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Vol VIII.—No. 12. 1889.—OTTAWA, DECEMBER—1889. Vol VIII.—No. 12

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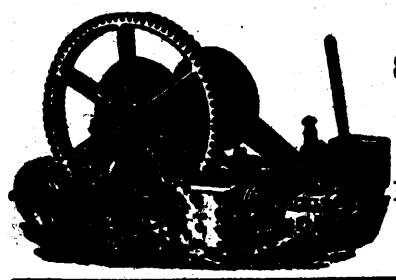
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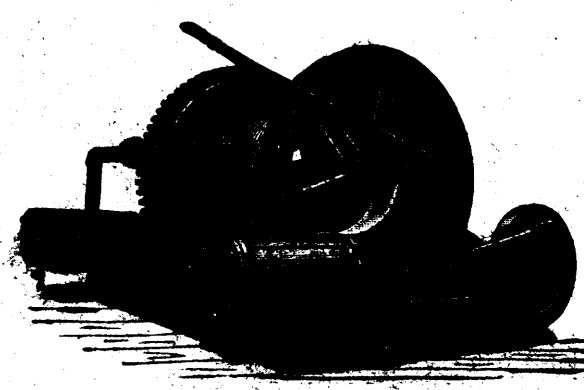
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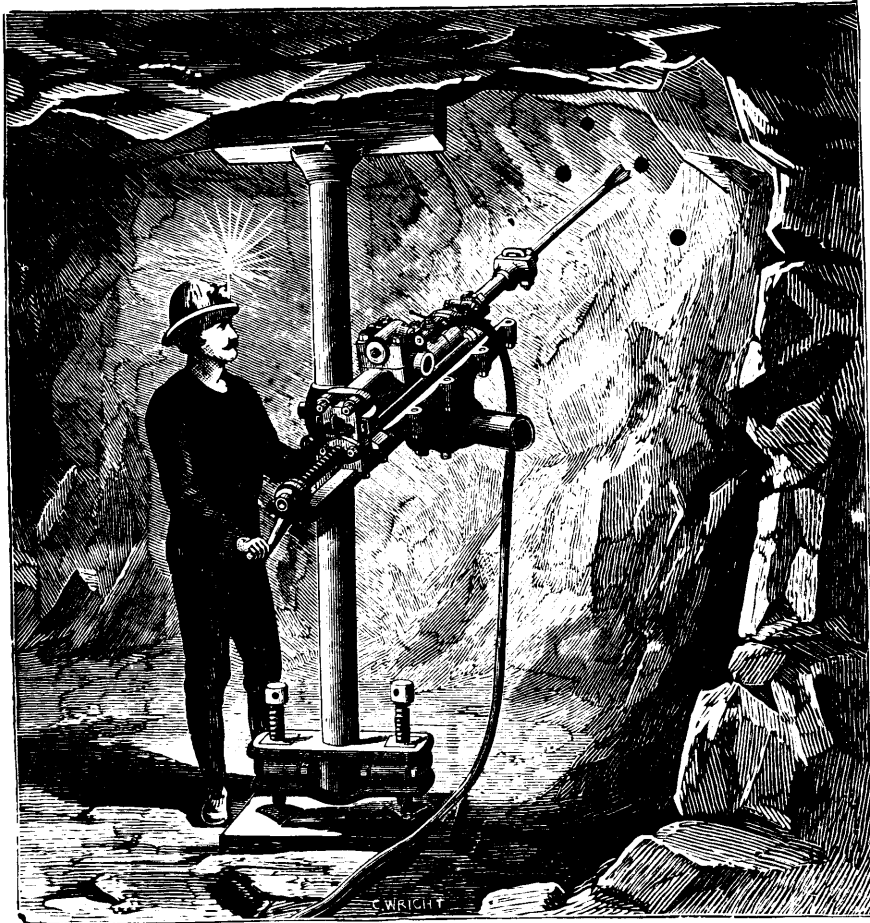
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 Mining Regulations.**

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

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

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

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

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

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

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

Lands situated south of the Mattawan
 River, Lake Nipissing and French River
 are sold under the Mining Act at one
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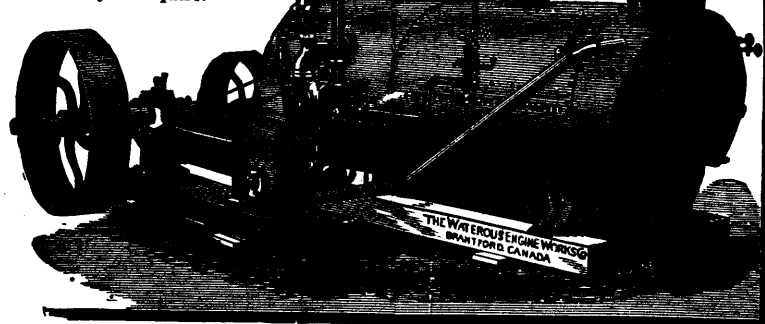
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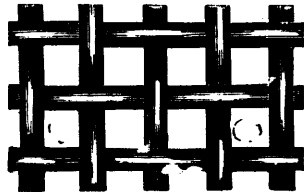
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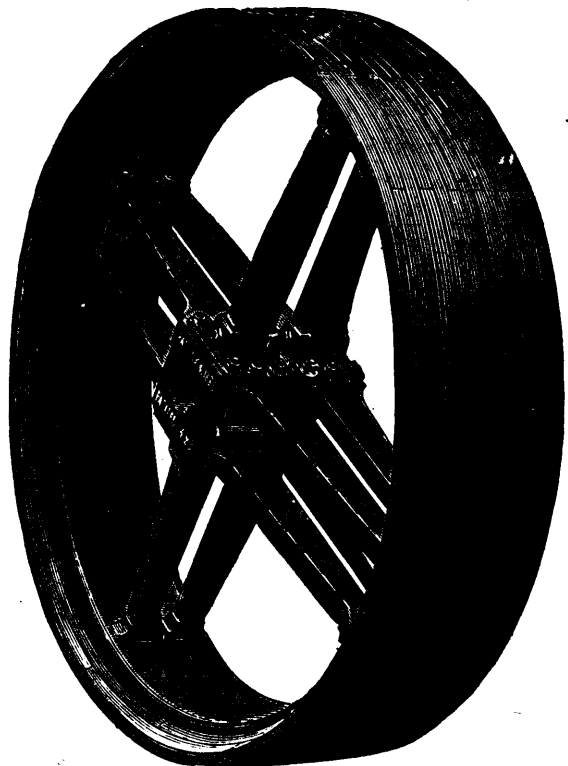
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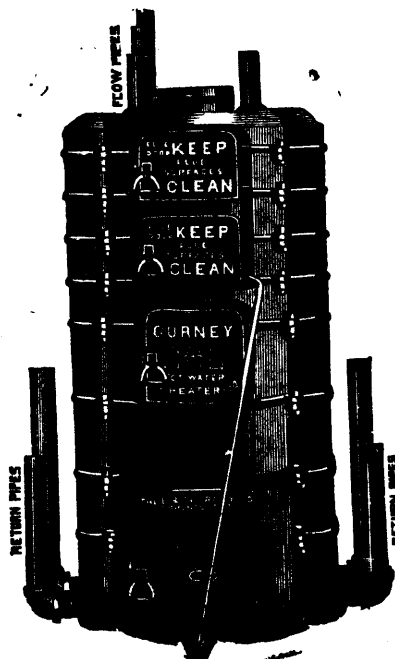
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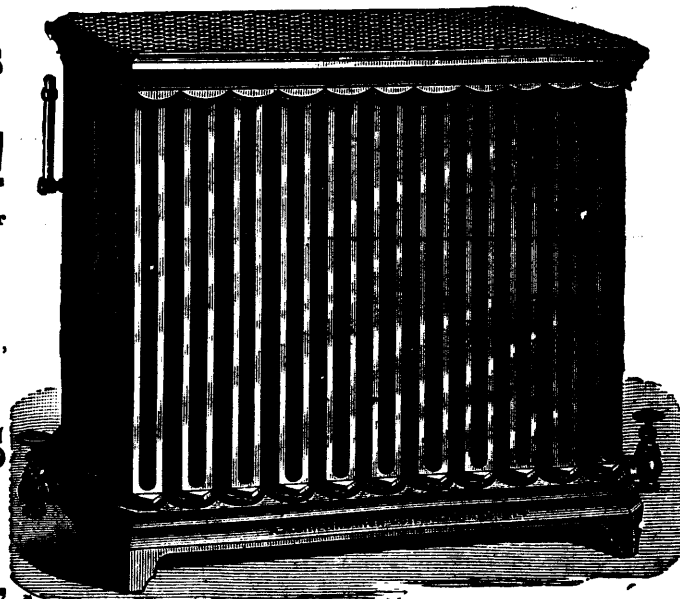
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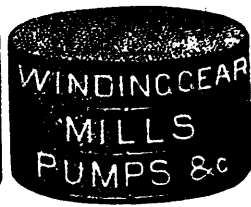
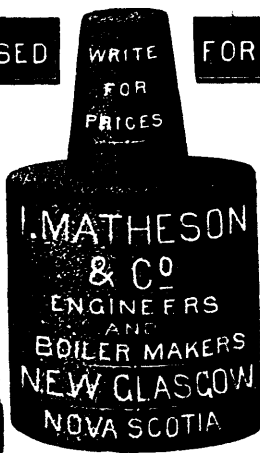
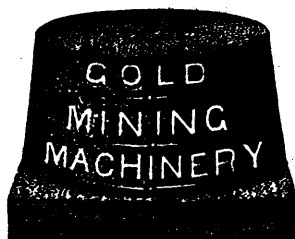
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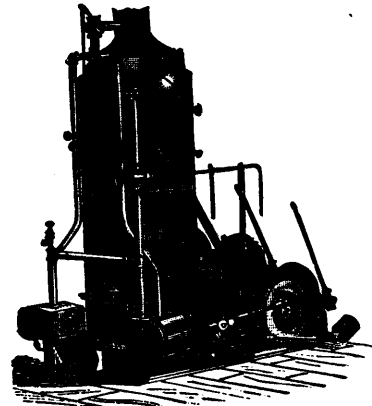
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The Phosphate Season of 1889.

The year 1889 will be a memorable one in the annals of the Canadian phosphate industry as having witnessed the first considerable awakening of foreign interest on its behalf. In December, 1888, Mr. Hermann Voss read a paper, in London, before the Chemical Manure Manufacturers' Association, entitled "Our Supply of Phosphates." This aroused considerable interest in the subject, and in January articles appeared in the *Times* and the *Morning Post* calling attention to the importance of the Canadian apatite deposits. The *Times* said: "In view of the scarcity of and increasing demand for phosphates, it may be well to point out that in our nearest large colony we have a source of supply which ought to be worked by British capital for the benefit of British agriculture." Nitrate had acquired great notoriety both as a fertilizer and as a means of making money, but an eminent authority made the statement that the nitrate used alone as a fertilizer was too stimulating and ephemeral in its effect, and it needed to be combined with phosphate in the ratio of two or three parts of phosphate to one of nitrate. The article in the *Times*, comparing the two, used these words: "To adopt a homely simile, the nitrate is like a glass of spirits, while the phosphate may be compared to a plate of beef." This struck the British imagination and phosphate was soon "the talk of the town." The agricultural papers, as well as the daily press, repeated the illustration until it became widely known. Col. North's nitrate mines and associated schemes had created such great fortunes that nitrate had become a household word, but now it became the fashion for every "city man" to say: "Nitrate is very well as a fertilizer in its place, but after all it is only a glass of spirits whereas phosphate is as a plate of beef." Financial men now began to say: "If money can be made in nitrate, why not in phosphate, which is required by the soil in threefold quantities?" Cables began to pour into Canada asking for offers of lands, and in a little while a good portion of the phosphate district was for sale on the London market. Some of our leading mine owners and several business men went to the scene of the excitement. Even eminent statesmen started for England with bonds of lands in their trunks, though the reporters were told to announce in the newspapers that the visit was "purely a pleasure trip." Prospectuses were soon drawn up offering Canadian lands to the public at from two to five times the price asked by the holders, which was generally quite the full value to begin with. The *Star*, the *Radical* evening daily, attacked these

schemes, exposing the inflation, and the issues fell flat. One scheme that asked for £150,000 only got £7,500 subscribed, and it was found that the British public were not enthused about phosphate investments. The summer holidays came and the boom collapsed, to the sorrow of many land owners, who had repeatedly been told by letter or cable: "The thing is done;" "The scheme is placed;" "Your lands are sold;" "The company is fully underwritten;" "It is certain to go." But out of hundreds of thousands of ones that were offered not one was sold, except that one private enterprise, the Foxton mine, which was taken up with Canadian and English capital on a comparatively snug basis. But the talk and excitement had made people acquainted with phosphate and with the Canadian deposits. In the fall, several visitors came across to make return "pleasure trips," and finding local prices so much lower than those of the London company promoters, they in a few cases bought lands, and in others bonded properties, intending to try the public again with them at more tempting prices. Several schemes are now in hand of this nature, and another trial of the sentiments of the investing public will soon be made. All these efforts have merely been for the purpose of speculating in lands, but it is pleasant to notice that now some enterprises are being undertaken that are based on genuine intentions to make a profit out of mining. The success of some of the properties that have been worked this year has demonstrated that "there is money in it," and we confidently predict that a great impetus is to be given to Canadian phosphate mining. It is well that the inflated schemes have failed, as they could only have led to disappointment, the capital being, in most cases, entirely out of proportion to any possible profits; but lands taken up on a legitimate basis and a large working capital being applied to the mining, instead of to the coffers of promoters, will doubtless produce results that will secure a permanent prosperity to the industry and a vast increase in phosphate production.

In our last issue we estimated the year's output of phosphate as being 32,466 tons, the largest annual production yet reached. Since then additional returns have been received, which increase the total yield to a little over 33,000 tons. Compared with the yield of other countries this is a small figure, as South Carolina alone produces over half a million tons yearly. But the Canadian industry has only just fairly got on its feet. Years of effort and much money have been spent in learning how to mine it profitably. The deposits are confessedly irregular and uncertain in occurrence, and those who have worked in a small way on single seams for a limited time, as has been usually the case, have not often been rewarded. It has been learned that large operations are essential to success; that it pays to break ground extensively, thus discovering many "bunches" that would have

been passed by if a single vein had been narrowly followed; that the true economic method of mining is to work a large number of pits simultaneously, for when one is "pinching" another will be "coming in," and the average output will be maintained. We hope soon to see a large amount of capital put into the working of these mines.

A few features of the season's business call for remark. Prices have steadily advanced and the prospect is favourable for still higher figures. The old standard of 1s. 3d. for 70 per cent. is still a long way out of sight, but there are those who predict that it will be again attained in the near future. The price has been as low as 7½d, but it got up this year to 10d. and a higher rate is now asked. Carolina phosphate of 55 per cent. quality has in the past commanded the same price as Canadian 70 per cent. This has been owing partly to difficulties arising from lack of knowledge how to treat the newer article and partly from the weakness and lack of accord of Canadian sellers. Time and experience will doubtless remedy these defects.

The export to the United States of 4,176 tons is a very encouraging feature, especially as it consisted of low grade phosphate that was formerly thrown away. Some progress is being made in the use of this on the soil in the crude state, without a mixture with acid, and this promises to create a large demand. It is also a very favourable feature that the English market is now calling for these low grades, and whereas two or three years ago it was difficult to sell anything below 80 per cent. in quality, there has this year been a good demand for 60 per cent. phosphate. This greatly helps our mines, as what is obtained from this grade is nearly all clear gain, it having to be mined in any event with the higher class rock.

Freights were fairly plentiful early in the season, and much room could have been had all midsummer for low figures, but the low water in the Lievres River prevented shipments to Montreal in time to avail fully of the opportunities. The too long deferred completion of the locks at Little Rapids is now eagerly looked for in another year. In the fall, cargo rates being high and vessels scarce, rates for phosphates rose to a prohibitory figure. About 1,200 tons had to be carried over the winter at Montreal, and 3,000 or 4,000 tons more at the mines, besides large quantities of second quality phosphate that awaits grinding by the mills. 7s. per ton was the prevailing rate, though as low as 5s and as high as 12s. was paid.

The railways projected or building in Ontario and Quebec will prove of great assistance for the transport of phosphate. The railroad will be completed next season from Westport across Bob's Lake giving access from that district to the Grand Trunk Railway at Brockville and the Canadian Pacific Railway at Sharbot Lake. The Kingston and Smith's Falls road will also benefit a

large tract of phosphate country The Ottawa and Gatineau Valley Railway, now in course of construction, has been graded as far as the Pêche, and when finished will open up a very extensive belt of phosphate and other mining lands, now undeveloped, mainly owing to scarcity of transportation.

With the continued working of the present mines and new enterprises now starting and the good commercial outlook, it seems safe to predict that Canada's best phosphate year will be surpassed by a better one in 1890.

The Duty on Mining Machinery.

We notice that the *Globe* and other papers have been publishing a statement announcing that the Dominion Government had at last decided to remove the duty on imports of mining machinery. The statement is premature, as the following letter from the Hon. M. Bowell shows:—"I have your favor of 9th inst., and cannot understand how the "*Globe*" obtained the information which it purports to give respecting the duty on mining machinery, as the Government has come to no decision in the matter. Even if it had, an intimation of that kind, as you are aware, would not be given until it had been laid before Parliament."

Canadian Iron Ore and New England Furnaces.

Our attention has been drawn to the following letter by a Mr. A. Evans, Jr., which appears in the *Bulletin* of the American Iron and Steel Association:

"I spent nearly three months of the summer of 1888 in the provinces of New Brunswick and Nova Scotia, and was part of that time in charge of the blast furnaces of the Londonderry Iron Company, at Acadia Mines, Nova Scotia. I did not find a single furnace in blast in either of these provinces, except one of the two stacks of the Londonderry Iron Company, and this furnace the company was only enabled to run on account of having a demand for the larger part of the iron at its own works, which consist of a pipe foundry, a rolling mill and an axle forge. As the Londonderry Iron Company could not successfully compete in the open market with imported pig iron, even with the \$4 protection, and \$1.50 of bounty at that time allowed by the Canadian Government, it built its pipe foundry under an especial concession, the government giving the company, if my memory serves me correctly, \$12 per ton on pipe, as an inducement to start a foundry of that kind in Nova Scotia.

Another reason for the company not running its idle stack, even if its own necessities required the pig iron, was that it was hard pushed to procure enough iron ore for the furnace then running, although Mr. John Sutcliffe, the general manager of the company, had travelled all over the province endeavoring to secure an additional supply. Indeed, while I was there, Mr. Sutcliffe took a two weeks' trip to Newfoundland in search of a supply of iron ore from that country, but failed to secure it. The ore the company was using would not have been used by any furnace in this country, as you will see from the analyses given below, which were taken from a lot of ore of better quality than the average output of the mines. The following analysis of a specimen of calcareous limonite ore, taken from the Totten mine, at Londonderry, will give a very fair idea of the richness of the ores the company was using:

	Per cent.
Insoluble matter.....	5.48
Ferrous oxide.....	54.78
Ferrous oxide.....	2.39
Alumina.....	2.81
Manganese.....	1.36
Limc.....	22.80
Magnesia.....	4.40
Average metallic iron.....	31.00

An analysis of a specimen of limonite ore, called hematite, taken from the West mine, gave the following results:

	Per cent.
Silica.....	16.00
Alumina.....	0.86
Magnesia.....	0.46
Phosphoric acid.....	0.57
Metallic iron.....	40.00

The coal received for the manufacture of coke was very poor, and all of it contained a great deal of slate, although the miners declared that they had taken especial care in its preparation and loading. The analyses given below were made from coke manufactured from the best coal received, we rejecting as high as twenty car loads in a single month as totally unfit for coking purposes. The coke made from coal taken from the west slope of the Spring Hill Company analyzed as follows:

	Per cent.
Ash.....	19.48
Sulphur.....	1.01

A sample of coke made from coal from the Albion mines analyzed as follows:

	Per cent.
Ash.....	18.38
Sulphur.....	0.87

This showing would undoubtedly condemn any property producing such coal and coke in any part of the United States.

Before returning to the States, I visited the output of the iron ore mine at Digby Bay, a deposit represented to be the largest and best in the province, and found it entirely unsatisfactory. I could see no indications of the existence of a large quantity of ore, and the specimen I brought away (a carefully selected sample) contained less than 40 per cent. of metallic iron, and was very high in silica, I think 21 per cent. It will be much cheaper for the New England furnace-men to use American iron ores, which are higher in metallic iron and lower in objectionable acids, or even to import Spanish, Cuban or Elban ores, paying the duty of 75 cents per ton, than to attempt to use any of the iron ores mined in the eastern Canadian provinces. And this applies to fuel also, for they will find that one ton of Pennsylvania coke, or 1½ tons of anthracite coal, is worth two tons of any coke they can procure from the Canadian provinces."

It is very apparent that the author of this remarkable letter has been inspired by a desire for political effect rather than for a fondness for speaking the truth. It would be easy to find in many parts of the world a tract of country as large as New Brunswick not adapted for the manufacture of iron, and the fact that this article is not produced there can hardly be called an argument against any proposal to take the duty off Canadian iron ore. The question of costs, of tariff protection, and special bonuses, may be passed over here, as reference is now intended more particularly to the supply of ore. The analysis given of calcareous limonite ore is certainly a curiosity, as it is the first time the public have heard of an iron ore containing free lime. The Londonderry ore has never laid any claim to be of high grade, the average metallic per cent. of the furnace supply varying from 40 to 45. The coke is silicious, running about 5 per cent. over the average Connelville, but apart from this it is of excellent quality, and better cokes could be secured. Small supplies of excellent ore have been drawn from Pictou and Brookfield, and enough Bessemer ore to run both furnaces could have been procured from Pictou county, but for the fact that the owners of the deposits have seen their way to do better than sell or lease to the Londonderry people. At present a railway is in course of construction from the Pictou coal field to the iron ores of that county, and preparations are being made for building furnaces, etc. There

are also in Guysboro county, and in several parts of Cape Breton ample supplies of first class ore.

The writer speaks of visiting "the output of the iron ore mines at Digby Bay, a deposit represented to be the largest and best in the province." As a matter of fact a small quantity of charcoal iron was made here a number of years ago, but, without any prejudice to the present or future values of these deposits, they have never been publicly represented as the "largest and best." As another matter of fact it is known that at numerous points in Digby and Annapolis counties there are iron ores practically pure and running from 60 to 65 per cent. of iron. The general tenor of the letter would imply that the writer after a very short stay in Nova Scotia, has desired to mendaciously condemn the iron ores of the province in general, and the Londonderry works in particular, and to conceal this motive under a specious cloak of political patriotism. He apparently forgets that if the United States takes the duty off iron ore, the Nova Scotian ore would have to compete with those from Cuba, Algiers, etc., and that curiously enough he is arguing against the best interests of those he pretends to be putting on their guard.

The attitude of the iron ore owners in the Maritime Provinces is one of indifference as to the adoption by the United States of the policy of removing the duty on iron ore. If they do not see their way now to ship their rich ores to the States in competition with other foreign ores, they would be on exactly the same footing if the duty were remitted, the only difference being a gain to the United States furnace man who is now handicapped by the native ores being regulated in price to compete with the foreign ore paying a duty.

The Promotion of Joint-Stock Companies.

Advices from England indicate that the promotion of public companies to operate industrial and mining enterprises has experienced a check owing to the losses sustained by the associations whose business it is to underwrite working capital, and the expenses of floating such companies. The stock of several recent enterprises has not been absorbed or taken up by investors to the extent expected, in some cases only from 5 to 10 per cent being subscribed, leaving a large amount of cash to be provided by the underwriters who are practically guarantees for the public to the vendors. As everyone knows, the floating of a company is attended with a great deal of expense, frequently as high as £4,000 Sterling being incurred. It can readily be understood, that a few losses to that amount, besides the difficulty and trouble of working off the stock, must render underwriters rather chary of assuming new obligations, for a time at least. The recent increase in the rate of discount by the bank of England and the larger

rate of interest now obtainable for money has also had a cooling effect, and a large amount of cash lately available for speculative enterprises has thus been withdrawn from circulation. With the opening of the new year, and the distribution of dividends, some improvement however, may safely be anticipated.

The Phosphate Trust (Limited.)

Just as we go to press, an occasional correspondent has handed us a most remarkable document which purports to be the Prospectus of a new concern on the eve of being submitted to the English public under the pretentious title of "The Phosphate Trust (Limited.)" The authorised share capital of this prodigious scheme is placed at £1,000,000 sterling, divided into 99,500 ordinary shares of £10 each, and 500 Founders' shares of £10 each. The acreage proposed to be acquired consists of 38,556 acres as follows:

ONTARIO.	
County of Lanark	5,237 acres.
" Renfrew	450 "
" Frontenac	9,695 "
	15,482 "
QUEBEC.	
Township of Templeton	4,698
Gore of Templeton	3,210
Township Portland East	2,583
" West	1,317
" Wakefield	2,400
" Hull	730
" Derry	200
" Buckingham	2,446
" Bowman	4,496
	23,074

We know nothing about the economic value of this extensive area of so called phosphate lands, and the highly colored prospectus (on green tinted paper) fails to enlighten our ignorance, further than to quote brief excerpts from the reports of the following illustrious mining experts: *H. Loken, C. Duvenny, Peter Powers, Thos Dowsley, J. F. McAndrew and E. Newton*, men, we need not say, wholly unknown to us or to the profession as mining engineers, or with any reputation as such. In addition to these celebrities, there are published portions from reports on other lots, written by the owners themselves, and these, very naturally, are most flattering and highly eulogistic. In such an extensive area, within the phosphate belt, there should be properties which, if systematically worked and judiciously capitalized, would amply repay investment, and that such may exist in the proposition before us, is suggested by quotations from the reports of Dr. Sterry Hunt, Prof. B. J. Harrington, Mr. Lanson-Wills, Mr. John D. Frossard, and a few others eminent in the profession, but these, we surmise, do not cover one-third of the mining lands to be submitted to the public. In conclusion, we cannot help thinking that the promoters will require something more than an indiscriminate collection of reports, something more specific and definite as to the ways and means by which such an enterprise is to be made to pay, before their scheme can be thought worthy of consideration by thoughtful

men and the investing public. For the credit of the Canadian phosphate trade, we trust the proposal, as it at present exists, will not be put to the public.

LETTERS TO THE EDITOR.

Halifax, Dec. 10th, 1889.

The Editor

THE CANADIAN MINING REVIEW:

SIR,—Under the head of Rockingham in your last issue you report the late discovery of gold near Princes Lodge, Nova Scotia, and state "but a close examination of the lodes as yet stripped fails to discover any gold in them." This statement is deliberately false, as the leads show gold, and we are prepared to show the same to anyone who may come to us and ask an examination. . . . There is no intention of putting a mill on the property until the work of development has been sufficiently advanced to warrant the same. The prospects so far are most encouraging.

Yours, &c.,

HENRY ARCHIBALD,
W. J. MORRISON,
W. G. COOMBS.

[The statement published in our last issue came from a thoroughly reliable source. However, our correspondent may have been misinformed, and we insert the above with pleasure.—EDIT.]

Stormy Meeting of the British Columbia Smelting Company.

A meeting of the shareholders of the British Columbia Smelting Company, limited, was held on Thursday, 21st ult., at Winchester House, Old Broad Street, London, Mr. W. J. Steele presiding.

The Chairman said that that was an adjournment of the meeting held on September 2nd. The shareholders had expressed a very natural wish that the report of Mr. Judkins should be printed and circulated. That had been done, and the accounts in London had been made up to September 30th, and had been audited by Messrs. Turquand, Youngs & Co., and had been found correct. Appended to the London accounts was a statement of receipts and expenditure at Vancouver. That statement had been signed by the local directors and the secretary, but was not audited; and, on submitting it to Messrs. Turquand, Youngs & Co., they most properly, in his opinion, refused to deal with it. In fact, the accounts were in such a shape that they could not possibly be audited. The board immediately wrote to the local secretary, instructing him to have those accounts audited on the spot. As soon as these, properly audited, were received from Vancouver, they would be incorporated with the London accounts, and a balance-sheet would be drawn up and audited by Messrs. Turquand, Youngs & Company, and issued to the proprietors. The sum due to the Bank of British Columbia was as nearly as possible £7,600, which was carrying five per cent. interest, and the board had received a telegram during the last few days to the effect that, if the interest to the 31st inst. was not paid, proceedings would be commenced under the mortgage. He considered that the bank had treated the company with great indulgence in this matter, as the notice of foreclosure expired on September 10th, and since that date they had taken no action against the company under the mortgage. They could not, however, expect them to wait an indefinite time for their money, even if they had ample security. There was a suggestion made at the last meeting that about £2,000 would be sufficient for the purposes of the company; but the directors were advised that any attempt to spend a couple of thousand pounds on the works would be so much money thrown away, and they could not recommend any such course. The board strongly recommended the shareholders to immediately subscribe a sufficient amount to pay off the mortgage to the Bank of British Columbia, so that the property might be kept intact until arrangements could be made for carrying on

active operations next spring. The directors recommended that the advances made by the shareholders for this purpose should be secured by debentures, and that the existing mortgage in favor of the bank should be transferred to a trustee for the debenture-holders. That would secure the redemption of the advances. The local directors had sent a very long statement to the board to complain of the remarks made at the last meeting, and resigning their seats. While the directors regretted that they would lose the services of gentlemen holding responsible positions in Vancouver, they could not withdraw from the position that they had taken up—that the company owed its present position to bad management at Vancouver, and improper management at the mine. The Chairman then read a long letter that had been received from the local committee at the mine, setting forth the position of affairs there. As early as December last the board had a very strong suspicion with regard to the state of affairs at the mine, and on January 14th a telegram was sent to the local directors telling them if they could not proceed with the smelting to shut down the works. That telegram was disregarded. Had they paid attention to it the company would have been saved a very considerable expense. He concluded by remarking that what was before them was the question, how to raise money to pay the Bank of British Columbia.

Mr. Oscar Reumen (interrupting): I wish to know, sir, why a letter, dated July last, numbered 54, was not produced when you had it in your hands at the last meeting? I want to ask you that question straight and point blank. There was a letter in your possession, and that letter was not produced at the last meeting.

Mr. James (a director): I don't quite understand, sir, the nature of your remark. What letter is it you refer to? and may I ask how you come to know of the number of the letters sent to us?

A Shareholder: Let the chairman answer.

Mr. James: Sir, I don't stand here to be dictated to.

Mr. Reumen: Mr. Chairman, there is a simple question about a letter; cannot we have an answer? ("Hear, hear.") This letter was in your hands, and you must have known of it at the last meeting. I want to know all about it. ("Answer, answer, answer.")

Mr. James: You ask a question which I am not prepared for the moment—"Answer, answer."—I will ask the secretary. ("Sit down; let the chairman answer.") If any gentleman here professes to recollect any letter, I confess that I have not that capability. (Uproar and cries of "Sit down.") I go further and say this—(Uproar, and "Answer the question.")

Mr. Reumen: Mr. Chairman, I have asked a question and I insist upon an answer. I do not want any outsiders to answer me. ("Hear, hear.")

Mr. James: I am not an outsider. (Laughter.)

Mr. Reumen: I am addressing the chairman, and I want to be answered by the chairman. ("Hear, hear," and noise.)

The Chairman: I will give you an answer. ("You?")

The Chairman: The question of producing that letter was not considered. ("Oh, oh.") There was no discussion by the Board in any way, and that Board had no object, directly or indirectly, in not referring to that letter at our last meeting; and if that letter had been asked for at the last meeting, it would instantly have been produced. We have no object in keeping back that letter. I can only say, however, that the letter is in direct disagreement with the letter of February, 28.

Mr. Reumen: I say that the last meeting was adjourned for the purpose of introducing that letter, and it would not have been adjourned if that letter had been produced. ("Hear, hear.")

The Chairman: I think you are making a mistake. ("No, no. There was no mistake.") The meeting was not adjourned for the purpose of producing that letter.

Mr. Birkin: I wish the chairman to read my letter to him tendering my resignation as director.

The chairman read the letter, which stated that Mr. Birkin resigned his position on the Board in consequence of language used at the last meeting, imputing to the Board "scandalous, disgraceful and sinister motives." That language was reproduced in the *Financial News* and the *Financial Times* of the following day.

Mr. Birkin then stated that he had done a great deal for the company and spent a lot of time in its promotion. They were in difficulties and he wrote a cheque for £500, and subsequently for £250, in order to help them out of those difficulties. He had every confidence in the Board and did not feel inclined to give his valuable time as a director when that gentleman stood up and accused them of being influenced by "scandalous, disgraceful and sinister motives." He was a larger subscriber than most men here, and he thought it was certainly creditable that gentlemen made such remarks without foundation. ("Hear, hear.") He ought to have had some knowledge to justify an assertion of that kind. ("Hear, hear.")

Dr. Jones said that, as he was accused of having made those remarks, he was entitled to reply. His reply was that at the last meeting the chairman stated that unless they subscribed sufficient money amongst them within six or seven days their property would be lost. He (the

speaker) got up and asked when that information was received. The chairman replied that they had received it a month before.

Mr. Reumen: Six weeks.

Dr. Jones: Six weeks or a month! And, although they received that important information, they did not convene a meeting, and they only gave it to the shareholders when the meeting was convened. They never informed them that the mortgages intended foreclosing. He (the speaker) took into consideration that if they had that notice fully six weeks beforehand, they ought to have called a meeting of the shareholders together, or, at any rate, some of the larger shareholders, and give that information, so that they might have had time to protect their interests and their property. ("Hear, hear.") He appealed to the shareholders present whether, under the circumstances, he was not entitled to make that remark. ("Yes, undoubtedly.") There was one thing he wished to say with regard to Mr. Birkin; he felt extremely sorry that that gentleman had resigned his position on the Board. He looked upon Mr. Birkin as the only member of the board who had their confidence—"Hear, hear"—and he felt that now that Mr. Birkin had resigned their case was hopeless, unless they had a complete change in the directors. ("Hear, hear.") With regard to Mr. Birkin, himself, he (the speaker) exonerated him from anything in connection with the bad management of the company, and extended to him the hand of fellowship. His remarks were directed to other members of the Board. ("Hear, hear," and uproar.)

Mr. Birkin replied that he did not wish to separate himself from his brother directors as regarded any responsibility attaching to the Board.

Mr. James: I say for myself that it is a deliberate lie if anyone accuses me of sinister motives. If anyone said it to me personally I should know how to deal with him. (Uproar.)

The Chairman: I can only endorse every word that Mr. James has said.

Mr. Curtis Hayward then addressed the meeting at considerable length, and, in the course of his remarks he was interrupted by

Mr. James: I cannot afford to sit here all the evening. ("Order, order.") Gentlemen, you cannot yell me down, and I won't be yelled down. ("Chair, chair,") I cannot sit here—(uproar)—I won't and will not sit down. He is not touching upon the business of the meeting. (He is, sit down.) I beg your pardon, he is not. ("Chair, chair,") Any gentleman who is at all acquainted with public meetings—(uproar, and cries of "Sit down"—is perfectly well aware—"Chair, chair")—that at an extraordinary meeting of a company, no other business can be brought forward except that for which it is convened. ("Why don't you sit down?")

Mr. Reumen: I shall move directly that this meeting is illegal. (Laughter.)

A Shareholder (to Mr. Reumen): Give some one else a chance, old man.

Mr. Reumen: I shall move that this meeting is illegal.

Mr. James proceeded to speak amidst great uproar and cries of "Sit down." He said: I'll not sit down for an everlasting noise; gentleman, I will leave you, I'll have nothing further to do with you. I call upon the chairman to close the meeting unless you—(Uproar.)

The chairman: I think, gentleman, it will be very much better for us to adjourn this meeting. ("No, no,") I for one will not remain here to be spoken to in this way. (Noise.) We can adjourn this meeting till next week if you like. ("No, no.")

Mr. Reumen: But you would remain if you had had your own way. (Laughter.)

Mr. James here put on his hat to leave.

A Shareholder: Take off your hat.

Mr. James: I will not take off my hat; when I meet gentlemen I take off my hat.

The Shareholder: Why don't you take off your hat?

Mr. James: I will not sit here to listen to men who insult gentlemen—(Uproar.)

Mr. Curtis Hayward: You don't like to hear the truth.

Mr. James: I say, as far as I am concerned, that is a deliberate lie—a great uproar—a deliberate lie, sir.

The Chairman (to Mr. James): Resign! resign!

Mr. James: I shall not resign.

A Shareholder: Resign!

Mr. James, No, I shall not resign. (Uproar.)

The Chairman: I think this meeting ought to be adjourned. ("No, no.")

Mr. James: Why this interruption, Mr. Chairman?

Mr. Reumen: Because you are not willing to hear the truth.

The Chairman: We are quite willing to hear the truth.

Mr. James: I think you should listen. (Sit down.)

The Chairman: Will you adjourn the meeting till this day week? (No, no.)

A Shareholder: I hope Mr. Hayward won't take up the time of the meeting. (Sit down, sir, sit down; where's the chairman?)

A Shareholder: I beg the chairman to stop the meeting. (Great uproar.)

Mr. James: I cannot wait here, it is a waste of time.

A Shareholder: Good-bys, good-bye; why did you come at all?

Mr. James then left the room.

Mr. C. Hayward said he was certain that all those who had subscribed to the capital of the company did so on the faith of the statements in the prospectus, believing that the affairs of the company would be managed by competent men, and that due attention would be paid to reports coming from the other side. This, he considered, had not been done. He held that it was not necessary to have a highly paid secretary out in Vancouver, and that a clerk at £200 a year would be able to do all that was necessary. He concluded his remarks by moving that a letter should be sent from London to the local committee, to the effect that the meeting was of opinion that the statements made by the directors did not afford grounds for concluding that the local directors in British Columbia were responsible for the mismanagement of the company's affairs, and requesting the local directors to withdraw their resignations, and continue to act in that capacity.

The motion was seconded, and after some further heated discussion, carried.

Meeting of the New Vancouver Coal-Mining and Land Company, Limited.

A General Meeting of this Company was held on Tuesday, 19th ult., at 12, Old Jewry Chambers, London, E.C., Mr. John Galsworthy presiding.

The Chairman, in moving the adoption of the report and accounts, said the reconstruction was completed in March last, when the present Company took over all the property of the old. He congratulated the shareholders on the fact, because he considered they had benefited very considerably in their position. In the first place, they got rid of the inequality on their shares, and at the same time they got rid of the liability existing on a certain portion of the shares. They also got the advantage of a rearrangement of the balance-sheet. Further, they got more ample powers. Previously they were in a very cramped position with regard to their powers, because the articles were framed a very long time ago, and they found themselves often in a difficulty with regard to their powers. The reconstruction, however, had given them more elastic powers, and in all respects more satisfactory to the directors. As to what they had done since the reconstruction, for the four months since that period they had made a net profit of £4,995, and from the balance-sheet which the liquidator had sent them they would see that from last December to June they made £8,157; thus, for the twelve months together, the net profit was £13,152. That profit contrasted very unfavorably, he must admit, with the profits made in the six months from June, 1888, to December, 1888, which was a period of extreme prosperity for the Company. But for that prosperity they would have found themselves in an awkward position, but in consequence of that great profit, they were in an extremely satisfactory position. At the meeting in May he foreshadowed that they would have not such good prices, and it was partly that which induced him to press the adoption of the contract with Messrs. Rosenfeldt upon their consideration. That prognostication had been realized, for whereas in the six months ended when he was speaking they made a profit of \$4.50 per ton during the period ending June, 1889, the price had only been \$3.50. The profit from coal for the half year had been very small, owing to the bad range of prices at San Francisco. The output for the four months had been 58,000 tons, and for two months 47,000, making together 105,000. This was a very large output, and ought to have yielded much more profit, no doubt. There had been issued the same number of debentures as before; all had been taken up, and they had not had one dissident, either from a shareholder or debenture holder, in carrying through the reconstruction. With regard to the state of the works, that was given very fully in the report; but that day they had received a telegram from Mr. Robins, which carried that matter a little further. It was as follows:—"East Field Mine: No. 1 level (canal) continues in good coal 6 ft. thick. No. 3 level: No change. No. 3, South Field mine, in good coal, but working approaching two barren districts pierced by No. 4 slope. No. 2 South Field slope, stopped by fault, driving two drifts across lode No. 1; slope in fairish coal. North Field Mine: Driving four levels all in good coal, 4½ feet thick; railway nearly graded; began laying rails; expect to ship cargo this year." The board had declared a dividend of £2 10s. per cent., making with the dividend paid in June, 5 per cent. out of the amount of profit transferred from the old company. The dividend did not affect the profits made by the new company; that was hardly sufficient for them to expend in that way, looking to the fact that they had

had to spend so large an amount of money on capital works for the last year.

Mr. Joseph Fry seconded the motion, which was carried.

In reply to Professor Lambert, Mr. Tendron (another director) said that the amount that had been written off under the reconstruction scheme was £44,549.

Professor Lambert: That means we are £44,000 to the good.

Mr. Tendron: That is a very safe shot; we are that or something more.

The Chairman then moved a vote of thanks to Mr. Samuel M. Robins, the Company's Superintendent, for the zeal and ability he had displayed in the management of the Company's affairs during the last half year.

Mr. Tendron, in seconding, spoke of Mr. Robins efforts in promoting the interests of the Company as indefatigable. The duties he discharged were multifarious. The only fault he (Mr. Tendron) had to find with him was that, having so many duties to discharge, and knowing the extreme confidence they placed in him, Mr. Robins thought that was sufficient for them as directors. Let him, however, say that their duties as directors could not be devolved, and he must obtain their counsel and sanction before certain matters were carried out. They trusted that he would enter fully into their views, and that they would not have to again make this the only complaint that could be urged against him.

Mr. Blundell seconded the resolution, which was carried without dissent.

Votes of thanks to Mr. McGregor, the mining engineer; Messrs. Rosenfeldt, the agents at San Francisco; and, finally, to the chairman and directors, terminated the proceedings.

The Production Of Coal In The British Colonies and Possessions—From

the annual Mineral Statistics just issued, it appears that the output of coal at the Cape of Good Hope during the year 1887 was 20,014 tons, of £56,047 value, while 5,600 tons were raised in metal, valued at £3,465, giving a total output for Africa of 25,614 tons. In India a total of 1,560,393 tons is given as the production, but the returns are stated to be incomplete. Of the total output of 3,750,459 from Australasia, New South Wales contributed 2,922,467 tons, as against 2,830,175 in the previous year; New Zealand 558,620 tons, as compared with 534,850 tons in 1886; Queensland 238,713 tons, as against 228,656 tons in 1886; Tasmania 27,663 tons, as against 10,291 tons in 1886; Victoria 3,226 tons, as against 86 tons in 1886. Canada produced 2,115,031 tons, an increase on the previous year of 759 tons.

Dangers of Afterdamp.—The following

very valuable explanations and cautions are given by Mr. W. N. Atkinson, one of Her Majesty's inspectors of mines, in his report on the Hyde Colliery explosion, which occurred on the 18th January last. "It may not be out of place here to say a word of warning to persons who, without experience of large explosions, are called upon to enter a mine after an explosion has taken place. They should bear in mind that the resulting afterdamp is of an extremely poisonous nature, and that it may be fatal to men when its presence cannot be detected by the lamps, or directly by any of the senses. It frequently occurs that men proceed into the workings before the ventilation is restored, and are not aware of the poisonous nature of the atmosphere, until they are so far overcome as to be hardly able to retrace their steps into purer air, and sometimes they perish. It is probably carbonic oxide which poisons them. A minute proportion of this gas in the air is fatal to animal life. It is invisible, and has very little odour. The lamp, on which the miner chiefly depends for information as to the state of the air, is useless to warn him that carbonic oxide is present, even when in such proportion as to be rapidly fatal."

Memo. of Quartz Crushed and Yield of Gold by Nova Scotia Mines from July 1st to November 30th, 1889, as per Returns received to date by the Department of Public Works and Mines.

NAME OF MILL.	WHERE SITUATED.	JULY.			AUGUST.			SEPTEMBER.			OCTOBER.			NOVEMBER.					
		Quartz Crushed.			Yield of Gold.			Quartz Crushed.			Yield of Gold.			Quartz Crushed.			Yield of Gold.		
		Tons.	ozs.	dwts.	Tons.	ozs.	dwts.	Tons.	ozs.	dwts.	Tons.	ozs.	dwts.	Tons.	ozs.	dwts.			
Wm. E. Pye (Deputy Commissioner)	Sherbrooke											390	59	19	110½	17	13		
Dufferin	Salmon River	800	157		800	219		550	145	10	680	103		800	149	10			
Oldham Gold Mg. Co's	Oldham	132	69		95	173	4				115	114	12	117	148	3			
Lake Lode	Caribou	88	39		70	36	11	53	30	7									
Damas Touquoy's	"	420	53	2	435	22	9	343	16	1	408	17	11	390	50	18			
Moose River Gold Mg. Co's	"				163	50	19	17	2	16	105	15	13	175	19	4			
Caffrey's	"										66	29	11						
Herbert Dixon's	"															66	12		
Withrow	Unincke	35	96	5	30	164	7				30	122	5	20	81	12			
Phoenix	"	125	16	7	200	21	5	235	24	2	225	29	6	232	31	5			
Eastville	"										33	82	3	9	19	17			
Oxford Gold Mg. Co's	Lake Catcha				94	16	12				199	67	9	67	165	12			
McGuire's	Whiteburn	27	93	8	31	101	5	29	78	10	28	74	15	30	150				
Whiteburn Gold Mg. Co's	"	153	148	2	116	134	17	110	126	17	153	146	14						
Egerton	Fifteen Mile Stream	152	78	2	168	77	11	183	130	15									
Rockland	Stormont	269	161		191	94	6	244	137	16	227	148	5						
Brunswick Gold Mg. Co's	Tangier	50	5	2				68	17	6	45	14	2						
Moxsland	"	26	4	3	5	15	12												
Philadelphia Gold Mg. Co's	Brookfield (Queen's)	101	125		130	131	16	176	159	10	105	74		140	89				
Kempt	Kemptville	25	24	10	24	23		24	23	10									
Free Claim	Renfrew	20	35	15							51	71	10						
Millipseget	Millipseget				9	3	15	1	1	15									
El Dorado	Wine Harbor				176	146	10	131	58	18									
Northup Gold Mg. Co's	Central Rawdon	100	352		85	189	10	100	218		50	71							
Annand's	Montague	70	67	5	80	71	1	30	173	8	104	315	5						
Jos. Kayes'	"	4	2	18	15	29	13												
Parker & Douglas Co's	Malaga	140	48	8	131	60	13	100	28	10	146	52	8	141	50	15			
Malaga Gold Mg. Co's	"	200	342		207	371					405	512	8	255	301	14			
New Brunswick	Harrigan Cove										10	3							
Eureka	Ecum Secum				65	35	10				119	33	16	11	11	5			
Neptune	Gold River	384	112	2				117	54	13									
Elmsdale Gold Mg. Co's	Elmsdale	10		16										41		12			

RECAPITULATION

July	2,036 ozs. 7 dwts.	October	7,158 ozs. 42 dwts.
August	2,190 " 11 "	November	1,353 " 12 "
September	1,423 " 4 "	Total	9,167 ozs. 6 dwts.

NOTE.—The returns for November are not yet complete, there still being some fourteen or fifteen mills to hear from. The value of the gold yield for these months is estimated at \$18 per ounce; or \$165,011.40.

PHOSPHATE.

In General.

"It is most satisfactory," says the *Trade Review*, "to notice the increased attention that is being paid to Canadian phosphates on both sides the Atlantic. Ultimately Canada must become the great source of supply, but, as we and others have repeatedly pointed out, there are too many interested people who insist upon making bonanzas out of the properties, or the enterprises with which they are connected. This has, very naturally, had a repellent, if not absolutely destructive effect, as capitalists who would be investors are not prepared to give the whole earth or its equivalent, for the few acres of apatite which these greedy persons control. The fact cannot be disguised or denied that several promising Canadian investments have been neglected for this very reason, but despite this, their intrinsic attractions are such as to have rivetted attention upon them and, through them, upon numerous other Canadian ventures of the same class."

A statement recently issued from the Comptroller-General's office of South Carolina, shows that the receipts by the State from phosphate royalties for the year ending Aug. 31, 1889, were \$206,805.91, with \$14,010.01 still due the State. The receipts for the previous year were \$186,993.87, showing an increase from that source of income of \$16,912.04.

The many friends of Dr. Penrose, lately connected with the phosphate industry of Canada, and now on the Geological Survey of the State of Arkansas, will be interested to hear of his movements. He writes from San Francisco, Nov. 29th:—"On my return to Little Rock in October I received orders to make a general report on the manganese ores of the Rocky Mountains and the Pacific coast. I had already made a report on the manganese of the Atlantic slope from the Gulf of St. Lawrence to the Gulf of Mexico, and had explored deposits in New Brunswick, Nova Scotia, Georgia, Arkansas and elsewhere. I left Little Rock the latter part of October and went first to Colorado and thence to Utah and Nevada. Then I came to California and after I have finished this State will go to Oregon, Arizona and Texas. For almost a month I was in the great deserts of Nevada, Utah and Western Colorado, which is one of the most dismal regions I ever travelled in." He gives a most graphic description of the weird scenery and the hardships of travel in a district where there had been no rain for three years. His indomitable energy seems to have found a sphere for its abundant exercise.

Templeton District.

We understand that the Blackburn mine has passed into the hands of an English syndicate, but the purchase price is not stated. The drift cut into the side of the big pit struck phosphate on the 15th of November, and is continuing a daily output of the finest ore. All the other "shows" are yielding large quantities, and are improving as the work progresses.

Kingston District.

The Foxton mine continues a steady output of 300 tons per month, its total production since the Foxton Mining Company purchased the property being officially stated at 1,600 tons. More

powerful machinery is now being fitted up at the mine, and more steam drills are to be put to work.

Perth District.

The Anglo-Canadian Phosphate Company continues its system of contract mining at Otty Lake and Bob's Lake. At the Otty Lake mines the "shows" are reported to be better than they have been for years, and fourteen new contractors have gone to work. At Bob's Lake a great number of productive seams are now opened and wait an enlargement of work that is soon expected to be made. The contractors continue to secure a very large output in proportion to the men employed, and the phosphate is found to be of a rich green color and of the highest quality as the work gets away from the surface.

Du Lievre District.

Mr. F. Stacey Shirley, New Bedford, Mass., proprietor of the grinding mills at Basin-du-Lievre, writes that he has perfected arrangements for doing a large business next season on his property. He says: "I find the interest in Canadian phosphate has become general, and I am thoroughly convinced that the crude rock itself, when finely pulverized, is a first class fertilizer, but we shall proceed to put it into form for immediate assimilation in the soil. I am already assured of sufficient sales to induce me to put in two new grinding mills, and if I can arrange for a supply of rock at reasonable rates, I intend to fit up the mill so as to produce from 50 to 80 tons per day. A chemist I am associated with has perfected a process for producing a cheap acid from waste products, which (if it proves as big a thing on a commercial scale as it does in laboratory tests) will create quite an industry in your section, and prove a valuable aid in furthering the success of my enterprise. I feel the time has come to create a business there, and mean to be one of the first in the new field."

Just as we go to press we learn of an unfortunate accident at one of the pits at the North Star, by which a couple of miners have been severely injured by a fall of timber. At time of writing it is not known whether the injuries are fatal.

There is nothing new to report from the other mines, at which work will be suspended as usual for a day or two during Christmas week.

Shipments, 1889.

Since our last report we have been advised of the following additional shipments of ground phosphate from Ottawa Valley mines to United States:

Buffalo, 200 tons	Value	\$2,000
Chicago, 50 "	"	500
250 "	"	\$2,500

There have also been 480 tons shipped from the Lievres district to Capleton for home consumption.

In our shipments to Europe under date of Nov. 9th, an omission of two tons in Messrs. Millar & Co.'s export was made.

The following shipments include the whole shipments to 18th December and an estimate of the total production from Canadian mines for the year 1889:

	Tons.	Bags.	Bbls.
Exported to Europe	23,542	132	2
Exported to United States	4,176	—	—
Home Consumption	480	—	—
Estimated quantity held over at mines	5,000	—	—
Total production 1889	33,198	134	2

MINING NOTES.

Nova Scotia.

In our August issue we published details of the gold production of the Province for the half year, ended 30th June, and in another portion of this issue, our readers will find details of the gold yield for the five months subsequent to that date. As will be seen, the returns for last month are not quite complete, some twelve or thirteen mills having yet to send in their returns, but it is apparent that the total yield for the year will be greater than 1888. We are much indebted to the Commissioner of Mines, and to his accountant, Mr. R. H. Brown for these interesting statistics.

Mr. R. G. Leckie, formerly Managing Director of the Cumberland Railway & Coal Company, has we understand, accepted the position of manager of the Londonderry Iron Co., taking office in the beginning of the year.

New Brunswick.

The Pope Manganese Company has made application to Letters Patent of Incorporation. The capital stock actually subscribed is \$75,000. The chief place of business is at Markhamville. The applicants are: Charles H. Converse, of Newton, Mass., merchant; William Pope, of Boston, Mass., merchant; Alexander Pope, of Boston, Mass., artist; William C. Pope, of Boston, Mass., merchant; Francis Ware, of Boston, Mass., merchant. Charles H. Converse, Alexander Pope and William C. Pope, three of the above named applicants, are to be the first or provisional directors.

Quebec.

Notice of application for incorporation has been made on behalf of the Canada Iron Furnace Co., Montreal. The capital is to be \$200,000, in 2,000 shares of \$100 each. The applicants are: P. H. Griffin, Buffalo, car wheel manufacturer; Robert Schott, Sheffield, England, steel manufacturer; George Edward Drummond, James T. McCall, Thomas J. Drummond, Montreal, metal merchants, and William John White, of Montreal advocate; of whom the said Patrick Henry Griffin, Robert Schott, George Edward Drummond, James T. McCall and Thomas J. Drummond shall be the first and provisional directors, the majority of whom are residents in Canada.

The United Asbestos Company, limited, of London, who own all the asbestos mines in Italy, have recently purchased the Fréchette-Douville asbestos mining property at Black Lake. This property is well known for its excellent quality of asbestos, and has very greatly improved during the last season, at least two-thirds of the asbestos mined having been of No. 1 grade, of a quality not inferior to the best obtained from the Thetford mines. We understand that the United Asbestos Company's manufactures principally consist of the Italian fibre, which they claim to be superior to that found in Canada for many purposes, but they use also a certain quantity of Canadian asbestos, and the recent advance in the price has induced them to purchase a mine of their own. Seeing that they are the oldest manufacturers in Europe, this policy will place them in a very

strong position to meet the demand for all classes of material. We understand that, although the company has given some extensive orders for machinery to enable them to vigorously work their property, they will not have very much asbestos from their Black Lake mine for disposal to other manufacturers, and those therefore who require supplies should make early application. Mr. John J. Penhale, of Black Lake, has been appointed the manager. The chief offices of the company are at 161 Queen Victoria street, London, E. C.

Ontario.

"The Provincial Natural Gas and Fuel Company of Ontario" has made application for incorporation under the provisions of the Companies' Act (Rev. Stat. of Canada, 1886, Chap. 116.) The objects of the new concern are to utilize natural gas, oil and salt in the counties of Lincoln and Welland. The chief places of business will be at Welland and at Toronto. Capital \$500,000 in \$100 shares. The applicants are:—Peter McLaren, lumberman, Perth; John Fisher Wood, M.P., barrister-at-law, Brockville; Napoleon Alexander Coste, civil engineer, Amherstburg; Eugene Marius Antoine Coste, mining engineer, Toronto; Loftus Cuddy, banker, Amherstburg; Donald McGillivray, merchant, Port Colborne; Joseph Kavanagh, merchant, Ottawa; Hon. John Graham Haggart, Postmaster General, Ottawa; Edward Andrew Smyth, gentleman, St. Catherines; John Gale Dickson, gentleman, Niagara; Richard Harcourt, M.P.P., barrister, Welland; William Henry Curtis, contractor, Olean, N.Y.; James Morris Balderson, barrister, Ottawa; O'Brien Joseph Atkinson, barrister, Port Huron, Mich.; Michael Andrew McHugh, barrister, Windsor; William McGregor, general dealer, Windsor; Maurice Bartholomew Twomey, merchant, Amherstburg; Auguste Emile Rondot, merchant Amherstburg, and Thomas John Watters, accountant, Ottawa. Peter McLaren, John Fisher Wood, Napoleon Alexander Coste, Eugene Marius Antoine Coste, Loftus Cuddy, Donald McGillivray and Joseph Kavanagh, are to be the provisional directors of said company.

Reduction Works, capable of smelting 70 tons per day, and crushing 150 tons, are at present in course of construction at Rat Portage.

Amongst the companies lately registered in London was the Murillo Silver mine, limited, registered by Granville, Smith & Co., Leadenhall street, E. C., with a capital of £60,000 in £1 shares. Object, to carry into effect an agreement for the sale to the company of certain freehold lands, containing in all about 80 acres more or less, together with the mines and mining claims or rights thereunder, lying in the territory of Thunder Bay, known as the Murillo Silver Mines Estate, and certain building, machinery, plant and effects.

The natural gas wells recently discovered at Welland are being energetically opened up. The pressure of the two wells, it is stated, is sufficient to allow the gas to be piped 100 miles.

The Sydenham Mica and Mining Co. operating in the Township of Loughboro, is now employing some 50 miners in mining and preparing its mica for the market. The mines are furnished with an excellent plant. The output for the year has been fully up to expectations.

Port Arthur District.

Operations at the principal silver mines continue pretty much as usual with the exception

of the Badger, where a large reduction has been made in the force, owing to the closing down of the Stamp mill. The supply of water is very limited, and during the severe cold of mid-winter it cannot be operated to advantage. It is not likely that further shipments will be resumed until the railway reaches the mine.

The Beaver mine keeps steadily in full force, and the district at large will benefit much from the enterprise of the management in securing a diamond drill, which has already produced evidences of rich ore bodies at a great depth below the present workings. It is the intention to test the formations to a depth of 1,200 feet.

The Shuniah Weachu mine has been shipping another rich carload of ore to England, and at least one hundred tons equally as good will be ready in spring for the railroads. The last shipment realized nearly \$100 more per ton than was estimated. They are getting rich ore from the different points in the mine.

The West End management have just returned from Denver, Col., well pleased with the result of the sale of the last carload shipment.

Progress is being made at various other mines and prospects. The Crown Point mine is reported to have made a good sale of its first carload shipment, and good results are obtained at the Elgin mine. Work is also in progress in the Wolverine, Mink Mountain, Medicine Bluff and other good prospects.

Owing to the favorable open season good progress has been made on the Port Arthur, Duluth and Western Railway. The contractors, accompanied by W. H. Howland, ex-Mayor of Toronto, and others are going out to the end of the track at the Kammistiquia River, and from thence will take a trip through the mining region as far west as Silver Mountain. Some American capitalists have secured the famous Kakabeka Falls property, and are laying out a town site and making extensive preparations for smelters, pulp mills, and other factories—in which electricity produced from a water-power at least three times as great as Minneapolis can boast of—will play an important part. A branch line of railway to connect with the P. A. D. and W. Railway is now being located.

A smelter in such close proximity to the extensive silver, lead and iron deposits in this neighbourhood will fill a long-felt want.

What we want next is for the Government to permit the free entry of such mining machinery as is required in the district and not manufactured in Canada.

Gold Mining Supplies.

The principal depot in Nova Scotia, carrying the most complete assortment of first class goods, is

H. H. FULLER & CO'S,
41 to 45 Upper Water St., Halifax, N.S.

Our line comprises Explosives, Fuse, American and English Mill and Hammer Steel, Bar and Bolt Iron, Steel Wire Hoisting Rope, Hemp and Manilla Rope, Rubber and Leather Belting, Miners' Candles, Oils and Lamps, Miners' Tools, Machinists' Tools, Blacksmiths' Tools, and every requisite for the gold miner.

H. H. FULLER & CO.,

Halifax, N.S.

The delay in issue of Patents by the Ontario Government for lands in Hunter's Island in the Rainy River District is causing a great outcry amongst those Americans who invested heavily there years ago. No surveys are permitted there at present by the Government under the mistaken impression that valuable timber limits might go astray under the heading of mining lands. The boundary between the Thunder Bay and Rainy River districts should be surveyed at once to prevent conflicting claims.

About twenty-four miles south-west of Port Arthur, in the Township of Crooks, a valuable deposit of native copper has been located, and considerable prospecting and developing is now going on. The fact that the ore averages from 8 to 10 per cent. of copper and is readily accessible to a good harbour on Lake Superior gives the find unusual attraction, and enquiries from capitalists are already numerous.

Manitoba and North-West Territories.

The Saskatchewan Railway and Mining Company will ask for an extension of their chartered line from its present terminus at Saskatoon, crossing the South Saskatchewan river and running north-easterly to Fort a la Corne, thence to the crossing of the Saskatchewan River at Grand Bend, thence north-easterly by the most favorable route to a junction with the Hudson Bay Railway (projected); also from the terminus in a northerly direction, crossing the North Saskatchewan, thence northerly to Green Lake, crossing Beaver River to Water-Hen River onward.

The London *Morning Post* had an interesting article the other day on the anthracite coal mines which the Canadian Anthracite Coal Company has been exploiting in the heart of the Rocky Mountains. In the course of its remarks it says: "Previous to November last the Admiralty employed upon the Pacific coast the bituminous coal of Vancouver Island, with the result that British men-of-war could be tracked by means of the black smoke for a distance of as much as 70 miles at sea. The advantage to our Pacific coaling stations of there being large deposits of smokeless anthracite within two days' railway journey of the coast is obvious. Moreover, the anthracite coal crops out in places along the mountain side, so that it is largely worked by horizontal tunnels, which are comparatively inexpensive in relation to vertical shafts, and the fact that the mines are close upon the main line of the Imperial Inter-Oceanic route of the Canadian Pacific Railway is another circumstance of prime importance. But the value of these Canadian anthracite fields is not based upon Imperial grounds alone, for as the ocean traffic between Vancouver and Australia, India, China and Japan undergoes its inevitable development, there is bound to arise a great and increasing demand for the smokeless fuel of which such large deposits exist in the Pacific territory of the British Empire. To this must be added the ever growing need for industrial purposes, a need that will make even Chicago, St. Paul and Minneapolis consumers of the Canadian anthracite. The United States Government is fully alive to the value of smokeless fuel in the naval marine, and it recently chartered two vessels to carry 5,000 tons of anthracite coal to the harbor of Pago Pago, in the Samoan Islands, which it is proposed to use as an American Government coaling station for vessels cruising in Pacific waters."

Appropos of the above, Mr. Macleod Stewart, president of the Anthracite Coal Company, wires to a member of the company from St. Paul, denying the telegram from Eau Claire which states that the deal with the English capitalists is off. Mr. Stewart recently returned from England with a modified cash proposition for the entire property. To the new terms the American stockholders unanimously agreed, and an option was granted Messrs. Stewarts, giving them control of the property. Negotiations are being rapidly closed with the English syndicate, whose capital is stated to be one and a half millions.

British Columbia.

The coal trimmers of Nanaimo have formed a union for the express purpose of keeping this work among themselves and to meet all the requirements of vessels arriving in that port, so that there will now be no delay in obtaining trimmers, as has very often happened. Recently there has been a number of miners, who, not being satisfied with working in the mines, are very often to be found seeking the trimming work. The trimmers are also endeavoring to obtain the right of trimming at the Bay, where the Chinamen now receive 50 cents an hour for mail vessels and 40 cents for other boats. A building will be erected near the wharf, so that the men can be on hand at a moment's notice, both night and day.

There is some talk of the erection of another smelter in Kootenay, so located as to suit the mines at Golden and Donald. Mr. McCarthy of Calgary, is the moving spirit.

Gold Commissioner Crimp of Cassiar, reports that the season just closed has been most satisfactory. The Bonanza on Dease creek, has done the best, panning out from \$7,000 to \$8,000. On the Tibbet creek the McVicar & Foster Company's claim has also done well, while Quartz creek has fully justified expectations. In all, Cassiar has produced between \$12,000 and \$13,000 worth more gold than last year. Had it not been for the rain and freshets which washed out the low lying claims, the returns must have been very considerable.

Messrs. Dunsmuir & Sons, proprietors of the several Wellington collieries, are most energetically prosecuting exploratory work at the coal lands purchased by them from Messrs. Horne and Sabiston, and situated between the East Wellington colliery and this city. It will be borne in mind that several years ago Messrs. Horne and Sabiston, together with Messrs. John Dick and Jacob Blessing, opened up a seam on this property and several hundred tons of coal therefrom were sold in this city. Then Messrs. Dunsmuir & Sons purchased the coal rights, amounting to between 500 and 600 acres. For some short time past the new proprietors have been running a tunnel or drift to strike the main seam of coal. They have already reached the main seam, and expect in the next 100 or 150 feet to strike the main seam. The work is under the immediate superintendence of Mr. Adam Ross, an experienced miner and overman. In a few months, at the outside, it is expected that this property, which has been facetiously styled "Jingle Pot," will be in a position to add materially to the general output of the Wellington collieries.

The following were the shipments of coal from Nanaimo for the month of November:

The New Vancouver Coal Co.	15,223	tons.
Dunsmuir & Sons.....	22,102	"
East Wellington Colliery.....	5,506	"
Union Colliery Co.....	4,300	"
	47,131	"

The shipments from the two camps at Kootenay Lake last summer were:

	Tons.	Silver per ton.
Number One.....	130	85 oz.
Little Donald....	66	95 "
Spokane.....	44	35 "
Della.....	16	105 "
Sky line.....	12	225 "
Gallagher.....	13	126 "
Krao.....	11	90 "
Silver King.....	60	300 "

These values do not include the lead, which, of course, will enhance values considerably. This return may appear very small, but when it is considered that the claims are being worked, as yet, only in a small way for development, and that only 10 per cent. of it can be shipped owing to the cost of transportation, these figures, after all, are very suggestive. Transportation to the lake is quite expensive, the means being by pack train.

Mining in the immediate vicinity of Barkerville has been good during the year, though scarcity of water has prevented better returns, but it is expected that the gold yield for the district generally will not be less than that of 1888. The test works are not yet completed in all details, but the balance of the material for the chlorination plant has arrived, and by this time will be in position.

Cheaply Mined Iron Ore.—The Dunn Florence and one or two mines in addition to these, being wrought on the ranges south of Ishpeming, are doing excellent work. At the Florence, ore is sold in the cars for \$2.25 per ton, and it is said the company netted about \$100,000 from its last year's product. The mine is a non-Bessemer, producing an ore that is liked by furnace men. It possesses a large deposit of ore which thus far, by reason of its nearness to surface, has been very cheaply extracted. As the mine grows in depth, the cost of production will increase considerably and profits will be reduced from what they now are, but still there will be a fair margin of profit, as the property possesses a wonderful amount of ore. The Dunn is making a splendid record, and has a magnificent storehouse to draw from.

Iron Ore in Great Britain.—Iron ore is produced in 29 counties of England and Wales, 12 counties of Scotland, and in one of the counties of Ireland. The production has fallen off seriously during recent years, and some of the older centres of production are becoming extinct, if they are not so already. Over 30 per cent. of the British ore requirements is now supplied from foreign sources, and the iron industry flourishes, though the ore is admitted free of duty.

South African Gold Production.—South Africa is fast looming up as a source of gold supply. The exports from the Cape and Natal for the eight months ended with August, aggregated \$4,695,000 against \$3,225,000 for the like eight months of 1888. The crushings for the Witswatersrand mines for third quarter of present year aggregated 64,387 ounces worth say, \$1,125,000, the increase averaged \$1,250,000 last month.

Gold Milling in the Black Hills.

(H. O. Hoffman, Rapid City, Dakota.)

(Continued from November issue.)

The latter corresponds with the height at which the issue of the pulp occurs. In the Homestake mortar the issue is raised by the insertion of the chuck-block 16½ inches above the foot of the dies, thus giving, with a shallower mortar, a deeper issue of pulp than the Caledonia mortar.

Dies.—The Homestake management casts its own dies. The quality of iron used is between gray and mottled, the top of the cylindrical part being chilled. The foot-plate has bevelled corners, and is 10 inches long, 10½ inches wide and 1½ inches thick. The cylindrical part or "boss" is 9 in. in diameter and 5 in. high. The level of the die is 10 in. below the discharge which takes place over the chuck block. The die weighs 121 pounds (one-seventh of the weight of the stamp) and lasts about six weeks, crushing 189 tons. By that time the cylindrical part has become slightly convex, and is worn down to 2 in. from the foot-plate. Its weight has then been reduced to about 30 pounds; thus 48 pounds of iron are consumed for every 100 tons of rock that are crushed.

The Caledonia mill buys its dies outside. They are of chilled white iron. The foot-plate has also bevelled corners, is 10 in. wide by 9½ in. long and 1½ in. thick. The cylindrical part is 8 in. in diameter and 5½ in. high. While the dies in the Homestake mortar fill its bottom completely, those of the Caledonia fit perfectly in the width only, there being a 3-in. space in the length that has to be divided up between the five dies. The distance from bottom of screen to top of die is 6 inches. The die weighs 160 pounds (about one-fifth of the weight of the stamp) and lasts three months, crushing 300 tons of hard rock. The cylindrical part is then worn down within 1 in. of the foot-plate. The worn-out die weighs 38 pounds, making the consumption of iron 40 pounds for every 100 tons of rock.

Amalgamated Copper Plates are placed along the entire length of the mortar. In the Homestake mortar, one plate is set to the discharge opening; in the Caledonia mortar, there are two plates; one under the discharge, the other beneath the lip of the feed opening.

The Homestake mills use the so-called chuck-block (half elevation, Fig. 2 and Fig. 3), placed against the lower flange and the two side-flanges of the discharge. The chuck-block consists of a 2-in. plank, bolted to the back of a 1½ in. board, and extending from 2 to 2½ in. above it. Its inside upper edge is rounded off, and over this, and along the inside face, a 3-16 in. copper plate is fastened with iron screws. The recess formed on top of the front board, 1½ in. wide and from 2 to 2½ in. deep, is taken up by the lower part of the screen-frame. Between this and the front board is placed a strip of carpet to form a tight joint. The frame is held in place by a vertical piece of flat iron bolted to the centre of the front board, a horizontal wedge being driven between the two. The front board has an iron facing along its lower half, and two vertical strips towards the ends, to protect the wood against the two horizontal and the two vertical wedges with which it is fastened to the mortar. To the back (beneath the 2 in. plank having the sheet copper), is tacked a strip of rubber cloth, which helps to make a tight joint between wood and flange of mortar. Two chuck-blocks, of different heights are in use. When the dies are new, a chuck-block 7 in. high is inserted; when they have

worn down 2 in., another chuck-block, 5 in. high replaces it. Thus the height of discharge is kept nearly uniform. The distance between the face of the shoe and the chuck-block (2 in.) is rather small. The violent motion of the battery-water drives the sands against the copper plate and scours off amalgam that has been caught on it. Thus comparatively little amalgam can settle on the plate. Wooden chuck-blocks last six months. After this time the coppers have to be removed and put upon new blocks, or they are scraped very carefully, put aside, melted and sold. Mr. R. Graham, the millwright of the Homestake mill, has therefore replaced, in his mill, the 2-in. plank, to which the copper plate is screwed, by $\frac{3}{4}$ -in. iron, to which the 3.16 in. copper plate is riveted with copper rivets. The face of the $1\frac{3}{4}$ -in. wooden front board is covered with $\frac{1}{2}$ -in. iron; thus the distance between face of shoe and Graham chuck-block is $3\frac{5}{8}$ in. instead of 2 in. This iron chuck-block lasts as long as the mortar, and more amalgam collects on it than on the wooden one. Of the free gold recovered, 55 per cent. is caught on this inside plate.

The reason that the Caledonia mill has amalgamated copper plates at both front and back is that the ore milled is not oxidized at all, which makes it harder to extract the gold. The aim is to keep the pulp longer in the battery and thus counteract the refractory character of the ore. The plate in front is 5 in. broad, the one at the back 8 in. Both are made of $\frac{3}{4}$ -in. copper and are simply bolted to the mortar, the lower edge of the plates being 9 inches above the foot of the dies. Of the free gold recovered, 60 per cent. is caught on these inside plates.

Screens.—Both diagonal-slot and wire screens are used in the district. With the exception of the Father de Smet mill, which uses partly No. 30 brass-wire screens, all Homestake mills use diagonal-slot screens made of heavy Russia iron. The needle number is 7, corresponding to a 30-mesh wire screen, the width of the slot being 0.024 in. The thickness of the iron is $24\frac{1}{2}$ (American wire-gauge) and its weight 0.987 lbs. per sq. ft. The slots are $\frac{1}{2}$ in. long and there are eight (formerly only seven) to the inch. The punched surface of the screen is 48 x 7 in.; there is a margin of 1 in., making the entire screen 50 x 9 in. A screen lasts two weeks. The wooden frame is 4 ft. 4 in. long and $11\frac{1}{2}$ in. deep, and has a strengthening rib, $1\frac{1}{2}$ in. long, down the centre. In fastening the screen to the frame, the lap is first tacked on, to hold it in place, then a piece of rubber cloth, 2 in. wide, is placed over it, small holes are punched through rubber and lap of screen and both are nailed to the wooden frame. The screen is placed on the frame with the rough side facing the mortar. On the outside of the frame are fastened, by means of two screws, three iron facings, $\frac{1}{2}$ in. x 9 in. and $\frac{3}{8}$ in. thick, which protect the wood from the one horizontal and the two vertical keys that serve to wedge the frame against the chuck-block and the planed flanges of the discharge.

Some time ago experiments were made with screens of aluminium-bronze, which proved extremely satisfactory. The bronze contains, according to a letter from the Cowles Electric Smelting and Aluminium Co., 5 per cent. aluminium, 95 per cent. copper and a trace of silicon, and is furnished in unperforated sheets at 45 cents per pound. When new it has a golden color, which it loses with use. The width and length of the slots are the same as in the ordinary screen, but there are nine slots to the inch instead of eight. The sheet is 0.035 in. thick. This screen lasts six months

and does not break (while the Russia-iron screen breaks in two weeks). The wear is uniform over the entire surface, the slots enlarging to No. 5 $\frac{1}{2}$ needle. The screens are then past use. The bronze, however, is not lost, but can be melted down and made into new screens. It is the intution of the Homestake management to introduce this screen throughout all its mills. This would have been done already, had not the contracts for Russia-iron screens been made before the bronze screen was tried.

GOLD-MILLING IN THE BLACK HILLS.

TABLE II.—Dimensions, Power, Batteries, and Product.

Mill.	Dimensions.			Boilers.		Engines.			5-Stamp Batteries.						Product.			
	Length.	Width.	Vertical dist. of Crusher—floor above bottom of ore bin, ft.	Number.	Cords of wood per 24 hours.	Type.	Cylinder.	Inches.	Dia. Stroke.	Number.	Distance between lines.	Lbs. of stamps.	Drop.	Inches.	No. of drops per minute.	Tons crushed per stamp in 24 hours.	Tons milled in one year.	Bullion produced.
Homestake,	100.80	100.80	14 $\frac{1}{2}$	2	11	A	20	42	16	44 $\frac{1}{2}$	850	850	9	85	4.5	96,790c	\$903,407	\$3.71
Golden Star,	120.88 $\frac{1}{2}$	120.88 $\frac{1}{2}$	23 $\frac{1}{2}$	4	14	B	20	60	24	36d	850	850	9	85	4.5	146,565c	\$410,953c	\$2.82
Highland,	112.92	112.92	22 $\frac{1}{2}$	4	14	C	26	60	24	46d	850	850	9	85	4.5	146,013c	\$410,953c	\$2.82
Dendwood,	112.46	112.46	22 $\frac{1}{2}$	2	11	A	20	42	16f	k	850	850	9	85	4.5	216,361c	\$639,229c	\$2.02
Golden Terra,	112.46	112.46	22 $\frac{1}{2}$	2	11	A	18 $\frac{1}{2}$	42	16f	k	850	850	9	85	4.5	216,361c	\$639,229c	\$2.02
Father de Smet,	68.60	68.60	40	2	11	A	20	42	20	36f	850	850	9	85	4.5	73,422m	\$293,816m	\$4.02c
Caledonia,	84.46 $\frac{1}{2}$	84.46 $\frac{1}{2}$	40	2	11	D	20	30	12	k	850	850	12	74	3.3	73,422m	\$293,816m	\$4.02c

The Caledonia mill uses No. 24 brass-wire screens, the thickness of the wire being No. 26, and the screening surface 48 x 5 $\frac{1}{2}$ in. The screen lasts one week. It is fastened to a simple wooden frame, 53 x 12 $\frac{1}{2}$ in., the horizontal sides being 3 $\frac{1}{2}$ in. wide, the vertical sides 2 $\frac{1}{2}$ in. Three wooden ribs, 1 in. wide, divide the screen-surface into four panels and thus prevent it from bulging out. The fastening of the screen to the frame and the wedging of this against the mortar are done as at the Homestake, except that there the screen-frame is placed on the chuck-block, and here it is keyed against the

lower rim of the mortar discharge. The Caledonia uses wire screens because, although its stamps drop 3 in. farther than those of the Homestake mills, the splash is not so great, by reason of the greater width of the mortar and the space taken up by the amalgamated copper plate below the feeding-lip. The force of the splash in the narrow Homestake mortar is thrown entirely against the screen; that of the wider Caledonia mortar is divided between the screen in front and the recess at the back. Thus the slot-screen would clog, while the wire screen allows the pulp to pass through free.

The upper part of the discharge of both classes of mortars, above the screen-frames, is closed either by an inch board or by a canvas curtain, or piece of old belting, suspended from a lat. This curtain or belt hangs down and meets the screen in the mortar. It has the advantage over the board in that the amalgamator can readily pass his hand into the mortar and remove any chips of wood, etc., floating on the water or adhering to the inside of the screen.

We have seen that in the Homestake mortar the pulp is driven with some force against the screens. In order to break its fall upon the apron-plate, a splash-board is fastened to the frame of the latter, thus preventing any amalgam collected there from being washed away. The Caledonia motion has no splash-board, as the pulp does not pass the screens with sufficient force to endanger the amalgam collected at the head of the apron-plate.

Stamps.—The stamps (Figs. 1, 2 and 3) used by both companies are of the ordinary pattern. They weigh 850 lbs., about 16 lbs. to the sq. in. of crushing-surface, and their centers are 9 $\frac{1}{2}$ to 10 in. apart. For dimensions and other particulars as to the different parts, see the table already given.

The stem tapers 6 in. at both ends, so that when it breaks, usually where it enters the head, it may be reversed. At the Homestake mills, a stem lasts about three years before new ends have to be welded to it. The Caledonia mill requires for its 60-stamp mill five stems yearly.

The tough cast-iron head is without the wrought-iron rings which are often used at the upper or lower end. It has the usual keyways for the removal of stem and shoe. These are parallel instead of being at right angles, as is usual. To fasten the head to the stem, the latter is let down through the guide holes and the socket of the head placed directly beneath it. The stem is lifted and dropped and driven with a hammer, if necessary. Then the stem and head together are dropped several times on a piece of timber placed beneath, until they are quite firm. At the Homestake mills, a head lasts five years, after which the socket has become so enlarged that the stem cannot be securely fastened in it any longer. The Caledonia mill requires one head a month.

Both managements buy their shoes from outside foundries. To fasten the shoe to the head, the shank is surrounded by small wooden wedges tied around it with a string; the shoe is put in place; and stem and head are allowed to drop. Thus the shank is wedged into the recess of the head, and by raising the whole and allowing it to drop several times, the shoe becomes thoroughly fastened in. To prevent it from injuring the die, a piece of planking is placed on the latter. At the Golden Star mill, a very neat arrangement is in use for fastening the wooden wedges to the shank of the shoe. After the wedges have been placed around the shank, a strip of canvas is wound around them and tacked to each wedge, forming a sort of collar,

which can be easily slipped over the shank of a new shoe. This simple arrangement saves a great deal of time and labor on clean-up days, when a good many shoes have to be replaced.

After being some time in use in the battery, a shoe becomes slightly concave at the base, but wears, on the whole, more evenly than the die. At the Homestake mills, a shoe lasts two months, crushing 270 tons of rock. It is then worn down to two inches from the base of the shank and weighs 40 pounds. This corresponds to a consumption of 37 pounds of iron for every 100 tons of rock crushed. At the Caledonia mill, a shoe lasts three months and crushes 300 tons. It is replaced when worn down to one inch and weighs 35 pounds, which corresponds to a consumption of 35 pounds of iron for every 100 tons of rock. It may be asked why the Caledonia mill, which buys both its shoes and dies, does not use steel, which is so much more durable, and consequently cheaper, especially if the heavy freight charges are taken into consideration. The answer is that because steel lasts so much longer than iron, steel shoes and dies would continue in use after they had become uneven. This would reduce the crushing capacity of the battery, and thus in the end there would be no saving at all.

In order to secure the tappet to the stem, the wrought-iron gib is first put into the recess. The tappet is then slipped over the stem, and when it has reached the desired place, is secured by keys which pass at right angles between the gib and the iron shell of the tappet surrounding the stem. All the tappets of the Homestake mills have two keys, those at the Caledonia have some two and some three.

Both faces of the tappet are used as working faces. In wearing down they become uneven and ridges are formed. The tappet then has to be removed and planed off on a lathe before it is fit for further use. Once in three years, when the two faces have worn down $1\frac{1}{2}$ inches, the tappet is replaced by a new one. A tappet rarely splits. Case-hardened tappets and cams have been tried at the Homestake mills in the expectation that the hardened working surfaces would last longer, but the tappets cracked and became useless, as they could not be well planed off. Steel tappets and cams have not been tried. It takes from six to eight hours to change the tappets and cams of one battery.

At the Homestake mills, the drop is 9 in., the number 85 per minute, and the order 1, 3, 5, 2, 4. At the Caledonia mill the height is 12 inches, the number 74, the order 1, 3, 5, 2, 4 and 1, 4, 2, 5, 3. The Caledonia mill has such a hard rock to pulverize that it is forced to have a higher drop and consequently a smaller number of drops per minute. That the Caledonia mill has two different orders of drop is quite unimportant, as they both comply with the same requisition, viz., that no stamp shall be immediately followed in falling by either of those next.

Cams and Cam-Shaft.—The stamps are lifted by cams fastened to a shaft which rests in boxes. These are supported by shoulders in the front of the battery posts to which they are bolted. Ten cams are keyed to one cam-shaft, which is set in motion by the cam-pulley.

The cams are double-armed. They are of tough cast-iron and have the form of the involute of a circle (slightly modified at the end), the radius of which is equal to the distance from the center of the cam-shaft to the center of the stamp. The hub of the cam, which is on the off-side of the stem, is not strengthened with the wrought-iron band shrunk on it, which is often used, but is cast sufficiently thick to stand

the strain. At the Homestake mills the cams have a working face 2 inches wide and $3\frac{1}{2}$ inches deep. The strengthening rib, beginning at the end of the cams, gains in depth towards the hub, where it is $9\frac{1}{2}$ inches deep. The hub itself is $3\frac{1}{2}$ inches thick. The distance from centre of hub to end of cam is 17 inches. A cam lasts three years. The cams of the Caledonia mill differ only slightly from those of the Homestake mills. The face is $2\frac{1}{2}$ inches wide 2 inches deep, the strengthening rib at the hub $10\frac{1}{2}$ inches deep, the hub $3\frac{1}{2}$ inches thick, the distance from centre of hub to end of cam 19 inches. The cams, being made of cast-iron, last over four years. From ten to fifteen a year are required.

The cam-shafts are of tough wrought-iron, turned down in a lathe. They have one longitudinal key-seat. The keys with which the cams are fastened to the shaft are of steel and are hand-fitted. Wrought-iron keys lose their shape too quickly, and machine-fitted keys get loose very easily, a great disadvantage. It takes ten hours to replace a broken cam-shaft, supposing that the keys have been already fitted. This ought always to be done, as the fitting of each key-seat takes about one hour. A well-appointed mill always has on hand several cam-shafts, with the necessary cams and keys ready for use. The cam-shafts of the Homestake mills were formerly made $4\frac{1}{2}$ and $4\frac{3}{4}$ in. in diameter and lasted about five years. Now the tendency is to make them stronger. The largest in use at present are $5\frac{3}{4}$ in. in diameter, and good for ten years. The distance between centres of cam-shaft and stem is $5\frac{1}{2}$ in. The cam shaft of the Caledonia is $4\frac{1}{8}$ in. in diameter and its centre is $6\frac{1}{2}$ in. distant from the centre of the stem.

The cam-shaft pulleys, at the end of the cam-shafts, vary slightly in the different mills. At the mills of the Homestake they are 6 ft. and 7 ft. 5 in., at the Caledonia mill 7 ft. 4 in. in diameter, the face is usually 15 in. wide. The pulleys are of wood. Iron could not stand the continuous shocks caused by the dropping of the stamps, and would also be too heavy. The pulley is built on a cast iron hub with flanges, and keyed to the cam-shaft. When put in place, the shaft is made to revolve and the face of the pulley turned off to the desired form, that it may be perfectly true. The cams are lubricated with axle-grease. To prevent any of this from dropping on the apron-plates, hindering amalgamation, a curtain is stretched out beneath the cams to catch any particles of grease that these may throw off while in motion.

Crushing Capacity.—The crushing capacity of a battery depends on the efficiency of the stamp (that is, the number of foot-pounds developed), the character of the rock under treatment and the discharging capacity of the mortar (that is, the height and size of the discharge, the character of the screen and the width of the mortar at the discharge). The Homestake stamp weighs 850 lbs. and drops 9 in. 85 times per minute, thus it develops 78,030,000 foot-pounds in twenty-four hours crushing $4\frac{1}{2}$ tons of rock, or one ton for every 17,340,000 foot-pounds developed. The Caledonia stamp weighs 850 lbs. and drops 12 in. 74 times per minute, developing 90,576,000 foot-pounds in twenty-four hours, crushing 33 tons of rock, or one ton for every 27,447,272 foot-pounds developed. Thus, although the efficiency of the Caledonia stamp is greater than that of the Homestake, it crushes lessore. There are several reasons for this. First, the character of the rock, which is much harder than that at the homestake, second, the width of the mortar at the discharge (16 in.

against $13\frac{1}{2}$ in.); third, the 2-in. recess for the 8-in. amalgamated copper plate below the feed, which is absent at the Homestake mortar. From the lower discharge of the Caledonia mortar (6 in. against 10 in.) a greater crushing capacity would naturally be expected than from the Homestake mortar. The above reasons will explain why this fails. The smallness of the Caledonia screen (258 sq. in. against 376 sq. in.) may be assumed to be counterbalanced by its character (Caledonia No. 24 wire against Homestake No. 7 slot, which corresponds to No. 30 wire). The Caledonia Co. claims that more gold is recovered by its slow method than by the more rapid one of the Homestake. This point could only be definitely settled by exact tests.

Apron-Plate, Mercury-Traps, Sluice-Boxes.—In order to save the fine particles of gold that have not been caught on the inside copper plates and to collect any amalgam and quicksilver that have passed through the screens, an amalgamated copper plate, the apron-plate, is placed in front of the mortar. The motion of the battery water, caused by the dropping of the stamps, throws with the drop of each stamp some pulp against and through the screen. This, passing over the lip of the mortar, flows in small waves over the apron plate. During the slight interval between these waves any heavy particles of the pulp (quicksilver, amalgam or fine gold) passing over the amalgamated plate have a chance to settle upon, adhere to, and combine with it. The plate consists of one sheet of copper, nearly as wide as the discharge of the mortar, fastened with iron screws to the inclined wooden table beneath it. In all the Homestake mills (except the Deadwood and Golden Terra, where it is 12 feet long) the copper plate, $\frac{3}{8}$ in. thick, is 10 feet long, falls 2 in. to the foot, and discharges into a copper-lined trough, leading to the mercury-trap. The apron-plates of the Caledonia are 8 feet long, $4\frac{1}{2}$ ft. wide, and the copper is $\frac{1}{2}$ in. thick. They have the same fall. The wooden table extends 4 feet beyond the end of the copper plate, at the same time narrowing to a width of 4 feet. It has a 1-in. rib down the centre and is overlaid with two blankets, 5 ft. wide and 22 in. long, the upper overlapping the lower. On these the heavy sands collect. Each is washed every half hour in a tank. These blankets last six months. Carpets were tried, but they frayed and had to be thrown out after one month. The pulp from the blankets flows into the mercury traps, one being placed in the middle of the discharge for every plate.

The plates are of Lake copper, furnished to the mills ready for use, and do not require any annealing to make them porous. They have, however, to be flattened with wooden mallets to make them lie smoothly on the wooden table and to remove any inequalities produced during transportation. At the Homestake mills they are first scoured with sandpaper, followed by emery cloth or with tailings and a wooden block 4 inches square, or with a grindstone, until the face is perfectly bright. If necessary, the sand is moistened with a weak solution of potassium cyanide, and spots are often removed with dilute nitric acid. The surface of the pure metallic copper receives a solid coat of potassium cyanide, which is applied repeatedly as a strong solution by means of a soft paint brush. After two days the mercury is sprinkled on this cyanide coat and rubbed into the plate with a moist cloth and tailings. When the plate is thoroughly amalgamated it is put into place and is ready for use. More than the usual amount of mercury is added to the mortar, that the new plate may become normal. This takes from two

to four weeks, during which time the plates are continually discolored by copper salts. To get these into solution, potassium cyanide or ammonia is added to the battery-water. At the Caledonia mill the procedure is similar, only more care is taken to scour the plate with mercury before it is put into use. Only the ordinary quantity of quicksilver is then added to the mortar with a new plate. In none of the mills are the plates coated with amalgam before they are put to use, nor are there any silver-plated copper-plates used in the district.

The mercury-traps, through which the pulp passes on leaving the apron-plates, save amalgam and quicksilver not collected on the apron-plates. There are additional traps at the termini of the sluice-plates outside. At the Homestake mills, until about three years ago, the pulp flowed from the apron-plates directly over the sluice-plates into the waste flume. Then the traps were introduced. How important this simple contrivance is, can be seen from the fact that in the Homestake 80-stamp mill there are recovered every month, by the inside traps, 80 oz of amalgam and 144 of quicksilver; by the outside traps, from 10 to 12 oz of amalgam and 40 of quicksilver. These traps are emptied only once a month—on the fifteenth. If they were emptied twice a month, on clean-up days, a still better showing could perhaps be made. At the Caledonia the traps are emptied daily, when the apron-plates are being dressed; this is done because of the accumulation of concentrates.

At the Homestake mills the inside trap consists of a wooden box, with copper-lined bottom 14 in. long, 17 in. wide and 24 in. deep. It contains three sliding wrought iron plates, parallel with its short sides. These are placed 2½ in. apart, the centre one extending to the bottom of the box, the others to 3 in. above it. The pulp flows under the first, over the middle one, and again under the third. The outside trap is larger. The wooden box is 48 in. long, 14 in. wide and 48 in. deep. It has three partitions set 10½ in. apart, reaching from the bottom of the box up to 1½, 3 and 4 in. below the level of the inlet, the outlet being 6 in. below this. In the middle, between two wooden partitions, is let down a sliding wrought-iron plate ¾ in. thick, reaching to 3 in. from the bottom of the box. The Caledonia traps are much smaller, since there is one for each apron-plate.

The sluice-boxes, receiving the pulp from the inside traps, are simple wooden troughs with copper lined bottoms. At the Homestake mills, they are from 8 to 10 ft. long, 18 in. broad and have a fall of 1 in. to the ft. The copper used is ¼ in. thick. At the Caledonia mill they are 8 ft. long and only 8 in. broad as less pulp passes through them. The main sluice into which they discharge is 2 ft. square.

Steam-Stamps.—The Homestake Co. has just erected an improved ball stamp. This is a new experiment in gold milling. The steam-stamp is successfully used for crushing native copper-ores at Lake Superior, and sulphide copper ores at the Anaconda mine, Montana. The results of its application to gold ores may be given in a future paper.

VI. LABOR IN THE MILLS.

All the heads of the different departments are responsible to the superintendent. The mill proper is in charge of a foreman, thoroughly acquainted with every detail of work. One foreman often has the general charge of several mills, as with the Homestake and Deadwood Terra companies. Next comes the millwright, who sometimes has, as in the Homestake mill,

an assistant called the pipe fitter. The millwright combines the trades of carpenter and machinist. His duty is to make the guides, put them in place and keep them in order; to exchange cams and cam shafts, fasten any cams that have become loose, make and replace screens, make and repair chuck blocks, to reserve and exchange shoes and dies of crushers and to look after all the piping in the mill, in one word, to erect and keep in order every part of the mill for which any mechanical knowledge is required. One of his duties, for example, consists in lining all the shaftings and in babbiting their boxes.

In this connection might be mentioned a method of lining shafts which originated with Mr. R. Graham, the millwright of the Homestake Company, and which has proved to be quick and effective. When a shaft is to be lined, the boxes are placed so as to be approximately in line. The lower bearing, which is to receive the shaft, is loosely packed with clay and a wooden center pressed into it. This consists of a semi-cylindrical piece of dry wood having the same diameter as the shaft and about the length of the box. The wooden centers of two or more boxes are now carefully lined and the clay packed tightly around them. When in line the centers are removed, one after another, and the clay cut out crosswise in the middle of each box. The centre is then replaced and the hollow space filled by pouring in babbitt (in the middle of each box) is placed the shaft, which is now accurately in line. Finally the space left is filled with babbitt. In this way the shaft can be quickly and accurately lined, the bearings will be absolutely true and the lining from ¼ to ⅝ inches thicker than the ordinary ¼-inch lining, consequently the shaft itself will last longer.

After the millwright comes the machinist. The Homestake Company having a large shop, all repairs are made there. At the Caledonia mill the foreman is also a machinist, and any extensive repairs are made by the Homestake Company.

As the mills are driven by steam, each one has two engine-men, who are responsible for their firemen. To guard against fire or any other accident, there is generally a night watchman for every mill. These men are directly responsible to the foreman.

The man who has immediate charge of the running of the mill is the head amalgamator. He also stands directly under the foreman, and is responsible for his assistants, the amalgamators, crushermen, oilers, feeders and day-laborers, if there are any. As, in addition to running the mill, he has charge of the collecting and safe-keeping of the amalgam, he must be thoroughly trustworthy as well as capable.

The amalgamators feed quicksilver, regulate the water-supply, set tappets, renew shoes, dies, screens and chuck-blocks, and look after the running of the battery in general. Quicksilver is fed by hand every half hour with a little wooden spoon, similar to a mustard spoon. The quantity required in twenty-four hours ranges from ¼ to ½ lb for every battery, according to the character of the ore, which varies a good deal. The correct amount is found out by the "feel" of the amalgam collected on the apron-plates. If this be hard and crumbly, there is danger of amalgam being carried off by the pulp, and more quicksilver is added. On the other hand, if too much quicksilver is fed into the mortar, the plates become too soft and slippery, less amalgam collects on the inner plates, and there is danger of liquid amalgam rolling off the apron-plates. Two methods of adding quicksilver are in use. At the Home-

stake mills, all the quicksilver required is added in the mortar, and the amalgam obtained is of medium hardness. At the Caledonia mill it is the aim, by adding only part of the quicksilver in the mortar, to make the amalgam on the inside plates as hard as may be, and to add the rest to the apron-plates, keeping these somewhat softer than those of the Homestake mills. Each management is satisfied with its own way of feeding the quicksilver, and it would be difficult to decide in favor of either method. Perhaps the fact that the Caledonia ore has, on the whole, coarser gold than the Homestake ore, may explain this difference in feeding.

The entire loss in quicksilver incurred by the Homestake management per year per stamp is 5.27 pounds, or, according to the tons of ore milled by the Homestake and Golden Star mills, 0.0044 pounds per ton of rock crushed. The entire loss incurred by the Caledonia mill is 7 pounds per year per stamp, or 0.0011 pounds per ton of rock crushed. Of course, with the hard and strongly-mineralized rock the Caledonia mill has to crush, more quicksilver will be floured per stamp than with the Homestake rock; and on account of the smaller quantity of rock crushed per stamp, less quicksilver is consumed per ton.

The amount of water required will vary according to the specific gravity of the rock, the percentage of sulphurets and the incline of the apron-plates. An excess of water will make the pulp in the mortar too thin (thus preventing an intimate contact of gold and quicksilver), will assist coarse crushing and will hinder the settling of amalgam on the apron-plates. Too little water will assist amalgamation, but will hinder pulp from passing the screens and will not carry that which has passed through them. As a rule it is better to use too little water than an excess. The right amount will just carry the pulp evenly over the apron plates. The Homestake mills use in twenty-fours 1 inch of water per battery, the Caledonia mill 1½ inches.

The setting of tappets is necessary that the stamps may always have the same height of drop, whether the shoes and dies are new or somewhat worn down. To accomplish this, the stamps are hung up, the mortar opened, the stamps then lifted up by means of an iron bar, used as a lever, and a block of wood, 1 inch higher than the desired drop, placed between shoe and die. The tappet is then loosened, allowed to fall on to the prop and again keyed fast. As the prop and the block of wood, placed between shoe and die, are both 1 inch higher than the required drop, on removing the blocks, the stamps will all have the desired uniform height of drop, while the different levels at which the tappets are keyed to the stem, will indicate how much the shoe and die are worn down.

The crusher-men, in addition to looking after the grizzlies, breaking the coarse rock and feeding the crushers, have to watch for any pieces of wood and iron found amongst the ore, take it out and throw it aside. This is the only way in which the amount of chips of wood entering the mortar can be reduced to a minimum. All small pieces of wood that pass through the grizzlies are finally found in the mortar, where they are periodically removed by the amalgamators, if not previously taken out by the ore-feeders, when the ore passes from the trough of the automatic feeder into the mortar.

The oilers have to keep all wearing iron parts of the mill lubricated and have to be especially careful not to use any excess of grease at parts where it might drop into the mortar or upon the apron-plates.

The feeders attend exclusively to the regular and uniform feeding of the ore. The principle followed is to "low." The height of ore between shoe and die should never be more than 1 inch and as much less as is possible without the stamp beginning to pound, or, as Mr. Adams* expresses it, "let iron almost wear on iron."

One or two day-laborers are generally found around a large mill, because there is apt to be constant need of extra work which does not fall within the province of the regular hands.

The shafts in the mills are changed monthly. Table V. shows the amount and kind of labor in mills of 60, 80, 100 and 120 stamps.

From the foregoing table it will be seen that the Caledonia mill employs fewer men than any of the other three mills. In comparing the 80 and 120 stamp mills of the Homestake Company, located next to each other and working on the same ore, we see that only three more men are required in the latter than in the former, although the product is half as much again. From this it can be seen that a large number of stamps is very profitable, as greatly increasing production without necessitating commensurate outlay of labor.

Daily Collecting of Amalgam and Dressing of Plats.—The amalgam which has collected on the apron-plates during the previous twenty-four hours is removed every morning when the day-shift begins. At the Homestake mills the head-amalgamator, at the Caledonia the day-amalgamator, each with an assistant, has charge of the operation. Every amalgamator has his own way of managing the details of this work, although the general outline is always the same. The method of the Golden Star mill will serve for illustration.

When the plates are to be cleaned, the water supply of the one battery is shut off, the stamps are hung up and the splash-board removed and washed at the head of the apron plate with water through a hose. It is then placed at the lower end of the plate and the hose is turned on to the screen and apron to remove all the sands that have collected there. The plate, if normal, is now clear and bright, except for occasional spots, so-called blisters, resulting from iron and copper salts. These are removed with a scraper (a blunt, double-edged chisel). Then the two men loosen the amalgam with heavy whisk-brushes, beginning at the top and working downward. When this is done the amalgam is swept in the opposite direction and collected at the head of the apron. There it is brushed into the amalgam-scoop with a rubber scraper (a small, sharp-edged piece of belting) and emptied into a small iron receiver. After this the plates are brightened by brushing them with a whisk-broom, using tailings brightened with a dilute solution of potassium cyanide, the men working from the head of the plate downward. If necessary a little quicksilver is sprinkled on the plate from a bottle over the neck of which a piece of canvas is securely tied. After being brightened, the plates are smoothed with soft paint brushes passed transversely over them, beginning at the bottom. This finishes the operation, which requires four hours for the twenty-four plates.

The amalgam obtained is contaminated with impurities. To remove these it is placed in a Wedgwood mortar and diluted with quicksilver. The amalgamator then adds water and works the amalgam to bring all impurities to the surface. These are in part washed off (the sands) with a hose, in part removed with a sponge or wet cloth (the base-metal amalgam) until the amalgam is perfectly bright. It is then passed through a small strainer and the residual paste

amalgam is transferred to a piece of linen, where the excess of quicksilver is pressed out by wringing. The ball of hard amalgam obtained is locked up in a safe and kept until the next clean-up. All the sands are returned to the battery; the waters go to waste, and the quicksilver goes back to the main stock.

The Clean-up.—Twice a month the gold amalgam adhering to the inner plates is removed, when the necessary repairs in the mill are also made. At the Caledonia mill the operations are the same at the first and fifteenth of the month and similar to those of the first of the month at the Homestake mills. At the latter the clean-up in the middle of the month differs from that at the beginning. At the first of the month the entire mortar is emptied, and the shoes and dies are changed, if necessary.

TABLE V.—Labor and Wages.

Classes.	Caledonia, 60 stamps.			Homestake, 80 stamps.			Fletcher de Smet, 100 stamps.			Golden Star, 120 stamps.		
	Number employed.	Length of shift.	Wages per shift.	Number employed.	Length of shift.	Wages per shift.	Number employed.	Length of shift.	Wages per shift.	Number employed.	Length of shift.	Wages per shift.
Foreman.....	1	12	\$6.50	1	10	\$5.00	1	10	\$5.00	1	10	\$6.50
Millwright.....	1	12	4.50	1	10	4.25	1	10	4.25	1	10	4.25
Pipe-fitter.....	1	12	3.50	1	10	3.50	1	10	3.50	1	10	3.50
Engineer.....	1	12	3.25	1	10	3.00	1	10	3.00	1	10	3.00
Firemen.....	1	12	3.00	1	10	3.00	1	10	3.00	1	10	3.00
Watchman.....	1	12	4.00	1	10	4.00	1	10	4.00	1	10	4.00
Head Amalgamator.....	1	12	3.75	1	10	3.50	1	10	3.50	1	10	3.50
Amalgamators.....	1	10	3.00	1	10	3.00	1	10	3.00	1	10	3.00
Crankmen.....	1	10	3.00	1	10	3.00	1	10	3.00	1	10	3.00
Oilers.....	1	10	2.50	1	10	2.50	1	10	2.50	1	10	2.50
Feeders.....	1	10	2.50	1	10	2.50	1	10	2.50	1	10	2.50
Day laborers.....	1	10	2.50	1	10	2.50	1	10	2.50	1	10	2.50
Total number.....	12			20			25			28		

* With the 20 additional stamps the Caledonia mill will require only one extra man, a carman, at \$2.50 per shift, to transport the ore. A chute from the main ore bin to the bin of these two new stamps would not have enough fall for the ore to be discharged automatically.

At the Golden Star mill the clean-up at the first of the month is carried on in the following way: It begins at seven in the morning. The feeding of the battery is stopped a quarter of an hour beforehand. The stamps are made to drop slowly, so that at seven o'clock no more ore may be found in the mortar above the screen-frame. The splash-boards are removed, the stamps are hung up, the water is shut off and the engine is stopped. The mortars on one side of the mill are then opened by removing the curtains, screens and chuck-blocks. The curtains and screens are first roughly washed by playing a hose over them. They are put aside to be more carefully cleaned later on. The six chuck-blocks from the batteries facing that side of the mill which is being cleaned up are placed

on two apron-plates, at each of which are four men to remove the amalgam under the supervision of the head amalgamator. This is done by scraping the plates with a chisel, when the hard amalgam drops off on the apron-plate beneath. As much amalgam is removed as is possible without exposing the copper. Then quicksilver is sprinkled on the plate, to dilute the hard amalgam somewhat. This is then divided evenly over the plate and brightened by scouring with a whisk-broom and tailings, and finally smoothed with a soft paint brush. The amalgam that has dropped on the apron-plate from the three chuck-blocks is collected at the head and put under lock and key by the head amalgamator. Thus the chuck-blocks of the entire mill are scraped and cleaned in four sets of six each. In the meantime another set of men scrape and wash the rim and flanges of the mortar and collect the amalgam. They also remove the plate amalgam which has settled during the past twenty-four hours. This is then also taken in charge by the head amalgamator. The dressing of the plates does not take place as yet. In order to keep them soft, a little quicksilver is sprinkled over them and evenly distributed with the brush. A third set of men begin with the work on the mortar as soon as the amalgam from the apron-plate has been removed. Two small platforms are placed at its head on the wooden frame for the men to stand on. They then remove the water, still remaining in the mortar, and shovel out the sands above the dies into a heap on the apron-plate (as the sands consist simply of coarse ore and do not contain any amalgam, they are returned to the battery after the dies have been put again in place). Before the die can be taken out the stamp has to be raised higher. Formerly block and tackle were used for this purpose. Now a piece of timber is placed crosswise on the rests of the splash-board, serving as a fulcrum for an iron bar with which the stamp is raised. It is kept in this position by placing a 4-inch piece of wood on the prop of the stamp and allowing the tappet to rest on it. The dies are pried up with the iron bar, lifted out and roughly cleaned. Those which are to be exchanged are taken away and piled up to be carefully scraped and washed in due time.

(To be Continued.)

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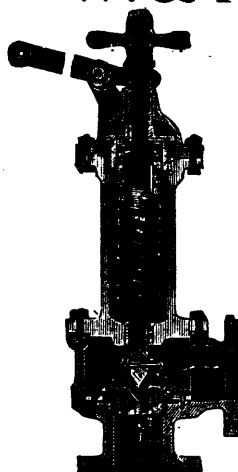
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PROVINCE OF NOVA SCOTIA.

Leases for Mines of Gold, Silver, Coal, Iron, Copper, Lead, Tin

— AND —

PRECIOUS STONES.

Titles given direct from the Crown, Royalties & Rentals moderate

GOLD AND SILVER.

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 five areas the cost is 50 cents per area, for every area in addition 25 cents. Cost of renewal one half the original fees. Leases of any number of areas are granted for a term of 21 years. 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 \$19.00 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 area 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 twelve months are issued, at a cost of twenty 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 a 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,

Commissioner Public Works and Mines,

HALIFAX,

NOVA SCOTIA.



DEPARTMENT
OF
Inland Revenue.

AN ACT RESPECTING AGRICULTURAL FERTILIZERS.

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

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

Every manufacturer or importer of fertilizers for sale, shall, in the course of the month of January in each year, and before offering the same fertilizer for sale, transmit to the Minister of Inland Revenue, carriage paid, a sealed glass jar, containing at least two pounds of the fertilizer manufactured or imported by him, with the certificate of analysis of the same, together with an affidavit setting forth that each jar contains a fair average sample of the fertilizer manufactured or imported by him; and such sample shall be preserved by the

Minister of Inland Revenue for the purpose of comparison with any sample of fertilizer which is obtained in the course of the twelve months then next ensuing from such manufacturer or importer, or collected under the provisions of the Adulteration Act, or is transmitted to the chief analyst for analysis.

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

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

Every person who sells or offers or exposes for sale any fertilizer, in respect of which the provisions of this Act have not been complied with—or who permits a certificate of analysis to be attached to any package, bag or barrel of such fertilizer, or to be produced to the inspectors to accompany the bill of inspection of such inspector stating that the fertilizer contains a larger percentage of the constituents mentioned in sub-section No. 11 of the Act than is contained therein—or who sells, offers or exposes for sale any fertilizer purporting to have been inspected, and which does not contain the percentage of constituents mentioned in the next preceding section—or who sells or offers or exposes for sale any fertilizer which does not contain the per-

centage of constituents mentioned in the manufacturer's certificate accompanying the same, shall be liable in each case to a penalty not exceeding fifty dollars for the first offence, and for each subsequent offence to a penalty not exceeding one hundred dollars. Provided always that deficiency of one per centum of the ammonia, or its equivalent of nitrogen, or of the phosphoric acid, claimed to be contained, shall not be considered as evidence of fraudulent intent.

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

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

E. MIALL,
Commissioner.

January, 1889.



NOTICE

It is hereby given that all communications in respect to matters affecting the Department of Indian Affairs should be addressed to the Honorable E. Dewdney as Superintendent General of Indian Affairs, and not as Minister of the Interior, or to the undersigned. All Officers of the Department should address their official letters to the undersigned.

L. VANKOUGHNET,
Deputy Superintendent-General
of Indian Affairs.

Department of Indian Affairs,
Ottawa, 11th May, 1889.



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OF CANADA.

The direct route between the West and all points on the Lower St. Lawrence and Baie des Chaleur, Province of Quebec; also for New Brunswick, Nova Scotia, Prince Edward and Cape Breton Islands, Newfoundland and St. Pierre.

EXPRESS TRAINS leave Montreal on 11th of each day (Sunday excepted) and run through without change between these points in 30 hours.

The Through Express Train cars of the Intercolonial Railway are brilliantly lighted by electricity and heated by steam from the locomotive, thus greatly increasing the comfort and safety of travellers.

New and Elegant Buffet Sleeping and Day Cars are run on all through Express Trains.

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Passengers for Great Britain or the Continent by leaving Montreal on Friday morning will join Outward Mail Steamer at Halifax the same evening.

The attention of shippers is directed to the superior facilities offered by this route for the transport of flour and general merchandise intended for the Eastern Provinces and Newfoundland; also for shipments of grain and produce intended for the European market.

Tickets may be obtained and all information about the route, also Freight and Passenger rates, on application to

G. W. ROBINSON,
Eastern Freight and Passenger Agent,
136½ St. James St., MONTREAL.

E. KING,
Ticket Agent,
27 Sparks Street,
OTTAWA.

D. POTTINGER,
Chief Superintendent.

Railway Offices, Moncton, N.B.
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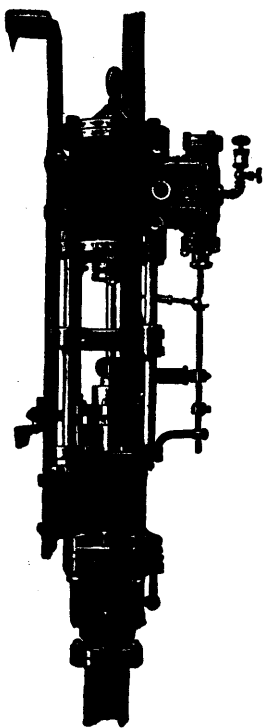
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Mining Regulations

TO GOVERN THE DISPOSAL OF

Mineral Lands other than Coal Lands, 1886.

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

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

QUARTZ MINING

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

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

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

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

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

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

IRON.

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

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

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

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

PLACER MINING.

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

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

The Regulations apply also to

BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

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

THE SCHEDULE OF MINING REGULATIONS

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

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

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

A. M. BURGESS,

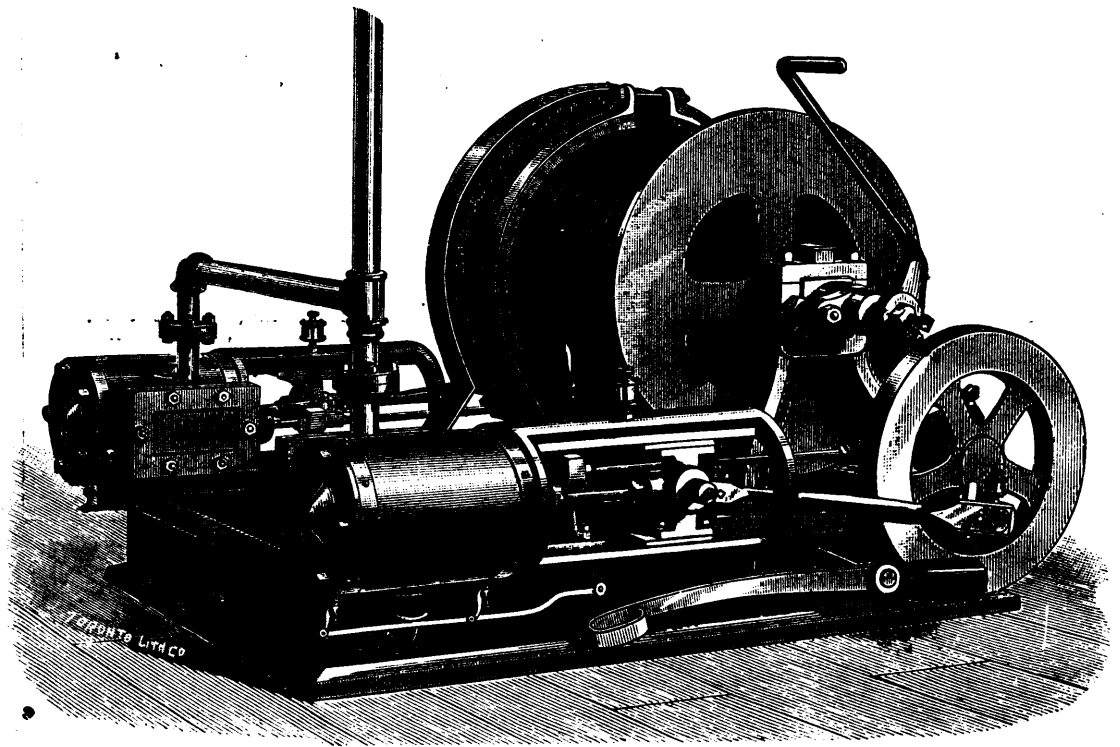
Deputy Minister of the Interior

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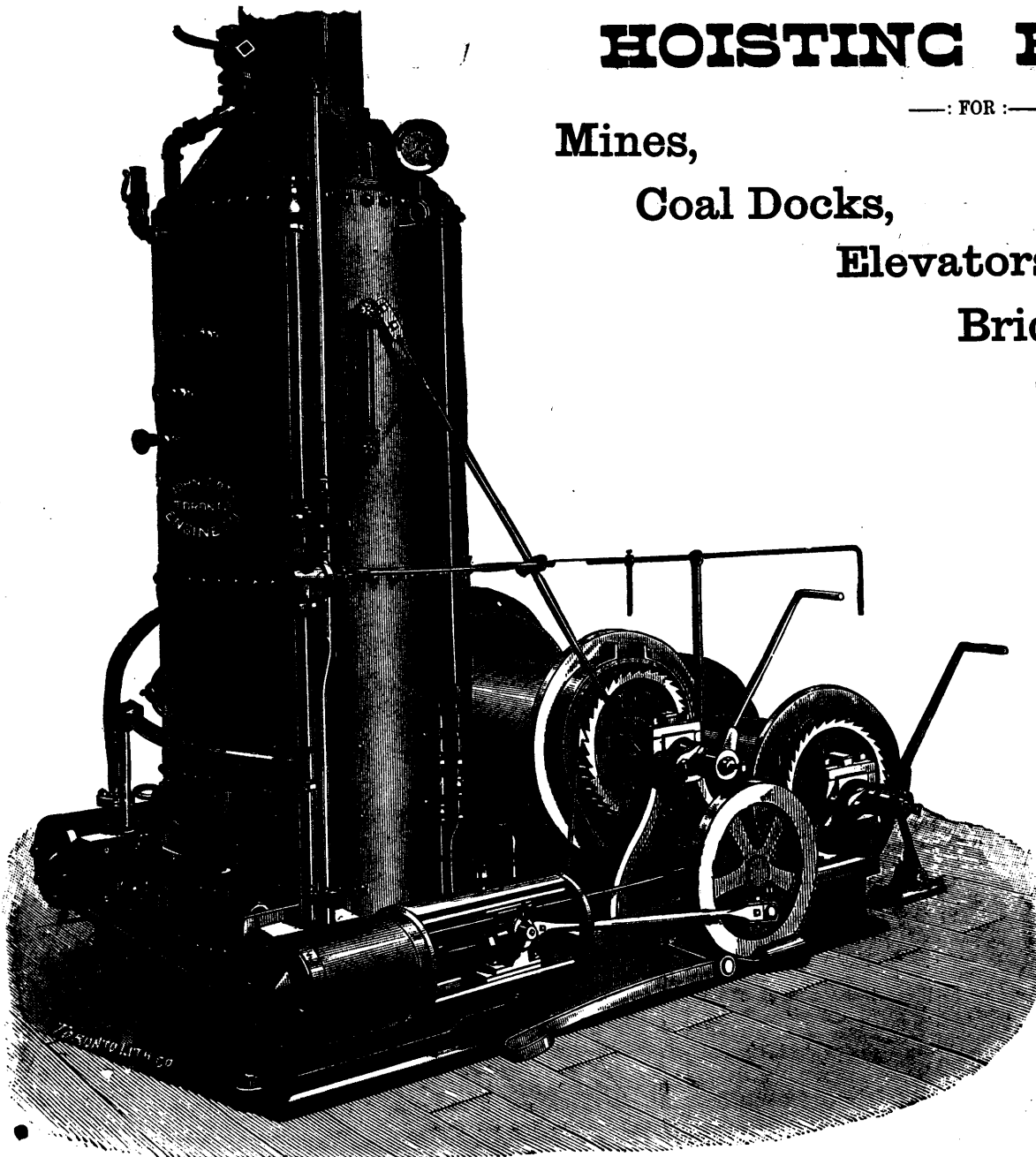
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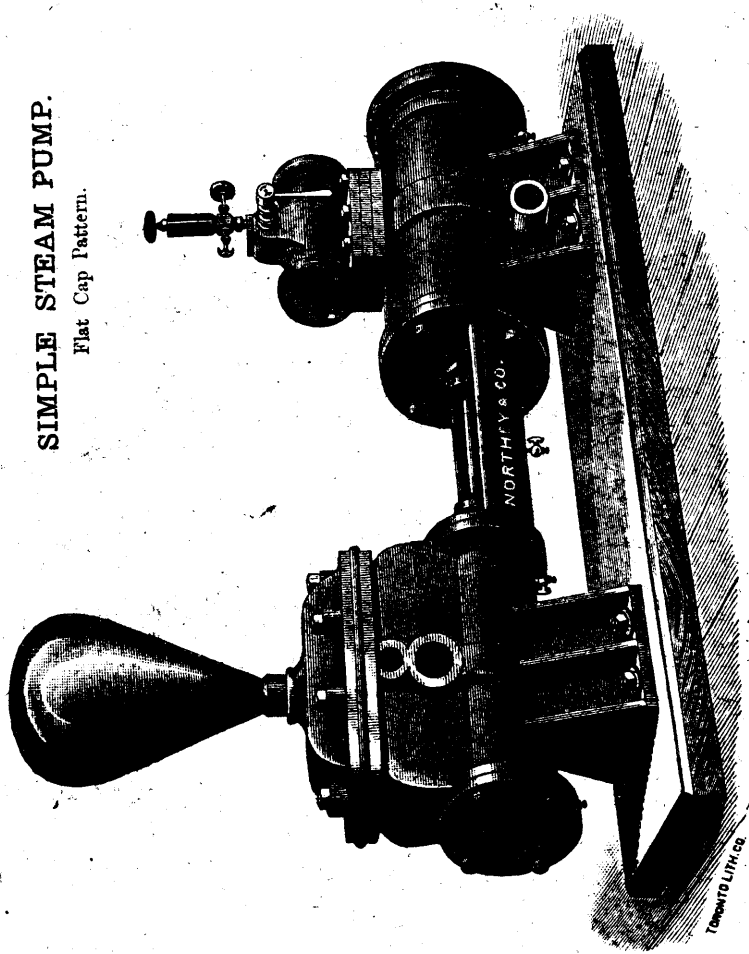
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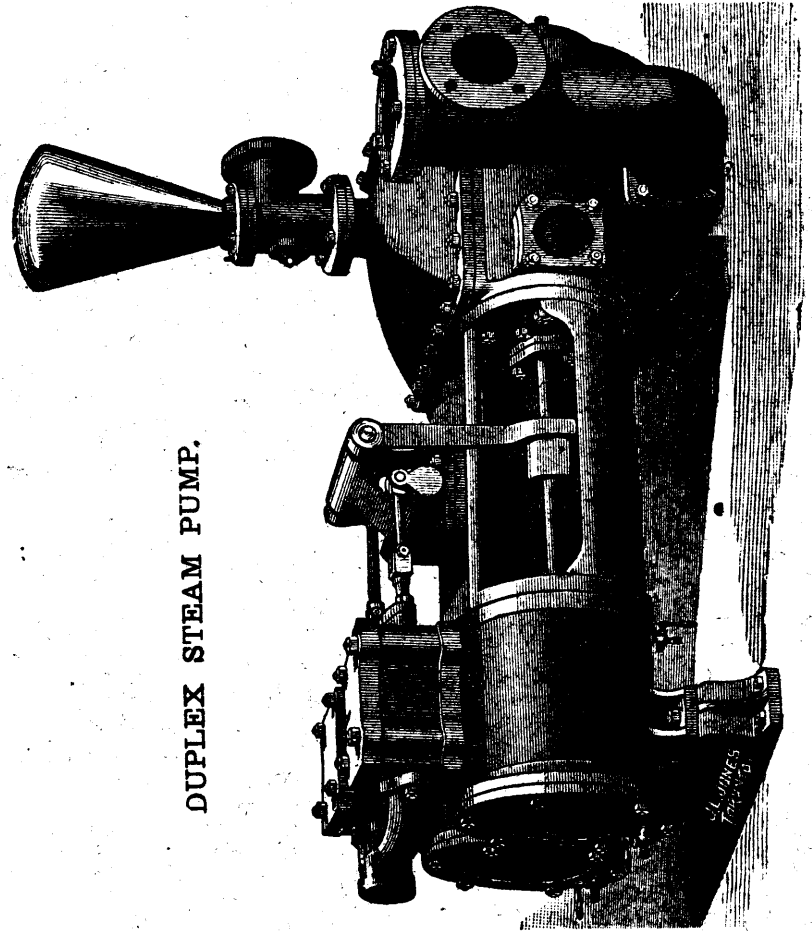
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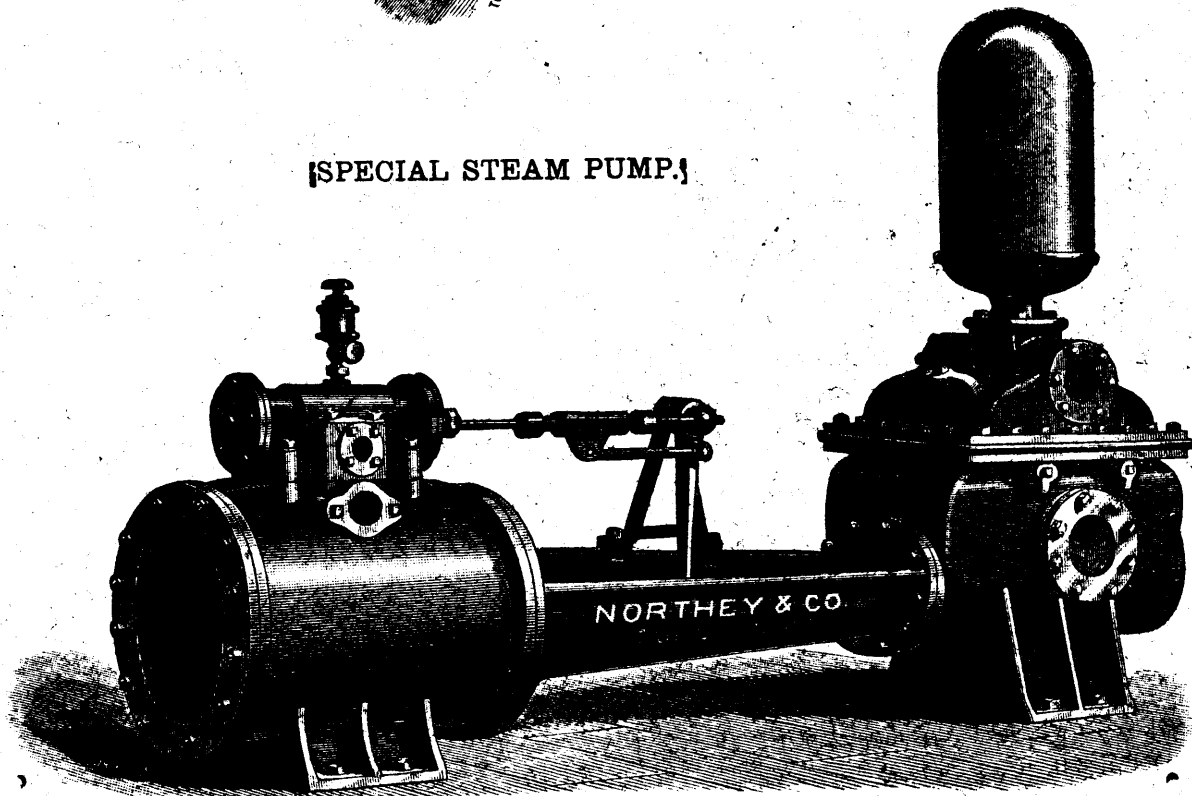
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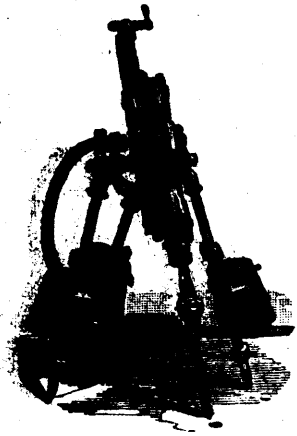


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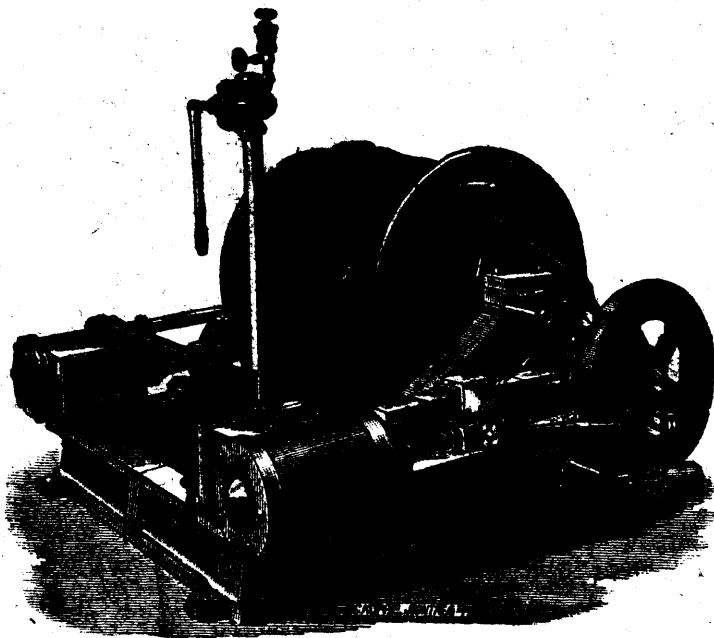


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