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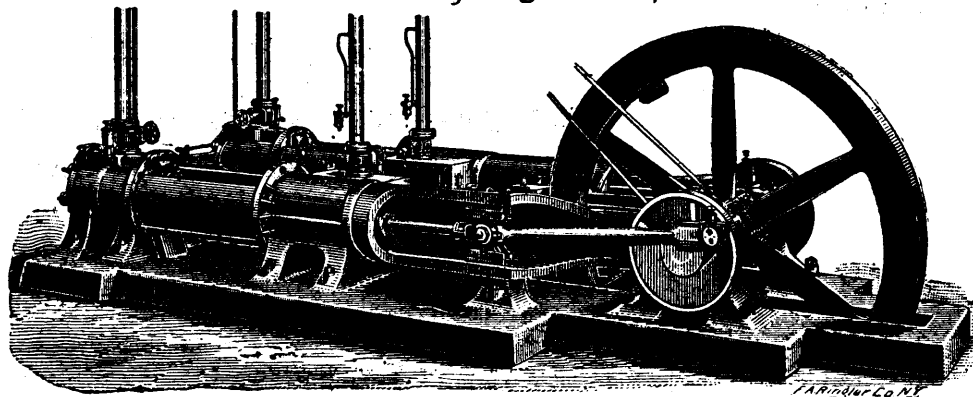
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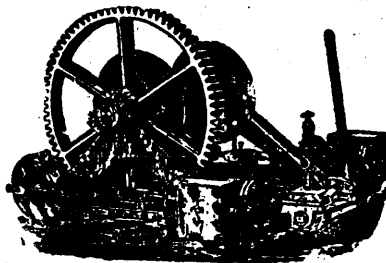
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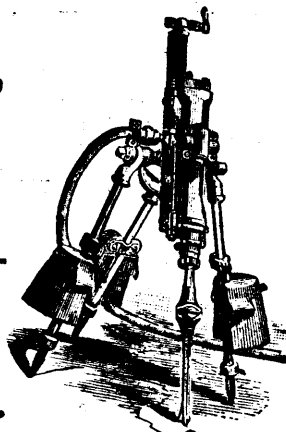
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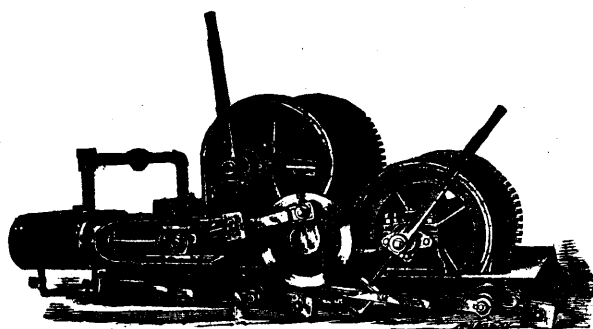
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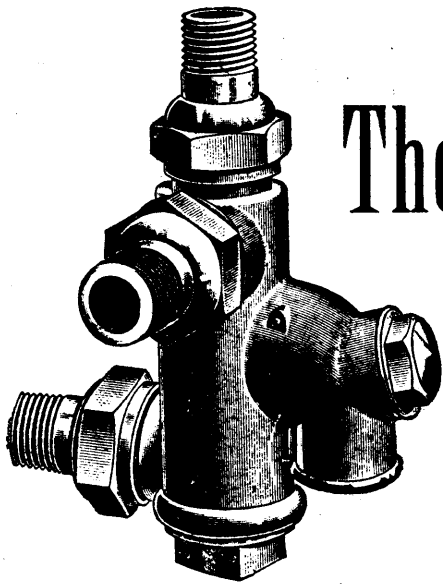
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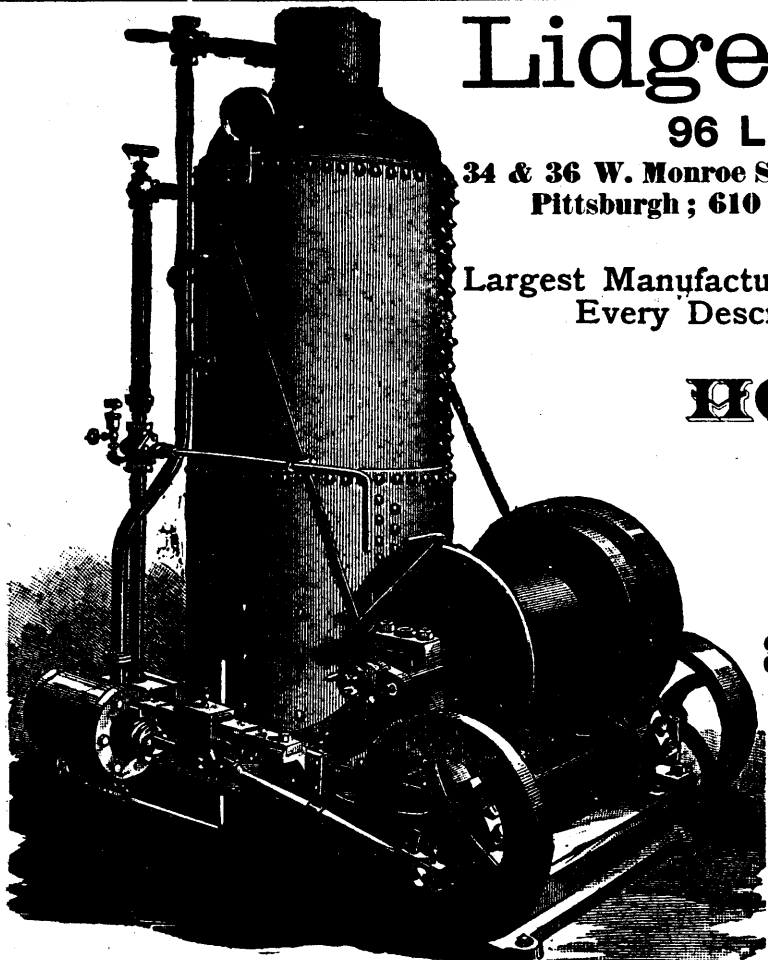
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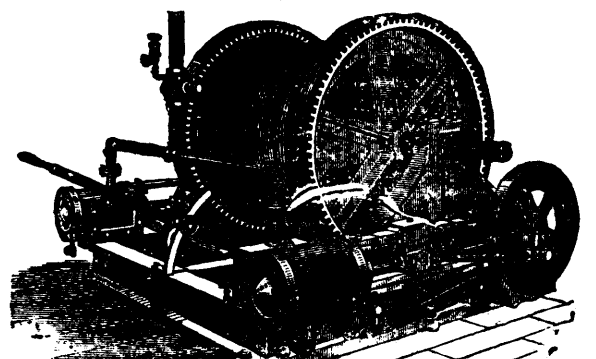
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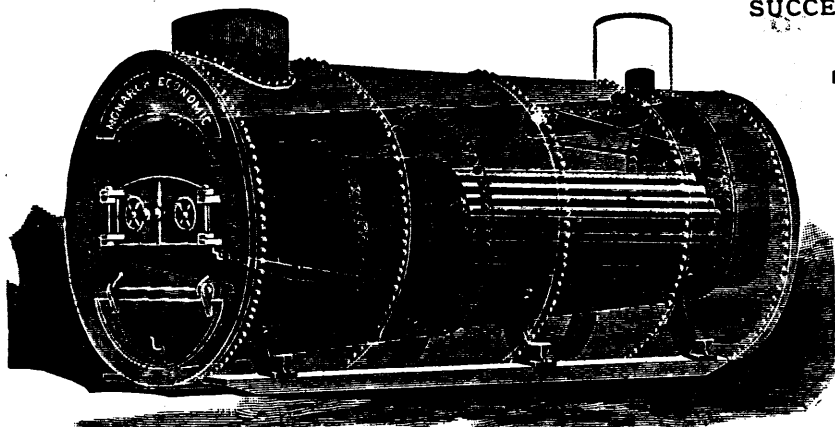
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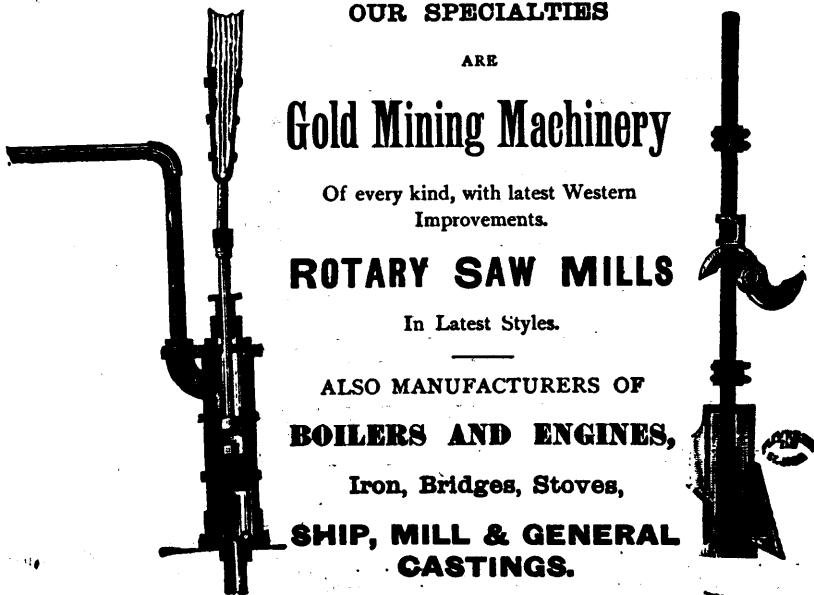
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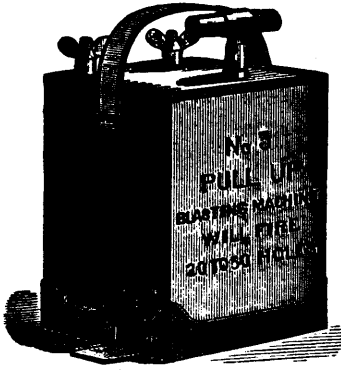
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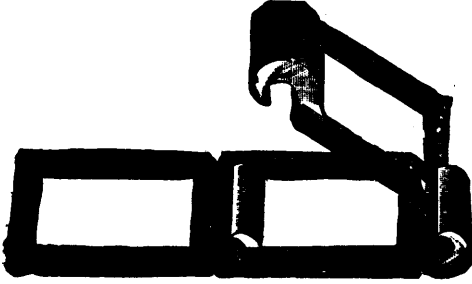
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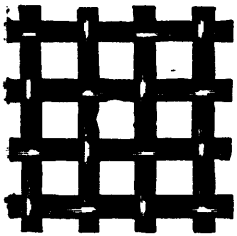
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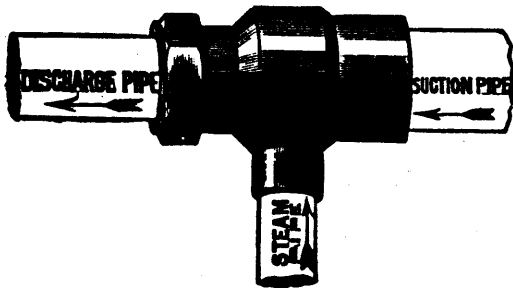
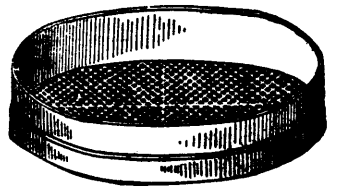
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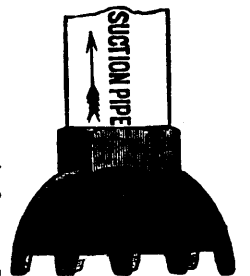
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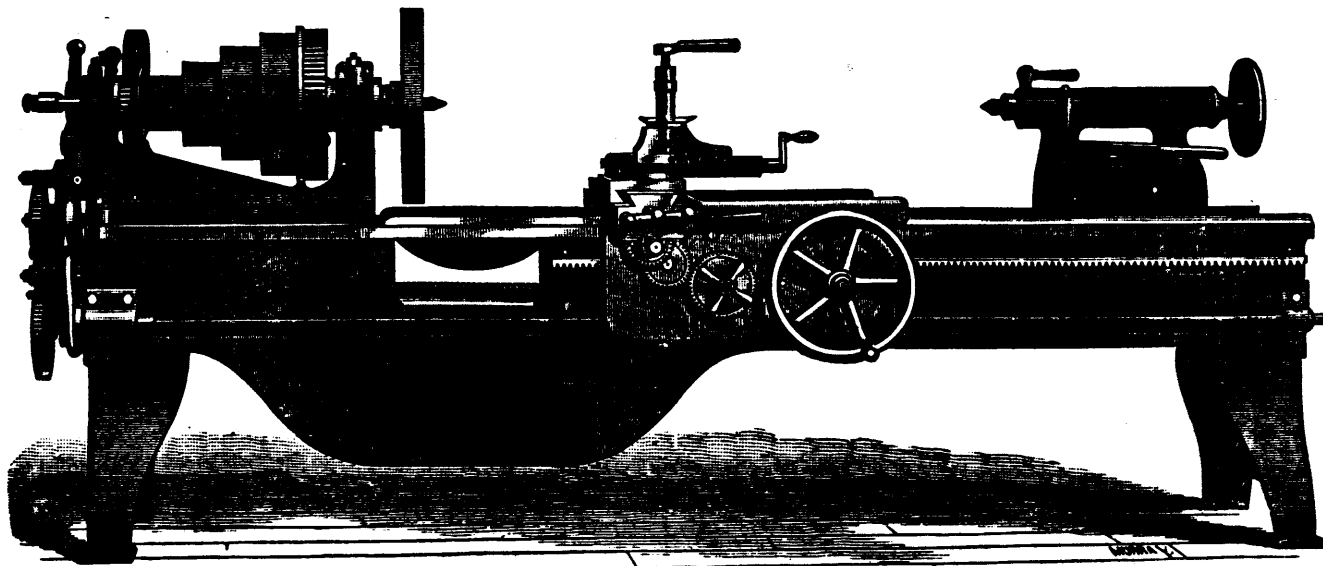
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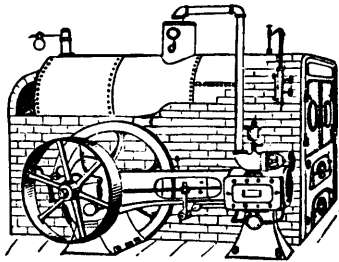
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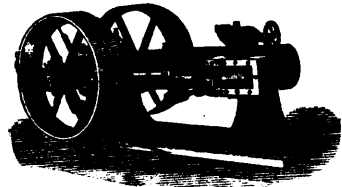
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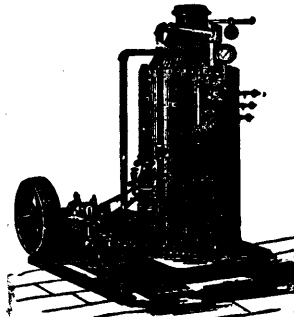
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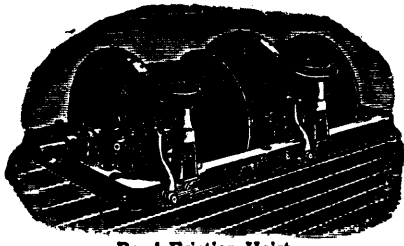
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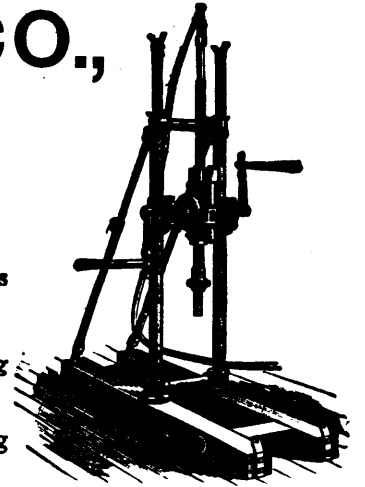
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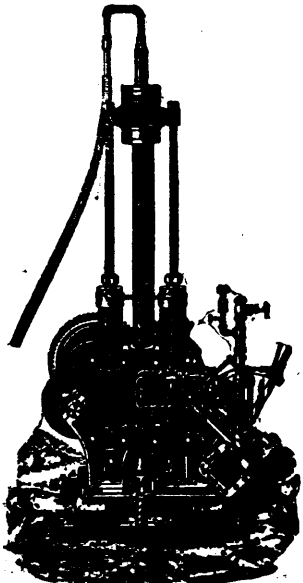
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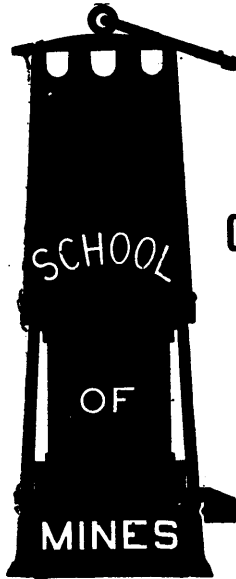
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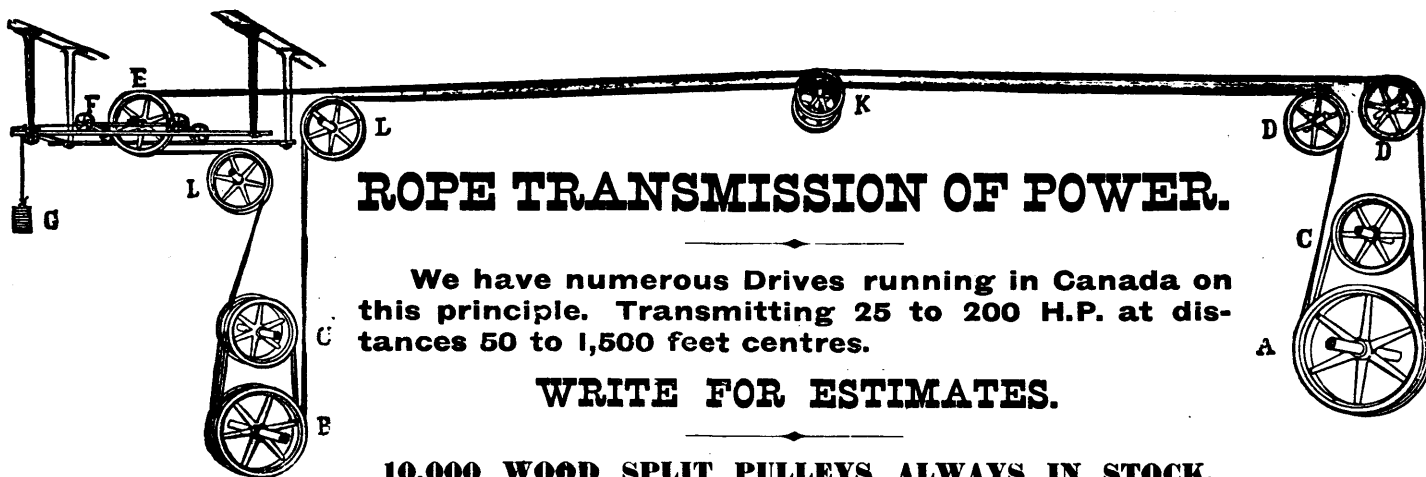
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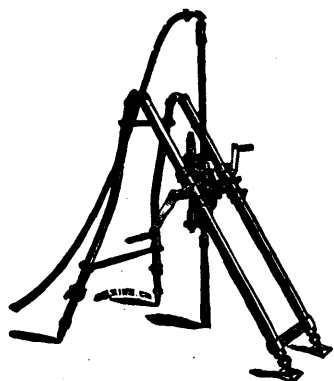
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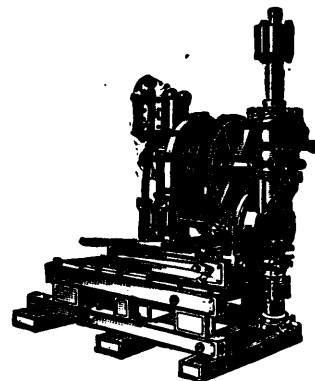
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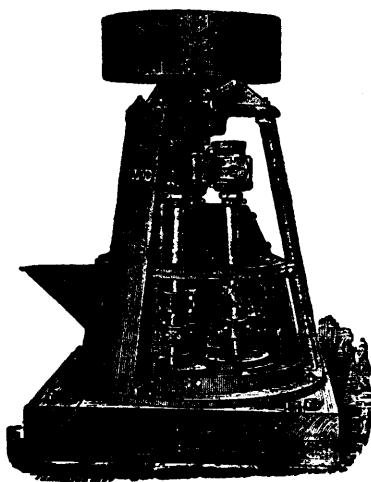
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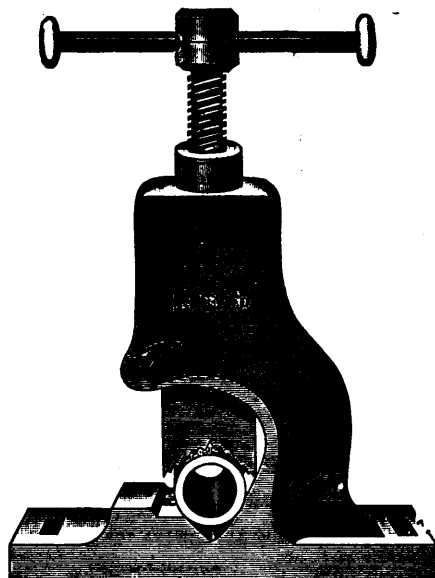
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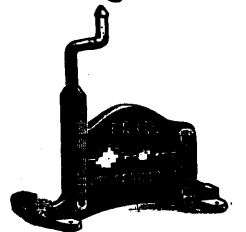
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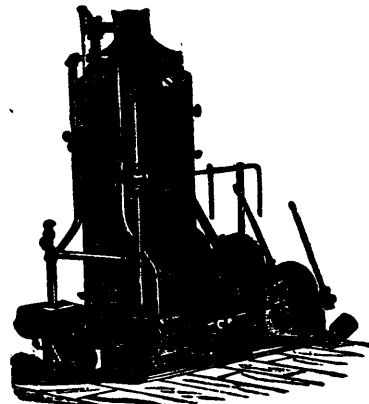
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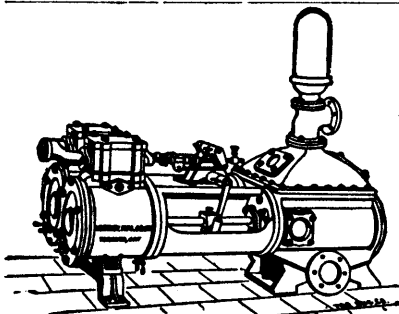
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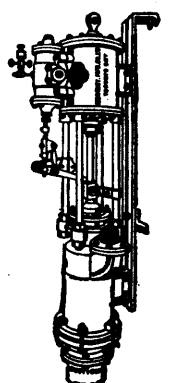
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THE following Resolutions of Council indicate beyond a peradventure the status of THE REVIEW as the exponent of the Canadian Mineral Industries:—

The Gold Miners' Association of Nova Scotia.

"At the annual meeting of the Gold Miners' Association of Nova Scotia, held at Halifax on March 15th, 1892, THE CANADIAN MINING REVIEW was adopted the official organ of this Association.
(Signed), H. C. WILSON, President,
G. J. PARKINGTON, Secretary.

The United Mining Society of Nova Scotia.

"Moved by Mr. R. G. Leckie, seconded by Mr. C. A. Dinock, That the thanks of the Society be tendered to Mr. E. 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. WYLOE, Secretary.

The Asbestos Club, (Quebec).

"Resolved: That THE CANADIAN MINING REVIEW is, by authority of the Members of the 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,
H. T. A. BELL, Secretary.

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The Increased Royalty on Nova Scotia Coal.

The Government of Nova Scotia are no doubt exulting over the success of their bill to increase the cost of production of coal in that province. And with reason, too, from their point of view; for it will give an increase of royalty of from \$35,000 to \$40,000, assuming the output of coal to continue as at present. Two and a half cents per ton increase of royalty! An outcry against this? why, it is absurd. The mine owners will never feel it, the public will willingly pay it, and moreover, the owners can well afford it. But can they? There comes the crux; thence springs the all-important question: Can the mine-owners afford it? With respect to the removal of the increase from them to the consumer, who will throw the first stone? Which company will advance the selling price and take the risk of being left out in the cold? Is the coal trade of Nova Scotia so profitable a one?—the coal trade generally so very desirable an investment that an additional two and a half cents per ton cannot affect it? Let us extend this enquiry into a much, a very much, older mining country, and let us see what the results are there. In a recent article in the *Birmingham Daily Post* reference is made to a "memorandum newly drawn up by the British Iron Trade Associa-

tion," in which it is stated that "between 1877 and 1887 the gross amount of the mining profits in England and Wales assessed to income tax fell from £12,719,000 to £6,481,000, or little more than one-half," and it goes on as follows: "Assuming the capital embarked in the coal trade at the latter date to be not less than 100 millions, nearly as much more would be required to capitalize the other mining industries of the country, including ironstone, limestone, lead, copper, tin, etc., so that the average yield at the latter date mentioned would be little, if at all, in excess of 3 per cent. In 1873 the evidence given by several witnesses before the Coal Committee went to show that the average profits of the coal trade over a period of years had not exceeded 2½ or 3 per cent." That is a tempting profit. And how stand the figures in other mining countries? "In Germany, for instance, the average dividend paid upon a capital of 7¼ millions sterling, embarked in twenty-three of the principal collieries of the Westphalian district, was, during ten years, less than 2¾ per cent."

What of Nova Scotia coal mining? Is the Province and the Government to be congratulated on a very different result? Fortunately, there is reason to believe that coal mining in Nova Scotia is not at so low an ebb as in the countries referred to; but are the results generally so much better that they can bear to be pared? Will any conscientious investor, holding in view the risks of the serious accidents to which coal mines are unfortunately liable, and the fluctuating prices of coal arising from the keen competition in the trade; will any such express his satisfaction with a less rate of profit than double, may trouble, the amount mentioned in the memorandum referred to? It would seem that the Government of Nova Scotia have assumed that at any rate the profits will bear reduction, and they have therefore unsparingly applied the pruning knife. It is singular in connection with the action of the Government that Mr. Drummond, the representative of the miners' interest, should so easily have acquiesced in this infliction of an additional charge on the cost of production. It is singular that his usual "cuteness" did not suggest the query: What if the consumer will not pay the 2½ cents additional?—what in that case may be the action of the mine owners? May they not attempt to reduce wages? Pooh! if they *all* add it to the selling price where does the bugbear come in? This may be the course of thought, but let us ask where are the large consumers? Are they not locally in an advantageous position—in spite of the protective duty—to play off American coal against Nova Scotian; and what may be the result? Throw off by an increase of price the requirements of the Grand Trunk and Canadian Pacific Railways; let their contracts pass into other hands, and where is the alternative demand that will enable the mines to be operated on the scale of production they are at present?

The position, though evidently looked upon by the Nova Scotia Government as one of little

moment, is a serious one. Apart from the practical results to be feared, there cannot be a doubt that the moral turpitude of their action will have a deterring effect on intending investors. Dr. Raymond has very ably expressed his opinion in this respect, and the letter of Mr. Odiorne, of Boston, to Mr. Poole, and by him read to the Committee of the Legislative Council, gives a direct confirmation of the views held by Dr. Raymond and all who have a practical knowledge of the cost and the profits of coal mining.

Mining Inspectors for Quebec.

The prosperity of a country is almost always the direct result of good government. One of the most important functions of government is the appointment of its permanent officials; and in the wise selection of the most competent and reliable men a minister shows his own fitness to govern.

From these officials, the head of a department gains the only reliable information, in detail, which can enable him to regulate and improve the ever-changing conditions of its internal economy.

Some of these require but little erudition beyond the three R's, and but little character beyond sobriety, steadiness, and honesty, for their fulfilment.

Others can only be creditably filled by men of cultivated intelligence and education, men who by special technical training and experience are the head of those with whom they have to deal, and the masters of the department they have to supervise—high-minded, honourable men, having a true sense of the dignity of their office and its moral obligations, and no self-interest outside that accruing from the faithful discharge of duty.

Mining inspectors should belong pre-eminently to the latter class, and as two such appointments are about to be made for the Province of Quebec, mining men are waiting the issue with interest.

It is known that the applicants are from three distinct classes of the mining fraternity.

Firstly—Professional mining engineers who are, or have been, engaged in developing the mines of the Province, and who from their technical and scientific training in one or more of the mining schools and laboratories of Europe or the United States, as well as their experience of the well-worked mines of those countries and the laws and regulations concerning them, are eminently capable of creditably filling the appointment.

Secondly—Those Canadian mining engineers who having graduated in the technical schools of the Dominion, and having had an equally careful scientific training, and possibly quite as much actual experience of practical mining as the former class, are technically quite as eligible, and have the undeniably superior claim of nationality.

Thirdly—That outside class of crude and embryo miners, half-speculators, half-prospectors, —wholly loafers—who are usually found vegetating

on the verandahs or at the street corners of the nearest village to where active mining operations are going on; a "iddle class "corner boys" without occupation or visible means of subsistence, except the "finest shows you ever saw," and the tracts of mining lands they have secured the Lord knows how, which they don't develop themselves or let willing labour develop; the parasites who gnaw the life out of legitimate mining in any country; the mining cuckoos who eat the nest-eggs of investors, lock up land and send the sons of the soil to labour and produce in alien countries; citizens who consume and produce not, whose only claim to citizenship is that they are always on the Government side, like the Vicar of Bray, for emoluments' sake; the willing receivers of election promises and distributors of election favours on the stump of their occasional and only activity—without technical or moral qualifications of any kind, for such an important and honourable appointment. This class may, unfortunately for the country, urge the claims of promises given in time of political peril or some other plausible and equally feeble obligation. But an intelligent and powerful community like the mining interest of Quebec, representing as it does the invested capital of many countries—having its organized Mining Association, and its trumpet of the press ever ready with clarion blast to denounce the wrong in the interest of the good "*bonis nocet quisquis pepererit malis*"—cannot recognize such claims without protest.

Let not the Government be embarrassed in its effort to select the right man by any political interest or bias whatever. Let us aid the minister of the Department in his duty of selecting the right man by pointing out with straight finger not the man but the class. Let the appointment be made after the crucial test of examination papers. Put the candidates through the concentrating process of competitive examination, and the "corner boys" will "pan out" low grade.

The General Phosphate Corporation.

The REVIEW is fully alive to the fact that its welfare is co-incidental with the prosperity of the mining industries of the country. Therefore, both private interest and public spirit combine to impel its management to pursue an editorial policy such as will best conduce to the promotion of the success of every legitimate effort to develop Canada's mineral resources. Animated by this spirit the REVIEW has always exercised tolerance and forbearance towards every enterprise that showed a genuine purpose of conducting practical operations, even though there was abundant reason for criticising its methods. It has pursued this course towards the General Phosphate Corporation, although fully aware of many objectionable features in its organization and management, because the company engaged in active mining work and the REVIEW had every reason to wish the undertakings to be successful. It was only after the results of the

efforts of the first year were published to the world, and the events of the second year had become common talk, that the REVIEW mentioned the obvious fact that the enterprise was a hopeless failure.

For daring to say what was in the mouth of everybody who had any familiarity with the affairs of the Corporation, we are denounced in public journals by the irate promoter, and accused of making statements that have "no truth whatever," and of being the organ of "owners of properties who were disappointed in selling to the Corporation." Libel suits are threatened, and the air is blue with denunciations. Since things have come to this pass, we think that the rules of courtesy are no longer binding upon us, and that the time has come when it is right to give to the public a brief outline of the history of the General Phosphate Corporation.

In the year 1889 a "phosphate boom" occurred in London, owing to the advanced price and threatened scarcity of phosphates, and the London market was flooded with offers of Canadian phosphate lands. Soon it was rumoured that "a million pound trust" was to be formed to acquire Canadian lands; and speculators went through the country bonding properties, until a vast amount of territory was locked up and placed under offer in London. Production was suspended on some of these properties that had been working, and the output of Canada fell off 10,000 tons the next year in consequence.

Among the speculators who were attracted by the excitement was the Hon. C. C. Colby, then President of the Canadian Privy Council, who had bonded lands in the Lievres River district. A prospectus of the "Phosphate Trust" was privately circulated in London, having among its directors the name of "Sir Charles Tupper, by special permission of the Dominion Government." By means of the great influence of promoters and vendors a great list of "founders" was obtained, numbering more of the nobility than had ever been grouped together before in a joint stock enterprise. In 1890 the affair was issued to the public under the name of the General Phosphate Corporation.

The Three Rivers Meat Company had meantime made its fiasco, implicating members of the Dominion Government, and possibly this was the prudential reason why the name of Sir Charles Tupper had disappeared from the directorate of the phosphate enterprise. In spite, however, of all this influence the public responded very poorly, and promoters and founders had to come to the rescue to float the concern.

The shareholders were so alarmed by the many criticisms made against the enterprise that the directors, rather than make further calls which would probably be resisted and involve litigation, decided to raise £100,000 by means of debentures, the loan costing them outright at the start the enormous sum of £15,526 14s 7d.

In the selection of lands we should judge that

the Corporation were guided more by the dignity of the proprietors than by the merits of the properties, for out of the three million acres that they say were offered to them they selected 2,660 acres of virgin land only opened up by prospector's shows made with the view of a sale, but belonging mainly to eminent men, none of whom had ever been actively interested in phosphate mining. The Hon. C. C. Colby, Mr. A. P. Peterson, Chief Engineer of the Canadian Pacific Railway, and the Hon. Peter Mitchell were among favored vendors, and with these were associated a Mr. Wm. Macintosh, of Buckingham, and Mr. George Stewart, of Ottawa, the latter owning some lots, chiefly in Bowman above the High Falls, where no productive mining had ever been done, in consequence of the inaccessibility of the region.

These lands, which probably did not cost the vendors £10,000, were sold to the public for £98,863 11s. 1d., including expenses of purchase. To operate these lands a manager and contractor in Canada each received a yearly salary of \$5,000, while in London the expenses for the first sixteen months, as shown by the report and balance sheet, aggregated some £23,686 17s. 7d., the sum of £3,802 5s. 10d. being debited to trustees' and directors' fees alone. Any one conversant with the Canadian phosphate industry knows that when prices are fairly high a good commercial profit may be made, but that there is no possibility of the great speculative gains that attend the mining of the precious metals. It is therefore clear that any enterprise weighted with such expenditures was doomed from the start, and that we were justified in stating that "its affairs have been grossly mismanaged," and that the statements of the prospectus "were made either without knowledge or with the deliberate intent to mislead the public." We stated also that the "promoters and vendors are the only persons who have obtained any benefit, but as the promoters probably receive their gains mainly in shares, they may not deserve congratulation, and it is only the eminent vendors who have "feathered their nests." These gentlemen received, besides a modicum of cash, the company's notes, secured by mortgage, and their influential connections permitted them to sell these outright in London at a small discount. So they fortunately got out of the operation all right. As a commercial transaction it is doubtless justifiable to sell things for what they will bring, but we cannot help feeling that it is to be regretted that statesmen should use the influence of their high positions to make a profit in such dubious transactions.

The moving spirit and chief promoter of the concern was one Knud Sando, a company promoter whose antecedents and substance are an unknown quantity, ably assisted in securing the titled founders by a peripatetic guinea-pig by the name of "H. Mallaby Deely, Esq., M.A., L.L.M." The London *Financial Critic* makes some very pointed references to this gentleman's career. After referring to the signal failure of

one of his salt trusts, it says: "He went in strongly for director-mongering, undertaking to supply company promoters with high-sounding names for directorates, and for this purpose always kept a large stock of Marquises, Lords, Baronets, M.P.s, etc., in readiness. Hitherto we understood that the formation of a directorate has been to the promoter an exceptionally difficult, not to say delicate operation; for, leaving aside all others, there is one very awkward obstacle that has to be encountered—the promoter or his friends do not happen to be personally acquainted with the gentlemen upon whom they would wish to bring their persuasions to bear, and their desire to include a few titles on their board has been in vain. Mr. Deeley, however, has changed all this, and by his system promoters can have lordly directors supplied them on the same principle as their tradesmen would supply them with butter." The Colonial Finance Corporation, Limited, had some hand in the affair, especially in connection with the North Star mine, and they sent representatives to this side who employed Dr. Francis Wyatt, of New York, to make reports on some of the properties. Mr. Sando says: "We had experts examine the various properties," but of those he names, Dr. Sterry Hunt was at the time an invalid in New York, Mr. Vennor was long since dead, while Dr. Penrose was Assistant State Geologist of Texas. We doubt if Prof. Chapman took the field at that time; so that the expert list is narrowed to Wyatt, Frossard and Obalski.

Now just a few words as to the mining operations. Work was undertaken on three properties. The Murphy lot in Templeton, after yielding 200 to 300 tons, was abandoned. The Ross Mountain, after an enormous expenditure and the placing of machinery in most difficult places before deposits of phosphate were verified, yielded a few hundred tons of high-grade ore and was closed down—a failure. At the High Falls extensive and expensive work was done for transportation through the long rapids and around the falls enhanced the cost of supplies. Some considerable amount was raised here, but a large quantity was of low grade, and the total cost was vastly above its market value, even before prices fell to their present lamentable rate. The statement that 4,000 tons have been mined is grossly misleading. Doubtless a great amount of rock has been blasted and there is a considerable stock of low-grade phosphate on hand, but at present Canadian phosphate under 75 per cent. is barely merchantable, and we believe that the production of high-grade phosphate up to the date of the last report had not reached 1,000 tons. The expenditure at the mines for the term embraced in the report was £18,507 10s. 6d. Of this it might be fair to allow £6,500 for permanent investment, leaving to working expenses £12,000, against which £3,339 was realised by phosphate sales. To cover the cost of mining it would have been necessary that there should still remain at the mine 3,000 tons of high-grade phosphate, and every miner in the district knows that nothing of the sort was the case. It is safe to say that taking all the

expenses of the company into consideration, every ton of phosphate raised has cost nearly ten times what it is worth at present prices.

Among the needless expenses incurred that have helped to swell the accounts, we may mention the sending out of a London solicitor to examine the titles of the lands, when eminent Canadian lawyers, far better versed in the matter, would have done the work for a tithe of the charge: also the employing of surveyors to draw maps of the properties, and the great amount spent in travelling expenses, which included the secretary's honeymoon trip to Canada, ostensibly to instruct the people here how to keep their books, or in their own words, "to arrange for a uniform system of keeping accounts." In fact the whole scale of operations has been carried on in the lordly manner appropriate to such a "Ruby and Sapphire" mine—another scheme which some of these same promoters have since floated in London.

We must note also the item of £7,798 10s. 6d. paid for an option of purchase on the North Star mine, the recovery of which depends upon the successful floating of a great superphosphate scheme which has been hanging fire in London for a year past awaiting a receptive condition of the investing public. It is most desirable that Canada should produce phosphate and manufacture superphosphate, and that our farmers should learn how to use the marvellous means of wealth that nature has placed within their grasp, but it is worse than useless for these enterprises to be floated in so reckless and extravagant a manner that their commercial failure is a foregone conclusion; for by this means a prejudice is created that prevents legitimate operations from being undertaken. The only verdict that can be given from the survey of such schemes is, either that the promoters are woefully and wilfully ignorant of the matters in hand, or else that the schemes are merely put forward for the purpose of unloading burdensome properties, enriching promoters, and providing fattening "husks" for the guinea-pigs.

Now we can have no personal motive in saying these things; in fact all such motives would lead us to be silent in face of these difficulties and disappointments. But we have the good and fair fame of our country at heart, and as public journalists we feel bound to put on record the true causes of the failure of an enterprise which is likely to be a public as well as a private calamity, in that it will weaken confidence both in the minerals in our high hills and the men in our high places.

The Mining Society of Nova Scotia will hold two sessions at Halifax on 17th prox. Papers will be read by H. S. Poole, F.G.S., John E. Hardman, M.E.; E. Gilpin, Jr., F.G.S., J. S. McLennan, and J. G. Rutherford. It is proposed to have a dinner in the evening, but if the weather be favorable and the members wish it, this may be changed in favor of an excursion to some neighbouring district, or a trip on the harbor.

EN PASSANT.

Shortly after we last went to press the vote was taken in the Parliament of Nova Scotia on the bill increasing the royalty on coal. It was a strict party vote, although there had been much squirming in caucus, and several members disliked the retroactive character of the bill and believed individually in the contention of the lessees that it was a breach of contract. The reasons for this contention have been published; they are endorsed by opinions from lawyers of the highest standing, Mr. Borden, Q. C., Mr. Henry, Q. C., Mr. Gray, Q. C., and Messrs. Drysdale, Newcombe and McInnes. No opinion to the contrary has been made public, but the bill passed.

If, said the lessees to the Government, you are as confident that you have right as well as power on your side as we are that moral justice is with us, agree to abide by the decision of a legal tribunal. This was a fair offer, but we are ashamed of the Government of Nova Scotia to say that it was not even entertained.

What can Nova Scotia in future expect capitalists to say, when asked to invest in mines in that province, of the security of tenure offered them? Can it be expected they will be satisfied with titles of a similar nature to those that induced their predecessors to walk "into my parlour?" Evidently even the Government of Nova Scotia of to-day does not think so, for at the last moment they added to the bill a clause authorizing the issue of leases at a still higher rate of royalty for a fixed term. Consoling, certainly, to present lessees, as it is tantamount to saying to them, "We do not recognize your leases as giving you the fixity of tenure previous Legislatures supposed they granted you, and you had better take out a new lease and agree now to pay more royalty or you need not be surprised at increasing impositions being from time to time put on you; in short, freeze you out if you are contumacious." Not content with this clause, a prominent member of the Government hinted at forfeiture of the leases if the lessees were troublesome. Most worthy motives.

And a fresh crop of capitalists are expected to swallow such bait and not to apply their experience that men who have once broken faith are likely on little excuse to so do again when needs must. Verily, there is great credulity in this world.

One course, however, does offer them reasonable security. Let them insist on having in their leases a clause leaving to the Supreme Court a settlement in the event of a dispute arising as to the meaning of the leases. To trust to the Government after this experience would be silly indeed.

The Government of Nova Scotia has passed what is known as a Compulsory Arbitration Act for the settlement of disputes between employees and their employers when coal owners and coal owners only. Disputes in other industries were not embraced in the fatherly regard for the

advancement of labour. Nor was the sauce compounded for basting, the goose considered suitable for treating the gander. This was nicely illustrated this Spring. When Premier Fielding was sitting as an arbitrator on a dispute over the discharge of one man at Spring Hill mines, his Government positively declined to submit to arbitration the dispute they had raised with lessees over their proposition to increase the royalty on coal at will, contrary to what the lessees are advised is both the spirit and letter of their contract with the Crown.

A special meeting of the Gold Miner's Association was held on Thursday, the 12th of May, to consider the question of amalgamation with the Mining Society of Nova Scotia. After discussion it was voted to authorize the council to amalgamate the Association with the Society, and to turn over to the Society the assets, debts and membership of the Association. The Mining Society will doubtless ratify this action at the quarterly meeting, to be held June 17th at Halifax, and the Gold Miner's Association, which, for more than four years, has done so much good for the gold industry, will cease to exist as a separate association, but its field of usefulness will, if anything, be enlarged and strengthened by its union with the Society. At the meeting it was announced that the geological maps of the Province were to be published on the larger scale, and a vote of thanks was given to Mr. B. T. A. Bell, of the REVIEW, for his efforts in that behalf, and to several members of Parliament who have aided in this good work.

In his annual report, Mr. E. Gilpin, Inspector of Mines, estimates the mineral production of Nova Scotia during 1891 to have been as follows. Gold, 23,391 ounces, as against 24,358 ounces in 1890, or a decrease of 967 ounces; iron ore, 57,311 against 55,191 in 1890, an increase of 2,120 tons; coal, 2,044,784 tons, as against 1,984,001 tons in 1890, or an increase of 60,783 tons; coke made 3,448 tons, against 36,738 tons in 1890, being a decreased production of 2,590 tons; gypsum shows an increase of 15,931 tons, the returns giving an output of 161,934 tons, as against 146,003 in 1890, the other products include. Manganese ore, 41 tons, grindstones, 19,800, moulding sand, 230 tons, antimony, 10 tons, limestone, 18,000 tons, copper ore, 900 tons. From the published returns of the coal sales we find that 1,849,945 tons were exported as against 1,786,111 during the previous year. The home sales were 639,737 tons, compared with 601,956 tons in 1890. The Province of Quebec took 775,286 tons against 751,931 tons in 1890; while the sales to the United States were 2,586 tons round, 58 tons run of mine, and 22,788 slack coal, in all 25,431 tons, as compared with 50,854 tons for the year previous. Mr. Gilpin reports the sales to Newfoundland, New Brunswick and Prince Edward Island as showing a little difference from the returns given in 1890.

Arrangements are nearly complete for the ensuing Quarterly General Meeting of the General Mining Association of Quebec, at Black Lake. Visiting members will leave Sherbrooke by special train on the morning of the 14th. After spending some time inspecting the asbestos mines at Thetford, all will return to Black Lake, where the meeting will be held in the Club House. Mr. J. Burley Smith, M.E., Glenalmond, will read a paper on "The Labor Question in its Relation to Canadian Mining," to be followed by one from Mr. L. A. Klein, on "The Present Status of the Asbestos Industry." Members will be the guests of the Asbestos Club, by whom they will be entertained to supper after the meeting. A pleasant outing and an instructive meeting should induce a strong turnout of members.

Our London letter, under date of 30th, reports the phosphate market as follows:—

"The market for phosphate is exceedingly bad, but Canadian 80% can be sold for Hamburg, at 10½d., and possibly up to 11d., and sellers are asking 1s. and in time I think they will get it. Florida 75%, after touching 8½d. is now 9d. and 9½d. asked. Bull River has at last tumbled down, and a contract was made yesterday at 7¼d. Grand Somme cannot be quoted above 10½d. for 70% and 11½d. for 75% London. Under these circumstances it would hardly seem advisable to sell at present, as so many mines having stopped, the market is likely to improve. I hear the Corporation is to be sued on all hands and is likely to be soon wound up."

Later reports indicate an improvement in the market with a slight advance in prices.

In another place we reproduce (from a photograph taken by one of his Toronto victims) a portrait of Charles Miles De Tracey Dobson, the subject of our article in last issue. In a thoroughly characteristic letter to the Ottawa *Free Press*, Dobson denies that he ever carried credentials from John Taylor & Sons. We never said he did. The copies he presented to us in 1886 were forgeries. It is unnecessary to deal with this blatant effusion further than to remark that when he takes his threatened action for criminal libel we will be fully prepared to incriminate him on every point of our indictment.

In his summary of the proceedings and work of the Geological Survey of Canada during last year, Dr. Selwyn has something to say of the injury and loss too frequently created in this country by the mining quack. Unfortunately, the opinions of these self-styled "experts" and "practical miners" are too readily accepted and acted upon, often in preference to a member of the Survey who is thoroughly acquainted with the geological structure of the district in which the information is desired. "These 'expert' and 'practical' opinions," says Dr. Selwyn, "rarely prove correct, and their first cost, often considerable, is by no means the greatest. Not a year passes unmarked by such cases, and the past season is no exception. The boring for gas at Stewarton in 1889; for water at Morden in 1890; for gas at Belleville in 1891; and for oil at Pincher Creek in the past summer, are some of the instances of such useless expenditures, all of which might have been saved had the advice of the department been sought and

followed." He might have added the losses sustained by the Ahn Reduction Works blunder at Sudbury; by Lucius J. Boyd's fabulous asbestos discoveries at Carthby; and the oil finds of that master-quack and imposter, the smooth-tongued and wily Dobson. The history of mining in Canada is pregnant with quacks and their vagaries. Dr. Selwyn's narrative of the Pincher Creek petroleum boom may be quoted in his own words:

"I found considerable excitement existed in the village, in fact, a decided boom in petroleum claims, and that a company had been formed to put down a boring, the site selected for the experiment being on sec. 21, township 2, range 29, some 18 miles south, a little east of Pincher Creek Village. On Monday, the 20th of July, I proceeded to the locality named, accompanied by several gentlemen interested in the work. The country traversed is fine farming land, a richly grassed undulating prairie well watered by numerous small tributaries of Pincher Creek and the Waterton River, all of which eventually find their way to the Saskatchewan. The site of the proposed boring was on a small flat on the left bank of one of the tributaries of Waterton River. A gang of men were at work erecting a derrick and preparing to put an engine and boiler, already on the ground, in place. The evening of the 26th of July and the whole of the following day was devoted to an examination of the rocks that were exposed in the creek both below and above the site selected for boring. They were ordinary varieties of sandstone and sandy shales of the Cretaceous, with irregular dips from 15° to 20°. The last exposure of these rocks up the creek was about three miles and a quarter, then, for about three miles farther, there were no exposures up to where the creek emerges from a rocky gorge, all along which there are good exposures of hard, flinty red, green and grey shales and sandstone, often gritty and quartzose and dipping to south south-west at 25° to 30°. These are the Cambrian rocks which here form the base of the eastern spurs and ridges of the Rocky Mountains. It was stated that both at this gorge and at several places in pools on the prairie to the eastward petroleum had been seen, but no one at the boring camp could show me any of these places. The whole country for miles around and up into the entrance of the South Kootenay Pass, nine miles to the south, was marked off with the stakes of the oil claims. On inquiry, I was informed that an 'expert' named Baring had been there and had expressed a favourable opinion as to boring where operations were being commenced. I was unable to learn any other reason for fixing on the site. The note I made under date 21st of July reads: 'There is nothing whatever to indicate the existence of petroleum in this vicinity. It seems highly improbable that it should be found here, though, of course, not impossible.' Subsequently we had a copious flow of water had been struck and the boring abandoned. The cost of this very absurd and useless operation must have been considerable."

The moral of all this is that extra care and precaution should be taken by capitalists to ascertain the qualifications, experience and ability of those engineers or experts upon whose statements or reports they may be called upon to invest their money in mining enterprise.

In all cases an investor, to whatever kind of undertaking he inclines, must largely rely on the judgment of others regarding the value and probable prospects of any particular property; but if this be so in regard to almost every kind of industrial undertaking, still more is it so in regard to mining enterprise, because not only are the properties, as a rule, situated a long way off, but the whole details of management are of so intricate and technical a nature that entire reliance must be placed on those who are, or who profess to be, experts in these matters. Those who are interested in mining and believe as we do, that it is a legitimate and often enormously profitable means of employing money, should insist that any laxity in connection with the all-important point of thorough initial investigation of mining properties will be held to entail grave responsibilities on the part of those who profess to speak authoritatively on

that of which they barely know little or nothing. The history of many Canadian mining enterprises points out in no unmistakable manner how lamentable has been the loss of capital for lack of that competent preliminary inspection and investigation which should be made into the capabilities of every mining property before the public are invited to invest their capital.

Mr. Sando, the promoter of the General Phosphate Corporation, is exceeding wroth at our outspoken criticism and *expose* of the affairs of his company, and with characteristic fanfare and bluster threatens an action for malicious libel. Mr. Sando has many bees in his bonnet just now, but we seriously doubt the sincerity of his intention to extend the collection by the addition of a first-class hornet's nest. People in glass houses don't throw bricks.

The last act in the White's Asbestos Company swindle was played out at Montreal the other day when the so-called asbestos lands at Garthby were unreservedly put up at public auction and did not receive a bidder. In the light of the unenviable record of the company and its ignominious collapse comment is unnecessary. It may, however, be interesting news to Mr. Lucius Boyd, the engineer who sent home such glowing reports of their value, and mainly on whose exaggerations—to put it mildly—the lands were unloaded at a high figure on an unsuspecting public.

Last month a reference was made to the death of a miner resulting from the alleged fumes of a roburite cartridge. The matter has since been brought up in the House of Commons when the Home Secretary stated that the facts of the case had been brought to his notice. Although the jury decided that the death of the deceased man was due to the poisonous fumes of a roburite shot, yet there was at the inquest a difference of medical opinion on the subject, and he had since had other competent opinions not in accordance with the verdict. The inspector of the district informed him that the precautions observed on the occasion in question, both in respect of the time which elapsed before the workman returned to the working place, and in respect of the air current which passed through the working place, were in conformity with the recommendations of a skilled commission in Durham which enquired into the possibility of danger arising from the use of roburite as an explosive in mines. Under these circumstances he did not think that he ought to interfere under the Coal Mines Regulation Act to prevent the use of an explosive which was largely used and which had the advantage of being flameless.

A writer in the *Adelaide Observer* speaks hopefully of the future of gem mining in South Australia. That gems of various kinds, he says, from the diamond to the garnet, exist in that colony has long been known, but probably only a few persons are aware how great a variety has been met with. Diamonds were first found at

Echunga about 36 years ago, and it has been computed that over 100 were secured on the diggings. No doubt, four or five times as many were thrown away by the diggers, owing to their ignorance of the nature of the gems. Most of them were small, and although two were worth respectively £20 and £50, the average value would probably not exceed 30s. each. Some years ago the Government employed Mr. Bean, who had recently returned from the African diamond mines, to visit Echunga and write a report on the prospects of finding the precious stones there in paying quantities. Mr. Bean's report was moderately in favour of diamonds being found, but he was not very successful in meeting with any deposits of the gems. It has been stated that diamonds have also been met with in the Far North, and it was said some years ago that one worth 70 guineas was picked up over 300 miles from Adelaide. Where they have been found there is a probability of more being met with, and a few hundred pounds expended in digging for diamonds at Echunga might prove to be money profitably spent. After referring to the article upon "The Diamond Mines of India," from the pen of Mr. A. Mervyn Smith, which appeared in these columns towards the close of last year, the writer points out that a great similarity exists between the formation in which gems are found in India, as described by Mr. Smith, and that of the large watercourses beyond Port Augusta. The writer has often thought from the appearance of the creeks, such as the Frome, the Arcarola, the Brachina, &c., and of the country through which they pass, that a proper search in their beds would probably be rewarded by valuable discoveries. If only 1 carat weight of diamonds is reckoned payable in India, we should persevere in the search, even though at first no more than this should reward our efforts. At the same time the different labour conditions in the colony would require 3 or 4 carats to make the work payable here. But let the fact be established that diamonds are to be found, it will be worth while to prosecute the search. Nor should the prospecting for gems be confined to the Far North. The North Para River, the Onkaparinga, the Torrens, the Hindmarsh, and the Norman are all worth trying. The Para is noted for the brilliance of the white topazes it contains, the Onkaparinga and the Torrens have yielded small spinnelles, zircons, and "gem sand" is found near the mouth of the two southern streams. Long before the discovery of the "rubies" in the Far North, the late Mr. John McKinley brought down from one of his exploring expeditions similar stones of beautiful colour and lustre, and longer ago still old Mr. Menge made a fine collection of gems, which he obtained chiefly in the Barossa district. Beryls are known to be plentiful in the neighbourhood of Mount Crawford, and opals are found there and at Angaston. Many years ago Mr. S. Vale, who obtained the prize at the Prince's Exhibition in 1867 for his geological collection, found a splendid Oriental topaz in the Port Lincoln district. The Episcopal Pastoral

Staff, which was presented to the late Bishop Short, some five and twenty years ago, contained a large number and variety of gems, said to have been all found in South Australia. All these facts go to show that there are precious stones in the colony, and that all that is required to be done is to set to work with a will to unearth them. A few months ago a storekeeper at Farina found a magnificent bluestone in the Far North. It was broken into several pieces, the largest being about the size of a pigeon's egg. He had them all well cut, and they would have passed for sapphires from their splendid colour and lustre, but they were not the true corundum, though quite equal in appearance.

CORRESPONDENCE.

Our National Museum.

SIR,—Mining, and the various branches of connected with it, are of the first importance to the trade and national advancement of any country.

A national museum is the index to the mineral wealth and resources of the country. It ought to contain specimens of both scientific and economic value found in the country, and classified under the various branches of the natural sciences, and also under the classification of trade conditions or industrial uses.

Our Canadian Museum at Ottawa falls short of now filling the requirements of the ever-increasing progress of the mining industry in Canada, and valuable collections made in all the departments, both scientific and industrial, are crowded and hidden for want of proper space and light to show the exhibits.

The building is not now sufficient to exhibit the Canadian specimens it contains, and was not built for a museum, and is not suited for that use. The danger from fire is also another serious point against its use as the National Museum of Canada.

As an educational institution its value is greatly lessened on account of there being no room to exhibit foreign ores and minerals, which have not, so far, been discovered in Canada, but which, from the similarity of the geology of a foreign locality and that of parts of Canada, we may reasonably expect, with industry and care, to find similar Canadian ores and minerals. This is a question of vast importance to the mining interests of the country, and for want of house room in this somewhat thinly populated country, or possibly of too much so-called economy on the part of the Government, the mining interests are not aided in the discovery of new Canadian ores or minerals.

The amounts expended by both the Federal and the several Local Governments on scientific, educational, and experimental agriculture and forestry, is largely in excess, and out of all proportion to that devoted to the advancement of the mining interests of the country, and hence the call for the erection of a suitable structure for a National Museum is a fair demand, warranted by the importance of the mining industry and the present necessities of the case.

We desire also to endorse the request of Dr. A. R. C. Sneyers, the Director, to have the museum made still more useful by having it opened to the public on Sunday, as is done in similar institutions in Great Britain and the Colonies. If "the works of nature are the works of God," it cannot be very wrong to study and admire these special works when arranged in a National Museum so as to illustrate the orderly evolution of the world and life, from the early forms of rock and life, through the various epochs of development, to that in which we find them to-day. The museum ought to be opened on Sunday for the better education of the working classes who cannot spare time from their every-day work to visit it during the week.

Until such time as we have a building in the Capital of the Dominion which is worthy of the name of a National Museum it is premature for local sections to advocate the establishment of a school of mines in isolated sections.

The attention of Parliament is again called to the pressing necessities for the erection of a suitable building for the national collections of Natural History and of the Geological Survey. K. S.

OTTAWA, 10th May, 1892.

C. M. Dobson.

SIR,—Allow me, as a constant reader of your valuable paper, to express my appreciation of your course in the April issue of the REVIEW in giving the mining public warning against Mr. C. M. Dobson, whom that gullible sheet, the *Halifax Critic*, had so cheerfully held up to be admired and worshipped by its readers. More than a year ago I was privately informed of the unreliability of Mr. Dobson, and it is now gratifying to learn that that information is accessible to the general public. The *Critic* for some years has been a laughing stock for the mining public in publishing just such trash as this endorsement of Mr. Dobson. Yours, etc.,

HALIFAX, 25th May, 1892.

STORMONT.

Portland Cement.

Sir, Will you kindly inform me through the medium of your paper—

- (1.) What are the ingredients of Portland cement, and (briefly) how prepared?
- (2.) Is water lime calcined before being ground? and wherein does it differ from common carbonate of calcium?
- (3.) Is there any market for best marl? If you have a column of "replies to inquirers," I will be glad to have reply through it. There are several lakes and marshes on line of junction of Selkirk and Archaean rocks worth inspecting.

Yours, etc., T.F.

LITTLE CURRENT P. O., ONT.

[Portland cement is made under two processes, called the dry and wet. The ingredients used are clay and chalk, or stone and clay. In the latter, and under the dry process, the stone is burnt into lime, and the lime is mixed with the clay in a slurry. This is carried into dry pans over the kilns, and the stuff is then burnt into slag. It is then passed through stones or crushing machinery, and ground very fine. Some manufacturers grind the limestone and mix it into bricks with the clay, and burn it in that way, afterwards grinding it. In the composition of clay and chalk, which is the cheaper way of manufacturing cement, they are simply run into a slurry. Marl has also been found to be a good substitute for chalk, and where large deposits of such are found, if in a convenient location for shipping, is valuable, providing good river clay, or brick clay can be found in close proximity.]

The analysis of cement is about as follows—

	Per cent.
Lime CaO.....	63.60
Silica SiO ₂	22.60
Alumina Al ₂ O ₃	6.72
Oxide of iron Fe ₂ O ₃	1.69
Magnesia MgO.....	0.97
Potash K ₂ O.....	1.62
Soda Na ₂ O.....	—
Sulphate of lime CaSO ₄	—
Water H ₂ O.....	—
Sulphuric acid.....	1.30
Carbonic acid.....	1.50
	100.00

—EDITOR.]

Notes From New Brunswick.

Sir, —I certainly owe you an apology for not having written you some items before now from New Brunswick, but was waiting for something tangible to present, also in the hope that our Local Government would have made some additions to, or some amendments to, the recent Mining Act passed by them, with a view to simplifying the same, but I regret to say, nothing has been done to that end.

While I and many others have a firm belief that there are mining districts in N. B. worthy of development, I am as firmly of the opinion that capitalists cannot be induced to expend any very large amount of money in New Brunswick mining localities while the industry is handicapped by useless and heavy royalties. If New Brunswick had positive mining grounds, yielding gold, silver, coal, iron, etc., in abundance, then the infliction of such royalties as are asked now would not be so bad, but when we are trying to develop the resources of the Province, and prove by the expenditure of time and capital that there are workable and profitable mines, it would surely be but wisdom on the part of the Government to exempt all royalties for a term of years at least. This is the view taken by practical mining men, who are talked to on the matter and are sincere in their desire to see the mining interests of the Province developed. Meantime, I learn from good authority that a couple of the best areas in St. Stephen have been bonded for some English capitalists who propose to start work of test and development at once on the Hall-Carroll nickel properties. The matter is in good hands, and if the nickel appears in as good quantities as stated, and as numerous assays of it show it to contain, we may look for a very tangible and profitable boom in this locality. The ore is abundant, and yields copper, silver, and in some instances traces of gold and nickel. The ore when placed side by side with the sulphure ore can hardly be told apart. We trust this venture will be attended with success, and we shall keep you informed as to its progress from time to time.

The Alma Copper Company has succeeded in forming

a development syndicate of company, and propose to open up the copper veins and deposits on the Bay shore in the Alma district in Albert County. The prospects are exceedingly good, so it is stated, there being a fair body of ore, and of a good grade. The company intend working cautiously and economically, and under the direction of a Capt. O. V. Brain, who, it is said, is a miner of some considerable experience. The New Brunswick Mineral Development Company of St. John, N. B., of which J. De Wolfe Spurr is President, and E. Wetmore Merritt, Secretary-Treasurer, are the parties who are prominent in the formation of this company. Their efforts will be watched with considerable interest, and it is to be hoped they may prove thoroughly successful.

I have not heard anything recently of the development at Woodstock of the silver mine on which considerable money has been spent, but presume the owners intend pushing forward further explorations. The Woodstock people are to be congratulated on the fact of their faith in their enterprise, and their willingness to put their money into it, no matter what the final result may be.

Rumour states that an important gold bearing ledge has been discovered in a certain section of the Province, and that parties who have spent considerable money in prospecting the same will shortly take up such necessary areas as they need, and propose putting in sufficient machinery to give some a thorough test. We trust the rumour is correct, and would be pleased to know that gold has been found in N. B. in paying quantities.

Prospecting and development for coal on the Oromocto river, a branch of the St. John, is going on, so we understand, and the parties behind the enterprise seem to think their efforts will be crowned with success. If any special features occur in connection with the same, will try and keep you posted on the same.

The Manganese mines near Sussex and vicinity are still at present working. It is stated that the Pope Manganese Company of Boston will resume operations at Markhamville during the coming summer. The Jordan Mountain Manganese mine was visited by a Mr. Dolson, M. E.—whom the REVIEW scores so unmercifully in the April number—with a view to its purchase by Chicago capitalists. If the parties who were instrumental in bringing Mr. Dolson here and to Nova Scotia—at, it is said, a very great expense—have been misled, it is to be deplored, as a few such cases as this will serve to do more injury to legitimate mining deals than a lifetime.

It is said Mr. Dolson also figured as a Keweenaw or C. E., having been employed by St. John parties to look into the merits of a proposed railway contract in Cape Breton. Just how correct this is cannot be stated, but with the reputation the REVIEW gives him, the less railway contractors have to do with him the better, I should judge.

Nothing definite is known of the gold and silver veins at or near Bathurst, which it is said were being prospected last season with a view to development and sale.

The phosphate mine of Messrs. Best and McLaughlin, near the Cantleiver bridge in St. John, is being steadily worked, and a fair sale of product is being made. The deposit is not of the highest grade, but sufficiently pure to meet with a fair sale at reasonable prices.

The opening up and putting on the market the waters of the Hamblet Mineral Spring, near Petitcodiac, N. B., while not strictly of a mining nature, is worthy of note. A strong local company has been formed, machinery put in, and the manufacture of the water into ginger ale, lemonades, etc., commenced. The natural water is also charged with carbonic acid gas, and is being capably sold as a rival to the famous Apollinaris water. The company is meeting with grand success so far, and feel highly encouraged in their venture.

Yours, etc.,

CRYSTAL.

FREDERICTON, May 3, 1892.

The Gay's River Conglomerates.

Sir, Seeing a letter in your February number by Robt. H. McLeod concerning the Gay's River conglomerates, New Scotia, I, as a way of 14 years' experience in the Ballarats, and surrounding districts of the alluvial deposits there, fully endorse all that Mr. McLeod says in his letter regarding them. From the description which he gives of the conglomerates, or the alluvial deposits, as they are called in Australia, I have not the least doubt, from what he says has been got already, that if the old bed was found I have no doubt that good payable gold would be got. It seems from what he says that the alluvial wash is very wide, but the main channel may not have been found yet. It is very common in the Ballarat district to have what is called "flat reefs"; that is, ground of considerable extent more or less, a little higher than the main channel, with wash all over it, carrying gold more or less, sometimes payable and sometimes not; but we always make for the main channel. I remember working in a mine 200 feet deep, about ten miles from Ballarat. The shaft was sunk about 250 feet from the old river bed, as we found out afterwards; we struck a flat reef with plenty of wash on it, containing a little gold, but we always always with a very slight expectation to strike the "gutter," as the old channel is called there, but we had to drift nearly 250 feet before we struck it, and, mind you, that was not in the main lead, but only a feeder running into it, so you can imagine what a flat reef can be on a main lead. He speaks of sinking through a wash a certain distance and then coming to a bed of sand; I like it all the better for that: that is what

is called a false bottom. "A false bottom is composed of sand and of other kinds of deposits." We always reckon that a good sign in sinking for gold; sometimes there is a little gold in the wash above the false bottom, and sometimes not. That bed of sand changes the wash entirely. If the wash above the sand had continued to the bed rock without the sand intervening, I would have very little hope of it carrying much gold, but according to his letter there is an entire change of wash below the surface, and that makes me very hopeful of payable gold being got. It shows there has been a regular flow in the old bed, and if any good gold bearing quartz reefs cross it, they are bound to throw gold more or less; so feeders coming into it help it wonderfully, and you can always make sure of getting good gold a little below the junction. If, by publishing this letter, you think it will do any good towards developing the alluvial deposits of Nova Scotia, I hope you will do so, and oblige.

Yours, etc.,

WILLIAM TODD.

ALMONTE, ONT., April 29, 1892.

Notes from Illecillewaet, B.C.

Sir,—After the long winter's rest this district is beginning to show lively signs of waking up for the summer's work. It was fondly hoped from the warm weather experienced in March last that an early summer would prevail, but these hopes were dispelled by a heavy fall of snow in the end of the month, and a long spell of cool weather, with the absence of the "Chinook" winds, has left a large amount of snow still on hand, and low down on the mountains. Locomotion is both difficult and dangerous over the low divides, and the danger of snow slides, or avalanches, with the softness of the snow on the surface, prevents any but the most daring from trying to cross the mountains. A few days of warm wind and soft rain would make a magical clearance now. So much for the weather prospects.

Mining prospects for the year look very healthy, and it seems as if some parts of the district were going to get good testing. Development work is going to be done in a thorough manner on many of the claims as soon as they can be got at to get stores and tools in. The trails are possible packing in on horses will commence. In the Illecillewaet Valley several claims are waiting for the snow to leave in order to commence work. The Lanark has been working steadily all the winter, and the output this summer will be a more convincing proof of our great resources in silver and lead than volumes of talk and gallons of ink. The Selkirk Mining Co. intend erecting an aerial tramway from the river up to the mine, and experienced engineers are on the way with the plant. This will be the first aerial tramway erected in the district, and much interest is naturally excited to ascertain the amount of success that will attend it. If successful, as there is every reason to hope that it will be, it will be the forerunner of many more.

Aerial tramways and electricity will be the great factors in realising the wealth of this wonderfully wealthy region. The time is within a measurable distance when the valleys of the Selkirk's shall glow with the beams of the electric light, and every necessary work that can be done in the mines will be accomplished with the most wonderful and marvellous agency. We have unlimited water power, sufficient for any number of dynamos, and the force needed can be conveyed to any part of the mountains by wires. Capital judiciously expended, economic and efficient management and the latest and best improvements in mining machinery, driven by electrical power, will place British Columbia amongst the foremost wealth-producing countries in the world.

The B.C. Government have voted some \$29,000 for trails in various districts, and this ought to do a large amount of work and will be of the greatest benefit to the country at large. We have two great excitements at present amongst the mines and mining camps: the Sleean and Kaslo camps, near Ainsworth, South-west Kootenay, and Fish Creek, or River, in West Kootenay. As I am not at present interested in South-west Kootenay we will speak of our own excitement—Fish Creek. That there is a wonderful surface-showing of galena in some of the claims, there is no doubt, and about a dozen claims will have a good and thorough testing this summer. I will mention some of them: the Edinburgh, Elizabeth and Scotia, owned by Messrs. Ryckman, Scott & Co.; the Amie and the Agnes, owned by The Golden Smelter Co.; the Heronback, the Alberta, the King Solomon, the Virginia, the Link, the Stockholm, the Avonport, the Kathleen, the Blarney—all these will be developed more or less this summer. As soon as horses can get in there will be great activity, and many important discoveries will be made. Many men will be out prospecting, and there is an enormous extent of splendid looking country for them to roam around in, and many more claims will be unearthed.

Now about town news. The Professor who was here last summer is back again, and received a hearty welcome from all the boys. There is a Committee of Ways and Means formed to promote the interests of the camp, and they mean business every time. Among the various items of work they have initiated, I may mention, first, they have petitioned the Council of the Government of British Columbia for a complete survey of the country between the C.P.R. and the Kootenay Lake mining camps; petitioned the C.P.R. authorities for a flag station at Flat Creek to facilitate intercourse with Fish Creek; propose running a newspaper for the district, and so on. We have now every description of goods at

reasonable prices through the business enterprise of Mr. D. Lamey, excellent hotels, unsurpassed scenery, and excitement enough for one of Rider Haggard's novels; bears plenty and lively—so Illeclilwaw commences the campaign of 1892 in great style. More in my next.

E. A. WATSON.

ILLECLILWAW, 12th May, 1892.

The Pictou Charcoal Iron Works.

SIR,—In reply to your favour of the 4th inst., I take pleasure in giving you the following information in regard to the charcoal iron furnace plant here at Bridgeville, now under construction.

Our property consists at present of:

1st. About 5,000 acres of heavy old-growth hardwood land, besides the wood bought of an additional thousand acres of land in our vicinity.

2nd. Mining rights on Grant's farm, at our very door, and about 400 acres of other land, only a few miles distant, not liable to any Government royalty; and the right of search for iron ores on five square miles of land at Springville, on five square miles at Sunny Brae, and on five square miles at Blanchard, on all of which places good ore is being found.

3rd. The limestone deposits on Grant's and McDonald's farms at Bridgeville and McLean's at Springville.

4th. The furnace grounds at Bridgeville, consisting of 11½ acres of land on Grant's farm, where the plant now is being erected, while we have completed about half a mile of railway track connecting our works with the New Glasgow Iron, Coal and Railway Company's road (running from Eureka Junction on the Intercolonial up through the East River Valley). From this track we have also graded road beds up to the stack house and coal sheds, through which buildings separate tracks will be laid.

As regards the buildings here we have long since finished our offices (28'x32', with a 9'x16' annex), which contains, besides the office rooms, a drawing and construction room and a chemical laboratory; our carpenter and blacksmith shops (25'x50'), and a stable and tool house. We have also nearly completed the engine house (15'x70'), the coal sheds, the stack house and the casting house, the former of which is 40'x70'x21' parts, with a capacity of 10,000 bushels of charcoal, and the latter 130'x52'x14' parts, with lantern 10'x4' running the whole length of casting house. The workshops and furnace buildings are to be covered, roof and sides, with corrugated iron, which has already arrived and will be put on in a few days. The hoist tower, which also will be covered with iron, is to be 70 feet high, with double elevators; and the boiler house (20'x32') will have iron frame and iron roofing.

The working plant proper, now under erection, will be of the following description:

The furnace stack, 50 feet high and 11 feet bosh, with crinoline strapping and red brick "shell," supported by six iron columns, and having a wrought iron mantle and water cooling jacket and six brass tapers and water blocks; the top provided with a Weimer friction wheel and gas-seal; the down corners 36' clear; huster and blow pipe 15" diameter, with butterfly valve.

The slat blast, a Cooper-"Durham" cast iron stove, with 30 V-pipes, 14'x8", cut in two and reversed, being arranged in two divisions, placed side by side and provided with two combustion chambers, one at the inlet of the cold blast and the other where the now heated blast leaves the stove. This arrangement, made by the writer at the Katahdin Iron Works, Me., from where this hot blast is now being moved to this place, proved there to be of great economic value, as the temperature of the blast can easily be maintained at a high degree (800° to 900° F.) with a very small amount of fuel (gas).

The boilers, which are nearly completed, will be four in number (30'x36") made of best Dalmat's steel plate, and will be built in sets of two, with separate iron draft stacks and independent steam and water connections, so as to be worked separately if desired, each set being sufficient to operate the entire plant. The fuel for the boilers as well as for the hot blast will, of course, be the waste gases from the blast furnace, and both of them are provided with gas burners of special design, with combustion chambers so arranged as to cause a quick ignition and complete combustion.

The blowing engine has two horizontal blowing cylinders of 5' diameter and 5' stroke, and are the same as have been in use at Katahdin. The elevator machines with two of Wood & Co.'s "safety cages," as well as the limestone breaker—a "Foster Crusher-Pulverizer"—will be run by belts from a special steam engine of about 5 h.p.

For the handling and weighing of the stack we will use the Weimer patent charging steel barrows, and the Richle's furnace charging scales and pig metal scales.

The water supply has been provided for by building a 2½' high dam on the millbrook (about 800' from the furnaces) and from there two 8" wooden pipes will be laid, besides which a good-sized reservoir is being made about 150' above the furnace level, to catch the spring water which comes out from the hills above the furnace site, and which will thus give us a pressure of about 65 lbs. at the furnace.

Provisions are also made for washing, roasting and screening the ore as it comes out from the tunnels on the Grant farm, a few hundred feet only from the furnace.

Three tunnels are at present driven here, all showing and yielding a fine quality of brown hematite, besides

which the McLean limestone quarry at Springville (three miles distant) has been opened up and a couple of hundred tons of the stone delivered to us for furnace use. We are also burning part of the stone quarried for mason work and find it to be of a superior (very-strong) quality.

For the carbonization of the wood, we have begun erecting brick kilns, of which 16 to 20 will be built this summer. These will be of a size and shape, according to the locality and circumstances, those here at the works being of the round type, with a capacity of 50 cords for kiln (equal to 1,100 cords, or 450,000 bushels of charcoal per annum); and those to be built in the woods of smaller size and of the Platburg (conical) type. Most of our wood will be burnt in the woods, from where we will haul the charcoal instead of bringing all the wood to the works for carbonization, thus making a considerable saving in freight.

As most of our building materials are here or on the way and we intend rushing work, we are in hopes to be making iron here before many weeks at the rate of 15 tons per day at first, which means a consumption of about 100,000 tons of ore and half a million bushels of charcoal and 13,000 cords of hardwood per annum.

Yours, etc.

ERNEST A. S'OSTEDT.

BRIDGEVILLE, N.S., 25th May, 1892.

LEGAL.

Jane Sword vs. The Sydney and Louisburg Coal and Railway Company, Limited.

This is an action in the Supreme Court of Canada, brought by the plaintiff, widow of the late William Sword, to recover dower. The land in respect of which dower is claimed is situated in the Sydney Harbour, Cape Breton. This water lot was granted to Wm. Sword on October 22nd, 1867, the grant being made after the passing of the B. N. A. Act, which became law on March 29th, 1867.

Wm. Sword conveyed the water lot in question to the Glasgow and Cape Breton (Nova Scotia) Coal and Railway Co. (limited) by deed dated June 6th, 1871, and two days subsequently to the date of this deed he (Wm. Sword) died.

On January 10th, 1881, the Cape Breton Co., then in liquidation, made a conveyance to the defendant's company purporting to convey the land in question.

On April 14th, 1881, an Act was passed by the Nova Scotia Legislature incorporating the defendant's company, as follows:

"The purchase by and conveyance to the Sydney and Louisburg Coal and Railway Company, made on the 10th day of January, 1881, of the coal mining leases and real and personal estate of the said Cape Breton Company, limited (including the coal mining leases and real and personal estate of the several companies aforesaid, namely: The Lorway Coal Company, Cape Breton; the Glasgow and Cape Breton, N.S., Coal and Railway Company, limited, and the Schooner Pond Coal Company, limited), are hereby absolutely ratified and confirmed, and the title to said leases and said real and personal estate, and to the line of railway hitherto operated by the said Cape Breton Company, limited, and the lands whereon the same is situated is vested in said Sydney and Louisburg Coal and Railway Company, limited, reserving to any person or persons or body corporate the right to compensation only for any interest in, or lien on, said leases, real or personal estate at the time of such purchase and conveyance."

At the trial it was admitted that since the date of the deed from Wm. Sword to the Glasgow and Cape Breton, Nova Scotia, Coal and Railway Company, limited, of the locus very valuable wharves have been erected thereon by said company and the defendant company without any claim being made by the plaintiffs.

The plaintiff at the trial in support of her claim put in evidence the grant from the Crown to Wm. Sword, the deed from Wm. Sword to the Glasgow and Cape Breton, Nova Scotia, Coal and Railway Company, limited, the deed from the Cape Breton Company, limited, and Chapter 73 of the Acts of the Province of Nova Scotia for the year 1881; all above referred to.

The action was taken by the Hon. James McDonald, Chief Justice, without a jury, and a verdict was found in favour of the plaintiff. The defendant company appealed from this judgment to the Supreme Court of Nova Scotia in banco, and the appeal was heard before the Hon. Mr. Justice Ritchie, the Hon. Mr. Justice Townshend and the Hon. Mr. Justice Meagher, and judgment was given, Mr. Justice Ritchie dissenting, dismissing the defendant company's appeal, and from this judgment the defendant company now appeals to the Supreme Court of Canada.

The defendant company contends that no title passed to Wm. Sword by the grant to him from the Lieutenant-Governor of Nova Scotia, the water lot in question being at that time vested in the Queen, represented by the Government of Canada, and that the grant could not operate to disincumber the Crown so represented, and that therefore there is no estate out of which the plaintiff can claim dower. The only answer that has been made to this contention is that the defendant company is estopped from setting up this contention because the defendant company acquired their title by or through the plaintiff's husband. In answer to this it is submitted:

(a) That it has not been proved as a fact that the defendant company claim through Wm. Sword; the deed to the defendant company is from the Cape Breton Com-

pany, limited, and there is no evidence that the company claimed the water lot in question through the Glasgow and Cape Breton, Nova Scotia, Coal and Railway Company, limited.

(b) That the taking of a deed does not estop the grantee from denying the title of the grantor, or his widow's right to dower.

(c) That an estoppel cannot arise when the party claiming to avail himself of the estoppel himself shows the truth of the fact which he wishes to estop the other side from setting up.

The plaintiff here having shown in attempting to make out her title that her husband's claim was through a void grant, cannot estop the defendant company from saying that her husband had no title.

Assuming that the defendant company cannot set up the want of seizin in Wm. Sword, they rely upon the provisions of the Act of 1881, vesting in them the water lot in question.

This ground is met by the plaintiff by the contention that it is *ultra vires* of the Legislature of Nova Scotia to legislate as to the title of this water lot.

The defendant company submits that the view taken by Mr. Justice Ritchie is correct. And if the Legislature of Nova Scotia could not vest in the defendant company, as against the Government of Canada, a good title to this water lot, they could vest the title by estoppel as against the defendant company, which is all that the plaintiff claims, and had full power to deprive the plaintiff of the rights which she claims, and this has been done by the clear words of the statute, and no injustice is done by this construction, as the right to compensation is reserved.

The action was taken to the Supreme Court of Canada, the argument by counsel being heard in February last. Judgment was reserved and in view of the enormous amount of work to be adjudicated upon by the court, it is not at all probable that the decision of the Hon. Justices of their Lordships in regard to this important case will be made public before the October sitting of the court.

F. W. Webster vs. T. G. Watters et al.

Judgment was given in this case at the Court of Review, Montreal, on April 30th, by Mr. Justice Davidson as follows:—

By what plaintiff styles "saisie conservatoire," but which defendant asserts is really a "saisie revendication," about 30 tons of mica have been attached at the mouth of a mine on lot No. 23A, in the 2nd range of the township of Wakefield, county of Ottawa. Plaintiff claims to have certain privileges upon the products of the mine. His action was dismissed by the Court at Aylmer, and this judgment is before us for revision. McVeity, Powell and Skead being then the owners, each for one undivided third of the minerals and mineral rights on the lot in question, on the 27th of October, 1890, made an agreement with plaintiff for the disposal of the mica which they might mine on lot 23, or other properties in which they were interested, or which they might buy, at the rate per ton of \$200 for large, \$100 for medium and \$25 for small sizes. The following clauses are sufficiently important to be quoted verbatim:—

"The said McVeity, Powell and Skead hereby agree with the said Webster & Co. to use all due diligence in searching for and taking out mica from the said lot No. 23.

"The said McVeity, Powell and Skead agree with the said Webster & Co. not to sell to all other persons, firm, or corporation, any mica of the character and description aforesaid for the period of two years from the present date. It is understood and agreed by and between the parties hereto, that in case the said McVeity, Powell and Skead shall dispose of the mineral rights in the said lot No. 23 in the 2nd range of Wakefield, that the purchaser or purchasers thereof shall be bound to carry out this contract with the said Webster & Co., and the mineral rights in the said lot No. 23 shall stand charged with this obligation, not only as against the said McVeity, Powell and Skead, but as against the future purchaser or purchasers of the said mineral rights, until the expiration of two years from the present date. It is further understood and agreed that the said McVeity, Powell and Skead shall deliver to the said Webster & Co. at the cutting shop located near the mine as aforesaid."

This deed was registered against the property. The vendors worked the mine for some time, and delivered between 100 and 120 tons to Webster. Then dissatisfaction arose as to the new and several methods of culling adopted by his agents whereby the rates agreed on were claimed to be largely shrunk, and that too in the presence of a rising and buoyant market. Finally the mine became flooded and work ceased. Then McVeity, on the 21st May, 1891, Skead on the 2nd of June, and Powell on the 29th of the same month, each sold his undivided third interest in the "mines, minerals and mining rights" in and upon this lot No. 23A, to the defendant, Watters, who thereby became sole proprietor. Watters, in turn, on the 2nd of July, 1891, sold one undivided third to the defendant, Elmhurst. All these sales were with warranty of peaceable possession and were registered.

The plaintiff's action followed on the 25th of August, and was directed against the five past and present owners above named. Subsequently discontinuances were filed as to McVeity, Skead and Powell, leaving only Watters and Elmhurst as defendants in the cause. Plaintiff, in his declaration, sets out the original agreement and intends the subsequent transfers as being fraudulent and

illegal. He prays that the mica seized be declared his on payment of the stipulated prices, that he be adjudged proprietor and entitled to exclusive possession of all mica on the lot, or that may be mined therefrom up to the 20th of October, 1892; that the lot be held hypothecated and subject to these so-called privileges and rights: that the above transfers be declared fraudulent and illegal; that the defendants be declared bound to carry out the agreement of the 27th October, 1890, made with plaintiff, and in default of their doing so that they be condemned to pay plaintiff \$40,000.

Separate pleas are filed by Watters and Elmenhurst. In either instance the facts alleged and the general grounds of defence assumed are identical. Denial is made of plaintiff's pretensions and responsibility, in any sense, for the agreement between plaintiff and the original owners is asserted. It is claimed to be a purely personal contract conveying no real rights upon the property.

Upon the discontinuance of the action against McVeitty, Skead and Powell the defendants produced a supplementary plea alleging that the nullity of these could not be demanded without the presence in the cause of their makers, and that a like objection existed against any condemnation in damages for breach of their contract, even if such had been set forth.

Watters and Elmenhurst bought with the knowledge of the bargain between the previous owners and Webster. They were also aware of its registration, but believed it to be a personal contract not imposing any charge upon the property itself, and further relied upon the warranties contained in their deeds. The suggestion is offered in the evidence that there had been an equitable fulfilment of the contract, as enough phosphate had been delivered to represent one ton a week for two years. Our judgment rests upon other grounds. Work had been stopped, delivery had ceased, and it is expressly and repeatedly sworn to that the sales to the present defendants were purely commercial transactions. They appear to us to be wholly untainted on the part of the buyers, with any purpose of ousting plaintiff from his rights. Knowledge of the agreement and of its registration does not constitute or create a presumption of collusion or fraud. Neither in fact existed. Did the original deed with Webster create a mortgage, servitude or any formal real right in his favor? The question has already received a judicial answer. During the progress of the present action the plaintiffs sought for an injunction against Watters and defendants to restrain them, for the time being, from working the mine. In refusing the application, the Superior Court *a quo*, the Court of Review and the Court of Queen's Bench all pronounced against the existence of real rights. This judgment, in appeal, practically concludes further discussion on the point. We don't see how any other view could have been adopted. There remain to be considered the personal rights invoked by plaintiff. We find, as was found by the judgment appealed from, that the mica seized was not extracted by McVeitty, Skead and Powell, their output having been by them duly delivered to Webster, but by and at the expense of the present defendants, Watters and Elmenhurst, whose property it is. Moreover, the absence of real rights, the disappearance of McVeitty, Skead and Powell as defendants, and the quashing of the seizure, leave us with a purely personal action, of which no service has been made upon the present defendants within the judicial district of Ottawa. Judgment confirmed with costs.

Desulphurization of Pig Iron.

At a recent meeting of the South Staffordshire (England) Institute of Iron and Steel Works Managers, Mr. T. E. Holgate, R.S.M., read a paper on "Manganese and Sulphur in Pig Iron." He stated that at the works at Hoerde the basic Bessemer process of steel-making was carried on, and for a supply of molten pig for the converters, the metal was taken in the fluid state direct from the blast furnace, without any remelting being required. With regard to the results, as they had to use coke containing much sulphur, they found that they had great difficulty in keeping the sulphur in the pig iron constantly low enough, and they hit upon a plan of desulphurizing the pig iron whilst it was in the "mixer" by means of manganese. They found that if sufficient manganese were added to give an ultimate total of 1.50 per cent. and the molten metal allowed to stand at rest for about 20 or 30 minutes, then, whatever might be the quantity of sulphur previously, it would be reduced at the end of the period to something like .05 to .08 per cent. They worked a furnace on a manganiferous pig iron and used the product of this furnace to furnish the required amount of manganese. Therefore the average percentage of sulphur in one series of 15 casts from the blast furnace was 642 per cent., and in the metal as taken from the "mixer" .046 per cent. Another set of 28 tests of the metal as taken from the "mixer" gave an average of .032 per cent. of sulphur, the highest being only .064 per cent. Therefore he thought they might, from the results obtained at Hoerde, regard it as proved that any pig iron, whatever amount of sulphur it might contain within ordinary limits, if it also contained manganese equal to 1.5 per cent or upwards, or had sufficient manganese added to it to bring it up to this percentage in addition to that required to form an equivalent to the sulphur present, and if it be left at rest in a perfectly molten condition for twenty or thirty minutes, then the sulphur would be reduced to .08 or .07 per cent., or less than this, through the separation of sulphide of manganese. If the presence of the latter was desirable in foundry pig iron, it was much more so in that for forge purposes

The Spontaneous Ignition of Coal, and its Prevention.*

By VIVIAN B. LEWES, F.I.C., F.C.S., Professor of Chemistry, Royal Naval College.

(Concluded from April issue.)

A few years ago, such an occurrence as a coal bunker on fire was rare, whilst at the present time hardly a week passes without some more or less serious cases occurring on the fast liners, and it is evident that there must exist some well defined cause for this enormous increase in cases of spontaneous ignition. On collecting evidence on this point, the first thing that strikes one is that bunker fires are almost entirely confined to vessels in which the bunker bulkheads are only separated from the funnel by a narrow air-space, or in close proximity to the boilers themselves, but where the bunkers are stepped back from the funnel casing and boilers, spontaneous ignition is a great rarity. Taking the case of a fast liner, it is found that the temperature in a coal bunker varies very considerably, according to its proximity to the air channel round the funnel casing. Close to the outside of the bulkhead the temperature is often as high as 200° Fahr. (93° C.) whilst inside 120° would be a fair estimate, and from the centre of the bunker to the side of the vessel, it is seldom above 70° Fahr. (24° C); the temperature, however, being higher near the iron decks, which, being in contact with the heated bulkhead, conduct the heat through the coal, and raise the temperature often up to 100° Fahr. It has been pointed out that if coal be kept at a high temperature, even though it be far below its igniting point, ignition is only a question of time; and if the bunker coal next the bulkhead be kept at 120° Fahr., any coal with a tendency to absorb oxygen will run a great chance of igniting within a few days. It is manifest that if this is the real cause of ignition, the seat of the fire ought to be found close to the heated bulkhead, but this is very often not the case, the mass of fire being found near the centre of the bunker, and sometimes even towards the sides of the vessel; but careful examination soon reveals the cause of this, as a line of charred coal is mostly to be found running from the heated bulkhead to the seat of active combustion, showing that the fire started by the high initial temperature has not had sufficient air near the bulkhead to do more than smoulder, but that as soon as it came in contact with a current of air passing up through the coal from the hatches in the decks, the smouldering mass began to burn fiercely.

In order to prevent spontaneous ignition of the coal under these circumstances, all that is necessary is to reduce the temperature of the bulkhead in contact with the coal, as if this is kept at a temperature not exceeding 82° to 90° Fahr., there is little or no fear of the oxidation of the hydrocarbons of the coal proceeding with such rapidity as to cause ignition in such a quantity of coal as can be carried in the bunkers; the iron decks, by subdividing the mass, also helping to reduce any risk. In order to reduce the temperature to the required extent, it would be necessary to make the bulkheads close to any heating surface, such as the funnel casing, double. Through this double casing sea-water would be allowed to circulate very slowly, and would effectually prevent any undue rise of temperature; whilst, to make the arrangements complete, a thermostat should be fixed on the inner plate of each bulkhead, which, if the temperature rose to 100° Fahr. (38° C.) would ring a bell in the captain's room, when the rate of flow of water could be increased until the required fall in temperature took place. Should this arrangement prove impossible from any structural cause, then a rapid current of air forced through the bunkers by means of a fan, or even an up-current formed by a good air-pump ventilator in the crown of the bunker, would go far to keep the temperature within safe limits. In a coal cargo, perfect ventilation is impossible on account of the mass of coal present, and, therefore, the hold should be battened down, and everything done to prevent imperfect ventilation, gas-tight bulkheads being a necessity for this purpose. In coal bunkers, on the other hand, on account of free access being obtained to both top and bottom of the coal, and also the small mass present, perfect ventilation is possible, and should be attempted, whilst the water bulkheads will do away with any undue rise of temperature.

Chemists have been repeatedly asked if analysis gives no indications by which a coal, liable to spontaneous heating, can be distinguished from another which is perfectly safe for storage or shipment in bulk; but up to the present time, the action has been so little understood, that no such differentiation was possible, but with a clear conception of the causes which lead to heating, it should be quite possible to do so. As I have shown, all coals, when heated to a temperature a little above that of boiling water, have their power of absorbing oxygen so increased that they will, in a few hours, absorb sufficient to give a perceptible increase in weight, and the greater their absorption power the greater will the increase be; and as it is upon this that the liability to heat depends, the amount of increase in weight would give a sure indication of the liability to spontaneous ignition. We have at present, however, no data to show what is a safe amount of absorption, and with what amount danger commences, and the owners of collieries yielding coal liable to heating are so anxious to prevent the fact leaking out, that there will be considerable difficulty in obtaining

* Paper read before the Society of Arts, March 2, 1892; with discussion thereon.

authentic samples to make the determination with. My own experience, however, leads me to think that if an airy coal does not contain more than 3 per cent. of moisture, and when powdered and heated to about 250° Fahr. in an oven for three hours does not increase more than about 2 per cent. in weight, it may be looked upon as a safe coal to store in bulk. I am perfectly aware that the precautions I have suggested will never, unless pressure is brought to bear upon them, be adopted by the owners of colliers, on account of the slight extra expense and trouble they would involve; but if Lloyds could be prevailed upon to lower the rate of insurance upon coal cargoes treated in this way, and substantially increase the rate upon cargoes in which these precautions had not been adopted, a class of disaster as appalling in nature as it is destructive in result would soon be entirely done away with.

Discussion.

SIR JAMES DOUGLASS, F.R.S., desired to thank Professor Lewes for what he had done in the way of providing a way of safety for those who had to convey coal to distant parts. The method proposed certainly seemed a little troublesome to shipowners, but it was not very expensive; and if it ensured safety to coal ships, as it seemed to do, it ought to be adopted. He hoped Lloyd's would see their way to encourage owners to adopt these necessary precautions. He should certainly urge the adoption of the necessary precautions with regard to the storing of coal in bunkers in any case he had to deal with.

MR. FRANCIS COBB thought, if the attention of Lloyd's was drawn to this paper, underwriters would very speedily fall in with the suggestion that properly protected ships should be insured at lower premiums than those which were not; and he should be glad if means were taken to distribute the paper amongst those interested. Up to the present it appeared that most people had been acting under a grave misapprehension. Considerable expense had been incurred in ventilating coal ships, especially those going to the west coast of America and the East Indies, and now it appeared that this was a step in the wrong direction. He knew of one case where an old American captain refused to have any ventilation, as he was loading his vessel for the west coast of America, and a fine iron ship alongside of him was ventilated at great expense; but in the end the old wooden ship delivered her cargo cool and in good condition, while the fine English ship was burned. The one captain closed his hatches as quickly as possible and never opened them again till he got to his destination, whilst the other put up wind-sails to blow air right through the cargo, which, at that time, they had been taught was the proper thing to do. If anything could be devised by which the liquid carbonic acid could be used without having a bottle for every eight tons of coal, which seemed to him impracticable, it would no doubt be very useful. If it could be carried in larger bulk and distributed where it was required, there would be no difficulty in fitting ships to carry it.

MR. W. E. STANLEY THOMSON said he had been favoured by Professor Lewes with an early copy of the paper, and had had communications from him before, and he had therefore taken the trouble to make himself acquainted with the results of the inquiries which had been held since the report of the commission in 1876. Professor Lewes' theory was, to some extent, contrary to the opinion of some very able men who sat on that commission, notably Sir Frederick Abel and Dr. Percy, which had been generally followed by courts of inquiry since. In one case, an inspector or manager of mines expressed the opinion that, unless there were pyrites in the coal, it would not fire; and the general opinion of the courts, since 1876, had been that it was generally pyrites which caused spontaneous combustion. Professor Lewes challenged this entirely, and had given some statistics bearing out his view; but his information went no further than 1883; if he had taken the last three years for which the Board of Trade had made returns, he would have found that they gave an average of something like twenty-five coal laden ships per annum which were either known to have been abandoned or were missing, and 200 lives lost. This was a very serious matter, and, if Mr. Lewes were right, the existing precautions were altogether insufficient and illusory, though they were founded on the report of the royal commission. That commission called special attention to a paper by Sir Frederick Abel and Dr. Percy, explaining scientifically the cause of spontaneous combustion, in which a great deal of space was devoted to the part taken by pyrites, though later on they also explained that coal itself was liable to oxidation, and, after explaining the process, they expressly said that this oxidation of the coal was one of the causes, if not the chief cause, of spontaneous combustion. It was strange, therefore, that during all these years not one word had been said, in the course of the many enquiries which had been held, and in which the courts have often been in doubt, to suggest that this was the probable explanation of the ignition of the cargo. On the contrary, attention seemed to have been confined solely to discovering whether the coal in question had pyrites in it, and whether it had been sufficiently screened. Since 1876 there had been altogether thirty-four enquiries in which the courts found that the cargoes had fired from spontaneous combustion; but, to make a fair comparison, he had selected those in which the ships were bound to South America, or round Cape Horn. Of these there were twenty-three, of which in nine cases only did the courts find that pyrites were positively present in any quantity; in 14 it was either absent or present in such infinitesimal quantity that they were unable to assign

any cause for the fire. Then, too, the average time from leaving port in which the vessels fired was, where pyrites were present, 2 months and 23 days; when absent, 2 months and 20 days, and this was very important evidence showing how little pyrites really had to do with firing these cargoes. He had tabulated these cases, classifying the information obtained as to the class of coal, whether wet or dry, the time the vessel sailed, ventilation, and so on, with a view to getting some explanation of the reason why some cargoes fired in, say two months, while other ships—sailing, apparently, under similar conditions as regards coal on board—had taken three months, or even longer, to fire; and it would be found that the conditions of heat and ventilation were important, and had very much to do with this. Vessels which went through the tropics during the sun's northward course would travel through the tropics at a time when they would have the longest period of extreme heat on the voyage; but if the sun were on its southern course the vessel would have the extreme heat for shorter time. With regard to ventilation, the courts seem to have had some difficulty in deciding whether iron masts, perforated below the decks, were injurious or not. Through ventilation was now always condemned, especially when lattices were used; but platforms and trunks had also been deemed dangerous. The most important point, perhaps, was the management of the hatches, and on that he had collected the following information: Particulars are not always given in the reports as to the keeping on or taking off the hatches, but where such information is given there is abundant evidence to show that taking them off to cool the cargo when it has given evidence of heating, or to dig down and get at the seat of the fire, or to see how the fire is progressing, accelerates combustion in a most alarming way. For instance, the temperature of the *Nadpole's* hold was found to be getting very high—it showed 95° by the thermometer—and next day it was 110°. At this time the fore and main hatches were off, and by next morning the temperature rose to 120°. Still keeping off the hatches, the thermometer next day registered 130°, and then fire broke out. In the case of the *Mounaener*, upon smoke appearing the hatches were taken off, but after trimming the cargo they were replaced and battened down the night. Next day they were taken off to see how matters were progressing, but the smoke was so intense that the master closed up the hold at once, and after sundry minor explosions next day the ship finally blew up. This coal had little or no pyrites in it, and had not been much broken, nor was it wet when put on board. Here is another case, in which the coal was clean and dry, but a good deal broken, the *God's Hill*. When 96 days out smoke was noticed coming from the forehold. Digging down to the seat of the fire and douching the coals vigorously, they, in four days, believed that they had effectually flooded out the fire. Four days afterwards, however, smoke appeared from the after hold. Attempts to get at the seat of the fire proved a failure, for a foot below the surface the diggers were met by so much steam and smoke that they were obliged to stop. The hatches were then put on, in hopes of smothering the fire, but this failing, they were again thrown open to allow the heavy seas which were breaking over the ship to fall into the holds; but the fire increased so rapidly that, on the following day, the crew had to abandon the ship. In this case the usually supposed causes of spontaneous combustion were not present; and the combustion must have been developing a long time before the first appearance of smoke. How far, previous to the smoke, the opening of the hatches may have contributed to the combustion we cannot say; but the consequences of keeping off the hatches while digging, and uncovering them to allow the seas to wash in, are conspicuous in the rapidity with which the fire spread. Here, again, is an instance of combustion which probably had been in a state of quiescence for want of air, and was brought into vigorous operation through opening the hatches. The *Yucca* had a cargo which the court found had pyrites in it, but it had been put on board dry and not much broken. The vessel was 68 days out on her voyage, and it was necessary to trim her cargo, which had shifted. On opening the hold they found "no signs of heat or gas from the coal"; but next day two of the crew were nearly suffocated by gas, and on examination the hold was found to be full of it; but still there were no signs of fire. By way of precaution the cable, they were again opened about twelve hours afterwards, and as the smoke was very great, they were soon put on, and battened down again. In the course of the next twenty-four hours the ship fortunately came in sight of land; but, meanwhile, her main hatch had been blown off, and the flames were coming out of her on both sides, fore and aft, whereupon the crew abandoned her. This is not the only case in which the crew have been deluded into the supposition that all was going well by finding only normal temperature at the surface of the cargo. From similar experience in the *Steele* and other cases, one might assume that combustion had been

in active operation, but had lain dormant for some time for want of air, so that there would not be that intense heat at the bottom of the hold which would affect the temperature on the surface of the coal. Anyway, in the *Yucca* case the course of events positively shows how active is the assistance which the open hatches contribute in developing spontaneous combustion when there is a tendency to it in the coal at the bottom of the ship's hold. Next comes a case where the hatches had practically always been off. The *Carr Rock* had a cargo in which there was little or no pyrites; it was not more than usually broken, and was put on board dry. At starting the thermometer indicated 75° Fahr. in her hold; a month afterwards it was 98°, and in another month 120°, whereupon they dug down into the coal; and as at a depth of four feet it was palpable that there was fire all over the hold, they stopped work and clapped on the hatches. Next day the hatches were taken off to see how matters were progressing, but finding the fire was burning furiously they were soon replaced. Water was poured into the hold; in a few hours explosions occurred, and soon afterwards the crew were obliged to abandon the ship. Here, too, we have none of the usually supposed causes of spontaneous combustion—no pyrites, no wet, no coal in a very broken condition—but we have the fact that the hatches were constantly open, and the coal would probably have been put



CHARLES MILES DeTRACY DOBSON.

(See our article "Head Him Off" in April issue.)

on board fresh from the pit in a very absorptive condition. We have therefore, an instance which actually bears out Professor Lewes' contention. From these illustrations, then, may we not assume, as a general principle, that the coal goes through a very simple process? It comes into the ship green, and that part of it which has been most broken, and lies at the bottom of the hold, immediately beneath the hatches, slowly heats. The air which surrounds it becomes warm, and ascends, while the cool air from above rushes in to take its place, and so supplies the oxygen required to assist in the process of combustion; meanwhile, perhaps, the hatches are off, but wet or rough weather sets in, and the hatches are battened down. The hold is then warmer, and combustion is accelerated so long as there is air within reach; and when that air is exhausted, combustion is at a standstill, and would actually remain quiescent so long as no air can get to it; but with the return of fine weather, the hatches are removed, the hot air then rushes up from below, a new supply of oxygen is drawn down to the now almost burning coal, and, in a few hours, the cargo is alight fore and aft. If this is a correct theory, Professor Lewes is perfectly right as regards keeping the hatches always closed. But now, as regards the sufficiency of the present precautions—assuming that oxidation of the coal and not pyrites is the cause of spontaneous combustion—the existing regulations are incomplete. It is simply

required that the coal should not be broken more than could be helped, that pyritic coal should not be put on board wet, and that ventilation through the cargo should be stopped. But what about green coal which is freshly won from the pit, and in its most absorptive condition? What about the facilities on board, through the hatches, for its getting air to sustain and accelerate combustion. It seemed to him that the carbonic acid thermometers suggested by Professor Lewes might be dispensed with, even with advantage, because what was wanted was not the exact spot in which the coal was on fire, but the fact of fire existing anywhere, and that would probably be given by the exit pipe for the gas surface. That gas was inodorous, but when the cargo was burning, there must be smoke, which could be seen, and then the only thing was to make for the nearest port. The carbonic acid seemed promising, but it had been tried and failed under some conditions. In one of the colonies, some years ago, a ship was specially fitted up for the special purpose of applying it when vessels on fire came into port, but on one occasion it was poured into the hold of a vessel for several hours without success. Last year a number of people were invited to see some experiments at Liverpool, and a large bonfire in a ship's hold was speedily extinguished, but that could hardly be considered an analogous case. Still he thought Mr. Lewes had made out a good case for the use of carbonic acid, and certainly he has contributed valuable information by his most interesting paper.

Mr. I. G. LORRAIN said he did a good deal of work on this subject some seven or eight years ago, and it was then urged upon him that an alarm was not what was wanted. A captain told him that he did not want to know that the cargo was on fire, he wanted to know what condition the hold was in before it got to that, so that he might take precautions. Carbonic acid arrangement, which was somewhat similar to that now suggested, was met with the same objection. The carbonic anhydride arrangement was not new to the society, as he had made a similar suggestion in 1885, laying stress on its cooling action, as well as on its being a non-supporter of combustion, and in November, 1885, Professor Silvanus Thompson showed a diagram of the apparatus. With regard to putting a fuse in the mouth of the bottle, it was not always possible to have the bottle in the place where the fire broke out, but he had found a good arrangement was to add some insulating material near the mouth, and mount the fuse in such a way that it acted like a fuse in an electric circuit; then by putting a thermostat in places where the fire was likely to occur, and having a source of energy sufficient to supply an excess of current that might be relied upon to melt the fuse.

CAPTAIN ANDREW CUNNINGHAM thought, when Professor Lewes' views were subjected to a little wholesome criticism by practical men, they might lead to practical results. He had considerable experience with coal cargoes; and having come to grief with the first one, he learned so many useful lessons, that he never had another accident. His conclusions were somewhat different from those now put forward. He could not go into the chemical part of the question, but it seemed to him, that moisture was the principal element in determining the combustibility of a cargo. It seemed a truism to talk of the oxidation of pyrites being the cause of ignition. It was like saying that a man died from want of breath. His experience, on his first voyage was much what Mr. Thomson had indicated, except that he omitted what every master was told by the skipper, that a cargo of that particular coal had never been known to take fire. He sailed from Dundee to San Francisco, and, wishing to be as careful as possible, he kept the hatches up, and had a trunk along the keelson, and an upright shaft too. After a time, when the weather got rougher, he put the hatches on, and was not in a hurry to get them off; but, 86 days out, he was told by the second officer that smoke was coming out of the fore hatch. He then took all the hatches off, and began pouring water down, and, after a time, the smoke disappeared. They continued pouring in water during the night, but the following day it became serious, and they began throwing coal overboard, until they got to the lower deck beams; then the coal began to get red-hot under the men's feet, and they had to stop. Then he turned the hose from a donkey-pump into the main hatch, filled the cavity with water, and put on the main hatches and battened them down. About midnight there was an explosion, and the next morning he was told that the men were coming up to ask him to abandon the ship. However, he took off the main hatch, and found it as cool as an ice-house, the beams and timber being all covered with coal tar, and he never had any more trouble for the rest of the voyage. The lesson he learned was, as soon as possible after leaving home to insert iron rods down the main and after hatches, by means of which he could tell by the hand how the temperature was getting on. Perpendicular shafts were quite unreliable as a test of temperature; he had seen a ther-

monometer in one of them gave a lower temperature than there was on deck, and at the same time he could hardly bear his hand on the iron rod at the five feet off. He always slipped out the main hatch down to the lower deck beams, so as to be all ready for putting water in. He thought the iron rods which he used as indicators might also be of use in conducting away the heat, and allowing it to escape into the air. He had never had any trouble since, though he had been more than once becalmed in the tropics. It was most dangerous to batten down the hatches, considering the large quantity of gas evolved. Professor Lewes had little notion of what shipowners were, or he would not recommend double bulkheads. The greatest point, in his opinion, was surface ventilation; the hatches should always be kept open, and a ship properly loaded would never take in any water which would injure her. The thermostat might be a nice thing for a laboratory, but would not do for a sailor. He gathered that the *Carr Rock* was filled block up between the beams, and there could not be surface ventilation unless there were several feet to spare between the decks.

SIR JAMES DOUGLASS could not understand how Captain Cunningham could place so much faith in surface ventilation, finding it was not at all uncommon in the North of England to see a heap of coal fire in the open air.

THE CHAIRMAN (Sir Frederick Bramwell) said Professor Lewes, in the paper he read at Cardiff, and again in the one he had just read, had taken the first step necessary in devising preventive measures, viz., to point out the causes of the evil to be guarded against. He had disproved the pyrites theory, because, though he did not say it had no effect whatever, he had shown that with coal absolutely free from pyrites, there was sufficient heat generated by the absorption of oxygen to cause spontaneous ignition, unless means were taken to prevent it under the conditions stated. One striking point was the increase of danger as the size of the cargo increased, especially in tropical climates. Two things recommended, he thought, would be found practically impossible. Double bulkheads would be very costly to make and keep water-tight, and would take up a great deal of space. It was admitted that no one would use them except under the pressure of legislation; but they could not legislate for foreign countries; and, if too heavy burdens were imposed on English shipping, other people, not subject to the same restrictions, would come and take our trade away. Another suggestion was that coal should not be shipped until it had been a month out of the pit, but that might involve so much expense in removing from one place to another, or from one railway wagon to another, that it would be prohibitive. Coal-owners' profits were measured by pence rather than by shillings per ton, and would not bear much diminution in this way. The proposal for the introduction of thermostats into the bulk to show what was going on, reminded him of a difficulty which the late Sir William Siemens experienced from the deterioration of certain cables stored on board a vessel, when he discovered by means of electrical thermometers that there was a spontaneous rise of temperature in them. As a result of those experiments jets of water were flowed over the cables, and, finally, it became the practice to coil in a tank which could be filled with water. He did not see why the use of liquid carbonic acid should not be available. Many voyages would take place with an atmosphere of the carbonic acid, and even where there was as liberal a supply as the temperature could be kept down ignition would not take place, and now-a-days it was becoming very common for large steamers to carry refrigerating apparatus. Where that was the case he did not see any difficulty in putting pipes near the bottom of the hold, through which a liquid, cooled down by the refrigerating apparatus, could be circulated, and in that way the heat could be abstracted from the bulk of the coal as fast as it was generated. He concluded by proposing a vote of thanks to Professor Lewes for his valuable paper.

The vote of thanks having been carried unanimously. Mr. LEWES, in reply, said Sir James Douglas had answered Captain Cunningham—with those views he did not at all agree—on the point of surface ventilation. Captain Cunningham had practical experience, and he had none, but he would rather go in a ship lashed down, and with a 2-inch pipe to allow the escape of gas, than with any amount of surface ventilation. If cold air were continually supplied to the surface of the coal, it would soak down and take the place of the warmer air which had paired with its oxygen, and thus you provided the very conditions most favourable for setting up spontaneous combustion. Mr. Cole had referred to the inconvenience of having to provide a cylinder for every eight tons of cargo, which he admitted, but it would be a great safeguard. It might, however, be arranged in another way. A large central cylinder, holding 1,000 feet, might be employed, and from that might run pipes along near the bottom into the cargo, pierced at intervals, with holes closed with fusible plugs; they would melt at any point where heating took place, and allow the escape of carbonic acid. He was much obliged to Mr. Thompson for the valuable information he had given, and only differed from him where he said that the vessel he had put forward were at variance with those enunciated by Sir Frederick Abel and Dr. Percy. The report referred to distinctly pointed to the oxidation of the coal as having more to do with the matter than the pyrites; indeed, he quoted the table he had given of the effects of moisture and pyrites from Dr. Percy's work on

"Fuel." He should not have referred to the thermostats but for their being so universally used, and did not think that there would be any difficulty with them. They should be so arranged as to give warning, not after firing had taken place, but before, so that precautions might be taken. The chairman objected to double bulkheads, but that was a favourite idea of his; and they were absolutely necessary, if carbonic acid gas was to be used, as there must be a gas tight bulkhead between the cargo and the engine-room. If the coal were batten down, which was most important, there must be no leakage of the gas into the engine-room; and the only way he knew of making a bulkhead gas-tight was by having it double, with water between. The use of refrigerating machinery would be very effective if the expense were not too great.

The Quebec Gold Fields—Down by the Chaudière River.

From the Special Commissioner to the *Financial Standard* (London, Eng.)

Down by the Chaudière River the land of gold lies. In the ancient channels of the stream, in the tributaries of the river, the precious metal remains, as Virgil quaintly puts it, "unused by the hand of labouring man."

If Chaudière River meant the fertile plains of far-off California, her banks would be highly lit with the camp fires of rugged miners; but, alas! her placid waters roll through Quebec.

The history of mineral Quebec remains unwritten, i.e., there is little to write about as yet, only the omnipresent mineral to wit, phosphate and asbestos, and the gold down by the Chaudière River. The first is the finest the earth at present yields, the second leads the markets of the world, but the last remains dormant, while beneath the distant Southern Cross a gang of cut-throat rascals, falsifying the too sanguine propositions of the great Cannan—flourish upon the horizon, while the cries of empire construction teach ought to be applied to its economic development.

This is the enterprise of the lordly Saxon. If the men who controlled the nascent Hudson Bay could view our follies and the follies of their successors in the great fur trade, they would disown us to a man.

Do you know, oh, most amiable John Bull, where Quebec is? Heard of it lately, eh? Do you know that down by the Chaudière River lies the great route to the East, and the fruitful West? In the heart of the continent, where the great mass of gold, debouches into a great waterway, which in its gigantic proportions, connections, and potentialities, excite the wonder and applause of this hemisphere. The name of that stream is the St. Lawrence. Did you ever hear of it, John Bull? You have heard of Valparaiso, La Plata, and the White-chapel atrocities, especially the latter, in which you were greatly interested, you remember; but did you ever hear of the St. Lawrence—the queen river of the West?

Perhaps you will presently tire of pursuing the puerile fallacies for which you are now notorious, and try to act like men. There is an empire to build out here, and patriotism is still fashionable.

You idle youths who betray infantile instincts, when with gold-nobbed canes between your lips you saunter carelessly down Regent street or Piccadilly, do wake up and be men. Seek the gold noh, if you will, but follow it through its devious career to the distant mine. Let the flame of enterprise leap up within you. Labour is still fashionable, and there is room for even a gold-nobbed cane out here in Canada.

Then you would promoters who may peruse these lines, even you compound the feeble nonsense for your gold cane blinder lives down by the Chaudière River. Keep your eye upon them, John Bull. They have got their eyes upon you. Whatsoever things are mean and shameless, these things are thine oh! immortal promoter of "direct meats," and thine is the power and the glory, oh! blinder!

Of his vainglorious boasting, his revelry and intrigue, we shall have occasion to write later, content now to warn you that his late defeat in the election of the 5th March will, doubtless, afford him leisure for the prosecution of his nefarious schemes, which, needless to state, do not embrace anything so honest as the gold down by the Chaudière River.

Howbeit, I fear that before substantial progress can be made in Chaudière Gold, radical modification of the present mining laws of Quebec must be instituted.

Indeed the whole history of gold mining in the Catholic Province is merely a dismal record of impotency and failures, principally due to the action of a past government, who coolly handed over the rights and titles to all the gold regions to a couple of lucky individuals, whose successors damp all enterprise with too stringent restrictions, and render a truly wealthy region as inaccessible as though it reposed in the heart of the wild Pama. I have, however, reason to believe that efforts will be exerted to throw Chaudière and Ditton open to the adventurer, capitalist, or operator, and than shall Quebec, with her busy metropolis, her mines of asbestos, phosphate, and of gold, dispel the shadow of Mercier's sins.

The Deepest Coal Shaft in the United Kingdom.—In his annual report, Mr. J. Dickinson, Chief Inspector of Mines, England, states that the deepest mine in the United Kingdom in 1890, was the Ashton Moss colliery, where the deepest shaft is 2,820 feet. Great depths are attained in this and in another colliery in the Manchester district, by means of down-brow workings, the depth at the bottom of the engine-brows being in Ashton Moss colliery 3,105 feet, and in Pendleton colliery 3,000 feet.

Canada's Mineral Production in 1891.

From the advance sheet, recently issued by the Division of Mineral Statistics and Mines, we reproduce the following summary of the mineral production of Canada in 1891:—

PRODUCT.	QUANTY (t.)		VALUE.
Metallic.			
Antimony ore.....	tons	10	\$ 60
Copper (b).....	lbs.	9,525,076	1,238,780
Gold (c).....	ozs.	51,040	925,486
Iron Ore (d).....	tons	68,799	152,005
Iron, Pig (value \$68,901).....		23,891	
Lead (e).....	lbs.	388,665	25,507
Nickel (f).....		4,626,627	2,775,976
Platinum.....		10,000	
Silver (g).....	ozs.	415,493	407,183
Total Metallic.....			\$5,535,097
Non-Metallic.			
Arsenic.....	tons	20	\$ 1,000
Asbestos.....	lbs.	9,000	1,000,000
"Bicks".....	thousands	173,868	1,047,311
"Building Stone".....	cu. yds.	187,685	708,722
Cement.....	bbls.	93,779	109,686
"Coal".....	tons	3,404,479	7,792,175
Coke (h).....	"	57,684	175,592
Feldspar.....	"	6785	3,425
Fire Clay.....	"	250	750
Flagstones.....	sq. ft.	27,300	2,721
Granite.....	tons	10,993	65,105
Graphite.....	"	260	1,560
Grindstones.....	"	4,479	42,589
Gypsum (i).....	"	203,545	192,096
Iron.....	tons	1,828,894	251,215
Limestone, for flux.....	bush.	11,376	11,376
Manganese (k).....	"	274	6,951
Mica.....	"		71,510
Mineral Paints.....	tons	900	17,750
Mineral Waters.....	galls.	427,485	54,668
Moulding Sand.....	tons	230	1,000
Petroleum (l).....	bbls.	755,268	1,004,546
Phosphate.....	tons	23,588	161,693
Pyrites.....	tons	65,366	258,844
Roofing Cement.....	"	900	2,700
Salt.....	"	45,021	161,179
Sand and Gravel (exports).....	"	243,724	59,591
Sewer Pipe.....	tons		227,500
Soapstone.....	tons	575	863
Terra Cotta (m).....	"		113,103
*Tiles.....	thousands	11,779	140,799
Total non-metallic.....			\$13,882,765
Total metallic.....			5,535,097
Estimated value of mineral products not returned, principally structural materials.....			582,138
Total.....			\$20,000,000

*Some returns yet to be received.

(a) Quantity marketed, except when otherwise specified. Tons are of 2,000 lbs.

(b) Copper contents of Canadian ores at a market price of 13 cents per lb.

(c) Nova Scotia gold is calculated at \$19.50 per oz., and that from British Columbia at \$17.

(d) The amount of ore here given was partly marketed as such and partly smelted in Canada, affording the quantity of pig iron given in the next item.

(e) Lead contents of Canadian ores at a market value of 4.35 cents per lb.

(f) Nickel contents of matte and ore shipped from Sudbury at 60 cents per lb.

(g) Production of the Province of Quebec and the amounts exported from British Columbia and Ontario at 98 cents per oz.

(h) Oven coke, all the production of Nova Scotia.

(i) Production of Ontario plus exports from New Brunswick and Nova Scotia.

(j) Production of Nova Scotia plus New Brunswick exports.

(k) Calculated from the inspection returns at 100 galls. crude to 38 galls. refined oil, and computed at \$1.35 per bbl. of 35 Imp. galls. The bbl. of refined oil is assumed to be 42 Imp. galls.

(l) Including fire-proof porous terra cotta and a certain amount of high priced ornamental pressed bricks.

**The Coal Royalty Legislation in Nova Scotia—
Full Report of the Mining Society's Plea for
its Repeal before the Committee of the
Legislative Council—A Strong
Argument Presented.**

*To the Hon. Malachy Bowes Daly, Lieutenant-Governor
of Nova Scotia:—*

The petition of the undersigned lessees of coal mines in the Province of Nova Scotia, humbly sheweth: That there has passed the House of Assembly and the Legislative Council, during the present session of the Legislature of the Province of Nova Scotia, an Act entitled "An Act to amend and consolidate the Acts relating to mines and minerals."

The 116th, 117th and 122nd sections of the said Act are respectively as follows:—

"116. All ores and minerals (other than gold or silver) mined, wrought, or gotten under authority of licenses or leases granted under the provisions of said chapter 7 of the revised statutes, fifth series, or of any Act heretofore passed by the Legislature of this province, shall be subject to the following royalties to the Crown for the use of the Province, that is to say:—

"117. Coal.—Ten cents on every ton of two thousand two hundred and forty pounds of coal sold or removed from the mine, or used in the manufacture of coke or other form of manufactured fuel."

"122. All leases of coal mines issued after the passing of this Act shall contain a provision that the royalties may be increased, diminished or otherwise changed by the Legislature."

There has also passed the House of Assembly and the Legislative Council during the said present session, an Act entitled "An Act respecting the royalties on coal."

The first section of the last mentioned Act is as follows:—

"1. The royalty of ten cents per ton on coal as fixed by the said section shall be held to have taken effect on the 23rd day of February, 1892."

The present rate of royalty on coal is seven and one half cents per ton on all coal including so-called slack coal, or in some cases nine and seven-tenths on round coal, such rates being optional on the part of the lessees and mutually regarded and treated as equivalent.

The first mentioned proposed Act provides in the 116th and 117th sections for an increase in the royalty to be paid by your petitioners and all corporations or persons operating coal mines under existing leases, amounting to 33 1/3 per cent.

The other proposed Act provides for the increased royalty being exacted retroactively, and it is submitted, is therefore specially objectionable independently of the grounds of objection to the main Act.

The previous legislation bearing on the proposed Acts is as follows:—Section 1, chapter 9 of the Acts of 1866 is as follows:—

"I. Lessees of coal mines in this province, their executors, administrators and assigns, holding leases from the Crown, or from the chief commissioner of mines, made since the first day of January, A.D. 1853, or hereafter to be made, shall upon giving notice in writing to the chief commissioner of mines at least six months previous to the expiration of such leases, respectively, of their intention to renew such leases respectively for a further period of twenty years from the expiration thereof, be entitled to a renewal thereof for such extended term upon the same terms, conditions and covenants as contained in the original lease, and in like manner upon giving a like notice before the expiration of such renewed term to a second renewal and extension of term of twenty years, from and after the expiration of such renewed term, and in like manner upon giving like notice before the expiration of such second renewal term to a third renewal and extension of twenty years, from and after the expiration of such second renewed term; provided that at the time of giving such notices, and the expiration of such term, respectively, the said lessees, their executors, administrators and assigns, are, and shall continue to be *bona fide* working the areas comprised within their respective leases, and complying with the terms, covenants and stipulations in their respective leases contained, within the true intent and meaning of Section 104 of the Act hereby amended, and provided that in no case shall such renewal or renewals extend, or be construed to extend, to a period beyond 60 years, from the 25th day of August, A.D. 1856, and provided also that the Legislature shall be at liberty to revise and alter the royalty imposed under such lease in or after the year 1886.

Section 103, chapter 9, of the revised statutes, fourth series (1875), is identical with the above section of the Acts of 1866, except that it does not contain the concluding proviso, that is to say the words:—

"And provided, also, that the Legislature shall be at liberty to revise and alter the royalty imposed under such lease in or after the year 1886."

No such provision as this latter is contained in any part of the Consolidated Acts of 1873.

Section 105, of chapter 7, of the revised statutes, fifth series (1883) is as follows:—

"105. The General Mining Association (limited), and other lessees of mines, other than gold and silver mines, in this province, their executors, administrators and assigns shall, upon giving notice in writing, to the commissioner of mines, at least six months previous to the expiration of their leases, respectively, for a

further period of twenty years from the expiration thereof, be entitled to a renewal thereof for such extended term upon the same terms, conditions, and covenants as contained in the original lease, or as prescribed by this chapter, or by any Act that may be passed by the Legislature of this Province, and in like manner upon giving a like notice before the expiration of such renewed term, to a second renewal and extension of term of twenty years from and after the expiration of such renewed term, and in like manner upon giving like notice before the expiration of such second renewed term, to a third renewal and extension of twenty years, from and after the expiration of such second renewed term, provided that at the time of giving such notices, and the expiration of such terms, respectively, the said lessees, their executors, administrators and assigns, are, and shall continue to be *bona fide* working the areas comprised within their respective leases and complying with the terms, covenants and stipulations in their respective leases contained within the true intent and meaning of section 107 of this chapter; and provided that in no case shall such renewal or renewals extend, or be construed to extend, to a period beyond eighty years from the date of the original lease, but the renewed lease shall not include in respect of each mine worked, a larger area than five square miles."

"(e) In the case of leases that are eligible for renewal, in which the conditions of renewal embodied therein are different from those prescribed by this chapter, and the lessees thereof are unwilling to have such conditions altered, the commissioner shall have power to renew said leases on the terms contained therein and as prescribed by chapter 9, Revised Statutes, fourth series, and no other."

Section 4 of chapter 4 of the Act of 1885, is as follows:—

"4. All leases of coal mines issued after the passing of this Act shall contain a provision that the royalties may be increased, diminished, or otherwise changed by the Legislature."

All leases in existence previous to the 25th day of August, 1856, expired on that date and were, with leases afterwards issued from time to time, renewable according to the terms of the Acts above set out, and the terms of the leases themselves on the corresponding dates in the years 1906, 1926 and 1946.

Your petitioners submit that the re-enactment in the Revised Statutes of 1873 of section 1 of the Act of 1866, without the proviso under which the Legislature was to "be at liberty to revise and alter the royalty in or after the year 1886," conferred upon all the holders of then existing coal leases, and upon all subsequent holders of coal leases up to the year 1884, when the revised statutes, fifth series, were promulgated, an absolute legal right to renewals of their leases up to the year 1946, without any increase in rent or royalty.

As to section 105, of chapter 7, of the revised statutes, fifth series, above set out, your petitioners are advised, and they submit that in considering the portion of this section which provides that lessees

"shall be entitled to a renewal upon the same terms, conditions and covenants as contained in the original lease, or as prescribed by this chapter, or by any Act that may be passed by the Legislature of this province," it must be assumed either that it was not the intention of the Legislature to provide for future legislation legalizing the imposition of an increased rent, in violation of a lease defining what that rent should be, or on the other hand if the language used as to the terms of renewal be considered broad enough to cover the matter of an increase of rent, then it is submitted that the Act itself was improper, and that the Legislature which proposed to legalize a specific increase of royalty in violation of existing contract rights, should not receive your honour's assent.

Further, as to this last mentioned section, your petitioners submit that even if on its proper construction it would include a right on the part of the Legislature to increase the royalty payable under then existing leases, such increase could be stipulated for only at the time of the renewal in the year 1886, of the leases respectively, all of which were to expire, and did expire in that year, so that the renewal being once made, the royalty could not legally be increased until the next following renewal date.

As to section 9 of chapter 4 of the Acts of 1885 above set out, your petitioners are advised, and they submit that upon its true construction, it relates only to leases to be issued subsequently to its passing, and that it does not relate to agreements merely expressing the rights of the parties by virtue of leases previously issued.

Your petitioners submit that there is clearly no legal ground for giving to the Legislature here an *ex post facto* operation, seeing that there is ample office for the words to perform in connection with original leases to be issued after the passing of the Act.

For the reasons above indicated, your petitioners submit that the proposed legislation in a most substantial and serious manner invades the vested rights of your petitioners, secured to them by contracts solemnly entered into, on the faith of which they have invested very large sums as capital in the various coal mining districts of this province.

By far the greater portion of such capital has been invested by persons residing outside of this province, and they, as well as others residing in Nova Scotia, would direct your attention to the breach of their contract rights which the proposed Acts involve above set forth,

and your petitioners humbly pray your honour to withhold your consent to the said Acts.

And your petitioners as in duty bound will ever pray, etc.

(Signed) THE MINING SOCIETY OF NOVA SCOTIA,
H. S. POOLE, PRESIDENT.
" THE GENERAL MINING ASSOCIATION.
" THE ACADIA COAL COMPANY (LIMITED.)
" THE INTERNATIONAL COAL COMPANY (LIMITED.)
" THE CALEDONIA COAL AND RAILWAY COMPANY (LIMITED.)
" THE GLACE BAY COAL MINING COMPANY (LIMITED.)
" THE GOWRIE COAL COMPANY (LIMITED.)
" THE CUMBERLAND COAL AND RAILWAY COMPANY (LIMITED.)
" THE INTERCOLONIAL COAL MINING COMPANY (LIMITED.)
" THE LOW POINT, BARRASOIS AND LINGAN COMPANY (LIMITED.)

MR. HENRY, Q.C.—Mr. Chairman and Gentlemen,—I appear before your committee as counsel for a number of corporations who have invested capital in the development of the coal mining industry of the province, and who are actively engaged in that interest at the present time, as well as for a number of persons who are interested in areas which are now being worked. The questions involved in this enquiry divide themselves into two aspects: First as to the actual rights of persons who have invested large amounts of money on the faith of the existing law of the Province in relation to this matter; second, in respect to persons who are seeking to bring about the investment of further capital. These two classes are manifestly similarly and diversely interested. The question may be regarded as almost exclusively a moral one; it is a question not so much of power as of propriety; it is a question not so much of what the legislature may enact, as of what it ought to enact or abstain from enacting. I am limited to a very short time to discuss a large and broad-reaching question, a question affecting not only the interests, but the honor of the country, inasmuch as it affects the opinion that will be held abroad of the permanence of the rights of parties investing capital within the territorial limits of the Province. To confine myself within the short space of time allotted to me, I must circulate a good deal of matter which otherwise might properly be dealt with. I begin, then, by calling the attention of the committee to the fact that in 1873 there arose or came into existence a certain important right on the part of every holder of a lease of coal mining areas in the Province of Nova Scotia, namely, the right expressed in the 102nd section of chapter 9 of the Consolidated Statutes of 1873. That right was expressed in the following words, which I will read:—

"Lessees of coal mines in this Province, their executors, administrators, and assigns, holding leases from the Crown, or from the Commissioner of Mines, made since the first day of January, A.D., 1856, or hereafter to be made, shall upon giving notice in writing to the Commissioner of Mines, at least six months previous to the expiration of such leases, respectively, of their intention to renew such leases, respectively, for a further period of twenty years, from the expiration thereof, be entitled to a renewal thereof for such extended term upon the same terms, conditions and covenants as contained in the original lease, and in like manner upon giving a like notice, before the expiration of such renewed term, to a second renewal and extension of term of twenty years, from and after the expiration of such renewed term, and in like manner, upon giving like notice before the expiration of such second renewed term to a third renewal and extension of twenty years from and after the expiration of such second renewed term; provided that at the time of giving such notices, and the expiration of such terms respectively, the said lessees, their executors, administrators, and assigns, are and shall continue to be *bona fide* working the areas comprised within their respective leases, and complying with the terms, covenants and stipulations in their respective leases contained, within the true intent and meaning of section 107 of this chapter; and provided that in no case shall such renewal or renewals extend, or be construed to extend, to a period beyond sixty years from the 25th day of August, A.D. 1856."

Now that comprises the whole of the legislative expression of the rights of the parties, under coal leases, from the day that law was promulgated. Speaking generally, it may be said that that section defined the rights of coal lessees in the Province down to the present time, for, though in 1885 another Act was passed, it is submitted with every confidence that the Act of 1885, providing for the right of the legislature to increase or diminish the royalties from time to time payable by the coal lessees, must be restricted in its operation to rights arising for the first time between the Crown and lessees after the passage of that Act. From 1873, down to the present time, every individual and every corporation interested in, or holding coal areas under the law of Nova Scotia, had a right to believe, and had a right to act upon the belief, that they had an implied right to ask for an extension of time in compliance with the terms of section 102, last read, keeping and observing the terms of the then existing law. Neither the Act of 1885 nor the Consolidated Statutes of 1884, which modify the rights of lessees at that time, upon a true construction, amount to a giving to the

legislature by express provision the power to do what is sought to be done by the bill now before the House. The bill now before the House proposes in no uncertain terms to subject the lessees of all the coal areas in the Province, carrying on the mining of coal, to an increase of thirty-three-and-a-third per cent. in the rental that they are now paying. It matters little whether the increase is 25 or 33 per cent., for if it would be discreditable, and I use the term with deference, to raise the rent contrary to the terms of the contract, the opprobrium to be attached to the Act would not be measured by the amount of the increase. The proposal in the measure under consideration is to raise the rental of persons who had the right to regard their rental as being fixed thirty-three-and-a-third per cent.; to impose upon them by an enforceable law of the Province, without any right of objection on their part, an increase in their rent. It does not require argument to show that if it is wrong that "A. B." should be given by force of legislative enactment the right to break his contract, it is equally wrong to give the Legislature the right to break their contract. In the one case the courts can give a remedy; in the other it depends upon whether there resides in the Local Legislature the power to break its contracts. Probably it has such a power, but, if so, there is all the more reason why a high regard should be paid to the principles by which the rights of individuals are regarded as being secured, and not to be dealt with upon a different principle from any others in a court of law. Now these parties had the right to go to the Government and get their leases renewed upon the same terms as before, a right which is common and perfectly familiar with regard to real estate. The Act before the House proposes to raise the rental thirty-three-and-a-third per cent. We say that that is an Act which is unjustifiable. No amount of exigency in the financial affairs of any country would justify resorting to such a means of raising revenue as that. It reminds one of the way in which King John used to get revenue out of the Jews by pulling their teeth. I am serious in suggesting that if it is the case that these corporations had these legal rights, which must be regarded as sacred, and as constituting part of their personal property, it is not competent as a matter of legislative policy, even admitting the power of the Legislature, to take that property away from them, which is practically what is involved in this bill. Now let us see what the position of these companies is. Let me take one of them as an example. The Glace Bay Company held three leases granted in the years 1862, 1863 and 1865, respectively. These leases were outstanding and never surrendered, and they continued to govern the rights of the parties up to the year 1886. In 1886, by reason of the coming into existence of the law contained in the fourth series of the statutes, to which I have already called attention, the Glace Bay Mining Company became entitled to receive a renewal lease upon the same terms, with regard to royalty, as those contained in their original lease, which I may mention, for the sake of avoiding confusion, was six pence currency. But in the meantime this legislature passed the Act of 1885, to which I must call the attention of the committee for a moment. That Act provided that thereafter all leases should contain a provision, providing for the right upon the part of the legislature to increase or diminish the royalties from time to time. That is to be found on page 10 of the Act of 1885. Now, if that Act, according to its proper interpretation, should be held to be applicable to leases issued previous to the passage of the Act, instead of attacking the propriety of the bill now sought to be made law, we would have to go back and attack that section of the Act of 1885 as a deliberate inroad upon the rights of the lessees. But upon the true construction of the section, the courts would be bound to hold that the provisions of the Act of 1885 did not apply, except to leases issued in the future. That is, it did not apply to existing rights, but must be confined to contracts arising for the first time after the passage of the Act. The section reads as follows:—

"All leases of coal mines issued after the passing of this Act shall contain a provision that the royalties may be increased, diminished, or otherwise changed by the legislature."

If that section really applies to existing rights we have to admit that at that time a violation of the principles, the soundness of which will be admitted by every intelligent man was committed. But we say that it was competent legislation, for it provided only for the case of corporations which should first become lessees after the passing of the Act, and we contend that it could not be held to affect the rights of parties under the existing law. Whatever question there may be as to the undesirability of making such a law, even as respects leases to be issued in the future, for the reason that such a power, subject to the whim of the government, would be unsatisfactory to capitalists abroad, it must be admitted that, so far as the interests I am now advocating are concerned, there would be no invasion of existing rights. Now, why does that clause not apply to existing leases? The language of the Act is: "All leases of coal mines issued after the passing of this Act." Now, at that time all the rights I am advocating existed. Some of them existed by virtue of leases long previously issued. All of them involved the right on the part of the lessees to get the renewals on the same terms that the existing leases contained. Now, what would happen when the leases came to be renewed? There would be documents issued covering a new period of time, but which would be in reality nothing more than a continuation of the old period. These documents are called renewals. They are a re-statement of the old

conditions in a document which carries the provisions and rights of the parties over a new period of time; only that, and nothing more. Therefore, inasmuch as it is shocking to an ordinary sense of fair play to break a contract, even though it be broken by a Legislature, the courts would, beyond all peradventure, hold that Act to apply to leases arising afterward; for to impute any other intention to the legislature would be to impute the intention to break a contract. That would be something discreditable, and something which the courts would not impute if there was any other way of giving effect to the language. Inasmuch as it would be held to be discreditable in any legislature to seek to take away a vested right, the courts would unquestionably construe the language so as to apply to new rights arising subsequently. That argument I need not elaborate, but I may say that we have in support of it the opinions of three or four lawyers, whose opinions have been sought without regard to politics, and who have all given it as their solemn, and confident opinion that the language in the Act of 1885 does not mean that the Government shall have the right to impose new conditions with regard to royalties upon persons having existing rights coming forward and demanding renewals, which up to that time they had the right to demand. But even if in 1885 this Legislature committed itself to a course of action which savored of unfairness or oppression, it does not follow that it would be justified in resorting again to a similar course now, but, if I am right, the Act under discussion undertakes, by force of legislative power, to affect the beneficial ownership of all these proprietors to a serious extent, and involves a breach of public obligation; it involves the apprehension, by people who have invested large amounts of money, that contract rights are not to be respected in the Province of Nova Scotia. Parties may go to their friends and say that they hold leases of property on certain terms, and may induce them on the faith of such assurances, to put in large sums of money, and then they may find themselves called upon to pay a different rent, and the enterprise, instead of being a fairly promising one, may become disastrous, and all on account of a breach of faith on the part of the people of the Province, represented by the Legislature. If the Act of 1884 gave these people what I say it did, this supposition is not improbable or extravagant. If it did not, there is no argument for me to make. I challenge the promoters of the bill to show that from 1873 down to 1885, these people did not enjoy the rights I say they did. Of course our main contention is that this amounts to a legislative breach of contract, and a deprivation of citizens and foreigners of actual existing rights by the instrumentality of an Act of Parliament.

THE CHAIRMAN—Your argument would involve the idea that no change could ever be made.

MR. HENRY—If a clear contract is made, it does not make any difference how long a period it covers. The exigencies upon which it is proposed to break it, must be great indeed. But let it be understood that while I, for one, am ready to admit that in the Local Parliament resides the power to cut down or impair or destroy private rights, it follows as an incident to the existence of that power, that Parliament must, by reason of the possession of such a power, be careful to see that it does not break faith with people lightly, and bring the country into disrepute. I understand that the Government in promoting this bill disavow any intention of breaking contract rights, so we need not discuss the propriety of their doing that as a matter of legislative possibility.

MR. B. G. GRAY—The Chairman spoke about making a contract for all time. That is not the case here, as we have express limits in point of time. The contract is not for all time, but must terminate at a definite time. There is first a period of 20 years, and this may be extended by renewal to 40 years, but it comes to an end absolutely at the end of 60 years.

MR. HENRY—Section 105 of Chapter 7 R. S. (5th series), reads as follows:—

"The General Mining Association, 'limited,' and other lessees of mines other than gold or silver mines, in this province, their executors, administrators, and assigns, shall upon giving notice in writing to the Commissioner of Mines at least six months previous to the expiration of their leases, respectively, of their intention to renew such leases, respectively, for a further period of twenty years from the expiration thereof, be entitled to a renewal thereof for such extended term upon the same terms, conditions and covenants as contained in the original lease, or as prescribed by this chapter, or by any Act that may be passed by the Legislature of this Province, and in like manner upon giving a like notice before the expiration of such renewal term, to a second renewal and extension of term of twenty years, from and after the expiration of such renewal term, and in like manner, upon giving like notice, before the expiration of such second renewal term, to a third renewal and extension of twenty years from and after the expiration of such second renewal term, provided that at the time of giving such notices, and the expiration of such terms respectively, the said lessees, their executors, administrators, and assigns, are and shall continue to be bona fide working the areas comprised within their respective leases, and complying with the terms, covenants, and stipulations in their respective leases contained, within the true intent and meaning of Section 107 of this chapter; and provided that in no case shall such renewal or renewals extend, or be construed to extend, to a period beyond eighty years from the date of the original lease, but the renewed lease shall not include, in respect of each mine worked, a larger area than five square miles."

It is in this section probably that we are to look for

the first attempt in any way to provide for a right on the part of the Legislature to change the terms of tenure of leases of coal mines as contained in the leases. Subsection (e) of the same section reads:—

"In the case of leases that are eligible for renewal in which the conditions of renewal embodied therein are different from those prescribed by this chapter, and the lessees thereof are unwilling to have such conditions altered, the Commissioner shall have power to renew said leases on the terms contained therein, and as prescribed by Chapter 9, Revised Statutes, Fourth Series, and no other."

What happened in 1886, in connection with the renewals of the leases was this: Renewals were prepared which contained an express provision in the terms of the Act of 1885, with regard to the power of the Legislature to alter, increase or diminish the royalties, and these leases were accepted in a good many cases by companies, who either did not observe the peculiar wording of the leases, or who did not realize that it constituted a change from the preceding form, which is entirely different. It will be necessary, in order to prevent confusion, to point out the substantial nature of the difference between these two forms, but at present I will content myself with saying that with regard to the language used in Section 105, Chapter 9, of the Statutes of 1884, the most that can be said of it is that it purports by a general term to give powers to change the terms of the leases, so as to give the Legislature power to increase the royalty. It may be said that the language is broad enough to include so extraordinary and improbable an intention, but even if it does so, it only gives power to the Legislature to do a wrong, and it is still for the Legislature to say whether in using language which might involve a matter connected with the general administration of the mines, it was meant that the Legislature hereafter should understand by the language used in 1884 that it was to have a right to exercise a power that would be otherwise a wrong. It is for the Legislature, and this committee to say whether under the power to change the terms of leases, they are to abstain from all question whether it is wrong to break a lease and to heap burdens upon these people, or to do a thing that is obnoxious to all notions of legislative policy. It does not advance the argument a particle to show that in 1884 there was a general power given to change the terms of leases. It may be that there is good reason to interfere by changing the terms. The terms may be inconsistent with the general management of the mines, and it may be desirable on that account to change them, but there can be no cogent reason except impecuniosity, which is no reason at all, for giving authority to raise the rent. We know that the subject of mines is one of public and general interest, and it may be that there is something in the terms of the leases which constitutes an obstruction to the exercise of the general policy, but no such reason can exist for raising the rental because it is necessary for the province to raise money from some source or another. This, I think is a conclusive answer to the suggestion as to the meaning of the words in the Act to which our attention was called. With regard to the impropriety of making a man pay more for property upon which he has expended large sums of capital, a humble illustration will suffice. Suppose that a man rents a farm upon which he grows potatoes only, and suppose that instead of paying so much an acre for the land, he agrees to pay three cents a bushel for every bushel of potatoes that he raises, and that an agreement is entered into by which he is given the land on these terms for a period of 20 or 30 years. Suppose that on the faith of this agreement he goes into possession and erects houses, and barns, and so on. After he has been working for ten years or so, his landlord comes to the Legislature, and says: "I am a little hard up. I agreed with so and so to let him have my place for a term of 20 or 30 years to grow potatoes, for which he was to pay me a royalty of three cents a bushel. He has been doing pretty well, and I think that now he ought to pay me six cents, or give up the enterprise." Will any lawyer, or farmer, or business man or miner, say that there is any difference between changing the terms upon which people have invested in the heavy works involved in mining, by raising the rates of royalty, and the injury that would be involved to the man who undertook to raise potatoes, by violating the terms of his contract? I say that there is no contract to permit of such a change unless the reception in 1886 of renewals which contained language that they were not obliged to be bound by, and their failure to realize that the language did them an injustice, is to be regarded as the making of a new contract. I say that these people stand before the Legislature to-day as they might have done in 1886, and say that they will accept no document which contains an assertion of a right on the part of the Legislature to change the rent that they are to pay for mining coal in the areas leased. Possibly some of these corporations did receive leases in 1886 which contained words, which, if it is said that they are bound because they did not discover the meaning, would bind them as a matter of acquiescence and consent, but I do not think it can be seriously argued that the circumstances under which the renewals were given amounted to anything that, on a fair view of it, would be regarded as a conscious acquiescence in the use of this language to change the terms with regard to the rent. Then I must point out why the companies did receive the leases. If some companies are not to be bound by the fact that they received the leases into their possession, other companies refused to receive them, and took leases which are in the terms of the Act passed in 1886, to which I have

not yet called attention. This Act contained a short provision at the end of one of its sections which gave the Legislature, by express agreement, liberty to revise and alter the royalty in or after the year 1886. Now, it will be necessary to say a few words with reference to the condition of a company which refused to accept the lease with the language based upon the Act of 1885, but, instead, received a lease incorporating the language of the Act of 1866 to which it had referred. The majority of the leases received in 1886 contained the language provided for by the Act of 1866, and did not contain the language in the terms of the Act of 1885, expressly giving the Legislature the right to increase or diminish the royalty from time to time. I refer now to the acts of 1866, Chapter 9, Section 1, which is identical with Section 102 of Chapter 7, of the statutes of 1884, which gave the Government the right to renew on the terms of the original leases. The two sections are identical down to the last clause of Section 1 of the Act of 1866, which reads as follows:—

"Provided that in no case shall such renewal or extension extend, or be construed to extend, to a term beyond sixty years from the 25th day of August, A.D., 1886, and provided also that the Legislature shall be at liberty to revise and alter the royalty imposed under such lease in or after the year 1886."

That provision of the Act of 1866 was deliberately dropped in 1873. Various publications were issued by the department re-announcing the law as constituted by the Act of 1873.

THE CHAIRMAN—Do you say that the leases which were not taken out under the terms of the Act of 1885 were taken out under the terms of the Act of 1866?

MR. HENRY—Yes, and this brings us to discuss for a short time the companies that have leases under the terms of the Act of 1866. Assuming for the sake of argument, that they are bound by the terms of that Act, having insisted upon having those terms in their renewals, as distinguished from the terms offered to them, we come to the question what right or liability, rather, is imposed upon that class by virtue of this language, which is the same as asking what is the meaning of the proviso in the Act of 1866. Bearing in mind that all these leases were to expire in 1886, which was solemnly and carefully provided for, and there was not a lease that did not expire in 1886, the purpose of the whole of the section is to provide what is to be done at the period of renewal. In that connection I will read it again. It is clear from that that 1886 was the time when the renewals were to take place if at all. The Act does not provide for any interference with the rental between 1866 and 1886. It is clear that the Legislature was to have the right to make the change in 1886. *Query*. When did it commence to have that right? Does it not strike even a non-professional mind that the Act provided for the making of new terms for each renewal? That the change was to be made in 1886, if at all? At that period another tenure is entered upon for another period of twenty years upon terms which may be ruled upon by the Legislature. Then in 1906 another term is entered upon when new terms are to be fixed. Then in 1926 still another term is entered upon.

THE CHAIRMAN—Your argument is that the renewal is good for the twenty years?

MR. HENRY—Yes, and this view is concurred in an opinion carefully prepared, after full investigation, by Mr. Borden, which the committee is at liberty to peruse. It is also the opinion of Messrs. Drysdale and Newcomb, especially I believe of Mr. Newcomb. If it is not felt that we have legal talent enough here, it should be sought elsewhere. The Legislature has the right to make the view that we say the court must take, and this is exceedingly important. The argument is easy to make and to understand. It is that, taking the whole section together, you find that the one thing to be done was to provide what was to be done in connection with the renewal of the relation of lessor, and lessee, by a new document, the lessee having the right to demand a renewal, and the Government being bound by the terms of the leases to grant it, and having the right to say that the rent should be so. This right is not a right to interfere during the twenty years, but a right to fix the rent for the renewed period, as it was fixed for the original period during which, as it has been shown, the Legislature had no right to interfere. Now, what happened? When these lessees took the renewals in the terms of the Act of 1866, they took the best thing that they could get, and we have to see what they got amounted to. The words of the Act were: "Provided also that the Legislature shall be at liberty to revise and alter the royalty imposed." Is that a mere statement of the law, or does it give the Legislature the power to alter the rate of royalty from day to day, and from year to year, and from time to time? I submit that it does not. The most that it means is the re-statement of the rights that the companies had. Admitting for the sake of argument that the companies are now liable to have the rate altered in the year 1906, they are not liable to have it changed before that time, and to do so would be breach of contract. We are willing to submit this point to any reputable judges. Therefore we cannot agree with the Provincial Secretary when he says that he does not intend to commit a breach of contract. The operation of the mines is often a boon to the province alone, while it is a source of loss to the people who put capital into the enterprise. We all know how delicate the balance with regard to the trade is, and how small a burden will destroy an enterprise. A few cents a ton added to the freight will keep the coal from markets that it now reaches, while a few cents taken off will enable it to go

further. The burden now proposed will not only impair the rights of persons who have now their money invested in the mines, but it will deter persons who have invested, or are desirous of investing in other enterprises. Surely in this enlightened age, morality and stability should be the governing considerations. If the proposed increase constitutes a breach of contract, it will be a serious thing for the Legislature to sanction it, if it be not a breach of contract, we will have no right to complain on that ground, and it will become in that case a question of expediency, whether the enterprises can stand the burden proposed.

MR. H. S. POOLE (the Acadia Coal Co.), said that many of the companies were not present other than by representatives. (The Chairman here stated that he had received telegrams from a number of companies authorizing Mr. Poole to speak for them.) The Premier and the Attorney-General had stated that they did not intend to use the power of the Legislature to over-ride the terms of the leases, but claimed that they were acting within their powers as assessors. If they were sincere in this opinion they should not object to allowing the contention to the lessees, which is a purely legal one, to be tried in court or arbitrated on as the lessees desired. The holders of the leases desired to approach the committee as legislators and landlords. Those holding leases issued since 1886 make no claim of rights interfered with; they approach the Legislature with a request for clemency and a careful consideration, if prepared to receive them, of facts confirming their contention that the average returns from coal mining did not warrant an increase. Other lessees appear to them as landlords, and to hold them to the conditions of their contracts. The Attorney-General had said that he would blush if he thought that it was for a moment intended to commit a breach of contract in this legislation, he claimed that the Government had the right to make the proposed increase. The Premier had impressed upon the holders of the leases the power of the Legislature, and had said that it would take away private property. When it came to the question of property the holders of the coal leases received a good deal of sympathy from gentlemen representing other branches of the mining industry. There were present here representatives of iron, gold and quarrying interests, who all felt that the security to the titles of their properties was of vital interest to their shareholders. Touching the question of legislation they had been told that they had nothing to say but to appeal to the clemency of the Legislature. He believed that there was a right of appeal to the Governor-General, and perhaps to England. The Prince Edward Island Legislature years ago had passed measures confiscating the lands of absentee landlords, but when the appeal went home their action was disallowed and a commission was appointed to indemnify the landlords, and the confiscation laws were disallowed. A year ago the Province of Quebec passed a mining law which included minerals not included here, phosphates for instance. There was a great agitation against the law and an appeal was made for its disallowance. A correspondence ensued. He quoted from the letters of the Minister of Justice, Sir J. S. D. Thompson, and his deputy, Mr. Robert Sedgewick, in the end the province agreed either to withdraw the bill or to modify it. In the Province of Ontario they passed the Mining Act of 1892, giving certain rights and privileges to the lessees and at the same time imposing royalties, but they were particular to distinguish as to vested rights under titles previously granted. The increase proposed here would be of considerable moment to the holders of leases. As had been already intimated, if this law had been enforced last year the books of one large concern would have shown a debit instead of a credit.

MR. R. G. LECKIE (Londonderry Iron Co.) desired to state that the effect the passage of the bill would have upon the manufacture of iron. At present the coke used in the manufacture of iron was made from slack coal. Slack coal had been free because it was an inferior product and contained impure matter. By bringing slack coal under the operation of the bill and imposing a royalty of ten cents a ton on it, it would make a difference to Londonderry mine in the furnace now going of many thousands of dollars a year. He was on the committee who were aware that for the \$2,000,000 expended by the Londonderry Company the shareholders had never received a penny of return. It takes two tons of slack coal to make one ton of coke, so that if the proposed royalty on slack coal as imposed it would amount to a tax of five cents a ton on coke, and this would be, as already shown, a very serious tax on the pig iron produced by the company. The rolling mill at present was carried on without loss, but also without profit. The imposition of the proposed tax would entail an absolute loss to the company. The company had been discussing the propriety of blowing in another furnace. If that were done the yearly loss would be still further increased. There never was a time when iron was as low as at present, and if the bill became law it would be a question whether the company could continue operations or not.

In answer to a question by Mr. Goudy, Mr. Poole explained that it was one of the express terms of the leases that coal "known as slack coal" should be free of royalty, and it was clearly a breach of covenant to require, as the Act did, that coal for the manufacture of coke should pay royalty, coke being almost entirely made from slack coal.

MR. G. E. FRANKCLYN (General Mining Association) concurred in what had been said. With regard to the bill providing for existing contracts, he thought, with an exception which he desired to point out, that it would meet the substantial requirements of justice. This spring he was in Montreal and made offers to the

Canadian Pacific Railway Co. When he returned he found the notice of the proposed increase of royalty. The offer made the company, of course, could not be withdrawn. As the price of coal went down they had been obliged to accept a lower price. If they had not done so the company would have taken American coal and the province would have lost the whole of the royalty. As the contract was practically made before the receipt of the notice, he thought that the coal, under the circumstances, should pay the old rate.

A. W. QUINN (Intercolonial Coal Co.) said that it was usual to commence negotiations for contracts early in January. He was engaged for from six weeks to two months in such negotiations before the actual closing of the contracts. Contracts had been made by his company amounting in all to 100,000 tons, of which a large portion went to the Canadian Pacific Railway. Contracts had to be made early in order to engage the tonnage required. Buyers could not be forced to definite terms. If one company did not meet their views another would.

MR. J. R. LITHGOW (Glace Bay Mining Co.)—While other companies holding leases prior to 1866 had the leases renewed, the Glace Bay Company did not take out renewals in 1866, but held the original lease, under which, in 1873, the company became entitled to renew on the terms of the original leases. According to that legislation they were only bound to pay six pence per ton, old currency, on round coal and have slack coal free. This being the case, it seemed like a breach of faith, when the time came to give the renewals, that they should be obliged to obtain them. He supposed that in 1862 the Province issued debentures bearing interest at 6 per cent., to terminate in 1886; and suppose that in 1873 the Legislature enacted that the holders of those debentures should be entitled to renewals for periods of 20, 40 and 60 years at the same rate of interest. The consequence would be that the debentures would be increased in value. Suppose that ten years after the Legislature should enact that the holders of the debentures should have the renewals, but only at the rate of 4 per cent. That would look like repudiation, but it seemed to him to be a parallel case. Or suppose that he leased a property for a period of 20 years at a specified yearly rental, and the landlord said that he might have a renewal for a further period of 20 years at the same rate. Then suppose that when the time came to renew, the landlord said, "you may have your renewal, but you must pay an increased rental." That illustration was applicable to the present position of the holders of coal leases. They were entitled to renewals on the terms of the old leases, but the Legislature said, "You must have your renewals, but you must take the chance of what the royalty will be." He did not think that that was fair, and he did not think that it would be sanctioned.

MR. H. S. POOLE—The Province of Quebec found that money could be borrowed at four per cent., and proposed to substitute debentures bearing interest at that rate for the debentures upon which they were paying five per cent. The result was that they had not only to withdraw the bill, but the debentures of the province fell far from par to 92.

MR. B. G. GRAY stated that he held three leases taken out under the statute which provided that the royalty was subject to revision and alteration. The legislation of 1885 changed those terms, and inserted a provision that the Legislature might increase or diminish the royalty. In interpreting this legislation, where the terms used were different, it would be held that the Legislature must have intended something different. If the first terms were equivalent to the last, the Legislature would not have found it necessary to make any change in them. He thought that the terms first used did not mean the same thing as the other. If the royalty could be increased in the way proposed, it could be increased every day in the week. He had contracts now current that had been made for six years. To "revise and alter" was a very different thing from "increase and diminish." In order to encourage enterprise, the Legislature might have intended, under the first terms, to give power to reset the royalty for a number of years.

MR. POOLE, in the following letter from a letter under date of 8th April, 1892, he had received from Messrs. F. H. Odiorne & Co., 86 State Street, Boston:—

"The parties (referring to certain Boston capitalists), have a bond only for the Inverness property, and they have written to the Halifax people that they shall not purchase, but will surrender their bond in case the Government raise the rate of royalty. There can be no question but that such action by your Government will prevent the investment of American money in your mines, and greatly injure the credit of your Government in all other matters. We shall be very glad if we can see any way in which we can aid you in this matter."

The following is the opinion of Drysdale, Newcomb, and McInnes, above referred to:—

55 BEDFORD ROW, HALIFAX,
April 6th, 1892.

DEAR SIR,—Referring to your conversation of yesterday with the writer, and to Mr. Glendenn's letter of the 25th ult., which you have herewith returned, we beg to say that it is our opinion, and we have no doubt that those words in your lease which provide "that the Legislature shall be at liberty to revise and alter the royalty imposed by these presents in or after the year '86," refer only to the successive times for renewal, or possibly to some one particular time for renewal only, to be selected by the Legislature, and not to any time during the currency of the renewal terms. This construction appears to be very

clear, having regard to the context, and the all important fact that the year 1886 was the time for the first renewal. It is further the most reasonable construction with reference to the context, and the rules with which a deal is made. It follows that the Government has not, as a matter of contract, the right to have at the present time a legislative revision of the royalty.

Yours truly,

(Signed) DRYSDALE, NEWCOMBE & McINNES."

H. S. POOLE, ESQ.,
Agent Acadia Coal Co., Stellarton, N.S.

"I approve of and concur in the above opinion,
H. McD. HENRY."

Also concurred in by B. G. GRAY.

Finally the Hon. Dr. Parker drew attention to the section which required the extra royalty to be paid, as for February 23rd, to which Mr. Poole replied:—

"That the lessees unhesitatingly regarded this section as retrospective; they had sent in their quarterly returns at the end of March as required by previous legislation, and the section in question did not show how a correction was to be made.

Iron Smelting in Toronto—The Petition of the Ontario Iron and Steel Company.

The petition of the Ontario Iron and Steel Co., by their board of provisional directors, humbly sheweth:—

That a petition to your Government for the incorporation of a company to be called "The Ontario Iron and Steel Company, limited," under the Ontario Joint Stock Companies Patent Act, has been signed by the following gentlemen, viz.: Elias Rogers, H. S. Howland, Robert Jaffray, A. S. Irving, S. H. Jones, H. N. Baird, J. K. Kerr, W. D. Matthews, John I. Davidson, H. L. Hime, T. D. Ledyard, provisional directors, and J. Kerr Fiskien, W. J. Mackenzie, J. W. Langmuir, Wm. Ince, Samuel Beatty, A. M. Walton, E. W. Brown, John McCrear, C. E. Clarence, J. McCaughey, Joseph Blakely, W. M. Stark, Harton Walker, Lewis Lukes, Fred J. Stewart, W. Hope, Alex. Rankin, W. H. Howland, S. Shaw, J. Enoch Thompson, S. Frank Wilson, H. Wyatt, Robert Hodgman, John T. Moore, James Baird, P. Lang James, C. E., A. C. Macdonell, Edward Moore, L. O. P. Generaux, James McGee, J. L. Scarth, Scott & Walmsey, C. J. Smith, R. H. Bowes, P. G. Close, Robert Beatty, O. A. Howland, C. S. Growski, jun., C. McMichael, C. Gordon Richardson; W. A. Allan, Ottawa, Ont.; Geo. A. Cox, John Leys, Herbert A. E. Kent, James Healey, Horace Thorne.

2. That although it is believed that promising deposits of iron ore suitable to make pig iron and steel exist in the Province of Ontario, there is at present no mine producing iron ore in Ontario, and the extent or value of such deposits is as yet unknown, nor is there any blast furnace in operation in the Province.

3. That ores, apparently of excellent quality, have been found in Ontario, some of which, being exceptionally free from phosphorus and other impurities, are suited to make the finest steel, but further practical tests require to be made to prove their quality, quantity and extent.

4. Your petitioners humbly present that, in order to obtain sufficient capital to erect and operate a furnace, it is necessary to demonstrate beyond a doubt that iron ores suitable to make pig iron and steel can be mined at accessible points in Ontario in sufficient quantities to supply such furnace.

5. That capitalists are unwilling to assume the whole risk of pioneering this enterprise, which, like all experiments, is attended with a considerable degree of uncertainty; therefore it will be necessary to obtain some financial aid from your Government to assist in the erection of such a furnace, and also a bonus upon the output thereof.

6. That foreign capitalists will not invest until it can be demonstrated that iron can be smelted profitably.

7. That a furnace erected in Ontario which will produce pig iron from such ores will be the most practical method of developing and utilizing the mineral resources of our Province and of determining the value of the mineral lands still held by the Government, which will benefit in a greater degree from the success of the enterprise than any private individual.

8. That a company, intending to erect and operate a modern furnace capable of producing one hundred (100) tons of pig iron daily, will require a paid up capital of at least five hundred thousand dollars.

9. That the establishment of such a furnace will lead to other industries incident to the multifarious applications of iron, steel and nickel-steel, thus retaining in our Province an immense amount of money which is now expended in importing the products of iron from foreign countries, and furnishing employment for hundreds of thousands of artisans.

The extraordinary growth of the population of the United States, which is largely due to the development of mining industries, furnishes an illustration of the benefits which will accrue to Canada from the same source.

Your petitioners therefore pray:—

1. That the Government of Ontario should make a suitable appropriation through the Bureau of Mines to test and prove by diamond drill borings, or such other means as the Government may deem necessary, some of the most accessible deposits of iron ore in Ontario, showing their extent and value; and such tests shall be made under such regulations and restrictions as the Government may deem expedient.

2. That an Act should be passed by the Legislative

Assembly authorising the Government to give a bonus of two dollars (\$2) per ton on the output of a modern furnace, which shall be of not less capacity than one hundred (100) tons per day erected at such place in Ontario and under such conditions by such company as shall be approved of by the Government, such bonus to be given for ten years from the time such furnace shall commence to produce pig iron, and also to aid, in such other manner as your Government may deem expedient, any company which will undertake forthwith the erection and operation of a modern furnace to smelt Ontario ores.

In the event of such prayers being granted to the satisfaction of your petitioners, your petitioners propose immediately to complete the organization of said company and to proceed with the erection of a furnace capable of smelting 100 to 150 tons of pig iron daily.

It is claimed by the promoters of the project set forth above that the requisite ores can be found in great plenty within about 115 miles of Toronto; and in a pamphlet recently issued on the subject, in which the undeveloped mineral centres in Ontario are discussed in detail, it is shown by the analysis of experts that the ores in almost every case are of unusual high grade, being particularly free from phosphorus and sulphur. The promoters have strong hopes that the time is not remote when a blast furnace will be established in Toronto and a vastly increased product of Ontario ores smelted right here. The Belmont Bessemer Ore Co., of New York, which last year leased the Belmont iron mine, about 110 miles east of Toronto, are building a railway nine miles long from the mine to the Central Ontario Railway, and state that as soon as this piece of road is completed, which will be during the summer, they intend to put on a force of 500 men at the mine and make large shipments of ore. A deputation will shortly wait on the Government and present fully the views of the promoters.

Nickel-Steel.

This alloy was first described in a paper read by Mr. J. Riley before the Iron and Steel Institute. Since then the alloy has assumed great importance, owing to the results obtained in the armour-plate tests at Annapolis. In these tests nickel-steel was shown to be superior to ordinary steel for armour-plates, and also to compound armour. Mr. Garrison observes that the United States authorities appear to have considered these results as conclusive and final, and adopted at once nickel-steel as the sole material for the armour-plates of the new United States navy. This, the author adds, appears a questionable and short-sighted policy, in view of some of the remarkable results which have been obtained with other and cheaper steel alloys.

The author next refers to the method of manufacture patented by the Cresoot Works in 1889, which consisted in the fusion of nickel scrap and pig iron in a reverberatory furnace under a layer of anthracite, for the purpose of avoiding oxidation. The resulting metal is used as an addition to metal poor in nickel.

What is known as "Marbleau's nickel-spiegel" is made by a process which consists in the simultaneous reduction of the ores, nickel, iron and manganese. According to Riley, nickel-steel can be made in any good open-hearth furnace working at a fairly good heat, and no special arrangements are required for casting. If the charge is properly worked, scarcely any of the nickel will pass into the slag. No particular care either is required when reheating the ingots for hammering or rolling. If the steel has been well made, and it is of proper composition, it will hammer or roll well whether it contains little or much nickel.

Steels rich in nickel are practically non-corrodible, and those poor in nickel are much better than other steels in this respect, the whole series of steels, up to 50 per cent. of nickel, taking, according to Riley, a good polish and finish. The alloys up to 5 per cent. of nickel may be machined with moderate ease; beyond that percentage they are more difficult to work. Mr. J. F. Hall has stated that he has made nickel-steel with a tensile strength of 97 tons per square inch, and with an elongation of 7 per cent., and Mr. G. F. Slocum has pointed out that the same sample of steel appears to extend uniformly over their whole length, in the manner, that is, of the manganese steel, to which reference has already been made. Some of the nickel steel recently made by Messrs. Carnegie, Phipps & Co. for the United States Navy department gave the following results:—

	I.	II.
Elastic limit, lbs. per square inch.....	59,000	60,000
Ultimate tensile strength, lbs. per square inch.....	100,000	102,000
Elongation, per cent.....	15.5	15.5
Reduction of area, per cent.....	29.5	26.5

The test-pieces were cut from $\frac{3}{4}$ inch plate, and the metal contained 0.2 per cent. of nickel.

Howe states that the hardness of nickel-steel depends on the proportion of nickel and carbon jointly, nickel increasing the hardness up to a certain percentage, and the hardness again diminishing as this percentage of nickel is exceeded. Steel containing 0.9 per cent. of carbon and 2 per cent. of nickel cannot be machined. The metal forges easily whether it contains little or much manganese. The presence of manganese in nickel-steel is most important if the conditions of treatment are to be successful. Salt water does not corrode nickel-steel as readily as ordinary steel. At very low temperatures nickel-steel shows considerable expansion.

The electro-conductivity of nickel-steel is very low, the resistance being very high. Hopkinson has shown that nickel-steel containing less than 5 per cent. of nickel is decidedly more magnetic than wrought iron, particularly for high inductions. On the other hand, iron containing 25 per cent. of nickel, it is non-magnetic at ordinary temperatures; but if cooled to 20° C., it becomes strongly magnetic, and remains so, when it again returns to normal temperature. If, finally, it is heated until it reaches its critical temperature, 580° C., it becomes again non-magnetic, and remains so until cooled once again to the temperature above mentioned,—20° C.

Mr. Garrison next proceeds to a consideration of the results obtained with the trials of armour-plates both at Annapolis, United States, and at Ochia, near St. Petersburg. A reproduction is given of a photograph of the plates used at Annapolis, and taken after the trial. The great advantage of the nickel-steel plate over the ordinary steel plate, lay in its absolute freedom from cracks, though it showed slightly less resistance to penetration.

Canadian Platinum.

By J. T. DONALD, M.A.

Under this title the writer read a paper before the meeting of the General Mining Association of the Province of Quebec, in January last. This paper was published in the Review and reproduced in *The Engineering and Mining Journal*. Owing to the wide publicity thus given to it the writer has received further information on the subject, the most interesting portion of which refers to sperrylite, the platinum mineral of the Sudbury district.

In the paper above referred to it was stated that "So far as can be learned no effort has yet been made to utilize sperrylite as a source of platinum." It now appears that this mineral has been used as a source of commercial platinum. Mr. Charles F. Crossmeyer, of Newark, N.J., writes me that last year Messrs. Eimer & Amend, of New York, furnished him with a quantity of sperrylite, and that he extracted the platinum from it and returned it to them in the form of wire.

It would thus appear that should sperrylite be found in sufficient quantity its contained arsenic will not be a barrier to its use as a source of platinum.

The Practical Working of Coal Cutting Machines.

At the last meeting of the Manchester Geological Society, Mr. Richard Sutcliffe read a paper on the "Practical Working of Coal Cutting Machines," in the course of which he said that he quite agreed with Mr. Walker, of the Wharfedale Silkstone Colliery, who was the largest user of coal cutting machines in England, when he said that actual experience points to 100 yards per 8 hours shift as being a satisfactory performance with coal cutting machines when the ordinary conditions of work in a coal face were in force. The writer had found that the most convenient machine, and a better one for all round work than any, was one having a cylinder at each end, with the cutting wheel in or near the middle. By this arrangement a comparatively light machine would keep the rails without extra fittings in working, and was capable of cutting either coal or fire clay, and the power could be varied to suit the material to be cut, by making it to run from 3 to 1, to 12 to 1 between the crank shaft and cutting disc, and its total length need not exceed 7 feet. To get anything like good results from the best machines, when cutting 3 feet deep more, the debris should be kept removed, as the fore or cutting portion of the wheel brought it from the groove or cut, otherwise it would be taken back in part by the back portion of the wheel, until it becomes jammed. As the attendant might have many things to look after, as well as the removal of this debris, it was often neglected, and therefore much of the power wasted. This fact must suggest to the contemplative mind the desirability of making a coal cutting machine capable of dealing with its refuse automatically, so as to prevent its return into the groove. The fixing of the chisels or cutters in the periphery of the rotating disc had a great influence on the working of a machine in cutting hard material. The proper way was to fix the cutters radial in the disc and hook them near their edges sufficiently forward to cut, and then as a cutter shank wore loose it got less instead of more work to do. Even the sharpening of the cutters had an important effect on the working of a machine, and a set of 20 machines sometimes blunted as low as 10 yards, and sometimes would cut as much as 1000 yards, even when properly edged and tempered, according to the material to be cut. If the holing was fairly free from iron pyrites, or such like impurities, the set of cutters should do from 50 to 100 when each cutter was doing its share in either coal or fireclay. A good coal cutting machine should be strong and simple in construction, with few working parts, it should have sufficient base and weight to keep on the rails when working it without extra fittings, it should be able to cut either way, and be easily reversed, and should automatically remove the debris so as to prevent it getting into the groove, and it should not exceed 3 feet in width nor 7 feet in length. Where coal had to be blown down after being cut it was best to make a deep holing, but when it fell from gravitation, it was sometimes advisable to take a lighter or shallow cut which enabled the machine to cut a greater distance, and the fillers to fill out a greater length, each in the shaft, allowing the gates to be farther apart, and whether the cuts were deep or shallow it was undesirable to dress

down the face more than was necessary to the machine to pass, as it saves labour, and made less small when allowed to remain for a few days.

At Garnett Colliery, near Airdrie, in Scotland, where machines had worked successfully for many years, in a 30 inch seam, with good roof and strong floor, they made the gates 14 yards apart. The corves were filled in the gate at about 83d. per ton, and the filler had to throw the coal when it got out of his reach, filling 6 yards at each side of the gate. The cutting was done by one contractor at 43d. per ton, and the filling was done by another. In Yorkshire the system was to take the corves into and along the face, necessitating the use of small corves in thin seams, but allowing the gates to be made at any desired distance apart, and accordingly they were made at from 12 to 50 yards apart, to suit the ideas of those adopting them, and it often took from two shifts upwards to fill out the coal. This necessitated irregular working of the machine, without any regular quantity of work being laid out for them per shift, and it was not nearly so methodical a system as the Scotch. It also compelled the filler to take up the spavin instead of confining his energy to the filling out the coal, which could be done very well while the gates were being drawn, and the spavin could be removed at any time. In some cases the machines were made to cut all in one direction, having to be taken back through the gateways, every time it cut through the length of the face, but almost all the recent installations were made to cut back and forward. His (the writer's) opinion was that money spent in taking them through the gates, except for repairs, was simply wasted. The best mode of working seemed to be to subdivide the labour into something like the following divisions—Hollers, blowers, and timberers, and fillers, packers and rippers. The hollers would include a man to drive the machine, one man to lay the way in front of the machine, and a youth to clear away the debris from the cut; the fillers, to devote the whole of their time in filling out the coal. The blowers would include men to bore the holes, timber up the face and blow down the coal. The packers to take up the spavin and rip and pack the gates. The whole of those about the machine should be under the control of a capable man (more especially at the commencement) who understood machinery and mining in a general way. He might have it on contract, so it could be left to the section under him, but he should have complete control of the men, without interference of subordinate officials, whose prejudices and jealousies would only hamper and impede the work. Energy, perseverance, and system would work machines in any mines, with a fairly good top, but, of course, their proper place was in thin seams, where holding forms the greatest part of the labour, and where properly worked they should benefit both the miner and the mine owner; the former, in doing the most laborious part of the work, and the latter by increasing the output, reducing cost of getting and in reducing the proportions of slack made in getting. Mr. G. B. Walker gives the saving effected in the reduction of cost of getting, at from 3d. per ton in a 3 feet seam to 10d. in an 18 inch seam, and that effected by the value of the yield of coal as compared with hand labour, at from 0.7d. in the 3 feet, to 10d. in the seam 18 inches thick, per ton, or making together a total saving of from 9.7d. in the 3 feet, to 18.9d. per ton in the 18 inches seams. In concluding his paper, Mr. Sutcliffe said that the boring type of machine had obtained a strong footing in America, but compressed air was the motive power in both countries, with few exceptions, and in the mining districts of the United States, machine mining was steadily increasing, there being scarcely any unworked territory of the Union where machines were not being, or had not been, used with more or less success.

Buckingham and Lievre Railway Company's Bill.

(Proceedings in the Senate.)

Hon. Mr. DICKEY, from the Committee on Railways, Telegraphs and Harbours, reported Bill (H) "An Act to incorporate the Buckingham and Lievre Railway Company," with certain amendments. He said: "The first amendment to this bill is in the clause which states the direction which this road is to run. By the Bill, as it came to us, it was required to pass along the River Lievre, and as the railway projectors did not desire to make it quite so crooked as the river, they asked to amend the Bill by putting in the words 'along or near the river.' To such an amendment, I presume there will be no objection. The next amendment is that which introduced the provision that this work shall be declared a work for the general advantage of Canada. The next amendment is to introduce the word 'connects' in the clause which gives authority to make agreements with other lines. These are the amendments, with the exception of the concluding clause of the report which is my duty also to explain to the House. This charter, as applied for, is for the construction of a line of railway from Buckingham up the Lievre River to its source, and also to continue that undertaking south from Buckingham to the River Ottawa, and to cross the River Ottawa by a bridge, and then to connect with other lines through the Province of Ontario. The House is probably aware that by our 66th rule, it becomes the duty of the committee to whom a private Bill is referred to report whether there is any difference between the Bill as it was brought before them, and the Bill which was originally applied for by petition and notice given. In this case all the provisions which give authority by this Bill to con-

struct a line from Buckingham to the River Ottawa, and a bridge across the Ottawa, and the connecting lines from that bridge to other railway lines in Ontario, were left out of the notice. No notice was given of them, and it became our duty to report that fact to the House, so that the House might deal with it as they chose. In connection with that a question was asked by the hon. gentleman from Sarnia as to whether the notices were regular in other respects, as to time, and I felt it my duty to look into that, and I have now in my hand the report of the Committee on Standing Orders and Private Bills, to which committee this Bill had been referred, in which they state that the notices were short in point of time, and recommend the suspension of the rule, and the rule was accordingly suspended. But the fact that the notice was short I felt bound to state to the House. It is for the House to determine whether they will pass this Bill now, or take it into consideration at a future day. My duty is discharged when I state the nature of the amendments.

HON. MR. CLEMON moved that the amendments be concurred in. He said: "The chairman has given a fair explanation of all the changes that have been made and I do not think they interfere with the Bill in any respect. It is true what he says, that there was no notice given of this bridge and connection, but it does not affect anyone. It is rather an improvement in the Bill as it was originally introduced. The motion was agreed to and the amendments were concurred in.

HON. MR. CLEMON moved the third reading of the Bill as amended.

The motion was agreed to and the Bill was read the third time and passed.

Alberta Railway and Coal Company's Bill.

(Proceedings in the Senate.)

HON. MR. GIRARD moved the second reading of Bill (39), "An Act respecting the Alberta Railway and Coal Company." He said: "The company asked for power to further extend their railway through the Crow's Nest Pass to a point where a connection may be conveniently made with the Canadian Pacific Railway. They also ask for authority to construct, maintain and operate irrigation ditches in the District of Alberta. Of course they ask for power to impose certain charges for the use of these irrigation ditches, but these charges must be submitted to and approved by the Governor-in-Council. The work referred to must be commenced within three years and completed in six years, and in the case of irrigation works the limit is seven years.

The motion was agreed to and the Bill was read the second time.

MINING NOTES.

(FROM OUR OWN CORRESPONDENTS.)

Nova Scotia.

Cumberland County.

The coal sales of the county were 462,267 tons, for 1891, against 438,608 tons in 1890.

The production of the collieries of the Cumberland Railway and Coal Company was 459,395 against 419,012 tons in 1890, in spite of the delay caused by the explosion. Since that date the enlargement and completion of the air-way has been finished. New pumps, screens, etc., have been put in, and the colliery generally placed in excellent order. Safety lamps alone are used underground, and no explosives.

There has been quite a lot of work done in the air-ways and the volume of air considerably increased. The new lift which was sunk last year in the east slope has been opened up this year, and levels driven east and west. During the winter the west slope has been sunk down 1,200 feet. There is also a new lift in the north slope and one in the east slope, 600 feet each, and 1,200 feet in the west. Properly speaking, we do not know the extent this lift may be driven westwardly, as every year further developments are made of this seam westerly, until now they are proven for some miles with slight variations southerly, caused by up-throw dikes or faults. Easterly the No. 5 slope is proved to some extent a distance of one mile, roughly speaking.

There are somewhere about 1,400 men and boys employed in these mines, and when we take into consideration the hazardous nature of their employment the casualties that do occur are comparatively few. During the year there has been placed in the north slope a new duplex pump—high and low pressure, water barrel 10 inches, stroke 36 inches, water column 10½ inches; the pipes are lined inside with wood.

The Chignecto mine has remained closed, and no returns of a satisfactory character have been received of the results of the prospecting carried on for other seams.

The output from the Joggins mines was 60,056 tons.

Pictou County.

The coal sales in 1891 amounted to 405,096 tons, as compared with 430,509 tons in 1890. The home sales were 265,095 tons against 277,753 tons in 1890.

Gay's River.

"The gold district of Gay's River," writes Mr. Faribault, "was re-opened last spring by the Coldstream Gold Mining Company, who put up an extensive 50 stamp steam mill and other large buildings. They sank a shaft, immediately north of Daniel McDonald's old works, which gave the following section of the Lower Carboniferous:

Surface drift.....	20
Conglomerate containing gypsum, non-auriferous.....	35
Coarse sandstone.....	2
Auriferous, irregular conglomerate.....	8

"This lower auriferous conglomerate is wholly composed of debris of the adjacent Lower Cambrian rocks, apparently in an old river bed, and rests on the lower graphitic ferruginous slate group. Beds of conglomerate similarly situated along the northern boundary of the gold-bearing rocks may prove sufficiently rich to be worked, but the great excitement caused two years ago by exaggerated reports of discoveries of gold in various places, remote from the gold-bearing rocks, have led a great many to take up valueless ground."

Oldham.

Mr. E. Faribault, in his preliminary report of the operations of the Geological Survey in this district, writes as follows:

"Special attention was given to the gold district of Oldham, it being a typical district, worked to a great extent and exposing to great advantage the quartz leads, all of which were prospected by means of surface trenches on account of the small extent of the drift. A detailed geological map of this district on a scale of 60 feet to one inch, with sections, was compiled on the ground. It shows the elliptical structure of the anticlinal fold, with all the known quartz veins, both interbedded and transverse; and also the numerous faults affecting them, and proves clearly that the richness of a lead depends altogether on its position and relation to the structure of the elliptical dome of the fold to which it owes its origin. In this work I am specially indebted to Mr. J. E. Hardman, B.Sc., M.E., manager of gold-mining properties in Oldham and Waverley, for such valuable information which his great experience in gold-mining enabled him to give.

"Some facts which have an important bearing upon the question of deep mining may here be introduced in view of the great interest taken at present by the mining community in the subject. From a study of the districts east of Halifax, and especially that of Oldham, it is plain that whenever an interbedded lead is followed some distance on the surface or to great depths, its relation to the axis of the anticlinal, and consequently to the stratigraphy of the fold, is constantly changing, and its size and workable value must consequently be affected; so that it is improbable that a lead found rich and of good size on the surface can be followed profitably to great depths. The limit of depth may vary from a few feet to 400 or 800 feet, according to the structure of the anticlinal fold. In most of the districts the zone of rich leads has the anticlinal axis for its centre, and it is probably the centre of the auriferous zone to a depth practically unlimited. Such is the case in the eastern part of the province, at Seal Harbour, Isaac's Harbour, Goldenville, Harrigan Cove, Salmon River, Fifteen Mile Stream, Killag, Mooseland, Moose River, Caribou, Gold River, Laverderville, Waverley and Oldham. In a few other districts where the auriferous zone is marked only on the north or south side of the anticlinal, the zone would, for the same reason, be parallel to the axis of the anticlinal to an inaccessible depth, as in Isaac's Harbour, Wine Harbour, Beaver Dam, Tangier and Lake Catcha.

"I would, therefore, strongly recommend that deep, perpendicular shafts be sunk on the anticlinals, and that cross-cuts be driven on both sides at various depths to test leads which do not crop out to the surface, many of which would probably prove very rich, as they would be cut in their most favourable stratigraphical position and could easily be worked by means of levels and overhead stoping from cross-cuts and the one perpendicular shaft. This system might be adopted with advantage at the North Star property of Isaac's Harbour, at Goldenville, where both sides of the anticlinal have been worked from 500 to 600 feet deep and abandoned, but the middle of the auriferous zone has never been tried; at Fifteen Mile Stream, in the vicinity of the Serpent lead; at Moore River, where Mr. D. Touguay has his main shaft; at Waverley, on the east and west side; and at Oldham, west of the Black Brook. No such systematic workings have, however, yet been undertaken in Nova Scotia that I know of, except in Oldham, where Mr. J. E. Hardman began last summer to sink a perpendicular shaft on the anticlinal dome. The result of his undertaking is awaited with great interest.

"The pay trend of the leads in different districts is also of great importance, but, unfortunately, the data necessary to draw conclusions are few, more, as in most of the mines, especially in old workings, no systematic records of the yields of different parts of the leads have been kept. I hope, however, to be able to throw some light on the subject from the notes I have gathered this summer."

The vertical shaft of the Napier Mining Company has reached a depth of 116 feet. A plat has been made at 100 feet, and a large station is now being cut, preparatory to driving the cross-cuts. The annual meeting of the company was held on the 10th May, when Mr. J. H. Hardman was re-elected manager. This company is doing the most important prospecting work that has ever yet been attempted in the Province.

The mines of the Standard Gold Co. are reported in good luck, the bulk of the milling rock coming from the 450 foot level. The company is opening up some ledges on the eastern end of its property which promise well.

The Oldham Gold Co. commenced work on the Old Dunbrack lode this month for the first time since the judicial sale of the property in 1894. The 150 ft. level west, is being driven by contractors, and the western slopes of No. 3 shaft are working. As soon as men can be obtained the eastern slopes will also be started. The Baker mine of this company shows no improvement, and is being operated at a loss.

Waverley District.

During May the mill of the West Waverley Gold Co. has been running continuously and has made some remarkable records for Nova Scotia. The largest record made in the month was 80 tons crushed in 60 hours, an average of 32 tons in 24 hours, or (as this mill has only 10 stamps), 3 1/2 tons per stamp per diem. The screens used were Russia iron, indented slot, No. 7 needle, or about 35 mesh. The stamps weigh 860 lbs., and drop 6 1/2 inches one hundred times per minute. The yield of gold is small, averaging about 7 dwts. for April. The capacity of the ten stamps is given at 600 tons per month.

This company is also making a fuel record which is noteworthy for this country. The total consumption of coal for the month (on two boilers) running the hoisting engine, mine pump, three air drills, a tank pump and the ten stamp mill with accessories, was a daily average of 1 1/2 tons of bituminous coal for 24 hours. The original estimate was two tons per diem. When the company has perfected its water supply so that the large engines can be run, condensing, a still further economy, can be looked for.

The Lake View company has closed down indefinitely, and the main shaft is now filling with water.

The tunnel under Laidlaw Hill in East Waverley is being driven by contract. A small boiler and engine have been placed at the mouth of the tunnel to force air for ventilation. The length is now close on 500 feet. As before noted, this tunnel is being driven on for the purpose of cutting the famous Barrel lode at a depth of over 100 feet.

Goldenville.

The community here were startled about the 1st of May to learn that a dastardly attempt had been made to blow up the engine and boiler of the Sutherland Mining Co. Some months ago there was a difference between the company (which is an American concern) and a person in Goldenville, which difference was finally taken into court to be settled. Judgment was in favor of the company, and the day after judgment was given, the engine of the defendants was found blown to fragments with dynamite, and an unexploded cartridge of dynamite with fuse attached, was found in the boiler. The works had been idle for some time, and the boiler was empty of water.

The Gold Miner's Association have taken up the matter and will ask the Government for reward for the detection of the offender. Nova Scotia has hitherto been known as a peaceful and law abiding country, but a reputation of this dynamiting work will change its reputation very quickly.

Darr's Hill.

The Duffern mine reports a scarcity of men, owing to the opening of the lobster season. Nothing new in the mine has been reported. It is rumored that the mine has been bonded for a sale.

Isaac's Harbor.

Nothing is doing here in mining. The sale of the North Star company's property, in April, is understood to have been in the nature of a re-organization of the company. The president of the company states that work at the mine will probably be resumed in June, and that the company will erect a small stamp mill on the property. Formerly the quartz produced was crushed at the Rockland mill on the opposite side of the harbor.

The Harbor Commissioners, under ruling of the court, have forbidden the Rockland mill to discharge its tailings into the harbor, and the mill in consequence has been forced to close. This action will prevent the working of the prospect in the Skunk's Den, as the mill is the only one in the district.

Montagu District.

Mr. Charles Annand sailed on the *Labrador* this month for England, taking with him two large boxes of magnificent specimens. It is hoped that his arrival will speedily consummate the purchase of the Montagu properties by the English syndicate. These properties now include the New Albion, the Montreal, and the Kaye-Simonds. Mr.

L. J. Boyd has been busily engaged in mapping the Kaye-Simonds on the same scale as the maps of the other properties, and this new map has been sent forward.

Killag District.

Mr. D. S. Turnbull has taken charge of the property of the Old Provincial Company, which is the name of the concern which acquired the property of Mr. G. W. Stuart *et al.* The shaft has been timbered, the engine has been set, and the pit for battery formations excavated. A saw mill has been erected on the property, and the work of construction is rapidly going forward. The shaft will come up in one corner of the mill building, the cage landing its car on the topmost floor, whence the rock will be trammed to the mullock heap, and the quartz will be dumped into bins. The mill is to have 10 stamps.

Country Harbor.

The Copeland mine at Johnson's Brook, is reported to be doing well.

Mr. Robt. McNaughton has built a 20 stamp mill here but has not yet started it. His quartz is reported to be of lower grade than the Copeland.

The experience of this district in 1886 and 1887 should be remembered, and its transitory character kept in mind by those owning property there. It is always better to creep before one walks in matters of mining.

In General.

We are indebted to the thoughtful courtesy of Mr. E. R. Faribault, of the Geological Survey of Canada, for a fine set of photographs taken in some of the prominent gold mining districts of Nova Scotia. In one of these we have an excellent illustration of the occurrence of the famous barrel-quartz from the Dunbrack lode at Oldham.

The first quarterly general meeting of the Mining Society of Nova Scotia takes place at Halifax on 17th prox. An interesting programme is arranged. We trust there will be a very full attendance at this meeting.

New Brunswick.

The recent and stratified deposits of Westmoreland and Albert Counties are varied and interesting, and those of tidal origin, viz. the salt marshes, are unique. "These marshes," writes Mr. K. Chalmers of the survey, "comprise, in Westmoreland and Albert Counties alone, an area of 35,000 acres, and have long been noted for their fertility. Of late years, however, they have deteriorated. This remark applies more especially to those portions which have been dyked and cropped continuously for a century or more, without the application of any fertilizing material to the soil, which has, in consequence, become deficient in plant-food. Lime and wood ashes have been recommended; but improving them in this way is slow and expensive. A scheme inaugurated by the more intelligent farmers of Sackville would, if systematically carried out, be more effective and economical, viz. the cutting away of portions of the dykes and aboideaux and flooding the marshes with the tidal waters of the Tantramar and other rivers, which flow through them. The tides, which rise high enough to overflow these marshes, if the dykes were broken, carry in red mud and deposit it on their surface. This is an admirable fertilizer, its efficiency having been abundantly proved by the experience of the Sackville farmers. This system of improving them will probably be adopted by all the owners of exhausted marsh lands around the Bay of Fundy. It seems the natural method of restoring them, partially at least, to their original fertility. The depth of the marsh mud is variable, but increases seaward. Immediately underlying it is a layer of fossiliferous blue clay, which rests on a peat or forest bed. At Aulac, Intercolonial Railway, the latter attains a thickness of 20 feet and is overlain by 80 feet of marsh mud. These marsh and peat beds indicate, therefore, a subsidence of the land here within the recent period of about 80 feet. Intelligent observers inform me that the peat or forest bed is continuous or nearly so, throughout, underlying the salt marshes everywhere.

"Bog-manganese occurs in Albert County, near the Dawson settlement. On a branch of Meldoon Creek an extensive bed of it has been opened up, and a branch of the Albert Railway constructed to it. Kilns for drying the materials have also been erected. This deposit covers about 25 acres of ground, and appears to be quite thick—in one opening the thickness being 26 feet. The ore is a loose amorphous mass, which can readily be shovelled up, and contains, in layers and patches, a considerable percentage of bog-iron ore, or red ochre. Indeed, very little of the material appears to be wholly free from iron, though large portions have merely a trace of it. The deposit lies at the foot of a hill, and its accumulation there appears to be due to gravity. There are still runways down the hillside, and, doubtless, the process of producing bog-manganese is still going on. Operations have temporarily ceased at this mine. Indications of other and similar beds of bog-manganese have been met with at the base of this hill further west.

"Bog-iron ore was found on the south side of Buctouche Harbour, Kent County, occupying an area of several acres. Where openings were made in two places, the deposit showed a thickness of from 12 to 15 inches.

"Just south of Richibucto Head another deposit of this material was observed, but its extent and thickness was not ascertained. Bog-iron ore was also noticed on the south side of the mouth of Kouchibougué River by Mr. Wilson, and in a number of other places. No use has yet been made of it."

Quebec.

Eastern Townships.

Mr. A. P. Low, of the Geological Survey, in his preliminary report, gives some interesting particulars of the resources of that portion of the Townships comprising the southern portions of the Counties of Champlain and Potouéou. He says:

"At Lac Tortue the Canada Iron Furnace Company has lowered the water of the lake some four feet, and as the lake is very shallow with slightly sloping banks, a large area is laid bare around its edge, and here the bog-iron ore which has formed in the lake as flat concretions is washed out of the surface mud with hand flats, while the ore in the deeper part of the lake is raised by a dredge which carries three rows of buckets on an endless belt.

"Apart from Lac Tortue, in all the flat country about Three Rivers on both sides of the St. Lawrence, bog-iron ore is found in patches which vary from three to eighteen inches in thickness. The ore is gathered by the farmers from their lands, and brought in and sold at the furnace. As iron smelting has been in operation about Three Rivers since 1737 the supply of ore in the vicinity is somewhat exhausted, but new supplies of great extent have been found about Gentilly, opposite Three Rivers, and along the Joliette branch of the Canadian Pacific Railway, so that enough ore will be forthcoming to run the new furnace at Radnor which will have a capacity of thirty to fifty tons a day, smelting magnetite from St. Jerome along with the bog ore.

"Ochre is a common mineral in this part of the province and is at present worked in two localities, at St. Malo, eight miles from Three Rivers, and at St. Tite Junction on the Piles Branch Railway. At St. Malo the deposit has been proven across twenty-two lots and in width from 100 to 300 yards, with a depth from one to twenty feet. At St. Tite Junction the ochre occurs in two gulleys which join and run into the St. Maurice; the ore has been proven along both gulleys for nearly half a mile and has everywhere a considerable thickness. The St. Maurice Metallic Paint Co. and Johnson Paint Co. have furnaces for burning the ore at St. Malo, the former grinding the burnt material at Cap Magdeleine, near Three Rivers, the latter at Montreal. At St. Tite Junction a furnace and grinding mill are in course of erection by the Radnor Paint Co."

Templeton District.

Watters & Co. have commenced operations on their recently acquired Haycock mica property. It is claimed that the output is from three to four tons per day.

The East Templeton District Phosphate Syndicate is working eighty-five men at last report, and purpose putting on thirty more.

McLaurin & Sons have only a small force employed putting their property in order.

Lievres River District.

The Anglo-Continental Guano Company has struck a fine lead of phosphate in the Crystal Pit of the Aulac mine, 105 feet from surface. It is found in N. E. drift, also in S. E. drift, and going down in sumps; the magnetite is now sinking in this promising exposure. Both mines are now in fine shape, while the works and arrangement of plant reflects great credit on the company's engineer, Mr. J. B. Smith.

Mr. R. H. Jones, author of the well-known work on asbestos, has come out from London to take a position as accountant to the General Phosphate Corporation.

The Lake Terror mica mine, situated on lot 13, in the 3rd Range, Portland West, has produced and shipped to date, 47 boxes of clouded mica, of an average weight of 250 lbs. each.

Wakefield.

Smith & Lacy, of Snydenham, Ont., who purchased the Grace mica property at Gracefield, in this township, have a force at work. The outlook for a good and steady output is good.

The Gemmill mine continues to produce mica and phosphate steadily. Since last fall about 85 tons of mica have been mined.

Ontario.

Port Arthur District.

Many of the silver prospects which, owing to water, have been idle all winter, are about to be opened up again. At present rather more activity than usual is noticeable.

The few amendments to the Mining Act, made during the last hours of the Ontario Legislature, are a step in the right direction and give satisfaction. People hereabouts are in hope that some of the capital which was seeking investment at the time of the introduction of the Bill may still find its way into the district.

The Port Arthur, Duluth & Western Railway, it is



AN ORDINARY
QUARTERLY GENERAL MEETING
OF THE
GENERAL MINING ASSOCIATION

OF THE PROVINCE OF QUEBEC

WILL BE HELD IN

THE ASBESTOS CLUB HOUSE,
BLACK LAKE, QUE.,

ON TUESDAY, 14th JUNE, 1892,

COMMENCING AT HALF-PAST FIVE O'CLOCK IN
THE AFTERNOON.

For the convenience of members and their friends attending this meeting a special car will be attached to the ordinary train (Quebec Central Railroad), leaving Sherbrooke, Que., at 8 a.m. on the morning of Tuesday 14th June. Black Lake members will join the party at 10.42 a.m. Train will arrive at Thetford Mines at 10.45 a.m., where some time will be spent in a visit to the Asbestos mines. Lunch will be served at half-past twelve o'clock (noon). Party will leave Thetford Mines at 1.30 p.m., returning to Black Lake by teams kindly furnished by the local Committee.

The ORDINARY QUARTERLY GENERAL MEETING for the reading and discussion of papers, etc., will be held in the

Asbestos Club House, Black Lake,

commencing at 5.30 p.m. Papers will be read by Mr. J. Burley Smith, M.E., Glen Almond, Que., and by Mr. L. A. Klein, M.E., Black Lake. At 7.30 members will be entertained to a dinner given in their honor by the Asbestos mine-owners and mine managers. Train will leave at 1 o'clock a.m. Wednesday, 14th inst., for Sherbrooke, where connection will be made for Montreal and points west. Tickets, \$5.50 for the round trip (from Sherbrooke to Thetford and return) may be obtained from the undersigned, or from Mr. A. W. Stevenson, C.A., Treasurer, 17 St. John Street, Montreal.

GEORGE IRVINE,
President.

B. T. A. BELL,
Secretary.

reported, has made arrangements with an American syndicate for connections across the border in Cook county, Minnesota. Doubtless before long some of their iron ores will be transhipped into our carriers at Port Arthur.

Much interest is taken here in that portion of the Summary report of the Geological Survey, just issued, having reference to the examination of the region west of Port Arthur.

Mr. Smith discovered excellent indications of a broad zone of magnetic iron ore on the west side of a lake on the Big Turtle river, called "The Lake where the River Bends." The ore is associated and interbedded with micaceous schists. The bands vary from fractions of an inch to three feet or more in thickness, and this interbedded occurrence of ore and schist in its broadest development appears to be from 150 to 200 feet wide. To the south-east, near the southern end of the lake, this band appears to be cut off by a fault, and from this fault northward the iron ore could not be traced for more than a mile and a-half, the rocks being so thickly covered with vegetable mould that exploration in this direction was difficult and uncertain. The rocks here strike north-west and south-east, and dip from 45° to 55° to the south-west. They are very evenly stratified in appearance and seem to constitute a tapering band trending eastward, then south-eastward from the broad land of Keewatin schists so largely developed in Manitou and Little Wabigoon lakes, and from certain ferruginous angular fragments found in the north-eastern arm of Manitou lake, Mr. Smith is inclined to think that more ores may be found in this vicinity, in the same geological horizon as the above, in the near neighborhood of the granites. An analysis of these ores made by Mr. G. C. Hoffman, chemist to this department, shows them to be very siliceous, yielding 40.17 per cent. metallic iron and 37.21 per cent. of insoluble matter, but no titanic acid. The ore is in such a position as to be easily mined, and considerable water-power is afforded at the outlet and inlet of the Big Turtle river. Unless the ore is found, as usual in this country, to be much richer in the actual ore bodies than in the surface indications, it will of course be of no commercial value in competition with the rich ores of the Lake Superior district on both sides of the international boundary.

According to reports the silver lead ores just east of Port Arthur contain an unusual amount of gold, no less than \$43 to the ton being given. Mining machinery is going in and extensive operations are looked for.

A vein of copper has likewise been discovered in the same neighborhood.

Some nickel locations have been surveyed east of Schrieler, where the conditions are similar to the famous Sudbury region.

In General.

Reports reach us of a well directed movement to organize a company to manufacture iron in the city of Toronto. Preliminary meetings have been held and the whole ground carefully gone over and discussed. Among the promoters are Elias Rogers, Robert Jeffrey, J. K. Kerr, S. H. James, John J. Davidson and H. N. Baird, of Toronto. A present bounty of \$2 per ton is paid on all iron manufactured in Canada, but to be entitled to it everything used in the manufacture must be Canadian. Now, smelting works to be successful in Toronto must use Pennsylvania coke, which is capable, so the firms interested in it declare, of producing a ton of iron for every ton of coke consumed. What is to be asked of the Dominion Government, then, is to pay the bounty of \$2 per ton, and yet allow the use of American coke. A first-class ore can be had from the well known deposits at Belmont and Haliburton, in Peterborough County. The estimated cost of mining either of these ores is placed at \$1.25 per ton, while the freight to Toronto, a distance of 110 miles, should not exceed 75 cents. If a furnace company in Toronto owned the mines in this simple, it should be able to lay down ore at works for \$2 per ton, if leased on royalty certainly not more than \$2.40 at the furnace. It is calculated that, on the basis of coke costing \$4.50, with both the magnetic and hematite ores costing \$3.50 at furnace, there should be at least a profit of \$5 per ton on making coke iron in Toronto. This includes the bonus from the Dominion Government of \$2 per ton.

The Belmont Bessemer Ore Co. are reported to have about 50 men and some teams at work on the iron mine. They are sinking a shaft and also drifting, and are stripping the soil off the ore, having already exposed a large body. They say they will have the railway running into the mine in about a month, when they expect to put on a much larger force.

CANADIAN COMPANIES.

Rackarock Company (Limited) gives notice that application will be made under the Quebec Joint Stock Companies' Act for incorporation to manufacture explosives, chemicals, acids, fertilizers and materials for initial explosions, including fulminate caps, detonating caps, electric exploders, railway fog-signals safety valves and electric blasting machines, in the Province of Quebec. Head office, Sherbrooke. Capital stock, \$35,000, in 350 shares of \$100 each. The directors are Sylvester Wm. Jenckes, John Mardieu Jenckes and Frederick Arthur Halsey, manufacturers, all of the city of Sherbrooke.

The North American Chemical, Mining and Manufacturing Company has given notice of application for an order to change its corporate name to that of the Owen Sound Portland Cement Company. The change is desired on the ground that the company wish to obtain a name descriptive of their business, which principally consists in the manufacture and sale of Portland cement.

The Moncton Freestone Co.—Notice is given that application under the New Brunswick Joint Stock Companies Letters Patent Act will be made for Letters Patent for incorporation. The object for which incorporation is sought, is to purchase, own, sell and deal in stone quarries and lands, to quarry, manufacture, purchase, sell and deal in stone for all purposes and such other things as are incident thereto. Head office, Moncton, Westmoreland Co., N.B. Capital, \$10,000 in 100 shares of \$100 each. The provisional directorate is made up as follows: Theophilus B. LeBlanc, contractor; Thomas Fitzsimmons, contractor; Robert A. Borden, barrister; Matthew Lodge, manufacturing agent; and Philip D. Bourque, quarryman; all of Moncton.

The Dominion Phosphate and Mining Co., (Ltd.)—The annual general meeting of the stockholders of the Dominion Phosphate Co., (Ltd.), was held at No. 103 St. Francois Xavier street, Montreal, on May 17th. No particulars of the business transacted have been received.

The National Oil Co., (Ltd.)—Messrs. Macbeth and Macpherson, solicitors for applicants, give notice that application under the Companies' Act will be made to incorporate the National Oil Co., (Ltd.). The objects for incorporation set forth are: The purchase of refineries, plant and machinery, the carrying on of the business of buying, leasing, letting and selling petroleum oil lands and other lands; buying, selling and producing oil and crude petroleum oil and other products thereof; sinking and putting down salt and oil wells, and otherwise developing salt and petroleum oil lands; working, leasing, buying, letting and selling oil refineries and salt works; manufacturing, buying and selling salt and petroleum oil and other products thereof; storing, tanking and warehousing refined and crude petroleum oil and other pro-

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ducts thereof, and granting warehouse receipts for the same; constructing and operating pipe lines for the transportation of oil, and the doing of all such other things as are incidental or conducive to the attainment of the objects aforesaid throughout Canada. Head office, Petrolia. Capital stock, \$150,000, in 1,500 shares of \$100 each. The provisional directors are Messrs. John McDonald and James Fiddes, of Petrolia, and Charles Henry Schooley, of Toronto.

Gillies Bros. & Co., (Ltd.)—Messrs. Greig and Jamieson, Almonte, solicitors for applicants, give notice that application will be made under the Companies' Act, for incorporation, to acquire and take over as a going concern in all its branches, the business of lumbering and manufacturing of lumber now carried on by James Gillies, Wm. Gillies, John Gillies, under the name, style, and firm of Gillies Bros. One of the objects of incorporation is to carry on a general mining business, to buy and sell and otherwise deal in mines, mining lands and minerals; to prospect, explore for, quarry, develop, work, extract and mine throughout Canada, and for such purposes to construct, establish and operate works, wharves and warehouses, and acquire and own real estate for such purposes. Head office, Carleton Place, Lanark Co., Ont. Capital stock, \$100,000 in 1,000 shares of \$100 each. The provisional directors are: James Gillies, Wm. Gillies, David Gillies, John Stark Gillies, all of Carleton Place; John Gillies and John Albert Gillies of Braeside, Renfrew Co., all in Ontario.

Sudbury Customs Smelting Co.—The following letter has been issued by this company: "We regret that owing to the difficulty of securing sufficient stock outside this place at par, and the refusal of the government to assist by the appointment of an assayer and chemist for the company, the directors of the Customs Smelting company have decided not to ask for further subscriptions at present, and at the last meeting of the board unanimously passed the following resolution:

"Whereas the local government of Ontario, has not considered it advisable to grant the petition of the citizens of Sudbury, of the Toronto Board of Trade, and of the deputation of those interested in the mining industry of the Sudbury District, for the appointment of a government assayer and chemist for the Sudbury Customs Smelting Co., (Ltd.), this board does not consider it advisable to ask for any further subscriptions of the stock in the Sudbury Customs Smelting Co., (Ltd.), and that the amounts already subscribed by others than the provisional board be refunded, and the said subscribers be relieved from any further obligation."

General Mining Association.—Mr. J. D. Hill presided at the half yearly general meeting which took place last month at the offices in London, and in moving the adoption of the report and accounts said that he thought he might safely congratulate the shareholders upon the state of affairs—the more especially in view of the fact that it was proposed now to declare a dividend of 8s. per share, instead of 6s. per share, being an increase of something like 25 per cent. He could not say that this was anything very brilliant. Still, looking to the fact that there had not been that active demand for coal which might have been expected, and that this was an era of low prices, not only for coals but for almost every other article of commerce, he thought there was good ground for congratulation. He thought £4, at which their shares of £8 stood in the market, did not represent their actual value; for, taking the last ten years, they had paid on an average 7s. a share, which, with the shares at £4, worked out at 9 per cent. The report was duly agreed to, and a dividend of 8s. per share declared. The retiring director, Mr. W. S. Cunard, was re-elected, as was also Mr. W. B. L. Atkins, the auditor.



The Separation of Nickel From Iron.—Dr. A. Classen observes that if the acid solution is treated with sulphuretted hydrogen, and then the excess of sulphuretted hydrogen boiled off, the solution oxidized, and the iron precipitated with an excess of ammonia, the ferric hydrate precipitate so formed will contain weighable quantities of nickel. It is therefore to be redissolved in hydrochloric acid, neutralized with ammonia, ammonium carbonate added, and the iron precipitated as basic carbonate on boiling. This may be redissolved and reprecipitated if necessary. When a precipitate has been obtained which consists of the oxides of nickel, cobalt and iron, these should be dried and reduced in a current of hydrogen. The weight of the metallic residue is then determined. It is then dissolved in nitric acid, neutralized almost completely with ammonia, ammonium carbonate is added, and the iron precipitated in the manner above described. The cobalt can be afterwards determined by precipitation with potassium nitrate. The weight of both nickel and cobalt having thus been ascertained, the difference between these and the joint weight of the three metals give the percentage of nickel. Both nickel and cobalt can also be separated from iron by precipitating them as oxalates; the double potassium iron oxalate is soluble.

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Under the provisions of chap. 7, Revised Statutes of Mines and Minerals, Licenses are issued for prospecting Gold and Silver for a term of six months, which can be extended by renewal for another six 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. Up to ten areas the cost is 50 cts. per area, for every area in addition in same application 25 cents. Cost of renewal one half the original fees. Leases of any number of areas are granted for a term of 21 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 in smelted gold valued at \$18.00 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 one square mile 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 free of charge, 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, 7½ 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

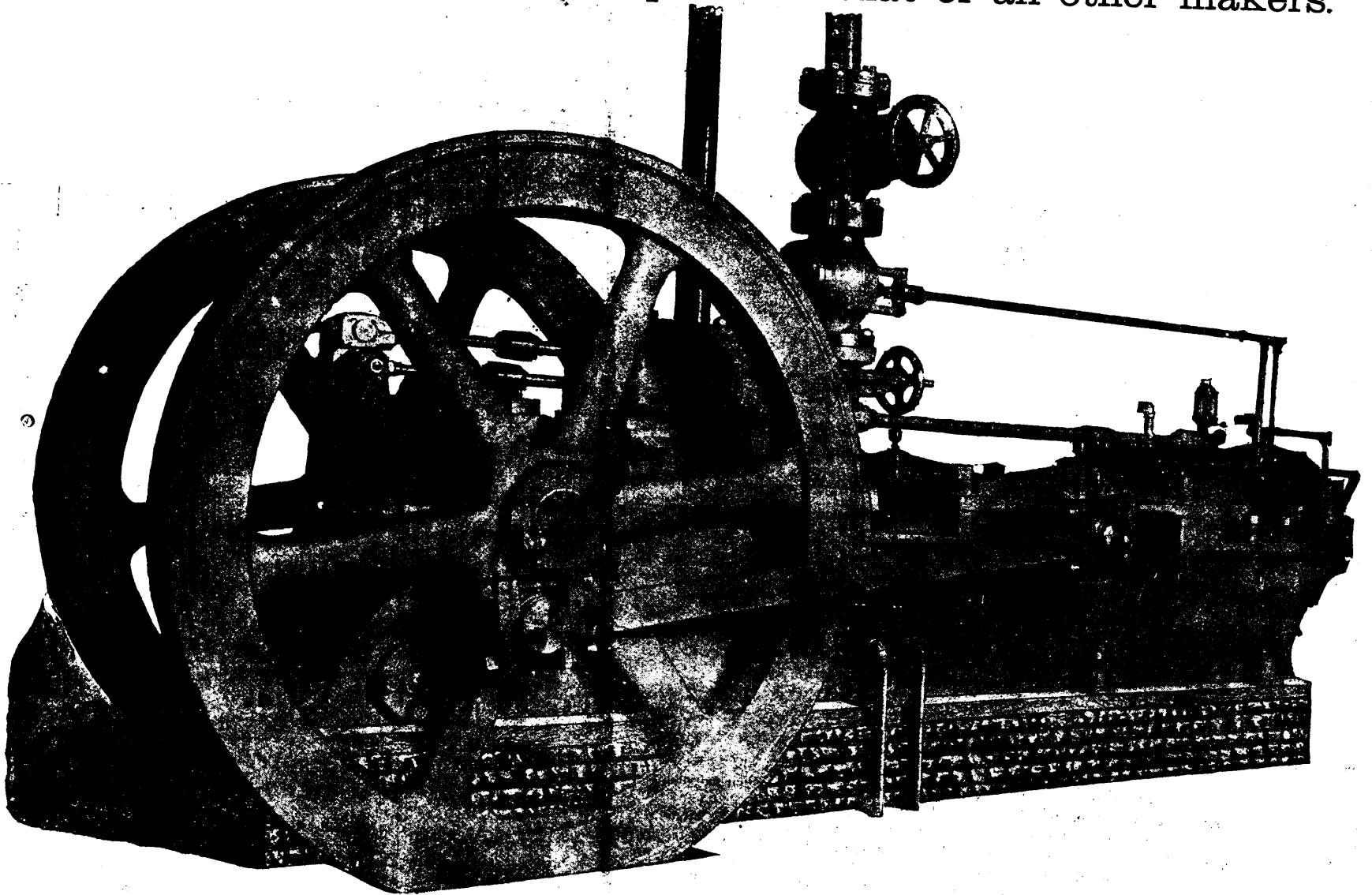
THE HON. C. E. CHURCH,

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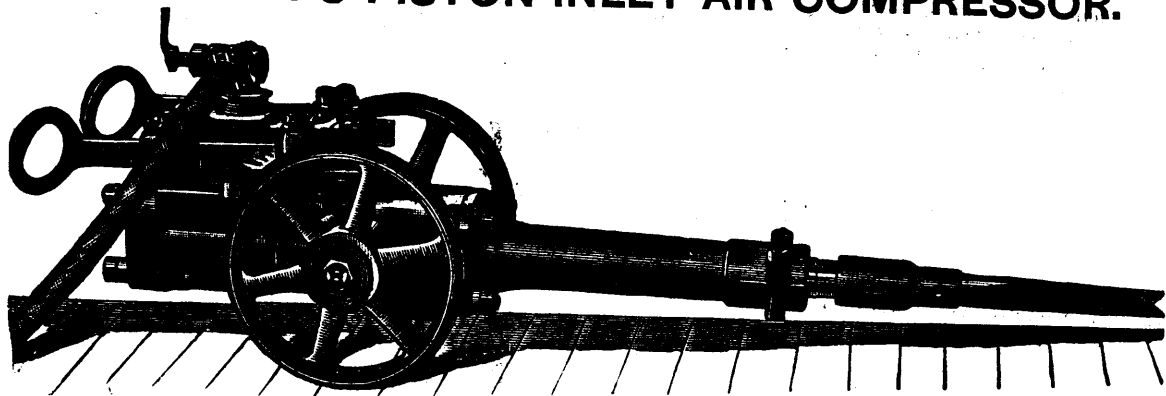
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