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Established 1882

Vol. XVII.—No. 5.

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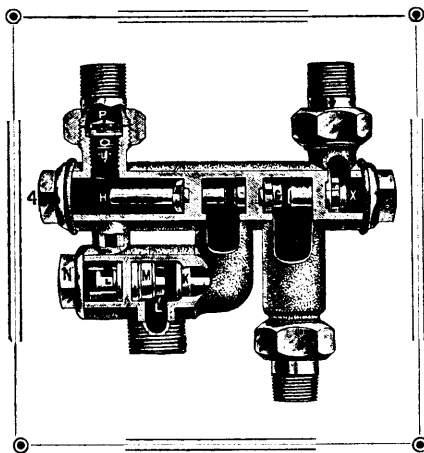
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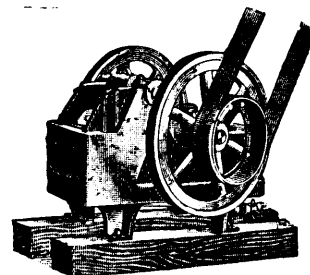
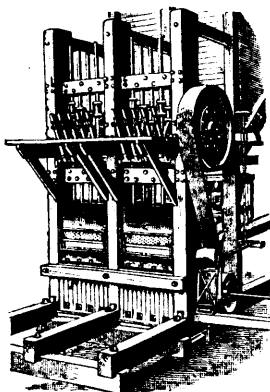
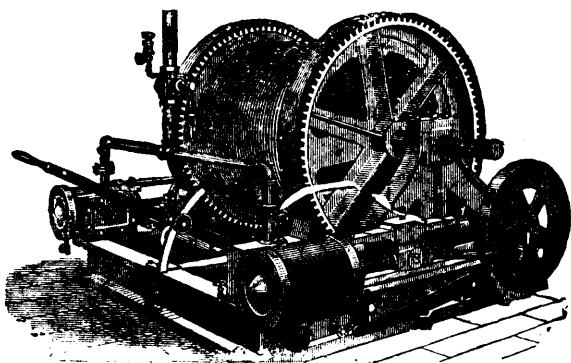
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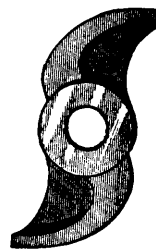
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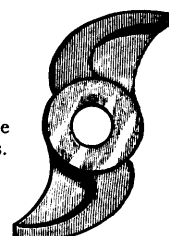
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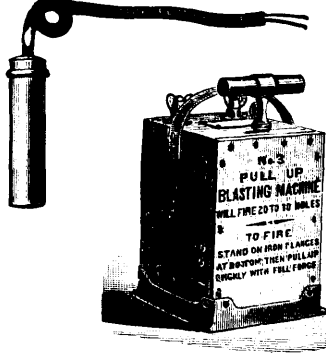
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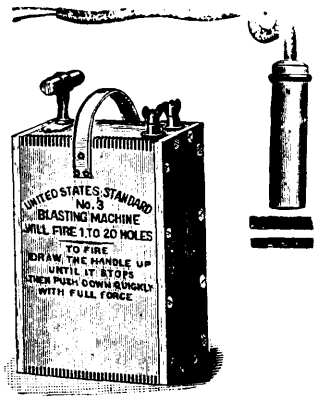
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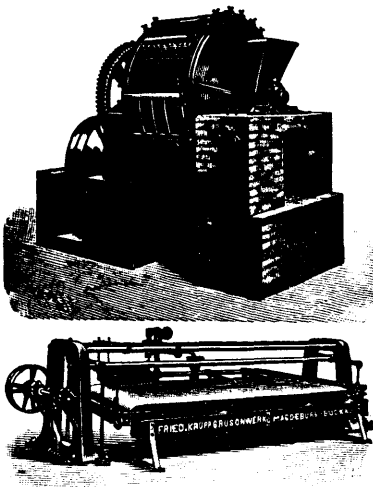
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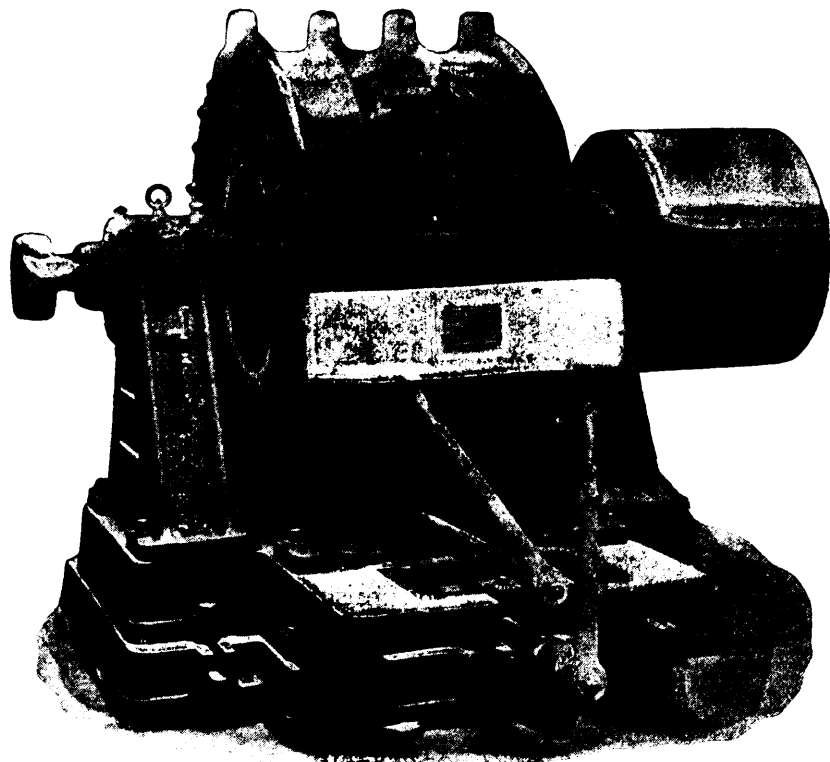
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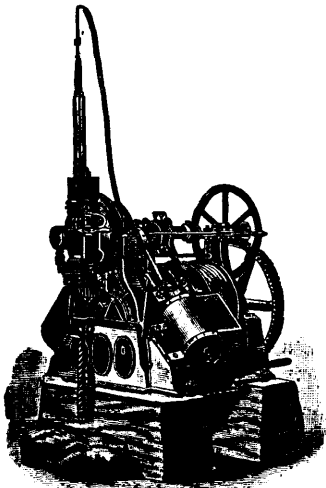


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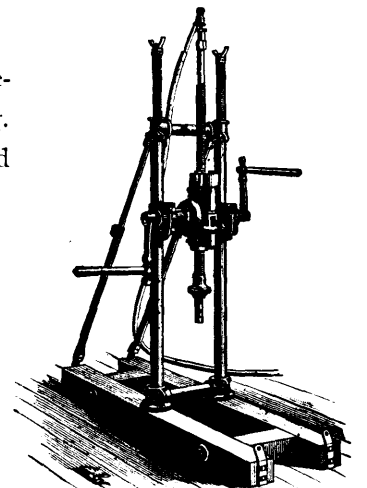
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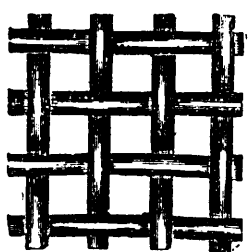
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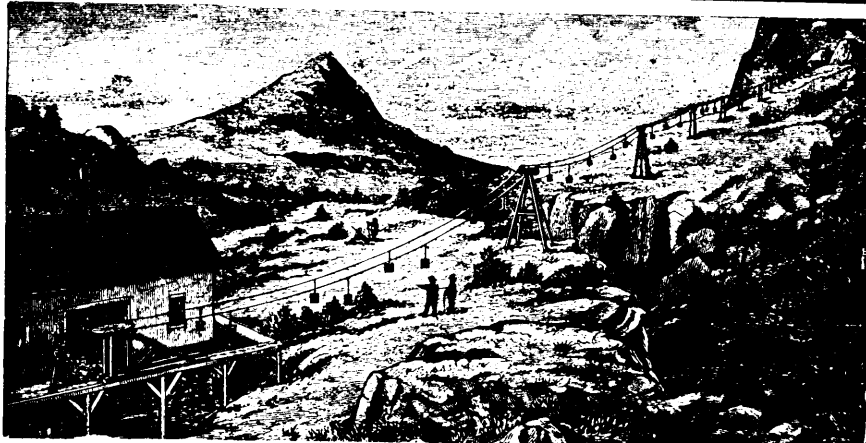
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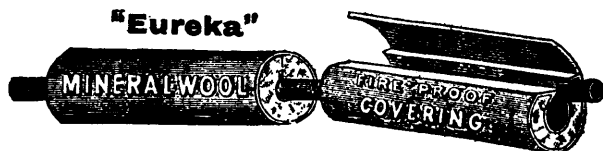
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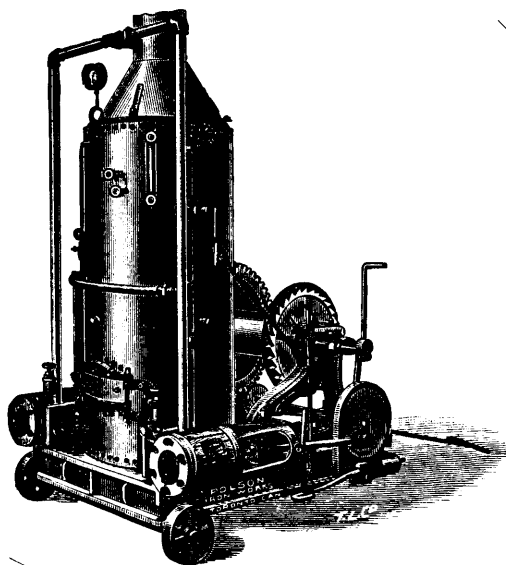
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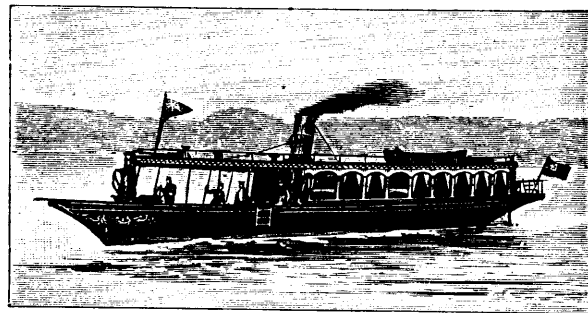
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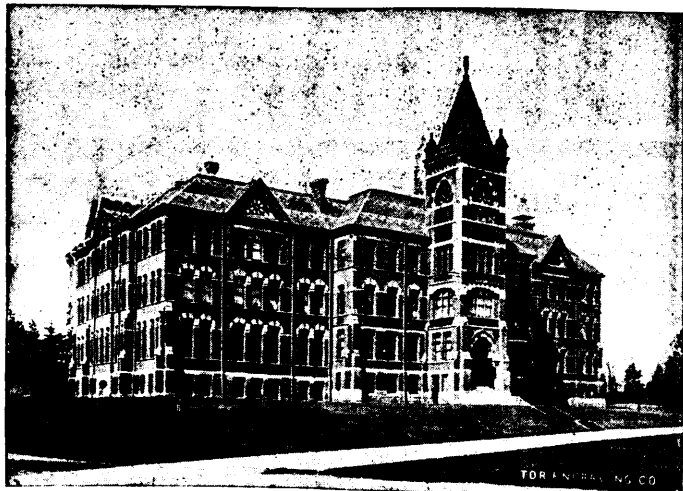
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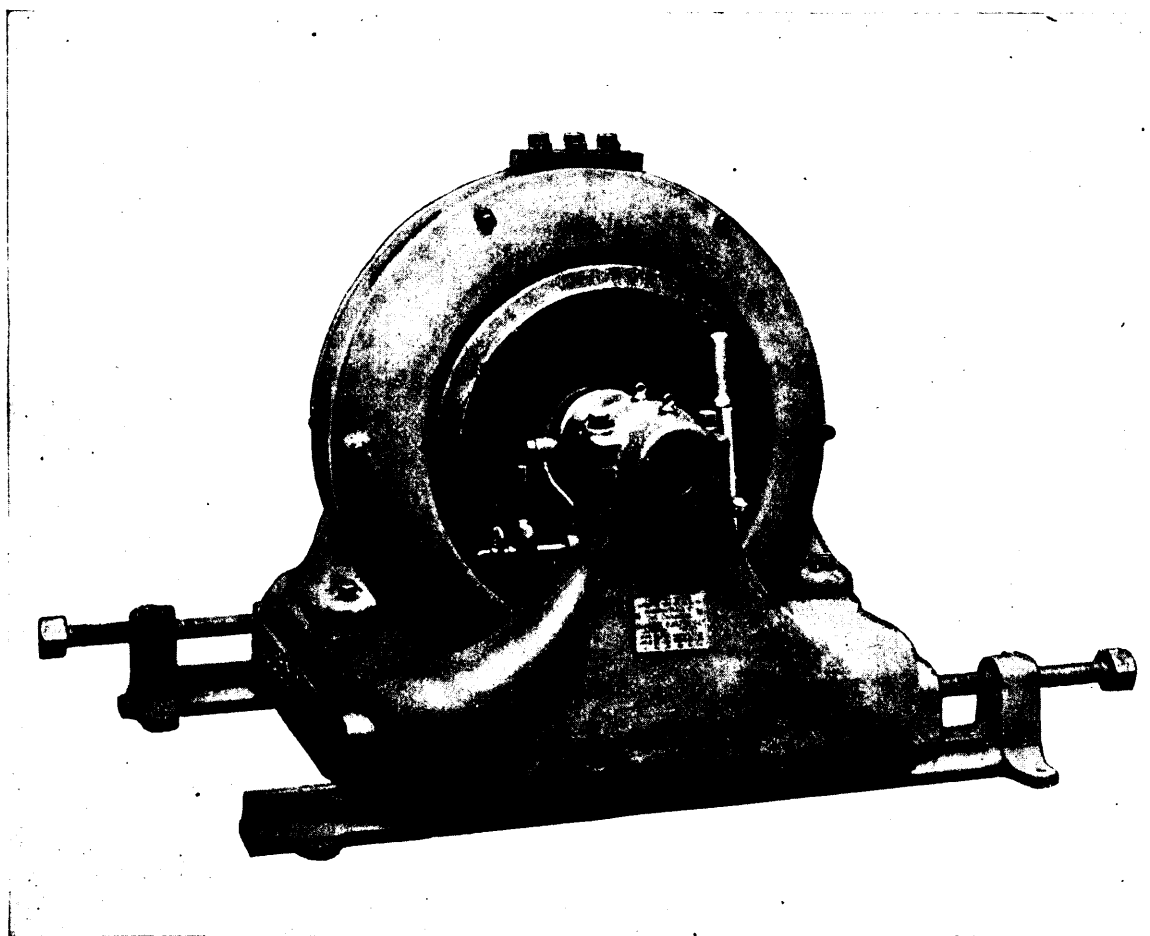
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		Quantity.	Value.	Quantity.	Value.
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“ Quartz	Oz.	62,259	1,244,180	106,141	2,122,820
Silver	Oz.	3,135,343	2,100,689	5,472,971	3,272,836
Copper	Lbs.	3,818,556	190,926	5,325,180	266,258
Lead	Lbs.	24,199,977	721,384	38,841,135	1,390,517
Coal	Tons	894,882	2,688,666	882,854	2,648,562
Coke	Tons	615	3,075	17,832	89,155
Other materials			15,000		151,600
			\$7,507,946		\$10,455,268

Production for 1890, \$2,608,608; for 1896, \$7,146,425; for 1897, \$10,452,268.

GOLD.

Gold-bearing lodes are now being prospected in many parts of the province, and at Rossland magnificent ore-chutes of very profitable gold-copper ore are being mined and smelted, the Le Roi having paid to date, \$725,000 in dividends, with a large and increasing amount of ore in sight as the workings attain greater depth, while systematic development on other properties is meeting with excellent results, mining having just fairly begun in this camp. Little doubt can now be entertained that Rossland will become a heavy producer of gold, and that excellent properties now only await sufficient and abundant capital to become paying mines, to further aid in which the facilities for cheaper transportation and smelting are being now supplied. At NELSON and at FAIRVIEW, CAMP MCKINLEY, GREENWOOD, CENTRAL and other camps in the southern part of Yale, important work is being done on the quartz ledges there, several new mills being under erection.

Exploratory work is also in progress in EAST KOOTENAY and in LILLOOET, ALBERNI, and on the Gulf islands and along the coast line of the mainland, as well as in other parts of the province.

In CARIBOO, several large undertakings, involving a large amount of capital, are at work exploring both modern and ancient river channels, the Cariboo Hydraulic Mining Co., on the Quesnelle river, proving, on development, to have in a channel of the latter kind, a great gravel deposit of exceptional richness, while other parts of this district now offer every inducement to capital.

Into CASSIAR, OMENICA, and the great area to the north, as well as Cariboo, there now promises to be a great exodus of explorers, incited by rich diggings now being mined in the YUKON, as on the KLONDYKE, to the north, and river and creeks long reported to be gold-bearing will now be made accessible, and well tested.

SILVER-LEAD.

Despite the drop in the price of silver, the SLOCAN mines are being much more extensively worked, while the shipments of high grade ore are constantly increasing, the higher price of lead more than compensating for the lower silver values. The production for 1897 has much exceeded that of 1896, as such mines as the "Payne," "Ruth," "Whitewater" and other mines increased their output.

At NELSON, the "Silver King" or Hall mines is shipping constantly a large amount of silver-copper ore, and the LARDEAU, TROUT TAKE, ILLECILLEWAET districts, on further exploration, promise to become rich districts. In EAST KOOTENAY large bodies of silver-lead ore will be mined on completion of the railroads now under construction.

COPPER.

Copper is being produced to a limited extent at ROSSLAND and NELSON, but the large deposits of at present low-grade ore in the BOUNDARY CREEK district will be fully tested when the railroad, now almost assured, is constructed. Prospecting is being done at KAMLOOPS, along the west coast of

the mainland and of Vancouver island, as well as at many other points, and TEXADA is producing high grade bornite ore.

COAL AND COKE.

The large collieries on VANCOUVER ISLAND are producing about a million tons of coal annually, and at COMOX an excellent coke is now being produced, much of which is shipped to the inland smelters. The great deposits of coking coal in East Kootenay, at the CROW'S NEST PASS, are now being opened, as the C.P.R. is now being built to the Columbia river to supply the great mining regions with cheap coal and coke.

SMELTERS AND RAILROADS.

The smelting industry is now beginning to assume large proportions, as preparations are being made to treat the ores of this province within her own borders, a most important factor in the increasing prosperity of this country, entailing as it does, and will, the employment of much capital and many men. The extension of the railroad systems to different parts is now in progress, and the next few years will see many parts in which the prospects for good mining are excellent, made easy of access, while ores can be shipped with facility to the smelting centres, where the assembling of the various interfluxing ores will make possible the treatment of all British Columbia ores at home.

CAPITAL.

Capital can now find here excellent and many opportunities for investment, if proper business care and the experience of qualified men are utilized, as the values placed on mines and undeveloped properties have reached a reasonable basis.

MINERAL LANDS.

Mineral lands are open to location to any person over eighteen years of age, who has obtained a free miner's certificate, and perfect titles to lode claims can be easily secured after \$500 worth of work has been done per claim. A great extent of territory has yet to be prospected.

YUKON GOLD FIELDS.

As the KLONDYKE and other gold fields in the Yukon in British territory is reached mostly via British Columbia, all SUPPLIES and OUT-FITS obtained at VICTORIA, VANCOUVER, ASHCROFT, KAMLOOPS, etc., can be taken in FREE OF DUTY, which otherwise WILL HAVE TO BE PAID if not purchased in CANADA.

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

Licenses are issued to owners of quartz crushing mills who are required to pay

Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at \$19 an ounce, and on smelted gold valued at \$18 an ounce.

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

MINES OTHER THAN GOLD AND SILVER.

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

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

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

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

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

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

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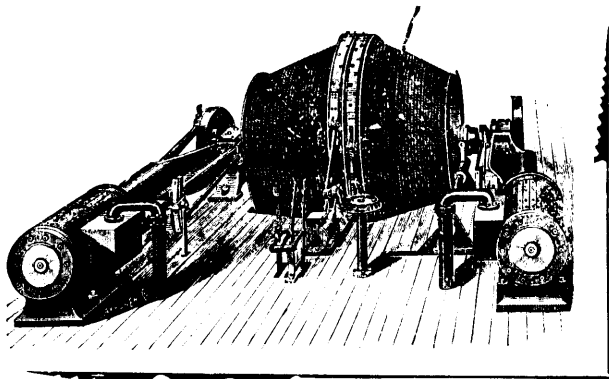
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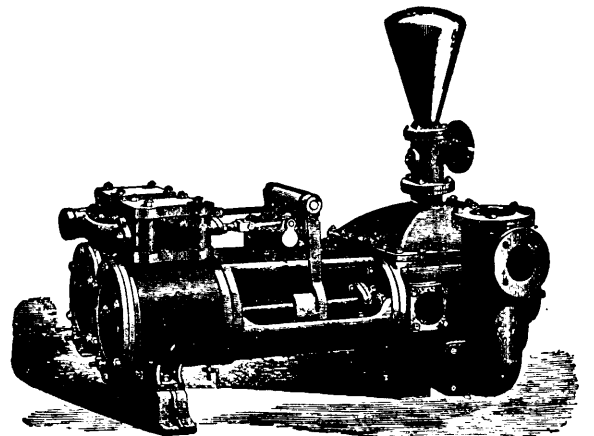


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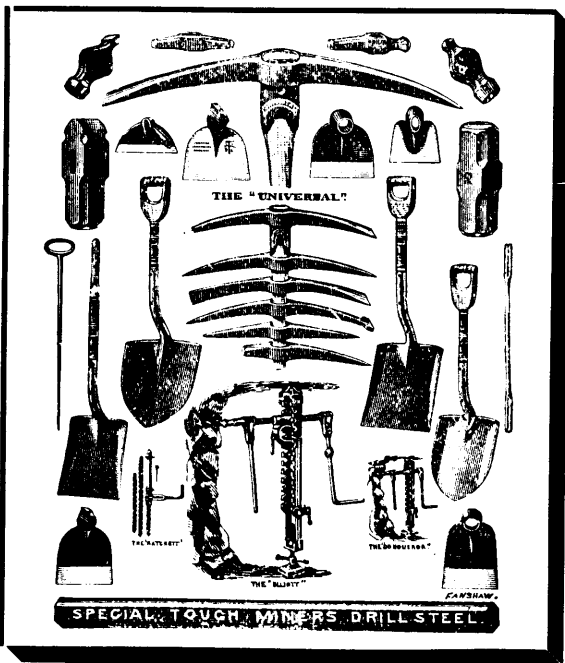
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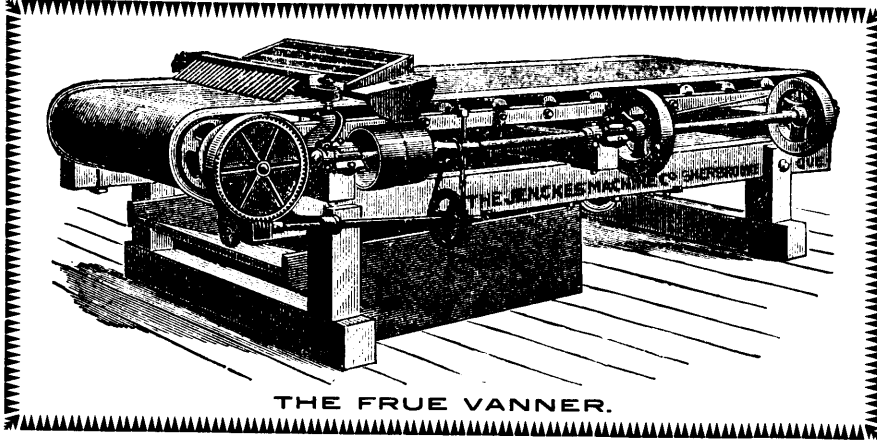
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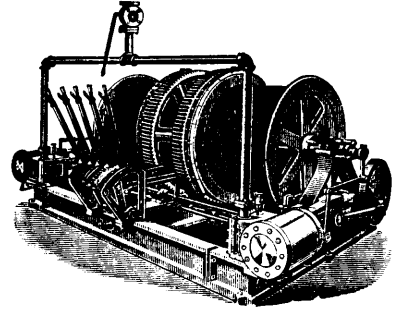
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THE CANADIAN MINING REVIEW

Established 1882

Official Organ of the Mining Society of Nova Scotia; The General Mining Association of the Province of Quebec; The Asbestos Club; and the Representative Exponent of the Mineral Industries of Canada.

B. T. A. BELL, Editor and Proprietor.

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VOL. XVII., No. 5.

MAY, 1898.

VOI. XVII., No. 5.

A Choice Bit of Promoting.

One of the most barefaced and shameless flotations as yet put upon the English market is that of "The New Golden Twins (Ontario) Limited," which is the first subsidiary company of the notorious Turner-Pooley-Boscowitz combination, known as the Klondike and Columbian Gold Fields, Limited. We have, as yet, refrained from commenting upon this parent company which has brought high officials of the British Columbian Government into unenviable notoriety as promoters, and the flotation of which has provoked a storm of angry and plain-spoken attacks from both the English and the British Columbian press, but we must say that if this first offspring is an exemplification of the methods which are to be pursued by the Klondike and Columbian Gold Fields, there is no language too strong, nor any condemnation too severe for it. It is charitable, if not complimentary, to suppose that this parent company is far too unsophisticated to fathom the wily methods of Ontario promoters, and what we say below should be news to them, at any rate, we shall hope so for the sake of decency.

The very first line of the prospectus of this first child purports to be an extract from the report of a mining engineer named Brown, and reads thus:—"Capable of paying very large dividends on an equally large capital." The second page informs us that a report on the property offered has been made by two gentlemen, one of whom is said to be a "Mr. Johnson Brown, M.E., of Wolfe River, Ont." This report, the directors say, is dated the 30th January, 1897, and contains statements to the effect that,—Mr. Brown had examined the two locations, 327x, 328x, offered to the company: that he had taken samples and obtained assays therefrom; that he considered the property most promising, and that if the ore should improve in depth the property would be capable of paying very large dividends on a very large capital.

Now the REVIEW flatters itself that there are few, if any, Mining Engineers of prominence and repute in Canada with whom it has not a more or less intimate acquaintance, and not knowing Mr. Johnson Brown it has been moved to ascertain the status of this unknown expert. The results of its investigations are given below for the benefit of such of the confiding shareholders of this company as may chance to read our pages.

As to matters of fact we present the following: (1) there is *no* Johnson Brown of Wolfe River, Ont., who is a M. E.; (2) there is a Johnson Brown of Wolfe River, Ont., who is a *half-breed Indian*, who can neither read nor write, and who makes his living by hunting and trapping; (3) this Indian has never seen Clear Water Lake, nor locations 327x and 328x; (4) but this Indian was employed in the summer of 1897 by one H. A. Wiley, (who now figures as a director of this Golden

Twins Co.) to do odd jobs and some prospecting round the Saw Bill mine, of which mine a brother of this Mr. H. A. Wiley is the managing director, and is the other expert whose report adorns this prospectus.

In the face of these facts, the extracts from Mr. F. S. Wiley's report are not sufficiently conclusive to justify the purchase, for \$65,000 in cash and \$150,000 in fully paid shares, of a couple of undeveloped locations in the wilderness of Ontario. Nor does the relationship of this gentleman to one of the directors convey a very desirable impression of disinterestedness, and the general opinion of a Mr. Kreissman (who is a comparatively unknown man on this side) *that Ontario has a great future before it*, is of no specific value for this enterprise.

Perhaps the most astounding thing of all in connection with this matter is that the flotation succeeded and the shares in January last were quoted at $\frac{1}{8}$ premium, which is only additional evidence of the success which may attend deliberate and systematic efforts to foist unknown or worthless properties upon the English public, which, as this chichest fake of the year shows, is only too gullible.

We have vainly searched for words adequate to characterize men or corporations who so deliberately pervert the truth, and publish as the report of a qualified mining engineer, a whole tissue of lies which do not even emanate from the poor half-breed Indian to whom they are ascribed. Such an endeavor to bolster up the purchase of two unknown and unimproved locations in the neighborhood of two other speculative ventures, which so far have been most unsatisfactory to their owners, can only be characterized as an offence which ought to be indictable and punishable with the penitentiary. The REVIEW thinks that Mr. Johnson Brown has a very good case against the parent company, and that somebody is in danger of prosecution for forgery; also that the shareholders of this unfortunate concern have a remedy to their hand in the provisions of the "Companies Act." In this connection the correspondence and affidavits published elsewhere in this issue will be of interest.

The President of the Mining Society.

The presidency of the Mining Society of Nova Scotia has this year been conferred on Mr. Charles Fergie of Westville, to whom also lately other honors have deservedly fallen. At the recent annual meeting of the Intercolonial Coal Mining Company the ability and zeal displayed by Mr. Fergie in the interests of that company were recognised, and the recognition found expression in advancing him from the post of General Manager to that of Managing Director and Vice-President of the Company, a position of no light responsibility in the eyes of those familiar with the history of coal mining in Pictou county and with the onerous and varied duties such a billet entails.

Mr. Fergie first saw the light through the murky atmosphere that empalls that busy centre of coal mining and factories, Wigan in Lancashire. His father was the Rev. Thomas F. Fergie, B.D., Vicar of Ince and an honorary Canon of Liverpool, who took great interest in the advancement of young pitmen, and was an energetic chairman of the Wigan Mining and Technical School, in which his son was subsequently a distinguished pupil. Mr. Fergie's success at school was followed by his obtaining several Queen's prizes and certificates in connection with the Science and Art examinations of South Kensington. His first mining experiences commenced some 25 years ago, May 5th, 1873, when he became an articled pupil of Mr. George Gilroy, an eminent mining and civil engineer and Managing Director of the Ince Hall Coal & Cannel Co., Ltd., near Wigan. With that gentleman he remained 8 years and passed through all the branches of practical mining, surveying, office work, etc., and during which period he passed his final examination obtaining a first class mine manager's certificate.

Mr. Fergie was then offered and accepted a position under the Barrow Hematite Steel Co., of Barrow-in-Furness, in connection with their coal and iron mines,—then under the able direction of Mr. Wm. Kellett of Wigan, a consulting mining engineer of considerable repute. He acted as assistant in a general way at the Iron mines, Dalton-in-Furness and at the Barrow Collieries, Yorkshire, for the space of one year, where he gained a further variety of experience in coal and iron mining. After that he was appointed Manager at the Barrow Collieries, South Wales, owned by the same company, and remained there 5½ years, when he was offered an appointment in this country by the Intercolonial Coal Mining Company, Limited, of Montreal. Mr. Fergie left Liverpool, Oct. 20th, 1887, to fill the position of assistant general manager at the Drummond Colliery, Westville, N. S. This position he held for two years when he was appointed the general manager of the company and in March last, as already mentioned, was made a director and vice-president of the company. At the last meeting of the Canadian Mining Institute he was also elected to the position of a vice-president.

EN PASSANT.

One of the most thinly disguised puffs of a company prospectus that we have seen, is contained in the *Illustrated London News* of February 26th, the *London Graphic* of the same date, and the *Sketch* of March 2nd, under the title of the "Eldorado of British Columbia," by a W. H. S. Aubrey. The company sought to be boomed in this way is known as the "Associated Gold Mines of British Columbia, Limited," having a capital of £500,000 stg.

This article is as noteworthy for its errors of fact as it is for its puffing of some ninety-six claims of which the mining public of British Columbia has heard little or nothing. To say that "snow seldom falls in the southern part of British Columbia" is true only of the coast section, and could never have been said by a man who had ever seen the southernmost camps either in West or East Kootenay during the months of December, January and February.

In view of the annual report of the Department of Mines which has been just issued, it is rather farcical to allude to the "rapidly increasing importance of Lillooet" as a gold producer, and to specialize the *Golden Cache* as a factor in this district. It will be news to a great number of our British Columbia miners to know that there are mines earning profits in the Big Bend and the Lardeau country to-day; and although West Kootenay is rightly extolled by Mr. Aubrey, the same can not be said of some of the other districts mentioned, as for example, the prospects in Albert Canyon which Mr. Aubrey says "have yielded,

and are continuing to yield, enormous wealth." Likewise, it will be news to the shareholders of the Lillooet, Fraser River and Cariboo gold fields, that the "Silver Cup" is yielding \$50,000 per month, and our Vernon friends will be dumbfounded to learn that the "Morning Glory" quartz assays \$1,000 to the ton. The statement that the Robert E. Burns mine, in the northern part of East Kootenay country, is to be brought out as a subsidiary company "within a month" will occasion much laughter among these people who have seen the Bobby Burns and know its condition. It will likewise be news to them to know that the R. E. Burns quartz "averages \$50 per ton," and we, for our part, should like to know the names of the "three eminent mining engineers" who have made "exceedingly favorable reports" upon that property. The whole article is one of the most impudent attempts to boom a prospectus that we have ever seen, and the idea of illustrating this attempt by pictures of Quesenelle Forks, a steamer on Kootenay Lake, and the town of Sandon, is as lugubrious to one who knows British Columbia, as it is possible to be. When will our brethren of the press on the other side of the water learn to value such articles at their real worth, and when will the credulity of the average Englishman commence to decrease in a very healthy ratio?

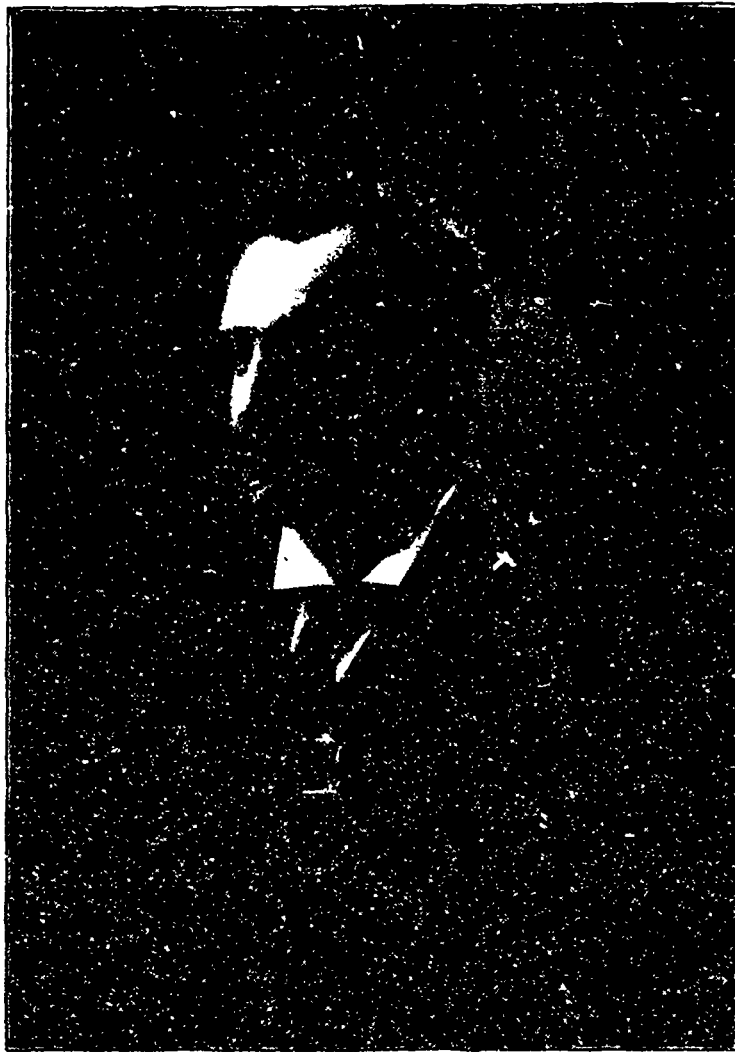
Of the merits of the claims thus offered, we only judge from the two that are named, the "Trahadah" and the "Robert E. Burns"—of the former we can find no one who knows of it; of the latter, we may say that if the other ninety-five claims are of the quality of this one, the shareholders will have a long time to wait for their dividends.

Our old friend of Barberton, S. A., and Montagu, N. S. fame, Mr. Alfred C. Woodhouse communicates a remarkable "professional" statement to the issue of the *British Columbia Review* of March 5th, upon which the comment is made that it is now "a proved certainty that the low grade ores of Trail Creek can be profitably treated." The eminent Mr. Woodhouse figures that the ores of the Trail District which contain an excess of iron, can be smelted at a cost of \$3.50 per ton; and that the ores which contain an excess of silica will be treated at a cost of \$2.65 per ton. He arrives at this conclusion after giving a remarkable series of costs for crushing these siliceous ores, and amalgamating, concentrating and cyaniding the various products made. Verily, here we have a Daniel come to judgment.

The *Mining and Scientific Press* of California has a very sensible paragraph on newspaper stories of a discovery by Edison of a method of extracting gold from low grade ores without the use of water, and goes on to remark that "while it would be in every way desirable that these extravagant claims were realized, it would seem that the name of the great inventor is being used to conjure with." This is undoubtedly true, and even more could be said of the many quacks and fakirs who are using the imperfectly understood force of electricity to do similar conjuring with. If we have heard of one we have heard of at least a score of wonderful electrical processes, during this year, which were going to separate gold from all its combinations and in whatever matrix. And further, were going to treat complex ores so as to separate the gold, copper, arsenic, iron and sulphur each from the other, in metallic condition, and deposit each element in a compartment by itself on the principal of balls in the pockets of a pool table.

It would seem that the gold fever, from which the civilized world is suffering, induces in the patient a remarkably credulous mental condition in which he is willing to believe (to the extent of investing his dollars) in anything which is fantastic enough to depart from ordinary methods and conditions.

Another shining example of the professional prospectus writers' art is a sheet we have recently received, being the prospectus of the "Scottish Corporation of British Columbia, Limited," capital £100,000.



MR. CHAS. FERGIE,
MANAGING DIRECTOR AND VICE-PRESIDENT INTERCOLONIAL COAL CO.

Elected President of the Mining Society of Nova Scotia, 1898-9.

This company states that it has already "provisionally" acquired nine gold bearing properties in British Columbia. What this "provisionally" may mean the promotor may know, but we can only consider it to be that they have merely acquired options or bonds upon these properties for limited periods. Five of these nine properties are as follows: The "York State," "Peacock," "Hummer," "B.F." and "Anna R.," which are on the east side of the Columbia River, and on a tributary of Beaver Creek. The best that can be said in the prospectus of these five claims is that assays from the surface gave \$1.32 to \$2.54 respectively, but the unknown expert who makes this statement continues: "Pay rock is assured with an assay of \$12 per ton," but how he enjoys that assurance is not communicated to his readers.

Two claims in the south belt of Rossland, neither of which we can find upon the map (viz., the "Pisa" and "Firenza") are only good enough to speak of as having given "an assay of \$8.27 in gold," as having "a quartz ledge 18 inches wide," and as having "a good chance of developing an ore body." Such chances are very frequent in that country, but are usually worthless.

Another claim called "Rabbit's Nest," on a tributary to Rock Creek, about five miles north of Rossland, has given a \$4.50 assay in gold, and the best thing that can be said about it by the two gentlemen whose names are printed as experts is that the entire vein is "filled with quartz, iron and sulphur ore," whatever that may be.

The last property, also some miles north of Rossland, is called the "Ram's Horn," and the best that is said of this claim is that it has "a well defined ledge of iron capping," which is enough for even a tender-foot, and that the surface assay value runs from a trace to \$1.30. And yet, on the strength of this perfectly ridiculous and absurd prospectus the public are asked to subscribe for \$250,000, of which \$200,000, either in shares or in cash, is to be paid to the vendor, who appears from the prospectus to be one Charles Bachman.

We are informed that it has taken the long period of nearly two years to bring this company out, and we can cordially recommend our Edinburgh readers to let it alone for another two years.

The following official returns of the operations of the Hall Mines Smelter for nine weeks ended 30th April, are of interest:—The first return, being for five weeks ended 2nd April, shows: 31 days 16 hours smelting; 7,437 tons ore treated, yielding 357 tons matte: containing (approximately) 156 tons copper, 111,420 ozs. silver and 272 ozs. gold. The second return for four weeks ended 30th ult., shows: 20 days, 10 hours smelting; 4,734 tons ore treated, yielding 218 tons matte: containing 92 tons copper, 71,460 ozs. silver and 254 ozs. gold.

Mr. R. G. McConnell, of the Geological Survey of Canada, has declined the position of Provincial Mineralogist, offered to him by the British Columbia Government, and on the 11th instant left Ottawa for the Yukon on an exploration of a portion of this territory.

A Bill incorporating the Canadian Mining Institute was passed by Parliament this month. The membership of the Institute is now very close upon two hundred, and embraces the best men in the mining profession of the Dominion. A library and reading room for the convenience of members will be established in the Windsor Hotel, Montreal, where admirable quarters have been secured. A general meeting has been called for Friday evening, 3rd June next.

In view of the incorporation of the Institute the Ontario Mining Institute was formally dissolved at a meeting held in Toronto on 5th instant.

At a meeting of the Engineers' Club of Philadelphia, Mr. L. Y. Schermerhorn opened a discussion on high explosives. On the ques-

tion of sympathetic explosions of high explosives Mr. Schermerhorn said that in his work of removing a reef in one of the greater lakes he had made experiments to determine at what distance a charge of dynamite under water would be exploded by the explosion of another charge. With holes five feet apart, and 12 lbs. of dynamite in each hole, he placed exploders in every other hole. Sometimes all would explode, and sometimes they would not. He never discovered the reason for the difference. On one occasion, with 25 holes loaded, and but five primed with exploders, the whole twenty-five went off and nearly wrecked the scow which was thirty feet away. What the conditions were producing that result he never knew. High explosives to be effective must be near the object to be injured. Experiments made by the British Government showed that 500 lbs. of guncotton exploded 100 feet from a vessel did not injure it. At 30 feet the side plates were driven in and the frames were distorted. A general conclusion has been reached that the value of torpedoes or mines when brought in contact with an enemy's ships depends upon their being placed with a very limited distance of the hold of the vessel. A curious fact in regard to the transmission of the shock of explosions was noted by Mr. Schermerhorn. Three distinct vibrations had been noticed by him, transmitted respectively by the earth, the water, and the air. The vibration through the earth is the heaviest, and the first to be perceived.

It is an axiom that legislation cannot protect people from the effects of their own folly. The attempt may be made but it is never more than partially successful. Thus, though there are stringent laws devised for the punishment of the confidence man, he still flourishes exceedingly, and his victims are legion. Especially is this the case where the confidence man casts his hook with a prospectus, and angles for his prey as a promoter of mining companies. It is only necessary to obtain a high sounding name for his company, to parade so-called expert reports extravagant in assertion and positive in prediction, and the admixture of human gullibility with human cupidity does the rest. The gudgeons rise to his line with a ready credulity almost touching in its simplicity, and only remember good advice when they are "landed" beyond hope of wriggling back to safety.

It is very difficult by means of legislation to protect these credulous ones from the consequences of their folly, yet this is what the French Government is undertaking to do, and if it fails it will at least make the road steeper, stonier, and more dangerous for the fraudulent promoter. Moved thereto by the number of discreditable ventures that have lately been put upon the market, and the amount of worthless stock in mining and other companies that has been foisted on the public to the ruin of countless small investors, M. Fleury-Ravarin, the deputy for the Rhone, has proposed a law of a decidedly drastic character. The Government has adopted it, and in the event of it passing it will render it impossible for promoters to float companies without giving substantial guarantees for their *bona fides*. According to its provisions every prospectus must give the fullest details of the company to which it relates, and the promoters will be liable to heavy fines in the event of these statements being proved false. M. Fleury-Ravarin provides also against the loss of legal remedy through the absconding of a fraudulent promoter threatened with prosecution, by making him provide a responsible guarantor, who cannot so easily abscond. Therefore, it is proposed that no prospectus shall issue unless it bear the signature of a solvent financial establishment, which has had offices in France for at least two years. This establishment is to be held responsible for what is contained in the prospectus, and in the event of fraud on the part of the promoter, it will be liable to heavy penalties. It is assumed that with the fear of being mulcted in heavy damages, and, what is more to the point, losing credit and reputation, bankers will make an exhaustive enquiry into the antecedents of the promoter and the character of a

company before venturing to append their names to any prospectus. The proposal has been unanimously approved by the Commission d' Initiative, which has recommended its discussion by the Chamber of Deputies.

The *Mining and Scientific Press* continues to cite instances of cheap mining and milling in California. In a recent issue it gives the following data of the Balliol Mining Company, at Sutter Creek, Amador County, during the month of April, during which the mill was closed sixty hours :—

COST OF MINING FOR APRIL.

534 days labor mining	\$1,145 50
25 days blacksmith, sharpening	60 00
1275 lbs. powder	102 00
5 boxes caps	2 50
2200 feet fuse	11 22
30 days lighting, miners' candles	7 50
31½ days labor tramping ore	647 12
30 days lighting, trammers' candles	7 50
5 gallons coal oil for lamps	55
Oil for cars	2 83
Total cost of mining and delivering 5885 tons of ore . . .	\$1,986 72

COST OF MILLING FOR APRIL.

118½ days labor on batteries and plates	\$ 362 00
61½ " " concentrators	168 00
44 " " rock crushers	101 25
94 " " ore bin	188 00
Mill repairs	161 27
Mill expense	60 12
Mill lighting	26 06
Power water supply for April	480 00
Total cost of running mill for April	\$1,546 70

Cost of mining and delivering 5,885 tons of ore . . . \$1,968 72 or 33¼ cents per ton.
 Cost of milling, " " " " . . . 1,546 70 or 26¼ " "

Cost of mining and milling \$3,533 42 or 60 cents per ton.

It is to be noted that there was no special effort to make any record; the above was an ordinary 27½ days' work. The mill is a 40-stamp one, each stamp weighing 1,000 pounds, with a four-inch drop, 102 drops per minute with a nine-inch die. It is also to be noted that forty stamps in 27½ days crushed 5,885 tons of ore—an average of 5.35 tons per stamp per twenty-four hours—a high duty. The ore was excavated from an open cut 75 x 125 feet, from which it was dumped into a chute and trammed 700 feet to another chute, where it was again trammed 800 feet to ore bin at mill, the ore being handled twice and trammed a distance of 1,500 feet.

CORRESPONDENCE.

Mining in Newfoundland.

SIR,—I notice an occasional brief reference to Newfoundland and her mineral industries in your admirable REVIEW. I have thought perhaps, a more extended reference as to what we have done and are doing in that particular line, may prove not altogether uninteresting to your readers. With that object in view I have gone to much pains to ascertain, as far as is now possible, what has been the actual mineral output of this colony since the inception of mining some thirty-four years ago, with the result as shown in the accompanying tabulated statement. Taking everything into consideration the showing is not altogether a bad one, the average annual value of our minerals, as may be seen, reaching nearly half a million dollars.

In the earlier stages of this industry all sorts of obstacles had to be encountered and overcome. Isolation, want of geological and mineralogical knowledge of the country, impossibility of procuring skilled labour except from outside sources, and then only on exorbitant terms; but beyond all a blind, stupid and unreasonable prejudice or utter unbelief in the mineral resources of the country, amounting almost to prohibition of any attempt at mining enterprise at all.

As a natural consequence of such a condition of affairs it is scarcely a matter of surprise that foreign capitalists held aloof. In fact, they were scared away by the grossest misrepresentation, and no one in the island would risk money in such precarious undertakings.

Slowly but surely a change for the better began to manifest itself. The establishment of the Geological Survey in 1864, coincident with the successful exploitation of the Union Copper Mine at Tilt Cove, Notre Dame Bay, soon began to dispel the doubts, and overwhelm with confusion the skeptics who could see nothing of any value in the country. In the course of a few years a reaction set in, which soon developed into a pretty fair sized Klondike fever, which reached almost boiling point between the years 1875 and 1880. The rush for mining claims, especially around the shores of Notre Dame Bay, the "El Dorado" of the island, continued unabated for several years, until every available foot of land was seized upon. Persons with the very minimum of knowledge, or without any at all, were so eager to participate in the mining boom that they rushed headlong without the slightest hesitation, to take up licenses extending over many miles of territory, because some more knowing one had located a promising mineral claim. Not a thought was given, nor indeed inquiry made as to whether similar geological or mineralogical conditions prevailed over the adjoining lots or not. Copper was the acme of all their desires, other, baser and more common place substances, even if recognized at all, were taken no account of. Many rather amusing incidents occurred during the existence of this craze, though not known at the time, and probably not even yet known to some of the dupes. Claims were taken out for land which had in reality no existence, others covered the same areas when starting from opposite sides of narrow points or head lands, still others, supposed to front on the waters of some deep arm or inlet were found upon actual survey to be situated several miles inland. These discrepancies were owing to the fact, that the old coast charts, the only maps available at the time, were exceedingly erroneous. They have since been replaced, in most instances, by recent surveys, either by the Admiralty or by this Department, and nearly all the chief defects are now remedied.

As may be supposed under such circumstances as those mentioned above, not more than one per cent of the claims so taken up proved paying speculations. Some which promised well in the beginning, either gave out after a while, or were spoiled in the operating. Others are locked up through litigation, or the inability or unwillingness on the part of their owners to do anything with them.

Notwithstanding these many detriments to establish an industry in mining, it has nevertheless taken root and is steadily advancing all the time. There are of course the usual fluctuations dependent upon the laws regulatiug supply and demand; but the fever stage has long passed, and the industry is now firmly established and on a sound and permanent basis.

The Tilt Cove Copper Mine still holds first place as a successful mining venture, and its output last year exceeded that of any other since the opening of the mine. The ore shipped realized the handsome sum of \$386,785, of which \$137,089 was clear profit. It is believed the increased demand for copper will create a renewed interest in our mines the coming season, and in all probability some of the old workings of Betts Cove, Little Bay, &c., will be reopened, while several new untried properties are now in the hands of English Syndicates who are preparing to test them.

Iron ores, heretofore regarded as all but useless, are, thanks to the success of the Nova Scotia Steel Company's mine on Bell Island, attracting considerable attention. There is little doubt that the war now on between Spain and the United States will interfere greatly with the shipping of this class of ore from both countres, and British manufacturers will have to look elsewhere for their supply of the raw material. Here in Newfoundland, her oldest and nearest colony, they will find an

MINERAL STATISTICS OF NEWFOUNDLAND.

YEAR.	COPPER.			NICKEL.	LEAD.	PYRITES.	Value.	IRON ORES.	Value.	CHROMITE.	Value.	OTHER MINERALS ETC.	Value.	TOTAL VALUE.								
	Ore.	Regulus Ingots.													Tons.	Value.	Tons.	Value.	Tons.	Value.	Tons.	Value.
		Tons.	Tons.																			
1854 } to 1861 }	627½						22,980					Slates No.		63,428								
1865	459½				450		17,001?					31,000	1,240	39,841								
1866	1,774½						65,656?							65,656								
1867	3,377				100		124,949?		4,800?			Slate, Tons.	600	130,349								
1868	7,831½						285,768?					Slate, Tons.	101,000	287,788								
1869	5,661						209,457?						2,020	210,661								
1870	5,226						193,362?							202,492								
1871	1,817						66,219?							66,919								
1872	4,955						588,560							591,120								
1873	5,553						191,555							197,955								
1874	5,052						121,248							126,072								
1875	10,018						370,666							382,546								
1876	25,134						614,700							622,060								
1877	47,454						1,261,004							1,265,828								
1878	35,823						822,636							823,998								
1879	28,408						555,790							555,890								
1880	22,042						441,680							441,680								
1881	27,351						547,020							547,220								
1882	19,634						468,576							468,576								
1883	11,989						256,724							256,796								
1884	4,079						99,217							106,817								
1885	4,401						102,420							102,420								
1886	235						246,150							246,150								
1887	7,491½						168,864							177,704								
1888	3,322						816,386							853,386								
1889	2,306						356,370							420,370								
1890	400						226,792							340,482								
1891	7,060						565,850							769,913								
1892	20,000						699,008							937,370								
1893	40,247						410,795							691,666								
1894	23,854						236,435							532,100								
1895	28,431						352,395							596,645								
1896	35,527						344,915							673,333								
1897	59,289						386,785							853,135								
506,196½	78,104½						12,234,503							14,647,676								
							5,418,16½							11,990								
							319							4,057								
							29,604							294,420								
							18,762?							81,560?								
							267,487							1,914,031								
							35,216							246,512								
							39,953							279,071								
							42,095							294,665								
							34,330							240,310								
							27,274							190,918								
							32,790							229,530								
							16,070							112,490								
							29,009							203,063								
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							29,009							203,063								
							35,216							246,512								
							39,953							279,071								
							42,095							294,665								
							34,330							240,310								
							27,274							190,918								
							32,790															

abundant supply of first class ores. Enquiries are being made every other day for iron ores, and quite recently the large manufacturing firm of Spencer & Co., Workington, have acquired the valuable Hematite properties situated on the north side of Conception Bay.

The chromite deposits on the West Coast promise well. Up to date some 4,000 tons have been raised at the Bluff Head mine, Port au Port Bay. Other finds of similar ore have been made recently on the N.E. side of the island.

Perhaps it is to the development of our coal areas, now at length actually entered upon, that we should look with renewed hope for the prosperity of the mining industry. Should the coal turn out at all equal to expectations, it cannot fail to exert a most beneficial influence on all other mining development. The Messrs. Reid, railway contractors, have secured a lease of the Grand Lake Coal fields from the Government, and have commenced operations. Already, the reports from the district are of a very favorable nature, and there is scarcely any reasonable room to doubt the success of the enterprise. Should the time arrive when we shall be enabled to utilize this coal in smelting the various ores on our own soil, then indeed will the country be fairly launched upon the road to mining prosperity.

The accompanying statistics will, as intimated, throw considerable light upon our mineral development, and give a fair idea of the progress made to date, together with the present status of this particular branch of industry in Newfoundland.

Yours, etc ,

JAMES P. HOWLEY.

St. John's Newfoundland, 1st May, 1898.

Alluvial Gold Mining at Edmonton, Alberta, Canada.

SIR,—An immense drift deposit, through which gold is diffused in very fine flakes and particles and in varying quantities, underlies the western portions of the districts of Alberta and Athabasca, extending from the south Saskatchewan river north to the Liard. Though the gold has been found on the uplands in different parts of this region (even on the top of the Beaver hills), more especially near Edmonton by farmers in digging wells on the prairie, it is only in the valleys of the rivers which now crosscut the deposit that any attempt to win the gold has been made. Though some work has been done on the south Saskatchewan where the gold (which increases in comparative coarseness the further north it is found) is very fine, and consequently difficult to catch by the crude processes hitherto in use, and some few miners keep steadily at work on the Peace river east of the mountains, and a larger number on the McLeod and Athabasca; the north Saskatchewan river for a hundred miles above and two hundred miles below Edmonton has been for the last thirty years, and continues to be the field which engages the larger number of men and, on account of the uniformity of the deposits and its accessibility, has yielded the most profitable results.

The river flows as a winding and easily navigable stream at the bottom of a valley about 200 feet below the general level of the park-like prairie country bordering it. The valley is a mile wide and the river 1,000 feet in breadth. Through the valley the river meanders from bank to bank, leaving broad bottom flats alternately. The ancient beds of the river are frequently traceable on these flats, as well as on the terraced sides of the valley.

A noteworthy fact in connection with Saskatchewan mining is that after a bar or beach has been worked out the same bar, after submergence by a rise of water is on the subsidence thereof again found to contain gold in paying quantities. Like the Pactolus river of ancient Lybia, its golden sands are ever replenished from the banks of the river and the sides of the valley. Gold was first dis-

covered on the Saskatchewan in 1858 by Sir James Hector, who is now director of the Geological Survey of New Zeland. On the virgin bars, in 1865 and for some years thereafter, the first miners taking advantage of the discovery made from \$15 to \$30 per day. As the cream of this deposit became worked out the yields gradually dwindled down until of late years \$1.50 to \$2.00 became the average earning, and a miner who made \$5.00 was considered fortunate. The mode of operation and apparatus used by these "hand miners" are very crude and inefficient, never more than 10 per cent. of the assay value of the ore being saved. A pick and shovel, a short dump box, a small screen called a "grizzly," a short blanketed sluice box, a water dipper, a tub and a gold pan constitute an equipment so portable as to be easily removed by the miner alone from place to place. The gold is obtained from the concentrate by mercurial amalgamation. This kind of mining is carried on principally during low stages of water, when the gravel bars and beaches are exposed. Only a few make a practice of drifting or tunnelling horizontally for short distances from the beach through the auriferous gravel, which at a depth of from 18 to 25 feet underlies most of the flat lands bordering the river. No complete records are available; but the amount of gold amalgam bought from these hand miners by the banks at Edmonton averages \$50,000 per year, the price paid being \$15 per ounce. The virgin gold dust is exceedingly pure and is worth \$20 an ounce.

The gold is always found more or less associated with black sand—generally magnetic—and platinum. There was no sale at the banks for platinum, and this with the black sand and other concentrates which did not amalgamate with mercury in the tub were treated as refuse and thrown away up to the end of 1896. Since then it has been discovered that the hand miners by the means before described save only 5,6,7,8,9, or at best 10 per cent. of the assay value of the gold in the ore. The value of the platinum is frequently as much as one-sixth that of the assay value of the gold in the gravel. A number of assays have been made of the original gravel, of the headings and tailings from a grizzly, and of the concentrates. These are all confirmatory of each other; so I will only quote those of Mr. W. Pellow-Harvey, F. C. S., Vancouver, one of the leading assayers on the continent. The first samples I sent to Mr. Harvey were taken from a fair average flat bordering the river in the valley. There were (1st) 20 feet soil and subsoil which assayed 50 cents per ton, then (2nd) nine inches hard blackish clay which was barren, and a "pay-streak" of 3½ feet of gravel showing \$2.50 to the ton in gold. From this same pay streak a sample of the concentrate from which all the gold had been taken by the usual local process Mr. Harvey made an assay showing:—

11 oz. 2 dwt. gold at \$20 per oz.....	\$222.00	per ton
3 oz. 2 dwt. platinum at \$15 per oz.....	46.50	"
	<u>268.50</u>	

As the result of personal experiment I had observed that much of the gold and black sand was in so minute a state as to be held in suspension in water for a long time after agitation and to even actually float on its surface. From this it appeared that water dashed on the auriferous gravel, in the manner customary in grizzly and every kind dredge mining hitherto in use here, must carry off the suspended and floating gold and fine black sand, leaving only the very heaviest particles and those at the very bottom of the stream of water a chance of being caught on the blankets of the sluices. To extract the value from the ore it therefore appeared necessary that a chemical process should be adopted. A test was accordingly made of the Cyanide process by Mr. Harvey which assayed \$2.50 per ton. This was passed through a coarse sieve to rid it of the large stones, and so

treated gave an assay value of \$4.00 per ton. The results were as follows: Cyanide consumption, 2 lbs. per ton of ore; but it would be considerable less on a large scale. Percolation test No. 1—on 1 lb. ore: 5 p.c. cyanide; treatment for three days. Assay of solution after treatment—3 dwt. 21 grains gold per ton. Assay of tailings after treatment—0 dwt. 12 grains gold per ton, which is equal to an extraction of 87 per cent. Percolation test No. 2—On 1 lb. ore: 5 per cent. cyanide; treatment, three days; assay of solution after treatment, 4 dwt. 5 grs. gold per ton. Assay of tailings after treatment—traces of gold per ton. This extraction is partially complete. From the above tests it is evident that the whole of the gold may be extracted by cyanide. Mr. Harvey estimates the cost of such treatment would not exceed \$1.25 per ton, to which must be added the cost of getting the sand in the vats.

Mr. Harvey also ascertained that practically the full value of the gold in tailings of a grizzly and that left by the hand miner in his concentrates after he had extracted all he could by his ordinary process could be saved by proper amalgamation. This fact has also been noted by Mr. Brindley of Edmonton, who found that the full value may be saved by grinding the concentrates in mercury.

Mr. Harvey says: "With regard to the fine sand washed away the cost of treating such material by cyanide would be about \$1.25 per ton if worked on a large scale, so that the question would be whether the sand would be rich enough to bear the cost of such treatment."

The chlorination process has been spoken of by a number of mining men as that which is likely to be most efficient in saving both gold and platinum at one operation, as well as economical owing to favorable conditions for its employment.

Mr. W. S. Edmiston, the mayor of Edmonton, consulted Mr. Heys, chemist, and Mr. W. T. Jennings, C.E., of Toronto, with the following results: From a sample of ordinary "pay" gravel assaying \$2.40 in gold Mr. Heys obtained by washing a 7½ p.c. concentrate, which assayed \$24.10 per ton, being a loss of 25 p.c. in washing. This gravel was obtained from a flat adjoining the river on which the overburden—consisting of loam, sand and clay—was 18 feet in depth resting on a pay streak of three feet of gravel. From these data Mr. Jennings deduced the estimates hereunder.

OUTLAY.

Removing 18 feet top earth by steam shovel, 600 cubic yards at 10 cents.....	\$ 60.00
Removing 3 feet auriferous gravel, 100 cubic yards, at 15 cts.	15.00
Washing 100 cubic yards of gravel at 10 cents.....	10.00
Rolling and treating 7½ tons of concentrates obtained from 100 tons of gravel, at \$1.50.....	11.25
Land, superintendence and interest on plant.....	14.50
	<hr/>
	\$110.75

RETURNS.

7½ tons concentrates at \$24 10.....	\$180.75
Less outlay as above	110.75
	<hr/>
	\$ 70.00

Profit per day..

Mr. Jennings goes on to say that a good ordinary steam shovel and a small rolling and concentrating plant on a scow will work up the above quantity, and that the whole cost of the plant in place and ready for work need not exceed \$16,000, from which it would appear that a highly profitable business could be done by processes involving a loss of 25 per cent. in washing and at a cost which seems highly estimated. Moreover the foregoing figures do not take into account the fact that the overburden would probably yield 80 cents to the yard, and so not only pay for its own removal and washing, but also yield a profit.

Whilst it is not claimed that all the flats bordering the river contain the assay values found by Messrs. Harvey and Heys in the samples submitted to them, there is a reasonable probability that in the 24,000 acres of flats, extending at the rate of 80 acres to the mile for 300 miles along the River Saskatchewan, there exists a savable deposit of \$10,000 per acre, or \$80,000 per mile, or \$240,000,000 in three hundred miles in gold alone, not to mention platinum, above or inside of the high water mark dividing the bench from the bar or beach diggings.

Above these flats there are the terraces on the sides of the valley which also contain gold in smaller or greater proportions. Even where good pay is found on them, owing to the absence of any sufficient water supply at a height requisite for hydraulic sluicing such deposits or for ordinary washing, none of the hand miners have attempted to work them.

The beaches and bars on which the miners have so long operated appear to yield each hand an average of \$1.50 per day, and presuming that to be the result of handling ten tons of gravel at a loss of 90 per cent. of its gold value, we may calculate that the average value per cubic yard would be \$1.95 taken off skimmings and a depth not generally so much as four feet, off selected spots. However, taking into consideration the experience of the people operating small dredges during the past two years, which goes to show that down to a depth of eight feet,—the lowest they went, though the gravel became richer, and further, that the poorest "dirt" that the dredges struck anywhere yielded them eight cents per cubic yard, whilst they were losing by the more lavish use of water in washing a greater proportion than even the hand miner, it may be fair to take the average value of the open beaches and bars and the deposits covered by shallow water adjoining them in which the small dredges have worked at \$1.00 per cubic yard.

The deeper parts of the submerged bed of the river have not been prospected. The only occasion on which any data were obtained was on a dredge which had been used in excavating for the foundations of a railway and traffic bridge being built across the Saskatchewan river at Edmonton. From this spot prospects, poor in gold but rich in platinum were obtained by panning, no assay being made. It is highly probable that rich concentrates occur in the eddies and natural riffles in the deep channel of the river, which is nowhere likely to exceed 20 feet in depth at ordinary stages of water, whilst the average depth would not be more than 6 feet under low water mark. Ordinary freshets will raise the water about 12 feet above this, and an extraordinary one in the summer of 1897 rose twice as high. The usual current varies from 2½ to six miles an hour, according to the stage of water and locality.

Mr. Charles Dennis Brindley, C.E., who is the originator of the type of dredge which has been most successful on the river, on which he has had a practical experience of mining for three years, has kindly furnished me with a typical sketch of the cross section of the river and its bed, founded on his own as well as the experience of other dredge men. The sketch, if to scale, shows the river to be of an average width of 300 yards; the high water mark to stretch from cut bank to cut bank, covering all beaches and bars, which are represented as of an average width of 100 yards; it also indicates resting on a wavy bottom of clay a deposit of gravel eight feet deep along the cut bank of the flat and tapering off to nothing at 100 yards below low water mark. This latter indicates a depth of superficial gravel in the continually submerged portion of the river bed of only two feet, or two-thirds of a cubic yard. At \$1.00 a cubic yard this would give a value of \$117,333.⅓ per mile, or \$586,666.⅔ within the limits of a five subaqueous lease. It would also show that the 100 yards above low water mark, containing an average depth of six feet, or two cubic

yards of gravel might be valued at \$352,000 per mile. Bearing in mind that the foregoing estimates are made from imperfect data—unfortunately the only one available—let us now recapitulate them so as to show the possible value of the auriferous deposits in the north Saskatchewan river for 100 miles above and 200 miles below the town of Edmonton.

300 miles flats of an average width of 80 acres per mile.....	\$240,000,000
300 miles beaches, between high and low water mark.....	105,600,000
“ “ subaqueous deposits.....	35,200,000
	\$380,800,000
Add for platinum 15 per cent. to value of gold.....	57,120,000

Estimated value of gold and platinum.....\$437,920,000

To the above it may be of interest to add that a complete analysis of the tailings of a grizzly showed a value of \$325 per ton in gold, silver, platinum, and iridium, with traces of rarer metals. When boring a well for the Edmonton electric light works on a flat adjoining the river the following section was exhibited:—Surface loam, clay, and sand 26 feet, auriferous gravel 3 feet, indurated black clay 2 feet, 10 inches; then followed stiff clay of a variety of colors for 38 feet and seams of coal, clay, sandstone and coal succeeded each other till natural gas was struck at a depth of 170 feet, when boring ceased. The whole country is underlaid by coal which crops out of the sides of the banks of the valley and river most conveniently, where it is mined by hand power at a cost of only 50 cents per ton. Fuel is thus very abundant on the river.

It would not be of interest to describe the failures made by several parties to procure the gold by different applications of machinery. As the result of the experience so acquired a local type of dredge has been evolved which is capable of digging to a depth of 18 feet from the surface of the water. Such dredges, of which there are several, operated last summer to the general satisfaction of their owners, and to the profit of several. For instance, the Star Mining Company of South Edmonton, which was the latest to place a dredge on the river last year, during a run of 43 days, handling never more than 100 tons per day, paying out as the wages of six men \$15.00 a day, and, for one month of the time run, working amongst the tailings of other miners, cleared a net profit of 11 p.c. on a capital of \$2,200. Besides this they have on hand 1,500 lbs. of black sand which they propose to send away for extraction of the value. Both they and all the other dredge owners acknowledge the imperfection of their concentrating appliances, and believe that they lose more than the hand miners. While they are satisfied with their digging scoops, they all intend to improve their concentrators in such a manner as to quadruple their returns. They also agree in the belief that dredges of ten times their present capacity could be run by the same number of hands per shift, and that there should be two shifts, so as to keep the machines constantly going during the dredging season, which generally lasts for 150 days. In the absence of Mr. Brindley who could give the best expert evidence on this subject I am unable to go into greater detail.

As the result of a description of Edmonton Placer Gold Mining published by me in the spring of 1897, Lt. Colonel Drolet, of Montreal, had his attention directed to it. Having employed Mr. Alexander McKenzie, an eminent mining expert, to thoroughly examine the river, and received a most favorable report from him, Colonel Drolet has formed a large company to operate the very extensive and valuable and subaqueous mining concessions he holds on the Saskatchewan River. The observations of Mr. McKenzie were, it is understood, confirmed by those of Mr. Hogue, who came out in the interests of London capitalists, and is now interested in Colonel Drolet's com-

pany "The Saskatchewan Gold and Platinum Mining and Dredging Company." This concern has, it is reported, purchased six mining machines at a cost of \$30,000 each in France, and that these will be started on the breaking up of the ice in spring.

When the loss they were sustaining by throwing away their tailings from the tubs became known to the hand miners and parties began to buy the same with the object of extracting the remaining value it became customary to save this hitherto waste product. The product was freely bought at varying prices at South Edmonton for the greater part of the season; but it still lies there waiting treatment or shipment to a metallurgist. The establishment of extraction works, under competent management, is a great desideratum in the interests of the mining community. It should also prove profitable to the owners as the present dredgers and miners would probably find it to their advantage to merely produce concentrates for treatment at extraction works, instead of attempting to save the gold themselves at the enormous loss now involved in the operation.

Among the parties passing through Edmonton *en route* to the Klondyke there have been three expert mining men whom it has been my good fortune to meet and to show our miners at work. They all expressed themselves astonished at the prospects and declared that had they not been sent or made engagements to proceed to the North they would have remained here, where they stated the prospects were good enough for them. One of them, Mr. Purdy, lately a mine manager in South Africa, with a mining experience of thirty years in that and other countries, said "you have a Klondyke of your own here and no man with some capital need go further." As Edmonton is a beautiful, fertile and healthy country, enjoying a tropical climate as compared with the rigors of the North, with railway communication and most of the other advantages of a civilized community, and its gold deposits are capable of being so easily worked by machinery of the proper kind, there cannot be a doubt that it will not be much longer overlooked or unknown by persons having the necessary skill and capital to take advantage of the enormous mineral wealth with which the district has been so lavishly endowed.

ISAAC COWIE.

EDMONTON, Alberta, 2nd May, 1898.

Gold Mining in Eastern Siberia.

SIR,—The general demand for gold on the markets of the world, the adoption of the gold standard by several silver countries, and the desire of adopting the gold standard expressed by other nations have lent a feverish activity to the search for and production of gold in several countries. Every mine is exerting itself to still increase its output, whether it be in Coolgardie or in the Transvaal.

The same thing is happening in Russia. For, on the one hand, Russia is adopting the gold standard, and on the other hand, Russia is the fourth gold-producing country. In 1888 it produced \$21,300,000 worth of gold, in 1891 this sum had risen to \$23,800,000, and in 1895 to over \$25,000,000. Certain estimates even make out that the output in 1895 amounted to \$35,990,000

In 1891, (the last year for which detailed statements are procurable) according to the Russian Bulletin of financial statistics and legislation, this output was distributed as follows:—

Ural Region.....	\$7,035,060
Western Siberia.....	1,704,339
Eastern Siberia {	
Yenisei	2,886,290
Transbaikalia	2,304,315
Lena District.....	5,448,155
Amour Province.....	4,437,457
Total output.....	\$23,815,616

A glance shows us how important is the gold production of Eastern Siberia; by including the Yenisei region in it, it is seen to amount to over \$15,000,000 a year, that is why so much activity has been shown for some time in the Siberian gold districts. It is precisely this part of Asia that is going to be tapped by the great Siberian railway, rapidly approaching completion. Two mining engineers, the one a Frenchman named Levat, the other a Russian, Mr. Sabaschnikoff, have recently returned to Russia after having traversed and examined from the standpoint of gold-production, an immense tract of land in Siberia. The result of their studies is not yet accessible in book form, but private information has reached us according to which, these engineers have declared that all Eastern Siberia, from the Yenisei River to the Amour River is formed of auriferous soil, of considerable richness in the valleys, and beneath the beds of the great rivers which cross it.

It is the country lying between Vladivostok and Nicolaieosk, and the great Baikal Lake, that is rich in gold, and the deposits of which are continuous and extensive. In general the deposits of Eastern Siberia are a hundred to two hundred sages (a sague—7 feet) wide and more. They are four to six feet thick and are very uniform in their formation, free from faults. The average contents of gold in the sands is from two to three zolotniks (1 zolotnik—66 grains troy) and frequently more.

But it must be remembered in connection with the Siberian gold mines that the working methods are primitive, and that results would be very materially altered if other methods were in operation. For instance, it should be remembered that the mines have been to a great extent dependent upon sumpter-beasts for their transport facilities: many thousand of horses, reindeer and camels are at the present time employed in these gold mines, and all the building timber and pit props required at the mines are conveyed by reindeer guided by native Yakuts and Tunguy. The possibilities of the future, when the assistance of railway connections will have been secured, are best seen from an examination of the methods which give the present immense results. The extraction of the auriferous sand is carried on simultaneously with the washing; but in underground mines the sand is prepared for washing in the winter. Experiments made with the application of the hydraulic method of exploitation have, so far, not been successful and there seems but little chance of this method being ultimately adopted in Siberia. For the gold bearing lands are so irregularly distributed that it seems almost impossible to usefully erect large water reservoirs which will give a pressure of water sufficient to make the hydraulic process practicable.

The motive power required for the machines used in the extraction of the gold is generally furnished by overshot water wheels. The water is led to the washing machines either by canals or by wooden conduits called *splotka*. The water supply is generally very well managed. The timber which supports the conduits in places attains a height of 40 to 50 feet, and is constructed with special lightness and strength. The supply of water to the canals and conduits is generally effected by partially damming the streams; there is seldom any need to store the water in reservoir ponds as almost everywhere an abundance of water is to be found. Portable engines are frequently used in the gold mines of the Olekminsk region and of the Amour: these engines are used whenever the water supply is not sufficient to work hydraulic motors.

At this present time, the washing of auriferous sand in Siberia is done in barrels, only very clayey sand being treated in pans. In rare instances, under particularly favorable conditions, when the profile of the soil is sufficiently inclined and the sand easily washed, it is excavated by hand and cast into troughs in which it is washed. This method, known as the Pakoulevski process, is a modification of the sluice process. A Mr. Koulubin, a mining engineer, some years ago intro-

duced the sluice method of washing, in the Ural Mountains, and he modified the Wooldear system to suit the local conditions of Siberia, a system originally projected for the hydraulic process. His class of washing appliances is coming into use in Siberia, where they are known as *Koubilinki*. The first machine used in Siberia for washing the auriferous sands, consisted of pans and wooden barrels with iron fittings inside. The first pans and barrels washed from 3,000 to 5,000 pouds (a poud—32¼ lbs.) of sand a day, but as the gold industry developed their dimensions proved insufficient, they were enlarged and their construction perfected. All the barrels now used in Siberia belong to one type and only differ in their general dimensions. Each barrel consists of a conical sieve with half-inch meshes. These orifices are of equal size down the whole length of the barrel and are distributed in a chess board fashion. The barrel is made of boiler-plate iron about ¼" thick. The inside fittings of the barrels generally consist of iron bands placed edgewise, the barrels are revolved by a special gear put into motion by hydraulic motors or portable engines. The barrels vary in length from ten to seventeen feet. The smaller diameter varies from 3½' to 4¼' and the larger from 4 to 7 feet. Below the barrels there is an inclined plane, the upper portion of which is divided by longitudinal beams into several parts on which there are transverse grooves for retaining the gold. Besides which, other arrangements such as brushwood or cloth obstacles are placed upon the inclined plane for the retaining of finer gold. The length of this inclined plane or sluice varies from 30 to 40 feet and is generally made with a rather steep incline.

The tailings fall through special trap-doors into carts or trucks and are dumped on the waste mounds. The barrel machines are made single or double. At the present time, one barrel can wash from 40 to 50 thousand pouds (32¼ lbs.) of light sand or 25 to 30 thousand pouds of pasty clayey sand a day.

Such is the present method of working gold in Siberia. Nowhere are they more painful: for this reason no placers are worked which yield less than 1 zolotnik per 100 pouds (= 33 ozs. troy per ton). Deposits yielding less than this are immediately abandoned on account of the high working expenses and the imperfect methods. And yet in spite of these deficiencies and obstacles of all sorts, the yield of Eastern Siberian gold does not diminish in any marked degree. The last official statistics (unfortunately published by decades) gave the yearly yield of Eastern Siberian mines as follows:—1881 to 1890, both inclusive, per year, in pouds of 32 lbs. avoirdupois: 1,621, 1,623, 1,554, 1,562, 1,349, 1,345, 1,328, 1,326, 1,462, 1,599.

It may here be pointed out that the greater or less yield in different years is dependent upon a number of varied facts such as is seldom met in any other industry. Leaving the frequent modifications of a legislative nature aside, we find the forces of nature playing quite an important part in the gold industry. For instance, a dry summer and a scarcity of water are very injurious, while an excessive amount of water, especially if it appear suddenly, frequently bursts the conduits and sluices and produces a perfect drought. It often happens that in the course of one summer a scarcity of water will be followed by too great an abundance.

That the injury arising from a hot dry summer has its compensation in the thawing of the peat soil which covers the gold-bearing deposits, for in those localities where the gold industry is most developed the entire soil is frozen and has to be thawed before the auriferous sand can be washed. Besides these meteorological phenomena directly affecting mining operations, the price of provisions also has a most important effect; at the gold workings the price of bread is entirely dependent upon the harvest of the preceding years and determines the cost of labor. In some localities this reaches 90 to

1,400 roubles (\$675 to \$1,050) per man for working a year which sometimes only covers four or five months. So much for what has been done under present methods, in the face of the immense obstacles of nature and the great economic defects. It is no vain prediction when it is said that the more complete and more extensive knowledge of this great gold region, the introduction of the railway and all that it means in the shape of machinery, building material, provisions, implements, &c., will immensely increase the yearly output of gold in that part of the world. It will be unusual too, if more auriferous tracts are not discovered in the future, it is certain that many a one that can not now be profitably worked, will, after the construction of the Trans-Siberian Railway, be made to yield satisfactory profits. The Siberian climate cannot be overcome, but the Siberian distances are being annihilated. What that can mean and must be made to mean, to the American mining engineer and manufacturer of mining machinery, must be dealt with on a future occasion.

W. B.

Philadelphia, 10th May, 1898.

To Whom it may Concern.

SIR, — In your issue of March, 1898, there appeared on page 92 in a contribution from "another correspondent" the following paragraph:

"The re-opening of the once famous Dufferin has commenced in earnest, large contracts for machinery, lumber and timber have been let, and it is said there are a hundred men already at work on the premises. We notice, with no regrets, an exodus, from several other districts, of the parasitical element that has helped to swamp more than one good mine in this Province. We would strongly advise the management of the Dufferin to fraternise a little with some of Nova Scotia's successful managers before condemning and deprecating too strongly the mine labour of the Province"

With regard to the advice contained in this paragraph, the undersigned in whose hands the Montreal, London G. & S. D. Co., Ltd., of Montreal, have placed the design and management of the reopening of these mines and their equipment with complete up to date plants of mining and milling machinery, would say:—

1. That the plants, the installation of which is now well advanced, are of the most approved modern types, and, in the mining work a system has been adopted and is now being vigorously carried out that has proved to be the most efficient and economical.

2. That the labor involved in this work has been and is being performed by natives or residents of Nova Scotia exclusively, except in the case of the engineer, Mr. R. T. Rogers, a native of Montreal, sent by the James Cooper Manufacturing Co., Ltd., to install the machinery which was furnished by that firm.

3. That the workmen retained in the service of the company are the equal of any engaged in similar work anywhere.

4. It is admitted that since the beginning of operations here a number of workmen have been dismissed for cause, but these same may have been the "undesirable element" referred to in the quotation.

5. It is also admitted that the "management" owing to the close personal attention required for the work in progress, has hitherto neglected to cultivate fraternal and social relations with the "successful managers" of Nova Scotia, but the hope is indulged that such managers will overlook this failure, as they are doubtless aware that "*mind one's own business*" constitutes one of the elements essential to success in mining operations.

BERNARD MACDONALD.

Dufferin Mines, N.S., 7th May, 1898.

A Couple of Notes on Pumping.

By HENRY S. POOLE, M.A., A.R.S.M., Stellarton, N. S.

(Read before the April meeting of the Mining Society of N.S.)

In our *Transactions* for 1896 are some papers which refer to pumping with compressed air, and at the time doubt was expressed whether the ordinary direct-acting steam pump was an economical engine to apply compressed air for the purpose in question. Reasons were advanced why such a doubt might be held in the face of very general recommendation of the ordinary steam driven direct-acting pump.

An opportunity recently presented itself for testing the efficiency of such a pump with one of equal size controlled by fly-wheels, and the test was as follows:—Both pumps had plungers of the same size (4 in.) and of the same length of stroke (12 in.) They were placed side by side so that at will either could be made to deliver into the same sising main against the same head of some 650 feet. Both pumps were considered to be in good working order, and any prejudice on the part of the attendants was in favor of the direct-acting pump.

The fly-wheel pump had little clearance in the cylinder and necessarily had to make the stroke of the full length of 12 in.; it cut off the air supply at $\frac{5}{8}$ lbs and utilized the momentum stored in the fly-wheels for finishing the stroke. On the other hand the direct-acting pump had $\frac{3}{4}$ in. clearance, and in spite of attention tripped often short of the 12 inches. In fact when ice began to clog the ports and any variation occurred in the air pressure the stroke would drop at times even to eight inches; and this pump necessarily took the full pressure of the air for the full length of the cylinder stroke and clearance.

The rotary pump did not suffer in the same way from ice, although it also makes ice if continuously run for several hours, no known device being able to prevent it under the existing circumstances. It may here be remarked that great relief was got by impinging a fine jet of water on the ports, but as the water available was somewhat destructive to the valve face the use of water was abandoned.

During the tests the conditions for each pump were identical: a uniform pressure of air was maintained; uniform speed of plunger, and the runs were for equal lengths of time, and the delivered water was measured in barrels.

The results in brief were as follows:—

The fly-wheel pump delivered 19 per cent. more water than the direct-acting pump with an equal number of strokes, so that on assumption that the valves in both were equally efficient the stroke of the latter pump could only have averaged 10 inches to the 12 inches of the other. In the compressor room, on the surface, the difference in the call for air was immediately noted, and a saving of 21 per cent. was recorded in favor of the fly-wheel pump; so it appeared that taking these results together the fly-wheel pump did as much work as the direct-acting pump with only 60 per cent. of the air that the latter required.

The other note on pumping that I would mention relates to the cost of packing plungers of pit pumps that have to deal with dirty water. When a duplex compound steam pump was put in the Acadia pit some 14 years ago, the water it had to throw to the surface against a head of 977 feet was comparatively clean. But in the course of time a change was produced by the decomposition going on in the waste, and now a flocculent reddish deposit accompanies the water, and in the course of time this deposit causes the pump plungers of cast iron to cut in the packing. A year ago it became desirable to replace the set of four plungers, but instead of putting in all four of the same material two were put in of cast iron and the other two of bronze. In the course of eight months the packing in the plunger glands was replaced four times about those of cast iron, while the original packing around the bronze plungers remained undisturbed. With such an experience it seems reasonable to presuppose that the more costly bronze plungers will prove in the long run to be cheaper than those of cast iron under the circumstances mentioned.

Notes on Mining and Milling Gold Ore in Queen's County, N. S.

By WILBUR L. LIBBEY, North Brookfield.

(Read before the April Meeting of the Mining Society of N.S.)

Believing that accurate figures giving the actual cost of mining ore from one of Nova Scotia's narrow veins would be of interest to this Society, and to intending investors in this Province, the following results of work both with hand drills and air drills are given. In making comparisons with the cost of landing ore at the rock-breaker on other mines, it must be remembered that the fissure vein at Brookfield averages to be not over 14 inches in width of crushing material. The extreme depth perpendicularly of the workings of the mine is 450 feet.

The figures given include the cost of sinking and drifting, and also, in the first table is covered the cost of excavating a large chamber to hold a double plunger Northey pump and a cistern capable of holding mine water for 12 hours.

During six months from May 1st, to November 1st, 1897, 5,606 tons of ore were sent to the mill at an average cost of \$2.54 per ton, as follows for ore landed at the rock-breaker:—

Labor which includes blacksmiths' and deck men.....	\$11,173 99
Timber and poles.....	392 40
Shovels.....	35 20
Picks.....	20 60
Blacksmiths' coal, 6 tons at \$10.66.....	63 96
Charcoal, 300 bushels at 15c.....	45 00
Axes.....	5 00
Hoisting ropes (estimated).....	50 00
Candles.....	364 29
Loss of steel.....	71 82
Fuel (pumping station and mill).....	1,046 00
Explosives.....	654 75
Iron (including rails for tracks).....	126 70
Miscellaneous expenses.....	125 00
Lumber.....	45 00
	<hr/>
	\$14,219 71

Some of my coal mining brethren will think coal is dear, but I am obliged to pay freight and teaming. Following are the figures for three months of work with the Ingersoll-Sergeant air plant, and it should be borne in mind, that not only have green men been broken in, but the method of stoping is being gradually changed from breast stoping to back stoping. The results are especially gratifying to the Brookfield Mining Company, as many old timers have flatly stated that a small lead could not be worked as cheaply by an air plant as by hand labor, and in one instance recently, an air plant has been discontinued and a return made to hand drilling.

The months taken are January, February and March, 1898, during which time 2,840 tons were sent to the mill at an average cost of \$2.44 per ton, as follows, for ore landed at the rock-breaker.

Labor (which includes blacksmiths and deck men).....	\$5,078 95
Timber and poles.....	198 80
Shovels.....	10 00
Picks.....	2 00
Blacksmiths' coal, 4½ tons at \$10.66.....	47 97
Charcoal, 150 bushels at 15c.....	22 50
Hoisting ropes.....	25 00
Candles.....	171 00
Loss of steel.....	11 25
Fuel at pumping station and mill.....	717 00
Explosives.....	512 50
Iron (including rails for tracks).....	43 45
Miscellaneous expenses.....	75 00
Lumber.....	25 00
	<hr/>
	\$6,940 42

The result thus far is apparently to place our ore at the deck head ten cents per ton cheaper with an air plant than by hand work.

We are, however, doing more than twenty-five per cent. more of sinking and drifting with the air plant. In fact, it would be impossible to place men enough in the mine to equal by hand the work now done by power.

Following is a table showing the expenses of running the 20-stamp mill for six months, commencing September 1st, 1897, and ending February 28th, 1898.

During this time 5,910 tons of ore were milled and concentrated at an average cost of 63 cents.

Fuel.....	\$ 876 00
Labor 2 firemen.....	360 00
" 3 amalgamators.....	900 00
" 2 concentrator men.....	420 00
" 1 carpenter.....	242 65
" 1 engineer.....	300 00
Miscel. expenses, including lubricants.....	75 00
Cost total for shoes and dies.....	397 53
Mercury lost, 79¼ lbs. at 60c.....	47 55
Screen wire, 192 feet at 50c.....	96 00
	<hr/>
Total.....	\$3,714 73

Some Tests of an Ore Concentrator.

By F. T. SNYDER, Keewatin, Ont.

(Read before the Mining Society of N.S., April meeting.)

The investigation which resulted in the production of the machine whose description follows, was undertaken in an attempt to increase the capacity of the frue vanner, which was recognized as doing good work, but as having small capacity. This limited capacity requires the use of a number of machines, which in turn require large vanner floor and the accompanying buildings.

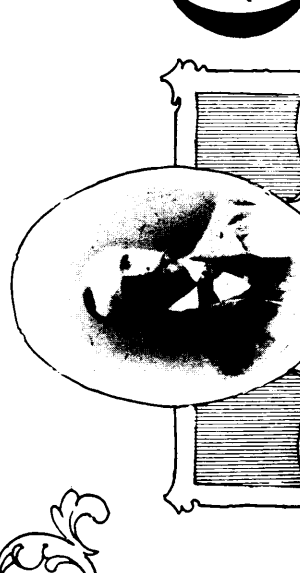
Before undertaking the comparison of the new machine with the old, it became necessary to obtain some standard, or to ascertain the law connecting the question of saving with the amount of material which the machine was required to handle. It is, of course, possible to run any amount of pulp over the belt, and the only effect of increasing the amount would be to lower the saving. It was desired to ascertain in addition some data by which the point could be determined where additional vanner belt capacity would not result in further commercial gain.

To determine these points, three four foot frue vanners are placed below two batteries of five stamps each, the two batteries being the same in every respect, and fed by automatic feeders from the same bin. The pulp from the first five stamps was split between two four foot vanners with a plan belt and a one inch shake, which were run at a speed of 200. The pulp from the second five stamps was run to one frue vanner, which in every respect was a duplicate of the others. To further insure impartiality, the spouts were alternated at regular intervals. Under these circumstances about four hundred tons of ore were run over each machine, crushed through a thirty mesh diagonal slot screen.

As it is the purpose of this machine to separate the material which is heavier from the quartz from the quartz itself, an assay on the heads and tails would give but an indefinite check, as the weight of the gold forms but a small portion of the total weight of the concentrates. The ore used was a hard quartz, containing gold and clean iron pyrite, showing no decomposition. The customary way of checking the work has been by panning the heads and tails. As this is dependent entirely upon the skill of the one making the test, it was rejected as being too indefinite, and an analysis of the heads and tails for sulphur was carried on in each test, from which the percentage of pyrites were calculated.

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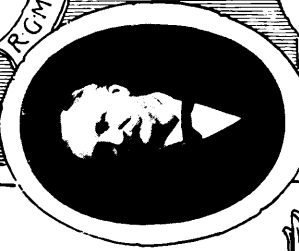
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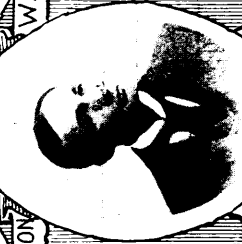
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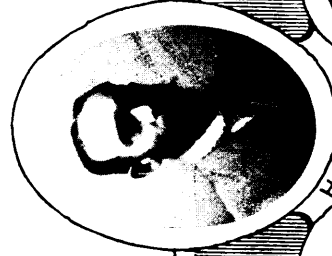


JOHN B. HOBSON



FRANK C. LONG

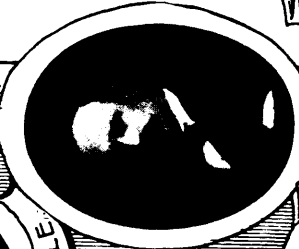
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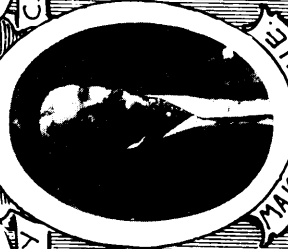
H.S. POOLE



W.L. LIBBEY



CH. DIMOCK



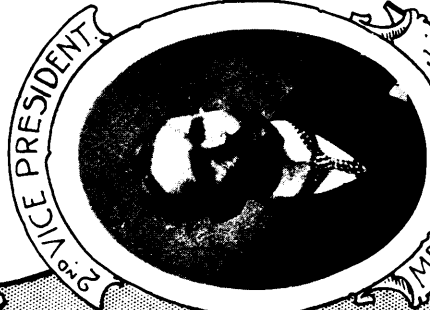
MAJOR G.L. CRIE

PROVINCE OF NOVA SCOTIA

1ST VICE PRESIDENT



MR. GEO. M. DAWSON



MR. W.A. CARTTER

PRESIDENT



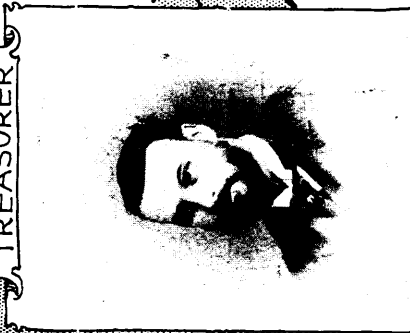
B.T.A. BELL

SECRETARY



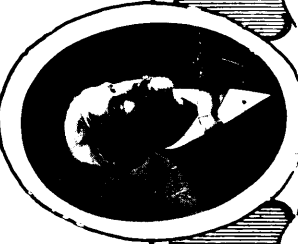
MR. JOHN E. HARDMAN

PRESIDENT

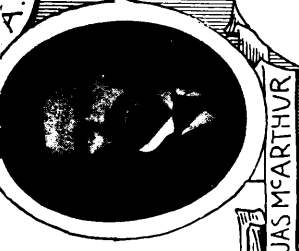


A.W. STEVENSON

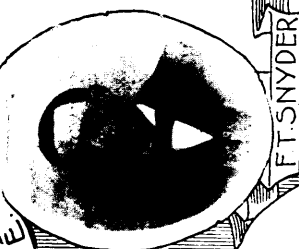
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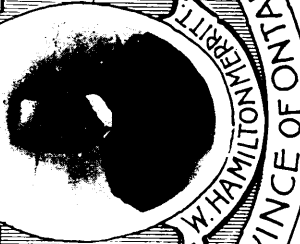
A. BLUE



JAS. McARTHUR



F.T. SNYDER



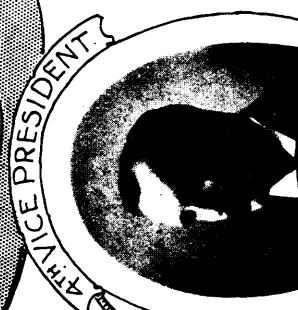
W. HAMILTON KERR

PROVINCE OF ONTARIO



MR. JOHN BUEH

3RD VICE PRESIDENT



MR. CHARLES FERGIE

4TH VICE PRESIDENT



J. BALSKY

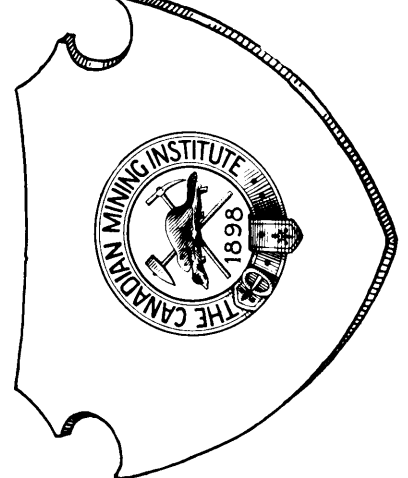


GEO. R. SMITH



JOHN J. PENHALE

PROVINCE OF QUEBEC



As two-thirds of the material saved by the machine would pass a 120 mesh screen, the desirability of this method will be recognized.

The average results of these tests were as follows :

For the two frue vanners, the heads contained 4.12 per cent. of iron pyrites, and the tails 1.91 per cent.: a saving of 54 per cent.

For the one frue vanner, the heads contained 4.77 per cent. and the tails 2.48 per cent.: a saving of 48 per cent.; or taking the one frue vanner as a standard, the second frue vanner saved 113 per cent. of the saving of one frue vanner, or about $\frac{1}{8}$ more. The concentrates contained an average of $8\frac{1}{2}$ % silica. As this decreased saving was much smaller than was expected by the doubling of the vanner belt surface, the test was repeated with similar results. As an explanation of it, the following is offered :

In distributing between the two vanners no sizers were used the pulp being directly split over the two machines. Assuming that one machine could save 50 per cent. of the iron pyrites, it will be seen that the best work that could be expected of the other machine would be 50 per cent. of what escaped, or 25 per cent. of the original contents. This assumes that the portion which escapes from a single machine would have the same screen analysis as the portion which is saved, but investigation shows that it is very much finer indeed. It being therefore the slippery one-half which increased belt capacity has to do with, a saving of one-quarter of that escaping, or $12\frac{1}{2}$ per cent. of the entire amount, would be all that could be expected, which is approximately what was found to be the case. It thus appeared that under the conditions of this test, doubling the belt surface will increase the saving about $\frac{1}{8}$.

The two vanners and the single vanner were then tested against a gyrating vanner. The gyrating vanner, as will be seen by the accompanying photograph showing both sides of the machines, has the same general arrangement of rollers and belt as the frue. Its peculiarity consists of the fact that each point of the belt is shaken around in a circle about an inch in diameter, in place of one inch side shake of the frue vanner. This motion is obtained by supporting below the frame a vertical pin, on which rotates a weight whose centre of gravity does not pass through the axis of rotation. This weight is rotated by means of a small belt, which passes round it and over idlers at the side of the machine up to the line shaft above. Any one who has had experience with a pulley out of balance, and the amount to which it can shake the building to which it is attached, will appreciate how the rotation of this unbalanced weight will cause the table to swing in such a manner as to give the required gyrating motion to the frame and belt.

The results of this test are the same as stated before, for the two frue vanners and the one frue vanner and the corresponding figures of the gyrating tables are, heads, 4.38 per cent. iron pyrites, tail, 1.68 per cent., or a saving of .61 per cent. Using the one frue vanner as a standard, it will be seen that the gyrating motion with the same belt width saved 129 per cent. of the amount saved by the one frue vanner. Using the two frue vanners as a standard, it will be seen that the gyrating motion did 113 per cent. of the amount done by the two frue vanners. In other words, it appears that a gyrating vanner of four foot belt width has about the same advantage over two frue vanners of this belt width that the two four foot belts have over one equal belt width; or, more concisely, from this test it seems probable that the gyrating shake so increased the saving of one foot of belt width that it becomes equal to four feet of belt width with the side shake.

As this result is remarkable, and was partially unexpected, an investigation was made as to the probable causes. One seems to be due to the fact that there is no end to the shake. The very fine material which has settled down to the belt is not disturbed by a reversal of the direction in which the belt is travelling, and so remains at rest until

carried forward into the concentrates box. Much of the extra amount saved, however, appears to be due to the following action :

It was noticed that the coarse material appeared at one edge of the belt, while the finer concentrates appeared at the other edge, and that they varied uniformly in size from one edge to the other. This caused the mill man to gauge his clear water in accordance with the size of the material as it is present under the clear water supply. At the side of the table where the coarse concentrates come forward, a large amount of water is used to wash back the coarse quartz which accompanies it, while on the side of the table where the finer concentrates appear only fine quartz comes forward, and it requires so very small an amount of water to wash it back that the fine pyrites is not disturbed.

To illustrate this sorting, samples were taken from various points across the belt, a screen analysis of which is herewith presented. Sample one was taken from the coarse side of the machine, sample two from the centre of the machine, and the third sample from the fine side of the belt, and four represents the average of the concentrates delivered by the machine :

Through	On	1	2	3	4
...	30	0.2	0.3	0.0	0.2
30	60	16.5	1.7	1.0	6.4
60	120	31.9	32.3	27.1	30.5
120	...	51.4	55.7	71.9	63.9

From this it will be seen that practically all the material between a thirty and a sixty mesh screen was delivered at the coarse side of the belt, while the larger part of the material which went through a 120 mesh screen appeared at the final side of the belt. On carrying the mesh analysis further by optical examination with a microscope, it was found that the material finer than 200 mesh was almost entirely confined to that sample which had appeared at the fine side of the machine. While in the operation of the machine the cause of this sorting was not discovered, several methods to control it were found effective, and it seems probable that in the case of the concentrates carrying two or three minerals, such as galena, in connection with the iron pyrites the machine could be made to deliver its material in two or three separate compartments at the head, with approximately clean production.

Shall we Have a New Mines Act Relating to Mines of Gold and Silver?

By B. C. WILSON, Waverly, N. S.

(Paper read before the April meeting of the Mining Society of N. S.)

Next to having valuable mines, efficient management and equitable laws clearly defined and properly administered are necessary elements toward success and reputation.

The first we have. The management I do not propose to call in question now, but to our mining laws, so far as they apply to "Mines of Gold and Silver," I beg to call your attention.

The first statutes relating to our *Gold Mines* date back to the early sixties, and their then primitive crudeness can be excused, but from that time to the present we have never had a thoroughly revised or out and out new "Mines Act," but almost every year amendments have been tacked on till it would puzzle an expert to define which was "patch" or which original structure, and it appears now as though no judge — or rather no two judges could agree upon its definitions, and I trust it is not libellous to characterize it as conceived in ignorance, perpetuated by disregard and fostered by litigation, and so complicated by annual amendments (I think three or four were added this year) that the unfortunate lessee seems to have obtained but the questionable privilege (through his lease) to resist all comers to the best of his ability — whether by invoking legal process or physical force — provided always that he has promptly paid all the assessments of rents and royalties. On this point the statutes are definite.

In making the foregoing arraignment I offer no criticism on the Government or on those appointed to administer the law as it stands.

It is not only exasperating and annoying to our people interested in the industry, but it has also a very deterrent effect on capital, without which our mines can never be properly developed, and the changes and amendments in the Act are so numerous; so overlap and nullify each other that about the only certainty about the statutes is their uncertainty and indefiniteness.

To illustrate a minor discrepancy, let me ask what is the legal size of a gold area. The answer is probably and promptly 150 by 250 feet. Without stopping to discuss the advisability of so small an area, let us investigate a little.

The writer can well remember when 50 by 50 feet constituted a gold claim — he having owned several of that size — but I believe these have all lapsed or ceased to have any legal status.

The next size adopted was 140 by 240 feet, and there are hundreds of these areas existing yet in some of the older districts — as Tangier, Waverly, Goldenville and others, and on which our paternal Government exact the same 50 cents per year rental as on the later standard of 150 by 250 feet. In still other districts spaces or roads of 30 feet wide or thereabout were left between every two tiers of lots, ostensibly for the purpose of enabling parties to reach their areas without trespassing on their neighbors' ground. These spaces or roads were not granted or leased, but were considered as public domain on which the owners of adjoining lots *might* trespass if sufficient inducement offered.

In course of time some observant student of mining geography investigated these new roads to possible fortune and applied for a mining lease of the same, causing some stir among adjacent owners. I am not prepared to state just how it now stands, but you can conceive what a conflict of interests might arise.

The next legal standard was the existing one of 150 by 250 feet.

It might be pertinent to observe here that these areas are too small, both for the price charged and for economic operations, and it is not competent to reply that a person may apply for a sufficient number of these small areas to make a "large farm," for it is not the occupier of large lots, but the fellow who plants down a solitary area here and there that blocks the way by emulating the dog in the manger; neither toiling nor spinning himself but taking advantage of the energy of others; demands an exorbitant figure under the penalty of rendering the efforts of his more enterprising neighbor abortive unless his demands are acceded to. And who so poor that he cannot raise 50 cents to checkmate his brother rather than develop his own territory?

This limited reference is sufficient to draw attention to discrepancies in the law. To enumerate all of which, and to their logical influences, would cover more pages, I believe, than does the lengthy Act on "Mines and Minerals."

The questions which result are:

1. The remedy.
2. Is it worth the effort?
3. Who shall inaugurate it?
4. And when and how?

I believe the two latter will prove the stumbling blocks.

The writer has had some experience recently in getting a new "Road Act" framed and put through the Legislature.

For years the municipal council of Halifax county has been discussing the question and urging the Legislature to legalize some system of road reform. We memorialised, suggested, interviewed and "resolved" without avail. Then we narrowed it down by asking its application to Halifax county only. This was more favorably received and we were asked to submit our views, which we did, and left them with the powers that were to be framed into suitable legal phraseology and presented to

the House. It passed its first reading, when we had the first opportunity of seeing how our "infant" looked. We simply did not know it at all, and after consultation were glad to withdraw it.

We next appointed a committee clothed with power to engage legal ability and to formulate an Act. We were not long in discovering that ordinary "committee work" did not amount to much, hence we came down to the practical, engaged a person to act on instructions from the committee, to send out circulars and inquiries to the several councillors and others known to be interested or who had practical ideas to offer, and after getting their several views to edit and combine them into a presentable document, have our legal luminary revise and condense and make acceptable and presentable to our law makers, with the result that we got up an Act acceptable to the council and which stood the criticisms of both branches of the Legislature and passed with hardly an amendment.

I have offered this digression merely to ask if there is not something indicated therein as to what is wanted or might be done towards compiling a new mining law.

The Government has frequently advised this Society to define its views on reform and they would endeavor to meet us in the most friendly attitude, and it is no doubt within the memory of many here how we "moved" and "resolved" and appointed committees, who presumably got in their "committee work" and who probably made some good suggestions, which we will infer were handed over to be engrossed, etc., etc., but we all know about how much has come out of it; and the question now is shall we make any further effort or just go on trusting to luck and let "Old Nick" take the hindmost?

I think you will agree with me that the frequent amendments are simply short cuts out of difficulties which continually crop up and which might have been provided against if due consideration had been given in the first instance, while it must be equally patent that this piling up of comulatory amendments is very far-reaching in its effects, and it may take many years and perhaps involve much capital to eliminate these stumbling blocks of patchwork legislation.

Well! The remedy? And whence it is to come or be inaugurated? From the Government? Hardly, I think; for under the present application of rents, royalties, leases and prospecting licenses, with no liability for errors of omissions or commission, no cost even for collection and hardly for surveys, it is quite evident that the Government has a "fine milch cow," and on the principal of "leaving well enough alone" can hardly be expected to disturb the goose that is laying the golden eggs. And seriously put yourself in their place—would you do it?

No amendment to the existing statute will mend the case, which, like the repairs to the Indian's gun, needs a new lock, stock and barrel, in short a *new* Act.

To thoroughly investigate, digest and prepare a reliable presentable Act will require all the time available between now and the next meeting of the Legislature, for it is not to be accomplished by a few hurried committee meetings: some *one* must give time and attention to it. Hundreds of circulars should be sent out to every miner, capitalist or others interested in gold mining, getting their views and suggestions, all of which in turn will have to be considered and edited; legal talent will have to be employed to sift and arrange, and the conferences with the Government will be in order to see how much "give and take" has to be introduced, and then again the whole code dressed into shape.

In such a way I have confidence a clear concise and intelligent statute could be produced, one which would eliminate much of the present indefiniteness and complications, and materially lessen the intervention of the law to define what the statute means; one which will bring the whole code up to date, relieved of the many conflicting and obsolete clauses which are occasionally drawn from their well-

earned repose to serve purposes of legislation, delay, and possibly some personal motive of not the highest moral order.

It is well to consider, however, that preparing such an Act is not going to be plain sailing by any means. Nearly every amendment now on the statutes, even already repealed, has at different times and ways created vested rights which have to be respected, in fact can only be hedged about, or perhaps eventually wholly or partially eliminated by effluxion of time under the introduction of some element of revision which will make it the interest of those interested to surrender their claim in lieu of the benefits the new regime may provide. And just here I might throw out the suggestion of an Act dealing exclusively and individually with mines of *gold* and *silver* as separate and distinct from other minerals, as it would simplify the Act and avoid conflict and necessary reference to that oft repeated expression in the existing statute of "mines, other than gold or silver."

Now who is to do this? Not the Government, for as before remarked this "mine's cow" furnishes her own provender and the Provincial exchequer enjoys the milking. And seriously, we could not expect them to frame an acceptable mining law. In the nature of things they can criticise, but not being practical mining men they know not the difficulties and obstacles which man and nature joined strew in the path of the gold miner; in fact certain of them are debarred by statute from obtaining that valuable experience which comes through a financial investment in a gold mine.

Who will furnish the means? My experience before referred to warrants me in saying it will cost \$400 to \$500 to get up such an Act as the exigencies demand, and this not for the time and talent of the committee, but for legitimate charges, expenses, labor and legal ability.

The Government might furnish a portion. It would not be judicious to permit them to furnish it all, else results might be as with our Road Act "infant"—we not being able to recognize it. We, the gold mining men of Nova Scotia, want a big say in the framing of such an Act, hence should not compromise ourselves for a handful of dollars.

I might just say the elimination of one law suit, or the "tribute" levied by the selfish holder of a "solitary" area in a block would be more than sufficient. But then as to these contingencies each one fondly trusts he will not be the "hindmost" in that race.

Question again! "Is it worth the candle?" It is! Then I may quote in full Dean Swift's short charity sermon: "If you believe in the security come down with the dust."

If a new revised mining law applicable to our gold mines is desirable, then the *gold mining men* must put their collective shoulders to the wheel and *they* must come down with the dust.

CARNEGIE STEEL CO. NOT IN I.C.—The following has been received:
44-46 Wall Street,
New York, April 5th, 1896.

DEAR SIR,—I have to acknowledge receipt of your favor of the 4th inst., regarding the statements made by parties interested in the establishment of a works for refining nickel in Canada, and I beg to state that neither the Carnegie Steel Company nor any of its officers is in any way interested in the above project. If such statements have been made, you can deny them, as they are untrue.

Your very truly,

THE CARNEGIE STEEL COMPANY, LIMITED,

(Signed) S. L. SCHOONMAKER,

Agent.

Notes on the recent Discovery of Coal near Cochrane's Lake, C. B.

By E. T. MOSKLEY, Sydney, C.B.

(An Address before the Mining Society of Nova Scotia.)

The importance of this discovery may be impressed on your minds by the fact that this seam of coal is at least six feet thick, and underlies about one hundred and fifty square miles of our coal field easterly of Sydney harbor. As is well known, this coal field is wonderfully uniform and unbroken, so that this seam may be estimated to have added to the eastern section of the Cape Breton coal field one thousand millions (1,000,000,000) tons of coal.

Patient, exhaustive and expensive explorations had from time to time been made by various persons, in hopes of discovering this coal seam,—by Prof. Lyman, in behalf of Marshall Bourinot, by Mr. Mills, a Mining Engineer, in behalf of some American capitalists, and by many others, but without success, until it was my own good fortune to be successful where so many others had failed. In making this discovery, I do not assume undue credit, because Mr. Poole, father of Mr. Poole one of the members of your Society, and Mr. Brown, father of another of your members, had years ago formulated theories about the location of this coal seam, which theories were subsequently adopted by the Geological Survey of Canada, and elaborately worked into shape by one of the foremost geologists of Canada, Mr. Hugh Fletcher of that Survey. I cannot speak too highly of Mr. Fletcher. The exactness of his knowledge and research, as expanded on the pages of the reports of the Geological Survey Department, is an abiding proof of his ability and professional talent. From time to time Mr. Fletcher had kindly aided me with advice, in the explorations which I was conducting by means of a diamond drill. Those explorations extended over the season of 1895, when Mr. D. J. Kennelly, late manager for the Sydney & Louisburg Coal & Railway Company, carried on explorations jointly with me. Mr. Kennelly did not persevere, so in 1896 and 1897 the explorations were continued at my own expense. I may say I was getting experience through the considerable expenditures which I had from time to time incurred. In this way I was acquiring a very exact knowledge of the particular district in which I was exploring, finally concluding that the coal seam for which I was looking should be in a particular place. I accordingly instructed the foreman of my work to put down a test pit there. He did so, and by good luck or good management cut through the cropping of what evidently was a coal seam of considerable thickness. This was on the Fergusson road, southerly of Cochrane's Lake, and on the south rise of the Cow Bay coal basin. The dip of the rock in that vicinity is northerly, at an angle of one in seven. I next instructed the workmen to move one hundred feet northerly, and to put down the diamond drill through the coal seam. In due time they did so, and this is the record of the result:—

	Feet.	Inches.
Top coal	0	9
Shale	0	4
Coal	5	5
Mixture	0	0½
Coal	0	3½
Coal and clay.....	0	11
Coal.....	0	4
	8	1

I then instructed the men to move the drill one hundred feet further northerly, and bore through the seam. In due time the work was done, the result being as follows:—

	Feet.	Inches.
Top coal	0	11
Clay.....	0	2½
Coal.....	5	0½
Clay	0	7
Coal.....	0	10
	7	7

I had told Mr. Fletcher that when I had any important information to impart, bearing on the economic interests of the coal field, I would write him. I did so, and he kindly came to Sydney to investigate the discovery. For his information I had a shaft sunk. He waited at Cochrane's Lake while the shaft was being sunk, then measured the seam, and kindly communicated the result to me, which was as follows :

"In the shaft I measured five feet six inches of clean coal of good quality. Immediately overlying this was a black streak probably representing the upper bench of the bore holes, but not well defined owing to the want of a solid roof."

I may add that I have had analyses of the coal made, giving excellent results. As a gas coal it is admitted to be the best in the coal field. It makes an excellent coke. One of the analyses, made by Mr. MacCallum, Analyst for the Dominion Coal Company at their office at Glace Bay, is as follows :—

Volatile matter	38.45
Carbon	55.80
Ash	5.75
Organic or combined sulphur	2.01

This analysis is of coal taken from a heap on the surface at the Fletcher pit. I expect that an average analysis of the seam farther to the deep will give even better results.

I think this discovery must be admitted to be of great economic importance, so far as our section of the country, and the Province generally, are concerned. Without expressing any opinion against the Dominion Coal Company, with many of the shareholders of which I am on very friendly terms, the fact must be admitted that the tendency of that company was in the direction of monopoly. I think it will be admitted that monopolies are usually not popular with the masses of the people, and, generally, not beneficial either. From this out, there can be no monopoly as far as the Cape Breton coal field is concerned. Enough coal is now known to exist outside of the Dominion Coal Company, in the eastern Cape Breton coal field, to justify the organization of several coal companies and the working of several collieries. I myself am trying to organize coal companies, and hope before long to be quite successful.

MR. BAIRD: I hope it is not a pocket you have struck. You seem to have only followed it in one place. Have you tested it for any distance ?

MR. MOSELEY: I consider that I have struck the Mullins coal seam. I have cut it four times myself, twice by pits, and twice with the diamond drill, and I believe that I can readily find this seam at almost any other part of the coal field. I may say that the Mullins coal seam was originally opened on property which at that time belonged to the General Mining Association, and at a place just southerly of the Victoria Mine. It is six feet thick on the farm of one McGillivray in that locality, where the Dominion Coal Company ran a slope 145 feet to the deep. The Mullins seam has been traced, to the satisfaction of those who understand such matters, from the shore of Sydney Harbor to Carroll's Hill, near the shore of the head Bridgeport Basin. The coal there is about the same thickness. It has also been found on the southern side of Bridgeport Basin, on the farm of one Lynk, where it dips south-easterly under the measures of the Glace Bay coal basin. I was present with Mr. Fletcher when he measured the coal on the Lynk farm and found it to be six feet thick. The seam was not found to my knowledge in any other part of Glace Bay or Cow Bay coal basins until found by myself. Those coal basins are so very regular that it may be assumed that underlies, first, the Glace Bay basin, until it comes under the influence of what is called the North Head anticline; this anticline runs inland, it was thought at first for only a few miles, but in the course of my explorations I

found it many miles inland; the seam then underlies the Cow Bay coal basin, in which I found it at Cochrane's Lake.

Exploring for this seam in the winter of 1895, I had a deep boring put down near the summit of the anticline. Mr. Fletcher, who was taking a deep interest in my work, advised me that when I got down 450 feet I would in all probability find the coal seam. Unfortunately, at 400 feet down one of the diamonds dropped out of the bit, and my workmen could not recover it. When they tried to use the bit the lost diamond cut grooves in the steel bit just like one would cut chalk with a knife. We had thus to abandon that boring while so near the goal, and I have not been able to get down the extra fifty feet, but I have such confidence in Mr. Fletcher's opinions that I am determined to get there somehow before I am much older.

I am strongly of opinion that what I found is the Mullins coal seam in the Cow Bay coal basin. It may be the same as the Tracy seam: I do not express a very strong opinion upon that point just now. I think, however, that the probability is that the Tracy is an underlying seam. I will know all about that question later on, since I expect that some of those with whom I am dealing in connection with the formation of companies may be carrying on extensive explorations shortly.

In estimating quantity, I take Mr. Fletcher's map, which has been very carefully prepared, from actual surveys. I calculate on this map that about 150 miles of the eastern Sydney coal field are underlaid by this Mullins seam. Each square mile contains, approximately, six to seven million tons of coal, so the 150 square miles should contain one one thousand million (1,000,000,000) tons, the figures above mentioned.

MR. FERGIE: Calculations of coal in any area are very problematical, but I have no doubt that your find is very valuable. What size of diamond bit did you use ?

MR. MOSELEY: One and five-eighths ($1\frac{5}{8}$) inch.

MR. FERGIE: What was the cost ?

MR. MOSELEY: When I commenced working, the average cost was \$2 per foot of rock bored, but at the last work, my men as well as myself having gained experience, the cost was reduced to one dollar per foot. I used the "Bravo" drill, made by the M. C. Bullock Manufacturing Company of Chicago. Either hand or steam power may be used; I found hand power the most satisfactory up to four hundred feet. For a 1,000 feet boring a larger drill would be required.

MR. BROWN: I am glad to hear that there is a possibility of this field covering 150 square miles. It will be good for the Dominion Coal Company as well as the General Mining Association, as the seam must underlie our areas,—of course at very great depth, probably 2,000 feet on our property, but in England, however, there are workings 4,000 feet in depth.

A Peculiar Lode Formation.

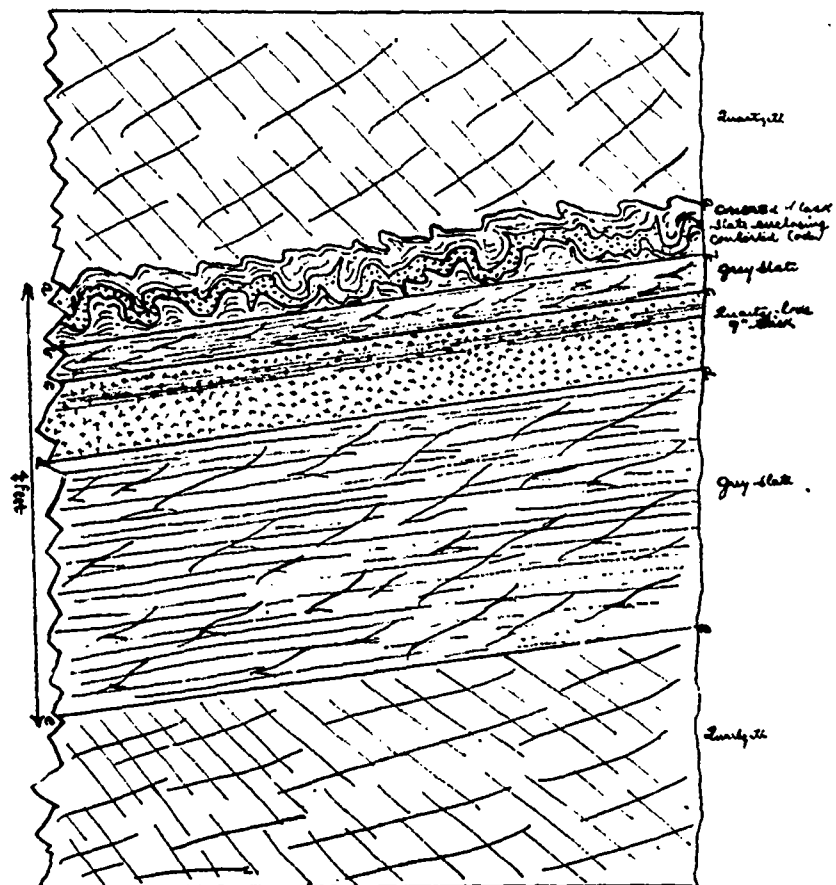
By C. E. WILLIS, Halifax.

(Paper read before April meeting of the Mining Society of N.S.)

While prospecting in the Gold River district, Nova Scotia, in 1887, I discovered on the bed rock under about eight feet of surface drift, a small piece of quartz weighing exactly two pounds, from which I mortared 16 dwts. of gold. I immediately started in to discover the lode from which this boulder came, but it was not until three years afterwards, and after a very large amount of heavy prospecting by myself and others, through surface ranging from eight to 22 feet in depth, that I was finally successful in locating the vein about 700 feet north of the place where the first boulder was found. During this prospecting many rich boulders were discovered, and I think not less than 40 or 50 ounces of gold were obtained in this way. At the point



Photograph of fragment of "Vermilion Lode" and contorted strata. Illustrating paper by C. E. Willis entitled "A Peculiar Lode Formation." April 13th, 1898.



Section of Vermilion Lode showing contorted strata

of discovery of each of these bowlders stakes were driven, and after the lode was cut these stakes were seen to be in a straight line from the point where the first bowlder was found, to the point where the lode was opened, proving in a very conclusive way the direct course taken by this glacier which ground off this lode. This is the more notable, taking the distance into consideration, the depth of the surface, and the fact that about one-half of the distance was along the slope of a steep hill. I think there can be no doubt that the place at which the lode was cut, was the exact point from which all the bowlders were originally derived. Accompanying each bowlder, with the exception of the first, was quartz from another lode, averaging about nine inches in thickness, and so highly colored by oxydation of the pyrites, that the lode was named "The Vermillion" even before the discovery. By reference to the sketch it will be seen that this large lode was separated from the rich one by about four inches of grey slate.

It was of no value, and I think but two small nuggets of gold were found in it, and the quartz was thrown on the dump. The rich lode was of a most peculiar and unique character, in size from three-quarters of an inch to two and one-half inches in thickness, inclosed in about six inches of black slate, the slate being totally different from anything found in the district. Both the slate and quartz are contorted and folded in a most remarkable manner, as can be seen by the specimens which I herewith submit for your inspection.

The contortions of the vein are conformable with corrugations on the quartzite foot wall of the belt at point *a* on sketch, while at point *b* on the other side of this small band of slate, there is no sign whatever of this corrugation, nor does anything of the kind show at *c*, *d*, or *e*. I have seen in other places corrugations of the strata, but always I think in slate belts, and nowhere on a quartzite wall, neither have I ever seen such deep and sharp corrugations as in this instance.

In bringing this unusual lode formation to your notice, I desire the opinion of the gentlemen present, as to how this small belt of slate with the enclosed lode was originally deposited, as after forming several opinions myself, I have come to the conclusion that I am entirely unable to figure it out. One of the peculiar things in connection with it is, that one side of this band of slate should be folded and twisted in this unusual way, while the other side shows a clean, straight cleavage.

This small lode was of marvellous richness for about 30 feet in length by some 25 feet in depth; I mortared one day eighteen pounds of this quartz, which gave me 28 ounces of smelted gold, and on another occasion 41 pounds yielded 38 ounces of smelted gold.

The ore obtained was sent to a stamp mill with the exception of a few small lots which were mortared, and counting it altogether the return was about 62 ounces to the ton. As it was impossible to separate the small lode from the black slate, the entire band of black slate was crushed with the quartz, and as the quartz was not one-third of the stuff milled, the lode itself must have yielded at the rate of over 190 ounces to the ton. But unfortunately for me the number of tons obtained was very limited.

FRANCE WOULD BENEFIT BY AN EXPORT DUTY ON NICKEL.—The Paris correspondent in the *Engineering and Mining Journal*, of the 2nd inst., page 419, indicates what effect a Frenchman thinks an export duty will have on the Canadian nickel industry. On the 31st ult., he wrote as follows:—

"Nickel shares continue to maintain a high price. The proposition in Canada to impose an export duty on nickel matte may have important results for our company. Such action would certainly result in its benefit to us, and give a chance for the metal from New Caledonia, which it has not had for some time past."

Rapid Sinking in a Nova Scotia Gold Mine.

By A. A. HAYWARD, Halifax.

(Paper read before the April meeting of the Mining Society.)

Just as there are many causes assigned for the continued depression and lack of confidence in the metalliferous mines of this province, particularly those of gold, so there have been from time to time equally as many theories advanced for the more economical and extended development of these mines by persons having more or less knowledge of the situation, and who firmly believe in the ultimate success and final recognition of the valuable natural resources which present themselves to the investigator in many localities, and which, if developed along proper and legitimate lines would place many of our mines in a position that would entitle them to recognition by the thoughtful and investing public. But just what combination of these valuable theories—for they are all more or less valuable, as many of them possess an element of sincerity and a more or less knowledge of the present situation and its requirements—we are to select for our guidance, it may be difficult to determine.

There are, however, lines along which we may advance without grave fears as to the results; lines which are familiar to the most inexperienced and which although comparatively indistinct to-day, if persistently followed, would, in many instances result in success instead of the failures which characterize so many promising mining enterprises.

Let us concentrate our thoughts for the time, along a single line which has for its inspiration but two objects, viz., time and economy: and when the results desired and but only partially obtained are compared with those previously obtained by other methods, two questions must naturally suggest themselves to those who are desirous of placing this industry on a footing that will compare more favorably with other channels of investment.

Are we, as a mining community, obtaining the best possible results with the finances and mechanical appliances at our disposal; and if after careful investigation, it is found we are not, then along what lines should we at first proceed if we are to obtain a greater degree of efficiency and satisfaction both to the investor and ourselves?

While not offering any suggestions as to how and by what means we are to obtain the best possible results, I beg to record only a few facts which are deduced from my own practice and from the observed practice of others during the past fifteen years, trusting that such facts may be sufficiently convincing to the most enthusiastic admirer of old times and old time ways, that we are not obtaining the best possible results with the means at our disposal.

Previous to the year 1884, and in many of the mines since that date, the motive force employed in drilling has been manual labor with all its attending disadvantages. Ignorance on the part of the owner and prejudice among employees has in many instances prevented, and is still preventing, the introduction of modern mechanical appliances for rock drilling. Appliances that have been tested and successfully used in mining operations in other countries under the most varied conditions; while in this province shafts are being sunk, cross-cuts and headings driven, up-rises driven, winzes sunk, under the same conditions that have existed for years, while hundreds of tons of ore have been, and are still being stoped, some at a profit and much at a loss. New mines are continually being added to the long list with records of failures and successes; some have appeared above the mining horizon with extremely bright and brilliant prospects, but their stay has been short—closed down, and why? In many instances because the ore would not pay for its development and production under the existing methods. Others again have appeared and have left behind them a

more successful record—and why? Because in many instances, the ore being of exceedingly high grade, the mines could stand any reasonable amount of unnecessary expense: the manager was able to keep the expense account within the limits of income and so it was pronounced a success, and to-day the abandoned dumps are pointed to as monuments of great mining successes by the advocates of hand labor, when, in reality, these mines would have returned a profit on the investment had the methods used during the reign of Montezuma been employed.

The results of such mining operations seem to have inspired many of the later date would-be-mine-managers with desires similar to those of the young man, who, when asked why, in building his new house he had followed so closely the design used by his grandfather replied, "Grandfather was a successful man, he raised three sets of twins in that house. It was good enough for the old man, and is good enough for me." Had the young aspirant for parental distinction built his house on other and more modern lines than those adopted by his successful ancestor, there is no evidence to show that even greater possibilities were not open to this advocate of colonial architecture.

We as a mining community have been prone to follow largely in the footsteps of those who in the past have been successful, without first ascertaining accurately what were the exact conditions under which these men labored, and what proportion of such success was due to their personal engineering ability and what portion of the success was due to natural conditions.

We as a mining community have been rather slow in adopting and applying modern methods and appliances in the development of our metalliferous mines. While speaking in general there are a few exceptions which in themselves offer the strongest proof that we have been somewhat backward. These exceptions have been equipped with modern appliances and managed with a large amount of intelligence and business tact, and are to-day producing ore at a profit from mines which, if worked under the old system, would not pay the cost of development. By the introduction of modern hoisting and pumping plants and the installation of compressed air and power drills, they have not only reduced the cost of development but have largely reduced the time usually occupied in placing a mine in a condition to produce ore, which is of the most vital importance when shareholders are anxiously looking for results.

It is only by comparing the cost and the time occupied that we are able to see the advantage possessed by the one system over the other.

The belts which accompany nearly all of the gold-bearing lodes of this province, and the small quantities of water encountered, together with many other advantages, all offer special advantages for hand labor, and yet, under the most favorable condition, the average cost of sinking a 4 x 12 x 200 foot shaft is found to be not less than \$20.00 per foot, while the speed at which such work could be accomplished would not exceed 40 feet per month with a double shift, and it may be said this would be almost the limit, while the cost of cross-cuts and levels would correspond favorably with the shaft work. Should it be found necessary to sink the shaft to the 400 foot level \$10 per foot should be added for the additional 200 feet, making a total cost of sinking a 400 foot shaft \$10,000, or \$25 per foot for the entire distance, a sum in many instances far in excess of the amount usually at the disposal of our smaller companies, while the time required to complete such an operation would not be less than thirteen months under the most favorable conditions.

If we accept these figures as fairly representing the cost of hand labor and time required to perform such operations, let us use as a

comparison similar work performed with power drills in the sinking of the Golden Lode shaft, a distance of 403 feet, during the Spring of 1895; also let us note some comparatively rapid sinking at the Golden Group mine during the month of August, 1897. While this work contrasts favorably with previous records of shaft sinking throughout the province, it does not by any means argue that the limit has been reached. On the contrary it has developed ideas which are convincing to the writer that even greater speed can be obtained without very materially increasing the cost per foot of the shaft sunk.

On the property owned by the Golden Lode Mining Company it was pretty well determined there existed a rich gold strike, but that such a strike would be deep and consequently expensive to reach. After a careful survey it was found that if this strike was to be developed it would be necessary to sink a shaft 403 feet through hard country rock composed of quartzite, and as this lode was not accompanied by a belt, as is usually the case in mines of this province, the shaft would have to be blasted out of the solid rock. When the depth to be sunk and the nature of the rock, together with many other disadvantages that were found to exist, were fully considered, the outlook seemed discouraging. It was a new departure, to sink a shaft 403 feet through hard, barren rock to determine the continuity of a gold strike, was something a little removed from the hitherto gold mining practice in this province.

The graduates of pre-historic practice were in full force and form, and ever ready to volunteer words of caution to any intending investor, and as the estimated cost per foot for timbering and sinking the shaft had been placed at \$15 this was their general point of attack. One would be a mining light, whose years of practice should have placed him beyond the limits of the initiatory department, very profoundly and confidentially confided to an intending investor that the cost would probably exceed \$40 per foot. Truly the man who has knowledge for others and profiteth not by his own wisdom is indeed to be pitied.

During the month of January the necessary buildings were erected in which were located the machinery necessary to perform the required work; in the engine house was located a small 35 horse power locomotive boiler, also a small high speed winding engine. Over the shaft, a distance of 125 feet from the engine house, was erected a hoisting tower in which was constructed a ventilating tower 50 feet in height, which in reality was an extension of the eastern compartment of the shaft up through the hoisting tower and 30 feet above it. As steam was employed as a motive force used in operating two Rand No. 2 rock drills, this ventilator was an absolute necessity, as it supplied cool and fresh air to the shaft and carried away the exhaust steam from the drills.

The shaft was divided into two compartments, each being 4 x 4 inside, requiring rock dimensions of 5½ x 12 feet.

Before beginning operations a model of the shaft was made and into this model was inserted pegs which represented the position of each and every hole that was to be drilled and their direction. The drill men were fully instructed as to the duty each hole was expected to perform and were also instructed to put down the holes each day as shown on the model irrespective of the seams or slips that might occur in the shafts.

The underground work was divided into three shifts of eight hours each. The first and drilling shift began at 7 a.m. and consisted of a foreman, two drill men and two helpers. The men in this shift were expected to drill all necessary holes and to have the work completed before three o'clock, which time they rarely exceeded, as most of the drilling operations were completed before one o'clock; the drills, tools

and piping were then hoisted to the surface, leaving the shaft ready for blasting. The second shift, which began at three o'clock, consisted of two muckers and a firing boss, whose duty was to measure the depth of each and every hole, keep a record of the same, also keep a record of the amount of explosive used in each and every hole. This firing boss remained on sixteen hours and had charge of both the second and third shifts. The records kept by him of the work performed in each shift were recorded in the office at the end of each shift in a book kept for that purpose. This shift was expected to fire the four sump holes and to clean up the same during their eight hours.

The third and last shift, which consisted of but two muckers, were expected to fire all the remaining holes, clean up the rock, quarry any loose rock in the bottom of the shaft, put in new slides and do any necessary timbering and leave the shaft ready for the drilling shift, which came on again at seven.

On the surface the shifts were divided into two of 12 hours each. The first shift consisted of engineer, deck man, blacksmith and carpenter. The second shift comprised but two men, the engineer and deck man. The deck man in each shift was required to tally the amount of water and rock hoisted in his shift; the engineer also recorded the amount of fuel used each day, which with the other records were recorded in the office at the end of each shift, so that from a perusal of the records it was possible without going into the mine to approximately tell how fast the shaft was being sunk and at what cost per foot.

When the shaft reached a depth of fifty feet, sinking was suspended and timbering begun. The shifts were then divided into two of 12 hours each.

The first shift cut three hitches in the rock, put in three hitch timbers 12 x 12 and bolted down the heads. Upon these hitch timbers was constructed eight feet of crib work, the timber having previously been prepared by the carpenter. The timber used in this crib work was hewn from green logs, they being found the most suitable to withstand the heavy blasting. From the top of this crib to the timber above, stulls were placed in the shaft and on these was spiked 2 inch plank which formed the dividing.

The duty of the second timbering shift was to bring down new and permanent slides, new ladders, bring down the main steam pipe and to place a head platform over one half of this crib which was used as a station. This work was expected to be completed in 24 hours from the time of beginning. The shaft was then ready for sinking again. The hitches referred to were always cut 12 feet from the bottom. As three feet was found to be about the average sinking done per day, the steam pipe used below this station was cut into sections of three feet each, one piece being added each day. By this means the steam hose was always suspended in the shaft and not under foot.

The drill men each day after coming out of the shaft, took their machines apart, cleaned them thoroughly inside and out, added new parts when required, put in new packing and kept them up to a standard, so that no delays were occasioned by drills being out of order.

During the month of April the work was performed with but one machine only, which sunk 55 feet 6 inches.

During the entire operation the total number of days occupied in drilling was 124, timbering 16, making in all 140 days required to sink and timber the shaft 403 feet. The average sinking was found to be 3.02 per shift, although five feet was in several instances recorded.

The following is a record of the work performed each month:

Month.	Drilling	Timbering	Number of Holes.	Feet.	Explosive.	Buckets of Rock.	Feet Sunk.
April	20	4	134	482	201	861	55.6
May	24	2	241	941	365	1,249	75.2
June.....	19	4	182	714	316	1,077	73.8
July.....	23	2	231	981	324	1,323	69.6
August.....	23	3	240	953	450	1,393	85.0
September..	15	3	147	657	236	949	44.2
	124	16	1,175	4,728	1,892	6,852	403.0

The average sinking, as will be seen, was 3.02 per day of 24 hours, while the amount of explosive used per foot is found to be 4.06 pounds per foot of shaft sinking, or \$1.22 per foot which includes detonators, connecting wire and so forth. The average monthly sinking was 71 feet 6 inches. During the month of August 85 feet was sunk, being the best work performed during the operation.

The total cost of the shaft, which includes management, office expenses, labor, fuel, timber, repairs of tools and all expenses chargeable to the shaft was \$4,647, or \$11.53 per foot, completed and timbered ready for permanent occupancy.

During the summer of 1897 the shaft of the Golden Group Mine was sunk 100 feet below the 240 foot level. The time required to sink this shaft was 30 shifts, and had it not been found necessary to save the small rich lode on the foot wall, this 100 feet would have been accomplished in 25 days.

I am not at present in a position to give the exact cost of this work; it was, however, somewhat in excess of the cost of sinking the shaft of the Golden Lode Mine. The same methods were, however, employed, and the same division of labor, showing that what could be done in one place can be done again under the same conditions and management.

When it is considered that the record of 80 feet per month, held by the Tamarack people, is the fastest sinking done in any metalliferous mine on this continent, the sinking of the Golden Lode and the Golden Group shafts in Nova Scotia with a record of 72 feet per month makes a fairly good second and fully illustrates the point that we, as a mining community, are not obtaining the best possible results with the finances and mechanical appliances at our disposal, when we sink shafts 40 feet per month and perform other mining operations on similar lines.

MINERS' LICENSES IN NEW DENVER DIVISION.—About 2,525 free miners' licenses were issued from the Recorder's office at New Denver in 1897, the total amount received from this source being \$12,525. The number of locations recorded was 1,482 at \$2.50 each, or a total of \$3,705. There were issued from the same office 1,170 certificates of assessment work done on claims. The total receipts for the office for the year were \$20,000.

THE RUTH MINES DIVIDEND.—The Ruth Mines, Limited, one of the few English companies that have yet invested in Slocan mines under fairly reasonable conditions, has declared a dividend of three shillings a share and carried forward £7,000 out of profits to date of £21,000. There has recently been a further issue of 10,000 shares, which were eagerly sought by the company's stockholders.



SUCCESSFUL ANNUAL MEETING.

HALIFAX, 13th APRIL.

The adjourned annual meeting of the members of the Mining Society of Nova Scotia was held in the Halifax Hotel on 13th ultimo, and was one of the most successful of the many good meetings held by this representative body. The proceedings opened at eleven o'clock in the forenoon, Mr. Charles Fergie, M.E., in the absence of the President, in the chair. After the minutes had been disposed of, the following were elected

NEW MEMBERS :

E. MACDONALD, Pictou
 MINER T. FOSTER, Halifax, N.S.
 M. R. O'SHAUGHNESSY, Waverley, N.S.
 ROBT. ARCHIBALD, Manager Can. Coal and Ry. Co., Joggins, N.S.
 D. McASKILL, Golden Group Mining Co., Montague, N.S.
 G. F. McNAUGHTON, New Egerton Gold Mining Co., 15-Mile Stream.
 GEO. E. MUNROE, Westville, N.S.
 L. Y. HESSLEIN, Halifax, N.S.
 WM. O'BRIEN, Halifax, N.S.
 J. E. RILEY, Montreal.
 H. GUFFEY, Caribou Mines, Caribou.
 A. B. COX, Isaac's Harbor.

DR. DAWSON ELECTED AN HONORARY MEMBER.

On motion of Mr. F. H. Mason, F.C.S., Dr. Geo. M. Dawson, C.M.G., Director of the Geological Survey of Canada, was unanimously elected an honorary member.

FINANCIAL STATEMENT.

Mr. H. M. WYLDE presented the financial statement for the year, showing a substantial balance in favor of the Society.

Mr. GEORGE STUART—I notice we have absorbed \$350 of the Government grant on current account. Have we any right to do that?

Mr. WYLDE explained that the expenditure had been applied to maintaining the Society's reading room.

On motion of Mr. B. T. A. Bell the report was adopted.

COMMITTEE ON LEGISLATION.

The Chairman having asked for this committee's report, Mr. WILLIS explained that Major Leckie, the President, who was absent, had he believed prepared a report. As a matter of fact, beyond the bill of the Canadian Society of Civil Engineers, which had been killed at its second reading, there had been no legislation calling for the attention of the Society.

THE CANADIAN MINING INSTITUTE.

The following letter from Mr. John Hardman, S.B., M.E., Montreal, was read:—

H. M. WYLDE, Esq., Sec'y.

Dear Sir:—In view of some of the sentiments which were expressed by some Nova Scotia members at the meeting of the Federated Institute in March last, and in view further of the completion of the proposed Canadian Mining Institute to a body corporate, it has occurred to me that the apparent misconception of the objects and purposes of the new Institute might be corrected by an explanation which I had hoped to have given verbally before your meeting, but which circumstances prevent me from attending, and I therefore ask you to read what follows to your business meeting before you come to the sixth item on your programme.

As has already been made public by the circular dated February 7th, and signed by the committee appointed for that purpose, the Federation was found to be deficient in its methods of obtaining adequate funds for the proper carrying out of its objects, which were, primarily, the printing and publishing of papers contributed by its members. Each year the Council has had to face a deficit.

The discussion of this deficit and the whole general question of ways and means occupied the attention of a large council meeting held on the 28th of January. Owing to the constitution of some of the constituent organizations of the Federation it was impossible to levy a greater contribution per capita than had been assessed. Furthermore, one organization was practically defunct, and another was so torn by internal dissension that its treasury showed only some \$40 of a fund. The matter demanded a thorough investigation of the results accomplished, and an intimate knowledge of the wishes and requirements of the mining fraternity of Canada as a whole; and for this reason it was referred to a committee. As your members will see from the printed report of that committee they considered that the mining interests of Canada as a whole were paramount to those of any one section or province, and they deemed the time propitious for organizing, upon a somewhat broader basis than the Federation, an Institution which should represent the mining interests of the whole Dominion. And this, without wishing or desiring to affect the standing or existence of such provincial societies as were in good circumstances and were necessary as safeguards

upon matters of provincial legislation. They furthermore desired that the classification of members into different groups should be somewhat of a qualification or registration of such members' professional standing, this being particularly urged by members from Ontario and British Columbia, which provinces have suffered far more than the eastern ones from the incompetency of the men engaged in the mining business; it was, however, quickly found that this was impracticable at the present stage of Canada's progress as a mining country, and this idea was abandoned.

The chief value of technical organizations has always been found to be in their literature, as is well evidenced by the large organization of the American Institute of Mining Engineers and the large membership of the Institution of Mining and Metallurgy of London, and others. To make the literature of the Canadian Mining Institute successful required only a sufficiency of funds, as the publications of the Federation are sufficient evidence of the ability of the members to make such literature, and the Treasurer's statements are equally evidence that the Federation did not possess funds enough at its disposal to remain a solvent concern.

Moreover, it is apparent to those who have watched the progress of Canada in mining matters during the last three years, that a professional man may this year be engaged in Nova Scotia and next year be developing a mine in British Columbia, and the reverse. Instances of this are too numerous to require mention, and as a consequence many members of the Federation were constituent members of two or more provincial organizations, and paying from \$20 to \$25 and \$28 per year for their membership. From this constantly increasing class of members came a strong expression or desire for a Dominion association and a more workable organization.

Having all these requirements and wishes in view, the committee before referred to (of which I had the honor to be chairman) proposed an organization on the lines along which the present Canadian Mining Institute was formed.

As the head of that committee, and as the President of the new Canadian Mining Institute, I strongly desire to represent to the Mining Society of Nova Scotia (with which Society I feel myself strongly identified) the complete absence of any intent, on the part of either the committee or of the Institute, to supplant in any way the provincial work of the Mining Society, or to in any way interfere with its autonomy. We have felt the need of a large and strong Canadian organization, to represent Canadian mining interests and to look after the proper development and progress of the large mineral districts of our Dominion, and we feel that such an organization can exist beneficially to the country without in any way being antagonistic or prejudicial to such provincial organizations as may desire to continue distinct and separate. We feel furthermore that the interchange and commerce between the different provinces, which is growing greater and greater each year, strengthens the demand for such an Institute as has been formed, and demands an affiliation of those men principally engaged in developing and exploiting the mineral interests of Canada. The investment of Montreal capital in the mines of British Columbia, Ontario and Nova Scotia, only adduces another argument in favor of a broad gauge representative body as against a combination of narrower and more sectionalized interests.

The history of mining legislation both in Quebec and Nova Scotia shows the need of a representative body to watch, and if necessary, combat, such proposed laws as are inimical to the welfare of its industries. There may still be need of such watching in Nova Scotia, and I should be the last one to advise its discontinuance; but at the same time I can recognize the advantages, both to the individuals and to the country as a whole, of an incorporated body which is representative of the mining industry of the whole Dominion.

We have room in the Mining Institute for all of the members of the Mining Society of Nova Scotia who feel that they are interested in the welfare of mining throughout the Dominion, and for such who have no such interest we feel that we can meet them and perhaps work with them in the conservation and advancement of provincial interests without prejudice.

I beg to convey my cordial good wishes to the Society in meeting assembled, and to remain, dear sir,

Yours very truly,

JOHN E. HARDMAN,

President, The Canadian Mining Institute.

THANKS TO THE INTERCOLONIAL RAILWAY.

On motion of Mr. Wylde, seconded by Mr. Bell, a hearty vote of thanks was tendered to the passenger department of the Intercolonial Railway, and to Mr. Price, its representative, for courtesies extended to members during their recent visit to Montreal.

THE SOCIETY'S ROOMS.

Mr. Stuart asked why the meeting was not being held in the rooms of the Society.

THE CHAIRMAN—It isn't large enough. Mr. Poole and Mr. Meissner had been looking about for more suitable accommodation.

MR. MEISSNER—The room we have now is excellent as far as it goes, but it is very small. He had no doubt better accommodation could be obtained for less money.

MR. BELL suggested the proper place to have the Society's rooms should be the Halifax Hotel, where more of the mining men of the province were to be found from time to time, and he suggested that the proprietors be seen.

MR. MEISSNER thought the suggestion a good one. Messrs. Poole and Meissner were delegated to make enquiries, and report to the afternoon session.

Messrs. Willis, Mason and the Secretary were, on motion of Mr. Bell, appointed a library committee.

ELECTION OF OFFICERS AND COUNCIL, 1898-9.

Past Presidents :

MR. H. S. POOLE, M.A., A.R.S.M., (Acadia Coal Co.) Stellarton.
 MR. JOHN E. HARDMAN, M.E., Montreal.
 MR. R. H. BROWN, M.E., (Gen. Mining Assn. Ltd.) Old Sydney Mines.
 MR. R. G. LECKIE, Truro.

President:

MR. CHARLES FERGIE, M.E., (Intercolonial Coal Co.) Westville, N.S.

Vice-Presidents:

MR. C. A. MEISSNER, (Londonderry Iron Co.) Londonderry, N.S.
MR. W. L. LIBBEY, (Brookfield Mining Co.) N. Brookfield, N.S.
MR. A. A. HAYWARD, (Golden Group Mining Co.) Halifax.

Honorary Secretary:

MR. B. T. A. BELL, Editor, Canadian Mining Review, Ottawa.

Secretary-Treasurer:

MR. H. M. WYLDE, Halifax, N.S.

Council:

MR. C. ARCHIBALD,	MR. F. H. MASON,
MR. CLARENCE DIMOCK,	MR. W. A. SANDERS,
MR. JAMES BAIRD,	MR. GEOFFREY MORROW,
MR. FITZ ANDREWS,	MR. J. H. AUSTIN,
MR. GEORGE W. STUART.	

Mr. Fergie very briefly thanked the members for the honor they had done him in electing him to the presidential chair, after which the morning session adjourned.

SHALL WE HAVE A NEW MINES AND MINERALS ACT
RELATING TO GOLD AND SILVER?

The members having re-assembled at three o'clock, the President in the chair, Mr. B. C. Wilson, Waverley, read a paper on the desirability of an amended Mines Act (re-produced in full elsewhere in this number).

MR. W. L. LIBBEY—I do not believe anything can be done with the Mining Act until it is taken hold of by some first class lawyer who knows the needs of miners. The Act will have to be revised from beginning to end with the aid of all the suggestions that can be made available.

MR. A. C. ROSS—If anything is to be done in that line this would be an opportune time, as the statutes are being revised, and the revising committee should have the assistance of some mining men when they come to the Mines Act.

MR. G. W. STUART—I agree with Mr. Ross.

MR. B. C. WILSON—If the matter is put off till the autumn we will practically get nothing done. We will need money, as I know from my experience in the small matter referred to: five hundred dollars at least will be required. An Act will have to be framed which will not only be acceptable to miners but also to the government, who are interested in the revenue obtained from the mines. It is important that we get the opinions of everybody interested in gold mining, and I know of no better plan than to send out copies of the Act, and ask individuals to give their respective opinions, and then with some persons to properly revise and edit them you would soon get them into shape. It is going to take some time and some money, and it depends on our gold mining men, because I think that the Mines Act so far as it relates to coal and other minerals is very nearly what is desired. If we do not take the initiative the government never will. Place ourselves in their position: would we do it? If we make complaints they say formulate what you want and we will be pleased to meet you.

MR. HAYWARD—Why not appoint a commission to carry the thing out?

On motion of Mr. Hayward, seconded by Mr. Partington, the following gentlemen were appointed a commission to take the evidence of miners, in accordance with the suggestion of Mr. Wilson: Messrs. Wilson, Franklyn, Libbey, Stuart, Hayward and Poole.

MR. ROSS—I think the government will favor a commission, on account of the fine questions which have arisen in regard to metals associated with gold.

MR. HAYWARD—I would like to have the Society empower that commission to use the necessary funds for that investigation.

MR. LIBBEY—It is perhaps more largely for the benefit of the gold miners, and I don't think we could burden the Society with the expense.

MR. STUART—Would it not weaken our position with the government to have this enquiry confined to gold? We will strengthen our hands by having all mining interests represented.

MR. POOLE—The Society could vote a certain sum, to be supplemented by private subscription of the gold men.

On motion of Mr. Hayward, seconded by Mr. Hampson, the sum of fifty dollars was appropriated from the funds of the Society for the purposes of the committee.

On motion of Mr. Libbey, the committee was made applicable to the general mining interests of the province, and the names of Messrs. Harvey Graham and Clarence Dimock were added thereto.

ADDITIONS TO TARIFF FREE LIST.

MR. BELL—I would like to submit a question of tariff which may be interesting, namely, the desirability of adding chrome and manganese steel shoes and dies to the free list. The government would be pleased to have suggestions as to additions to the present free list, and every gold miner will agree with me that these articles should be put on.

MR. WILSON—I understand that parties are mining manganese in New Brunswick and carrying it to Ferrona to make steel. Would not such a motion conflict with that industry?

MR. LIBBEY—Are you not looking after the interests of a child not yet born? I will take shoes and dies from any man who will say that his are as cheap as anybody else's, even if they are not as good as the Brooklyn chrome shoes and dies.

MR. AUSTIN—Speaking of goods not on the free list reminds me that brattice cloth is omitted. That is not made in the country, and is not used for any other purpose than mining. I would like to incorporate brattice cloth in it.

MR. PARTINGTON—Why not add tappets and cams?

On motion of Mr. Sanders, seconded by Mr. Libbey, it was resolved: That the Society, through the President and Secretary, memorialize the Dominion Government to add to the present free list the following articles of mining machinery:

- (a) Chrome and manganese steel shoes, dies, cams and tappets for stamp mills.
- (b) Brattice cloth for colliery purposes.
- (c) Ventilating fans for collieries and blast furnaces.

RAPID SHAFT SINKING.

MR. HAYWARD then presented his paper on "Rapid Shaft Sinking," (reproduced elsewhere in this issue.)

MR. LIBBEY—Mr. Hayward might have mentioned, when he stated it was under the same management, that it was the same character of rock.

MR. HAYWARD—The Golden lode is one of the hardest in the province. In most of the gold mines the lode is accompanied by a belt. In this we had to make a foot wall out of the solid rock.

MR. LIBBEY—It would be different sinking in slate formation.

MR. HAYWARD—In that case you would use a low grade powder.

MR. STUART—I would like to ask two questions. First, as to the quantity of water you had to contend with, and secondly, would you advocate determining the position of the holes previous to examination of the shaft in all characters of rock?

MR. HAYWARD—The holes were put down as nearly as possible at the same depth, so as to leave the bottom of the shaft as nearly level as possible after each shift.

MR. PARTINGTON—Did it require fast timbering?

MR. HAYWARD—We timbered every fifty feet. We could cut fifty feet without timbering.

MR. POOLE—Did you fire shots singly?

MR. HAYWARD—Four sump holes were fired together. That broke five feet between holes.

MR. PARTINGTON—It would be interesting if you would submit a drawing, showing the position of each hole.

MR. HAYWARD—During the first 154 feet we had practically no water. From that down we had from ten to fifteen barrels each hour.

MR. STUART—Could you have obtained the same results if you had enough water to pump?

MR. HAYWARD—We would have the same results by using a tank with a vacuum pump. We did not take advantage of slips, because if we did that we might have to use only one drill at a time. The holes ranged from nine to eleven; two extra holes when there was a corner. An extra hole might be put in when there was a lump. The vein was slightly on the incline. I am quite satisfied that by sinking a shaft eighteen feet in length there is not the slightest difficulty (where you do not attempt to save quartz) in sinking one hundred feet per month. The difficulty in a short shaft is that you can only put in two men. The extra cost on the eighteen feet would be very little.

NOTES ON PUMPING.

MR. POOLE presented his paper "A couple of notes on Pumping," (re-produced elsewhere in this number).

MR. HAYWARD—How far is the surface receiver from the compressor?

MR. POOLE—Ten feet.

MR. HAYWARD—We had in Montague a similar experience. The receiver was located in the engine room, about thirty feet from the compressor. The pipe would freeze up, and we placed our receiver one hundred feet away and overcame the difficulty. If the first receiver is placed at a longer distance from the compressor you will get better results.

MR. HAMPSON—The latest practice is not to abstract the water but to dry the air. They have an air cooler. If you dry the air before you pass it to the receiver you have done your first duty. It is friction that causes moisture.

MR. HAYWARD—A long pipe will do that.

MR. HAMPSON—Whereas drills would work at some distance and show no ice a pump worked between the drills and the compressor will freeze. In Mr. Hayward's case there were only drills. Mr. Libbey's drills never showed ice, yet in the case of a pump nearer the compressor we had great trouble with ice. The trouble is that the air at the pumps is at a much less temperature than the air in the mine.

MR. HAIGHT—The quantity of moisture that a given volume of air can hold depends on the temperature only. If a cubic foot of free air, saturated with moisture, is compressed to six atmospheres, it will deposit five-sixths of its moisture when it has returned to its original temperature. The average moisture in air is only about seventy per cent., so that not so much as five-sixths will be deposited. The temperature in the air cylinder of a compressor is much too high for any moisture to be deposited there, so it is necessary to give the air a chance to cool and then to deposit its moisture. Water in the form of a fog may be carried along in a rapid current of air, in the same manner as it is carried in a current of steam giving wet steam, but that water will be separated when the air passes slowly through a receiver. It is merely a question of cooling the compressed air, and then letting it pass slowly through a receiver and deposit its moisture.

MR. HAMPSON—The trouble is that in this country too small a pipe is used. In one mine I found that they had a three inch pipe from the compressor to the receiver, and from the receiver two two inch pipes. You cannot take enough air through a two inch pipe to work three drills.

MR. BROWN—The air which goes through water is the driest when it gets into the pit.

MR. HAMPSON—The principal trouble I find is in the exhaust passages. If the exhaust is direct there will be very little trouble.

MINING AND MILLING COSTS IN QUEENS COUNTY.

MR. LIBBEY presented his paper, "Notes on Mining and Milling Ore in Queens County," (reproduced elsewhere in this issue).

MR. HAYWARD—Last year we broke the rock, hoisted it to the surface, pumped the mine, carted the ore to the mill, and paid official expenses in Halifax, at 43 cents per foot. You can bore better in whin than in slate under certain conditions.

On motion of Mr. Bell, Messrs. Brown, Fergie, Poole, Hayward and Wyldie were appointed a committee to revise and edit papers and reports of discussions.

The meeting then adjourned.

ANNUAL DINNER.

The Annual Dinner of the members took place at eight o'clock in the Halifax Hotel. Among other guests present we noticed the Hon. Mr. Longley, Attorney General for the Province, Mr. Foster, United States Consul, and Major Ferguson, an English gentleman visiting the country in the interests of a British syndicate. After ample justice had been done to an excellent menu, the Chairman gave the time honored toast of "The Queen," which was received with characteristic loyalty, followed by that of "The President of the United States," a toast which was also received with great heartiness. The United States Consul having suitably acknowledged the compliment, Mr. Poole proposed

THE LOCAL GOVERNMENT.

HON. MR. LONGLEY—Mr. President and gentlemen, I am quite sure that none of you regret more sincerely than I do that Mr. Murray, who properly represents the Provincial Government on all occasions, should not be present here to-night. I am very sure that some matter of public moment has prevented him from attending. I have had the pleasure of being present at these social gatherings of the Mining Society of Nova Scotia ever since its formation. Some people come and some go, but my lot seems to be doomed to stay in this body through all its vicissitudes. I do not suppose there is any political opponent of this government (and by some strange infatuation there are some political opponents of this government) that wants me to get out half as badly as I want to get out, although while I remain a member of the government it shall be my pleasure and duty to advance the interests of the people of Nova Scotia all I can. (Applause.) I thank you for the kind manner in which you have referred to the Local Government, and I cannot do less than say that this Mining Society of Nova Scotia occupies a unique position in the Dominion of Canada. There have been mining associations formed here, there and elsewhere in Canada, but among them all this is the only one that exists with any degree of health and prosperity. (A voice: that is not quite correct!)

The object of this dinner of the Mining Association is rather for fun than to discuss questions which relate to mining, yet you will pardon me if I venture to say a word or two more in line with the purposes and objects of this Society. The first observation is that whereas the mining interests of Nova Scotia are to-day in the front rank of the industrial interests of this province, and while the mining interests of Nova Scotia, I have no hesitation in saying, are the greatest mining interests to be found anywhere in the Dominion of Canada, the fact remains that fortuitous circumstances have brought about that in the great money markets of the world other provinces of Canada receive greater booms than Nova Scotia. But water finds its level, and as a matter of fact in the long run that country will take the most important place in relation to mining interests that has the greatest mining resources, and if it be a fact, taking all our minerals into consideration, that Nova Scotia has the greatest resources of any portion of the Dominion, the time will come when this will be recognized, and when this will be the favorite field for the investment of the capital of the world. (Loud applause.)

Coal occupies a position which must be satisfactory to those interested in mining matters. A few years ago the government granted a special lease and charter to the Dominion Coal Company. Two or three things were predicted with respect to that, not altogether consistent with one another; but in making predictions consistency is no factor. The first prediction was that these coal mines falling into the hands of foreigners would be closed in a short time, to the detriment of the people of Cape Breton and the utter ruin and downfall of the British Empire. That prophecy has not been fulfilled. The Dominion Coal Company have exercised a most low lived tendency towards getting out coal. They have reached that stage that they would sell that coal to Englishmen, Spaniards or Ethiopians; in fact to any person who would buy coal. (Hear, hear.) There was a prediction that these people would be able, by means of the special boon given them by the government, to drive all other coal out of the province, and that every other company would have to pack up and get out. This was not fulfilled. The Intercolonial Company never had a more prosperous year than 1897, and I trust it may have many more prosperous years. The General Mining Association had a prosperous year also. (Applause.) We have another extremely important mining industry, namely, gold mining. It is one in which I have the most abounding faith. (Applause.) Not because I talk after dinner, but from a sincere conviction. The returns to date have been very satisfactory, considering the circumstances surrounding the development of gold mining since the discovery of gold. In the first place we have not received very large accessions of foreign capital in respect to the development of gold mines. So far as the investment of British capital in the gold mines of our province is concerned, in the main (I am making no general statement), most of it has been invested under the most unfavorable auspices, under the management of incompetent English people (hear, hear), and in the main, not in every case, under the influence of English mining engineers who knew nothing about the conditions of gold mining in Nova Scotia, and whose methods were inconsistent with the remotest possibility of success. (Hear, hear.) That does not alter the fact that the gold mines of Nova Scotia to my mind now present more than ever prospects of splendid results to the investor of capital. (Applause.) Hitherto holes have been dug in the ground and some quartz taken out, and if it realized from one to five ounces to the ton it was ground up and the gold taken out. But any systematic method of opening lodes and taking out ore has hardly yet come into existence as a regular feature of the mining industry in Nova Scotia. Some years ago application was made to the Government of Nova Scotia by people interested in mining, pointing out that it was desirable that the government should give a special grant for the purpose of opening up leads and carrying on a system of underground mining on a large scale. The government did not accede to the desire that provincial money should be put into any such enterprise, and although there may be a difference of opinion at this table, and differences of opinion are always to be respected, I am bound to say I think that the majority of fair minded men here will agree that if the Government of Nova Scotia had done that they would have taken a course contrary to sound business principles. (Applause.) Enterprises walking upon props are of no value, and will never get on a good footing if pampered by government aid. There will come a time, and it is rapidly approaching, when capitalists will

become convinced that by sinking hundreds of feet below the surface the most profitable results possible will be attained, and when it is introduced as a legitimate business enterprise it will be on a permanent basis. I have one other observation to make with which I am sure you will all agree, and that is that we want to bring to our aid men having the fullest scientific knowledge of whatever pertains to this industry. It is after all a question of knowledge. Knowledge is power in Nova Scotia as elsewhere, and we need never expect to accomplish any miracles or to get permanent results by resorting to misrepresentations of any character. (Hear, hear.) We want to know dead cold facts in regard to our mineral resources, and when we have them we have a basis upon which we may expect to make money, or abandon the prospect of making money in the gold mining industry of Nova Scotia. I may state, Mr. Chairman, that I have been making myself the greatest possible efforts to get one or two wealthy men in the city of London to invest in Nova Scotia in one or two of the most promising gold mining centres, for the purpose of testing the sinking of a deep shaft and mining on a large scale. If they would do this under the direction of Canadian managers who had actual working experience here in Nova Scotia I believe the result would be satisfactory.

There is another important mining industry to which I should refer, namely, iron mining. When we consider that we have unlimited resources with respect to coal in Nova Scotia, and according to Dr. Gilpin's report, which I do not think any person would care to call into question, that there is more iron than there is coal to smelt, and when coke can be obtained at a reasonable rate in Nova Scotia, it is unfortunate that hitherto the smelting of iron has not been attended with the best possible results. I hope to see Nova Scotia a great centre of smelting works. I still hope with the enterprise of our people, aided by foreign capital, that we will have profitable results and that Nova Scotia will take its place as one of the great producers of pig iron as well as steel.

We have also a fine copper deposit in Nova Scotia which is worthy of the interest of this Society and of the Government. So far as the Government is concerned I think I may say it has always manifested an interest in mining matters and tried to do within its scope all it could to assist in developing the mining industry. (Hear! Hear!) One day we are abused like pickpockets for favoring capitalists and owners of mines, and the next day we get abused for lending ourselves to demagogue associations at the expense of those putting capital into enterprises. If the Government were praised by one and abused by the other I would think that we had done wrong, but when abused by both I am satisfied we have done pretty nearly right. (Laughter.) We are engaged in the revision of the Statutes. I have the opinion of Mr. Bell, and his authority for stating, representing as he does a great organ of public opinion with reference to mining matters in Nova Scotia and in Canada, that the mining laws of Nova Scotia are the best yet of any of the Provinces of the Dominion. It is one of the inestimable boons of all free born British subjects that they have the liberty to abuse the Government and all its laws, and they will even abuse the mining laws of Nova Scotia, yet in the main I think we have as good mining laws as they have in any part of this continent of America. (Hear, hear.)

A commission is now engaged in revising the Statutes, and anything that can be done to make the mining laws more satisfactory that commission will have pleasure, I am sure, in doing. (Hear! Hear!)

I feel that I have occupied too much of your attention, but I have spoken of these matters because they are of the greatest possible interest to me and to the Government of this country. I am sure that I wish this Mining Society the utmost success and prosperity. I thank you for the manner in which you have received this toast, and as I have so long in the past had the privilege of attending these meetings, I trust an accident of fate will not deprive me of a position one of the perquisites of which is to enable me to enjoy the delights of your most charming hospitality. (Loud applause.)

THE MINING INDUSTRY OF NOVA SCOTIA.

MR. B. T. A. BELL—Gentlemen, I have great pleasure in proposing this toast, not only as one of the oldest members of this Society, but also as one who has an extensive acquaintance with the mineral resources of the other sections of the Dominion. I can most heartily endorse the highly eulogistic sentiments expressed by our friend the Hon. Attorney General with respect to the great future in store for the mineral resources of Nova Scotia. I can assure you from my peregrinations throughout this country, and from my knowledge of other mining districts in the Dominion, I am more than ever confident that Nova Scotia will in the future occupy a very prominent position as a mineral producer both of coal and gold as well as the other minerals. I have great pleasure in asking you to drink continued success to the mineral industries of Nova Scotia. (Applause.)

MR. LIBBEY: I hardly anticipated the pleasure of making a speech and I must confess there is one of the alloys of metal that I lack and that is brass. The Hon. Attorney-General has very ably set forth the prospects of the Province, and I cordially agree with him in saying that the mining industry does not need pap. (Hear, hear.) Although I represent a mining industry as severely taxed as any other, I may say that the gold miners do not need any help. We will not even ask to have the two per cent taken off. (Laughter.) One matter I would like to mention particularly is the Mining Report. We should either have a comprehensive report setting forth what has been done or none at all. (Hear, hear.) Most of you are familiar with what we are doing in Brookfield, and I believe there are many other places in the Province capable of making returns that would put us in the shade, and I have no doubt that in the near future they will do so. I can only add my best wishes for the future success of the mining industry. (Applause.)

MR. C. A. MEISSNER also replied to the toast, referring more particularly to the importance of the iron and steel industries of Nova Scotia.

THE GUESTS.

The last toast was that of the Guests, proposed by the Chair.

MAJOR FERGUSON: I am very much indebted to my friend, Mr. Oland, for the pleasure of meeting you here. I feel that I am rather a fraud, because I only left the service five months ago and can scarcely be looked upon as an authority in mining matters. I represent capitalists who have sent me out here to examine and report upon the gold mines of British America and the Yukon. We have delayed our departure from Nova Scotia very much beyond the time originally intended for it, because we have found so much interesting matter here that we felt we could not leave this place without further investigations.

The mining engineers associated with me tell me from their experience, that they have never seen or dreamed of the possibility of such a field of venture as that of Nova Scotia. Some of the properties, however, are worthless, simply because they have not been worked in a systematic manner. The first idea is the one expressed by Hon. Mr. Longley that you must go down and get into the old country. You have a new country on the surface which is misleading. You must find capital to go down. So confident are we in what we have seen and heard that we are endeavoring to acquire some property here, and I hope in the course of a few days we will have acquired it. I feel assured that there will be no necessity for us to go further afield with the object of making money. I can only say that I am deeply indebted to you for having given me this opportunity of meeting you and I wish you every success, and I hope if we do locate here we shall be good friends and pull together and help each other to the best of our ability. (Applause.)

The remainder of the evening until long past midnight was spent in the enjoyment of a first class musical programme. The entertainment being materially enhanced by the splendid vocal contributions of a theatrical company then playing in Halifax. Mr. Johnston's clever recitations were also the source of much amusement and were deservedly encored.

Dominion Coal Company, Limited.

INCREASED SHIPPING FACILITIES AT SYDNEY, C. B.—THE NEW INTERNATIONAL PIER.

The expansion of business and concentration of shipments at the International pier in Sydney harbor have compelled the Dominion Coal Company, Limited, to build a new wharf at that point, thus adding to shipping facilities, which were already remarkably convenient and conducive to the rapid handling of large quantities of coal. Plans and estimates were prepared in the company's office at Glace Bay as recently as December last, work of laying the foundation of a large new pier was commenced, and has been so vigorously prosecuted that to-day the pier stands well-nigh completed, a monument to the business enterprise of the company and to the push and energy of its local officials.

The new pier is located to the north of the old one in Sydney harbor. It is 1,165 feet in length and at its extreme outer end stands 37 feet above high water mark, or 10 feet higher than its weather-beaten but more massive neighbor, which has done such faithful service during the past five years.

With a depth of 26 feet at ordinary low water, steamers of almost any size can be accommodated with bunker coal at any time without interfering with the work of loading cargo steamers at the main wharf. The pier is built entirely of southern hard pine, while all timber below ordinary high water mark has been creosoted as a defence against the insidious teredo. It is supported on piles driven in rows that are 15 feet apart throughout the entire length of the pier, and these again are supplemented by heavy framed cribs of hard pine sawn square, ballasted with stone.

The empty cars will be taken away by a drop table, on the principle which has proved so successful at Louisburg. By this method, each car, after being discharged, is dropped 15 feet to a lower track and runs by gravitation to the yard where the trains of empties are made up for return to the mines. The pier is to be lighted throughout its entire length with arc lights supplied from the company's plant on the spot. A new feature is to be introduced in the shape of a telescope chute, which is expected to deliver the coal where required in vessels without undue breakage. These chutes are now being manufactured in the company's shops at Glace Bay, while the finishing touches are at the same time being put upon the pier. At present rate of progress the pier should be ready to operate in June, and the rapidity with which the work of construction has been pushed will be understood from the fact that the timber was landed in Louisburg on March 8th, and the last of the 76 bents was erected on April 8th. This means that over half a million feet of timber was framed and set up with some 13 tons of iron bolts in thirty days.

The New Golden Twins, Limited.

SIDE LIGHTS ON CERTAIN WILEY METHODS OF COMPANY PROMOTION.—AN IGNORANT INDIAN FRAUDULENTLY QUOTED AS A MINING ENGINEER.

Editorially we have referred this month to the disgraceful methods of certain Ontario company promoters in foisting upon the English market two 'prospects' at a large price as embodied in the prospectus of the New Golden Twins, Limited. From the following correspondence and affidavits it will be apparent that the Twins have obviously come into the world with their eye-teeth cut, and could give pointers to Romulus and Remus and their foster mother.

WHAT THE COMPANY BELIEVES OF THEIR PROPERTY.

The following is an extract from the report of the statutory general meeting of the New Golden Twins (Ontario) Limited, held on 30th December last:

The Chairman said: This statutory meeting has been called in order to comply with the Companies Acts, and is, therefore, purely formal; but I think, considering that we have only been in existence as a company for a few months, I have a very satisfactory statement to make to you. On the formation of this company the Board immediately proceeded to communicate with their managing director, Mr. Harold Wiley, who is very well known in the Lake of the Woods and Rainy River district, as to the best means for the rapid development of the properties belonging to the company. Letters were received suggesting the manner in which he proposed to deal with your properties, and stating that he had secured the services of an excellent foreman and competent miners. We have received since a considerable number of letters from Mr. Wiley, and your Board is more than satisfied with the way in which he is looking after the interests on your properties. On November 17th Mr. Wiley wrote us, and said: "During the week we have done some prospecting, and found lots of splendid-looking ore, but have not yet decided as to

the location of the first shaft. I am under the impression that it would be advisable to strip the vein of all timber, debris, etc., for a distance of a couple of hundred feet before deciding on the exact location of it. I will make a more thorough examination of it next week, and will advise you in detail what I think the course to pursue." We then received another letter—and there were several intermediate ones, all very full of technicalities—on December 13th, sent from Port Arthur on November 29th, in which Mr. Wiley says: "Continuing my report of November 15th, I have to say that on the 16th we completed the office building and began clearing timber from the vein and building a blacksmith's shop. We completed the blacksmith's shop on the 19th, and immediately commenced stripping the vein. On the 20th we had it stripped a distance of 150 feet long by 30 feet in width." The last letter from Mr. Wiley was received here December 28th, two days ago, and left Port Arthur December 9th, and I believe you will consider it a very satisfactory letter. After going into the expenditure and the work done he goes into rather closer details: "The shaft, which is a perpendicular one, is drawn 15 feet, and is looking better every foot. The quartz is very well mineralised, and carries copper, iron pyrites, and galena, with here and there showings of free gold. We have done considerable panning, and invariably got colours in every pan, and acid tests of course show up better results. The size of the shaft is 7 feet by 9 feet, and, so far as I can judge, we are nearer the hanging wall than the footwall side. You must remember that it is much harder to sink a shaft in a large 30 feet vein than it would be a vein the exact size of the shaft, as there is no wall to break (the vein being so wide), and every hole must be drilled to a nicety. I estimate that after the 50-foot level is reached it will not pay further sinking by hand drill, and my intention now is to cross-cut the vein at that depth and see exactly what values we have across the lode. The company has, I am sure, a most valuable property, and one which will prove up well on development. Both locations are magnificently timbered with pine and tamarac; the latter will be most useful for firewood, and the former for timbering purposes." That is as far as we have gone with the properties, and I



JOHNSON BROWN,
Wolfe River, Ont.

(An half-breed Indian who states his name was fraudulently used to promote the New Gold Twins, Limited.)

think it is a very good working for four months. In a great many gold-mining companies one knows of it takes considerably more than four months before they touch free gold, and I think we may congratulate ourselves on having obtained a very valuable property, which will certainly vie with other mines in the same district that are now beginning to pay, and to pay handsomely. I consider that we are fortunate in having with us to-day Mr. Wiley's brother, Mr. F. S. Wiley, who is the pioneer of the Rainey River and Lake of the Woods district, and who has only just reached London.

GROUP OF THE MEMBERS MINING SOCIETY OF NOVA SCOTIA.

(Taken for the REVIEW at Halifax, 13th April, 1898.)

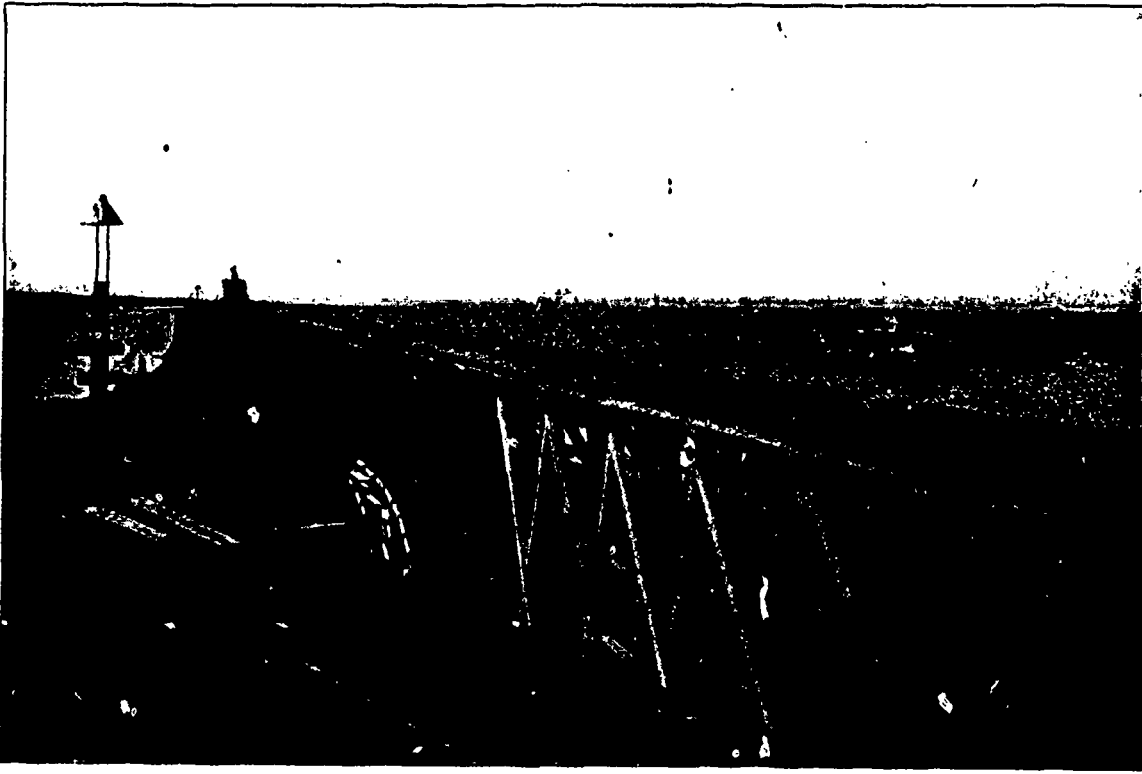


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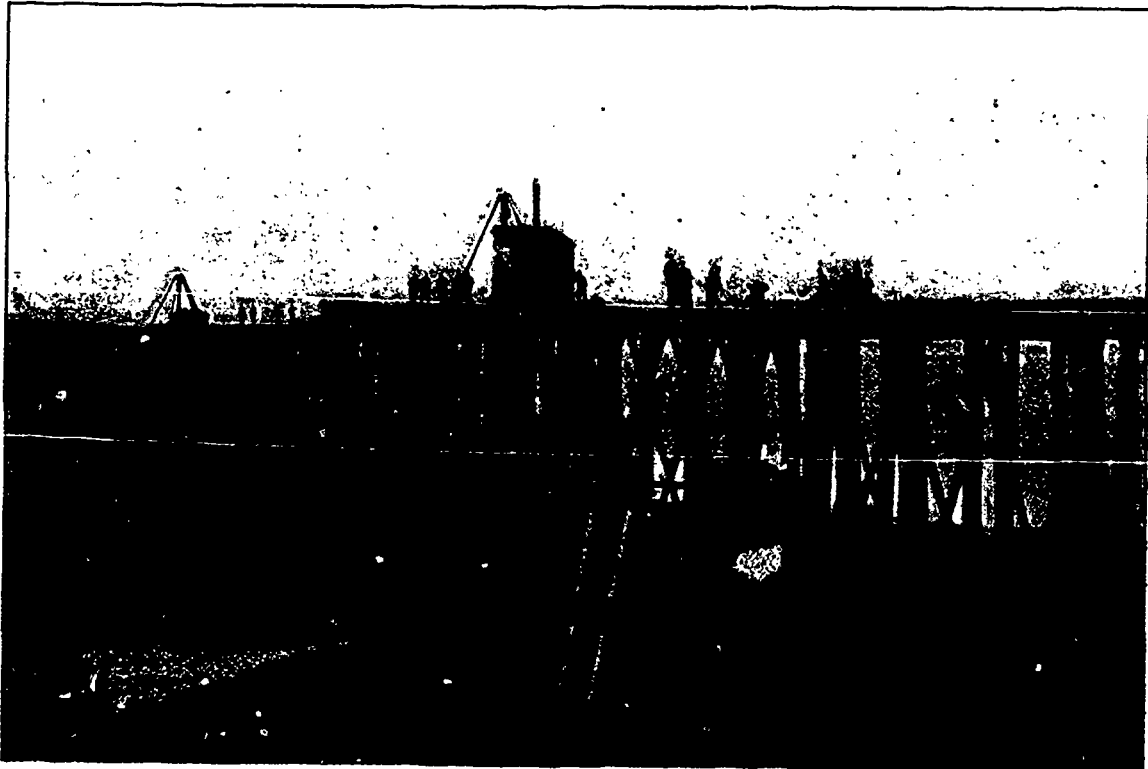
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Mr. George Stuart, Truro.	Mr. Joseph Austen, Halifax.	Mr. B. T. A. Bell, Ottawa.	Mr. J. E. Hampson, Halifax.
Mr. W. A. Sanders, Uniacke.	Mr. A. C. Ross, Sydney.	Mr. B. C. Wilson, Maccan.	Mr. E. T. Mosely, Sydney.
	Mr. W. L. Libbey, N. Brookfield.	Mr. H. S. Poole, Waverley.	Mr. H. Height, Halifax.
	Mr. Chas. Fergie, <i>President</i> , Westville, N.S.	Mr. C. A. Meissner, Londonderry.	Mr. R. H. Brown, Sydney Mines.
	Mr. Harry Wyde, Halifax.	Mr. F. H. Mason, Halifax.	Mr. G. J. Partington, Musquodoboit.

DOMINION COAL COMPANY, LIMITED.



International Pier No. II., Sydney, Cape Breton, (under construction.)—View from inner end showing Return Track for empty cars on lower deck.



International Pier No. II.—View of outer end of Pier.

WHAT OUR CORRESPONDENT SAYS ABOUT IT.

Our correspondent writing from Bonheur, Ont., under date of May 1st, says:—

"I have just returned here from a hurried visit to Saw Bill Lake and during my trip made some inquiries about the prospects of the new Golden Twins. What was universally said would offer no encouragement to the stockholders of that company. On the contrary the results so far obtained, as one would judge from current report, leave not even a slight hope for the stockholders getting anything from their investment."

JOHNSON BROWN'S NAME WAS FORGED.

The following is a copy of the affidavit of Johnson Brown, the half-breed Indian, who was quoted as the mining engineer from Wolfe river as saying that "the property was capable of paying large dividends on an equally large capital:"

DISTRICT OF THUNDER BAY,
Province of Ontario,
To Wit:

WOLFE RIVER, Ontario,

29th April, 1898.

I, JOHNSON BROWN, of Wolfe River, do solemnly declare that my name mentioned in the prospectus of the New Golden Twins, capable of paying very large dividends on equally large capital is false, and that what Mr. Johnson Brown, M.E., of Wolfe River, Ontario, says in his report dated 30th January, 1897, stating that I have much pleasure in informing you that I examined properties known as gold locations 327 and 328 on Clear Water Lake, near the Saw Bill in the Rainy River District, Ontario, where free gold is frequently seen, etc., etc., is also false, and in said prospectus Mr. H. A. Wiley is the managing director, and other particulars have been read to me as I cannot read or write as suggested in said prospectus, and that I am not a miner or mining engineer, and that my name has been forged and used in a fraudulent manner attached to the said mining prospectus, and that I am a half-breed Indian who makes my living hunting and trapping, and that I live in the woods among Indians, and last summer about in June H. A. Wiley employed me at Wolfe River to work around the Saw Bill mine and to do some prospecting, and I never saw Clear Water. I never put my name or mark on any paper as a mining report, and never heard of the New Golden Twins or of my name being used for such a purpose before said prospectus was read and shown to me to-day, and I make this solemn declaration conscientiously believing the same to be true and knowing that it is of the same force and effect as if made under oath and by virtue of the Canada Evidence Act of 1893.

[Signed] JOHNSON BROWN.

His
X
Mark.

Declared before me at Wolfe River,
in the District of Thunder Bay,
this 29th day of April, 1898.

[Signed] J. P. DONNELLY,
Commissioner, Etc.

Province of Ontario,
DISTRICT OF THUNDER BAY,
To Wit:

I, ALEXANDER J. McCUMBER, of the Town of Port Arthur, in the District of Thunder Bay, explorer, make oath and say:

That I reside in the Town of Port Arthur, in the District of Thunder Bay, and have resided there about nineteen years.

That I am personally acquainted with Johnson Brown of Wolfe River, Ontario, and have been acquainted with him for about seven years.

That the said Johnson Brown is a half-breed Chippewa Indian who makes a living by hunting, fishing and acting as guide, and lives among the Indians in the woods.

That the said Johnson Brown speaks some English but can not read nor write.

Sworn before me this 4th day of March,
A.D. 1898, at the Town of Port Arthur,
in the District of Thunder Bay, Ontario.

J. P. DONNELLY,
A Commissioner for taking Affidavits, etc.

The Stamp Milling of Gold Ores in its Relation to Cyaniding.

By Mr. E. H. JOHNSON.

The President, in his inaugural address, delivered here in July, in comparing the two solvents, cyanide and chlorine, on closely concentrated ores, used the expression: "given equal preparation of the material for the use of the solvent." This question of "preparation of material" could, I think, be given a wider field of application than merely to closely concentrated ores, and include the consideration of the present methods of preparation of tailings. The recovery of gold from tailings and slimes has assumed a position of sufficient importance at the present day to warrant consideration of their preparation at a stage prior to their collection. Beyond the various methods of collection and classification, the actual preparation of the tailings is outside the domain of the cyanide worker, and I hope I may therefore be forgiven in venturing outside that province to point out one or two details of common milling practice which militate against the successful treatment of tailings and slimes. I feel encouraged to do so since I find on enquiry that differences of opinion exist between experienced mill men themselves on these points.

It is usual, in referring to the degree of fineness, to which an ore is crushed, to quote the mesh (in number of holes in the square inch) through which

the material has been passed, and to overlook the important part played by the height of discharge, which is regulated by the "chuck block" of the mortar-box screen. Though, doubtless, you are all familiar with this device, it would, perhaps, be as well for me to define it. It may be described as a block of wood, covered on the mortar-box side with an amalgamated plate, fitting in the screen opening of the mortar-box below the screen frame, and varied in height according to the wear of the dies and the individual taste of the millman. The deleterious influence of the "chuck-block" on tailings preparation is in direct ratio to its height, and I find anything from 3 inches to 9 inches recommended by its advocates. Admitting for the moment its utility for the purposes of amalgamation—a much disputed point—surely the ores of the Main Reef series do not vary sufficiently in character to warrant this wide range in its application. The action of a high discharge is to cause the repeated return of ore particles beneath the stamps, although they were probably sufficiently reduced in size to have passed the screen could they have reached it. The screen-mesh, therefore, becomes no guide to a knowledge of the degree of fineness of pulp without acquaintance of the height of discharge. This is further complicated by the length of drop of the stamps and quantity of water fed into the mill, since by these means also facility of discharge can be accelerated or retarded. The result of a high discharge on the pulp is the reduction of a large proportion of the sand particles to a degree of fineness which is unleachable without excessive loss of sands in classification. Another disadvantage is that the pyritic portion, being the most friable, a large percentage of the fine pyrites passes into the tailings, since it is difficult to retain them in spitzlute concentration.

I made a series of sifting tests some time since of tailings produced by a mill crushing with a 900-mesh sieve and a 9-inch "chuck block." I found that 75 per cent. to 85 per cent. of the tailings produced would pass through an 8,100 mesh sieve. The result was the separation of an abnormal amount as slime and a most imperfectly leachable product of the remainder. So impermeable indeed was this material, that vats containing 100 tons of sand absorbed 30 tons of solution without allowing any to pass the filter. The only means of draining these vats was by boring holes with a long rod through the sands, and so forming channels—hardly a desirable form of leaching, you will admit. The ideal physical condition of tailings for treatment is perfect accessibility of every particle, with the crushing carried sufficiently far to expose the gold to the solvent, and a minimum reduced beyond that point. The nature of the rock here, where the gold is principally carried in the more friable portion—the matrix of the pebble—renders the use of high discharge still more disadvantageous. The tendency of unevenly crushed material is to form compact masses of mixed tailings and slimes, which not only resist treatment, but become enriched by the absorption of gold-bearing solution. These lumps may be noticed forming a fringe round the edge of dumps and round the conical heaps formed during the filling of a leaching vat.

I have touched upon the influence of the "chuck-block" only in its relation to the production of tailings. It would be interesting, metallurgically, if one of our representative mill-men would explain its action and advantages, or otherwise, from the amalgamation standpoint. With the high stamp duty required of mill-men on these fields (something like double the quantity per stamp as is the case anywhere else in the world), any retarding of the discharge of the crushed material beyond the desired mesh of sieve seems to me to be anything but a desideratum.

Another common milling practice is that of taking the heated water from the condenser of the engine for milling purposes. In this connection I would like to draw attention to the well-known report of Mr. Wm. Skey, analyst to the Geological Survey of New Zealand, on the losses in gold amalgamation occurring in the Thames Goldfields. You will pardon me quoting somewhat fully, as his remarks have taken an extended bearing from their applicability to cyaniding as well as amalgamation. He reports:—

1. "That numerous samples of bright, clean-looking gold, of all degrees of fineness, refused to amalgamate on any of their natural surfaces, though taken directly from the reef and untouched by hand.
2. "That on such surfaces sulphur was always present.
3. "That native gold, or gold in a pure state, readily absorbs sulphur from moist sulphuretted hydrogen or ammonium sulphide, and absorbs it directly when administered in boiling water.
4. "That surfaces so treated refused to amalgamate, though no apparent change could be observed in their aspect.
5. "That gold so affected is rendered amalgamable by roasting in an open fire, unless copper is present to the extent of 7 per cent., or perhaps less, while the same effect is produced by contact with potassium cyanide, chromic or nitric acid, and calcium chloride acidified.
6. "That this absorption is altogether of a chemical nature.
7. "That sulphate of iron in presence of air and water decomposes various metallic sulphides common to auriferous ores, in such a manner as to liberate sulphuretted hydrogen."

The point I wish to emphasize is that the absorption of sulphur from sulphuretted hydrogen by native gold occurred immediately when administered in boiling water. Ferrous sulphate is present to some extent in all our mine water, and, consequently, in the water used in milling. The conditions necessary for the decomposition of the metallic sulphides, and consequent evolution of sulphuretted hydrogen, are therefore present. It is fair to assume that the rapidity of this decomposition is in ratio to the temperature of the water, as indicated by Mr. Caldecott in his paper on the "Treatment of Accumulated Slimes," read at the July meeting of this Society. Mr. Skey has pointed out the injurious action upon the free gold, and we have to consider the injurious action of this decomposition in providing us with those oxygen-absorbents and cyanicides which impair results in subsequent treatment of tailings and slimes. Nature has been already sufficiently generous with respect to these ferrous compounds without our adding to the supply by a system that is advantageous to no department of gold recovery.

There are two chemical conditions of the ore in which the cyanide treatment progresses satisfactorily: 1st—The condition before any decomposition of the metallic sulphides has taken place; 2nd—When complete decomposition has been obtained, or, in other words, when the ore has satisfied its absorbent capacity for oxygen. No better example of this could be given than the experiment made by the President, and quoted by him at the August meeting of this Society. It was in reply to a question respecting the effect of partial roasting. He said: "We made a careful series of determinations by partial roasting. We started on top and took our samples right down through the

furnace, and the moment the heat commenced to act we got extractions, which decreased all the way down until the ore was dead roasted, when the extraction went up." As roasting would only be available in the treatment of rich and heavily sulphuretted material, it behooves us to endeavor to obtain as near as possible the first condition named, and to avoid anything in the preparation of the ore which advances the decomposition of metallic sulphides. The initial stages of decomposition having been set up, the rest becomes cumulative from the further reaction of the products of decomposition, and as each reaction requires a further supply of oxygen, there is a constant withdrawal of available oxygen required for successful treatment.

Having endeavored to deal with these two milling practices from the point of view of their influence on cyanide work, it would be interesting to hear if in amalgamation there are compensating economic advantages to justify their undoubted deleterious influence on cyanide work. It is with no desire to trespass within the province of the mill manager that I have brought forward these few remarks, but, if possible, to draw attention to the double function of the mill in its capacity as an amalgamating machine, and its equally important service in the "preparation of material for the use of the solvent."

MINING NOTES.

Nova Scotia.

Mr. E. R. Faribault, whose excellent surveys and maps of the gold fields of Nova Scotia are highly appreciated by the mining men of the province, contributes to the Summary Report of the Geological Survey, issued this month, a brief synopsis of his investigations last year, which will be read with interest. We quote from it the following:—

UPPER SEAL HARBOUR GOLD DISTRICT.—Thirteen days were spent making a survey of this new district, discovered at the time we located the anticline in the spring of 1892, and a plan on the scale of 500 feet to an inch has been prepared, giving the geological structure of the anticlinal fold from Country Harbour to the head waters of Seal Harbour streams, a distance of 28,200 feet. This anticline has a general course of N. 60° W. (*mag.*),* with a pitch to the east of 10° at the west end, increasing to 32° at the east end, the strata on both sides of the axis having about the same inclination to the north and south, the angle of dip averaging 50° near the apex, and increasing to some 80° some distance off. Three main parallel faults have been discovered and located this summer, cutting the fold diagonally at angles varying from 40° to 50°, with horizontal displacements varying from 500 to 1,100 feet and running about N. 15° W. (*mag.*) As the gold-bearing veins are here confined to the crown of the anticlinal fold, where they bulge out to large size, and as the greater part off the district is covered with heavy drift and woods the exact location of these faults becomes most important in tracing out the auriferous belt; and I may say that several hundred areas were taken up by local prospectors last season on finding out the extent of the displacements of these faults.

The eastern fault lies west of Dolliver Mountain gold mine, passing in the vicinity of the north branch of Davidson Brook, with a displacement of 500 feet to the north on the east side, shoving the anticlinal fold from area 772 to area 869 on the east side.

The middle fault lies 600 feet west of the mouth of Isaac's Harbour River, and follows the general course of the Northwest Branch Brook to the head of the harbour, down which it runs, passing between Hurricane Island and the eastern shore. The anticlinal fold is cut off on the east side of this fault on area 906, block 6, and shoved to the south-east some 1,100 feet, in the vicinity of the discharge of the Branch Brook into Isaac's Harbour.

The western fault runs parallel to the other two, along the valley of the south branch of Smelt Brook of Country Harbour, and is well seen at the Porcupine Rock, but, on account of heavy drift, the anticlinal could not be located on either side in the vicinity of the fault. The fold is, however, well exposed further west on the shore of Country Harbour, on areas 780 and 781 of block 10, giving a horizontal shove of some 500 feet.

The only mine in operation in the district at the time of my visit was the Richardson gold mine, working an auriferous quartz vein that follows a belt of slate lying between two heavy beds of quartzite, curving to the eastward around the anticlinal fold, which dips to the north at an angle of 70°, to the south at an angle of 50°, and with a pitch of 21° along the axis. The belt on the north dip has a width of 7 feet, and has been worked 150 feet on the incline; on the south the width is 8 feet, and it was worked to a depth of 200 feet, while on the apex the belt increases to a thickness of 25 feet, half of which is quartz, and has been worked on the incline to a depth of 400 feet. The slate, as well as the quartz, contains milling gold, but it also holds an important amount of auriferous sulphides, which, from analysis made by Mr. F. H. Mason, of Halifax, contain a good percentage of gold that is not free-milling, and should be saved by suitable concentrators.

A great deal of exploratory work has been done in the last few years to the east and west of the Richardson property, along a distance of some five miles on both sides of the anticlinal axis; notably on the Dolliver Mountain property, where some twelve veins showing gold have been opened, and also on the McMillan, the Samuel Grant, the O. J. Griffin, the H. Richard and the East Gold Brook areas, where some rich drift has been found. Large belts of low-grade ore, similar to that of the Richardson vein, occur along this fold, but they will only be found on the apex of the fold, where more prospecting should be done; and this could be accomplished most readily and at least cost by sinking perpendicular shafts along the axis.

ISAAC'S HARBOR GOLD DISTRICT.—The three faults above described as affecting the Upper Seal Harbor belt have been traced across this belt lying two miles further south. The middle fault and the western fault run down the harbour and pass between Hurricane Island and the eastern shore, and converge at Dung Cove, giving a horizontal throw of some 1,500 feet to the north on the east side of the harbour. The Mulgrave belt should thus be the continuation of the Hurricane Island belt, where an anticlinal and synclinal fold only 12 feet wide is developing on the western side of the harbour into the Burke mine anticline and North Star mine syncline, which are here 100 feet apart. This explains why the Mulgrave belt can not be traced on its natural course on the western side of the harbour, and it gives also the theoretical reason for the occurrence of an auriferous belt apparently remote from an anticlinal fold.

The Hattie belt, now operated by the Griffin Gold Mining Company, on the south side of the Isaac's Harbour anticline, is likewise shoved by the same fault some 1,500 feet to the south on the west side of Dung Cove, at Red Head, where rich drift has been found.

The eastern fault described above appears to pass a few hundred feet west of the Skunk Den mine, apparently cutting the Mulgrave leads between areas 13 and 14, but the extent of this fault here could not be exactly made out. It may have a displacement of 500 feet, like that two miles further north.

The knowledge of the location and displacements of these faults should assist in tracing out rich veins beyond them and encourage the prospecting of new areas.

COUNTRY HARBOUR GOLD DISTRICT.—No work was being done here at the time of our visit. More evidence was gathered, however, confirming the views expressed before regarding the structure of the district. The quartz veins, so extensively worked here for some years with large returns, are situated along a very sharp anticlinal fold which is a part of the Cochran Hill and Forest Hill anticline swung into a north-and-south direction by the Country Harbour fault, which has caused a horizontal displacement of over one mile to the south-east on the north-east side of the fault.

FOREST HILL GOLD DISTRICT.—One week was devoted to making a plan on the scale of 500 feet to the inch of this newly discovered district, where a belt of gold-bearing rocks occur between two axes of granite, from which numerous dykes and veins are sent into the adjoining rocks which are altered into andalusite, staurolite and garnetiferous schists. The belt is plicated into an anticlinal fold which has a north-west course, gradually curving to the west and south-west, and most probably joining the Country Harbour anticline. On the McConnell property the anticline has a pitch to the east of three degrees. The Modstock, McConnell, Mason and Phoenix companies are working a group of some ten veins 1,000 feet south of the granite on the south side of this fold, which has an overturned dip to the north varying from 90 to 70 degrees. The Salmon river and Ophir leads, which have so far been the most productive, are the nearest to the anticline, being respectively 100 and 500 feet from it; and judging from the present developments, it appears that the outcrops of the pay-streaks on the different leads are situated along an imaginary line crossing diagonally the course of the leads, and running north 73 degrees west (*mag.*) from the McConnell mill. I would thus suggest cross-cutting north from a shaft on the Salmon river lead in the vicinity of the O'Connell mill, where the anticline is well exposed twenty feet north of the mill, to develop leads on the line of the pay-streak which do not crop at the surface. Auriferous quartz veins have also been prospected on three different properties one mile further west, on the south side of Mile Lake, where granite spurs from the mass lying immediately to the north cut the stratified rocks and interbedded veins in all directions, creating disturbances which render prospecting very difficult. This district is the most interesting place yet visited in the province for studying the relation of the granite to the sedimentary rocks.

COCHRAN HILL GOLD DISTRICT.—A hurried survey of this district has been made and partly plotted on the scale of 300 feet to one inch. The axis of the anticline, not located here before, was determined at the crusher, on area 533, block 77, and traced eastward where gold-bearing drift was discovered last season, a fact which ought to encourage prospecting along its course, which is south 79 degrees east (*mag.*) This anticline is a very sharp fold overturned to the south, the dip on the north side being to the north at an angle increasing from 60 to 70 degrees, as we recede from the axis, while the south leg has an inverted dip to the north increasing from 75 to 85 degrees, as we approach the axis. The pitch is to the west at a very low angle. At the time of my visit a large belt of leads, called the Mitchell belt, which has been worked from time to time with more or less success, was being re-opened. This belt is 250 feet south of the anticline, 100 feet wide, and composed of several veins of low-grade ore from two to fifteen inches wide.

GOLDENVILLE GOLD DISTRICT.—One month was devoted last season to this most important district, in making a detailed survey of over 125 auriferous quartz veins which have been worked from time to time. A plan, on the scale of 200 feet to an inch, was plotted in the field, showing the size and cropping of the veins, as far as they can be traced on the surface, the extent to which they have been worked in depth, and the faults and disturbances affecting them. These veins occur on both sides of a main anticlinal fold, which has a general westerly pitch varying from 0 to 30 degrees, with a perpendicular dip on the south side, and a north dip of 43 degrees. In studying the structure of this anticline more closely, we find that gentle undulations leave the main fold in a north-westerly direction, and that the enlargements and pay-streaks of the veins are found along well-defined lines, having the same north-westerly directions and corresponding to the anticlines of these undulations, while the synclines correspond to a narrowing or disappearance of the veins and to lower grade or barren ore. Three well-defined transverse undulations have been traced on the north side of the saddle, the most easterly of which leaves the main Cobourg shaft near the anticline and runs north 65 degrees west (*mag.*) to the shafts on the Gold Hill belt, then curving slightly to the north, it runs north 57 degrees west (*mag.*) to the shafts on the Gladstone, developing enlargements and rich streaks on the veins it crosses. Important pay-streaks have been worked along this line on the Cobourg lead to a depth of 200 feet on the incline; on the Gold Hill, 75 feet; Bung, 280 feet; Wellington, 750 feet; Dewar, 400 feet; Cameron Whin, 100 feet; Blue, 300 feet; McKenzie, 150 feet; Zwicker Big, 300 feet; Gladstone, 140 feet; McClure, 300 feet; Harrison, 300 feet; Dougald Cameron, 60 feet; Dan McKenzie, 90 feet, and on the Wheel lead, 75 feet.

The second undulation leaves the Mayflower belt on the anticline, and runs N. 50° W. (*mag.*) to and beyond the Little Hayden lead, creating enlargements and pay-streaks on the veins crossed. The most important are those worked on the Mayflower, Roothog, John R. to a depth of 90 feet, Murray, Serpent, Bailey 130 feet, Old Hayden 90 feet, Jumbo 180 feet, and on the Little Hayden worked to a depth of 350 feet. A swamp lying north-west of the Little Hayden has, no doubt, prevented prospecting further north-west on this undulation, but there is every reason to believe that rich streaks occur there.

The veins crossing the space between the two most easterly undulations have been found of no value, and prospecting done to the west of the Hayden undulation has proved that the veins pinch out and are completely wanting for a space of 700 feet, at the west of which the western undulation begins.

Only a few veins have so far been opened on the western undulation, passing about the McRae vein, but good streaks may yet be discovered on some of the veins crossing this line.

* The magnetic variation in this part of Nova Scotia is about 25° E.

On the south side of the Goldenville anticline, the interbedded auriferous veins are perpendicular and run straight, except on the saddle where they curve to the north-west, and the angle of dip decreases gradually. Here again, as a general rule, the richest streaks have been found where the strata and the inclosed veins begin to curve around the main anticline. One well-defined line of pay-streaks leaves the anticlinal axis at the Mayflower belt and runs S. 35° E. (*mag.*) developing the rich streaks worked on the Palmerston and the Meridian big belts to a depth of 100 feet.

The above general conclusions are sufficient to prove that the mode of occurrence of the veins depends entirely upon the structure of the folds and the lateral pressures to which they owe their origin. If, therefore, the structure of a gold district can be ascertained and mapped out, it becomes quite simple to locate the lines of pay-streaks and to trace them to great depths, as is done in Bendigo, Australia, where mining operations have been pushed down, at six different mines, to depths of over 3,000 feet, by means of perpendicular shafts on the top of anticlinal folds.

Enormous lateral pressure has induced, at the east end of the district, small cross-faults, the two largest giving a horizontal displacement of 40 and 42 feet respectively on the south side of the fold, of later origin than the auriferous veins.

The district, once a centre of much activity and from which over \$2,000,000 of gold has been extracted, has been little worked for the past 15 years, but within a year or two abandoned properties have been re-opened and worked with very satisfactory results, so it is safe to say that this district is destined in the near future to resume its position as an important gold producing centre.

At the time of our visit operations were being proceeded with renewed energy on the Coburg, the Springfield, the New Glasgow, the Stuart-Hardman and the Sutherland properties. The return from the four first named properties for the month of August was 397 ounces of gold from 1,245 tons of quartz.

SALMON RIVER GOLD DISTRICT.—A few days were spent in a survey of this district, but the plotting of the field notes is not yet completed. The surface of the district is largely covered with drift and only a few out-crops could be seen, outside the Dufferin mine, at the east end of the district, where some veins have been opened. Large plans and sections of the extensive underground workings of the Dufferin mine have been made by the company. By the courtesy of Mr. R. G. Leckie, manager of the company, these plans have been placed at the disposal of the Geological Survey and will be of great value in affording the data necessary to work out the structure of this important district.

The quartz vein worked at the Dufferin mine are situated on the apex of a very sharp anticlinal fold. At the main shaft the apex has a westerly and easterly pitch, which has caused a sliding and an uplift of the strata, developing large auriferous quartz veins on the crown of the saddle. These latter occur one under another in the same manner as some of those in Victoria, Australia, to which allusion has already been made. No work was done here last summer, but I was informed that the company contemplates the erection of a suitable plant and will sink a deep perpendicular shaft on the crown of the saddle to work the large ore-bodies converging at this point.

FIFTEEN-MILE STREAM GOLD DISTRICT.—Ten days were spent in a survey of this district and a plan on the scale of 300 feet to an inch was completed in the field. The north anticline of the Moose River mine passes through this district and is here composed of three minor anticlinal folds. The two most northerly folds are only 130 feet apart at the east end of the district, on the New Egerton property, and have a pitch to the east at an angle of 30 degrees. The northernmost is well exposed at the west end of the district, on the east shore of Sheet Harbor river, 100 feet south of the Free Claim lead, where the pitch is to the west at an angle of 18 degrees, but the middle fold could not be located here as the bed-rock does not crop out immediately south of the Free Claim mine. The east and west pitches of the north anticline meet and form a dome a short distance west of the Hudson property, where good ground is most likely to be found.

The southern anticline is well exposed at the west end of the district on area 905, block 2, 750 feet south of the Free Claim lead, also on the Sheet Harbour portage-road on area 858, block 4. Further east, it passes about 50 feet north of the Halliday lead, beyond which, it is thrown to the north, about 150 feet, by a fault, and passes north of the McCuaig lead and south of the Hudson and White leads, prospected here on the eastern pitch of the anticline. No veins, have, so far, been operated on this fold, but some very rich drift, derived no doubt from its axis, has been found 600 feet to the south of it on areas 706 and 713, block 6, and at other places, and considerable prospecting has been done through a great thickness of drift to find the auriferous veins. No doubt systematic prospecting along this anticlinal fold will bring to light rich veins.

Mining operations have, so far, been confined to the quartz veins lying along the two northern anticlines. The New Egerton Gold Mining Company has lately taken possession of the principal properties which had been worked from time to time by different companies, and they are now operating on a large scale the important belts of low-grade ore known as the Mother Seigel, and the Nonpareil, on the synclinal fold, immediately south of the middle anticline, at the eastern end of the district. The returns for the first nine months of 1897 are, 8,269 tons of quartz passed through a 40-stamp mill, giving 2,557 ounces of free gold, or an average of 6.19 dwt. per ton, and last September, 1,000 tons gave 445 ounces, or an average of 8.90 dwt. per ton.

This district is one of the most promising for new discoveries, and is likely eventually to become one of the most important mining centres in the province. But on account of its isolated position, with only one bad road of thirty miles for ingress, it has not been given all the attention it deserves.

KILLAG GOLD DISTRICT.—A few days were employed surveying this comparatively new district, a plan of which was plotted on the scale of 300 feet to an inch. The anticline passing through this district is the continuation of the Goldenville fold from the east, and of the Gold Lake fold from the west. It has a course of S. 79° E. (*mag.*), but instead of having a westerly pitch as in the two latter districts, its axis has a pitch to the east at an angle of 15°. The measures on the south side have a due east-and-west (*mag.*) course and perpendicular dip, while on the north side the measures have a general course of S. 55° E. (*mag.*) and dip to the north at an angle averaging 35°.

Only a few veins have so far been worked in this district, but very rich drift has been found for some distance along the course of the axis, indicating that more will yet be discovered. The veins are much larger and more numerous on the apex of the fold than at a distance from it, and more prospecting should be done along this line and operations carried down to greater depths on the saddle.

At the time of my visit, the H. S. McKay property was being operated on two different leads, one on the north dip and the other on the south, with good results.

Prospecting was being done on the Mott-Stuart property, on some areas where very rich quartz was found, and two leads dipping to the north have been discovered showing gold quite freely.

CARIBOU GOLD DISTRICT.—Twelve days were devoted to surveying this district, a plan of which was plotted on the scale of 500 feet to an inch. The anticlinal fold passing through this district is the continuation of the Cochran Hill and Cameron Dam anticline, which has brought up the upper measures of the lower quartzite group of the gold-bearing series on an elliptical dome, 2,900 feet broad and four miles long, surrounded and overlain by the upper slate group. This dome has its centre on areas 328 and 329, block 2, where many quartz veins have been segregated in slate belts interbedded with quartzite beds, dipping away from the centre at low angles along the axis of the fold, increasing gradually to 65° on the north dip and to 70° on the south dip. The course of the fold from the centre of the dome is N. 79° E. and S. 76° W. (*mag.*)

Besides the many interbedded veins which have been operated from time to time for some years, four important large fissure-veins, cutting the strata at small angles, have also been worked extensively with good returns. One of these cuts the quartzite and slate group and the other three cut the slate group near its base. Two of the latter are at present worked.

More attention should be paid to the large belt of flat veins lying close together on the centre of the dome, on areas 328 and 329, block 2, on the property of the Caribou Gold Mining Company; for the structure of the fold shows that they probably overlie a succession of similar veins, all of which could be worked most economically by a perpendicular shaft sunk on the apex.

MOOSE RIVER GOLD DISTRICT.—Twelve days were spent in this district and a plan on the scale of 200 feet to an inch was plotted in the field. The Fifteen-mile Stream and the Beaver Dam anticlines converge as they approach this district from the east, and are here only 450 feet apart, with two minor plications between them. The folds have a general east and west course. The most northerly, which is the more important, has a north dip increasing gradually from 35° to 80° and its axis has a pitch to the west at an angle of 10°. The measures on the south side of the south fold dip south at an angle averaging 60 degrees, and the axis has a pitch to the east at an angle of 15 degrees, and the minor intervening plications lie at an angle seldom higher than 45 degrees. The immense strain and pressure accompanying the meeting of these folds have greatly disturbed the measures and have caused many flexures and faults which complicate very much the structure of the district. The main lines of faulting have a general course varying from N. 10 degrees E. to N. 25 degrees E. (*mag.*), with displacements from a few feet up to 165 feet.

With the exception of one or two small, true, fissure veins of but little importance, cutting the strata at small angles, all the veins worked in this district are of the interbedded class. The most important are those worked on the north dip and on the crown of the northern anticline, by the Touquoy and the Moose River Gold Mining companies. Some veins have also been worked on the south anticline and on the two smaller plications lying between these two main folds.

A belt of slate, over 100 feet wide, plicated by these folds, contains a large percentage of auriferous quartz occurring in corrugated veinlets and filling fissures generally following stratification. A large quantity of this slate has been mined on the Moose River property by open quarries, and a considerable percentage of the slate as well as quartz has been crushed and is said to have given satisfactory returns. This large belt of slate could be mined at a very low cost, and if certain parts of it were sampled separately, tested and found to contain enough gold to cover expenses of mining, it would become a great source of revenue, as the belt is repeated by these plications and gives a considerable width, and can be traced for some distance east and west. Belts of slate of a similar nature that occur in other districts seem worthy of consideration.

The discovery, last summer, of a 100-ounce pocket on the Britannia lead, newly opened on the south dip of one of the middle plications, on the Touquoy property, has created more interest in the district, and, as a result, prospecting has been begun on the east and west ends of the district, where much good ground is yet undeveloped.

MOOSELAND GOLD DISTRICT.—One week was occupied in surveying and plotting this district and a plan on the scale of 200 feet to an inch is in progress. All the leads worked occur on the south leg of a very sharp fold, dipping 75 degrees on both the south and north sides, the axis of which runs from the centre of a dome east, magnetic, and N. 81 degrees W. (*mag.*), and has a pitch of 10 degrees to the east and 5 degrees to the west.

Several lines of faulting have caused important displacements at the east end of the district. The westernmost of these runs S. 35 degrees E. (*mag.*) along the edge of a flat on the west side of the Tangier River and gives a horizontal displacement of 560 feet to the north on the east side, the anticline situated 48 feet north of the Irving lead being the same as that immediately south of the Bismarck lead.

On the east side of the Tangier River, another main fault, running parallel with the first, passes through the west Otter Pond and follows its brook to the south, while northward it follows the river along Grassy Lake. The Bismarck lead anticline is shoved 1,500 feet to the north on the east side of this fault, to a ridge 150 feet north of the west Otter Pond, and 50 or 100 feet north of the Brown lead opened here. The pitch of the anticline, which is to the east on the Bismarck lead, is changed to the west on the east side of the fault where the veins will curve westward around the fold. Small faults exist no doubt between this fault and the Bismarck lead, and one was located at the east end of the workings on this lead, but a great thickness of drift east of the river prevents the determination of the others.

The location of the anticline to the east of these faults opens up an important new field for the prospector; and the block of country situated between the two main faults and lying to the south of the Bismarck lead anticline, is certainly very valuable, as it contains the continuation of the Irving and other rich leads worked years ago on the old Musgrave property.

The very large belt of four veins, giving fifteen feet of quartz in the space of 35 feet, and exposed for 1,850 feet along the apex of the anticline north of the Irving lead, contains some sulphides and it should be properly tested for gold by means of perpendicular shafts along the eastern pitch of the apex. The same may be said of the continuation of this belt on and under the Bismarck lead fold, the latter lead having been found quite rich on the eastern pitch of the apex where it reaches the thickness of fourteen feet.

LECKIE ET AL V. STUART AND HARDMAN.—A suit brought by Major R. G. Leckie and associates against George W. Stuart, Truro, for the recovery of \$10,000 paid on the purchase of a mining property in Goldenville district of Sherbrooke, N.S.,

was determined at Halifax this month by Mr. Justice Townshend, and decision was given in all points in favor of the defendants.

The purchase price was \$50,000 with \$20,000 preferred stock. Mr. Leckie and his associates, who were Graham Fraser, Hon. William Stairs, John F. Stairs, Hon. Senator McKeen, Thomas E. Kenny, Wiley Smith, Michael Dwyer and others of Halifax, alleged that a certain belt, known as the "Mayflower" belt, one of the numerous belts on the property for which the purchase money was paid, had been misrepresented in the report of Mr. John E. Hardman of Montreal, who is also directly interested in the property. The defendants had the mine re-pumped and examined by E. R. Faribault, of the Geological Survey; William Blackmore, general manager of the Crow's Nest Pass Coal Company; C. W. Pye, C. E., Sherbrooke; William McIntosh, manager of the Modstock Gold Mining Co., Forest Hill; Rory McDonald, late manager of the North Star Gold Mining Co., Isaac's Harbor; George A. Hirschfeld, mine operator, Sherbrooke; C. F. Cox, manager of the Richardson Gold Mine at Isaac's Harbor, and others.

The facts brought out by the examination of these witnesses at the trial, were that the "Mayflower" belt was forty feet wide, averaging two-thirds of crushing material instead of being but twenty feet wide and averaging fifty to sixty per cent. of quartz, as set forth by Mr. Hardman, upon whose report the purchase was made and the \$10,000 paid on account. The result of Mr. Justice Townshend's judgment is that the defendants may, if they choose, compel the plaintiffs to complete the purchase and recover additional damages if they desire. This, we are now informed, Stuart and Hardman will not do, as the facts above referred to have proved the property to be of much greater value than they believed it to be at the time of sale to the plaintiffs.

Just a few weeks previous to the sale of this aggregation of 97 areas to the plaintiffs, Stuart and Hardman leased two areas only to Mr. George A. Hirschfeld, of Goldenville, and the sale was made subject to this lease. This fortunate tributor has continued to work the two leased areas, with a very small and primitive plant, yet has succeeded in taking out \$26,000 worth of gold at a handsome profit. His last ten days crushing gave a brick containing 127 ounces, a yield of nearly an ounce to the ton, out of a belt giving four feet of crushing material. Some idea of the value of the property over which this litigation has been held may be obtained from these results.

DUFFERIN MINE.—Our correspondent writes: I may say that I visited the Dufferin and find that Mr. Bernard McDonald, M. E., has about completed the installation of a large and well arranged hoisting, drilling and pumping plant, and has commenced the sinking of new shafts preparatory to working the mine on modern principles. A new 60 stamp mill will be built close to the mine, and the old water mill abandoned. The water power will probably be used only for pumping purposes. Mr. McDonald very properly deprecates the manner in which work has previously been done at this mine. He could not well do otherwise.

Mr. George McNaughton, manager of the New Egerton at Fifteen Mile Stream, has about completed the large new cable hoist. Hereafter this large and profitable mine will be worked by open cut 125 feet wide. The present 30-stamp mill will be increased by 20 more stamps.

The Richardson mine, of Isaacs Harbour, keeps up its steady yield of 250 ozs. per month from its 40 stamps. The management contemplate putting in 20 more stamps. They have just installed a Wilfley concentrator, which will be followed by others if results are as satisfactory as expected. Recent analyses of the concentrates seem to indicate a loss in the past of 40 per cent. of the gold contained in the ore.

Under the management of Mr. Arthur McNaughton, the New Glasgow Co's mine at Goldenville is again producing handsome profits for its owners. Mr. McNaughton supersedes James A. Fraser in the management of this mine, and at the same time retains also the management of the Blue Nose, which is producing largely. Its net profits average over \$2,000 monthly.

Geo. A. Hirschfeld, on areas 747 and 748 of the Stuart-Hardman block, at Goldenville, has in the past 13 months produced 1355 ozs. of gold at a handsome profit. This property embraces 97 areas in the heart of the district.

British Columbia.

A recently issued statement of the finances of the Cariboo Mining, Milling and Smelting Co. (under date of 1st May), shows dividends to date amounting to \$188,964.76.

The Big Valley Creek Gold Mines (Ltd.) is to be reconstructed.

The Consolidated Cariboo Hydraulic Co's mine at Quesnelle Forks, produced gold in 1897 to the value of \$138,520. For the years 1894, '95 and '96 the quantity produced was of a value of \$194,052. The directors will this year increase the water supply by constructing the Moorhead ditch to connect with the present system at an estimated cost of \$125,000. When the Moorhead system is completed it is estimated that it will afford 127 days' water of 2,000 miner's inches for 24 hours, in addition to the present supply obtained from Polleys and Boot-Jack lakes, and streams subsidiary to main canal, making the total water supply sufficient to operate the mines 250 days of 24 hours during the season.

The Dardanelles is temporarily closed down to allow repairs to the compressor and permit special steps to be taken to pump out the water which has lately dammed the pumps. When these steps have been taken successfully it is hoped to work a fine showing of ore in the lower levels of the mine.

At the Le Roi drifting has been resumed in the 700-foot level. The company is installing a new dynamo, which will have a capacity of 300 lights, for use in the workings on the surface. A number of arc lights will be installed to facilitate work out of doors.

The War Eagle shipments average about 100 tons daily. Underground a chamber is under way at the 625-foot level in the shaft, and a cross-cut back to the ledge has been commenced. There has been no marked change in the ore bodies. The employees now number 130. The company is now installing a new assay office, which will be ready for operation very soon. Notwithstanding the heavy expense which the War Eagle is undergoing in the improvements at the War Eagle mine, it expects to resume work soon on the Crown Point, and tenders are being received for the sinking of a 75-foot shaft from the main tunnel level on the ledge in line with the upper shaft. The company expects to install a hoist and proceed with power to sink indefinitely.

The War Eagle Mining and Development Company of Rosland, B. C., have closed a contract for electrical machinery to operate the new plant which they are installing at their mine. The plant in question will consist of a 40 drill Ingersoll-Sergent air compressor, and a double drum mining hoist, both to be supplied by the James Cooper Mfg. Company, Montreal. The shaft will be double compartment, and the hoist will have a capacity sufficient to handle two loaded skips, to be raised from a depth of ultimately 2,700 feet, at the rate of 1,000 feet per minute. This will be the severest duty so far undertaken by any electrical mining hoist in the world. The electrical machinery is to be supplied entirely by the Canadian General Electric Company. The compressor motor will consist of a 300 kilowatt three phase synchronous motor, operating at 200 revolutions per minute, and operating the compressor fly-wheel directly by a rope drive without intermediate shafting. The hoist will be operated by a 300 H. P. induction motor, capable of operating up to 600 H. P., operating in synchronism at 300 revolutions per minute, and handled by a regulator similar in style to the street railway controller. By use of a large external resistance any desired variation in speed may be obtained up to synchronism. The operation of an alternating hoisting motor of this capacity is a very nice engineering problem. Power to operate this machinery will be obtained from the three phase circuit of the West Kootenay Power Company. In connection with the latter it may be mentioned that the two large 1,000 H. P. revolving field generators supplied by the Canadian General Electric Company are now in position. The line, with step-up and step-down transformers, is completed, and the plant is expected to commence operations within the next two or three weeks.

The British Columbia Bullion Extracting Company of Rosland, B. C., have ordered from the Canadian General Electric Company, a 100 H. P. three phase synchronous motor, and a 50 H. P. three phase induction motor, to operate their works.

The following amounts have been paid by the leading dividend mines of British Columbia:—*Slocan District*—Idaho, \$240,000; Whitewater, \$194,000; Reco, \$287,000; Rambler-Cariboo, \$40,000; Slocan Star, \$400,000; Last Chance, \$40,000; Two Friends, \$6,000; Ruth Mines (Ltd.), \$75,000. *Trail Creek District*—Le Roi, \$825,000; War Eagle (old company), \$217,000. *Nelson District*—Fern Mines, \$10,000; Hall Mines (preferred), £1,750; Hall Mines (ordinary), £25,000. *Yale District*—Cariboo, \$189,000.

The ore shipments from Rosland mines from January 1st to May 1st aggregate 28,000 tons, valued at about \$1,250,000. The shipments from January 1st, 1897, to the same date, May 10th, amount to 101,000 tons.

At the colliery of the Crow's Nest Pass Co. at Coal Creek there are at present 44 men employed, and a number of commodious log buildings have been erected for their use. They are now in about 1,000 feet on the seam, and have made considerable progress in "rooming" the coal. From forty to fifty tons a day are being taken out, and there are already 2,000 tons on the bank. The work being carried on now, however, is principally for development purposes, so that when the time comes as large a force of miners as may be necessary may be employed to meet the demands of the market. By the time the railroad is finished through to Kootenay lake the mine will be in shape easily to produce from 200 to 300 tons per day.

The winze on the Iron Mask, near Rosland, has reached the 105-foot level below the main tunnel, which is equivalent to a depth from the surface of 305 feet, the deepest workings yet opened on the property. About two feet of excellent shipping ore has been disclosed in the winze. In the west drift on the main tunnel level a raise is under way to open ground for stoping. The raise is disclosing some good ore.

W. H. Aldridge, in charge of the Trail smelting works, is enlarging and re-equipping the plant.

The Lillooet Fraser River and Cariboo Gold Fields will resume work on an extensive scale on its City of Spokane property in a few days.

NELSON NOTES.

It is still too early for the prospectors to go far from the towns, as a rather late spring causes enough snow to remain on the hills to make any exploration useless, but a continuation of the fine warm days that we have been favored with lately will make a vast difference in that respect. Consequently the only points to which attention can be turned are those claims which have been worked for some time past, more especially during the past winter; and it is most satisfactory to observe that in all cases so far reported the prospects of the various properties have remarkably improved on development.

This seems to be the case not only in the immediate neighborhood of Nelson, but also in the tributary districts, more especially perhaps the Ymir camp which still shows up particularly well, the directors of the Ymir mine being about to erect a stamp mill on their property. It is stated, indeed, that a 40 stamp mill is contemplated.

On the Dundee mine it is intended as soon as the weather permits (which in this district means when the snow is off the ground,) to build a 1,600 foot tramway and a concentrator. This company seems at any rate to be backed with plenty of capital, and to be developing their property steadily; let us hope the success they deserve will be their reward. A recent report from that mine was to the effect that a four ft. vein of shipping ore had been struck in the 250 ft. level, which augurs well for the permanence of the ore body.

At the Tamarac mine in the same district, it is proposed to erect a 50 stamp mill very shortly, so the managers must feel assured they have something good in front of them.

It is, of course, a matter of opinion as to how long the ore will remain free milling, but there can be no doubt that while at the surface and for a comparatively few feet down it may be amenable to stamps and plates, yet before long it certainly will not be so, but will show up in its true character of "base ore." It certainly seems to me to be a serious question as to the advisability of erecting a very large stamp mill for these properties, which after a year or so may be no longer of any use, unless it be to crush the ore for concentration.

In the Salmon river district not far from Ymir, a report comes that a three foot vein of ore has been struck on the Flossie R which carries \$21 in gold, and this at only five feet from the surface. No doubt the camp is a good one if all reports are not strictly true.

In rather a different direction, on Kootenay Lake, near Goat River, some good galena ore has been discovered at Kuskanook which is said to have yielded at the smelter about 100 ounces of silver and 10 per cent. lead; and also in the same neighborhood petroleum has been found, though what the quality and quantity may be is so far uncertain. This is a district which will be enormously improved by the Crow's Nest Railway, and it is altogether probable that a very extensive and hitherto almost untouched mineral country will be opened up, most likely with very profitable results.

Kuskanook is at present the landing place for supplies to the Crow's Nest line, and may be considered a gateway into East Kootenay generally, which has been kept back very much for lack of transportation facilities; but as an indication of the faith mining men have in the country, it is stated on good authority that there are 100 locations on the north fork of St. Mary's River, and over 200 locations on Wild Horse Creek, (alas for the endless repetitions of the same name for creeks 100 miles and more apart!) which show Galena, Grey Copper, and in some cases free milling gold quartz. No doubt we shall hear a great deal from East Kootenay this summer.

At Boundary Creek—south and west of Nelson—things are very promising, and if, as is expected, D. C. Corbin's railway will pass through that district it will be an immense advantage. It is altogether probable, as it is mainly a copper camp, that a smelter will be erected there—water and timber being abundant, and the railway practically ensuring cheap fuel.

To return now a little nearer home.—The Hall Mines Smelter has been steadily working, and a short but most successful trial run was made with the lead furnace in addition to the copper plant. If only certain alterations could be made in the duty charged in the States upon lead, the smelting of that metal should be a very profitable operation; but as it is it seems really cheaper to ship the ore to smelters on the other side of the line than to smelt it at home.

The well known Athabasca group on Toad Mountain has passed—or is on the point of passing—into the hands of a strong English syndicate who will find working capital in ample quantity, and will erect all necessary hoisting and mining machinery. This group of claims holds its own very well, and appears to be run on common sense principles; it will probably turn out very well for its owners.

The Fern is still alive and very well, a clean up was made towards the end of March which the directors think most satisfactory, though at the time of writing details are not at hand. The Cyanide plant is being actively proceeded with, development work is being steadily carried on, and the whole property is improving. About 30 tons of quartz is crushed daily, and all looks exceedingly healthy.

The Delight group is also being developed, and samples of the ore recently brought down show increasing values. In the same neighborhood, the Summit claim is also being steadily worked, some 100 feet of tunnelling having been driven, and Galena with copper found; but hardly enough has been done yet to say what it will eventually prove to be—it is in a good place near the Silver King, and will very likely be all right.

A. H. HOLDICH.

Ontario.

The mill of the Canadian Gold Fields at Deloro, was burnt down this month. Fire started from the drying machines. Nothing was saved from the laboratory. The about 30 men are thrown out of work. The loss is estimated at \$75,000.

Owing to the work done by J. Burley Smith in Bald Indian Bay, 1895-6, and the results and information obtained relative to the course, width and value, of the veins running under the waters of the bay, diamond drilling has become an important feature in prospecting on the Lake of the Woods. There are at present five drills in use in the district, not including the Provincial Government plant, which is at the disposal of miners for half the cost of operation, the Government bearing the other half. The machines in use are of the following makes:—Bullock (2), Sullivan (2), American Rock Drill (1). The Government machine is of the Sullivan make. There has been about 7,000 feet of drilling done in the district during the past two years. The drills make from 5 to 15 feet per day of 24 hours, according to the country in which they are working, and the cost averages about \$3 per foot. Much important information has been obtained from the work done, more particularly, the finding of the Sultana vein, by Mr. Smith, under Bald Indian Bay, which led to the sinking of the large coffer dam at a cost of about \$20,000, and the lawsuit still pending between the Burley Gold Mining Company and J. F. Caldwell.

The shaft at the Crystal mine, Lake Waohnapitac, is now down to depth of over 160 feet, and the value of the vein is reported to be improving.

At the Mikado, on Shoal Lake, about 100 men have been employed steadily throughout the winter, and the 20-stamp mill has been kept constantly busy, making a monthly return of from \$15,000 to \$20,000. At present the returns are about \$1,000 per day, the mill running on rich ore taken from No. 1 shaft. The diamond drill has been at work through the ice and the main vein is reported to have been located under the lake, where its value and width are the same as in the shafts.

The old 10-stamp battery at the Regina, erected in 1895, is being replaced by 20 new stamps installed by the Gates Iron Works of Chicago. The main shaft is down about 400 feet and six levels of about 150 feet each have been run at various depths. At present the ore, of which there is about 30,000 tons in sight, is running 10 dwts. in gold per ton. The mine has gone steadily ahead since Mr. Pringle took charge about a year ago.

At the Sultana, the 30-stamp mill has been running steadily all winter, although no public reports are given regarding the returns. The main shaft is down about 500 feet and the mine employs about 100 men.

The Cordova Exploration Company, Limited, a wealthy English syndicate, is pushing forward the development of the Belmont gold mine, under the management of Mr. D. K. Kerr.

In the Rainy River district, work has continued on the Randolph, Foley, Olive and other properties, and the Ferguson mine is being re-opened. Gold has been shipped in small quantities from these properties during the winter and arrangements are being made to erect mills and mining machinery at a number of points.

The outlook for the whole district is promising, although there is not the demand for property that existed last year. Now that the idea that a free gold specimen constitutes a mine is being dissipated it is probable that much less money will be wasted than in the past. It has been well established that gold exists in paying quantities in the district, but considerable working capital is required to place the property on a paying basis.

The first part of the seventh volume of the Reports of the Bureau of Mines, covering the calendar year 1897, shows a total mineral production in Ontario of a value of \$3,899,821, an increase of \$105,818 over the previous year. The following table is given to show the number of mining locations sold during the year by districts with their area and the amount paid into the Treasury as purchase money:

DISTRICT.	No. of Sales.	Acres.	\$
Rainy River	440	26,739	53,985
Thunder Bay	9	917	2,160
Algoma	5	448½	747
Elsewhere.	16	1,690	2,586
	472	29,794½	59,478

In addition to the above 86,014½ acres were leased, yielding \$84,821.

The business of the Bureau will be best appreciated when it is compared with the total transactions for the five preceding years as shown by the following table:

	1892-6.	1897.
No of sales.	407	472
Acres	32,294½	29,794½
Price paid.	\$72,360	\$59,477.71
No of leases.	619	783
Acres	61,527¼	86,014½
Rent paid.	\$59,158.68	\$84,821.35
Rent of land previously leased.	15,440.30	6,241.11

Quebec.

The Coleraine Mining Company is negotiating for the construction of a concentrating plant to be erected on its chromite property, near Black Lake.

The demand for mica continues good, and steadily increasing sales of Canadian are reported to Great Britain and Germany. The bulk of the product, however, still goes to the United States.

The silver lead deposits, near Bryson, are being vigorously opened up by the Grand Calumet Island Mining Company. The main shaft is now down 125 feet. An important shipment was made this month to Antwerp.

The Bell's Asbestos Company reports a dividend for 1897 of four per cent., and carries forward to reserve account £2,339 13s. 5d. In 1896 a dividend of five per cent. was paid. The result of the year's operations was a net profit of £5,171 13s. 2d., to which was added the amount brought forward £1,968 03s., leaving for appropriation £7,139 13s. 5d.

Mr. R. Chalmers (Summary Report Geological Survey, 1897) says: "Gold mining operations in the Chaudiere Valley, and in the 'Eastern Townships' generally, have been somewhat restricted during the past season, owing to causes unrec-

essary to relate. In the first-mentioned district an advance has, however, been made and new methods of operating the alluvial mines there have been inaugurated. Two new companies have been formed—one called the Gilbert-Beauce Mining Company, whose object is to re-open and work the gold mines of the Gilbert River Valley; another, known as the Central Quebec Gold Fields Company, to explore the gravels of Riviere du Loup Valley. To carry on the work more advantageously in the Gilbert Valley, a scheme of draining the mines by an open cut or trench has been adopted, the slope of the valley being sufficient to allow this to be done, an opening of twenty or thirty feet in depth affording an outlet to the drainage of that portion of the old pre-glacial channel above lot 15, DeLery. At the time of my last visit (November 4) this open cut or trench had been carried up stream to a point where it was from sixteen to eighteen feet below the surface and tunnelling was in progress. The bottom of the pre-glacial river-channel, it was expected, would be reached at a depth of twenty feet, when sluicing for gold would commence. If this scheme is successful the whole of the Gilbert Rivier Valley above the point mentioned can be drained into this trench by gravitation.

“On Marie Creek, a branch of Mill River, Mr Coupal has been washing for gold during the whole season, and is reported to have been meeting with fair success.

“The Central Quebec Gold Fields Company, organized to work the auriferous gravels of Riviere du Loup, with Mr. Louis Gendreau, of Jersey Mills, as manager, has sunk several shafts some two or three miles above the mouth of the river to a depth of sixty feet, reaching the pre-glacial gravels. Water came in so rapidly, however, that work had to be suspended until pumps were put down. Mr. Gendreau informs me that he found gold in the gravels near these shafts, and nuggets of an ounce weight or more.

Methods of Dealings with the Water.

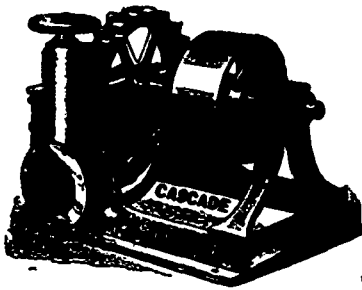
If the quantity met with does not exceed ten 200 gall. bowks per hour, and there is only one winding rope in the pit, it will probably be best to wind the water with the sinking engine.

Should the quantity met with exceed this, it will be more economical in such a case to sling a small high pressure pump, with a cast-steel snore, protected by 3 in. deal lagging secured with iron clam, the steam, exhaust, and delivery pipes all being coupled to the hanging ropes (which will probably be old winding ropes) by iron stretchers and staples every 9 feet or so. The snore-piece will be telescopic, and capable of being drawn out 6 feet to 9 feet, and the steam pipes should be arranged with a stuffing box at the pit top to allow them to slide freely.

These ropes will be raised and lowered by the common crab engine, the two drums being held by a ratchet and dog when put out of gear. If the steam cylinder be of a type that has no dead points, it can be driven by a lad from the surface simply by regulating the stop valve, and also lubricated. This is both economical in heavily watered shafts where several pumps are at work, and also a great safeguard. The sinkers in this case signal to increase or decrease the speed of the pump.

Should it not be advisable to tub this feeder back, it will after a time be necessary to add a second pump below this, suspended by a similar pair of ropes, on other drums, and similarly arranged.

The upper pump will then either be fixed on a platform in the shaft side, or, if the ground be so heavy that this is not feasible, hung on two ropes attached to balks at the surface. The lower pumps will deliver into a cistern fixed in the shaft side, from which the upper pumps will draw, or, should permanent pumps be afterwards required, it may be possible to put in and utilise a permanent water-hold.



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THE HALL MINES LIMITED

Holdes of share warrants in the above Company are hereby notified that the Directors have this day declared an Interim Dividend of one shilling per share (less Income Tax) on the Ordinary shares of the Company, payable on and after the 2nd May, 1898, and such dividend, in respect of shares for which share warrants are outstanding, will be paid at the Bank of British Columbia, 60 Lombard Street, London, E.C., and branches, against the Second Dividend Coupon attached to such warrants.

A. E. ASHLEY,
Secretary.

1 Leadenhall Street,
London, E.C., 21st April, 1898.

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If the shaft be a large one, and the Galloway scaffold utilised, a pair of guide ropes and a special water barrel may be employed to deal with a moderate feeder in place of pumps.

Such water barrel would be made of steel plates shaped to assist its entrance into the water, with a self-filling valve in the bottom and a self-emptying apparatus to discharge into a water box at top, on a projecting lever striking a piece of timber.

Quantities up to 3,000 to 4,000 galls. per hour can be dealt with in this way, but it is better suited for drawing from a cistern in the pit, into which shaft feeders up to 5,000 galls. per hour can be led, and into which the barrel is guided by two rope guides.

The best form of water barrel is doubtless the pneumatic. This consists of a cylindrical vessel of sheet iron, 4 feet or so in diameter, and 8 feet high, closed at the top, but with a door bolted to cover for access when necessary. The floor is 5 in. above the bottom of the cylinder, and consists of a 3/8-in. steel plate, with an 18-in. central opening. The valve consists of a block of cast iron having its lower face and vertical sides turned quite true, and with a sheet of leather tightly strained over it. A vertical spindle with turned ball at its lower end connected to the valve is held loosely in a guiding socket, and the valve seat is also turned.

A glass gauge shows the height of the water in the barrel, to which one half of an instantaneous coupling is attached.

An ordinary air-pump condenser is placed at the surface, and 3-in. pipes brought down the shaft and connected to 30 feet of flexible hose furnished with a stopcock, and to the end of which the other half of an instantaneous coupling is attached. On the barrel reaching the bottom, the hose is quickly coupled up, the stopcock opened, the air within exhausted, and the barrel filled with water and the stopcock closed, and the hose uncoupled. It is discharged at the top by the barrel being lowered into a water box and the valve spindle forced up. It can be either filled or discharged in 30 seconds, and the winding, &c., takes 1 1/2 to 2 minutes. With 5,000 galls. per hour in the pit bottom a shaft was sunk by this means at the rate of 5 or 5 1/2 yds. a week.

It should be added that rope guides are essential in the last two cases, and that these should be supplemented at surface by wooden steadying guides, to prevent the barrel kicking back when discharging.

The older method generally adopted in the North of England, when heavy feeders are met, and which will ultimately either be tubbed back or permanently pumped, is to put down one or more pumping engines at top, of such a type that they can afterwards be used for winding or haulage engines. Gearing is introduced, and quadrants and heavy pitch pine spear rods brought down the pit. The pumps are hung by means of ground spears attached to 5 or 7 fold ground blocks, the ropes from which go to ground crabs. The ground spears are pitch-pine rods connected together by four long spear plates and bolts, and the bottom spear rods are attached to the pumps by iron collars or hoops. Two crab ropes might also be taken down the shaft and fastened to the bottom pair of ground spears, or attached to the iron collars or hoops passed round the pump.

(TO BE CONTINUED.)

CANADA, PROVINCE OF BRITISH COLUMBIA,

No. 3. **IN THE SUPREME COURT.**

IN THE MATTER OF

O. K. GOLD MINING CO.

Limited Liability (Foreign) in Liquidation.

The undersigned Official Liquidator will sell by Tender, subject to ratification by the Court,

The O.K. Mine and Buildings belonging to said Company; also the entire Mining and Milling Plant of said Company, situated on the south slope of O.K. Mountain in Trail Creek Mining Division, about 2 1/2 miles west of Rossland and close to main wagon road and Red Mountain Railway, leading from the City of Rossland, West Kootenay District, British Columbia, to Northport, Washington, distant about 15 miles. The claim is surveyed and Crown granted.

The ore was at first largely free milling. It was originally treated by a five stamp mill, which was superseded by the present 10 stamp mill.

The O.K. Mine has been worked since 1893, and has always been a producer. About 2,472 tons of ore from this mine were milled from January 19, 1897, to June 19, exclusive of several hundred tons of custom work for adjoining mines.

It is most favorably situated in all respects.

The new ten-stamp mill is thoroughly equipped for the economical handling of ore. It is connected with the mine by a 600-foot gravity surface tram way, with 20 wire rope carrying rollers, etc., complete, the elevation of the workings being 200 feet above the mill; one 3-wheel brake with 650 feet 3/4-inch steel wire rope; two self-dumping ore cars, 18-inch gauge.

The mill contains two 50 horse-power Standard tubular boilers, each containing 54 12-foot tubes; one 85 horse-power Corliss engine; one 10 stamp mill; one No. 6 Blake crusher; one grisly 4 x 10, 3 x 3/4 iron; two Challenge automatic feeders; one overhead crane, with iron track; one 1-ton Weston differential pulley block; one gold retort, with cover, wedges and condenser pipe; one Rand straight line Class C 12 x 18 air compressor, capable of running four drills; one 28" x 8 foot air receiver; one No. 7 Miller duplex pump; three 6-foot Fraser & Chalmers frue vanners; plain belts; one 4-core hydro-metric sizer; one Woodbury concentrator; one bumping table; and one Fraser & Chalmers ore sample grinder, etc.

BUILDINGS

The principal buildings are: The new mill building, containing 10-stamp mill, but designed and built to accommodate 25 stamps; engine and boiler house, office buildings, mess room, cook house and store room, manager's residence.

DEVELOPMENT WORK

Comprises three main tunnels, one winze and a number of drifts, a shaft 15 ft. deep, together aggregating over 1,500 ft., which is entirely confined to one corner of the property. Two-thirds of the property are as yet unprospected.

Tenders are now invited for the sale of the property as a whole, including new 10-stamp mill, the mine, four machine drills and all buildings connected therewith.

The undersigned reserves the right to accept or decline any tender, and to withdraw the property from sale at any time, and the further right to fix a reserve price upon the property, and to make such other conditions as may meet with the sanction of the Court.

The property is open for inspection, and intending purchasers will find it advantageous to make an application for this purpose to the undersigned, at No. 3 Imperial Block, Rossland, B.C., where an inventory can be seen and all further necessary information will be furnished.

Richard Plewman,
Official Liquidator.

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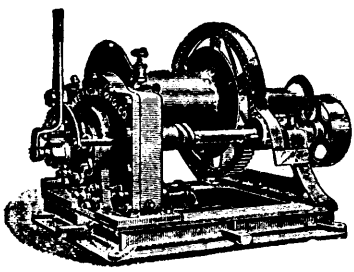
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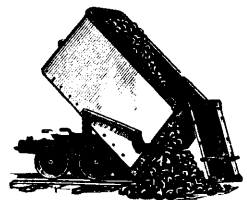
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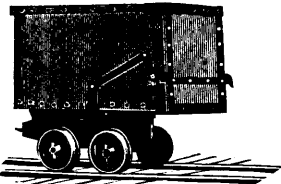
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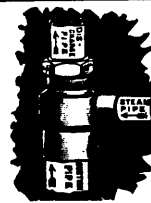
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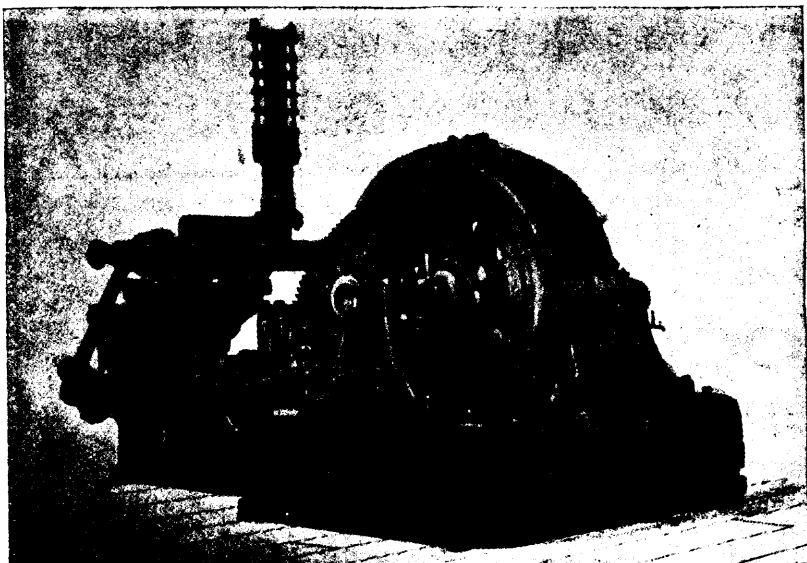
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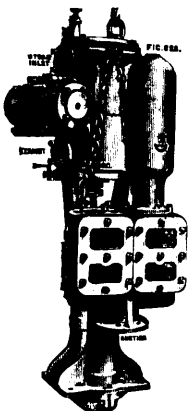


Fig. 620—"Griff"
Sinking Pump.

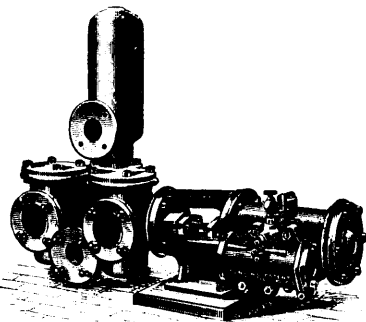


Fig. 598—"Cornish" Steam Pump
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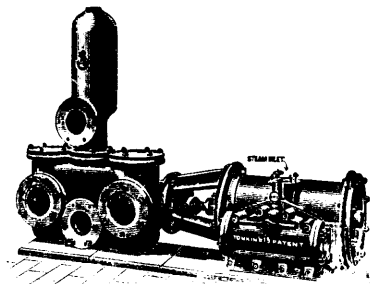


Fig. 600—"Cornish" Steam Pump
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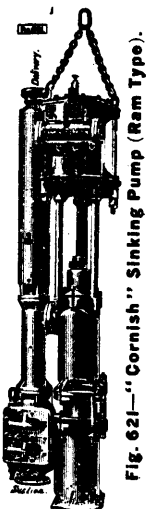


Fig. 621—"Cornish" Sinking Pump (Ram Type).

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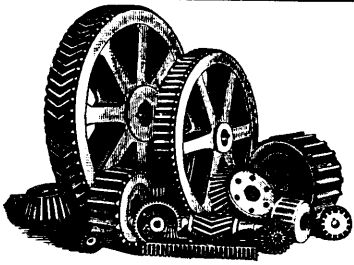
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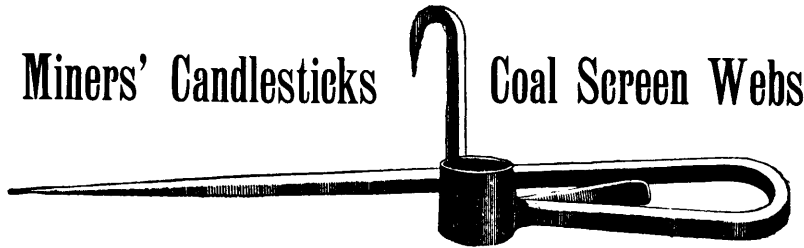
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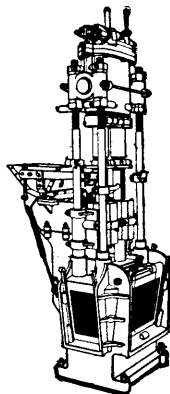
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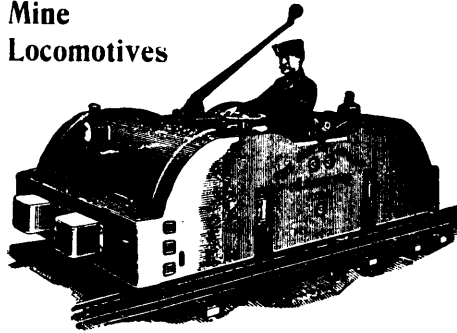
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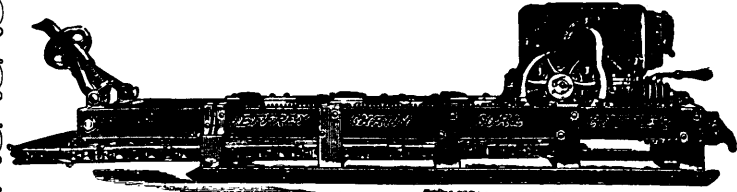
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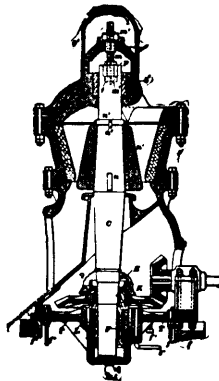
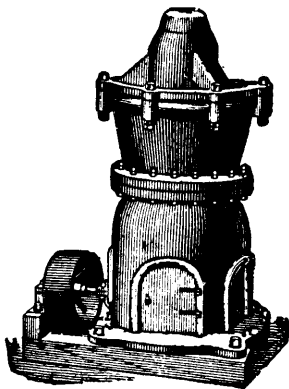
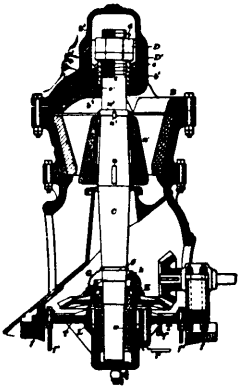
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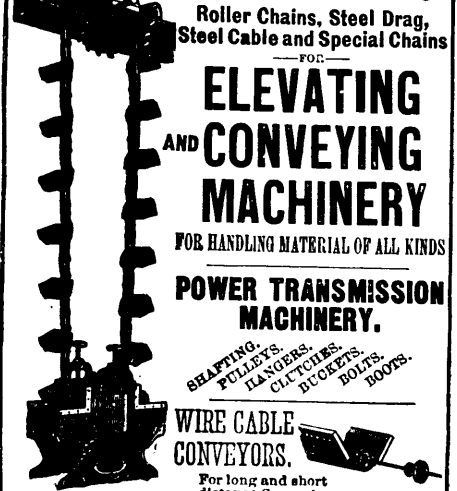
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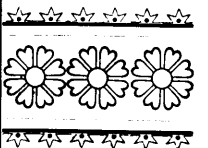
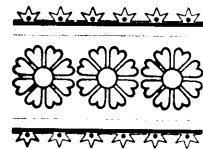
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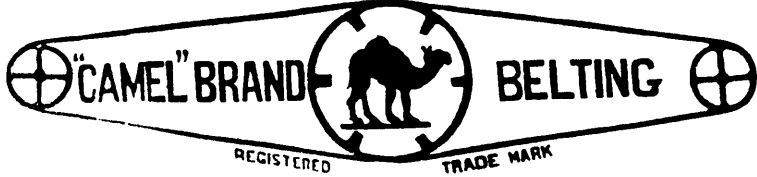
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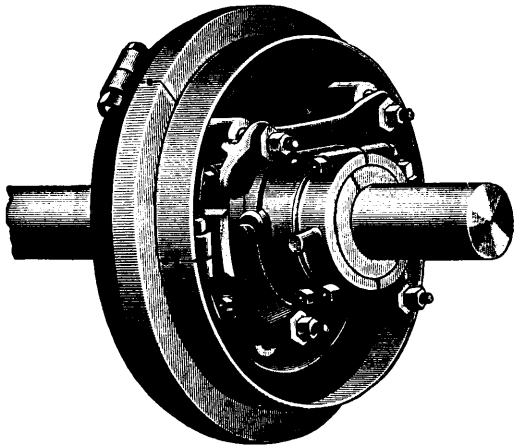
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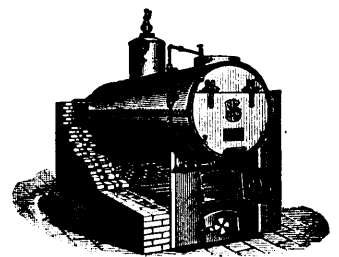
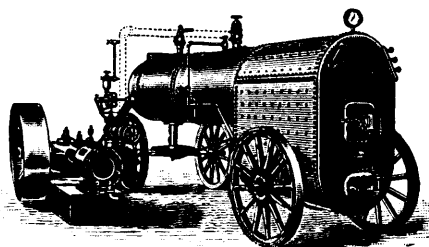
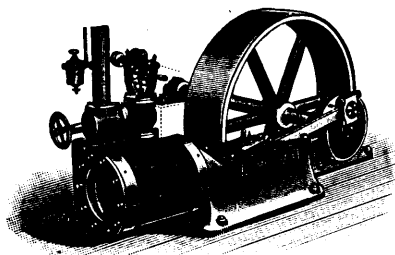
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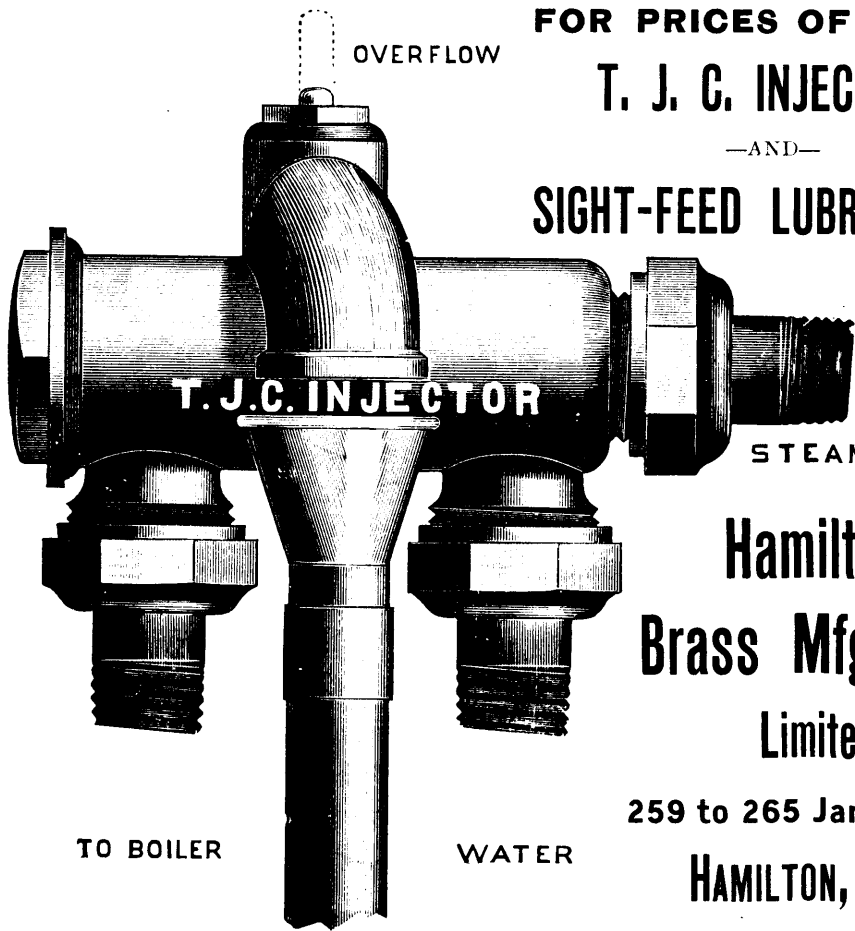


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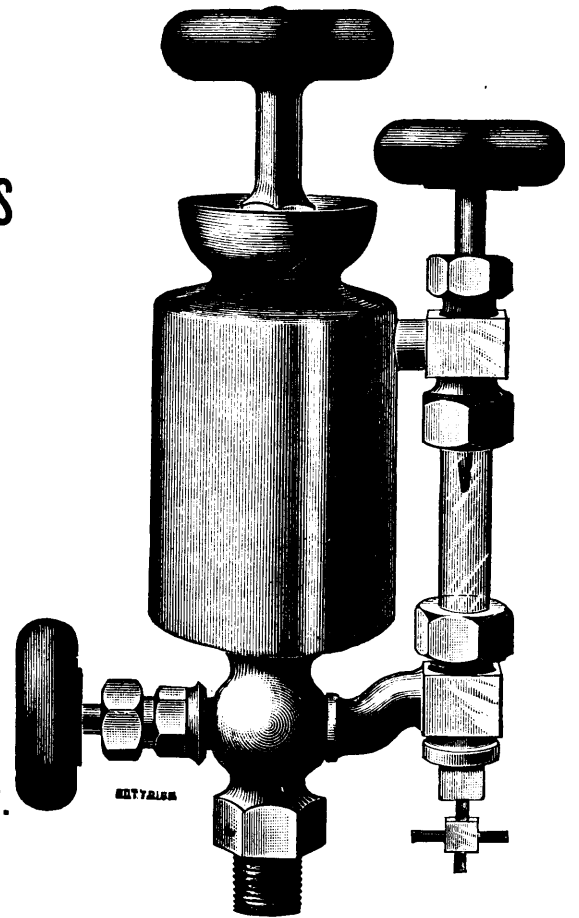
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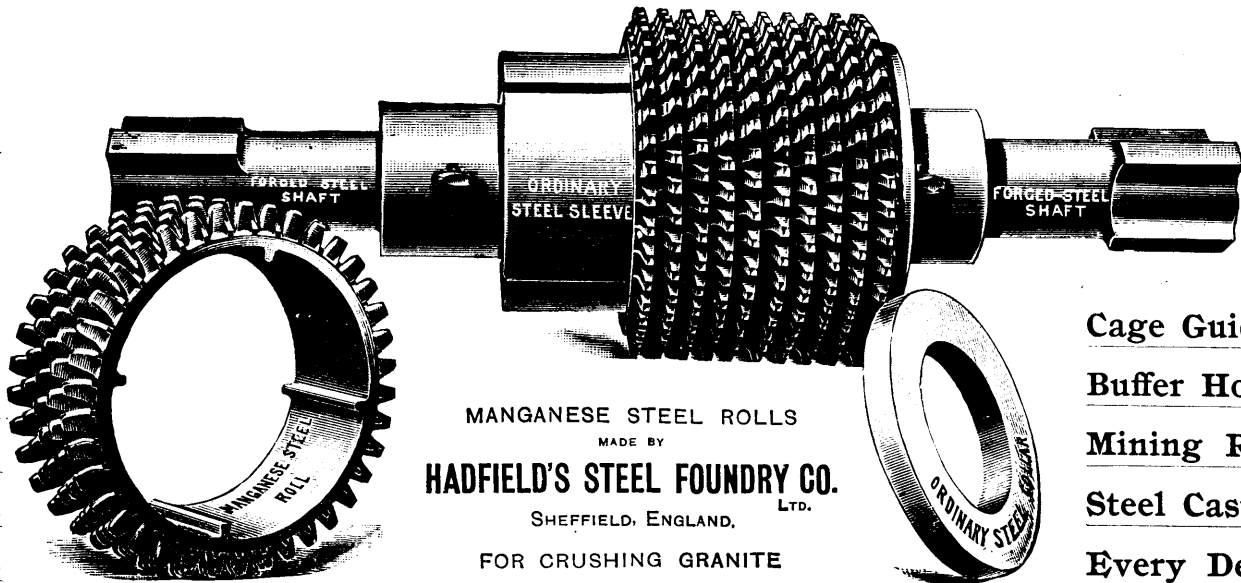


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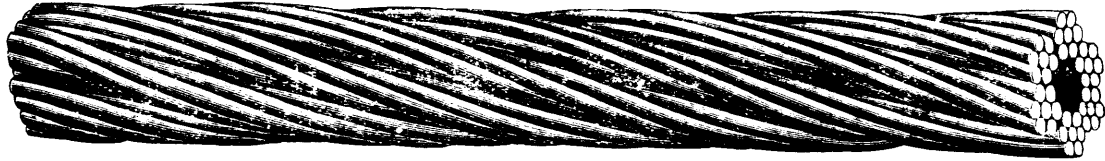
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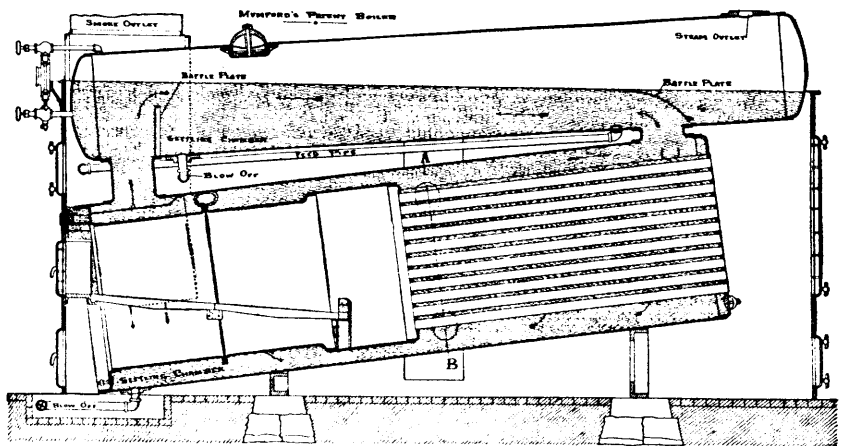
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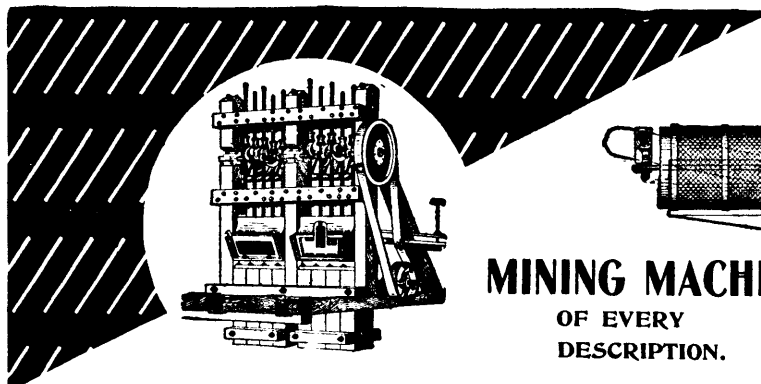
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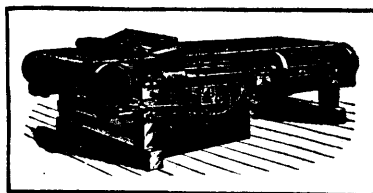
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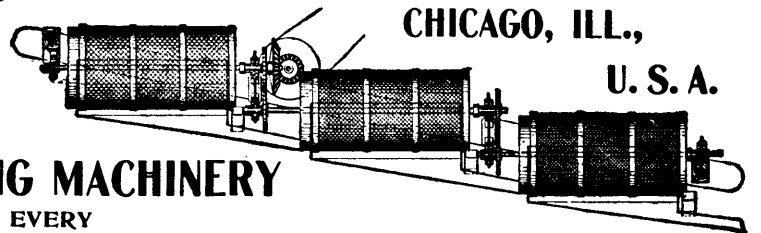


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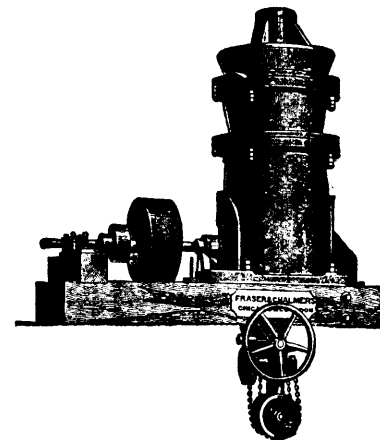


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