had been decided to call the members together to consider what steps should be taken. Some of the members had suggested testing the legality of the Act in the courts, while others were in favor of approaching the Government and asking for its abolition or amelioration.

MR. JAMES KING, M.P.P.—Our President, the Hon George Irvine, Q.C., told me the tax was legal and my company paid it. So had many others.

MR. L. A. KLEIN—I do not think that the law was framed with the object of taxing mines, but rather as a safeguard for the proper storage of explosives in large cities like Montreal and Quebec. There was a clause in the Act which left the taxing of mines, quarries and railroad works within the discretion of the Lieutenant-Governor in Council. I would suggest that a deputation from the Association wait on the Government and point out the burdensome nature of the impost on an industry which deserved encouragement rather than restriction. The Government should be asked that the mining industry be exempted from the application of the tax.

MR. W. H. JEFFREY—The tax is unjust, and I will test it even if no one will assist me.

COL. LUCKE—I will assist you. I will not pay until I am compelled to.

MR. T. P. BACON—Our company received a threatening letter from the collector, but after getting a legal opinion thought it best to pay up.

MR. W. H. IRWIN—There can be no doubt that the tax is a very onerous burden. He thought the better plan would be to see the Government and explain its hardship and if possible get it remedied. He would move the following resolution:

"*Resolved* that a deputation, to be nominated by the chairman, wait upon the Quebec Government and lay before it the sense of this meeting regarding the imposition of the Powder Tax as applied to mines, with a view to inducing the Lieutenant-Governor in Council to exercise his right of exempting the mines of this Province, as provided for in the Powder Act, and that as an alternative the Government be requested to grant a case to test the legality of the Act."

MR. J. BURLEY SMITH—The tax is an iniquity which should be combated. He would co-operate in a measure of resistance.

THE SECRETARY recommended a policy of conciliation. There was no use of "kicking against the pricks." That the Act was legal enough was shown by the opinion of their President, who was a member of the Government when it was framed, and it had been endorsed by many of the company's solicitors who had been consulted regarding it. There could be no doubt of the injustice of the Act. It was a tax on industry. The Government might just as reasonably make an impost on their picks and shovels. To companies operating a number of pits on one property, and where the minimum quantity of powder stated by the Act was a necessity at all, the tax was practically prohibitive.

MR. IRWIN'S motion having been seconded was put to the meeting and carried.

THE CHAIRMAN then named the following deputation: L. A. Klein, Black Lake; J. Burley Smith, Glen Almond; S. P. Franchot, Buckingham; Col. Lucke, Sherbrooke; Hon. George Irvine, Quebec; and James King, M.P.P., Quebec.

THE INTERNATIONAL MINING CONVENTION.

THE SECRETARY submitted the correspondence with reference to the meeting of the American Institute of Mining Engineers and the International Mining Convention, to be held in Montreal during the week beginning 21st February next. Dr. Raymond had intimated that so far 160 gentlemen and 69 ladies had signified their intention of being present. The Mining Society of Nova Scotia would attend in a body and hold a special session. The Dominion Government had voted $1000 towards expenses, and the Hon. E. J. Flynn had promised to recommend an application for a similar amount to the Quebec Government. The Mining Society of Nova Scotia would arrange its programme of papers and discussions, and Ontario would be represented by a committee consisting of Messrs. W. Hamilton Merritt, M.E., Toronto, (chairman); A. Blue, Director of Mines, Toronto; Prof. C. Gordon Richardson, Toronto; T. D. Ledyard, Toronto; E. N. Rathbun, Deseronto; J. Bawden, Kingston, and G. Mickle, Sudbury. These gentlemen would, in conjunction with the Provincial Mining Association of this Province, formulate a programme that would represent the interests of Ontario. So far as he could note, the attendance from all sources would not be much short of 600. The Canadian Society of Civil Engineers had adjourned its annual meeting to the date of the Convention, so there would be meeting in Montreal at one time the greatest Convention of engineers ever held in this country. The list of papers promised was large and thoroughly representative of the interests of the country.

On motion Messrs. Stevenson, Irwin, Gardiner, Hopper and the Secretary were named a committee to arrange a programme of entertainmeat for visiting members.

THE CASE OF CAPT. T. J. WATTERS.

THE SECRETARY—I have been asked by a number of members to submit for consideration the question as to whether a Civil Servant should be debarred from investing his means in mining. As you all know many Civil Servants in the employ of the Dominion Government are engaged indirectly in the operation of mines of phosphate and mica. As an instance it is well known that Capt. T. J. Watters, an officer of the Customs Department at Ottawa, has invested heavily in establishing the mica mining industry in the County of Ottawa, on a scale that is highly creditable. But the question has been raised that Capt. Watters has no right to invest his money in mining and is debarred by the Civil Service Act from engaging in anyway in any enterprise beyond his official duties. Some of our members think that this application of the Civil Service Act is an injustice and would like it considered by the Association.

MR. J. BURLEY SMITH—I am strongly opposed to the policy of permitting a public servant using his time in a private enterprise.

COL. LUCKE—As it is now dinner time, I beg to move the adjournment of the meeting. I hardly think Capt. Watters' case comes within the scope of this Association—it is a matter between Capt. Watters and the Government.

The meeting then adjourned.

COMPLIMENTARY DINNER TO MR. C. CIRCKEL.

In the evening at half past seven o'clock, the members assembled at the Vienna Cafe to give a "send-off" to their genial confrere, Mr. C. Circkel, M.E., manager of the Templeton Asbestos Company, who was about to leave for Europe. About twenty-five sat down at the table, including: A. W. Stevenson, C. A., Montreal; His Honor Judge Dugas, Montreal; J. N. Greenshields, Q.C., Montreal; Col. Lucke, Sherbrooke; L. A. Klein, Black Lake; W. A. Allan, Ottawa; J. Lainson Wills, Ottawa; A. Merrill, Templeton; George R. Smith, Black Lake; W. Bell, Montreal; S. P. Franchot, Buckingham; C. W. Morgan, Toronto; Hector McRae, Ottawa; John J. Penhale, Black Lake; F. P. Bacon, Montreal; J. Burley Smith, Glen Almond; R. Bond, Montreal; Robt. Gardiner, Montreal. Mr. A. W. Stevenson, treasurer of the Association, presided, having on his right hand the guest of the evening, and on his left His Honor Judge Dugas. Mr. S. P. Franchot acted as croupier. After an excellent dinner and the usual loyal and patriotic toasts had been honored, the chairman in few graceful sentences, proposed the toast of their good friend Mr. Circkel, who was about to leave them for a short time. Although only a little over a year in their midst his geniality and *bon homme* had won him hosts of friends, and he hoped that they would all see him back again early in the New Year, invigorated by his trip for renewed activity at the mines, The toast was honored with three times three and a tiger and "He's a jolly good fellow." Mr. Circkel responded by briefly thanking the members for the honor they had done him. Since coming to Canada he had been treated with the greatest kindness. He could not find words sufficient to express all he would like to say, but with their permission he would play and sing something for their entertainment. Mr. Circkel then delighted the company with a selection from his German songs. His Honor Judge Dugas followed with some particularly happy allusions to the subject of "the Law," and was succeeded by Mr. J. N. Greenshields, Q. C., who declared in a vigorous speech that it was the bounden duty of Governments and Parliaments to encourage in every possible manner the development of the great natural resources of the country. Too much money has been wasted, he said, on effete schemes to build railways where they were not required, and to promote other equally futile enterprises. Considerable humour was manifest in the capital speech of Mr. S. P. Franchot, while the drollery of the stories told by Mr. Hector McRae was inimitable. The remainder of the evening was pleasantly spent in song and sentiment to which Messrs. W. Bell, George R. Smith, Col. Lucke, B. T. A. Bell and J. Lainson Wills contributed. Tne company separated at midnight.

The Iron Industry of Canada—Its Position and Prospects.

(Colliery Guardian.)

It is not, perhaps, too much to say that no hopes or expectations indulged in by the iron and steel industries of the United Kingdom have been more signally disappointed than those which have been built upon the development of the iron and steel requirements of the British colonies. The growth of the demand for our metals in those regions has not by any means kept pace with the growth of population, or with the reasonable expectations built upon the actual requirements of the colonies, in the form of railways and other works of public improvement. Why this should be so it is not easy to explain. Works of public utility have been pushed forward in some of our colonies to a notable extent, and with characteristic enterprise, but the capital is lacking to enable them to go ahead as English manufacturers would like. India, for example, has only now a railway system of some 16,000 miles, or less than one-tenth part of the railway system of the United States. Canada, "the larger half of the North American continent," as it is grandiloquently termed, has not even such an extensive system as India. The Australasian continent, with an area exceeding that of either India or Canada, has less than one-half the railway mileage of either. As with railways, so with other works of public improvement into which the use of iron and steel enters as an element of importance, and hence it happens that the whole of Greater Britain, extending to over 8 millions of square miles, or nearly three times the area of the United States, excluding Alaska, had, in 1891, a total demand for iron and steel under a million and a-half of tons, or less than a fifth part of the total consumption of the United States, of which the mother country furnished exactly 1,131,786 tons in all. Taking the three principal colonial consumers, the quantities taken by each in the years 1882 and 1891—an interval of ten years—were as under—

	1882. Tons.	1891. Tons.
Australasia.....	302,450	401,800
India.....	274,925	305,974
Canada.....	246,516	206,904
Total.....	823,891	914,678

The total increase shown on a comparison of these two years is only 90,789 tons—a perfectly insignificant increase when the growth of the three possessions dealt with is considered. Nor have our colonies of the second rank a much better record to show. The figures are appended for four of the next most important colonies:—

	1882. Tons.	1891. Tons.
Cape of Good Hope.....	68,315	113,067
Natal.....	13,347	30,887
Ceylon.....	9,300	10,140
British West Indies.....	12,501	11,689
Totals.....	103,563	165,783

Here we have a total increase of 62,320 tons, principally in the demands of the Cape of Good Hope. The increased demands of all the seven principal possessions dealt with, would scarcely keep a good-sized English ironworks busy for a single year. The increase in the other minor colonies is comparatively trifling, and does not, at the most, exceed a few thousands of tons in each case.

But there is another matter which is calculated to excite as much apprehension and dissatisfaction as the circumstances already stated, and that is the anxiety of some of our principal colonies to provide for their own requirements in iron and steel. This disposition has been more especially apparent in India, Canada, and New South Wales. In India, the matter is, of course, entirely in the hands of the Government, and of such capitalists as choose to go into such speculations. The Government have bestowed some attention, and expended some money, in attempting to arrive at an accurate knowledge of the real resources of the country for the prosecution of the iron manufacture. In more ways than one they have offered encouragement to capitalists to embark in the iron trade in the most favourable situated localities, but up to the present time, not much has been done in that direction. In Canada, the establishment of a home iron industry has for years past been the avowed wish and aim of the Government, and in his well-known Budget speech of 1887, Sir Charles Tupper, after notifying to the Canadian Parliament that the charcoal iron manufacture was formerly one of the most important industries of Ontario and Quebec, proceeded to state that "if the protection we have given cotton and woollen, and all other industries of Canada, be applied to iron, to-morrow will show what the past history of Canada has shown—that these charcoal furnaces will again be in full blast, and that in Ontario and Quebec they will become most essential and important industries in the future." In pursuance of this programme. the Canadian Government raised the duty on pig iron to 15s. per ton, and at the same time offered a bounty of a dollar and a-half a ton for every ton of pig iron made in the Dominion. It is not a little singular that in spite of all these inducements, and of the almost certain command of a market to the extent of between 200,000 and 300,000 tons a year, not much progress has been made in the way of realising the programme of the Government. This has not been because of the scarcity or the inferior quality of the natural resources of the country. Pictou County, Nova Scotia, where several blast furnaces are already carried on by the New Glasgow and Londonderry companies, is rich in several varieties of ore, notably brown hematites and spathose and specular ores, the former varying from 50 to 60 per cent. of iron, and the spathose ores from 40 to 45 per cent. Bog iron ores and clay ironstone are also found in several districts, and in Ontario, running through a number of townships, there is a deposit of ore of such high quality that a railway has been constructed over 100 miles in length to carry it to Weller's Bay, in order that it might be shipped across the lake to Charlotte, Oswego and other places in the United States. Nevertheless, the trade has never assumed large proportions. Indeed, the largest quantity of iron ore raised in Canada in a single year has hitherto fallen short of 100,000 tons, valued at the mines, in the official mineral statistics, at about 7s. 2d. per ton. Assuming about two tons of ore to the ton of pig, it would appear as if this ore were equal to the production of from 40,000 to 50,000 tons of pig iron a year, but the actual quantity of pig made in Canada has not until recently come up to that figure. Probably owing to the comparatively small scale on which Canadian ores are worked, the cost of production appears to be somewhat high. In many cases the cost runs up to about 7s. per ton, and in the most favourable conditions it does not appear to fall below a dollar. At the Acadia Mines, in Nova Scotia, according to a report made to Dr. Selwyn, the director of the Geological Survey, some years ago, the ores cost about a dollar per ton at the mouth of the level, exclusive of dead work, which, however, almost doubled this cost. At the furnace where it was smelted, in Nova Scotia, this ore cost about 2½ dols. per ton, or practically as much as the Bilbao ore cost delivered in England, after a transport of over a thousand miles. The Londonderry Works, which use this ore, were completed in 1853, but they have since been extended. The furnace first erected, and used until quite recently, was 35 ft. high only, with a bosh of 9 ft. The blast was cold, and was produced by water-power until 1874. The cost of producing a ton of iron at the same time was stated to be 20 dols. 68 c., or over 80s., per ton, but the blast furnace was only in blast for six or seven months at a time, and was tapped about once in every six hours.

Since then, the ironworks established in Nova Scotia have come more fully abreast of modern requirements and practice. During the present year the New Glasgow Iron Company, which is, perhaps, the most enterprising undertaking of its kind in the Dominion, has blown in a furnace of modern type, and is otherwise extending its plant, so as to embrace the production of various descriptions of merchant iron and steel, including rails, while it is said to be raising about 200 tons of iron ore daliy from the present mines, which would represent from 20,000 to 30,000 tons of pig iron. The Pictou Charcoal Company has erected a new furnace in the same region for smelting the ores in the neighborhood, and they are said to contemplate adding mills and forges. In Annapolis Valley, also in Pictou County, the Londonderry County, one of the oldest in the district, has recently undertaken the development of a very promising ore property, which is already equipped for the production of some 200 tons a day. There is a good deal of talk of other exterprises being started in the same promising locality. Nova Scotia does undoubtedly possess unique advantages for the prosecution of a successful iron industry. Coal of good quality, and suitable fluxes, are found alongside excellent iron ores—the three necessary raw materials being found in abundance within a radius of from twelve to twenty miles. There are very few localities in the world that present this conjunction. In the neighboring country of the United States, the ores have generally

to be brought from 700 to 1,000 miles to the coalfield. In the United Kingdom, about one-fourth of all the ore smelted has to be brought from the north of Spain. In Germany the greater part of the ores smelted by Westphalian works have to be brought thither from Luxemburg and Meurthe-et-Moselle, and so with the now comparatively smaller iron industry of Belgium. But while Pictou County has the advantages referred to, it labours under the disadvantage of being far removed from the principal markets, whether of Canada or of other countries. Montreal, the chief market of the Dominion, where there are several important foundries and engineering works, is about 700 miles by the Intercolonial Railway, which might possibly charge the makers of iron and steel monopoly rates. On the other hand Pictou has a harbour that is tolerably well established, and is open all the year round, so that in the summer months, at any rate, there would be competition by the St. Lawrence River with the railway. So far as the cost of producing pig and other iron at Pictou is concerned, there would appear to be no good reason why it should not be moderate, when the mines and furnaces have been more fully developed. There is said to be an ample command of labour at a fairly reasonable rate of wages—much under that paid in the United States. The people of Nova Scotia look forward to obtaining a hold in the United States markets, but this is hardly likely while the present duties are in force. Besides, it is probable that the rate of freight from Pictou to Boston, New York, or Philadelphia would be considerably more than the rate from England, so that unless Pictou made cheaper iron than the "mother country," the chances of its iron occupying any notable place in the imports of the United States would be but small.

Iron ores of good quality are found in considerable abundance in other parts of Canada, and to a large extent in Ontario, as already indicated, but as these ores are far removed from suitable coal deposits, they can only be used in charcoal furnaces—which would mean a very limited consumption—or exported to the United States. It would appear as if iron ores that had only to be sent a few hundred miles at the most by railway, should be able to compete with ores that are sent by sea for a distance of between 4,000 and 4,500 miles, as is some of the principal ores now imported into the United States from Spain, &c.; but as a matter of fact the United States import the Spanish ores to a large extent, and the Canadian ores to a very limited extent indeed. The prospects that lie before the owners of Ontario ores is not therefore very brilliant. Whether they are likely to be improved, and by what means, we shall consider, with other matters, in a future article.

The Coal Fields of Cape Breton.

ROBERT ROBERTSON, JUN.

(Further communication to the Mining Institute of Scotland.)

The seam worked under the sea at Sydney Mines maintains an average thickness of 5½ feet, varying from 4 ft. 9 in. to 6 ft. ¼ in., and dips at the rate of 1 in. 6 to 1 in. 7.

The proportion of coal worked is about 40 per cent. and the highest point of the workings above the level of the pit bottom has a cover of 353 feet, and from that point to another point in the same section, having a cover of 370 feet, and 600 yards apart, encloses the only area where water in any quantity comes from the roof. The quantity of water met with up to the present is, however, very inconsiderable, the greater part of it being collected by means of dams to prevent it flowing towards the dip workings, and is conveyed to the bottom by gravity in malleable tubes from 1 in. to 2 in in diameter. The quantity delivered at the bottom is only 5 gallons per minute. All the water made in the workings, which are all towards the dip, is conveyed to the shaft in tubs, equal in capacity to the coal tubs, and does not exceed twelve tubs per day.

From those points mentioned above the thickness of cover gradually increases, until at the lowest point of the workings it attains a thickness of 1050 feet.

The depth of water is very uniform over a large area, both in the harbour and out seawards, ranging from 40 to 50 feet.

The annexed plan of the part of the workings referred to shows the method of working, and also the area in which all the roof water is met with.

This section is now in operation, as it was feared that the quantity of water might become greater, and prove troublesome in the dip workings, and, as these workings were approaching a break in the strata which runs through the length of Sydney Harbour, the management decided to cease working in that direction. At the point marked A there is 370 feet of cover, and at B 353 feet.

It will thus be seen by the accompanying sketch that the face of the main levels is considerably higher than the bottom of the shaft, there being no less than 230 feet of rise on the level. This is accounted for by the change of the direction of the line of dip, and the levels being continued on the same bearing.

The coal measures consist of a great accumulation of sedimentary strata of shale, sandstone, and fireclay, of which the shales constitute in thickness nearly two-thirds of the whole. They are in part argillaceous and arenaceous, but in most cases carbonaceous and bituminous. The first are of a grey or bluish grey colour, but occasionally tinged red with the peroxide of iron.

The sandstone beds are generally of considerable thickness, mostly coarse-grained, rarely pebbly, and false bedding is very frequent. The manner in which the most delicate and fragile ferns are preserved in the shale beds proves that they were deposited in quiet shallow waters, while the sandstone, except in a few instances, appears to have accumulated under conditions of an opposite character.

The following section of the strata in the shaft may be of some interest:—

	Feet.	Inches.
Strata, various, not accurately noted.	81	3
Coal, (Lloyd's seam)	66	8
Shales and sandstones.	172	5
Coal	0	3
Shales and under clays.	9	6
Hard sandstone	33	0
Coal.	0	9
Soft shale	1	10
Coal	0	8
Under clay, coaly shales, and coal	11	0
Strong dark grey sandstone	10	8
Shales, coal, and under clays.	7	0
Slaty sandstone, with micaceous partings	16	9
Hard dark blue shale, with ironstone bands	4	0
Coal	1	2½
Band of black shale and clay	0	4½
Coal and shale mixed	0	10½
Soft clay and band	1	1
Under clay, with stigmaria rootlets	10	2
Soft blue till	8	8
Coal, coarse and brassy	0	2
Under clay	2	0
Coal, bright and good, carb. limeveins	0	2½
Under clay, with stigmaria rootlets.	1	4
Grey slaty shale, with iron balls	3	2
Soft shales, grey or bluish	7	8
Sandstone, grey, getting harder towards bottom	8	3
Blue till or shale	3	5
Red till or shale, soft and hard	3	2
Hard, close-grained blue till	4	2
Red shale, soft, like marl, and chalk	0	10
Strong blue shale	3	3
Red shale	6	5
Grey and greenish crumbly shale	16	3
Red shale	2	0
Grey and bluish hard shales	8	9
Hard close-grained shale	2	0
Hard close-grained sandstone, with cutters	23	0
Blue shale	4	4
Black shale, clay parting over it, with gas	1	8
Dark blue shale	9	5
Black shale, with clay above and below.	0	4
Blue shale	5	8
Black shale	2	6
Blue shale, sandy	3	7
Blue shale, softer	8	
Coal	0	
Sandy shale, or mixed shale and sandstone	11	6
Red shale	2	6
Greenish hard compact shale	2	2
Sandstone and strong sandy shale	10	10
Red shale	1	0
Sandstone	3	3
Red shale	9	5
Hard sandstone.	12	6
Blue till	15	5
Soft shale, with calamites and coal	0	1½
Coal and shale mixed	1	5½
Strong sandy shale	4	7
Fireclay	3	3
Blue sandy shale	5	7
Hard sandstone	0	6
Sandstone	9	1
Hard slaty blue shale, with calamites	4	0
Blue or olive shale, with some black, and signs of fossils, clay parting below	1	9
Hard sandstone	1	0
Blue and black shale, fossils, lingula and small shells and scales of fishes	1	4
Blue shale	7	4
Black shale, full of shells	0	9
Dark blue or olive shale	0	6
Grey crumbly or slickensided shale, or fireclay, or under clay	9	6
Strong hard grey sandstone	10	6
Strong hard white sandstone	21	1
Hard blue shale and sandstone	4	0
Slaty sandstone, with black coloured partings and marks (micaceous).	2	6
Strong white sandstone	5	1
Strong white sandstone, with black partings, but strong and close	8	0½
Coal	6	0
Total depth	680	11½

The Cornish pumping engine is being dispensed with on account of the heavy expense incurred by frequent breakages of the pump rods. The copperas water, coming from the old workings to the rise, has a very injurious effect on the plates and bolts, causing frequent breaks, and necessitating the frequent drawing of the rods.

Underground Haulage by Endless Rope at Ansley Hall Colliery.

(Paper by W. G. Phillips before Chesterfield and Midland Counties Institute of Engineers.)

The great importance of the question of underground haulage was attested by the attention the subject has received from time to time from mining engineers competent to deal with the subject in several able and exhaustive papers, and was further shown by the great interest taken by all connected with coal-mining wherever the underground haulage of coal was performed by machinery, to the partial or entire exclusion of horse or manual haulage. Nor was this a matter of wonder when they considered how much of the success of colliery operations depended upon the fact that, whatever the system of haulage employed, it should be such a one as would ensure the certain and expeditious removal of the production of the collier from the remotest as well as the nearest working place in the pit, and at the same time be economic in its working. The various systems of underground mechanical haulage were pretty generally known, and the writer did not intend in this paper to enter into the merits or demerits of any of the known systems, but simply to set forth the particulars, and the working of the system he had adopted at Ansley Hall Colliery, and which had been in successful operation for a period of five years, to the entire exclusion of horse haulage.

The pits are 13 feet 6 inches in diameter, and are sunk to a depth of 168 yards, intersecting the Rider Coal at 68 yards deep. From the bottom of the shaft a crut or measures head is driven to the Deep, cutting the Rider Coal at 325 yards from the pit bottom.

At this point the measures are lying at an angle of 25 degs., and to reduce the gradient an incline to open out the Deep Coal has been driven to the side of the dip, and the levels driven out from the bottom. The length of the incline is 480 yards. The Rider Seam is worked on the longwall system, opening off from a rib or pillar 32 yards thick, in this instance, left to support the haulage road or level. In the present case eight stalls are at work, with a working face of nearly 1,100 yards. The coal from these stalls is jigged down the gate-roads, the number of tubs jigged at each run varying from three to six, and the average length of each gate-road is over 400 yards at the present time. The Rider Seam has a workable thickness of 6 feet, and reposes upon another seam, the Bare Coal, 4 feet 2 inches thick, with a fire-clay parting intervening, and varying in thickness from 12 inches to a thin "scud." The Bare Coal is unmarketable, and therefore not worked. Immediately overlying the Rider is a heavy blue bind 24 feet thick, and immediately underneath the Bare Coal is a bed of fire-clay eight feet thick. The former is a bad roof, and the latter is a worse floor, inasmuch as the Bare Coal makes sufficient water to set the fire-clay heaving, and thus give considerable trouble.

It is, therefore, very desirable to make the headings between the two seams, leaving a good thickness of Rider Coal to form a roof, and more than half the Bare Coal to form a floor. The measures are very undulating, and thus the crookedness of the haulage road or level is accounted for.

The coal left to form the roof of the main road is only partially successful, and a great part of the roads are supported.

When the roof coal breaks down steel girders 50 lbs. to the yard are used in the main roads.

The haulage is by endless rope driven by engines working on the surface, the rope travelling in the winding shaft, and proceeding from the pit bottom underneath the tubs.

The speed of the rope is 2 to 2½ miles per hour. The tubs are attached singly to the rope by means of a clip, and are put on not nearer than 20 yards apart on the main rope; but on the level, which is worked by another rope driven by the main rope, there is no prescribed distance for clipping on the full tubs, and it is not uncommon to see a dozen full tubs within a yard or a yard and a half of each other.

The empty tubs are put on the rope within a few yards after leaving the cage, and they proceed to the bottom of the incline, where they are detached and run by gravitation.

The hanger-on at the bottom of the incline detaches the empty tubs, and attaches the full ones, which latter are detached by a youth at point, from which they run by gravitation to the hanger-on at the pit bottom to be caged.

At point, a youth detaches the full tubs from the level rope, and they run by gravitation to the hanger-on at the bottom of the incline, and he attaches the empty tubs to the level rope to go in-bye

At the bottom of each jig or gate-board, standing room sufficient for the number of tubs composing the run or journey is provided, and the hanger-on at the bottom of each jig takes the empty tubs he requires off, and attaches the loaded ones from his gate-road to the level rope.

Two "doggies" or "corporals" are employed to superintend the haulage on the level, and to pick up any little defect which may develop during the working.

A pair of semi-portable engines by Fowler, of Leeds, are placed on the surface. They were originally employed in their present position for sinking, and were not intended for the purpose for which they are now used.

The rope driving wheel is of the "C" class, 8 feet diameter, and is of cast iron. The rim of the wheel is in semi-circular segments, bolted together and secured to the arms of the wheel by means of sockets, into which the arms are dove-tailed, the connections wedged up with dry hard wood wedges, and further with small iron wedges driven into the wood. The rim, when worn out, can be replaced by a new one with comparatively little difficulty.

Although the writer has had good duty from the wheel he is now working, he would strongly recommend that the wheel should be cast with a plain rim with the arms, and that the C segments should be of steel, and be bolted on the rim of the wheel. The life of the segments would be much longer, and they could be replaced with less difficulty than in the other manner described.

The rope, after going three full turns round the C wheel, is led over 6 feet pulleys fixed upon wood headgear, and down the shaft. The vertical pulleys leading the rope are 6 feet in diameter. The empty or in-bye rope is led round the back of the pit bottom by two horizontal pulleys, each 4 feet in diameter, working loose underneath the plates, or flat sheets, on spindles fixed into cast-iron plates resting upon pitch pine beams, the rope emerging from the under side of the road.

Steel rollers in cast-iron frames are fixed every 15 yards for carrying the rope and keeping it from the ground.

The curve A at the top of the incline having to bear practically the whole weight of the haulage, was put down correspondingly strong.

The whole of the rollers are steel; all the spindles are wrought-iron, turned, and the rollers are bored out.

The sleepers are pitch pine, 12 inches by 6 inches, some of which are joggled into the side, and a strong post set on the middle one, for the purpose of keeping the curve from lifting with the working.

It was a question with the writer when laying down this system whether to make these junctions with rails and points or with plates.

It was found, however, that the limited room which the nature of the strata allowed would have made the working of the junctions with rails and points very troublesome, and plates were adopted, and have worked very satisfactorily. The plates are laid so as to leave a groove 1 inch wide in the track of the rope in each road, into which the rope sinks when the tubs are not passing over, and the hanger-on is enabled to push his full tub across the plates to the deep side road without any impediment. The length of the coupling of the clip is so arranged that when the tubs are passing over the plates the rope is lifted by the clip out of the groove, and thus avoids the possibility of the clip getting fast in the groove.

A most important matter in endless-rope haulage is the clip, or hook, or whatever may be the name given to the means of attachment of the tub to the rope.

The one the writer has adopted and used for over five years is the invention of Mr. T. W. Smallman, of Nuneaton.

It is made of steel or malleable iron, and is formed of two sides between which works a lever. A fulcrum is formed by a steel peg a short distance from the back end of the lever, on which end is formed a wedge-shaped preparation. Below the fulcrum of the lever a strong bolt couples the sides, and by which the range of the clip is regulated, and at the back of the clip is a pin to which the coupling is attached.

The action of the clip depends upon the wedge-shaped end of the lever working in an inclined recess formed in the inside of the plates. To release the clip from the rope the lever is lifted up, the wedge end being brought to the aperture in the sides, which are then released from their grip. To attach this clip the hanger-on takes it by the end of the lever with one hand, and swings or flings the hook into the draw-bar of the tub without touching it with the other hand, ho'ding the lever in a vertical position; the lower edges of the sides are apart, and dropping the clip on the rope he brings the handle down with both hands.

One item in favour of endless-rope haulage as compared with horse-haulage seemed to have been overlooked by previous writers, but was one of no inconsiderable moment. This referred to the great wear of sleepers, and the cost of labour in keeping a road subject to heavy horse traffic. The extra cost in this department would do something towards liquidating the cost of ropes and rollers. With respect to the wear and tear of tubs, in the working of inclines with varying but heavy gradients, it must be self-evident that the distribution of the weight over the full length of the incline, in single tubs, equalized the strain on the whole of the haulage tackle, and thus reduced the risk of breakages, whilst the absence of coupled trams running at considerable speed on such inclines removed the cause of much damage to tubs. The writer was not prepared with a detailed statement of the cost of his tub repairs, but he found that the average cost for labour was not more than £25 per annum.

In conclusion, the writer apologized for the absence of many particulars which would have added interest to the paper, but which for the lack of time he had been unable to supply.

Fatal Accident at the Malaga Gold Mine, N. S.

On Thursday 15th inst., Joseph Francis was killed, and two miners injured, by an explosion of a miss-fire shot at the mine of the Malaga Gold Mining Company, at Malaga, Queen's County, Nova Scotia. It appears that the deceased miner, who was working at the bottom of the pit, started to clean out a hole that had missed fire the day previous. He succeeded in getting down to the cartridge, withdrew the cap and passed it to his partner, continued to drill out the dynamite, though he had been previously warned by Mr. Thomas, one of the foremen, not to do so. Shortly afterward the cartridge exploded, killing Francis instantly, and severely injuring Joseph Wamboldt, who was very near at the time, and Lamont Simpson who was at work a few feet away. Though many of the men were working near the fatal spot, all escaped uninjured, except those mentioned above. At the coroner's inquest a verdict of accidental death was returned.

MINING NOTES.

[From our Own Correspondents.]

Nova Scotia.

Pictou County.

On Wednesday forenoon, 7th inst., Overman Johnston finding a number of feeders in the Tunnel which is to connect the main seam of the Drummond colliery with the Scott pit or Sweet William, and also noticing that the air was a trifle dull, gave instructions that no shots were to be fired until brattice was put up. The shiftmen attended to the bratticing. The afternoon shift came on at two o'clock, Overman Quigley relieving Overman Johnston. The brattice being put up it was considered that the place was free of gas, and the shift fired two shots in the coal, and loaded it away. Nothing wrong was noticed with the shots, both having done their work well. A third shot was standing ready in the stone over the coal, which should have been fired on the first shift—had the air been satisfactory. Before firing this prepared 'shot' the second shift mined it two feet further in order to give the charge every play. Before the shot was fired Overman Quigley examined the place thoroughly and found all clear. The men came out and the battery was attached to the wire and set off. Simultaneously with the firing of this shot came an explosion of moderate force, which knocked the men down, blowing out their lights. After relighting their lamps the men made for the "face" and found the coal on fire. They worked until exhausted and overcome with damp, but the fire was master. They then ran to the bank for assistance. When they returned the damp was so strong that lamps would not burn within a hundred feet and little progress was made. Then the pumps were connected with pipes leading to the fire and also hose. The hose gave way. Then pipes had to be obtained to replace the hose. A hand fan was called into requisition to enable the men to work. The water was played on to the fire, but without success. Several times it was thought under control, but the gas exploded again, slightly burning and hurting a few of the men. A half hour later another attempt was made, but another explosion following, the men were forced to retire. A consultation was then held and it was decided to force the water in to cover the fire. At date of printing the scene of the accident had been dammed off, and all danger was reported as past. The officials, the deputy Inspector and a large body of men did their duty faithfully. Some of the men lost their clothes, but the management will, no doubt, make these good.

Quebec.

Templeton.

The Charette property back of Perkins' Mills has been purchased by the Lake Girard Mica Mining System. Men are now engaged opening up shows and operations will be pushed in the spring. The same company is working the Murphy lot in Range 11. Buildings are being erected, machinery working, etc. 35 men and three teams are employed.

Mr. L. K. Lee has shut down his two lots on McGregor Lake for the winter.

The phosphate shipments from East Templeton this season has been the smallest for some years. Less than 2200 tons were shipped by rail and barge.

Wakefield.

The Lake Girard mine is now fully equipped with air compression, etc. The old shaft is turning out large quantities of mica at 200 feet depth.

Denholm.

Messrs. McRae & Co. are working ten men on their property at Long Lake. The mica is ruby of good quality. Operations will be continued through the winter.

Hull.

A fairly good show of white mica has been opened up on Charlebois' farm, in rear of the Hon. R. W. Scott's. Four crystals are in sight and the mining rights of the 50 acre range can be acquired for $10,000. At this figure the property will pay back—Charlebois.

Lievres River.

Mr. W. A. Allan is working 8 or 9 men at the Little Rapids. About 40 tons of amber mica has been turned out so far.

Messrs. Lewis Bros. & Co. have closed down for the winter. They have been working about 22 men all season on lot 14, in 3rd range. Output, about 25 tons trimmed mica.

Eastern Townships.

Things are looking prosperous at the Howard mines, Suffield, Que. A large force of men are employed in developing the property, and preparations for the immediate shipment of pyrites are being made. The Moulton Hill mine is temporarily closed.

Calumet Island.

Messrs. Russell have reached a depth of 32 feet in the shaft now being worked on their Zinc Blende deposit. A shipment of 30,000 lbs. was recently sent to Swansea, and there is a large quantity of ore at the mouth of the pit. Preparations for a large output next season are now going on. Six other openings than that mentioned above have been made on the property.

Ontario.

Hastings County.

The Crescent Gold Mine—The development of this property has steadily and intelligently progressed under the able management of the superintendent, Mr. Geo. McDougall, since May last, with a force varying from 30 to 45 men. The intention of the Company being more to develope the property than to raise a large quantity of ore. Owing to the very broken and distorted nature of the ground, the work had to be done near the surface, and although not yielding any great direct financial return, it has placed them in possession of very valuable information as to the staying qualities of the mine.

The tunnel to the length of 90 feet has been opened, disclosing a large body of low grade ore; a shaft has been sunk 95 feet on this vein. They are now prospecting on a vein about 300 feet west of the original, having a shaft 62 feet in depth sunk, and have just struck a vein five feet wide of quartz, heavily charged with mispickel, carrying gold from $20 to $80 per ton.

The surface work of this property by the original owners yielded very valuable returns, and now the present owners are on the point of being handsomely rewarded for their pluck and perseverence in spending the very considerable sum they must necessarily have done in order to prove the extent of the ore deposit.

The 10 stamp mill of most modern design is conveniently situated on the property, having a capacity of 20 tons in the 24 hours, and has crushed within the last three months about 1,200 tons of rock, which has yielded a paying quantity of gold, so that the general outlook for this property is very promising.

The Belmont Iron Mine, Lot 19, 1st Concession, Belmont, operated by the Belmont Bessemer Ore Company, Ltd., is not now being worked. During the year the ore deposit has been partially stripped. A fifty foot drift has been driven into the ore at a depth of forty feet, and a shaft house and ore dock built and other preparatory work done.

The mine can be put in good condition for shipping ore by the time the railroad, now being built to the mine, is completed, which will probably be early in the coming summer.

Belmont Gold Mine—The exploration of this property which was commenced in September, 1891, was continued until March of this year, and consisted of the sinking of a working shaft on the westerly portion of the north vein 10 x 10 to the depth of 95 feet, and two openings about 800 feet east on same vein to the respective depth of 21 and 27 feet, also a shaft on a vein to the south to the depth of 33 feet, besides other prospecting work and about 1,100 tons of ore raised, a shaft house erected, a substantial boarding house and office, blacksmith shop, etc.

All the ores so far mined consist of a quartz gangue, heavily charged with sulphides of iron and copper. Several hundred tons of the ore were treated by the Crawford Mechanical Gold Extractor last winter, which proved the value of the ore, and the close saving that could be made by that process.

On the 11th October last, Mr. Middleton Crawford purchased a controlling interest in the property, and has since that time sunk the main shaft to a depth of 115 feet, has started drifting on the 30 and 70 foot levels, raising a sufficient quantity of ore to feed the new mill which he has erected. This mill at present contains two Crawford mills, a third is to be added the first of the ensuing year.

The ore will be all handled automatically, complete machinery for the purpose being placed in position, and everything promises a most systematic and economical manner of mining and milling.

Hastings Mining and Reduction Company—In June last, representatives of the Hastings Mining and Reduction Company, Ltd., of Toronto, visited several localities in the County, and finally decided upon establishing their works in the village of Marmora, where abundant and never failing water-power was secured from the Pearce Company, and on which a mill 40 x 76 has since been erected, and into which the machinery is now being put.

This Company proposes to treat the refractory arsenical gold ores which occur in this district, by the Walker Carter process, and Mr. Thos. Walker, of Philadelphia, Pa., is now superintending the erection of the plant.

The Hastings Mining and Reduction Company also secured some mining claims at Deloro, near the Consolidated Gold Mining Company's property, and a small force of men have for the past two months been engaged in active mining. Some 250 tons of rock ready for milling are already on the dumps, and in a few weeks, when the mill is ready for active operation, a larger force of miners will be put on. A little free gold is seen, but most of it is in the heavy sulphides, which have hitherto baffled all efforts made to extract the precious metal profitably, but

it is claimed that by the Walker-Carter process not less than 85 per cent. of the assay value of the gold can be secured. Should this expectation be realized, the development of the district will receive a decided impetus.

Prospecting—There has been considerable prospecting done in this county, and some good finds are reported in the Township of Tudor and Elziver.

In the latter a very rich silver vein has been struck which has been traced for some miles into the adjoining county.

The coming spring promises well for development work, as many of the owners of properties now lying idle are making arrangements for practically testing the quality and quantity of their ore deposits.

The Rathbun Company is seeking a bonus from the Ontario Government for the erection of a charcoal iron smelting works in Deseronto.

The North Hastings Mining Co., with headquarters at Marmora, has recently leased from Mr. T. P. Pearce of Toronto, the right to mine for a number of years on 20 acres of lot 8 in 8th con. of Marmora. Machinery of the most modern construction, costing $15,000, is now being delivered.

Reports have been received of another rich strike in the Lingham gold mine, township of Belmont.

Port Arthur District.

The Ogema Mine has again been placed under work; the manager stating that the returns from the shipment of ore were of such a satisfactory character as to warrant sinking 50 feet more.

Petrolia District.

The prevailing activity in drilling operations augurs confidence on the part of operators in the future of the trade, notwithstanding the fact that the market has recently become and still is somewhat, we may say considerably depressed. So far, since the fall season set in, the weather has been on the whole, favorable, and has been taken advantage of to the fullest extent practicable.

Major John Savage is at work on the Mutual Oil Company's property, with the intention of sinking a test well, perhaps several, to a depth of 2,500 feet feet, and should experiment result in demonstrating the truth of the theory adhered to by not a few thoughtful men, and that our staple is not confined to the depth to which wells average and consequentially good paying finds become plentiful enough to create a big surplus of crude, it would appear to be reasonable to count upon a sweeping decline in prices which would have the effect of checking development and of limiting operations. Still it is premature just now to discuss this question, and we must only hope for the best.

The output by refiners continues fairly good with but little change to note in wholesale prices, as we pointed out in a former article; the matter of retail prices rests entirely with outside dealers, one thing is certain, that is, the refiners' profits are very slim, the percentage being much below that realized by dealers in other times.

British Columbia.

West Kootenay.

The sectional boiler and diamond drill outfit shipped to the Kootenay & Columbia Prospecting and Mining Company from Ottawa December 4th, reached Nelson, B.C., the 19th inst., and is now on its way into the Slocan district. Jos. Kelly, the expert driller who had charge of the tunnel borings at Northumberland Straits is in charge.

A half interest in the Stanley and Nip and Tuck claims has been traded by Duncan McDonald, of Nelson, to a Spokane syndicate. The other half is owned by Ottawa parties. Development work will be pushed on these claims next season.

Mr. Edward Watts, who has been working in the Kootenay district the past two seasons, is now on his way home to visit his family and will return in February.

A sample shipment of silver lead ore—10½ tons from the "Dardanelles" mine near Kaslo, gave $5,000 gross. the cost of mining, packing, etc., was $1,000, leaving a margin of $4,000.

Among the mines working in the Kaslo and Slocan districts for the winter are: Freddy Lee, 15 men; Washington, 12; Great Western, 9; Blue Bird, 15; Young Dominion, 4; Recau, 6; Best, 6; Dardanelles, 12; Northern Belle, 4; Lucky Jim, 15; Wellington, 8; Idaho, 8; Slocan Boy, 6; Mountain Chief, 6; Montezuma, 8; Four Mile creek claims, 16. Total, 150. This means a disbursement of over $25,000 a month for wages and supplies.

In an interview with the *Colonist* Mr. E. C. Campbell says: "People outside the mining region are often inclined to think that if there be such mineral wealth in the country, and the fact could be established, there would be no lack of capital to develop it. Such people ask, "What of all this bonded property of which we hear? Why not do some development work and not always be prospecting?"

The answer is that the bonding of property is a *bona fide* transaction, and that while English capital will not be invested until everything is demonstrated to an almost dead certainty, the Yankees are disposed to gamble a bit, and invariably reap the biggest share of the initial profits. Of the seventeen mines under working in the Slocan country this winter but two are run by English companies —at least British subjects—one by Messrs. Mahon, Vancouver, and another by a purely English syndicate.

The Slocan country is being developed more this year than ever in its history. The Washington, the Grand Western, the Alpha, Bluebird, Freddy Lee, Idaho, Queen Bess, Lucky Jim, Dardanelles, Best, Mountain Boomer, Vancouver, Spokane Bay, Noble Supply and several other claims are being run the winter through, development work proceeding on the good properties without intermission.

The Washington has had two tunnels run this season—one of them 200 feet, while the winter contract when complete will bring the total up to 700. In the tunnel-ing some good pay has been struck, a three-foot seam having been encountered with the return of from two to five ounces per ton.

The Slocan Star has stopped work for the winter, but before doing so were down to a depth of 100 feet. The fact of a company such as this going down to such a depth with satisfactory results gave an impetus to all other owners and prospectors. They are now in four feet concentrating ore. White Bros. have every reason to be well pleased with their speculation.

The Freddy Lee, owned chiefly by Jim Wardner, of Fairhaven, is also doing well. The firm has, at present, a pack train of not less than one hundred mules, each carrying 200 pounds, plying twice a week between the mines and Kaslo. From this point the Northern Pacific handles the freight at about $7 per ton. But when the smelter is erected at Pilot bay, the journey will be shorter. The mule pack has been steadily employed for the past couple of months; always with a full load—the product of the mine on the one and that of the farm on the home trip. The ore from this mine ranges all the way from 150 to 500 ounces per ton. Considering that the great Cœur d'Alene mines are more than satisfied with 50 ounces to the ton, it will be seen what an immense fortune there is in the Kaslo mines with from 150 to 500 ounces, as soon as their transport facilities are more favorable. At present it takes some $90 to bring a ton of ore to the smelter, whereas, with the Nelson & Fort Sheppard Railway in operation, the miners might defy the Cœur d'Alene or any other mines in the world.

Messrs. Wardner have spent no less than $6,000 to make a trail to their mines, and very many other operators are clearing the road.

E. H. Tomlinson, treasurer of the Farrel-Hendryx smelter syndicate at Pilot Bay, has bought from E. A. Bielenberg the John W. Mackey, Jim Fair and Flood claims, adjoining the now famous Best mine. Mr. Tomlinson expects to continue work on the Bear Lake claim during winter. The ore of this claim is chloride and brittle silver in quartz, assays from which have yielded $750 and $1,400 per ton.

Yukon County.

Mr. P. G. McDonald, who has spent six years in the country known as Forty-Mile Creek in Alaska, has just arrived down from that section. As to the place and its future prospects, he reports as follows:

"There are two ways," said he, "of reaching Forty-Mile Creek, which is located 700 miles from the headwaters of the Yukon river. One is by way of the Yukon itself. The river is navigable the entire way and four steamers ply it, two of them up as far as Forty-Mile Creek. The other route is by way of Juneau to Chilcat, and thence over the divide into the mines.

"The claims worked so far are entirely placer, as there has not yet been a quartz prospector in the country. The quality of the gold found in the claims ranges from flour to shot, and even larger. The gravel is from four to six feet in depth, and bedrock generally lies from eight to twelve feet down. The gold is quite irregularly distributed, and this fact renders the work rather uncertain. The pay comes in spots and pockets. There is good timber on the banks of the Yukon and especially on the islands in the river, but back a little way from the stream the timber gets smaller.

"The camp is looking better this season than for some years past. The supplies were very good for the season. There were about 200 men on the creek and its tributaries this year. These probably averaged $500 a man for a run of about 60 days. About $2,200 was the largest amount taken out of one claim. Living is very expensive, averaging close upon $600 per year per man. Wages are from $8 to $10 per day, and flour $15 per sack of 100 lbs. There is considerable game in the country, but very uncertain in its movements, rendering it sometimes quite scarce.

"The country ought to be a good one in time as there is gold scattered all through it, but at present it is very little developed, a hard country to get into, an expensive one to live in and the chances of making anything big are nothing to speak of."

Vancouver Island.

The New Vancouver Coal Company is employing at present, including Chinamen on top, about 1,400 men, with a vigilant staff of competent miners continually employed and specially detailed to guard against disaster. In the Esplanade shaft, two electric motors are kept running 16 hours a day to haul coal from the interior. A third motor has been received for No. 2 level in the same mine which will greatly assist in increasing the output.

The following are the foreign coal shipments for the month of November:

New Vancouver Coal Co.	26,665
Wellington	16,638
East Wellington	3,308

The New Vancouver Coal Company's shipments for last month are smaller than during the previous period by 5,243 tons. The Wellington Colliery also shows a decrease of about 200 tons; whilst the foreign output of the East Wellington Colliery shows an increase of nearly 300 tons.

Kamloops District.

Bonds have been signed for the sale of the "Lone Prospector" mine, situated at Mosquito Flats, North Thompson, for the sum of $10,000, to Messrs. H. P. Heacock, of Missoula, Montana, and William Hedge, of Fairhaven, Wn. Messrs. Wood and Tunstall are to be congratulated on the energy displayed in making the first step in opening up the North Thompson mines. Messrs. Heacock and Hedge are to commence work by April 1st and expect to spend $50,000 on the claim next year in a concentration plant and development work.

The Kamloops Coal Company, Limited, intend to keep 10 or 12 men employed all winter at their mine, on the North Thompson River, preparing the mines for a large force of miners, which will be employed early in the spring, it being the intention of the company to make daily shipments, as soon as navigation opens. The product has proved to be an excellent steam coal, suitable for locomotives and also makes a good strong coke, such as is required for smelting purposes, it being the only coal in the Province which will make coke suitable for this purpose.

An hydraulic claim has been taken up on Tranquille Creek by several residents of Kamloops, a number of whom have been out prospecting for some weeks past. It has long been known that gold existed on the Tranquille Creek, Chinamen having worked the creek and made wages for several years past. The men who made these locations have control of large capital, and will next spring work the mine in the most thorough manner. Some fine samples of coarse gold were washed out while prospecting the ground, which have been sent to friends in the east, who may become interested in the property.

A two foot seam of good coal has been struck on Coal Hill, 2 miles south of Kamloops, by Major Vaughn. An incline shaft on an angle of about 30° is down 100 feet. Prospects are very good for a good bed of coal.

Miscellaneous.

R. G. Tatlow has obtained the consent of the Provincial Government to the extension and consolidation of the leases owned by the several platinum mining companies in British Columbia. He goes to England next week to arrange for the development of these valuable mines.

The Tumbo Island Coal Company is doing steady work on its mines in the Pumpers Pass County.

The Horse Fly company, located about twenty miles from Quesnelle Forks, has done very well on its placer claims and more money has been taken out than during any two years before.

CANADIAN COMPANIES.

The Creighton Gold Mining Company, (Ltd.)—Letters patent were issued to this Company on 16th November, 1892, to carry on mining works and operations for gold, silver, and associated metals and minerals. Capital stock is $1,000,000, in 200,000 shares of $5 each. The names of the applicants are: Alexander Burritt, city registrar; Edward Seybold, merchant; Crawford Ross, merchant; Wm. McGillivray, lumberman; Matthew George Dickieson, accountant; Moses Chamberlain Edey, architect; John Inkerman MacCracken, barrister-at-law; James Davidson, lumber manufacturer; Walter Silas Odell, brick manufacturer; all of Ottawa, Ont.

The Ontario Standard Oil Company, (Ltd.)—Notice is given in the *Ontario Gazette*, for application for a charter for this company, to sink and work artesian wells for oil, to lay down pipe lines, and to refine and deal in oils and all by-products of petroleum and other oils used

for light or fuel. Operations are to be carried on in the counties of Lambton, Middlesex and Kent, Ontario. Head Office, Toronto, Ont. Capital stock, $250,000, in 5,000 shares of $50 each. Those applying are: Samuel M. Brookfield, ship-owner; Hon. Simon H. Holmes, notary; Donald G. Keith, merchant; Lawrence G. McKain, contractor; all of Halifax, N.S., and Abner Nelson, hotelkeeper, Toronto, Ont.

The Toronto and Orillia Stone Quarry Company, (Ltd.) gives notice that application will be made for incorporation under the Ontario Act, to quarry, prepare, and sell stone and lime. The operations are to be carried on at the Township of Rama. Head Office, Orillia, Ont. Capital stock, $10,000, in 100 shares of $100 each. The names of the applicants are: Andrew Tait, lumber merchant, Orillia; Joseph Tait, Toronto; William Britnell, stone dealer, Toronto; Edward Cooper Wainwright, bookkeeper, Orillia, and Cornelius Arthur Masten, barrister-at-law, Toronto.

New Vancouver Coal Mining and Land Company, (Ltd.)—At the semi-annual general meeting of the New Vancouver Coal Mining and Land Company, (Ltd.) held in London on last month, the chairman, Mr. John Galsworthy, expressed regret at the disappointing character of the report. The board had hoped to be able to get through the half-year without any loss, but unfortunately they had made a loss of £4,600. The net output for the half-year had been 177,263 tons, as against 204,890 tons in the previous half-year. That decreased output was one of the elements which accounted for the loss, but a further reason for it was lower prices and increased cost of working. He believed, however, that they had now turned the corner, and, so far as he could judge, they were not losing anything during the current half-year, and the prospects were more encouraging. He was pleased to say that the superintendent had succeeded in obtaining from the men at the Northfield Mine a reduction of 20 cents a ton in labour, and he hoped more would be done in that direction. Since the last meeting the board had allotted £10,600 of the £20,000 debentures of the new authorized issue. After stating that in the face of the loss shown by the accounts, and the present condition of the San Francisco market, the board were unable to recommend the payment of a dividend for the past half-year, the chairman read the following telegram from Mr. Robins (superintendent), dated 26th inst.: "Work resumed on both seams, Protection Island shaft. No change in coal below fault in No. 1 level (No. 1 shaft); two feet mined good. No change in Southfield mines, nor Northfield. Harewood four feet of fine coal. Market more encouraging." He then moved the adoption of the report, which was seconded by Mr. Joseph Fry, and carried unanimously.

Toad Mountain Mining Company, (Ltd.) will apply for incorporation under the British Columbia Companies' Act, 1890, to purchase properties and conduct a general metalliferous and hydraulic mining and smelting business in the ores of iron, gold, silver, copper, clays and other minerals. Capital stock, $1,500,000 in 1,500,000 shares of $1 each Head Office, Nelson, B.C. The trustees of the company are: Aaron H. Kelly, Chas. Van Ness, Frank Fletcher, Andrew Crichton Muir, and Harvey O. Brown, all of Nelson, B.C., and F. B. Morse, E. D. Ide, James N. Glover, R. N. McLean, all of Spokane, Wash.

The Halifax Asbestos Company, (Ltd.) gives notice that application will be made, under the Nova Scotia Companies' Act, for incorporation for the purpose of mining, manufacturing, selling and dealing in asbestos and other minerals. Capital stock, $15,000, in 15,000 shares of $1 each. Head office, Halifax, N.S. The applicants are: Theron R. Gue, capitalist; Charles E. Willis, mining engineer; Arthur E. Curren, merchant, all of Halifax, N.S., and James R. Hayes, merchant, Bay St. George, Newfoundland.

The Montreal Mining Company.—Notice is given in the *Canada Gazette* that application will be made, at the next session of the Parliament of Canada, for an Act to wind up and liquidate the affairs of this company, and for the distribution of its assets and dividends. Hall, Cross, Brown and Sharp, solicitors for applicants.

MINING LAWS OF ONTARIO.

ANY person may explore Crown Lands for minerals.

Mining lands may be taken up as surveyed locations or staked claims.

Locations range from 40 to 320 acres.

Claims range from 10 to 20 acres on vein or lode.

Locations may be acquired in fee or under leasehold.

Price of locations north of French River $2.50 to $3.50 per acre, and south of it $2 to $2.50 according to distance from railway.

Rent of locations first year 60c. to $1 per acre, and subseqtent years 15c. to 25c. per acre.

Rent of claims, $1 per acre each year.

Claims must be worked continuously.

Royalty on ores specified in the Act, 2 to 3 per cent. of value at pit's mouth less cost of labor and explosives.

Royalty not charged until seven years from date of patent or lease, nor (as provided in s. 4 (3) of the Mines' Act, 1892) until fifteen years in the case of an original discovery of ore or mineral.

Original discoverer of ore or mineral on claim entitled to stake out a second claim.

Crown Lands sold under provisions of mining laws in force prior to 4th May, 1891, exempt from royalty.

Copies of the Mines Act, 1892, may be had on application to

ARCHIBALD BLUE,
Director Bureau of Mines.

TORONTO, April 24, 1892.

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Annual Report, 1888-89,

VOL. IV.

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GOLD AND SILVER.

Under the provisions of chap. 1, Acts of 1892, of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of twelve months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. The cost is 50 cents per area. Leases of any number of areas are granted for a term of 40 years at $2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at $19 an ounce, and on smelted gold valued at $18 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of the Province, he may stake out the boundaries of the areas he desires to obtain, and this gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

MINES OTHER THAN GOLD AND SILVER.

Licenses to search for eighteen months are issued, at a cost of thirty dollars, for minerals other than Gold and Silver, out of which areas can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department for a nominal fee, and provision is made for lessees and licensees whereby they can acquire promptly either by arrangement with the owner or by arbitration all land required for their mining works.

The Government as a security for the payment of royalties, makes the royalties first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists, who have always stated that the Mining laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are: Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones; five per cent.; Coal, 10 cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast, and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the Counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the Island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

THE HON. C. E. CHURCH,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.