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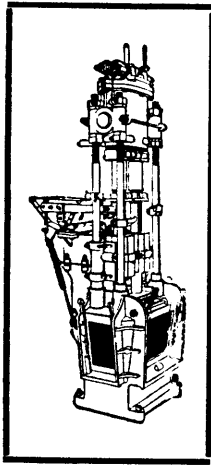
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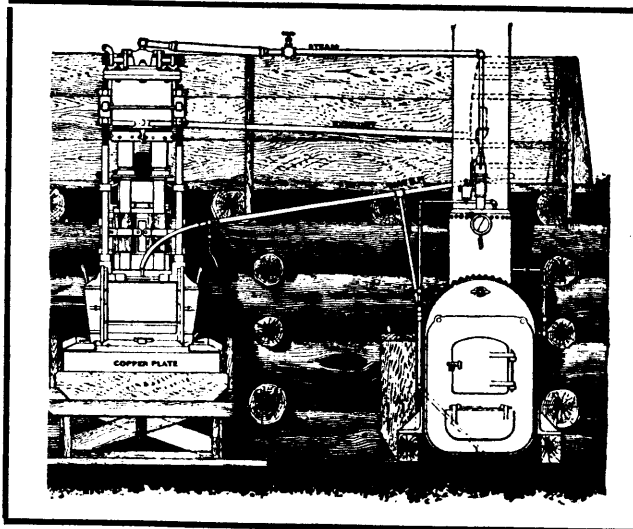
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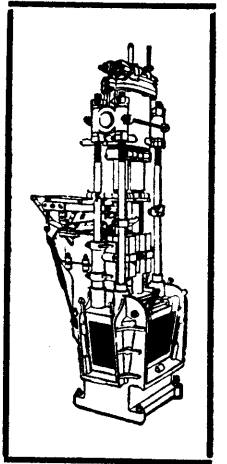
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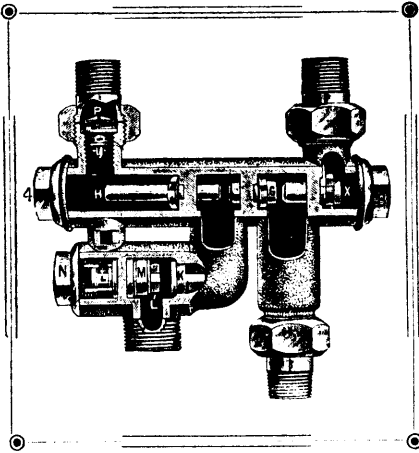
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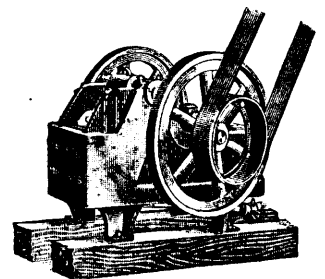
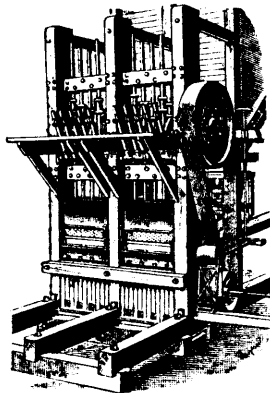
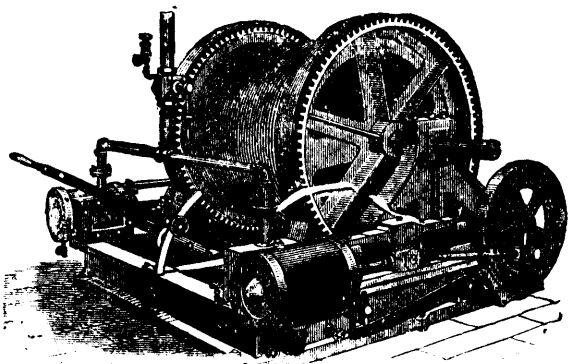
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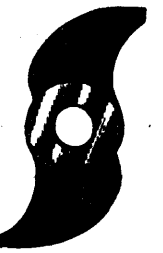
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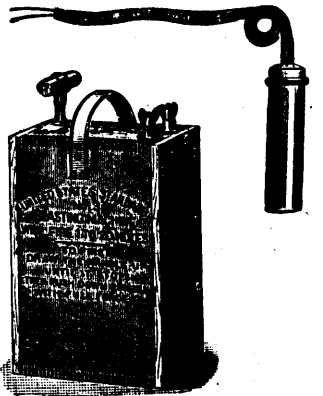
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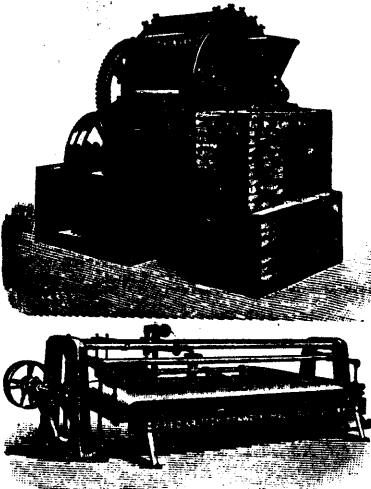
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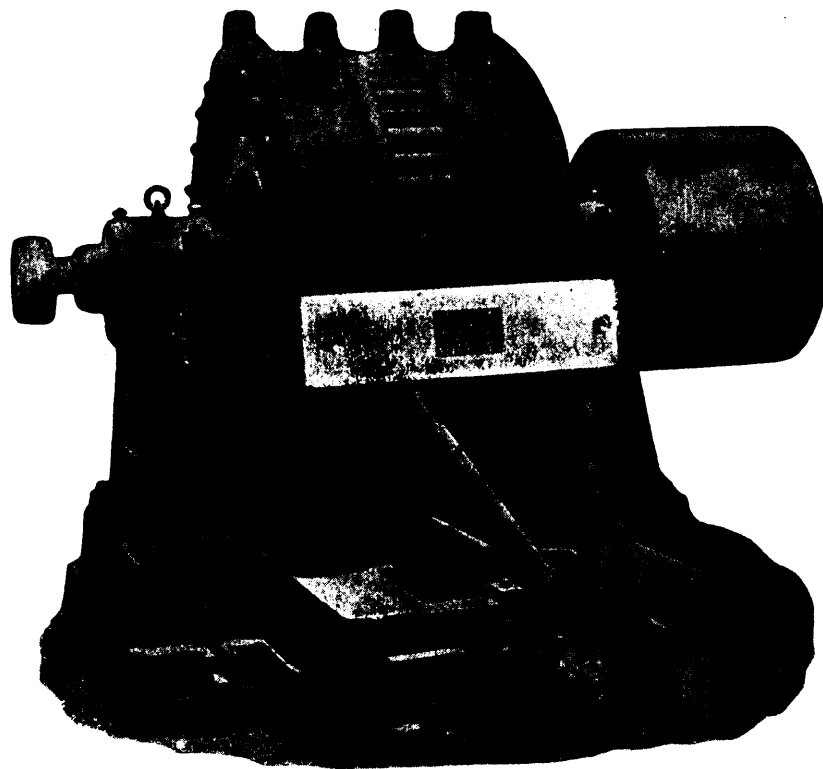
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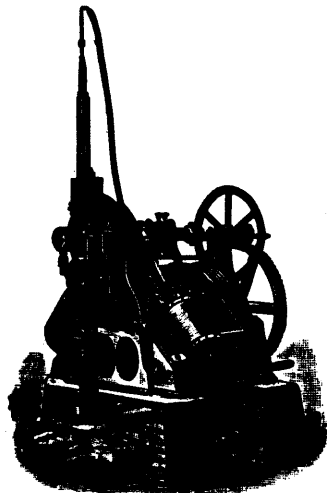
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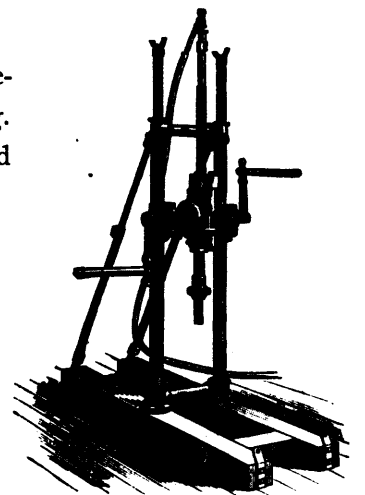
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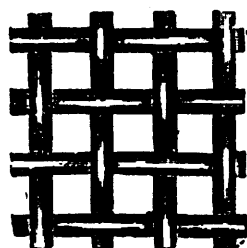
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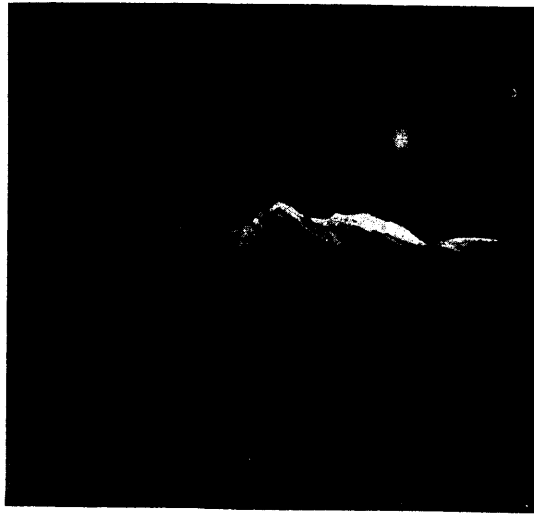
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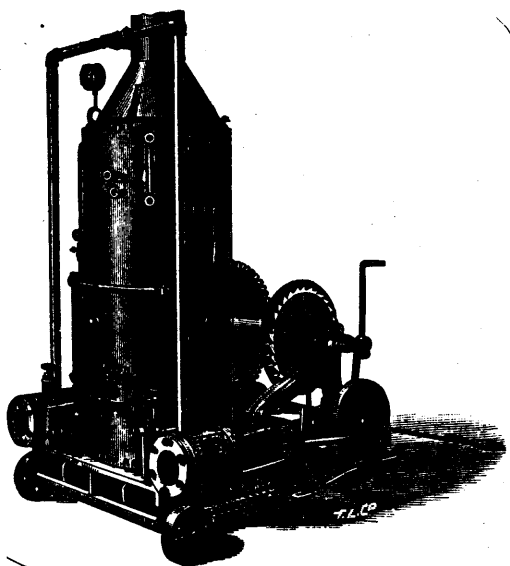
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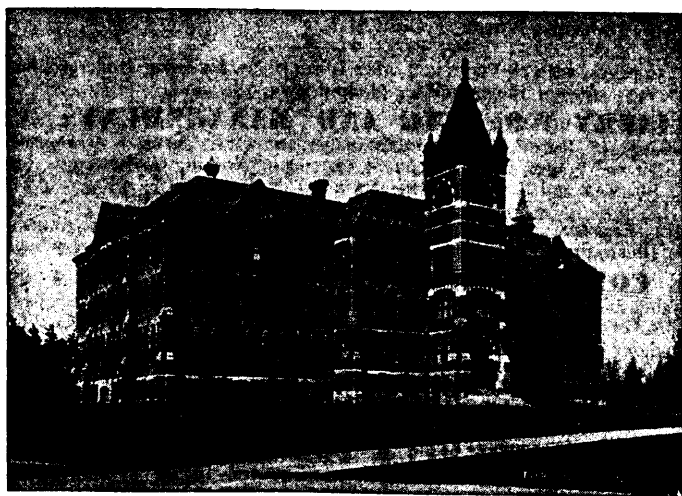
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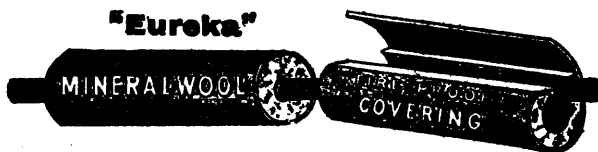
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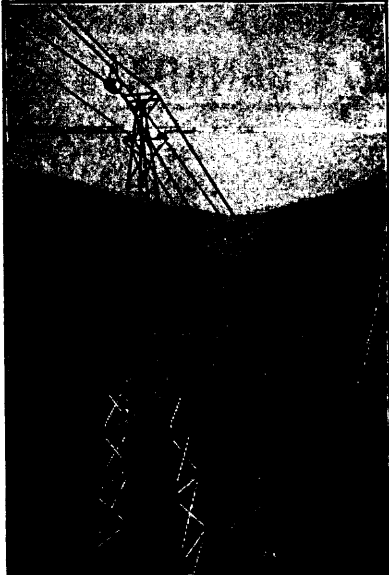
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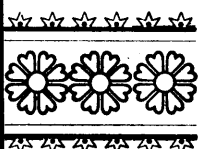
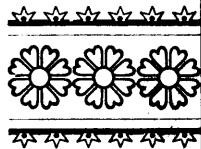
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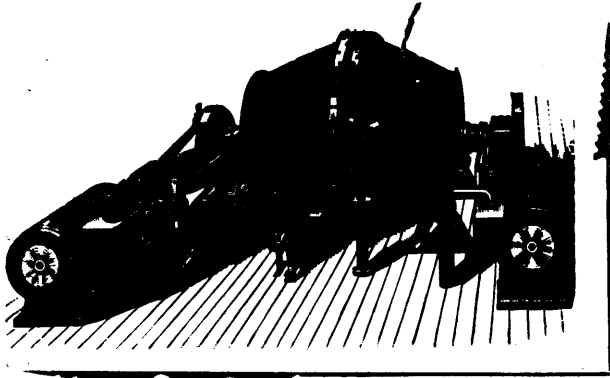
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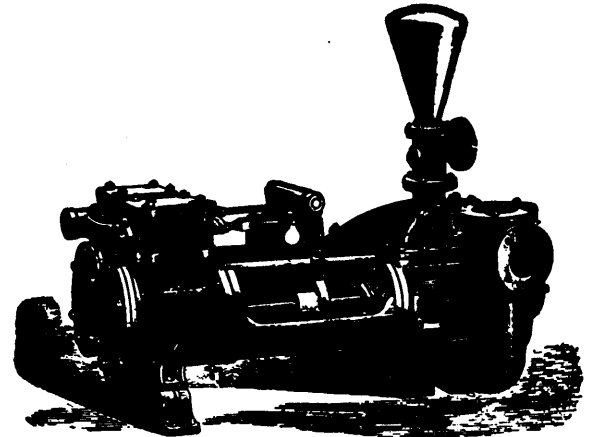


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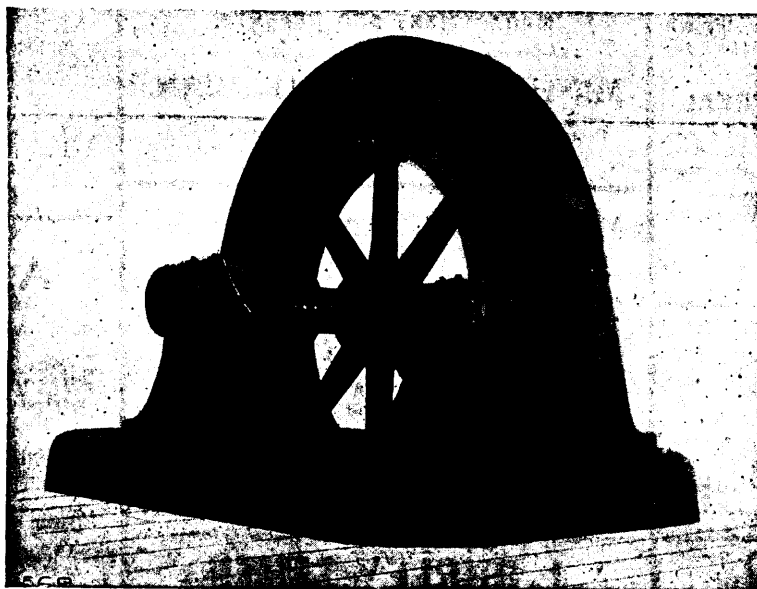
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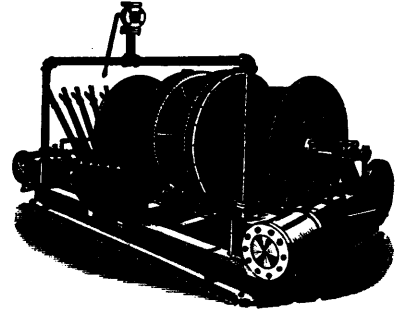
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The Canadian Mining Review

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.

Published Monthly.

OFFICES { Slater Building, Ottawa;
Metropole Building, Halifax;
Windsor Hotel, Montreal.

VOL. XVI., No. 12.

DECEMBER, 1897.

VOI. XVI., No. 12.

The Cape Breton Coal Trade.

In a chronicle for 1897 of the Cape Breton coal trade, must be described a season of active work, fully taxing the capacity of the mines, a steady progress in changes and improvements, aiming at economy in working and the turning out of better and cleaner coal, disappointments and heartburnings for the few, offset by bright future prospects for the many. In Cape Breton public interest in matters pertaining to coal centres, naturally, to a very large extent, in the Dominion Coal Co. This is so because its operations, as compared with other companies, are on so vast a scale, while its power and wide-reaching influence enables it to push its business to an extent and in directions not attempted by other and smaller concerns. The company has many and bitter calumniators with whom, when they deride its pretensions and predict its early collapse, the wish is no doubt father to the thought; but let hostile critics at home and abroad say what they like, the closing of the year finds it in a stronger and more encouraging position than it occupied twelve months ago. At the end of November the shipments, which have already overtopped the million, exceed the total reached at the close of the previous financial year, ending February 28th, 1897. It is not likely that the shipments from Louisburg during the next three months will be as good as they were last year, when the lower duty in the United States enabled the company to place quite a handsome quantity in New England, but the increase at the end of the twelve months will be a substantial one, and under the circumstances eminently satisfactory.

Twelve months ago not a few misgivings were felt as to the course of business in 1897. It was feared that, in the revision of the Canadian tariff by the Laurier government, the coal duty might be swept away. This fear was strengthened by the fact that the Premier and some of his lieutenants had promised such a change to their friends in Ontario and Quebec. But an attack on the coal industry of Nova Scotia was forestalled and headed off by the action of the Hon. George H. Murray (Mr. Fielding's successor in the premiership of the province), who made the retention of the coal duty one of the widest planks in the platform upon which he appealed, with such conspicuous success, to the electorate of Nova Scotia last spring. Whatever may have been the wishes and intentions of the Laurier cabinet, the attitude assumed by Mr. Murray rendered it impossible for them to meddle with the protection of Canadian coal from foreign competition.

Soon after the St. Lawrence had opened to navigation, it became evident that, in spite of tariff tinkering and a general feeling of uncertainty arising therefrom in manufacturing circles, the demand for coal in Montreal and other points on the St. Lawrence was to be a very

lively one. The previous winter had been favourable to a large and steady consumption of fuel, and before the St. Lawrence was open the Dominion Coal Co. had shipped several cargoes from Louisburg to Portland, for transmission to Montreal, to replace depleted stocks.

In addition to its own fleet of five steamers and two barges, the company had under time charter during the season twelve large steamers, six of which number belonged to the much discussed "Turret" type. Over and above these the company chartered some thirty steamers for single trips. The output available for shipment averaged over 5,000 tons per day, the bulk of which was shipped at the International pier, Sydney. This fine structure, which has already been fully described in this journal, proved fully able to cope with even a much larger quantity during the twenty-four hours. And here we may mention that an important extension is to be made this winter, in the shape of another pier, parallel to the main one, which will possess the one essential lacking in the other, viz., height, sufficient to load or bunker from the shutes any steamer that comes along. This work has been rendered necessary by the abandonment of the Victoria pier, at which, up to the present, most of the bunkering has been done. Mr. P. L. Naismith, who, as superintendent of the Sydney and Louisburg Railway, and as shipping agent, is about the busiest man on the works, has shown himself quite equal to the dual capacity, and is ready for still heavier taxes on his resources. It is no idle boast to make the assertion that nowhere in the world to-day can coal be handled with greater ease and celerity than by the Dominion Coal Co., whether we take the loading of the coal in Cape Breton, or the discharging of it in Montreal. The past season has been marked by many, too many, marine disasters in the St. Lawrence trade generally, and the steamers chartered by the Dominion Company have suffered with the rest. More particularly have the "Turret" steamers been unfortunate in this respect, one only of the six having escaped injury, more or less serious. Whatever may be the merits of this type of steamer, (and without doubt they make good colliers), there can be no two opinions as to their being insufficiently and inefficiently manned. When a steamer is undermanned it is difficult, especially in a coasting trade, to get men to stay in her, and of this abundant proof is afforded by the fact that one of the "Turret" steamers had over seventy changes in her articles at Sydney in six months, to say nothing of a much larger number in Montreal. The same steamer, by the way, can boast of having had six captains during the same period. Surely this is a record.

The operations of the company in Montreal were again hampered, as in previous years, by want of water in the Upper St. Lawrence during the autumn. This state of affairs has necessitated the shutting out from steamers entering the Lachine Canal, of fully one-fourth of

their full cargoes. It is expected that improvements to be made in the harbor of Montreal will avoid this to a very large extent in future.

We now turn to the work done at the mine themselves. At the "Reserve," "Caledonia" and "Dominion," the three great producers, shaking screens and picking belts have been erected and put in operation, with satisfactory results. At the "Reserve" a large "Chandler" ventilating fan, capable of producing 200,000 cubic feet of air per minute, has been put in. This fan, which was manufactured in England by the Chandler Company, is coupled direct to an engine, supplied by I. Matheson & Co., of New Glasgow, and is doing excellent work. The endless haulage system, which was introduced underground a few years ago, has been still further extended in the various mines. The above improvements were carried out under the supervision of the company's late mining engineer, Mr. Wm. Blakemore, who has recently been appointed general manager of the Crow's Nest Coal Co., Ltd. His Cape Breton friends wish him every success in his new field. His successor in Cape Breton is Mr. John Johnson, whose reputation is a guarantee for sound and skilful work. One of the most important improvements under contemplation in Mr. Johnson's department, is the erection of a large central pumping station for all the collieries, which will do away with separate pumping at each mine. When completed, this station will drain an area containing 60 millions of available coal. The "Sterling" mine has been closed down and the pumps taken out, the management finding that they could win all the coal they required from the "Harbor" seam at the International colliery. At the "Hub" the sinking of the "deeps" has been continued down into the basin, in order to ascertain the condition of the coal, and what change, if any, the basin might develop in the sea area. Up to the present, the quality of the coal has sensibly improved, the bands of splint being much thinner than in other parts of the seam, while, so far, the basin has not shown any indication of change. Parenthetically we may add that the swish of the waves overhead has been audible only to the abnormally long ears of the funny newspaper man, sent down by Lawson, Wiedenfeld & Co. to write up, or, more correctly speaking, write *down* the Dominion Coal Co's property.

At the Gowrie colliery, where work for a long time past has been gradually growing lighter and more intermittent, it has been finally decided to suspend mining operations altogether, and to take out the pumps. The same orders have been given at Victoria colliery. This mine, where the cost of mining as compared with others is very heavy, has, like the Gowrie, been threatened with extinction for some time past, and the blow has at length fallen. It will be seen that, for the next year or two at least, the output of the company will be mainly from the favorite "Phelan" or "Reserve" seam. Of this coal, together with the "Harbor" and "Hub," the company is in shape to ship up to 8,000 tons per day. Before quitting the mines we should mention that one of the most interesting features of the past year's work has been the erection of the coal washing plant near Port Morien. The object of this plant is to wash the coal free of all impurities, and thus render it more suitable for coke making and gas purposes. It is capable of washing 700 tons of coal per day, and has handled 600 tons per day during the past season when at work.

It is in connection with the above mentioned closing down of the Gowrie and Victoria mines that the heartburnings and disappointments mentioned at the outset of this notice have occurred. It is not to be wondered at that property owners in and around these collieries should resent the closing down of the one industry upon which, for many years, they have depended for their means of livelihood; and it is impossible not to sympathise with them in the misfortune which has overtaken them. The cruellest part of the whole business is that it is upon the worthier and better living people in these districts that the blow falls with the greatest severity. The workman who has lived from hand to mouth for years, may be spending a large percentage of his earnings in drink, is only inconvenienced to the extent of having to pack up and move to another colliery. The man who has lived thriftily, and has invested his savings in the building up of a comfortable home of his own, suddenly finds that, in order to support his family, he has to move to another locality, and that the property which represents his hard earned savings possesses little or no value as a saleable asset. Undoubtedly this is very hard lines. At the same time it is very difficult

ST. LAWRENCE COAL DELIVERIES.

We are indebted to Messrs. Carbray, Routh & Co., Montreal, for the following statement, showing the quantities of Nova Scotia Coal delivered by water to the St. Lawrence ports during the season of navigation just closed, together with the quantities of coal received from other sources.

	MONTREAL.		SOREL.		THREE RIVERS.		QUEBEC.		TOTALS.		EACH FIELD.	
	1896	1897	1896	1897	1896	1897	1896	1897	1896	1897	1896	1897
<i>Cape Breton—</i>												
General Mining Association	74,610	78,435	8,808	8,793	2,144	2,416	33,473	30,740	119,035	120,384		
Dominion Coal Co.....	485,804	576,339	9,053	7,535	5,571	6,542	47,345	80,092	547,773	670,508		
Cape Breton Colliery.....	4,750	3,378					1,330		6,080	3,378		
Total	565,164	658,152	17,861	16,328	7,715	8,958	82,148	110,832	672,888	794,270	672,888	794,270
<i>Pictou County—</i>												
Intercolonial Coal Co.....	33,569	40,587						3,762	33,569	44,349	33,569	44,349
<i>Foreign—</i>												
Scotch, English, Welsh and American....	67,434	69,917		4,550			18,933	8,377	86,367	82,844	86,367	82,844
	666,167	768,656	17,861	20,878	7,715	8,958	101,081	122,971	792,824	921,463	792,824	921,463

The returns for previous ten years were :—1895, 724,948; 1894, 796,282; 1893, 737,891; 1892, 626,087; 1891, 602,323; 1890, 543,656; 1889, 467,525; 1888, 517,539; 1887, 482,103; 1886, 377,500; 1885, 360,000.

to see why the Dominion Coal Company should be held up to public execration for what it is doing. It must be conceded that it has the right to conduct its business on the principles that always govern business men. Why then should it be expected to establish a tradition not observed by any other business corporation in existence? And why should it be called upon to make a question of sentiment override in importance the question of profit and loss? The idea, no doubt, is very beautiful, but too Utopian altogether to be carried into effect in these days. The company's charter was granted after lengthy debates in the local houses of parliament, during which the possibility, and even probability, of mines being closed down was freely discussed; and it was moreover granted by the votes of that party which claims, by some peculiar, divine right, to be the friend and champion of the working man. Furthermore, the then representatives of the county, who had been elected as workmen's candidates, never raised a whisper against the legislation; and yet, at the present time, men of the same party, after what was foreseen as inevitable from the start has come to pass, threaten to raise their voices in parliament in favor of the company's charter being rescinded. We trust for the good name of the province that no such folly will be perpetrated. We do not speak of the folly of rescinding the charter, for that of course is impossible, but the folly of seeking to meddle with legislation which has brought an immense amount of capital into the province, and which will in good time develop the coal resources of Cape Breton to an extent only dreamed of by the most sanguine.

In the resentment engendered by the seemingly harsh treatment meted out to the inhabitants of Victoria, Port Morien and other localities, the public lose sight altogether for the time being of the immense amount of work which the Dominion Coal Co. has provided during the past five years, and of the benefits accruing from the large sums of money it has spent, to the county at large. Not a word is heard of new and thriving settlements which have sprung into existence. No credit is given to the company for progress in many directions, while opprobrium is heaped upon it for any change which has the appearance of benefitting one locality at the expense of another. Such events as the closing down of Victoria and other mines come as the natural sequence of the establishment of a concern like the Dominion Co. Finding that three of its mines cannot be worked to advantage, by reason either of the quality of the coal or of the cost of mining it, as compared with the other six mines, and knowing that it can extend the output of the six so as to win from them all the coal it required for shipment, what does it naturally do but close down the unprofitable three; and we maintain that any other corporation, be it American, English, Scotch or pure Canadian, would, under similar circumstances, do exactly the same thing. We can feel sure that men deprived of work by the closing down of any mine will be looked after and provided with work elsewhere, and in doing this the company will be doing all that can reasonably be required of it. If local politicians wish to legislate to the lasting good of their constituents, let them direct their energies against the wholesale, and, if rumors are correct, official smuggling that goes on so openly along the eastern coast of Cape Breton, to the degradation and demoralization of the community, or let them secure lasting fame by having placed on the statute book an Act that will make it a criminal offence for anyone, clergyman or layman, to promote a pic-nic or strawberry festival within 20 miles of a colliery, between the 1st of May and the 31st of October.

It is pleasant to turn from the contemplation of abandoned collieries to the vista of brighter and busier times, opened up by the announcement that a contract has been concluded between the Dominion Coal Co. and the New England Gas and Coke Co., by which the latter bind themselves to take delivery of a minimum quan-

ty of 800,000 tons per annum. It must, of course, be some considerable time before the New England company are in a position to handle this coal, but meantime the news supplies a comfortable sense of good times to come. We can already picture to ourselves new shafts being sunk, and the building up of new localities, amid which, we hope, the sense of injury at present abiding with many in Cape Breton will pass away.

Now the rest of the acts of the Dominion Coal Company and all that they did, and the pier that they built, stretching out several thousand feet into the Atlantic, and their \$100,000 Palace of Desolation in Glace Bay, are they not written in the book of the chronicles of * Lawson, Wiedefeld & Co., of Boston.

We must not conclude this notice without brief reference to the General Mining Association, who have held on the even tenor of their way as of yore, having enjoyed a busy and prosperous season's work.

They have had three steamers under time charter running in the St. Lawrence trade, and in addition have loaded the three steamers of the Dobell line on their return trips from Newfoundland. They have started the sinking of a new shaft on their property, 13 feet in diameter, so that they are evidently bent on keeping a hold of their share of business.

The new Campbellton mines, on the Bras d'or Lake, have been kept busy at a limited output, and we hear of one or two cargoes having been shipped by Mr. Penn Hussey, in his new harbor at Broad Cove, but we are unable, from lack of knowledge, to say anything as to the prospects of business there.

Local interest in and around Sydney has recently been aroused by the announcement that Mr. E. T. Mosely has proved an authentic seam of 6½ feet of coal on his property, near Cochrane's Lake. With Mr. Mosely is associated as part proprietor our old friend, Mr. D. J. Kennelly, and it is in order for this veteran "boomer" to reappear on the scene as the "Dens ex Machina," who shall "push d'em clouds away" that have hung over Sydney of late, and restore the town to its former lustre. The owners of the property which has gained the appellation of the "Mountain Kitty" mine, also claim to be enriched by the discovery of this season, and the county is over-run with prospective millionaires.

A Libel on Canada's Gold Fields.

On another page of this issue, we print an article referring at some length to the mistakes some English capitalists have made in their investments in Canadian mines, also a passing reference to the employment of some newspapers by promoters to further their schemes. In such category must evidently be placed an article in the *Financial Bulletin* of London in its issue of September 4th, entitled "Canada's Gold."

This article is such a gross misrepresentation of facts that it calls for extended notice and for correction. After alluding to the probability of Canada "in the near future proving the richest gold producing portion of the Empire," it praises a letter to the *London Standard* from its correspondent at Toronto, and says the writer evidently knows what he is talking about. If the statements in the *Bulletin's* article are based upon this letter, it is abundantly evident to anyone knowing Canada that the *Standard's* correspondent is supremely ignorant of the subject upon which he writes. A letter to a daily paper imposes little if any responsibility upon that paper, but a sheet which calls itself a "Journal of Mining and Investment," and publishes statements in a

* Vide an amusing and wildly extravagant description of the Dominion Coal Company's Cape Breton properties, in a brochure published by the firm of hostile Boston brokers.

leading article must unquestionably assume the responsibility of those statements.

To begin with, the *Bulletin's* dates are wrong, gold being first discovered in Quebec in the year 1844 and not in 1836; and the first workings in Nova Scotia date from 1862, or 25 years later than the *Bulletin's* date.

Similarly it is an error to say that the "declining placer mining districts" of British Columbia were given "fresh life by the discovery and introduction of quartz mining"; as a matter of fact quartz mining has never been "discovered," nor carried on as a business, in the placer mining districts of British Columbia, nor have the latter been revived to the slightest extent by quartz mining within their limits. It is an injustice to the districts of Trail, Nelson and Slocan, (which are comparatively remote from Cariboo) to consider them as in any way an appendage to the placer mining industry. To these three districts in Southern British Columbia is entirely due the renewed interest in that Province, and the chief credit, as well as the chief production, must be given to the silver lead mines of the Slocan.

The article then goes on to give a "criticism" of Canada's gold fields, proceeding from east to west.

As regards Nova Scotia (which is to-day the safest gold field in Canada for investors) it is dismissed with nine lines, and the extraordinary statement is made "that although the annual yield is increasing, we do not think that the Province is likely to prove a field in which the British investor would care to embark his capital." The ore is said to be so low in grade that it would give little or no profit after paying "the necessary expenses of a London Board of Directors and offices." Side by side with this is the admission that the ores can be mined and milled for seven shillings per ton.

It is evident that the omniscient writer of this article has never heard of the phenomenally rich returns which have come from Nova Scotia mines; of the yields where 21,000 tons gave 20,000 oz. of gold, where 24,400 tons gave 25,400 ozs. of gold, of the recent cases where many lots of quartz yielded from 10 to 80 ozs. of gold to the ton, nor has he knowledge of the fact that one million tons crushed in that Province averaged over 13 pennyweights to the ton.

The heading of the next paragraph gives the keynote of the whole article and of this depreciation of the other gold fields of the Dominion; this heading is "The extraordinary rich Province of Ontario." The article which we printed in our November issue, by Mr. Horace V. Winchell, shows conclusively that this language is, to use a slang phrase, decidedly "previous." As Mr. Winchell points out, gold mining in Ontario is in a very uncertain and preliminary stage, whereas the gold mining industry of Nova Scotia is well established, the conditions of success and failure there are well known, and the whole industry is in a legitimate state such as cannot be shown, to the same extent, in any other Province of the Dominion. It has been the opinion of many of the foremost engineers, both English, American and Australian, who have visited that Province, that its low grade ores offer as great opportunities for successful and permanent mining enterprises as do those of any other gold field on the continent; and when it is borne in mind that these engineers have seen the great gold fields of the world, the Rand, Australia, and California, their opinions are certainly of much greater weight than those of the editor of the *Financial Bulletin*.

For British Columbia, this very ill-informed writer has no good word. After saying that "placer mining is unskilled labor," requiring only muscle and a good constitution, he proceeds to say that the richest gold fields of British Columbia are in the Kootenay and credits that district with a production of gold for 1896 of £773,000 sterling. Evidently this ignoramus has not a copy of the Government Blue

Book for last year upon his table, and for his information we will say that the report of the Minister of Mines shows that the total production of the West Kootenay district was £800,000 sterling, of this amount £400,000 (or more than one-half) is credited to silver alone and only £222,450 was produced in gold, leaving nearly £200,000 for the value of the lead and copper produced there. Of this amount of gold, it is interesting to note that less than £1,000 can be in any way credited to alluvial mining.

The depreciation of British Columbia is finished by saying that though it "has great possibilities" the expenses of working smelting ore "must leave small profit to English companies unless lightly capitalized."

Here then we have two Provinces, Nova Scotia and British Columbia, of great natural mineral wealth, which cannot be expected to return satisfactory dividends, because, in the one case, the fees of the directors and office expenses are so large, and in the other case, because the supreme bombastic ignorance of the writer assumes high working costs for smelting ores.

To one who knows British Columbia, such ignorance is most irritating, for, if ever there has been a poor man's camp, it is the Slocan.

Like most other English writers this *Bulletin* man is evidently of the opinion that Rossland is all British Columbia, instead of being only a very small fraction of that Province.

Coming back to Ontario, the writer makes some remarkable statements for which his authority is unknown on this side of the water, unless, indeed, it be the *Ontario Government Gold Concessions Co.*, which is the most likely source of the whole article. While the REVIEW believes that Ontario possesses gold fields of unquestionable value, and that their future development will result in a permanent and profitable industry, it deprecates any attempt to misrepresent facts or to exaggerate or distort existing conditions. We therefore point out that the Lake of the Woods district at present has no fissure veins "developed to a depth of 350 ft.," and that the Sultana is not a fissure vein, but is well understood to be a huge lens of quartz, occurring as a segregation, and that there is no authority for stating that its ore averages one oz. of gold to the ton. On the other hand, it is well known to the best informed that the average yield is considerably less. Of the Mikado mine it is well known that the crushings which have been made in its own mill have shown a much lower average than the 3 ozs. per ton which was obtained from the first custom mill lot, and which was made from selected ore. A misprint is undoubtedly responsible for the statement that a "70 stamp mill has been erected"—it is really a 20 stamp mill.

Referring to the Ontario Company Limited, we may say that gratuitous booms have no place in a paper which pretends to be of a financial and investment character, nor are the computations of any man, even if he be as good a manager as Mr. Breidenbach, of any value when they are not based upon development work, but are figured only upon surface assays and surface work; the computed yield of £2,430,000 sterling is too ridiculous to call for comment.

The cost figures for mining and milling "in this happy district" as this article calls Ontario, are given at sixteen shillings per ton (we think 20 shillings per ton nearer) as against the Nova Scotia cost of seven shillings, but no figures are given of the average yield. Owing to the unfortunate way in which the Ontario Government Mines' Report is made out there are no official data of value either. But it is safe to say that the \$121,848 (about £24,000) given as the total yield of Ontario for 1896, came from one that did not average 13 dwts. to the ton.

The *Bulletin's* article "sums up as the matter of Canada's gold" as follows: "Nova Scotia and Quebec can be of no interest to the British investor," British Columbia will "leave small profits," the Klondike "a pure lottery"—but the great, and good and wise Ontario Government Gold Concessions Co. Limited, will be fostered by the Ontario Government and offers "every inducement to the investor" to call at Finsbury House and get some shares.

The meaning of this article is clear beyond peradventure, and we do not hesitate to say that it is such boom articles as this one of the *Bulletin's* that will cause unquestionable loss to the investing public and bring disrepute to Canadian mines. We are ashamed of our profession of journalism when we find papers willing to publish such padding, either for or without consideration. For our own part, as our columns will abundantly justify, we are quite sure that there are first class opportunities for British capital in the Provinces of Nova Scotia, Quebec and British Columbia, as well as in Ontario, and we are quite within the mark in saying that the chances of success are even better in the easternmost and westernmost provinces than they are in the central provinces of the Dominion, and this without being at all derogatory to the full value and importance of Ontario's gold field. As Canadians we deprecate any attempt to boom one province at the expense of others, particularly so in the case of the newest, or perhaps we should say, the most undeveloped one of the lot. It is manifestly the object of the article referred to, to induce subscriptions to Ontario corporations, rather than to those authorized to work in the other provinces.

Such grossly ignorant and misleading statements as are contained in this article can, however, only deceive those English investors who have no means of getting information from other journals, who are happy in possessing on their staff writers who are much better informed regarding Britain's colonial possessions than is the writer on the *Financial Bulletin*.

Recent British Investments in British Columbia.

The attention paid by the English press during the last few months to the mineral wealth of Canada, particularly to the Province of British Columbia, moves us to make comment upon the British investor's art of making successful mining investments or the reverse.

Something over a year ago, London began to wake up to the fact that there were profitable fields for the mining broker to exploit in western Canada, and the crop of mining, development and so-called "parent" companies has been quite prolific since. We have not as yet heard that any of these companies have succeeded in producing profits, but we do know that some of them have come to serious grief in British Columbia, during the season just passed.

The most stupendous collapse has been that of the Lillooet, Fraser River and Cariboo Gold Fields Co., Limited, which (to use the language of its chairman, at the annual meeting in London last December) "was going to vote itself a substantial dividend in December, '97." For months now this company has been in the toils. In the month of September last, two engineers of repute, one in the interests of the English shareholders, the other in the interests of those confiding French investors who were beguiled into buying this company's shares at a premium, visited all the options and properties controlled by this corporation, and proceeded, without ceremony, to "turn them down," as the mining expert says.

The great "City of Spokane" mine, in Rossland, which was said to have four clear, well defined veins running through it, which could be traced straight from the Le Roi, War Eagle, Centre Star and Iron Mask claims, and for which \$45,000 in cash was paid early in 1896,

and upon which a still larger sum has since been expended in buildings and in work, is now absolutely idle, and is likely to remain so. Such, likewise is the condition of the "Lanark Group," which was taken hold of little more than a year ago.

The acquisition of this group was a surprise at the time to many well acquainted with British Columbia properties, and doubts were freely expressed as to the reasons which had led to its purchase. The management; however, immediately began spending money in a lavish fashion. A townsite called "Laurie" was acquired, a large sum spent in clearing up the ground, and a somewhat elaborate hotel erected. In addition, there were built houses for the workmen, a bridge over the Illecillewaet, a large concentrating plant with its water flume and various other accessories, together with an Otto aerial tramway over six thousand feet long, running from the mine to the concentrator.

Work was begun and prosecuted on one or two claims, but apparently solely with the view of getting out what ore was in sight; and as soon as the concentrator was finished this ore was sent down as fast as possible. Thereafter, the newspapers began to record such items as that of the weekly shipment of so many tons of ore from the Lanark mine. Something like £7,000 worth of ore was shipped when suddenly the concentrator stopped, and the reason leaked out that the ore body was exhausted, that the development had not been kept ahead and that, for the present at any rate, there was no more ore to send down over that expensive tramway to the expensive concentrator on the expensive townsite, with the expensive hotel and expensive staff.

The chairman, in his address to the shareholders, last December, is reported as saying of this group, "We anticipate getting fifty tons of concentrates regularly per day, year in and year out." — It will be interesting to know how these anticipations will realize at the shareholders' meeting.

The "Alpha Group," in the Lardeau district, was the "promised bonanza;" the shareholders were told that "at least five thousand tons, worth sixty dollars per ton, are immediately available," i.e., \$3,000,000 or £600,000 sterling in sight!!—Where is it now, and why is the Alpha group so silent? Why did the engineers close this property also? Where is the Sunshine Group, which promised profits of £12 to £16 per ton?"

In the face of what has occurred the chairman's words, "our mines have been well developed and show every possible prospect of success," now read very queerly, and one wonders what the Directors will find at this year's meeting that will be "a subject for very great congratulation." Over £250,000 of the £300,000 share capital of this company have now been issued, and its prospects are practically nothing.

Another venture, which seduced a portion of the British public by the statements of the learned expert, who travelled to England with a bag full of specimens, is the Golden Cache mine. The management of this property took twelve months to build a ten stamp mill, which ran but three days when it was shut down for the paltry reason that the grade of its tramway had to be changed. Imagine the capacity of the management when such an initial feature as the grade of its tramway had not been properly determined at the start. It is, however, reported and well known that one English gentleman, a member of Parliament, has invested over £70,000 sterling in this property, which no expert of any standing has ever reported upon publicly. The fabulous values ascribed to quartz from this property (given as high as \$2,000 per ton) have not and cannot be substantiated, the result of the first mill run of three days is reported at \$10 per ton. The management of this company have certainly aroused the suspicions of all competent judges by refusing access to the mine to visitors and visiting experts, going so far even as to block up the entrance to the

workings with huge piles of ore (?) to give plausible pretext for refusing admission. From one professional man, however, who managed by methods of his own to get into the mine, it is reported that though the quartz vein is still there, the gold has largely disappeared. Meantime, the promoters of this proposition talk vigorously of increasing its capacity to one hundred stamps, while they have not demonstrated its ability to keep ten stamps going on pay rock.

Again, we have the managing director of the "Gold Fields of British Columbia, Limited," a corporation which is treading closely in the footsteps of the Lillooet, Fraser River & Cariboo Gold Fields Co., informing the shareholders of the *Waverley Mine, Limited*, that "the Waverley alone can ship 1000 tons per week for the next few years that will net the company £10 per ton profit." This figuring means £520,000 sterling of a profit *per year*, for the next few years. While it is possible that the Waverley is really a good mine, it has not by any means been proved such as yet, and to make such a statement to the shareholders about a property, which is still in the developing stage, is to lay up for oneself a store of future trouble such as the Lillooet people have gotten into.

The fiasco attending the operations of the "Galena Mines Limited" and the Vancouver Syndicate is laughable, even if it be pitiable, and we cannot coincide with our contemporary, the *British Columbia Mining Record*, in ascribing to the Vancouver syndicate, the role of an unintentional instrument for foisting this property upon the public. There must have been considerable intention in a transaction which permitted the taking of £525,000 of a total of £550,000 for a property whose original cost of acquisition and development was far less than £20,000.

We might go on and call attention to some of the perfectly impossible statements that have been made about other mining companies in British Columbia, some of them dealing with hydraulic mines, such as the *Golden River Quesnelle*, but the examples we have mentioned are a sufficient text for the warning that we desire to make chiefly to the British investor, but also to all people who have the good of Canada at heart. It is an old and trite saying in London regarding industrial and railway investments that "Canada stinks in the nostrils of the British public," but hitherto this saying has been applicable only to that portion of Canada which lies east of the 80th meridian. Unless both Canadian and English promoters and investors conduct their operations in a more honorable and sensible fashion, we are afraid it will apply even to the Pacific coast.

So long as London continues to be the financial centre of the whole world, promoters, shysters and sharks of all nationalities will flock there with the hope of selling nothing for something, and with the expectation of cheating capitalists; and it is equally true that the major part of the blame for losses incurred must rest on the investors and shareholders alone. Upon no one else but the company's officers can the blame be attached to the position of the Lillooet, Fraser River and Cariboo Gold Fields Co., Limited. The undue haste of this company to force their shares to a premium in the market led to the adoption by its management of a policy which acquired properties before the same had been either thoroughly investigated or developed. The rush of the "Gold Fields of British Columbia Co." to float the subsidiary Waverley and Tangier (Recordia) companies is likely to have similar results, if we may judge from the reckless statements we have already quoted regarding future production. The failure of the Galena Mines, Limited, can be ascribed only to incompetent investigation before purchase, and in a large measure to a grossly ridiculous overloading of the venture at the start with a huge capital. The Golden Cache business lies directly at the door of the investor, who might have, and should have, insisted upon complete and exhaustive

reports by competent experts, who have made free milling ores a specialty, before buying shares. We have heard a great deal about the caution and prudence of the British capitalist and comparisons have been drawn, not entirely to his favor, with the enterprise and dash of the American capitalist. It would seem, however, that whenever a new mining country is discovered the cautious Britisher throws his caution over his shoulder, and believes the most extraordinary yarns brought to him from everywhere, and often vouched for by engineers of his own nationality.

During the last eighteen months there has been an influx into Canada (chiefly into British Columbia, but also into Ontario) of a large number of representatives of English capital, who, in very few cases, have been qualified for the duties they have had to perform. As we have repeatedly pointed out in these columns, most of the mistakes that English capitalists have made on the American continent, are directly attributable to lack of care in the selection of the men sent to represent them, to undue credulity (which is another word for lack of business prudence), and to the neglect of the ordinary precepts of mining. We can refer our readers in this respect to the many extracts and comments we have made upon the letters of Mr. Thomas Tonge, which have appeared in the *London Mining Journal* and other publications.

We are no pessimists as to Canada's mineral resources; on the contrary, we are firmly of the opinion that they are one of her chiefest sources of wealth, and we desire the introduction of British rather than American capital. But it is allowable, if not our duty, to point out to them the usually superior manner in which the American makes his mining investments. Perhaps the chief point of difference is in his selection of the engineer or agent, who is sent to make the examination or advise upon the purchase. The American usually prefers such a man as is familiar with the country and the district in which the proposition lies, and rarely sends a coal miner to examine a gold property or consults an expert in silver-lead smelting regarding the erection of his stamp-mill. But just as absurd selections are frequently made by our English friends. At present the particular recommendation for an English engineer who appears in Canada is the statement that he has been in South Africa, and frequently that experience is all he has had. It is unnecessary to say that experience with the South African ores is of very little use in the larger field of British Columbia, which presents almost entirely smelting ores (either of silver-lead or of gold-copper character) occurring in rocks of the most diverse description, frequently of eruptive origin, and requiring a wider experience and a greater knowledge than is gained in the free-milling fields of those.

But perhaps the one cause which so far has contributed most to losses and mistakes with the English corporations in British Columbia, is the grasping haste which they have shown to acquire property, presumably in order to get a quotation at a premium. We have seen letters from the directorate of a London company in which complaint was made against their engineer that he had "turned down everything he had yet seen," and in which the individual to whom the letter was addressed was requested to "procure another engineer, one *who could get something* for the company."

We have heard some of the most successful mining men in the United States say words to the effect that they first looked to the *man*, and then afterwards to the *mine* offered, believing that their chances of failure were minimized if the character of the man upon whose advice they relied was unassailable. It has occurred to us that many of the English corporations now working, or intending to work, in Canada might do well to adopt this last suggestion, and to pin their faith less implicitly upon men whose only record is failure wherever they have been in charge.

The Ontario Mines Report for 1896.

There has just been laid on our table the "Sixth Annual Report of the Bureau of Mines of the Province of Ontario." In passing, we note that the province's total production reaches a value of \$5,000,000 and requires a report of over 280 pages, whereas the Province of British Columbia, whose production reaches \$8,000,000, is content with 50 pages less.

Ontario seems to be going ahead but slowly; we note that but for the production of iron and gold the province would have shown a decrease this year from last year's production of nearly half a million dollars. The increased production has come chiefly from cement, iron and gold, and there are notable decreases in the production of brick, (both common and pressed), tile, sewer-pipe, nickel and copper, while petroleum remains about the same.

The manner in which the "Summary of mineral production" is made out, is open to criticism; for example, the production of iron is given as 28,302 tons, but it is not stated what amount of ore was treated to get that production, hence the wages given in the fourth column (\$47,000) are no criterion of the cost of that iron, and do not constitute a correct figure to set opposite the value of the product, which is placed at \$353,780. Similarly we are informed that there was a production of 7,154 ozs. of gold, but we are not told the number of tons from which this product was obtained. The \$91,210 of wages paid out for 189 men employed, contrasts rather queerly with the figures for the 1895 report, where only \$56,234 were paid to 237 men. It is certainly rather startling to find, as one may justifiably infer from these figures, that the wages of the employees in the gold fields have gone up over 100 per cent. in one year. We have heard many complaints at different times of the statistics published by the Nova Scotia government, in which an attempt is made to give the total number of days labor employed in producing the amount of gold for any year, and the average earnings per man per year, but certainly that way is preferable to this method of merely stating that so many dollars and cents were paid to so many employees, without giving any foot note or explanatory item to say whether this number of employees comprises only those laborers employed about producing mines, or whether it also includes laborers working upon properties which are in the development stage but are not yet producers. We have gone roughly over the figures of production accessible to us during the last twelve months, and we are very much inclined to doubt the correctness of the yield given for the year 1896, believing that the yield is considerably larger.

But perhaps the most important objection to this report is the fact that it was only distributed in *November* for the year which closed on the 31st of last December; that is, it has taken at least ten months for the Bureau of Mines to get its statistics before the public. Again, we say that the sister province of British Columbia affords a good example to Ontario; its official report for 1896 was available to the public in the month of March, 1897.

The report is embellished with a number of very good illustrations from photographs, and there is a history of the "Silver Islet" mine by the distinguished Director of Mines, who puts into a condensed account all the information at present accessible regarding this mineral phenomenon. There is, however, a tremendous amount of padding in this report. There are about 157 pages of matter strictly germane to a government report and the other 130 pages are accounts reading more like fiction, or travels perhaps, than like the pages of a Blue Book.

The report of the Inspector of Mines occupies 36 pages and as usual, is remarkable for the information it omits and the choice English

it displays. In reading through the report, one comes upon many minor matters that are open to criticism. Why, for example, should the value of the Regina gold be stated in English money? Why say "£3-10s. 0½d." instead of \$16.99, and why, if one may ask, should four pages be taken up with the proceedings of the tariff hearing in Washington?

We have before made reference to the paragraphs, yes pages, of fine language, that read like extracts from a private diary or from a volume of travels. Doubtless they are interesting to some people, but while it may be necessary for the director to know that the inspector went out on the 3rd day of July, and that the afternoon of the following day was spent at a particular mine, the public does not care a snap when Mr. Slaght went out, nor how long he stayed at this particular mine. They want to know the condition of the mine, as they are the taxpayers who pay Mr. Slaght's expenses and salary, in order that he may see that the mines are worked in a ship-shape fashion, safely and economically. But perhaps one cannot blame a man who has worn the cloth for indulging in rhetoric, and for knowing nothing of mining. It is a very gentle sarcasm to read as follows: "The mine is kept in a neat and safe condition," and then to read several lines below that "the foreman and a miner were both killed by falling into the shaft" of this same "neat and safe" mine. We also note that the said inspector seems to derive his information chiefly at second hand, e.g., he was written to by Mr. This, and is informed by Mr. That; Mr. the other gives him descriptions, which, for a young mining country, may pass as being reliable information to come from the hands of an official who is paid *à sec* that things are properly done, and not to tell of information and writings gotten from others.

Will not the taxpayer consider that it is a waste of public paper and public printing ink, and therefore public money, to inform the public that he was "provided with comfortable lodgings in the residence of Robt. Huntley, chief engineer, to whose genial wife and daughter I am indebted for the enjoyment of the quiet Sabbath rest;" also, "it may be stated in honor of Gen. Wilkinson, that besides his repute for kindness and integrity, he conducts a religious service every Lord's Day in the dining room for the benefit of the workmen." Upon the same page (253) we are treated to a lot of nautical details about Gen. Wilkinson's private yacht, and it is edifying indeed to learn that this same yacht when in a storm "rocked and rolled as though drunk, but bravely outrode the fearful, raging storm." One might say that this savours more of W. Clark Russell than of a government report. Another interesting bit of information, which is really unique, is the news that the crew of the vessel are considered its passengers, but we have Slaght's word for it; and it is also most delightful to know that the workmen of the Regina have such personal affection for the General, that when he comes home they jump into boats and row out to meet the steamer he is on. One hopes that these are only the night shift men and not the chaps on duty.

These 36 pages of the inspector's report are full of choice paragraphs. One is: "The lake is beautiful, and affords exquisite delight on a pleasant, balmy day." In his report of an accident (page 271) one is quite concerned to know whether "blastings in very hot ore" is dangerous *outside* of the meaning of the Mines Act, as Mr. Slaght says, "it is certainly dangerous *in the meaning of the Mines Act*." All of the rubbish which is constantly met with in reading the inspector's report, only raises the enquiry as to what on earth such a man knows about the business he is following, and inevitably conveys to the reader the idea that all his matter is unreliable because of his ignorance. A recent appointment to a similar position is apparently as well qualified, or rather disqualified, for the position, as will be seen on reference to our *en passant* column, wherein we give a few choice sayings dropped

by this inspector in the Lake of the Woods district. It also seems to us that the editorial blue pencil could be wielded in the manuscript to great advantage.

We have spoken before this of the necessity of putting the mineral resources of Ontario properly before the public, in the shape of a report, after investigation, by a competent engineer of some experience, standing and reputation in other fields. As Mr. Winchell pointed out in our last issue, such a report would be of great service to the public, and to the Bureau of Mines as well, at this present stage of development. Something of this sort is the only thing that will clear away the smoke, in the shape of diverse and contradictory reports, which are now current regarding Ontario's gold fields.

The War Eagle Report.

We have received and publish on another page the "First Annual Report of the Directors of the War Eagle Consolidated Mining and Development Co., Ltd.," and find it interesting reading, in view of the many changes in conditions which have occurred since the taking over of the property from the old "War Eagle Gold Mining Co.," on January 20th of this year.

In the short preparatory report of Mr. George Gooderham, the President, we note his statement that the Canadian Pacific Railway has announced its intention to transport and smelt "Rossland ores at cost, for the purpose of stimulating the development of that camp." As this railway has never been addicted to philanthropy, the public may rest assured that Sir William's announcement is made with a mental reservation, and that shipping mines will pay for the freight and treatment of their ores in some one of many other ways known to large monopolistic corporations, and that the shareholders will have to depend upon the grade of their ore for dividends.

The financial statement of the company shows a loss for the nine months of \$40,799.61, which, upon inspection of the profit and loss account, turns out to be a working loss of \$56,626.48, since the \$15,846.87 credited is that portion of the share of profits of the old War Eagle Company coming to the new company. It is perhaps somewhat misleading not to clearly show somewhere in the accounts that the real loss in operating the combined properties for nine months is \$56,626.48.

Of this amount \$21,415.17 is the loss due to the working of that white elephant, the Crown Point prospect.

The REVIEW has always felt that this property was a millstone around the neck of the new company, and this feeling is intensified when we find that a property which was taken over at a high figure, and upon which over \$21,000 has been spent in nine months, is dismissed in the manager's report with five lines, containing only 56 words, the purport of which is, "copper ore without gold value; scatterings of iron and copper without value."

The REVIEW suggests to the shareholders the policy of closing this property until dividends are resumed from the War Eagle vein, when, if ever, they may have money to spend in fossicking about the Crown Point.

The report is commendable for the detailed figures of costs, etc., which are given, but there are one or two points to notice which are important. For example: On page 10 are given some average costs of tunnelling, raising, stoping, etc. We note first that Mr. Hastings' figures here are, in two cases, different to those given on page 15, e.g., 2,354 feet of tunnelling, etc., against "2,303½ feet;" on p. 15 similarly "371 feet of raising" against "421 feet." These errors may be inadvertent, but they are not typographical.

Upon computing total costs by page 10, we find a sum differing by over \$30,000 from the total of profit and loss account, and no clue is given as to where else this amount is to be found in the cost accounts.

We sincerely hope that the War Eagle Company is not going to adopt the suicidal policy of charging development costs to the *capital account* instead of to *operating expenses*, where they properly belong. If that is done with the figures before us, we find—after making deductions of the amounts charged to "Crown Point," "Richmond" and other claims, and adding proper amounts for mucking, hoisting, etc., to the costs of the 1,059 tons yet in the stopes but not shipped,—that the average cost of extracting a ton of ore from the War Eagle claim during the past nine months has been over \$8.50 per ton; adding to this figure the best rates for freight and treatment that we have heard offered for Rossland ores, viz., \$8.50, makes a total of \$17.00 per ton required in order to clear expenses.

In view of such figures, it is probably a wise policy for the company to stop production until competition enters the field, which it will rapidly do, since the C.P.R. has announced its intention of building into Rossland, and of erecting smelting works at Robson, and since the Northport smelter will shortly be in blast.

The announcement that the mine has 38,000 tons in sight that will average \$29.00 per ton should be very gratifying to the shareholders. We have tried to check this from the information in the report, but have been unable to do so.

The map of the mine workings at the end of the report should be made on a larger scale, and in better style; it is unworthy the rest of the report, which, on the whole, is a good model for the rest of our Canadian mining companies to follow.

EN PASSANT.

The REVIEW extends the season's greetings to all its readers.

So many requests have been made for copies of the unique verses entitled "Walk," which appeared in these columns a number of years ago, that we have had them reproduced in pamphlet form, and with this number enclose a copy for each subscriber.

Recent dividend announcements by British Columbia mines include the Cariboo Mining, Milling and Smelting Company at Camp McKinney, which pays this month its seventeenth dividend of \$16,000, or \$189,000 to date, and the Idaho (silver) of \$30,000, making \$340,000 to date.

Since last announcement the following subjects have been entered for discussion at the ensuing meetings of the Federated Canadian Mining Institute: "Mining Law and its Bearing on the Development of Mining Mines and Mining Districts," by Mr. Frank C. Loring, M.E., Rossland B.C.; "The Gold Bearing Reefs and Placers of Northern British Columbia," by W. Hamilton Merritt, A.R.S.M., Toronto; "Concentrated Foods especially devised for Explorers and Prospectors of Mines," by J. T. Donald, M.A., Montreal; "Notes on the Discovery of a New Coal Seam in Cape Breton," by Hon. E. T. Moseley, Q.C., Sydney, C.B.; "Notes on the Analysis of a Rare Mineral new to Canada," by Dr. W. L. Goodwin, Kingston, Ont.; "A Summary of Mining Progress in Ontario in 1897," by A. Blue, Director of Mines, Toronto; "Notes on some West Kootenay Ore Bodies," by J. C. Gwillim, B.A. Sc., M.E., Slocan City, B.C.; "Mining Machinery in the Slocan District, B.C.," by Howard West, A.R.S.M., New Denver, B.C.; "The Chemistry of Foundry Practice," by E. A. Sjostedt, M.E., Montreal. Altogether thirty-three subjects have been entered for discussion.

The coal shipments from Vancouver Island, B.C., for the past three months are reported to have been:—

	SEPT.	OCT.	NOV.
New Vancouver Coal Co. ..	11,794	13,716	19,672
Wellington.....	10,675	20,575	16,977
Union.....	15,227	16,616	21,313
Total tons.....	37,696	50,907	57,962

With respect to the reported discovery of the Mullins seam in the Cow Bay Basin, Cape Breton, Mr. E. T. Moseley of Sydney, sends us the following details of diamond drill section of the seam:—

Coal.....	11 inches
Shale parting.....	2½ "
Coal.....	5 ft. 6 "
Fire clay.....	7 "
Coal.....	9 "
Total.....	7 ft. 11½ inches

Mr. Moseley will submit some notes on this new discovery at the February meetings of the Federated Canadian Mining Institute.

The accounts of the Cape Asbestos Company submitted last month disclose a gross loss on the year's operations of over \$43,000. It does not appear that Canada has much to fear from Blue Asbestos in competition with her own superior product.

Mr. W. F. Ferrier, B. Sc., F. G. S., lately on the staff of the Geological Survey of Canada as lithologist, has resigned to take a more lucrative position with the War Eagle Consolidated Gold Mining and Development Co. at Rossland. Mr. A. A. Cole, B. Sc., who has for some time been assistant to Mr. Ingall in the division of Mineral Statistics, has also gone to British Columbia to fill a better position. Rumors of the resignation of other prominent members of the staff are current. The parsimonious policy of the Government towards this, one of the most ably conducted and most deserving branches of the public service, is greatly to be deplored.

Apropos of several apparent collapses amongst English companies operating in British Columbia, it is pertinent to observe the part which some newspapers have played in the promotion of such companies. We alluded in our issue of December, 1896, to the exaggerated statements published in the *Journal of the Imperial Institute*. The London *Economist* of December, 13th, 1896, gave rather a flattering item regarding the Golden Cache mine; but the greatest development of the boom newspaper has been in Ontario, where the *Toronto Globe* and *World* have apparently vied with each other in selling their columns for the publication of the most exaggerated notions of ignorant and unscrupulous boomsters. The *Rossland Miner* was easily the chief amongst this class, and we are sorry to see that the *British Columbia Review* (the only paper published in London devoted to the interests of that province), apparently treading, or, at any rate, approaching the footsteps of the *Miner* in working up an enthusiasm over Rossland and the projected sale of the Le Roi in London. We take exceptions, by the way, and very strong exceptions, to calling the Le Roi mine "the most remarkable gold mine on the continent of America"

We note that a corporation called the British American Corporation, with a capital of £1,500,000 sterling, has been registered, and that it has already distinguished itself under the management of Lieut.-Governor Mackintosh by purchasing a controlling interest in the Josie mine, and sundry prospects in Rossland. In view of what we publish

in this number regarding English mistakes in British Columbia, we think this company would do well to print as a motto on its letter heads, *Festina Lente*.

An old time acquaintance of our Nova Scotia friends, who has loomed up as a tremendously big gun in British Columbia, is Mr. Alfred Woodhouse of "Barberton Herald" (South Africa) fame. To those who know Mr. Woodhouse the reading of the proceedings of the meeting of the Recordia Syndicate, Limited, will be very, very amusing. Mr. Woodhouse stated that the ore deposits of the Boundary country were far greater than anything he had ever seen before, and he spoke "with experience of India, Africa and Australia." Why did he leave out Nova Scotia? Certainly he should be proud of the record he made there, and certainly he had an experience there. Possibly Mr. Woodhouse considers his Nova Scotia experience was too slight and too uninteresting, from a free milling point of view; even though such little incidents as the rapid building of a stamp mill on an ice foundation and the drowning of three men through careless mine inspection, would be considered interesting to other people.

Another interesting speaker at this Recordia meeting was Mr. Thomas Rickard, who predicted a *daily output*, for half a dozen claims in the vicinity of Rossland, of from 3,000 to 5,000 ozs. of gold, or from \$20,000,000 to \$35,000,000 a year. It is truly remarkable how stupid we are on this side, as shown by the fact that we have to wait the arrival of such gentlemen as Mr. Woodhouse and Mr. Rickard, to tell us of our great future wealth and predict our daily output. Unfortunately for Mr. Rickard, we think that he made a slip when he spoke of concentrating Rossland ores.

What has been printed of Mr. Bratnober's report on the Klondike gold fields, made for the Exploration Company, Limited, is rather different reading to what we have been accustomed to from that country. Mr. Bratnober reports that the gold-bearing quartz veins seem to lie in a mica schist, and are all of very low grade. The veins which run into the diorite flanking this mica schist carry no values. He also reports the ground as very spotty, and the output for 1898 is estimated at \$5,000,000. Mr. Bratnober agrees in the opinion already expressed in these columns that hydraulic mining on the Klondike will be impossible, but he says, further, that quartz mining will also be impossible unless the veins are very high grade.

So far as the REVIEW can gather, from those best able to judge, it seems probable that the greatest benefit that will permanently accrue to any portion of Canada from the Klondike craze, will be the opening up and settlement of the rich gold districts of Omineca and Cassiar in northern British Columbia; and as, so far, no free milling deposits of magnitude have been found south of the railway line, it is quite probable that the free milling part of British Columbia will be found in these districts.

Among the choice bits of wisdom which fell from the lips of the youthful and recently appointed inspector of mines, this summer, in the Lake of the Woods district, we have been favored with the following:—"Your sump is too near the bottom of your shaft;" and, when passing through the workings of a property not a thousand miles from Shoal Lake, he asked, "What are you doing here?" Cousin Jack replies, "Oh, this here? she's a raise." Inspector says, "Oh, that's what we call a winze upside down." It is also currently reported that this learned official wrote "Consecrates for the product which comes from the head of a vanning machine."

The following curious incident, whereby a blast was fired by lightning in a stone quarry at Windmill Point, is related by an engineering contemporary: This quarry was opened this year and at present is not one hundred feet wide, but is about nine hundred feet long extending east and west. On the south side is a line of seven derricks one hundred feet apart with masts fifty feet high. Each mast is guyed with six independent wire cables 250 feet long fastened to the bottom of trees, stumps and logs, buried under piles of stone. One hundred feet from the easternmost of these derricks is the first one of two more one hundred feet apart in a line about 45 degrees from the continuation of the other line and north of it. These two are guyed the same as the others. It may be readily seen that some of the guys of one derrick cross the guys of two or more other derricks at different elevations. This happens in many parts of the quarry. Each pair of derricks is operated by one double drum hoisting engine. The first three derricks on the west end stand in a little grove and one guy from the second derrick is fastened around the bottom of a tree. On Monday, Sept. 13, a thunder storm passed over the quarry a few minutes before the men quit for the noon hour during which this tree was struck by lightning. One of the guys of derrick No. 1 passes about two feet above one of the guys of derrick No. 3, which is again about forty feet above the level of the quarry under this crossing. At the time the lightning struck the tree a number of holes in succession had been charged, one of which was under the above crossing of guys. These holes were five or six feet apart and six feet deep and were charged with about five pounds of 40 or 50 per cent. dynamite. The exploder wires as well as the leading wires are connected and the charges are fired after the men quit work at noon and also at night. At the instant the lightning struck the tree as near as is known, and while the men were working in all parts of the quarry, a flash was seen to pass vertically above one of the holes, followed by the explosion of the charge and the throwing about of the stone. A curious circumstance was that only one hole was exploded and that no one was hurt.

The sinking of a round shaft, with present known appliances, is a far more difficult operation than the sinking of a rectangular shaft. In a rectangular shaft, varying from 7 to 8 feet in width, a bar of that length, fixed to the sides of the shaft, will retain its rigidity sufficiently when the drills are in operation; but in a round shaft, where a fixed bar has to be the whole span, of the shaft's diameter, the length is too great to secure the rigidity of the bar when the drills are in operation; hence tripods and mounted bars have to be used, which are ineffective in their work, and entail a maximum amount of labor and cost, with a minimum result in the speed of sinking. McCulloch's shaft-sinking frame, made by the Tuckingmill Foundry Co., Cornwall, is so designed that the bars on which the drills are operated shall be perfectly rigid, removing at once all difficulties connected with round shafts, and enabling them to be sunk with an economy in working, and with speed in sinking. The frame is lowered by ropes, working from the hoppet head of the shaft, and is attached to the cross-heads of the frame, and these ropes pass through a guide. The kibble rope also passes through the same guide, thus preventing the kibble from swaying, and avoiding as well any possible entanglement with the frame ropes. The frame is built up of hollow tubes, on which a number of clamps are placed. The centre of the frame is a square of four fixed bars, held together by four strong crossheads. The movable bars pass through these crossheads, at right angles to the fixed bars or framing, and are moved quickly to the circumference of the shaft by a rack and pinion. The cone parts of each bar are then screwed up against the shaft by a screw, operated at the back end of the bars, and which moves within the bars or tubes. This arrangement enables the frame to be tightened up

against the shaft when the drills are in actual operation, and not in any way altering their position, or the holes that are being bored. It is also automatic in its movement, for whenever the frame is loosened (through the jar and vibration of the drills, or from any other cause), the lever and weight attached to each screw of the bar has a tendency to tighten the frame against the shaft's circumference. The frame has only to be lowered to the required distance from the floor of the shaft, tightened against the circumference, and is at once ready for work.

The clean-up of the Cariboo Hydraulic Mining Company for the season is estimated to be about \$136,000—somewhat below the amount anticipated, and due to a shortage in the supply of water. This will be remedied by the new works contemplated by the company. By the way, the capital of the company has been increased to \$5,000,000, in shares of \$5, \$4,000,000 of which is allotted to the shareholders of the old company, and \$1,000,000 held in the treasury for disposal by shareholders. The directors for the ensuing year include W. D. Matthews, E. B. Osler and H. C. Hammond, of Toronto, and George F. Hartt, R. B. Angus, T. G. Shaughnessey and John Cassils, of Montreal.

The trial balance recently issued by the Noble Five Consolidated Mining and Milling Co., of Cody, B.C., gives some interesting information respecting the company's operations. It appears that the company secured \$80,000 through the sale of treasury stock, which sum was supplemented by the proceeds of accommodations at the Bank of British North America at Sandon, to the amount of \$33,000. To the amount of its obligations to the bank, and another \$20,000 for supplies and labor, the company is in arrears. The gross value of the ore shipped by the company is given at \$119,781.08, against which there was a charge of \$27,998.03 for freight and treatment, \$16,391.46 for ore duties, and \$50,728.17 as the actual cost of mining, \$8,044.97 as the cost of operating the concentrator, and \$5,670.82 as the cost of operating the tramway, so that the cost of the actual handling of the company's output, exclusive of management, tools, interest, etc., was \$117,833.05, or within \$2,000 of the gross value of the ore mined. The cost of the tramway is entered at \$25,173.89, the concentrator at \$33,529.42, and development at \$23,510.79. As a result of this lavish expenditure, the company is in difficulties. An effort is being made to borrow \$150,000 to wipe out this indebtedness and to carry on operations. A radical change in the management would seem to be necessary.

Gold on the Brain.

Whatever of veracity, or the lack of it, may be in current reports as to the gold deposits in far away Alaska, one thing is evident, that the public mind has been fired with an easily ignited zeal to secure what there may be of the yellow metal stowed away under the Alaskan icy apron. All kinds and conditions of men, with or without money or experience, are being inspired with Alaskan ambitions. As is usual in such cases, common sense, prudence, and a candid investigation of the situation are, for a time, laid aside with shoes needing mending, and collars in need of soap. Men otherwise of a practical and sagacious turn of mind are suddenly illuminated with golden visions, and with or without good reasons, join in a stampede, they may end in chasing a rainbow or making a fortune, with the chances in favor of the rainbow.

In the present instance, the gold fever is not without its precedents, and is only phenomenal when placed in contrast with the supposed increased intelligence of the times. Of other like fevers burning in men's

bones, all of us are more or less familiar. History is a box of such skeletons as in the quest of the precious metal have become lunches for buzzards, or victims of boomers and transportation companies. The curtain has not yet been dropped on the stage where comedy and tragedy join hands in the great and never-ending drama of gold on the brain. In this particular phase of what sometimes seems to be temporary insanity, Ballarat and Bendigo in Australia, Kimberly and the Rand in South Africa, and places beyond enumeration in the United States and adjacent territory are in grim evidence. The apple of fortune has dropped in certain baskets, but of empty hands and disappointed men no census has or ever could be taken. Everybody knows this, but the first report of a nugget turning on the end of a pick, or of a diamond gleaming on a shovel, sets men walking on their head and talking with their heels. It may be folly, but it is human nature, and as the house fly of to-day finds the sore place on a horse and the molasses in a store, just the same as his ancestors did when Moses was a boy, and Solomon knew less than his school master; so in the nineteenth century as in the first, a golden finger beckons the crowd to fortune or to ruin. The crowd is never missing from the Klondyke to the Orange River, or from Peru to Australasia. In many cases the pilgrimage of the prospector has been the precursor of states and kingdoms. New country has been exploited and settled, and civilisation behind a pick has made as rapid a march as behind the cannon. All this may be historically true, but it in no sense justifies a man in neglecting to look before he leaps. We are of opinion that some blind leaps may be made in the present Alaskan craze, and what looking is done, will be that of the traditional dog who let go the bone in his mouth for its shadow in the stream. It may or it may not be that Alaska is richer than Threadneedle Street or the Bourse, but the wise man will certainly count the cost before making the experiment. As of old, so in the year of our Lord, 1897, the boomer will display his splendid abilities in making mountains of mole-hills, and paradises where a rat would miss his dinner, and transportation companies will collect fares from men, who if they ever get back at all, it will be with a sore memory, thin shoes, and a hobo's satchel. On the other hand Alaska may wear a golden shirt under its furs, and make many millionaires of adventurous shoemakers, and men who never owned a house or rode in anything else but a wheelbarrow may build palaces and drive thoroughbreds, but if it is left to a turn of the dice box and not to well-planned and well-justified enterprise, it will be an accident to the few, and a vanished dream to the many. It would be well if in this movement to Alaska men would use common sense as in buying a pair of shoes, and be sure of a fit before paying the bill. Gold on the brain does not always reach the pocket.—“*The Age of Steel.*”

Battery By-Products.

(Address by CHARLES BUTTER'S, before the Chemical and Metallurgical Society of South Africa.)

I may say I have divided this subject into the by-products that are obtained from the mills, and from the chlorination works, cyanide works, and the melting-room. First I take

By-Products from Stamp Mills.

In the process of amalgamation we have the inside copper plates, the screens through which the pulp passes and the outside copper plates, brushes and rags that are used to clean the plates with, the screen frames, mortar boxes, shoes and dies; all these come in contact with the gold and quicksilver, and take up more or less amalgam. The ordinary clean-up gives the plate scrapings, which contain, besides

the gold amalgam, particles of iron, sand, iron pyrites, especially magnetic iron pyrites when present, bits of copper, sometimes a little grease, and various coloured metallic films that spread over the plates as a result of the decomposition of pyrites and other sulphur compounds. This amalgam is then cleaned by grinding and washing, generally in an amalgamating barrel with various chemicals, such as lime, cyanide of potassium, and other chemicals special to the individual amalgamator. Into this barrel is also put the ashes which result from the burning of the chips, rags, brushes, scalings from the screens, the cleanings round the dies, and all the odds and ends round the amalgamating room that may contain a little amalgam. As a rule, this barrel is a grinding barrel, and its products at the finish of the operation are clean amalgam, fine silica, slime, and water containing various chemicals. At many of the best mills, when the barrel is empty all these various products are saved, because complete amalgamation of all the gold contained in the barrel has not by any means taken place. Some of the quicksilver has been floured, some of the hard amalgam has been ground up into an impalpable powder, and in the grinding up of the pyrites some of the amalgam adhering to the fine grains of the pyrites is floured. Where cyanide has been used, which is frequently the case, some of this floured gold has been dissolved. Hence, besides looking after the amalgam from this barrel, the sands and slimes should be most carefully settled, and the water drained into a collecting tank filled with scrap iron, old zinc, cyanide cases, bits of screens from the battery; in fact, any old scrap iron that may be about that might contain gold. This tank is assiduated with sulphuric acid, and the sludge from it, in addition to the slime and sand settled from the washing of the amalgam, can be sent away for treatment. The value of this product will vary from 50 to 300 ounces to the ton. The sludge tank should be cleaned up once or twice a year, and the sands and slimes twice or four times a year, according to the size of mill. The above remarks apply to any form of grinding pan or other machine for cleaning amalgam. The value of this product and the weight obtained varies, of course, with the size of the mill and the richness of the ores. In a 100-stamp mill, from 40 to 50 ounces may be easily obtained from this source per month. In many mills this material is run straight to waste. The screens, after being rusted and beaten, still contain about two ounces to the ton, and can be readily sold as a blast furnace flux, or worked up for ferrous sulphate in a chlorination works, and the sludge from this afterwards treated. The copper plates, upon being worn out and cast to one side, still contain, after the most careful scaling, sufficient gold to make them worth more for their gold contents than for their copper value. These should always be sold to a refinery. The iron chips, which are known as battery chips, always contain more or less amalgam, even after the most careful rusting and cleaning. A very efficient and cheap way of rusting battery chips, old screens, and any old iron that may be suspected of containing amalgam, is to make a bed of clean concentrates—that is, concentrates containing as much sulphur as possible,—and bed the screens and chips in alternate layers of screens, chips and concentrates, and keep this bed watered with a solution of warm water and salt for about a month or six weeks. At the end of that time, if this has been done in a warm place near a boiler furnace, or, if that is not obtainable, under a glass frame, in the same way as a forcing bed for flowers would be arranged, this material can be dried and put through a ball mill. What iron is left from the chips, or pieces of iron, would be so deeply rusted that all amalgam is scaled off, and the screens will be found to have disappeared and pulverised. This product is then available for the blast furnace or chlorination works. The gold obtained from these various sources is quite sufficient to warrant the serious attention of the amalgamator.

By-Products from Cyanide Works.

The by-products that are obtained from the cyanide works are very much less in the case of fresh unoxidised ores than from acid or partly oxidised ores. Where the ores crushed have been exposed to atmospheric influences, and are partly weathered, the products of incomplete decomposition of the iron compounds always introduces a series of complication in the solution and precipitation of the gold, that increases the amount of by-products, whether the gold so dissolved is precipitated by chemical or electrical agency. In the case of the unweathered pyritic ore, or of perfectly oxidised ore, a solution is obtained comparatively free of iron salts, but in the case of a partially oxidised ore the ferrous and ferric salts produced form, with cyanide and alkali, ferro-cyanides and ferrous and ferric hydrates. These diminish the efficiency, more especially of the chemical precipitating agency, and also increases the amount of sludge obtained from the electrical precipitation boxes. In the case of these acid ores, a comparatively large amount of lime is needed, which, going into solution in the shape of hydrate, carbonate, and sulphate of lime, crystallises out in the zinc box and in the electrical precipitating box upon almost everything that it comes in contact with, more or less destroying the precipitating surfaces. This is a serious difficulty in the treatment of acid slimes. The surfaces of the lead cathode are almost completely covered after a few weeks by these comparatively insoluble lime salts, which gradually slip off the lead surfaces. By carrying down gold they thus tend to enrich the precipitates in the bottom of the boxes, as well as the floating precipitates which pass through the boxes and out into the sump. In zinc precipitation everything that accumulates in the box in the way of slime is taken as the main clean-up. The particles which flow away from the box in mechanical suspension in the form of insoluble complex cyanides and hydrates, clayey matter, insoluble humus which has been precipitated from humic acid, and, in fact, any flocculent participates that may float through the box, will always carry gold along with them, which may be partly deposited in the sump. Hence, one might properly say the only by-product produced directly from the zinc precipitation boxes, outside of the products resulting from the treatment of the zinc slimes, are the participates obtained from either the settlement of the precipitated liquors, or the precipitate obtained by filtration of all the liquids after passing through the zinc box. Under ordinary conditions, in a well conducted cyanide works, treating fresh ores, filtration of the precipitated solutions merely to obtain the floating matter from the zinc boxes would not pay, but where acid ores are treated the precipitated sludge obtained from the sumps is of sufficient importance to warrant its careful collection. This precipitate varies in value from 1 up to 20 ozs. to the ton. Precipitates so obtained from the Simmer and Jack cyanide works, where fresh pyritic ores have been treated, assayed 2 ozs. 18 dwts. During the precipitation of rich solutions, running from 5 ozs. to 8 ozs. to the ton, flocculent precipitates assaying 14 ozs. per ton, and composed of zinc cyanide and zinc ferro-cyanide, insoluble in the dilute liquor used, were carried over into the sumps. A skimming taken from the top of the treated tank, partly mixed with exhausted residue, gave an assay of 16-dwts per ton, due mainly to finely-divided precipitated gold, which had been pumped back. Black skimmings of organic matter, resulting in the same way from the filtering through sand of precipitated liquors, gave an assay of 5 dwts. per ton. I consider it worth the attention of cyanide managers to see that the sumps are regularly cleaned of sludge, which may be dried by pouring into a small enclosure or dam made of tailings in the open air. After two or three weeks this material is dry enough to sample and assay, and in nearly every case will be found rich enough to sell to the smelting works. The gold in precipitates so obtained is not easily soluble in cyanide

solutions, unless special preparation is given to their proper oxidation, either by means of preliminary roasting, or long continued exposure to aeration and agitation with cyanide solution in an agitating vat. At one of the earliest meetings of the Society, it was mentioned that 300 ozs. of gold were recovered from the sludge in the sumps at a certain works.

By Products obtained from Siemens and Halske's Precipitation Boxes.

In the Siemens and Halske boxes, the main clean-up is obtained from the melting of the lead cathodes. Whatever else is obtained from the box in the shape of gold is termed gold from by-products. The sources of these by-products are the insoluble compounds of iron cyanogen. The iron of the anode oxidises, forming ferrous hydrate, which partly unites with the cyanide in the solution, forming ferro-cyanide, from which Prussian blue is derived, and partly undergoes further oxidation to ferric hydrate. Portion of these precipitates settles in the bottoms of the boxes, and a portion floats through them into the sump, where they become by degrees oxidised to the ferric state. This precipitate also adheres to and saturates the sacking which covers the iron plate, when, after long usage, this sacking becomes rotten, it is removed and burnt, and the anodes are likewise carefully scaled of oxide. The value of the Prussian blue, of the ashes resulting from the burning of the sacks, and of the scalings of the plates, vary with the care and regularity with which the process has been carried on. In a sand plant, where all the solutions come filtered clear to the boxes, the Prussian blue may be cleaned up for sale every two months, and may contain from 5 to 50 ounces to the ton. The product from the sacks and the plates, which is obtained once every one or two years, may have about the same average value as the Prussian blue. The value of these by-products has averaged, so far, at the Worcester, which is the oldest Siemens and Halske sand plant, about 25 ozs. for scalings in 1895, and 21 ozs for scalings in 1896; 21 ozs for Prussian blue in 1895, and 9 ozs. for Prussian blue in 1896. In a slime plant, the difficulty of obtaining an absolutely clear liquid for precipitation introduces a certain amount of ore slime, which becomes mixed with the Prussian blue, thereby increasing the quantity and decreasing the value of this product. With fresh slimes a clearer liquid and less mud is introduced into the precipitation boxes than with acid slimes. What with mud from imperfect settlement, precipitated lime salts, and the formation of insoluble sulphates and hydrates and complex cyanides, any precipitation process, no matter how perfect, is very much handicapped. To prevent this state of affairs in the precipitation boxes, I am now constructing sand filters to clarify the liquid before precipitation. When a sand and slimes plant are worked together, as at the Bonanza, a large proportion of the solutions decanted off from the slimes can be clarified by passing through the sand vats as a wash. The precipitates which form in the boxes themselves do not have nearly so bad an effect as the introduction of a small amount of finely divided silica or clay. While there may not be over 1 oz. to the ton of finely suspended siliceous slime in the liquid flowing through the box, still this small quantity coats both the anode and cathode with a fine film of non-conducting material, thus preventing the gold from adhering firmly to the cathode, as well as raising the voltage in the box. Hence, the clarification of the solutions, whether from fresh or accumulated slimes, will tend to reduce the amount of by-products, which must be sold, and increase the percentage of gold directly obtained by the melting of the lead strips.

Siemens and Halske Melting Room By-Products.

The melting of the Siemens and Halske strips is generally done in a small reverberatory furnace, about 5 feet by 2 feet 6 inches. If this

lead is fairly clean, and free from siliceous mud and iron salts, a quick, clean melting takes place, and at the end of the operation a little powdered coal may be spread over the surface of the oxidised bath, and the temperature raised to as high a point as possible; afterwards the furnace is allowed to cool down, and the lead tapped into moulds. In addition to the clean lead obtained from this melting, which may run from 5 per cent. up to 10 per cent. in gold, there is obtained a clean liquid slag, which is mostly litharge, or in the case of dirty lead strips the temperature obtained is not sufficient to slag this, and a pulverulent residue is left in the furnace, which is known as "skimmings." Generally, where it is necessary to make more than one melting for a clean-up, all the skimmings resulting from previous meltings are put into the furnace, and the furnace is brought up to as high a temperature as possible, and the skimmings are sweated of their remaining lead contents. When every drop of lead has been drained from them that can be obtained, the hot skimmings are raked out and allowed to cool. These skimmings are then ground in a Chilean edge-roller mill, and screened through a screen of about eight holes to the linear inch, from which two by-products are obtained, known as "coarse metallics" and "ground skimmings." The coarse metallics are melted in a pot, and yield one or two bars of lead. The lead bars obtained from the melting furnace are then re-melted in an iron melting pot, carefully skimmed and poured into moulds. The skimmings obtained from this melting pot are added to the first lot of the skimmings obtained from the reverberatory furnace. All the lead, whether obtained directly as bars from the reverberatory furnace or from melting the coarse metallics, is considered lead bullion, and only the skimmings are known as "by-products," for the reason that the skimmings must be re-melted in a pan furnace before their contents are obtained as lead bullion. Under careful treatment, the amount of gold obtained in the skimmings may be reduced to under 1 per cent. The cupellation of this bullion produces another set of by-products, amounting to about $\frac{1}{4}$ per cent., which are known as the "refinery by-products."

Chlorination Works By Products.

The only by-product which is obtained from chlorination works is the sludge which is cleaned up once or twice a year from the second set of precipitation vats. In the precipitation of gold from chlorine solutions, by means of sulphate of iron, the presence of certain salts in the solution prevent complete precipitation of the gold, and, in addition to that, there always remains a certain amount of suspended gold in the liquids. Sufficient time for complete settlement is seldom given. In some works the precipitated liquor is drawn off from the gold 24 hours after precipitation; in other works 48 hours are given. I rarely draw it off before 72 hours. In some cases this liquor is passed through the filter-press. Either long settlement or the filter-pressing of the liquid will reduce its assay value; which, however, will still vary with the salts which are contained in it. At our works, after 72 hours, the assay value of the liquor is from 4 to 12 grains; if there is much copper present, an average of about 2 dwts. may be expected. The presence of lime also tends to give a higher value. The precipitation of very dilute liquors of from 2 to 3 dwts. is frequently very imperfect with F_2SO_4 . Precipitation by means of hydrogen sulphide gives the lowest residue. This acid liquor, when drawn off from the precipitated gold and placed in tanks filled with scrap iron, rapidly decomposes, yielding a precipitate of gold, copper, and basic iron sulphides and hydrates. In a temperate climate, at the end of a week the liquor can be run to waste, assaying not over 2 grs.; in a cold climate, these vats are generally enclosed in a house, and slightly warmed by steam. The sludge obtained from these final precipitation vats is worth from 1s. to 8s. per ton of ore treated, and no chlorination works is con-

sidered complete without them. In California, the gold obtained from this sludge is equivalent to about 2 per cent. to $2\frac{1}{2}$ per cent. of the total gold obtained in the chlorination works. The by-products obtained from melting the slimes are very small, because in well-conducted works the slime is nearly pure gold. The treatment of the slag produced will be mentioned under the heading of "melting-room by-products."

By Products from the Melting Room.

The product taken to the melting-room from the chlorination works is slime which has been treated by sulphuric acid and carefully washed and may contain from 25 per cent. to 90 per cent. of gold. In the handling and melting of this, there is a certain loss of gold which is left on the hands and tools when mixing with fluxes; and a certain amount is lost in transferring to the crucible, in the slag, in the mould, and in the sink where the bar is scrubbed and cleaned. From every one of these sources of loss ultimately the bulk of the gold can be recovered. All of the above remarks apply also to the precipitates obtained from zinc boxes. In every melting-room there should be a couple of tanks, holding from 100 to 200 gallons of water. All the washings from the tools and hands, and from the sink where the bar is cleaned should be thrown in this tank. At the end of every four or five months this liquid should be carefully drawn off after assaying, and the precipitate cleaned up. I have known as high as 200 ozs. taken from a tank of this description. At the end of the year, even with the most careful work, the tank in the melting-room is always a source of profit. The pots may be scaled, and the scalings melted after grinding; after most careful scaling the pots will still be found to contain from 20 to 40 ozs. to the ton. The ashes and flue-dust from the melting furnaces may be cleaned up, and the former will be found to contain on an average about 5 ozs. to the ton; along with the pots they form the most refractory material with which the smelter has to deal. The slag from melting zinc gold slimes, after grinding and panning, will assay from 25 to 200 ozs. to the ton; an average of 50 ozs. to the ton is what is generally found here. Unless the zinc slimes have been treated by the acid process, the slags are by far the most important by-product of the melting-room. In case the slimes have been treated by the acid process, the thin lead *matte* which is found upon the bar after pouring has been found to contain about 14 per cent. gold. Finally, the furnace in which the material has been either roasted or melted becomes saturated with gold, and when renovations take place all brickwork and mortar of the furnace, as well as the brickwork of the floor, will give an average value of about 20 ozs. to the ton. Where mill gold only is handled, only the immediate lining of the furnace is valuable. In the panning of the ground slags for the coarse gold which is sometimes done here in small rockers or on incline tables, I have frequently noticed that only the coarse particles of this ground slag is saved, and the finer particles or slimes flowing away with the water is allowed to go to waste. Quite 20 per cent. or 25 per cent. of the ground slag goes into slime, and this assays just as high as the coarser particles. No water should be allowed to flow to waste when the slags are washed, but should all be retained in tanks for clear settlement, and subsequent cleaning-up and drying of the settled slimes. The cemented or iron floor of the melting-room should be kept scrupulously clean, and the sweepings carefully saved, as they will invariably assay over 5 ozs. to the ton.

The attention of managers and directors should be given to these sources of income, and regular quarterly account sales of these by-products should be required. Too frequently the battery is utilised, as the great sewer through which these valuable products disappear, along with a large proportion of their values.

War Eagle Consolidated Mining and Development Co.

DIRECTORS' REPORT AND ACCOUNTS SUBMITTED AT FIRST MEETING OF SHAREHOLDERS.

We are indebted to Mr. George Gooderham, President of the Company, for the following very full and complete statement of the affairs of this Company, as embodied in the reports submitted to the shareholders at their first annual meeting on 23rd ultimo:—

Excerpt from Directors' Report.

Submitted herewith is a statement of the accounts and a report on the mine, the former being brought down to the 30th of September, and the latter to the 31st of October.

These are so complete as to call for little by way of comment or explanation.

FREIGHT AND TREATMENT OF ORES.

The Directors having found it impossible under existing conditions to obtain any reduction in the cost of freight and treatment of the Company's ores, and feeling that the present rates could not be long maintained in the face of improving railway facilities and the competition likely to ensue thereon determined in July last to stop shipping altogether, and to devote their energies to putting the mine in shape to ship freely when rates were satisfactory.

Up to that time the Company had been shipping about thirty tons a day, chiefly ore encountered in development.

This policy of withholding the ores from shipment has been abundantly justified by the important announcement since made by the Canadian Pacific Railway, both to your Directors and to the public generally, that it will at once provide for the transportation and treatment of Rossland ores at cost for the purpose of stimulating the development of that camp.

What these rates, both for freight and treatment, will be, your Directors are at present unable to announce, but that they will be settled within the next month, and that they will be sufficiently below existing rates to justify the Company its policy of non-shipment is not open to doubt.

In view of the magnitude of the ore reserves on hand and the extent of the development of the War Eagle Mine it will be necessary as soon as possible to double the capacity of our compressor and hoisting plant in order to be prepared to handle our output and maintain our ore reserves.

In this connection it may be said that the West Kootenay Power & Light Company are installing an electric plant of 5,000 horse power at Kootenay Falls, and have promised power this winter at one-half the cost of steam.

Altogether your Directors think the shareholders are to be congratulated on the continued improvement in the mine under systematic development and in the certain prospect of being able within the next few months to materially cheapen the cost of mining, transporting and treating the Company's ores.

GEORGE GOODERHAM, *President.*

ACCOUNTS FOR NINE MONTHS ENDING 30TH SEPT. 1897.

<i>Assets.</i>		
Mines and Mineral Claims		\$1,670,013 11
Cash, on hand and in banks—		
Bank of Montreal, Rossland	\$2,404 01	
Bank of Toronto, Toronto	991 55	
On hand	228 05	
		3,626 61
Mine supplies, etc., on hand—		
Candles	\$51 20	
Powder	1,791 57	
Lumber	453 88	
Fuel	423 75	
Lubricating oils	389 16	
Pipe and fittings	630 37	
Drill and machine fittings	1,507 49	
Rolling stock and rails	803 84	
		6,051 26
Permanent improvements	3,131 29	
Boarding-house improvement	25 00	
		3,156 29
Boarding-house supplies	1,525 95	
Rossland Office furniture and fixtures	355 12	
Toronto " " "	301 30	
B. C. Smelting & Refining Co. for exchange on ore settlements	3 59	
Hall Mines Limited, " " "	0 15	
		\$1,685,033 41
Profit and Loss		40,779 61
		\$1,725,813 02
<i>Liabilities.</i>		
Capital stock paid up	\$1,650,000 00	
George Gooderham	75,813 02	
		\$1,725,813 02

PROFIT AND LOSS ACCOUNT.

To cost of Mining, etc.—	
<i>War Eagle Mine:</i>	
Mine labor	\$60,894 22
Mine supplies	14,216 78
Compressor supplies	444 52
Compressor labor	2,388 29
Fuel	4,002 74

Office expense	\$21 76
Salaries	5,503 29
Assaying	1,409 28
General expense	1,287 86
Legal expense	250 45
Surveying expense	429 25
Written off for depreciation in value of permanent improvements, rolling stock, rail, tools, office furniture, etc.	2,989 25
	\$94,637 69

<i>Crown Point Mine:</i>	
Mine labor	\$12,624 25
Mine supplies	3,749 13
Compressor labor	2,503 87
Salaries	950 24
Office expense	3 75
Legal expense	334 00
Compressor supplies	90 26
General expense	237 30
Assaying	37 75
Fuel	794 62
	21,415 17

<i>Richmond Group</i>	
Assessment work, etc.	1,172 60
To Tiger and Uncle Sam	870 25
" General expenses	4,845 16
" Toronto Office expenses	\$60 10
" Boarding-house labor	259 30
" Interest	1,686 70
	\$125,746 97

By net proceeds of ore sales	\$68,983 24
" Profits of the War Eagle Gold Mining Co. from 1st to 20th January, 1897	15,846 87
	\$84,830 11
" Transfer fees	137 25
" Balance	40,779 61
	\$125,746 97

Manager's Report.

CROWN POINT.

The main tunnel was run fifty feet ahead, passing through some stringers of copper ore without gold value. The drift at level of bottom of shaft, continued north by hand drills, is in the vein, but only a scattering of iron and copper, without value. The station for the underground hoist is being cut out under the raise.

WAR EAGLE.

Since May 22nd, date of my semi-annual report, up till October 1st, 1,468½ feet of tunnelling, 135 feet of raising and 115 feet of sinking has been done to prospect the veins, and with favorable results.

No. 1 Raise.—The finest body of ore discovered, was opened by the No. 1 Raise, in the ground lying between the old Nos. 2 and 3 stopes, about No. 1 Tunnel. The virgin area is 120 feet long by 100 feet high. In making the raise, about 350 tons were taken out. A large portion of the ore extracted was shipped with the West Raise ore. 170 tons sold alone, netted \$14.34 per ton. The average of mine samples in this working gives a width of five feet and a value of \$24.50 gold. Some fifty tons are broken in the Raise ready for shipment. The top is ten feet from the surface. The Nos. 2 and 3 Chutes were always considered as disconnected above tunnel No. 1, but are now shown to be ends of a continuous ore chute, comprising old No. 2 Chute, No. 3 Chute, and the ground between. I have just started a prospecting drift east, half way between Tunnel No. 1 and surface, to see whether there is any ore between Nos. 1 and 2 Chutes. The No. 1 Raise ground is equivalent, above the No. 1 Tunnel, to the West stope ground above the No. 2.

West Stope, West Raise Stopes.—The West Stope and West Raise Stopes are fulfilling all the conditions I pointed out on May 22nd. They contain, as far as worked, a continuous body of ore six feet wide. Between May 22nd and October 1st, 1,342 tons were shipped, and 1,060 tons broken ready for shipment. The value is fairly represented by the average value of the total ore shipped, \$23.00 per ton.

375 Foot Levels.—The 375 east and west have not done as well as expected. Both are driven on bodies of ore five to ten feet wide, assaying \$10.00 to \$16.00 gold. The 375 east for the past twenty feet has had a fine body of ore five feet wide, assaying \$16.00 gold, about \$20.00 total values, very heavy in iron, and looking as if it might make quite a strong chute. This ore is further east than the good showing on No. 2 tunnel. The 375 west is also improving. The faces of the two drifts are already 385 feet apart all in ore bearing ground. I expect the 375 west will continue for eighty-five feet and the 375 east for fifty feet; if so, the ore chute on the 375 level will be 510 feet long. Ninety tons of ore have been shipped from these drifts; the rest is on the second class dumps.

500 Foot Tunnel.—On the 500 ft. level, at the winze, the vein has only been cross-cut. It is ten feet wide, and the portion that looks like the pay streak is five feet. The average values were too low to be called ore, going about \$4.00; hand samples went up to \$38.00. I have no doubt that in drifting, bodies of shipping value will be found. The winze is down 270 feet, twenty-eight feet below the 500 foot level; both it and the 500 foot levels east and west will be pushed.

The 500 foot level east from our extension of the Iron Mask tunnel is 140 feet long, and encountered a body of quartz ore, six feet wide, fifty feet long, and averaging \$15.00 per ton gold. The 500 foot level, westward from the extension of the Iron Mask, is 516 feet long, and has just entered a vein carrying a pay streak twelve inches wide, assaying \$75.00 gold. This working is now getting into favorable ground for ore, it is 450 feet further to the

winze. A branch called the South 500 Wes' has been run southwesterly for 257 feet from this tunnel, to prospect a parallel vein without finding any ore.

East Raise.—Prospecting here has not resulted favorably. Some ore was found, but nothing to really add to the value of the mine. We will push the workings further.

South Drift.—This has been run north 63 feet from Tunnel No 2 and passed into an ore body 50 feet long, 30 inches wide, assaying \$20.00 gold per ton. This amount of ore is still in the face. The drift has also been run south 341 feet and just struck an ore body 18 inches wide, assaying \$26.00 gold.

Summary.—From the estimate of ore in sight, it will be seen that I am able to claim \$722,000 net; an advance of \$237,000 over May 22nd. Were it desired to ship ore, I would put machines stopping in the West Raise, West Stope No. 1, Raise 375 East and 375 West. Without any exertion, they would each produce twenty tons, or one hundred tons daily, while I have no doubt various other openings in the mine would lend their quota.

Development.—It will be seen from the maps that the veins are opened 520 feet on their greatest depth, and 1,400 on their greatest length. During the year, from January 20th to September 30th, the following work has been accomplished:

2,354 feet of tunnelling and drifting at average cost per foot.....	\$20 12
371 feet of raising, at average cost per foot.....	30 33
173 feet of sinking, at average cost per foot.....	92 29
4,810.75 tons of ore stoped, at average cost per ton.....	3 25
1,050 tons of ore broken in stopes ready for shipment.....	2 80
600 tons produced from headings and shipped, not included in cost.	
50 tons produced from headings, yet in chutes.	

These costs are fully specified in the accompanying tables. The old headings, at the time this Company took over the mine, aggregated, 2,825 feet, so by September 30th the development was doubled. On November 23rd there were 1 1/4 miles of tunnels, drifts, raises, and winzes.

Ore Shipments.—The following tables, "Product of the Mine" amount of ore sold to smelters, its value, and their charges. As you know, the smelters do not pay market values, but arbitrary ones set by themselves. For instance, the actual average gross values contained in War Eagle ore, sold since January 20th, per ton were:—

Gold at \$20.66 per oz.....	\$19,773
Silver at 60 1/2 per oz.....	1,981
Copper at 10 3/4 c. per lb. (N.Y. price for casting)...	5,530
Average actual market value per ton.....	\$27,284
The average gross value per ton returned by the smelters was.....	\$23,014
Difference, or indirect charge for smelting.....	\$ 4,270
The average direct smelting charge per ton.....	10,150
Total real smelting charge per ton.....	\$14,425

The total gross value at market prices during period of shipment of the 5,410,100 1/2 tons, between January 20th and September 30th, 1897, was:

Gold, 5,178,737 1/2 oz. at \$20.66.....	\$106,992.60
Silver, 17,803,300 1/2 oz. at 60 1/2 c.....	10,720.72
Copper, 278,316 lbs. at 10 3/4 c.....	29,918.97
Total market value.....	\$147,632.29
Total smelters' gross value.....	125,526.62
Total smelters' net value.....	69,577.77

PRODUCT OF THE MINE.

Charges and Values per Ton.

YEAR.	Net Value.	Direct Smelting Charge.	Smelters' Gross Value.	Indirect Smelting Charge.	Total Actual Smelting Charge.	Gross Market Value.
1894.....	\$24 41	\$12 50	\$36 91	\$6 63	\$19 13	\$43 54
1895.....	29 05	10 87	39 92	7 41	18 28	47 33
1896.....	21 29	8 89	31 18	5 79	15 68	36 97
1897.....	14 69	9 42	24 11	4 18	13 90	28 59
1897.....	12 86	10 15	23 01	4 27	14 42	27 28

Charges and Value per Annum.

YEAR.	Net Tonnage.	Net Value.	Direct Smelting Charge.	Smelters' Gross Value.
1894.....	46.93	\$1,145 55	\$586 62	\$1,732 17
1895.....	9,980.93	289,951 36	138,485 32	398,437 68
1896.....	8,920.29	189,944 38	83,222 41	278,166 79
1897.....	1,995.55	29,318 42	18,803 57	48,121 99
1897.....	5,410.75	69,577 77	54,948 85	124,526 62
	26,354.45	\$579,937 48	\$271,047 77	\$850,985 25

YEAR.	Indirect Smelting Charge.	Total Smelting Charge.	Market Value.
1894.....	\$321 39	\$908 01	\$2,053 56
1895.....	73,925 83	182,412 15	472,363 51
1896.....	51,611 07	139,833 48	329,777 86
1897.....	8,928 55	27,732 12	57,950 51
1897.....	23,105 67	78,054 52	107,632 29
	\$157,892 51	\$428,940 28	\$1,008,877 76

Ore Reserves.—By a careful comparison of the areas now opened by the No. 1 Raise, No. 1 Tunnel, West Raise, No. 2 Tunnel, Winze, and 375-foot Levels, with those from which the past product of the mine has been extracted, and the output of the small stope in Josie North, the shaft at mouth of No. 2 Tunnel, and small ore chute in the 500 East, I consider that 38,000 tons smelters' gross value \$29.10 per ton, total \$1,108,000.00, a safe estimate of ore that may be called in sight. Probably in extraction a greater tonnage of lower value than this estimate will be produced, but the net results will be the same. The valuation and tonnage is based upon past product of the mine. I do not mean to preclude the possibilities of the ground now opened yielding in excess of estimate. The mine is in an advantageous position for stoping, and while carrying on the present line of development, this ore could be placed on cars at foot of ore bins for \$3.25 per ton, and the total amount extracted in a year. The cost of extraction per ton, so far, has been \$3.25, an analysis of which is shown in the table of costs.

Thirty-eight thousand tons in sight at \$29.10 per ton may be considered a proportionately high value in comparison with five thousand four hundred and eleven tons shipped this year at \$23.01 per ton.

I believe the ore shipped was lower grade than the total of the ore blocked in the mine, because it came from West Raise on the west boundary of the ore chute, from the West Stope, all along the bottom of an ore chute where it passed into a barren zone; from the ragged edges of the old No. 2 Stopes, and from the 375 East and West, that are in a fairly poor level as far as run; the only heavy ore came from the No. 1 Raise.

The ore estimated in sight is along the No. 1 Raise and the shaft, and under the high-grade body found on No. 2 Tunnel, and in the heart of the West Raise or No. 3 Chute.

I should judge that at least 10,000 tons of low-grade ore would be mined with the 38,000 tons of high-grade. With low general smelting rates, this would probably go direct to the smelter, otherwise to the second-class dump. Six thousand tons of such ore is already on the dumps and about the mine, extracted with the past high-grade ore. I could not give any authoritative estimate of the values of this 10,000 tons—probably \$10.00 per ton.

A careful analysis of all our vein samples in ore of quantity that would have been considered worth stoping shows the following percentage of values:

Gold Values.	Per Cent.	Gold Values.	Per Cent.	Gold Values.	Per Cent.
\$1 00	0.34	\$14 00	6.32	\$30 00	0.86
2 00	1.20	16 00	12.13	32 00	3.08
3 00	1.54	18 00	5.13	34 00	0.68
4 00	5.13	20 00	4.61	36 00	0.85
6 00	8.20	22 00	1.71	38 00	0.17
8 00	16.07	24 00	3.59	40 00	2.31
10 00	10.94	26 00	3.56	50 60	1.37
12 00	8.85	28 00	1.71	80 90	0.68
				\$15 41	99.88

This data is from 385 assays; their average value in gold is \$15.41. A rejection of the low-grade ore to either the waste or the second-class dumps, and hand-sorting, brings up the contents to shipping values. The percentages are not exactly fair, as I think the wider ore bodies were the richer. So far, there has not been any large bodies of lower-grade ore than this discovered in the War Eagle. About the rest of the camp, I have not the requisite information to judge. They would occur in the Centre Star, Cliff, Cons. St. Elmo, Columbia and Kootenay, Monte Cristo, Great Western, Jumbo, Deer Park, and Iron Horse.

Future Working.—Following the present lines for the immediate future is the best. An enlargement of compressor plant and hoisting engine will be necessary. This will not be practicable until next Spring, when the proposition of a vertical shaft can also be met.

Cost of Mining.—This is fully set forth in the monthly statements rendered and others herewith attached. The driving expense is comparatively high, and the country rock, a dark augite porphyrite, as comparatively hard; the costs of ore extraction are not so bad.

Richmond Group.—Only the necessary assessment work has been done on these claims. They have also been surveyed, and application made for Crown grant.

In conclusion, I wish to call the attention of the Board to the cheerful and efficient services of Mr. John Fitzwilliams, the foreman, and Mr. Charles V. Jenkins, the accountant.

Yours truly, JOHN B. HASTINGS.

COMPARATIVE STATEMENT OF MINE COSTS.

Showing average cost per foot for period from January 20th to June 30th, 1897, as compared with costs for period from July 1st to September 30th, 1897, not including charge for depreciation in value of permanent tools, appliances, etc., etc.

MINING NOTES.

British Columbia.

WEST KOOTENAY.

The production of West Kootenay for the month of November is beating all previous records, just as each month since July has done. The total production being for the month about \$375,000, an increase over October of \$40,000, and this gives a daily production of about \$29,000. The increase being mainly due to the increased output of the Hall mines smelter which is now treating custom ores, and the Slocan which is shipping more heavily than ever.

The Fern mine, of Nelson Division, which has been running 10 stamps for the last couple of months, has cleaned up during that period some \$15,000 from 1,000 tons of ore yielding \$14.50 per ton with value in the concentrates besides this \$14.50 which is free milling.

This demonstrates the existence of valuable gold properties in the Nelson and Southern Slocan or Slocan City divisions. In the latter division the Chapleau recently made a shipment of one carload, or 20 tons, which gave a value of 5.6 oz. in gold and 60 oz. in silver, or a value of \$112.00 in gold alone. This for a car lot is pretty fair.

The Enterprise for some time idle on account of changing hands has now renewed operations. It is one of the leading wet ore properties of Slocan City division. The mainstay of that camp being a silicious dry ore of gold and silver.

To-day, Dec. 6th, there is being held a celebration in Slocan City to mark the opening of the C.P.R. branch road up Slocan River valley. This road now open gives a direct line from the Slocan to Nelson and Rosland and it will largely replace the routes at present by boat over Kootenay Lake and Arrow Lakes. A good collection of the typical ores of the district is on view, and this with a renewal of active mining in the vicinity will help along the district.

The Arlington, the well known "specimen" mine of Springer Creek, begins shipping again to-day. The Chapleau has another carload ready for the new railway and the Evening Star has been transferred to Mr. Hugh Sutherland for a reported price of \$50,000.

The Silver Nugget, also bonded by Mr. Sutherland, has been formed into a close syndicate of owners of whom Messrs. Mann & McKenzie are largely represented.

Under the new management of Messrs. McCune, McDonald, etc., the Last Chance mine of the Slocan is being pushed to the front as a shipper.

The Payne mine, owned by the same people, still leads the way with 500 tons a week, whilst the White Water is a good second with 337 tons.

On Nov. 15th a new mining regulation came into force. This regulation provides, to some extent, for the cases where a free miner allows his yearly licence to lapse. Heretofore, anyone neglecting to renew this yearly free miner's licence, placed his mining property in great jeopardy. In fact he lost all title to it if anyone cared to jump him. Now there is provision made for such cases, and with the help of considerable red tape a man may redeem his error in failing to renew at once on expiration.

The Josie and Associated claims are turned over to the company of which the Hon. Mr. Mackintosh is head. This deal has been pending for some time, and like a good many other Rosland deals, we have a lot of rumors before we learn of a consummation.

The Iron Mask, of late in a dispute with the Centre Star, has been shipping considerably. This ore is not treated at the Trail smelter, but exported raw, as are also all the Slocan, and some of the Ainsworth ores.

The troubles of the Noble Five company do not appear to grow less. It is said that there is a general scramble after amounts due to local creditors.

The Lucky Jim has been sending out some 70 tons of ore a day consigned to the Pilot Bay smelter. The smelter, however, is not yet blown in. This ore concentrates 5 to 1 and is to be shipped in bulk. The cars having a trap door arrangement to receive the ore from the tramway ore bins on the line of railway.

The Idaho paid up another \$30,000 dividend making a total of \$240,000. It is near this mine that the Queen Bess is situate. The Queen Bess is now in the hands of the Queen Bess Proprietary Company Ltd., of London, of which Mr. Kingsley Milbourne is managing director. No large amount of ore has yet been shipped from this mine but it has been well spoken of.

The War Eagle mine is now said by the management to be capable of shipping 100 tons of ore per day, with somewhat over a million dollars in sight. No shipments of any account have been made since it was taken over by the Canadian company, the work being all in development.

J. C. G.

NELSON.

Winter appears to have set in now in earnest, a short spell of very fine, clear and cold weather has been followed by heavy snow and a warmer atmosphere, which makes all locomotion uncomfortable and renders the pedestrian uncertain what kind of costume will be most serviceable in keeping him dry.

Nature of Work.	Period.	Work Accomplished.	Cost per Foot
1. Tunnelling, drifting, etc.	Jan. 20 to June 30.	1,270 ft.	\$19.42
	July 1 to Sept. 30.	1,033 1/2 "	19.52
2. Raising	Jan. 20 to June 30	288 1/2 "	29.17 1/2
	July 1 to Sept. 30	132 1/2 "	29.84
3. Sinking	Jan. 20 to June 30.	98 1/2 "	95.05 1/2
	July 1 to Sept. 30.	76 1/2 "	81.74

NUMBER OF EMPLOYEES.

On War Eagle and Crown Point Mines, these have averaged 107, including boarding houses, 9; and office, 2.

TABLE OF MINE COSTS.

January 20th to Sept. 30th, 1897.

	NATURE OF WORK.				
	TUNNELLING, DRIFTING, ETC.	RAISING	SINKING	ORE EXTRACTION	
				Shipped from Broken-down Stopes	In Stopes, not Shipped
Total No. of feet	2,303 1/2	421	175	4,810 3/4	1,059
Tons of Ore					
Average cost for:					
Drilling	\$6 58 1/2	\$9 44 1/2	\$32 43 1/4	\$0 91	\$0 90
Mucking	2 95 1/4	3 95 3/4	3 89 1/4	44 1/2	08 1/2
Timbering	01 1/2	3 14	7 07 3/4	31 1/2	35 1/2
Smithing	1 18	1 22 1/4	3 91 1/2	10 1/2	16 1/2
General labor	1 76 1/4	2 46 1/2	7 89	23 1/4	23 1/2
Hoisting	27 1/4		5 64		
Ore sorting				16 1/4	01 1/2
Air	1 51 3/4	2 12	7 61	18	21 1/2
Explosives	2 08 3/4	2 76 1/2	7 37 1/2	27	29 1/2
Candles	21 1/2	30 1/4	9 1/2	03	03 1/2
Drill fittings	19 1/4	25 1/2	61 1/2		05 1/2
Lubricating oil	04 1/2	05	19	00 1/2	00 1/2
Gen'l mine supplies	72 1/4	1 10	3 33 1/2	13 1/4	04 1/2
Assaying				07	10 1/2
Surveying	12 1/4	07	47 1/2		
Office expense	18 1/4	27	75	02 1/4	01 1/2
Legal expense	05 1/4	08 1/4	26 1/4	01 1/4	02 1/2
General expense	34 1/2	44 1/2	1 12	03 1/4	05
Salaries	1 18 1/2	1 78	5 66 1/2	19 1/4	10 1/2
Depreciation	65	95	3 05 1/4	09	08 1/2
Total average cost	\$20 11 1/4	\$30 33	\$92 28 1/4	\$5 21 1/4	\$2 80

During the progress of tunnelling and drifting, raising and sinking, 650 tons of ore were produced of which 600 tons were shipped; 50 tons are yet in chutes, entailing a further cost of :-

	Tunnelling	Raising	Sinking
Ore sorting per ft		\$0 43 3/4	
Assaying per ft.	\$0 29 1/4	45 1/4	\$0 32
Or at cost per ton			
Ore sorting	23 1/2		
Assaying	1 43		

Of ore extracted, 100 tons were stoped by hand, costing \$7.28 per ton, the drilling alone being \$3.49.

The smelter returns of the Le Roi show that the ore from that mine is averaging 1.54 ounces in gold, about four per cent copper and in the neighborhood of three ounces in silver, making a total value of about \$40. The numerous surface improvements lately undertaken on the mine are now completed, and Captain Hall, the superintendent, is well satisfied with the shape things are in. Operations have lately been commenced stoping ore at the 100-foot level. In the original development of the mine little attention was paid to the ore at this level, and a fine reserve remains almost untouched. The west drift at the 600-foot level is now in about 225 feet, and the ore body, which is from seven to eighteen feet wide, is showing up most favorably. Stoping will soon be commenced on this level. Notwithstanding the heavy drains on the mine, amounting from \$25,000 to \$30,000 monthly, paid out on the construction of the Northport smelter, the property continues to pay its regular \$50,000 dividends monthly. The smelter will be in running order by January 1, and then work will be resumed on the new three-compartment shaft to the west of the present workings.

The prospectors are now driven from the hills, and the towns are full of men anxious to strike a winter's job, or at any rate to make sufficient to pay their board bills, though no doubt there are a very few who suffer no mental disturbance on account of inability to meet that or any other pecuniary liability.

Work, however, is going on in all directions; claim after claim is being worked by any number from two to two hundred men, all arrangements having been made during the past season to provide adequate shelter and grub during the winter, so that the result of the next few months' work may show with more accuracy what the real value of the property is likely to be, and prepare the owners either to hold or sell next spring.

Perhaps one of the most steadily worked claims is the Fern mine, which has been spoken of frequently. The management made a clean up recently, after running 37 days with ten stamps, crushing during that time about 1000 tons of ore; and were gratified to find the total value was about \$15,000, \$3,000 in concentrates and \$12,000 in gold bricks. This can be considered highly satisfactory, and when the additional 10 stamps are working as they soon will be, dividends should not be far away. The managers claim they have enough ore in sight to last 20 stamps at least one year, and as development work is being steadily carried on all the time, it is probable that the statement is quite within the truth.

Toad Mountain is coming well to the front in the shipping list, as in addition to the Silver King which supplies the Hall Mines smelter, the Morning claim is shipping ore, while the Delight, Irene and Julius Caesar are all busy working and expect to ship ore long before the spring.

The Athabasca is still steadily sending its ore to the smelter, and the results should be very satisfactory to the owners; a sleigh road is being constructed in order to deliver the rock at a less expense, and a large quantity of the best is sacked and ready for shipment when all is complete. A considerable force of men is engaged and work will be prosecuted all winter. This seems a most promising mine.

In the immediate neighborhood of Nelson, on Eagle Creek, heavy contracts have been let for tunnels and other development work on that well known property the Poorman which, it is expected will render the extraction of the gold-bearing rock less difficult and prove the existence of other veins, whose presence is strongly suspected. A little further away, on Porcupine Creek, (south of Nelson) a pleasant surprise is reported for the owners of the Jubilee claim; it appears that a certain part of the rock had always been rejected as it looked valueless, but on an assay being made out of curiosity it was found to carry a very high value; it is said as high as \$1,500 to the ton. If this is true it shows the necessity, so frequently insisted on in the past, of throwing nothing away till it has been proved by assay to be worthless. Similar cases have occurred before, notably in the Slocan, where the expenditure of a few dollars in assaying would have saved many thousands afterwards.

Very good copper veins are reported from Fairview district, (south-west of Nelson) the ore apparently being yellow sulphide, with gold and silver value, and occasionally some other variety of copper ore of a very much higher grade. I had the pleasure of seeing some specimens from that district lately and have no doubt it is a country rich in copper. Probably a smelter will be built somewhere about there, and it seems as likely a place as any in the Kootenay to make such a works a most profitable venture.

Perhaps, however, the district that looks most promising just now is in the neighborhood of Yonir, on the N. & F.S. R.R., a few miles south of Nelson. There we have the Dundee mine shipping ore to the Hall Mines smelter, which returns a handsome profit after all expenses are paid, the value being chiefly in gold but also in silver and lead; while in addition there is the Royal Oak group which will be working all the winter and probably shipping some ore, and the Summit group on which a very good strike is reported to have been made quite recently of gold bearing quartz; but the Dundee seems to be the most developed at present.

At Ainsworth, much more activity prevails, as owing to the expected blowing in of the Pilot Bay smelter at a very early date, all the mines that can ship ore are doing so. The tramway at the Lucky Jim has been completed and is bringing some 70 or 80 tons of ore down daily at present, (though its capacity is considerably in excess of that quantity) which is conveyed to the Pilot Bay concentrator for further treatment before smelting; and though nothing very startling has occurred in the camp for the past few weeks, there is an air of prosperity and a general feeling that better days than the town has known lately are before it now.

Very cheering reports are coming to hand about the Cariboo Creek camp, near the Narrows on Arrow Lake. It is not very long ago that the first discoveries were made, but it has been quickly and steadily going ahead and will prove as good a place as any for investment. The principal claims there or in the immediate vicinity are the Promestum, which will be worked all the winter, the Chiefstam group, and the Good Hope group, both of which are in a position to work during the winter. In addition to these there are several other claims less developed, and also strong indications of placer diggings on Cariboo Creek itself. At any rate, applications for lease of ground for placer work have been filled and some have been filed, which hardly would have been the case if there had not been good reason to suppose there was "pay dirt" to be found there.

Nelson itself had "a very close call" from fire the other night, and it was undoubtedly owing to the exertions of the citizens that the greater part of the town is not in ashes to-day. If one particular large new building had got wall alight, nothing could have saved the whole business part of the city, but the Bucket brigade did excellent work and the town was saved. It is but fair to add that the water works are undergoing reconstruction and at the time it was impossible to throw much of a jet.

The Hall Mines smelter, to return home again, is working well, during some fourteen days work, 3,283 tons of ore (not all of it Silver King) were smelted, and the product was about 233 tons of matte carrying nearly 50 per cent. copper, 0.5 oz. gold and 300 ozs. silver per ton. The management hope before long to start up the small blast furnace for lead smelting, and to refine the matte from the big furnace to a much greater extent than has been done hitherto, new reverberatory and roasting furnaces being now in the course of construction for that object.

The value of the mineral exports of South Kootenay for November, was some \$324,000 not quite so much as in October; but so far for December the value (for four days) has been about \$213,500, which is a good showing. Everyone seems confident that next year's output will far exceed what it was in 1897, and judging from the number and value of the prospects that have been developed during the past twelve months, there appears to be a very strong ground for such confidence, and just adding that your correspondent himself shares that general belief, he takes pleasure in wishing your readers a happy and prosperous New Year.

A.H.

COAST NOTES.

The limited Vancouver and Victoria markets for provincial mining stocks are now greatly depressed, there being an average fall of over 10 per cent. in the values of the shares most in favor, and a rather greater decline in others. These are probably, in part, due to a general desire of small holders to realise ere Christmas on stocks bought for speculation, and in part also due to a demand for capital in connection with Yukon trading and prospecting ventures. The somewhat disappointing first returns from the Golden Cache crushings have also had their influence on prices. These things notwithstanding, the stocks most frequently bought and sold, such as, for example, shares in the Golden Cache, Dominion Developing Co. and the Tin Horn, continue to command large, if reduced, premiums on issue prices. Until however, the time of more general production comes, these considerable fluctuations in the values of home mining stocks, mostly held speculatively, will continue.

The copper-gold deposits on Lynn creek, North Vancouver, have on further test been found disappointing, and as a result the most important options held in respect of the claims—those of the Findlay syndicate—have been abandoned. There is too large a proportion of zinc in the deposits for claims to be worked to advantage under available treatment processes. The result is disappointing to Vancouver, many of whose people expected much from these neighboring claims, some of which on first and surface tests showed great promise. There is fortunately but a very small aggregate loss of capital expended on their preliminary development.

The proposal to establish a Vancouver smelter and refinery in the harbor front apparently "hangs fire," despite the City Council's offer, subject to ratification by the money by-law electorate, to take stock in the undertaking to a value of \$65,000. The promotion of the company in the London money market seems to be by no means easy, by reason, as it is here surmised, of its being in the hands of men of but moderate moneyed influence. Hope is not however abandoned of the ultimate acceptancy of the offer by the promoting syndicate, and subsequent formation of the necessary company. Meanwhile, unfortunately, Vancouver citizens, now asked to confer considerable tax exemptions upon C.P.R. rights of way and proposed new wharves and warehouses, are beginning to grow lukewarm in their support of a smelter proposal, which at first found very general favor. There will, accordingly, be some doubt as to the city voters' decision on the sharetaking form of bonus proposed, though there is no doubt that many coast and inland mines and claims, especially such as are copper or copper-gold yielding, stand much in need of home smelting facilities within cheap and easy reach by water.

The Yukon "boom" remains the topic of the hour, alike in Vancouver and Victoria, which are keen in their rivalry, each hoping to secure the bulk of the outfitting trade that is to be done within the Dominion. Each city is busily advertising its opportunities, both officially and unofficially—in the former case by municipally circulated pamphlets, in the latter by the distribution through local traders of tens of thousands of commendatory and advisory circulars. The Vancouver City Council hopes, in particular, to secure the co-operation of the Canadian Pacific Railway, in circulating, gratis, in Canada, the United Kingdom and the United States, at least 30,000 maps and pamphlets printed and published by the city. The pamphlet naturally makes the most of the presumed advantages of the proposed C.P.R. route and services via Vancouver, the Stikine River, Telegraph Creek and Teslin Lake.

Meanwhile the more sober-minded and likewise disinterested among the citizens of Vancouver and Victoria have in most cases concluded that although there is certain to be a worldwide rush of travel to the Yukon, by outfitting and to which the traders of each city may and will profit, it will not be to the permanent interest of the British Columbian community to "boom" the Klondike, it being already apparent that the Yukon's present and probable early future gold outputs have been grossly exaggerated, with the certain result next year of grave disappointment to many thousands, if not tens of thousands, of would-be miners and prospectors. This notwithstanding, it is regrettable to note that some few British Columbians, as well as many British promoters, are sitting out prospectors, whose broad instructions, given somewhat openly, are to secure Klondike claims, good, bad or indifferent—of any sort, in fact, that may be found capable of exploitation in any available money market, London, England, for choice. The would-be gold mining investor of next year should therefore, if well advised, be more than usually wary as to participation in Klondike and Yukon mine ventures of an average kind.

Apparently authentic reports are in the meantime to hand of promising finds of copper-gold ore—surface specimens being stated in some cases to assay up to \$200 a ton—in western Cassiar, and within a district which lies, it would appear, somewhat beyond the bounds of the Cassiar Central Railroad

Company's extensive charter rights, though it may well happen that the deposits may be found continuing into that company's sphere of action. It is also stated that through the same country, from the shores of a deep water inlet situated some 200 miles south of the mouth of the Stikine, an all-Canadian road and railroad route to Telegraph Creek and thence, via Teshn Lake, to Dawson City, has recently been discovered and in consequence come under the active observation of the Dominion Minister of the Interior and the men of the C.P.R. If the above mentioned copper ore and absolutely all-Canadian route to the Yukon prove serviceable, the discoveries will be most valuable to British Columbia, whilst they will also be of eminent service in attracting to development far south of the frozen Yukon many would-be northern gold-seekers otherwise certain to be sadly disenchanted on or soon after reaching Klondike. The writer gives the above in words under some reserve, much secrecy being naturally maintained by those interested in regard to details. The information came, however, from a likely quarter, and there are good names connected with C.P.R. railroad work that are quietly mentioned in connection with it. These most concerned will, however, keep more or less silent for a short time, pending the maturing of their various development proposals. At least two railroad charters are likely, it is said, to cover the suggested new all-Canadian route in question, and one of these the C.P.R. will, it is also suggested, either own or control.

The gold miners of Dawson and the tributary district of the Klondike are, according to advices which have just reached the coast, generally protesting in mass meeting and by proposed delegations against the new Dominion regulations concerning Yukon gold claims. They protest first against the reduction of claims to 100 feet in lieu of 500 feet in length, as affording insufficient opportunity for generally profitable gold mining in so hard and costly a country as the Yukon, and they also strongly deplore the proposed Government reservation of a proportion of each hereafter located group of claims. They urge that returning miners and prospectors have altogether exaggerated the past yield and over estimated the probable future output of the Yukon gold claims and assert that, of 1,500 hitherto recorded, but so have proved remarkably rich, and these attracted world wide notice. Others are, they say, for so hard and costly a country, either but moderately productive or "practically unknown quantities," whilst the much-boomed claims on Bonanza Creek will, they declare, as regards most of them, be worked out in one or two years, during which, considering the short lives of the placer mines in question, the proposed royalties of 10 and 20 per cent. on output will be an excessive exaction against capital and labor invested in rapidly exhausting properties. They also urge that the royalties will, if imposed on those who acquired leases prior to their enactment, be really inequitable, as conflicting with legitimately acquired vested right. The miners plead further that the royalties will operate very unequally upon claims differing greatly in their possible durations of profitable working, and they urge that the royalties will oftentimes prove prohibitive in a land where productive work is only possible for a few months of each year, whilst the cost and difficulty of maintenance at least quadruple similar exactions on mine labor in temperate climates and in easily accessible regions. They plead, too, that the Government reservation and sale of claims, and other regulations, will all benefit the capitalist rather than the hardy worker, and urge that in the last resort there may be resistance, even to bloodshed, against the enforcement of the obnoxious regulations. The Dawson City mass meeting, held in mid-September, at which these resolutions were adopted, is stated to have been as orderly as it was determined, and it was thereat resolved, on the urging of Gold Commissioner Fawcett, to put the case first before Major Walsh, the administrator, on his arrival in the Yukon, and afterwards, if necessary, impress it directly upon the Dominion authorities at Ottawa. The threat of possible bloodshed ought to have little influence on the Dominion Government's decision, as the police and military authorities of Canada can doubtless sufficiently, and with little actual strife, assert the rights of law and authority; but if the claims of the Klondike be in general so short-lived and but modestly productive, as the miners assert—and the moderate actual shipments of gold made to date tend in part to corroborate their assertions—the Dominion authorities may well reconsider carefully their proposed regulations, whilst would-be gold-winners in the Klondike will be wise if, pending further and fuller investigation, they moderate their ardour and for the present "hold their hands" and refrain from setting out for the "north countree."

NICOLAI C. SCHOU.

Vancouver, 8th Dec., 1897.

MISCELLANEOUS.

Mr. John B. Hobson, M.E., manager of the Cariboo Hydraulic writes: "At Horebly, we succeeded in having the mill completed for operation by water power, but owing to some minor difficulties encountered underground and of securing the number of drift miners required, we did not succeed in getting the mine sufficiently opened to keep our mill running much more than half time. The material crushed included all sorts extracted during the progress of development work. We succeeded however in crushing with 10 stamps, as high as six tons per hour through screens with $\frac{1}{2}$ in. round holes. The steam machinery and battery feed pumps arrived too late to enable us to get ready for a continuation of the work during winter, but expect to be going full blast next season.

Nova Scotia.

The fiscal mining year ended on Sept. 30th, but it is impossible as yet to make any comparisons between this and previous years on account of the large number of gold mine owners who have failed to report their returns up to date.

The North Brookfield mine will take the lead again this year, notwithstanding the fact that it shows a falling off of over 1,000 ounces on last year. The returns for the fiscal year from this mine show that 3,366 ounces of gold have been produced from 8,076 tons of quartz milled. The Richardson mine takes second place with 3,019 ounces of gold from 24,684 tons of rock, while the New Egerton which took second place last year comes in third with 2,856 ounces of gold from 9,158 tons of rock crushed. The other principal gold

mines have not as yet sent in their September returns. The North Brookfield and the New Egerton mines have both during the last fiscal year doubled their crushing capacity. The Symon-Kaye mine considering it has been working for only four months of the year shows the very excellent return of 523 ozs. from 122 tons.

The November returns from the North Brookfield mine show the very excellent yield of 514 ounces of gold, while the Richardson mine yielded 294 ounces 10 pennyweights.

We are pleased to see the once famous Oldham district on the producing list again. H. N. Reeves *et al* have returned 169 ounces from 171 tons of rock for the months of July, August and September.

The Arcadia Gold Reduction Co., operating at the Ovens, Lunenburg Co., returned 78 ozs. from 2,100 tons.

The Elk mine at Caribou produced 56 ozs. from 90 tons for November, while the Blue Nose returned 59 ozs. from 196 tons.

The past month has produced three very serious accidents. At Spring Hill James Ferguson was killed by a fall of stone, while another man was fatally injured by being struck by the boxes. At the Gold Lake mine, Caribou, a boiler explosion killed the manager and two men. The last accident can only be put down to stupidity. A second-hand boiler had been purchased, and after being retubed and patched, the boiler makers proceeded to test it with steam instead of hydraulic pressure, the boiler failed to stand the pressure (91 lbs.) and the natural result was that the mine manager McPhail and the two boiler makers were dispatched into eternity.

What appears to be a really important new find of coal has been made about three miles from Port Morien (late Cow Bay). Mr. E. T. Moseley, the discoverer, has done a considerable amount of drilling during the summer and has now cut the seam by a shaft 20 feet in depth. The seam consists of three benches, the largest being five foot six inches, and the coal is reported to be of very excellent quality.

Mr. Giffin, of Isaac's Harbour, and others, have opened up a very promising gold lead near the Richardson mine at Isaac's Harbour. The lead is eight foot thick and a trial mill run gave 6 dwt. per ton. A shaft has been sunk on the lead to a depth of 50 feet and levels driven 24 feet in each direction.

Messrs Mason & Heal are doing some prospecting work at Ardois, in Hants Co. This is a proposition new to this province, a 20 foot belt of slate has been cut which only contains from five to ten per cent. of quartz and gives from three to four pennyweights of gold per ton.

The Cheticamp silver lead mine has been at a standstill for the last few weeks, on account of some difficulty over the claims. The Cheticamp Gold Mining Co. have licences for gold and silver, while Mr. George Oland has a licence covering five square miles for mineral other than gold and silver and he claims that this five square miles covers some of the same ground that the Cheticamp gold and silver licences cover. As the property is essentially a silver lead proposition, supposing both licences stand good, there is every prospect of delightful complications following. Such a complication of affairs has been foreseen for a considerable time, and suggestions have been made by men interested in the mining welfare of the province but the Commissioner of Mines has seen fit to ignore them, and we can only hope that the present muddle will be the means of bringing a suitable amendment to the laws referring to these points.

Mr. John McMillan together with Sydney and Halifax people is re-opening the Palgrave mine, near Isaac's Harbor. This property has been in litigation for eleven years, prior to which some \$100,000 in gold were taken from it.

Mr. Fitz Andrews has struck a lead on what is known as the Skunk's Den property at Isaac's Harbor. For a number of years rich drift has been found on this property and a number of people have tried to locate the lead. We had a call from Mr. Andrews recently and he informed us that the lead was from two to five feet in thickness and shows gold. Mr. Andrews together with Halifax people will start development work at once.

Some very rich quartz has been struck in the Jubilee mine at Renfrew. One comparatively small lot contained 75 ozs. of gold, while six barrels of quartz, milled at Oldham, produced 34 ozs. 15 dwt.

We hear that the Parker-Douglas mine, in Lunenburg Co., is showing up very well just now and is turning out a lot of very good ore. F. H. M.

Quebec.

At Black Lake, Mr. P. P. Hall is opening out a large deposit of chromite.

The Coleraine Mining Co., operating in the same district, closed down their pits on 1st instant, having about 1,000 tons low-grade chrome on dumps. The asbestos mines, as usual, will close during Christmas week, and reduced working forces will be in order thereafter until the spring.

The settlement of the sale of the American Asbestos Co.'s property is, we understand, delayed by the claim of Messrs. J. S. Mitchell & Co., of Sherbrooke, who hold a judgment for \$2,000 prior to the insolvency of the company. It is understood that the incoming company has secured the services of Mr. P. H. Crabtree as manager.

The North American Graphite Co., whose mine and works near Buckingham have been closed down for some time, has started work again on orders for their product.

Ontario.

Last advices from the Regina state:—The main shaft is 370 ft. deep, the vein is 4½ ft. wide, containing 17 dwts. of gold per ton. The mine manager estimates that he has 24,000 tons of ore in sight, worth on an average 10 dwts. to the ton. He reports that the fourth and fifth levels south are opening up high-grade ore bodies. Both levels are in ore that is 5 ft. wide, and that will probably average 1 oz. of gold per ton. In the fifth level south the vein averages, for 3 ft. of its width, over 2 oz. of gold to the ton. The new "Tremaine" steam stamp mill has been completed, and will commence work this month. It is equal to five gravitation stamps. Mill return for October:—The 10-stamp battery worked for 16 days; tons crushed, 181; bar gold, 81 ozs.; from cyanide works, 44 ozs.; also smelted gold, from five months accumulated hard amalgam from tables, 113 ozs.; total gold for October, 238 ozs. Cablegram concludes:—"Mine looking splendid." The stamps were stopped for ten days in October during the remodelling of the amalgamating and concentrating plant.

New Brunswick.

It has been some time since I mailed you any mining notes from New Brunswick. I thought it well to do so now, as there seems to be a tendency to make some attempt at developing some of our mineral showings in various parts of the Province. The boom in British Columbia, Ontario, and the marvellous tales of the Klondike have had a stimulating effect on the men who are inclined to invest, and from all I can glean quite an amount of New Brunswick capital has gone into Rossland, Kootenay, out west in the United States and other centres. That these investments may all prove wholly successful is my best wish, but I cannot help finding myself regretting that some of this home capital has not found its way into channels nearer home in New Brunswick and Nova Scotia, where chances are undoubtedly as good on the average as they are away from home. That this fact will be sooner or later demonstrated I feel sure of, and the sooner it materializes the better for all concerned.

Some New York capitalists and investors are considering the opening up and development of a combination vein of copper, gold and silver in the New Ireland district. The vein is of a good width and carries values to extent of from \$30 to \$40 per ton, and samples of matte sent to Swansea from this ore gave \$75 per ton. The ore is similar in appearance and results to the Rossland copper ores. There is no doubt, with capital properly applied this property can be made to pay handsomely.

Quite an impetus has been given to the search for coal in the Province, but so far without much success. Boring with the Government drill at the Gorge near Moncton was prosecuted for some months, but so far as I can learn without success.

The drill is now being utilized in prospecting for coal at Dunsinane on line of I. C. Ry. a short distance above Sussex, but with what result is not yet known. St. John, N.B., capitalists are engaged in the enterprise.

Quite a large amount of money was spent in the past year or eighteen months in developing some copper areas at Point Wolfe, in Albert County, on the Bay of Fundy shore. Moncton capital was used in this venture. First class showings of a very high grade of copper ore were made, and the ore carries considerable gold. It is understood the property has been bonded to American capitalists.

Developments are also being made on a copper property near Alma, Albert County, N.B., and it is said under auspices of English capitalists, and prospects are a sale of property will be completed.

Reports of discoveries of gold-paying belts in various parts of the Province have been heard of, but nothing definite can be established, though it would not surprise me to hear of the precious metal being found in paying quantities.

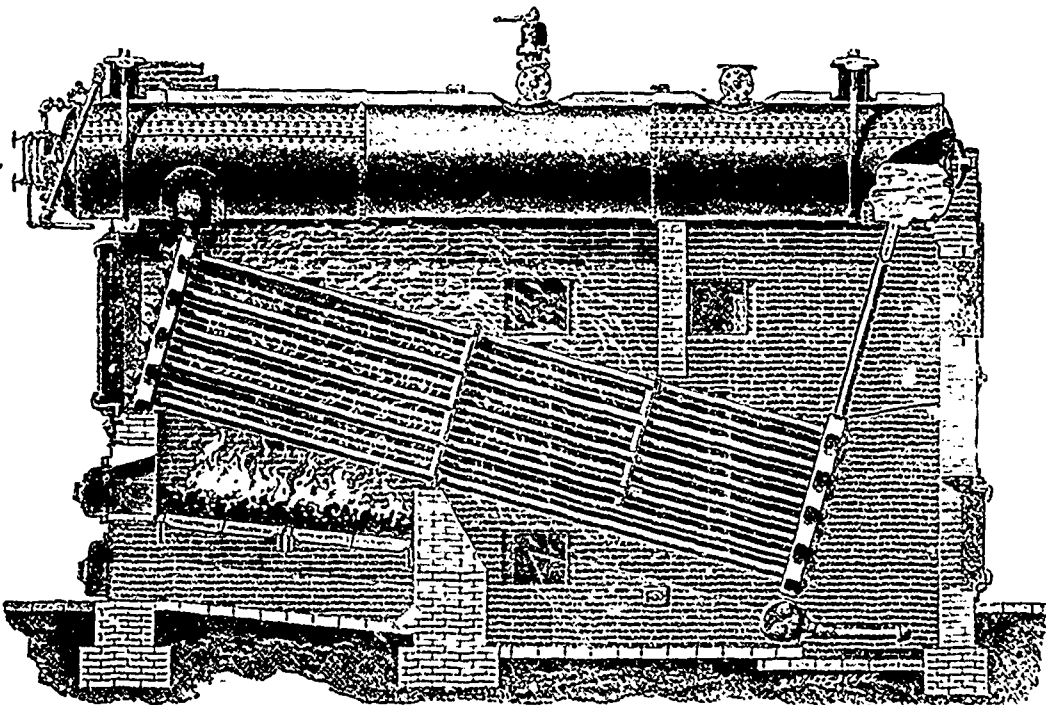
Considerable excitement has been aroused over the discovery of a vein of silver and lead ore in Woodstock, N.B. Some prospecting has been done and assays of ore found are very satisfactory. Just what size of vein or belt it is has not been made public, and meanwhile the development will be watched for eagerly.

It is said that some further efforts will be made to develop the pyrrhotite or nickel producing belt near St. Stephen, N.B., but nothing definite has as yet been decided on, so far as I can learn.

It is stated on good authority that some American capitalists have bought and propose opening up a black granite quarry at or near Bocabec, N.B., in which Sheriff Stewart of St. Andrews is deeply interested.

The Mineral Products Company of New York, a wealthy combination under management of a Mr. Russel P. Hoyt, have spent a large amount of money in placing drying machinery and other plant on the bog manganese deposit in Dawson Settlement, Albert County. This is an enormous deposit of bog manganese or wad, and the intention is to take it out in large quantities, dry it and press into briquettes. These briquettes will be transported

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over the Albert Ry. and I. C. Ry. to Bridgeville, Pictou County, N.S., where company have leased the iron mine and furnaces of the Charcoal Iron Co., and by a combination of the manganese and iron manufacture on a large scale ferro manganese. These gentlemen shew evidence of business by the investment of capital and not "wind," and are to be congratulated on the prompt business manner in which they are working. In Mr. Hoyt the company have a thoroughly keen, bright and affable business manager, who evidently knows what he is about. Success to them, I say.

Some movements are in train for buying up and developing several manganese deposits in New Brunswick and Nova Scotia, but what the ultimate result will be remains to be seen.

There is a movement on foot to buy and develop a valuable iron pyrites and copper producing property in Charlotte County, N.B., by parties in New York. Just how far the matter will proceed is not yet definitely known, but options on the same have been granted.

A number of Moncton and other capitalists are engaged in developing some mica and talc deposits in Cape Breton, and also in the development of alluvial gold deposits at a point in Hants Co., N.S., known as the Meander River. Strong evidences of considerable wealth have been found, and it is said a trial test (sluicing) yielded about 5 oz. of gold from 20 tons of drift. The results of the find will be eagerly watched in future, as it is understood every available area for miles in and around the locality has been taken up by speculators, &c. I find, however, I am digressing and must not occupy too much of your valuable space. I shall keep a lookout and keep you posted as to the results of any of foregoing matters or any new developments that may arise.

QUARTZ.

Experiments with Oxy-Hydrogen for Mine Blasting.*

The idea of employing as an explosive the oxy-hydrogen gas generated by the decomposition of water into its elements—hydrogen and oxygen, is not new. As pointed out by Professor Berthelot, in the introduction to his well-known work *Sur la Force des Matieres Explosives*, oxy-hydrogen gas affords a perfectly typical example of an explosive in the strict sense of that term, inasmuch as its stored-up energy exceeds, weight for weight, that of any other explosive known. Unfortunately, however, on the one hand the volume of a given weight of oxy-hydrogen gas at atmospheric pressure is so considerable that, within this volume, the pressure of the gases produced, on the explosion occurring, is not sufficient for powerful blasting action; and on the other the gaseous condition of oxy-hydrogen requires air-tight receivers for the eventual application of the gas, this double disadvantage having hitherto prevented its use as an explosive.

* From a communication by Bergassessor Heise, Gelsenki chen, to "Gluckauf," of Essen-an-der-Ruhr.

Experiments in this direction have, however, lately been made by Dr. Oelsé, of Kolu, in which the well-known difficulties have been to a large extent successfully avoided, the new method consisting essentially in decomposing water by the electric current in a closed vessel, though the gas generated is not allowed to pass off freely, but is highly compressed by continual decomposition of the water, while the receptacle used for decomposing the water afterwards serves as a blasting cartridge. According to the inventor, the generation of oxy-hydrogen gas by the electric current is solely dependent on the tension of the current led through it, but independent of the pressure set up in the vessel; and on this account it is possible to store up a larger quantity of explosive gas under considerable pressure in a comparatively small receiver with slight expenditure of power.

The cartridges used in the experiments consist of two portions, the pressed out steel cylinder and the closing plug, attached to which latter are the electrodes and igniting wires. The steel cases are 18 cm. (7 in.) long and 3 cm. (1 1/8 in.) in diameter, while the thickness of metal is 2.5 mm. (1/8 in.) and the cubic content 87 cubic centimetres (5 cubic inches), the resistance being put at 1,200 atmospheres. The closing plug is screwed in, the conductors, insulated with vulcanite, being led through it, and both electrodes being formed by ordinary iron nails. The cases are filled with 22.5 g. ammes (0.79 oz.) distilled water, to which 2.5 grammes (0.087 oz.) of chemically pure soda lye is added for increasing the conductivity. In the carefully closed cartridges the water is decomposed by an electric current of 0.8; to 1 ampere and 8 to 10 volts tension, the decomposition of the water being effected slowly with a slight heating of the steel case owing to compression of the gases. The length of the charging operation depends upon the strength of the current passed through the cartridge, its capacity in relation to the enclosed fluid, and the desired ultimate pressure of the gases, while the strength of the current is also dependent upon the superficial area of the electrodes. The experiments were so carried out that in about forty hours' time 20 grammes (3/4 oz.) of water were decomposed, and the explosive gas generated showed a pressure of 450 atmospheres, when the cartridges were ready for use.

For the work of blasting the cartridge is to be connected up with two electric conducting wires for ignition introduced into the shot hole in the usual manner and tamped. The explosion is brought about by allowing an electric spark to leap from one electrode to the other by means of a Nobel or Bernhard igniting apparatus; and if several cartridges are used in one shot hole they are connected in series, which is necessary because the explosion of one cartridge may not be transmitted to the one next it, so that all the cartridges must carry their own ignition with them. In order to prevent, in inclined shot holes, the small quantity of water which remains in the cartridges from covering the electrodes and preventing them from giving off a spark, the cartridges are inserted with the closing plug foremost in rising shot holes but the reverse in horizontal and falling holes.

Trials carried out at the Mont Cenis Colliery, Westphalia, showed that with such cartridges sufficiently intense blasting effect can actually be produced, the power exerted by a cartridge in rock having been about equal to that of 150 grammes (5 1/4 oz.) of ordinary nitrate of ammonia explosive,

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such as westphalite, dahmenite, etc. The inventor also hoped to obtain a safe method of blasting for fiery and dusty collieries. Starting from the opinion that, with the exceedingly rapid speed with which oxy-hydrogen gas explodes, and which Prof. Berthelot puts at 2,770 m. (9,000 ft.) per second the combination of hydrogen and oxygen to form water in the state of vapour and the appearance of flame therewith connected must be finished before there is time for the steel case to be rent asunder. On the other hand, to this view of the question may be opposed the fact that the calculated detonation temperature of the oxy-hydrogen gas is unusually high, being put by Professor Berthelot, for complete combustion in its own volume, at 8,017 degs. Cent., although it may be supposed that this temperature is not actually attained.

For deciding the question, some experimental shots were fired at the Mine Association testing station, near Braubusch, difficulties being encountered from the splintered steel cases sticking fast to the bore of the mortar that represents the shot-hole, while the cartridges must not be ignited when hanging freely in the heading, as the steel splinters might do damage.

On this account, in the first experiment at the testing station a cartridge was inserted for half its height in a box filled with pieces of rock and partially covered with faggots, the explosion chamber being filled with a mixture containing 7½ per cent. of firedamp; but no ignition of the mixture occurred on the cartridge being exploded, the faggots having in all probability prevented the ignition. Further experiments were therefore made with the steel cartridges placed loosely in a pipe of 13 cm. (5 in.) diameter, open at one end and from 12 to 15 centimetres (says ½ in.) therefrom, and exploded. In this case a cloud of colldust was raised artificially without any admixture of firedamp; but no ignition followed the explosion of the cartridge, while, on the other hand, four shots of only one cartridge each all ignited explosive mixtures containing 6½ or 9 per cent. of firedamp. The firedamp might not, however, have been ignited by the flame of the explosive gas but by sparks caused by the torn-off particles of the steel case; on that account, the next experiment, the iron pipe was wrapped round with several casings of paper, notwithstanding which ignition occurred. Two other experiments were then made by firing the cartridges in a wood mortar, the bore of which corresponded with the diameter of an ordinary shot-hole, when the mortar was splintered without ignition taking place. In a last experiment the cartridge was inserted in a very strong paper tube, the diameter of which, 8 cm. (3 in.), was sufficient to permit the explosive mixture to surround the cartridges, when ignition again occurred.

It must therefore be considered that the ignition was caused by the flame of the explosion; and even if the result had been more favourable the practicability of the method must not be considered set at rest. Certainly the idea is very taking to substitute for explosives a slight expenditure of power with electrical machines; but the cost would be too great on account of the steel cases, while it still remains to be proved that the internal pressure of 450 atmospheres in the cartridges is unattended by danger.

Note on Mine Surveying with the Plumb-Line.*

Orientation with two perpendiculars being a work of great difficulty in shafts of considerable depth, notwithstanding the manifold improvements and appliances that have been introduced, the following account of the results obtained in a shaft where, on account of local conditions, improved methods could not be employed, will be not without a certain interest. The task in hand was the deepening of the Rudolf shaft, at Pribram, so as to intersect drivages from the 5th, 9th and 11th levels of the Archduke Stephan shaft, some 1,000 m. away, the 5th level being 138 m. below bank, and the other levels comprising an additional depth of 200 m. The Stephan shaft was very wet and traversed by a high-speed ventilating current; the plumb-lines were placed at a distance of not more than 2 to 2½ metres apart and 210 measurements had to be taken with the theodolite in the whole extent of the headings (about 7,000 m.) in the different levels. Accuracy was important, since an error of 1 minute would have made a difference of 273 mm., or an error of 3 minutes a difference of 819 mm. The No. 5 level connecting both shafts was utilized in the measurement of the headings, and the angles were measured with Reichenberg theodolites with verniers registering 1 minute and 30 seconds. At each station the angle and supplementary angle were repeated with a projecting telescope. No special light signal was employed, only the centre of the theodolite screws being viewed. The longitudinal measurements were made by a 2 m rule along the stretched cord. When checked, the difference in the 980-1,000 metre headings was found to be only 25-30 millimetres, and in the main strike only 30-42 seconds, a very satisfactory result under the circumstances. The important labor of sounding the shaft was performed six times; on account of local considerations of space the desirable acute form could not always be attained for the angle of junction, which generally exceeded 25 degs., and the sides enclosing this angle were only 4-5 metres in length. The plumb-lines were each loaded with a 2 kilogram weight dipping into water, and their pendulations had to be estimated without any special appliance, for which purpose a theodolite with two vertical threads gave a better result than crossed threads. On the 11th level the calculations gave an average of 21 deg. 36 min. 54 sec., and the variations actually occurring in the performance of the work of sinking were 46 sec., and a deflection of 209 mm to the east, whereas the maximum errors to be looked for amounted to 53 sec. and 241 mm. In the 11th level the average orientation was 15 degs. 15 min. 12 sec., and the maximum errors to be feared were 1 min. 06 sec. and 300 mm, whilst actually the differences did not exceed 57 sec and 259 mm. (east). From these results it may be assumed that mechanical sounding can be relied on even under unfavorable conditions, and, apart from the relative expense of the instruments, is simpler and therefore preferable to the optical method. It is worthy of note that simple triangular junction gave better results than double triangles; and the triple triangle method is still more difficult than the latter, owing to the presence of three perpendiculars all pendulating inharmoniously, and therefore constituting so many difficulties to be overcome.

* J. Nemecek, "Oesterr. Zeits. für Berg- und Huttenwesen."

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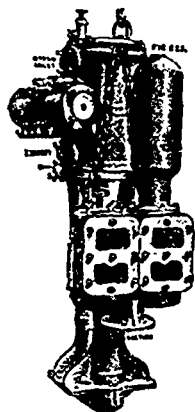


Fig. 620—"Griff"
Sinking Pump.

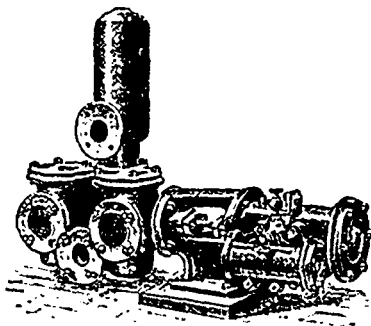


Fig. 598—"Cornish" Steam Pump
for Boiler Feeding, etc.

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AND
PROGRESS

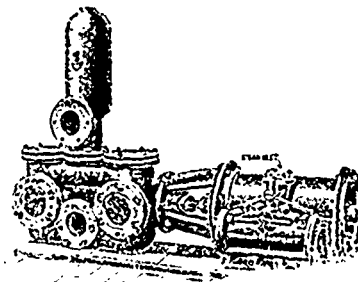


Fig. 600—"Cornish" Steam Pump
for General Purposes.



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

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Cheap Mining and Milling.

Some reference was recently made herein to the low rate of mining and milling gold ore in various localities—South Dakota, Colorado, Australia, Alaska and California. Subsequently a statement appeared from one of our travelling correspondents that at the Monte Cristo mine, east of Jackson, near Volcano, Amador county, this State, where the vein carried an average value of \$2 per ton, ore is mined and milled at an average cost of 60 cents per ton. This statement has elicited several enquiries as to its authenticity, the low cost of mining and milling having attracted considerable attention. The statement is believed to be substantially correct, though details are not to hand.

Such low rate is, however, not unprecedented in this State. At the Spanish mine, Washington, Nevada county, Cal., has been furnished a similar record. There the vein averaged 90 feet in width, the hanging wall being a soft shaly slate, the pay ore being found on that side. There was a 1,200-foot tunnel, the vertical distance from the surface being 350 feet. The ore was hauled out by gravity, the empty cars being hauled back by mules. The ore was passed through a Blake rock breaker and ground in roller mills, of which there were three of 5 feet and one of 4 feet diameter. The mills made fifty-eight revolutions per minute and were fed by automatic ore feeders. The following is a record of one month's run of the mine :

MINE—COST OF PRODUCTION.

Run : Twenty-eight days' work produced 3,443 tons of ore.

	Labor.	Supplies.	Total.
Extracting ore.....	\$703 50	\$113 41	\$816 91
Delivering ore to mill.....	160 20	17 95	171 15
Dead work.....	102 50	10 93	116 13
General expense .. .	78 35	1 95	80 30
Total.....	\$1,047 25	\$144 24	\$1,191 49
Cost per ton	304	042	346

MILL—COST OF REDUCTION.

Run : Twenty four and a half days reduced 3,443 tons of ore.

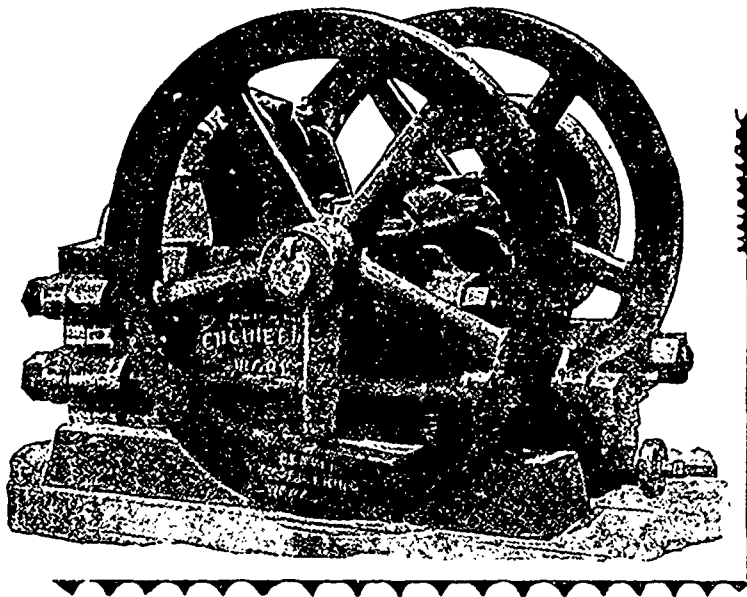
	Labor.	Supplies.	Total.
Mill expenses.....	\$227 32	\$194 33	\$421 65
Water for power.....		161 70	161 70
Handling ore.....	154 50	5 35	159 85
General expense .. .	78 40	1 95	80 35
Total.....	\$460 22	\$363 33	\$823 55
Cost per ton	133	106	239
Bullion produced.....			\$3,138 55
Total expenses			2,015 04
Profit.....			\$1,123 51

It will be seen from this that the ore only yielded a trifle over 91 cents per ton, yet a profit of 32.6 cents per ton resulted, the total cost of mining and milling the ore being 58½ cents per ton. The percentage of profit was 35.8 of the total. In the previous month 2,796 tons of ore were worked, which yielded \$1.16 per ton. The profit was 56 cents per ton, or about 48 per cent. of the total. The profit that month on a yield of \$3,268.49 was \$1,572.91. The cost of mining that month was 37½ cents and of milling 23 cents per ton, an average for the two months of 59½ cents per ton.

COAL DUST BRIQUETTES.—The following is taken from the journal of the Iron and Steel Institute : Briquettes are being made with coal dust and bisulphite of lime solution, a waste product of paper mills at Gornor, in Hungary, where there are also some charcoal-fired blast-furnaces, the waste gases from which are used to concentrate the solution. When the latter has attained the desired degree of concentration, it is led into a briquette machine, where it is intimately mixed with the coal dust. The briquettes thus obtained acquire great hardness on drying. At first they were used as fuel instead of wool, and inasmuch as they gave out no disagreeable effluvia in burning, it was afterwards decided to use them in the blast-furnace. The injurious action of the sulphur contained in the briquette was eventually counteracted by using a sufficient quantity of calcareous flux, causing the sulphur to pass off in the slag; and it appears that the results are now quite satisfactory. In Velna's process of making briquettes, petroleum residue or mineral is used as binding agent for culm and small coal. Briquettes are thus made for industrial purposes and for gas-making. For coking, the mixture is not made into briquettes, but is charged into the ovens in lumps. From 5 to 10 per cent. of the binding agent is used. At a briquette-works near Kausche, in Germa, the air from the drying-ovens is passed through roomy brick chambers so as to deposit dust, which is then returned to the ovens. The plant at Blanz used for making briquettes now consists of two works, one with three Revollier presses and the other with four Bietrix presses. For the former, 9 per cent. of pitch is mixed with 91 per cent. of coal in a pugging-mill heated with steam. The pressure in the press is 142 to 156 lbs. per square inch. The briquette then contains about 4 per cent. of water. It is left on a conveyor belt for forty minutes, and then loaded into railway trucks. Two hundred and forty tons are made daily. The Bietrix presses make 330 to 340 tons daily, one briquette at a time.

SAFETY APPARATUS FOR MINE CAGES.—A safety apparatus for mine cages, devised by Herr A. Balazsy, Kremnitz, Hungary, consists of a main and subsidiary arrangement, the latter of which, in the event of the winding rope breaking, is immediately brought into action by a spring in connection with the rope, thus clamping one portion of the cage. This stoppage of one portion brings about a throwing into action of the main safety arrangement on the other portion of the cage that continues to descend, because plates with curved edges, fastened to the cage, permit a finger fastened to the subsidiary portion to lift the safety catches and cause them to engage with the sides of the shaft.

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Late Nova Scotia Items.

The famous Richardson mine continues to produce its monthly bar of gold that when alternately brought to the light causes the owners of the mine to smile, the November bar weighing near 30 ounces. It is rumored that the management intend in the near future to add to their plant greater facilities for an increased production of the immense quantity of ore that the mine contains, and more modern appliances for the separation of the precious metal. The Richardson, among our gold producers, is to the front, and it is only one mine of several that must eventually be opened on that Upper Seal Harbor anteclineal.

The Hurricane Point Gold Mining Company, recently organized, that have taken over the Palgrave and McMillan properties, are now preparing to resuscitate that long idle mine and to bring to light the gold that has for many years been lying dormant there. That mine in many ways has superior advantages that many others have not. To-day a hundred ton schooner is lying at the wharf within one hundred yards of the mine and storing her load of coal alongside the boiler. The management anticipate raising gold by the beginning of the new year, and even in a day or two resounding the whistle, that, owing to its prolonged silence, many have prophesied had whistled its requiem. The Hurricane Point mine, no doubt, will maintain its old-time reputation.

C. F. Andrews and S. M. Giffin have succeeded in unearthing a large and very promising lead, supposed to be a continuation of the Hurricane Point lead, near the Eureka mill. Experienced prospectors most acquainted with that locality say that the fortunate finders have struck the rich lead that different prospectors have for a quarter of a century been looking for. The owners will commence mining and crushing in the near future. They have a crushing mill on the property.

It is reported, and I think quite accurately, that Bauld and Griffin have found the Lower Seal Harbor lead, for which people have been searching at

intervals for more than thirty years. Many of your readers no doubt have examined from time to time the large, very rich boulders that drifted from the Lower Seal Harbor lead. The owners of that property are preparing also to operate their mine during the coming winter.

OTTAWA COUNTY SHIPMENTS.—The mineral shipments from Ottawa County over the Ottawa and Gatineau Valley Railway during the year to date comprises:

Asbestos.....	632,250 lbs.
Mica.....	2,610 "
Felspar.....	12,000 "

and over the Pontiac Pacific Junction Railway:

Iron ore.....	595,140 lbs.
Galena.....	295,140 "

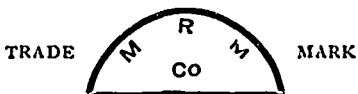
NEW B. C. COMPANIES ACT.—A recent number of the *Official Gazette* calls attention to the law that will go into effect January 1st requiring companies to pay fees for registration and the prescribed advertising. There is a difference of opinion among miners as to whether this will apply to companies already organized. It is stated that the fees and total charges for a company with \$1,000,000 capital will amount to nearly \$600.

COLLIERY ACCOUNTS.—At a meeting of the members and students of the Manchester and District Society of Incorporated Accountants, held last month, the president, Mr. John King, of Wigan, delivered a lecture on "Colliery Accounts." The lecturer showed that the proper keeping of colliery accounts was an elaborate affair, there being twenty-eight items in his list of forms to be used by the bookkeeper. Specimens of these forms were distributed about the room, enabling those present to follow the lecturer with interest in his elucidation of the system propounded.

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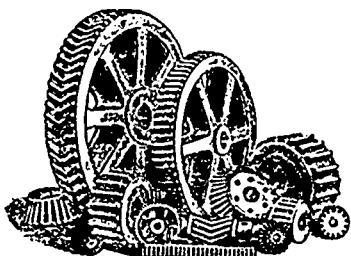
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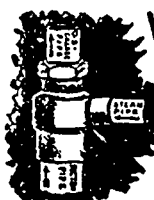
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THE FOLEY MINES CO. OF ONTARIO, LTD.—Manager Strong states that the mine is now in good condition, and with the imp oved plant development will be carried on more rapidly and at less expense than heretofore. The new air-compressor plant has been installed; at present five drills are at work. In the main shaft which is now being pushed toward the 400-ft. level, there is 6½ feet of ore in the winze between the 200 and 300 ft. levels, and 4 ft. in the drift at the 300-ft. level. It is stated that two gold bricks have been brought out this month, one weighing 98 oz. and the other 102 oz.

CENTRE STAR VS. IRON MASK.—There have been some conflicting statements with regard to this case. The complaint of the plaintiffs is that the Iron Mask commenced a shaft on their own ground and continued it downward until it struck the workings of the Centre Star tunnel. The injunction in question was to restrain the defendants temporarily from further proceeding with this shaft or interfering with the plaintiff's work in their tunnel. A continuance of the injunction until the hearing is now moved. The Centre Star management has resumed work at the point in the tunnel where it was stopped by the management of the Iron Mask. The latter company is, however, stoping, and it has appealed from the decision to the court at Victoria.

IMPROVEMENTS IN SHAFT SINKING.—The use of iron cylinders as casing in sinking shafts through quicksand and other loose material has found frequent and useful employment. The chief difficulty has been in forcing down the cylinders through any but the softest ground, with any degree of uniformity. Not long ago Herr Simon, the manager of the Neue Hoffnung Colliery, near Pommelte, Germany, devised a plan for overcoming these defects. When sinking a shaft at that pit, he constructed pit lining in such a manner that a heavy ring with internal jacket projections all round could be screwed on to a curb set in masonry, and serve as counter-thrust for a number of hydraulic hand-presses acting on the iron sinking cylinder. By this arrangement it was found possible to always keep the sinking cylinder in advance of the work. Haniel & Lueg then employed this system, with good results, in conjunction with mechanical presses working in combination and actuated by hydraulic accumulators, notably in the sinking of the No. 2 shaft at the Rheinpreussen colliery at Homburg-on-the-Rhine. However, the means for loosening and removing the material within the sinking cylinder did not keep pace with these improvements. A new method has lately been proposed by Herr Pattberg, manager of the Rheinpreussen colliery, by which the walls of the cast-iron sinking cylinder are provided with a number of pipes through which the loose matter is pumped up. For the disintegration of the quicksand or clay, a revolving cutter is used, which throws the material out toward the circumference of the cylinder. The pipes in the wall of the cylinder debouch in various groups, and it is therefore possible to always use one set of pipes, corresponding to the advance of the cutters, for removing the material. The pumps are fitted with india-rubber valves, those being less liable to erosion by the mud constituents, than if made of iron. Before the sand enters the pumps it is run into a large settling tank, where the coarser fragments subside. The saving of time effected by this arrangement allows slight defects to be overlooked. Still, lumps as large as a nut can be removed by the pipes; larger pebbles must be caught and got rid of by other means. Any stoppage caused by obstruction of the pipes can be overcome by forcing the mass through in an opposite direction, or if the obstruction be stubborn, by the aid of a percussion drill. Moreover, since the number of tubes is large, it does not greatly matter if one or two of them do get stopped up. It is also claimed that, by using the Pattberg apparatus, the iron sinking cylinder can be brought right through the quicksand down to the water-bearing stratum without decreasing the diameter of the shaft.

AUTOMATIC SAFETY LAMPS.—An automatically igniting arrangement for miners' safety lamps has been devised by Herr H. Freise, of Hamm, near Bochum, Westphalia. In this device the pricker, besides having its end turned at right angles as usual, is fitted a little lower down with a small plate, the two sides of which have toothed edges. When the lamp is completely closed and locked, one of these toothed edges can regulate the wick, and, by giving the pricker half a turn the toothed edge on the other side of the plate can raise the igniting band to a striking surface mounted on a spring, so as to bring about the ignition, while by a simple turning of the pricker the wick may be trimmed by a small plate and the upper end of the igniting band can be cleaned by the horizontal end. Instead of the friction surface for ignition, one for igniting by percussion, also mounted on a spring, may be substituted, being provided with several slits to permit the insertion of the pricker end for drawing out the spring, by a recoil of which the percussion is effected.

A THEORY OF THE FORMATION OF COAL. based on facts and experiments which appeal to scientists, has recently been put forward by M. Fayol, manager of the Commentry coal mines, in France. These mines are partly worked in the open air, rendering it easy to obtain the relations of the different strata making up that region. It appears that at first the pebbles constituting the pudding stones were formed of rocks whose place of origin was sometimes quite distant, the coal being the result of vegetable debris laid down in horizontal layers, one above the other. The conclusion arrived at assumes that a liquid must have been necessary to transport and arrange in this way such different elements—coal, therefore, being a product of transportation. It is suggested that the climate of the coal epoch being very

moist, abundant floods carried away trees and whole forests and swept them into lake basins, the trees thus forming great rafts of logs; the heaviest materials, gravel, sand, clays, were deposited in the order of their density, the lighter vegetable matter floating longer and being deposited last. Thus, it is thought, explains why the layers of the earth and coal are not parallel, and why all these layers, as has been observed in deltas, are inclined in the same direction and at different angles.

NEW EXPLOSIVES IN MINING.—Inventors have been busy lately in the endeavor to discover a safer and cheaper explosive than gunpowder for the blasting of coal. Some interesting experiments were recently carried out at Southport, to determine the relative strength and efficacy of a new explosive. The conditions of test in each case were the same, ten grammes of the explosive being used. This was placed in a steel mortar loaded with a projectile weighing thirty-five pounds. All shots were fired at an angle of 35°, with the following result: Gunpowder threw the projectile 51 yards, kynite 88½ yards, benedite, as the new powder is called, 155 yards, and dynamite 161½ yards. Benedite contains no nitro-glycerine, and it was also subjected to severe tests as regards handling. Unlike dynamite and explosives generally benedite could not be exploded by either a blow from a hammer or direct application of flame, an advantage which ensures perfect safety in the use and handling of the explosive. It can only be exploded by means of a detonator. For safety blasting in coal mines a series of trials have shown that when it is exploded in the presence of highly inflammable mixtures of pit gas and coal dust it would not ignite them. It is further claimed for the new safety explosive that its cost of production is much below that of powerful explosives generally, and it is to be put on the market at a considerably lower price.



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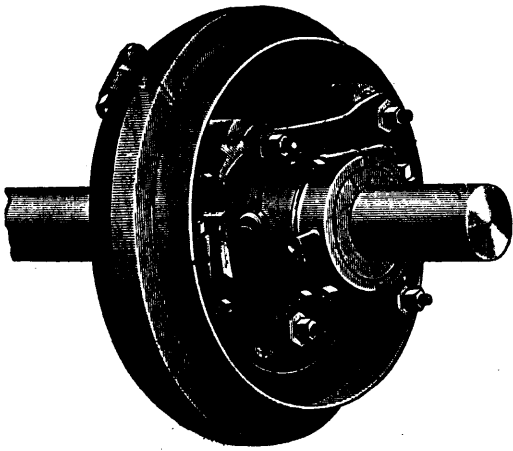
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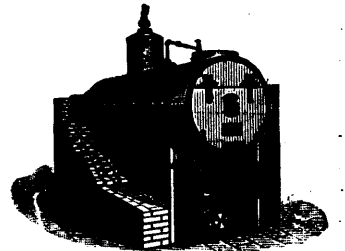
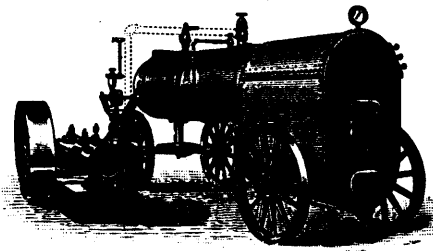
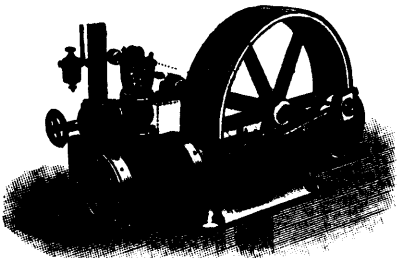
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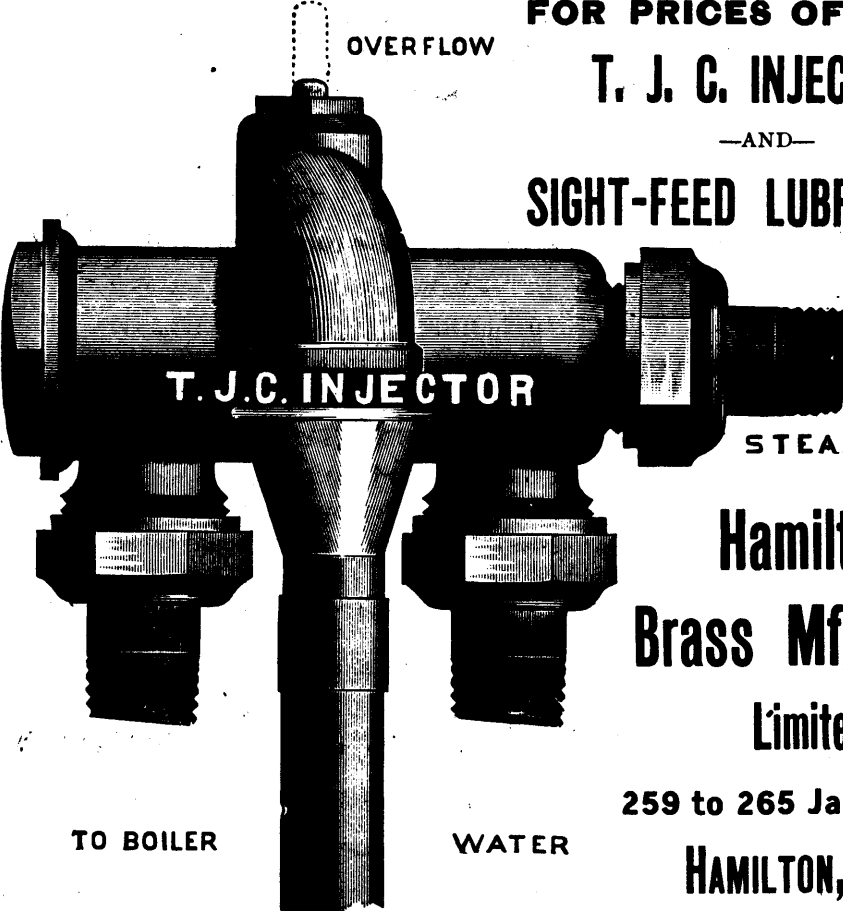


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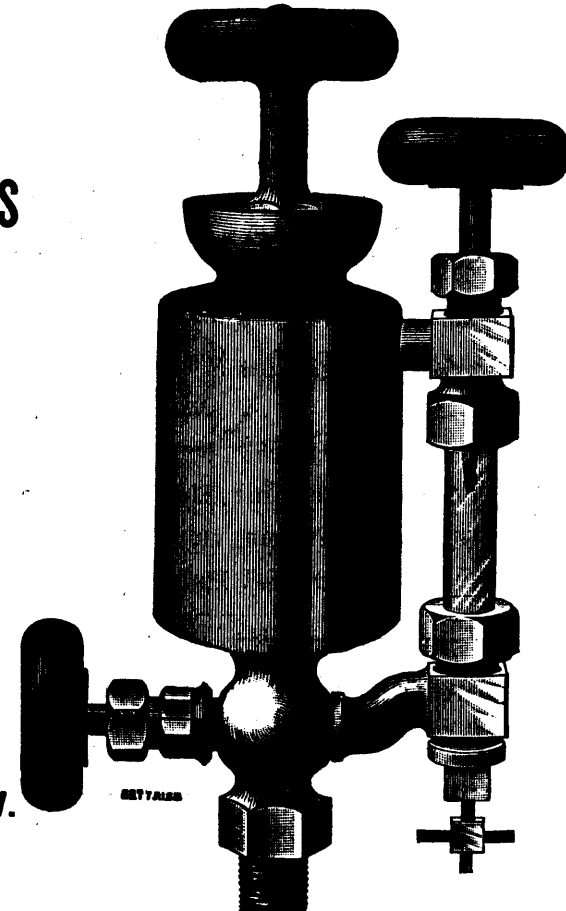


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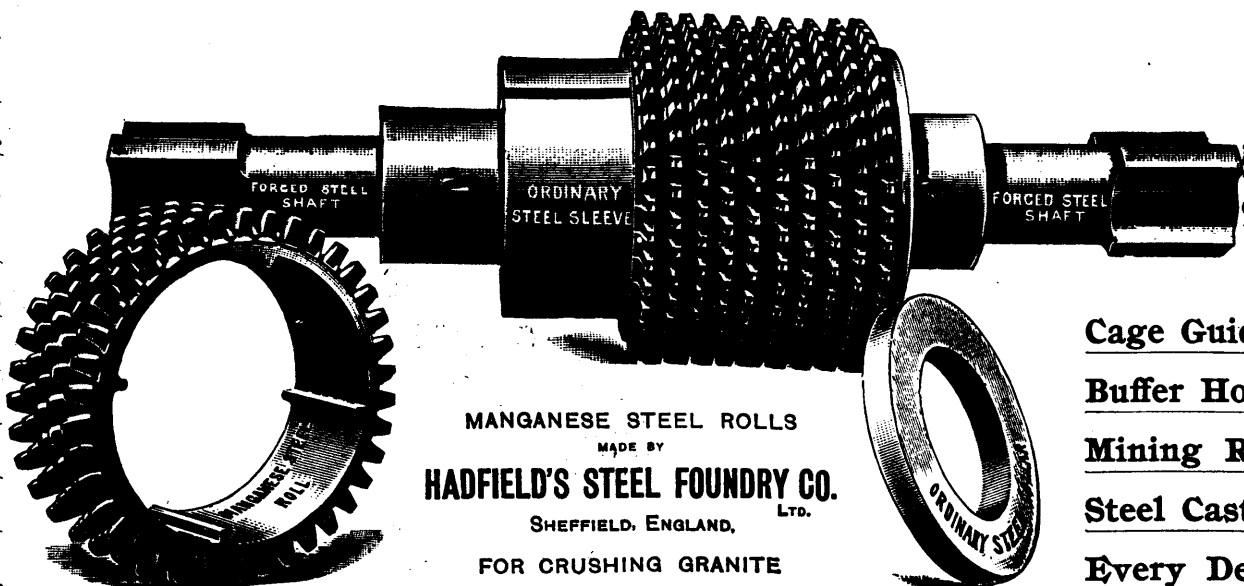


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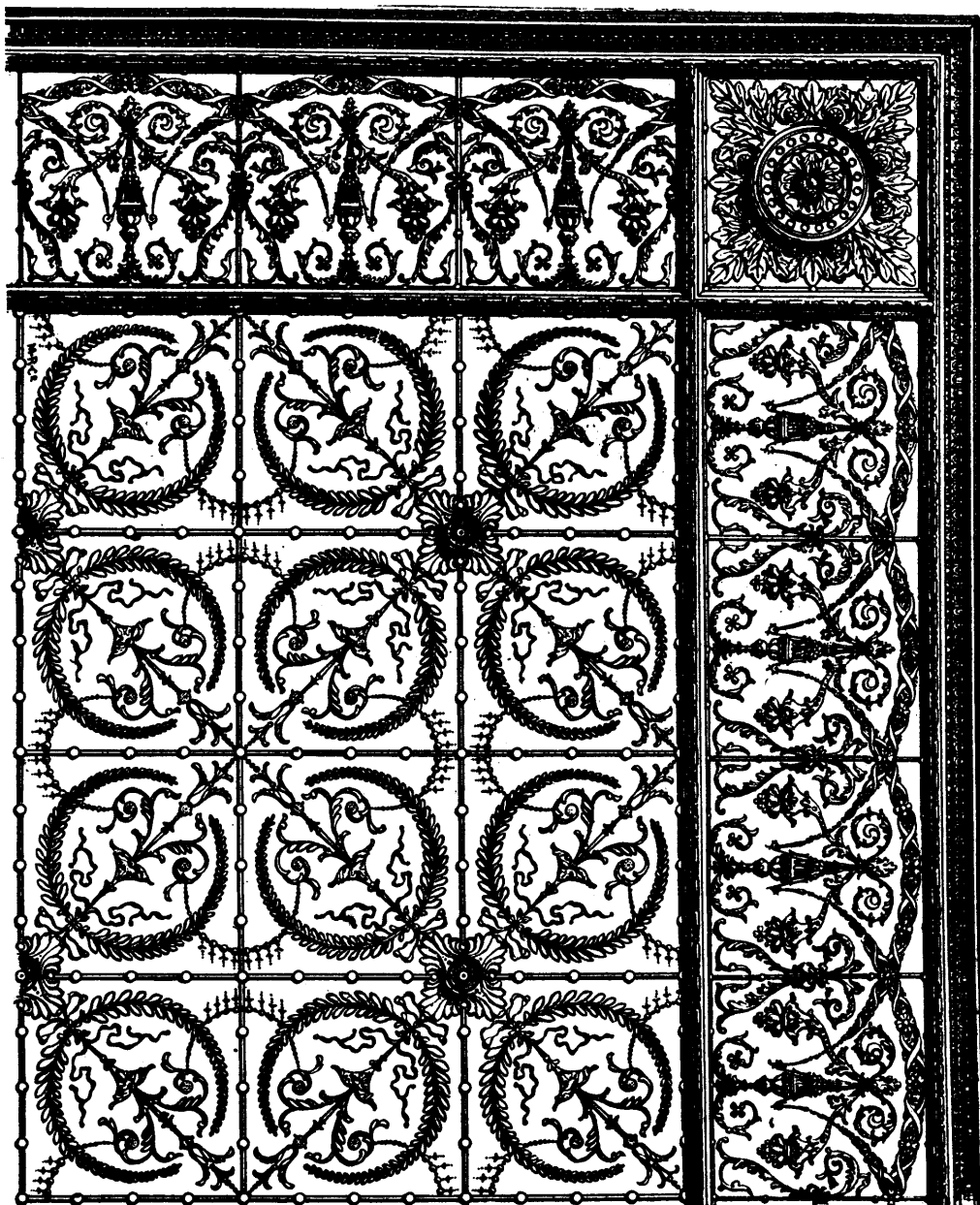
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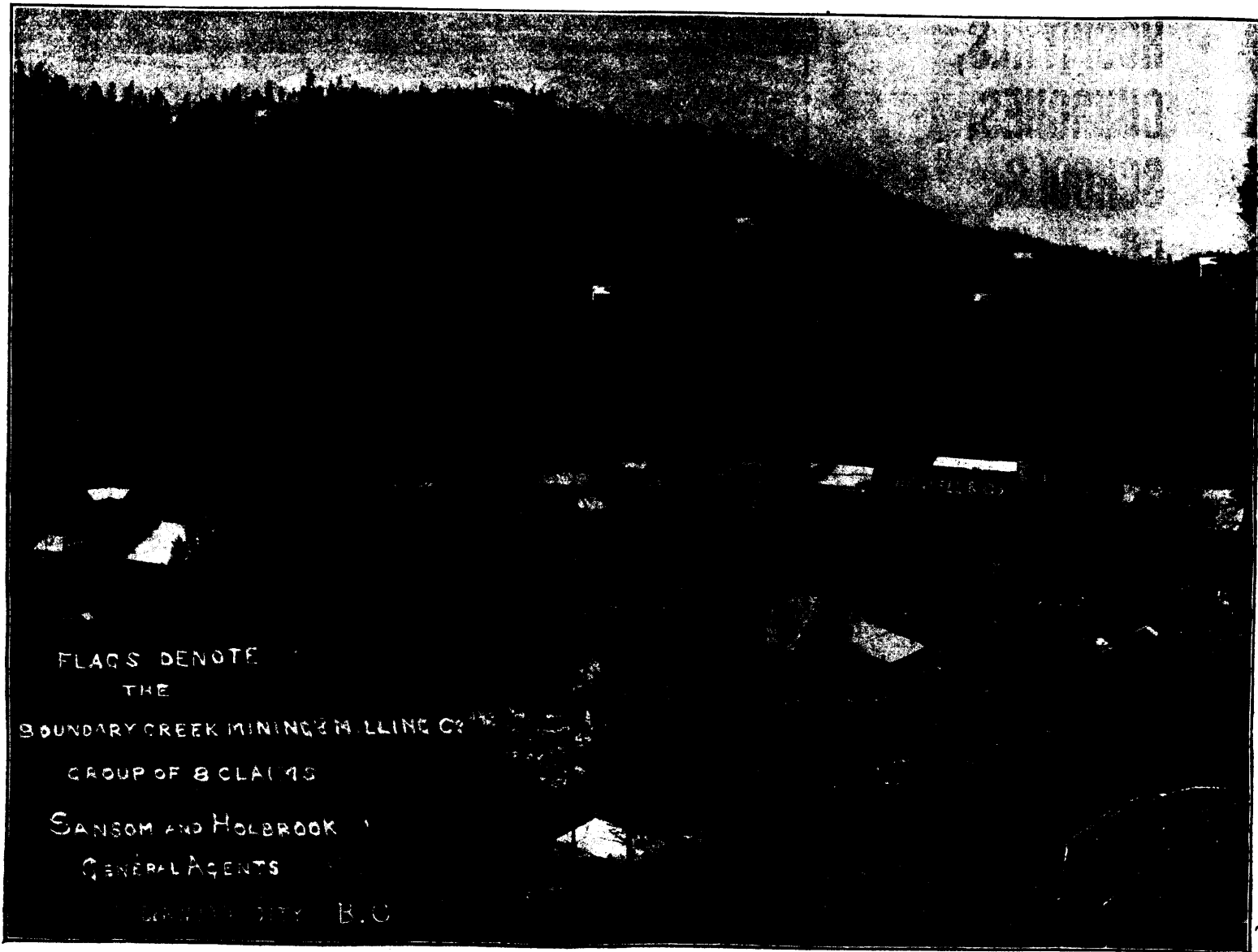
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SYLLABUS OF PAPERS.

The following among others, will contribute papers for discussion:—

- | | |
|--|---|
| MR. HENRY S. POOLF, M.A., A.R.S.M., General Manager, Acadia Coal Co., Stellarton, N.S. | MR. ROBERT HEDLEY, Metallurgist, Hall Mines Ltd., Nelson, B.C. |
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| MR. F. H. MASON, F.C.S., Halifax. | MR. H. H. PRINGLE, M. Inst. of C.E., Regina (Canada) Gold Mine, Rat Portage, Ont. |
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| | MR. FRANK C. LORING, M.E., Rossland, B.C. |

STUDENTS' SESSION.

A session for the reading and discussion of Papers presented by students of Mining Engineering, in competition for the prizes offered annually by the General Mining Association of the Province of Quebec, will be held on Tuesday Evening, 1st February. Intending competitors are requested to communicate the subject of their papers to the Secretary before the 31st of December.

ANNUAL BANQUET.

The Second Annual Dinner of the members of the Federated Institute will be held in the Windsor Hotel, Montreal, on Thursday Evening, 3rd February. His Excellency the Governor-General and other notable persons are expected to be present.

REDUCED RATES ON RAILWAYS.

By arrangement with the various companies, specially low rates will be given to members of the Federated Institute and their friends attending these meetings respecting which fuller particulars will be announced later. For further particulars application should be made to

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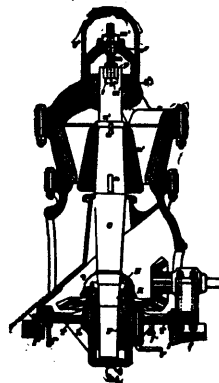
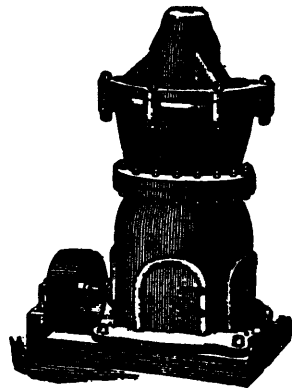
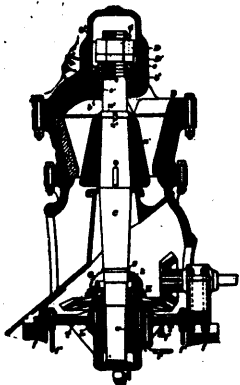
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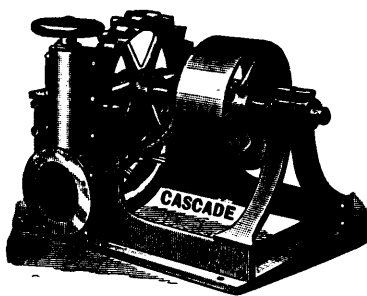
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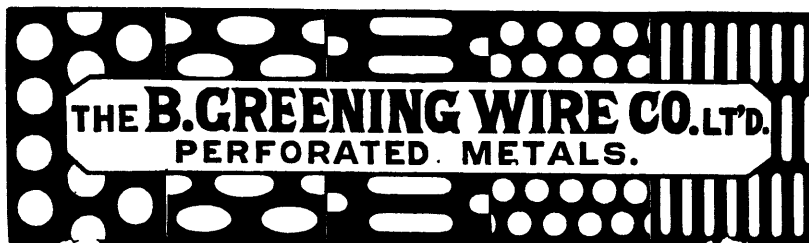
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PROVINCE OF BRITISH COLUMBIA.

Gold, Silver, Lead, Copper, Coal, Coke, Oil, Iron, Mercury, Platinum, Etc., Etc.

THE MINES OF BRITISH COLUMBIA
HAVE PRODUCED OVER \$100,000,000.

AMOUNT AND VALUE OF MATERIALS PRODUCED 1895 AND 1896.

	Customary Measures.	1895.		1896.	
		Quantity.	Value.	Quantity.	Value.
Gold, Placer	Oz.	24,084	\$ 481,683	27,201	\$ 544,026
" Quartz	Oz.	39,264	785,271	62,259	1,244,180
Silver	Oz.	1,496,522	977,229	3,135,343	2,100,689
Copper	Lbs.	952,840	47,642	3,818,556	190,926
Lead	Lbs.	16,475,464	532,255	24,199,977	721,384
Coal	Tons	939,654	2,818,962	846,235	2,327,145
Coke	Tons	452	2,260	615	3,075
Other materials.....			10,000		15,000
			\$5,655,302		\$7,146,425

Production for 1895, \$2,608,608; for 1896, \$7,146,425.

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, \$575,000 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 LILLCOET, 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 will much exceed that of 1896, as such mines as the "Slocan Star," "Payne," "Ruth," "Whitewater" and other mines increase 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, ILLCILLCWAET 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 interfusing 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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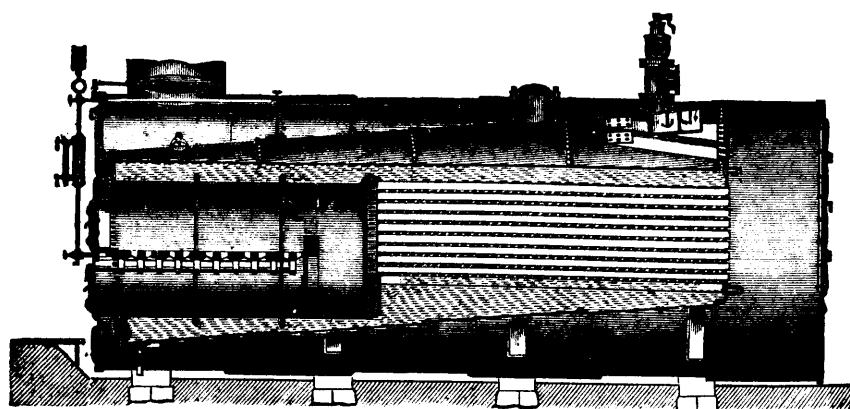
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