



# THE **MINING REVIEW**

Canadian

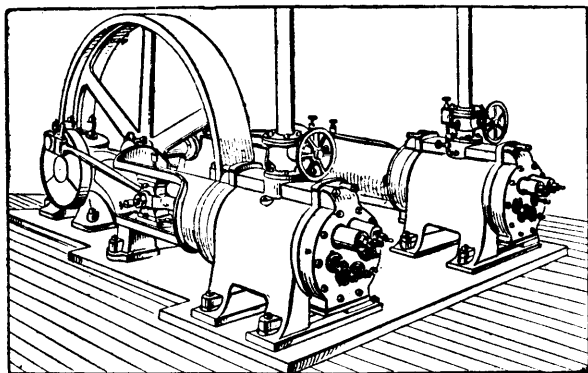
Established 1882

Vol. XV.—No 12

MONTREAL—OTTAWA—HALIFAX.

DECEMBER, 1896.

## POWER AIR COMPRESSORS FOR BELT OR WATER WHEEL



DUPLEX MACHINE.

General Offices and Works.

**SHERBROOKE, QUE.**

**F. R. MENDENHALL,**

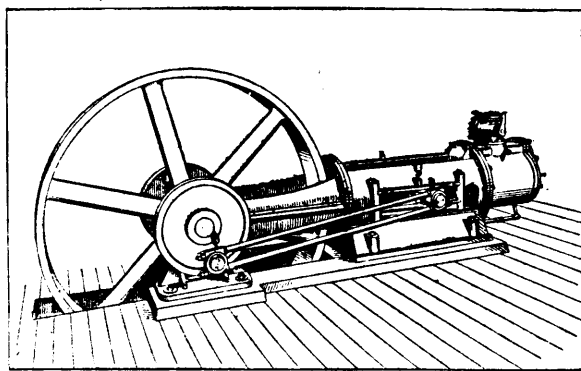
Agent, Rossland, B.C.

**H. H. FULLER & Co.,**

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STRAIGHT LINE MACHINE.

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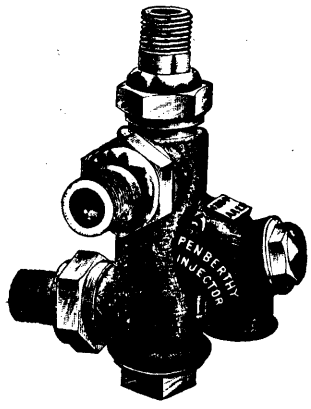
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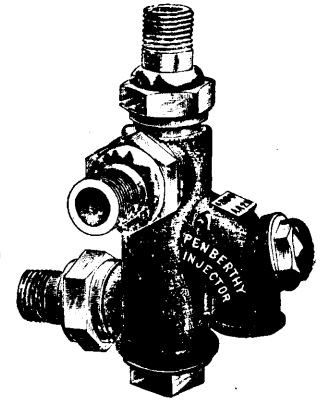


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**AUTOMATIC INJECTOR**

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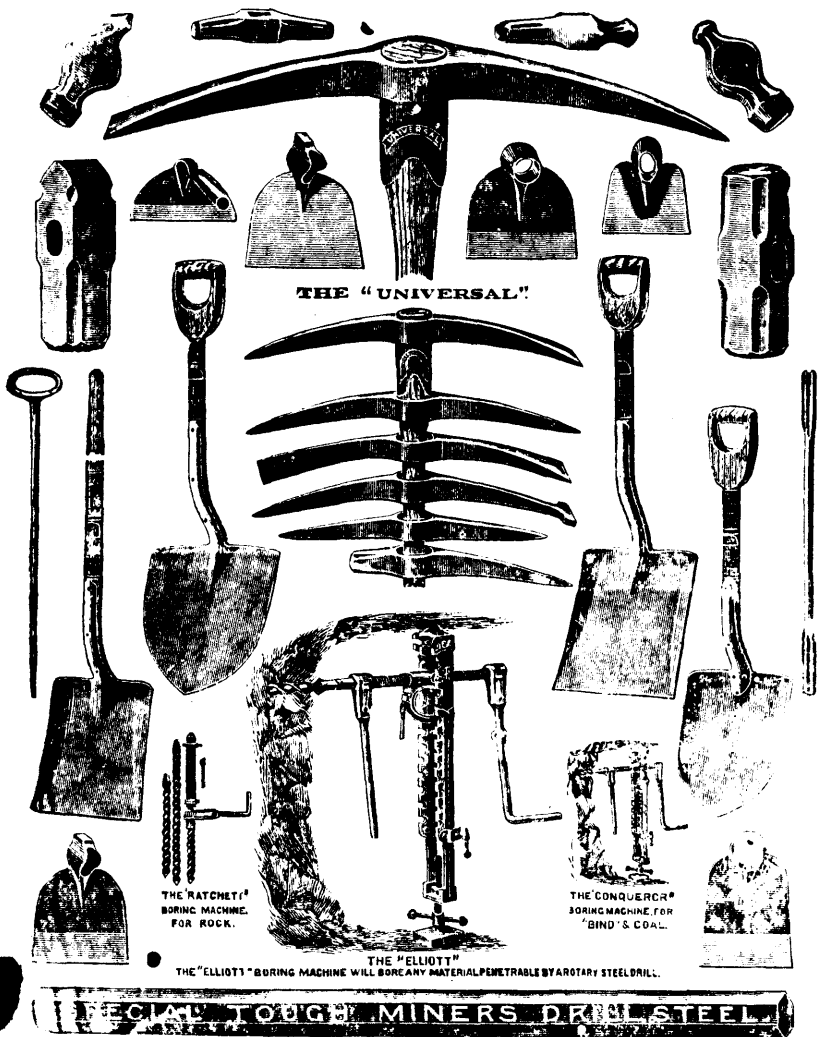
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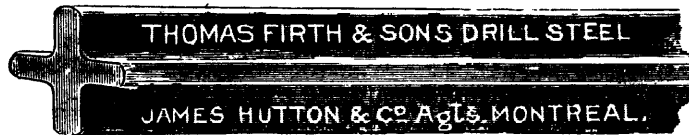
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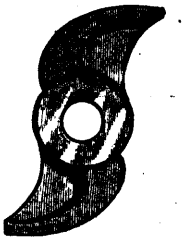


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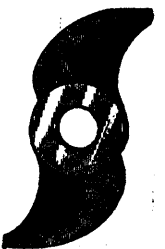
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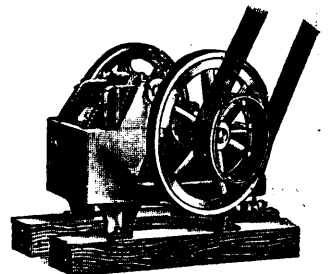
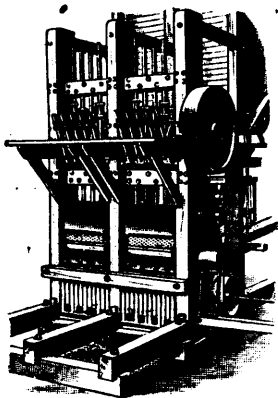
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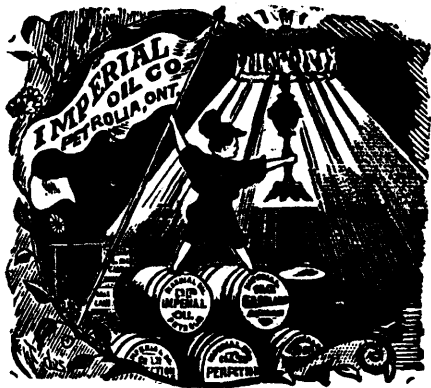
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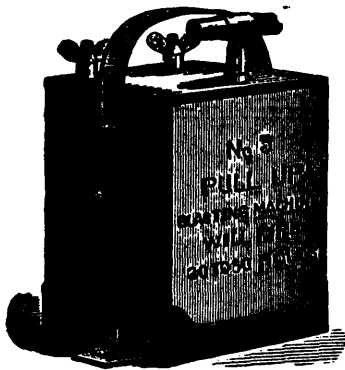
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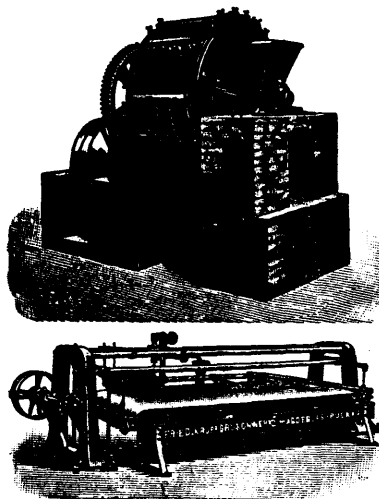
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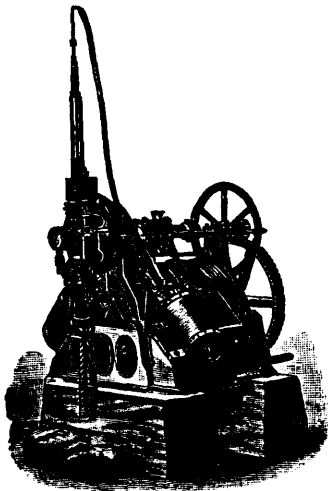
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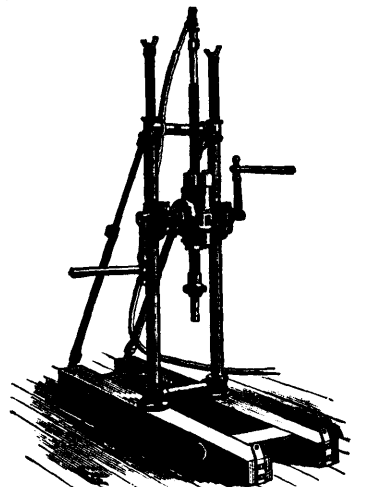
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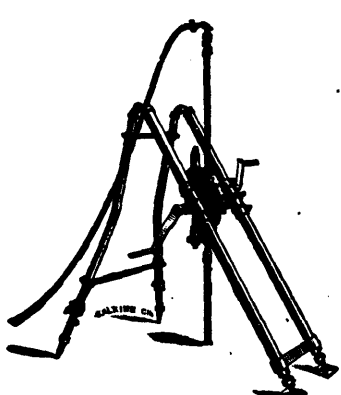


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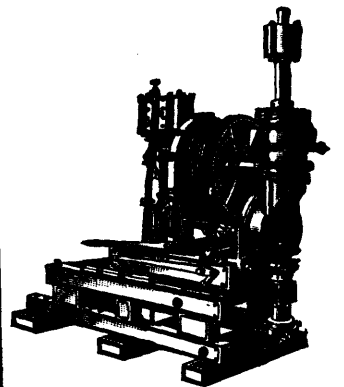
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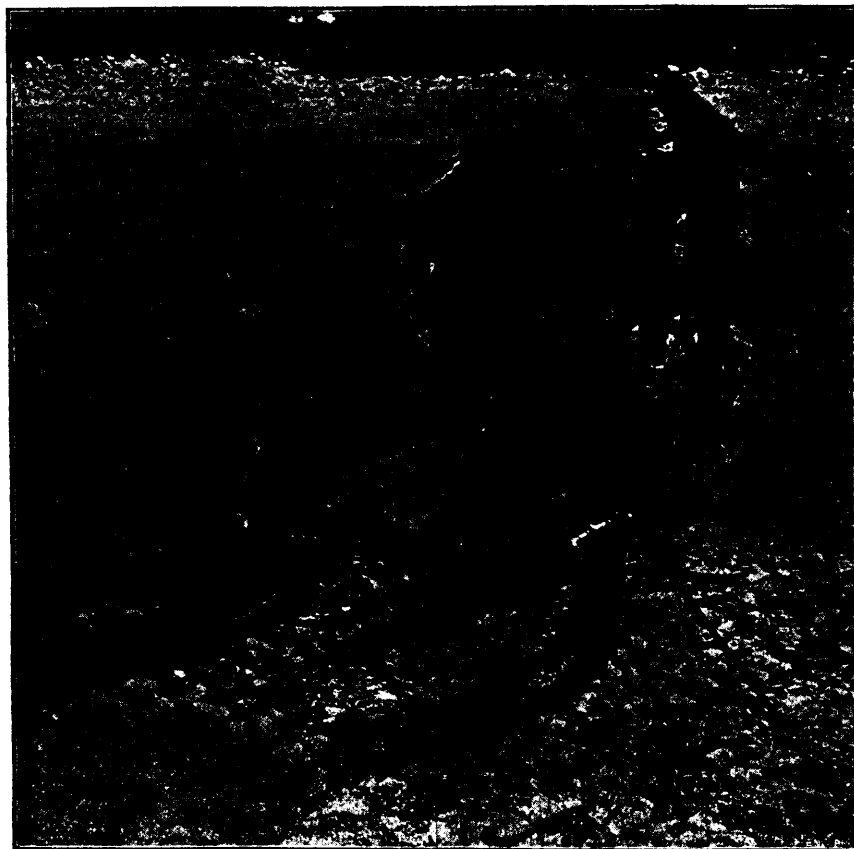
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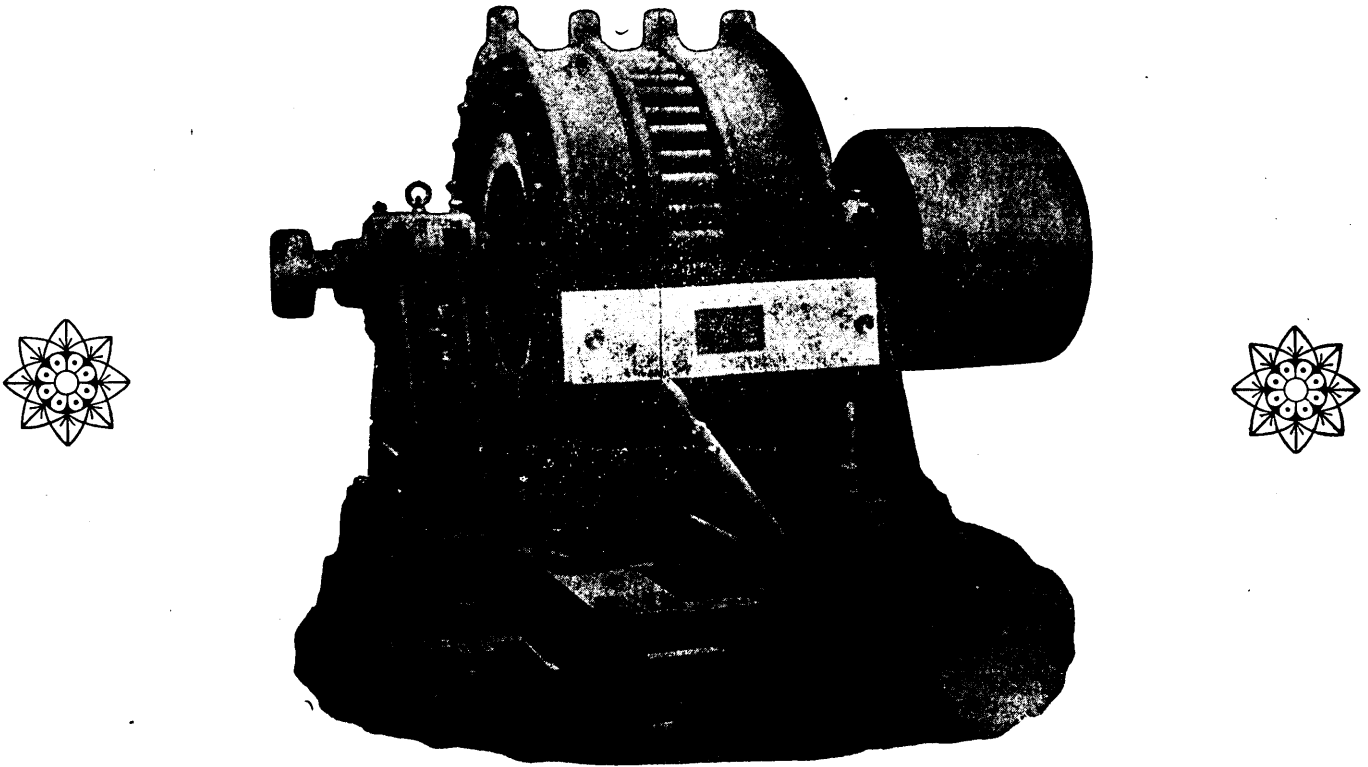
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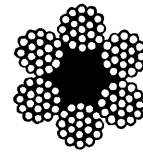
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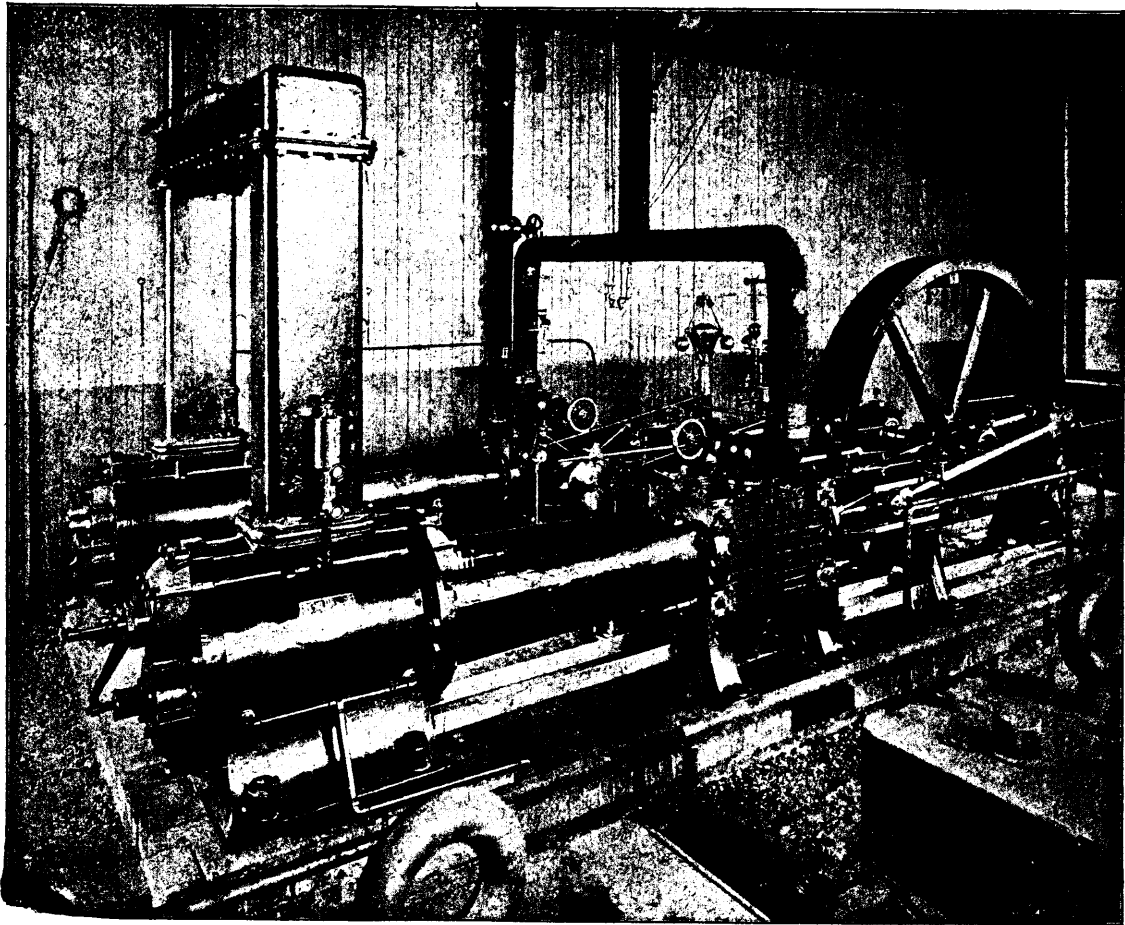
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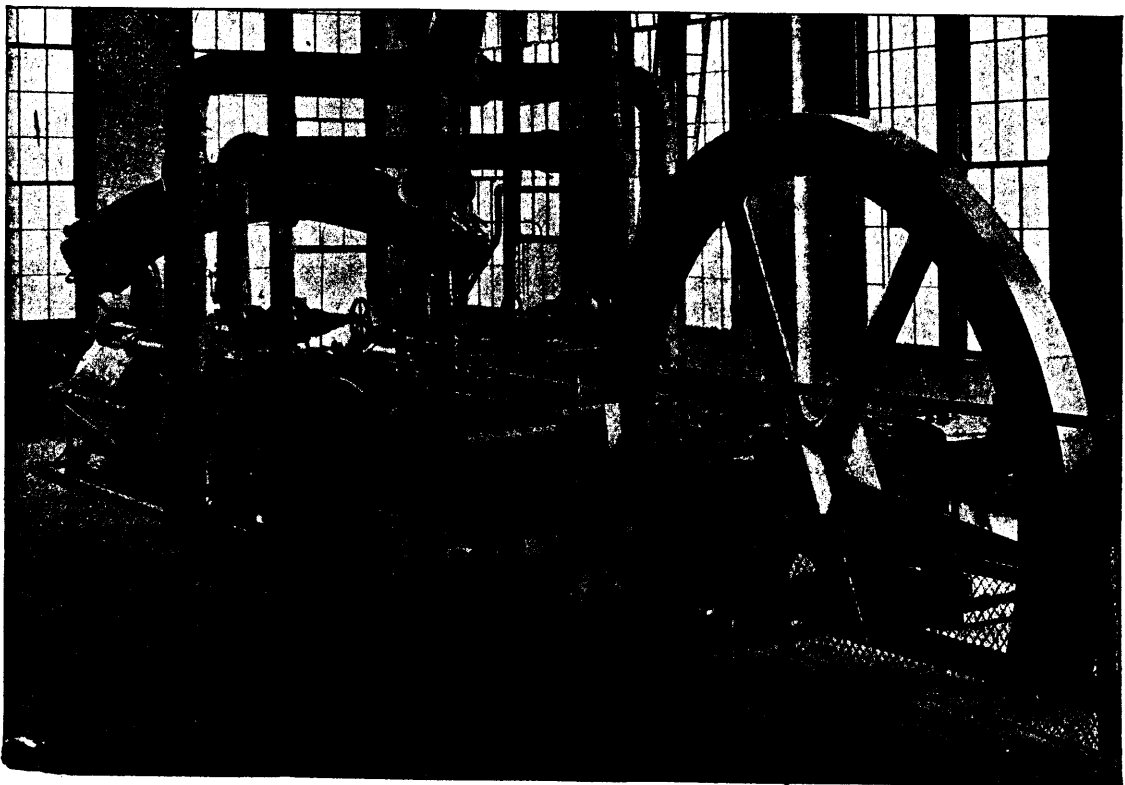
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# THE MINING REVIEW

Established 1882

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

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

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## Truth vs. Exaggeration.

We are continually coming across instances amongst our exchanges of the grossest misconception of the actual state of the mining business in British Columbia, and more particularly in the Rossland Camp. One example, taken from a paper of such high standing as the *Journal* of the Imperial Institute, will serve as a text;—"That its output will surpass even that of the Rand is, in the opinion of those well qualified to judge, also most probable, \* \* \* \* more than \$1,750,000 worth of Kootenay ore has been smelted and the product shipped in three months. The Rossland camp may alone be expected to produce between 350,000 and 400,000 tons of ore per annum, the gross products being estimated at between seven and eight million dollars, nearly one half of which is profit, \* \* \* \* The value of the mining industry of Southern British Columbia should reach a total of thirty to forty millions of dollars per annum within the next five years."

Now such representation as this is gross *misrepresentation*, and cannot but work injury to the ruines of British Columbia, as it is calculated to lead investors to expect a production which every informed person knows to be not five, but many years hence.

For the information of our readers interested in British Columbia, we propose to take up our quotations and offer a few figures and facts as a commentary.

The statement that the gold fields of British Columbia will surpass those of the Rand is one oftener met with in the prospectus of some Rossland property. So far as we are aware, every engineer of repute who has examined the Trail district has a very different opinion.

The output of the Rand for the year 1895, as given by the Johannesburg Chamber of Mines was 2,080,013 ounces fine gold, worth \$42,993,869. Unfortunately we have no reliable official figures of the value of the output of British Columbia, the official Report of the Minister of Mines for that province being sadly deficient in this respect, and being more remarkable for the information it omits than for that which it contains.

The Report, however, estimates the total value of gold, silver and lead produced at \$2,811,545, of which \$2,175,000 is credited to Kootenay proper. This includes the product of the Silver Lead mines of the Slocan country estimated at \$1,000,000, leaving \$1,175,000 for the rest of Kootenay. Mr. Carlyle, the Provincial Mineralogist, states the total value of the output of Rossland from 1891 to July 1st, 1896, as compiled from the smelter returns to be \$1,007,007 from 27,085 tons of ore, an average value of \$37.18 per ton. The largest month's production the camp has yet had was in the month of October, 1896, when 5,037 tons were reported to have yielded \$175,000, an average of about \$35.00 per ton. Supposing this production to be kept up for a year we get a total of only \$2,100,000 for the year.

When the Rand started, with a production of 23,155 ounces for the year 1887, it started *not* as a refractory ore-field, but as a free-milling gold field in which progress is naturally more rapid than in any other. Yet it took the Witwatersrand seven years to reach to the \$40,000,000 mark, with a climate in which prospecting and all surface operations can be carried on the whole year round, whereas, practically the whole of the Kootenay field is under snow for five months out of the twelve. The inevitable result must be a much slower opening up of the mines of British Columbia than of those countries more favorably situated climatically.

From the rational point of view there is no reason to suppose that British Columbia has any larger contents of the precious metals than other territories situated on the same Cordilleran Belt, and a few figures of the two chief producers to the south may be of interest:—

MONTANA—Enjoying a climate less severe than that of British Columbia, had a gold production 1895 of \$3,677,586, and a silver production of \$9,825,305, a total of \$13,502,891, without counting its enormous production of copper.

Colorado, whose latest camp Cripple Creek is as young an infant as Rossland, had in 1895 a gold production of \$13,559,954, and a silver production of \$11,687,150, or a total of \$25,247,104.

In the face of these figures, we would ask our foreign and native investors to look askance upon such extravagant statements and require proof before admitting them true. We do not imagine that any intelligent person knowing the conditions that exist in British Columbia will expect a value of "thirty to forty millions of dollars per annum" to be reached in any such period of time as the *Journal* names, if it is ever reached.

The statement that "1¼ million dollars' worth of Kootenay ore" was smelted and the products shipped in *three* months is an unqualified mis-statement and cannot be at all substantiated.

The statement that Rossland alone may be expected to produce 350,000 to 400,000 tons a year of a value of seven to eight millions, and giving one half of this as a profit is, to say the least, very questionable. It supposes the production of 1,200 to 1,500 tons a day of \$20 ore, mined, shipped and smelted at a cost of \$10 per ton. Unless some new and large ore-bodies are found the one-half of this production will not be realized, and no one who is familiar with the hard nature of Rossland diorite, the costs of smelting siliceous pyrrhotites, and the price of labor in British Columbia will believe the statement that \$10 per ton will come near paying the charges mentioned. At the present day costs vary from \$14 to \$20 per ton, and nothing is in sight at present which will lead to a very material reduction of these charges.

We have every faith, and much reason, to believe that British Columbia has an enormous wealth of mineral both precious and base within her boundaries, and we believe that investments in her mines if made judiciously, will be satisfactorily remunerative. We are not

"bears" on British Columbia, quite the contrary, we are decidedly "bullish" and the object of this article is to promote knowledge amongst those people who have money to invest in mining. But we take the point, and soundly we believe, that all journals and newspapers, particularly those which have reputations to lose, should be exceedingly careful in the statements made in print respecting new mining camps and ventures; for the reason that dishonest and unscrupulous promoters, coming across such statements as we have quoted, do not hesitate to abstract that portion which suits them, and use it in the prospectuses or advertisements they issue. Such a quotation catches many an investor who would otherwise pass by.

Every mail brings to the REVIEW office prospectuses garnished with abstracts from one journal or another tending to boom the particular property in question. There is one gratuitous sheet published in Montreal which makes a business of clipping from irresponsible papers in the west such paragraphs as are likely to boom shares, and of inserting isolated paragraphs bearing upon the profits of mining elsewhere than in British Columbia.

From published share lists we have computed that the enormous sum of \$233,344,000 is supposed to be dependent upon British Columbia mines for dividends, and we are fully aware that we have not succeeded in getting a complete list of the companies formed. It is perfectly apparent that there is no hope of any satisfactory dividends being paid upon this sum, which is daily growing larger and larger.

We do not believe that the horde of sharks, snides, bums, brokers and played-out traders who are gathering in the shekels of eastern and English suckers, are promoting the interests of the Kootenay, or British Columbia, or mining interests and industries anywhere. On the contrary, we are already getting evidence that the early investors are growing tired, as witness the painful plaint of a "Josie" shareholder in the Rossland Miner of November 13th. This shareholder is a sample of many to come in the near future. "Why," he asks, "is the long promised dividend still deferred? Weeks ago every issue of your paper declared the wonderful strikes and showings obtained from the Josie, and that a substantial dividend could shortly be expected." Where is it? Echo answers.

Another restless soul, possessor of some Poorman stock, wants to find out what has become of the money paid for shares last spring, since not even an entry of the proceeds of such sale can be found in the books. And for the comfort of this shareholder the omniscient editor replies that "since the stock was assessable there never was any stock set aside in the treasury. The Poorman company never had a cent in its treasury because it had never levied any assessments on its shares."

And yet this same Poorman is held up by the boomster press as one of the shipping mines of Rossland Camp (which it is) and one of the jewels in the Rossland crown (which it is not) and men there are—poor fools—who believe newspaper paragraphs and invest in such companies as the Poorman, all of which stock that was sold, says the editor, with cold comfort, "was proprietary stock and the proceeds belonged to the owner of the stock."

And yet another infant writes complaining that stock is listed in Rossland at 20c and in Toronto at 10c.

Many a sad and sorry shareholder will there soon be in Toronto and other places, who, because of his own folly will condemn mining in all its phases when the real condemnation should be against such dunderheads as himself, who buy stocks on the statements and despatches of the correspondents of the *Globe* and *World*, who know as much about mines and their merits and demerits as the devil that inks the type.

Again we repeat our advice, not alone as regards British Columbia mines but for Rainy River, Lake of the Woods and anywhere else, and we repeat it knowing full well that by the majority it will pass unheeded,

but believing it to be the duty of every paper which has the true interests of mining *as a business and not as a gamble* at heart to exert its influence against the wave of partial insanity, which has broken loose in Toronto and threatens to attack Montreal and other Eastern cities.

Beware of the big plate glass window with big chunks of ore displayed! Beware of the nicely gotten up prospectus offering you a non-assessable share (?) of \$1 par for 10c, and the garbled extracts from newspapers and reports from men called mining engineers, but of whom you know nothing, and whose previous record is a blank. Beware of the local newspaper man who claims intimate knowledge of the property, he has probably had a "rake-off" of 10,000 non-assessable shares.

If you believe a mine to be a good one and think seriously of investing some of your cash before writing your cheque, do the following things:—

(1) Insist on a report upon the property and its prospects made by a mining engineer of repute and of experience, and do not accept one because the promoter assures you he is a good one. Have your engineer vouched for by some one not connected with the scheme, and have one who has already earned a reputation he cannot afford to lose.

(2) Obtain a copy of the companies incorporation and by-laws and see that the directors and officers are men of probity and of standing in the world of affairs, and that the powers given to them are not in excess of what prudent corporations usually bestow.

(3) See that the provision for working capital is ample and is deemed ample by your examining engineer.

If all these points are satisfactory go ahead, and write your cheque, and you will then have every chance in your favor that your investment will be successful if you follow up the above points by a fourth one, viz.: See that the management be economical and honest, and do not think time ill spent in scrutinizing closely the monthly cost sheets and disbursement account.

#### Mining in Nova Scotia during 1896.

Mining operations in Nova Scotia during the year 1896 present few new features. The coal and gold outputs show an increase over the preceding year, but are little above the average. Iron mining and smelting have been carried on, but not as briskly as might have been the case. The country has had to stand a general election with its attendant doubts as to tariff legislation, and this feeling of uncertainty has been increased by the presidential election in the United States.

About 140,000 tons of gypsum have been shipped, the principal part coming from the Dimock quarries at Windsor. Small amounts were also shipped from Walton and Cheverie. The Messrs. McCurdy shipped to the States about 22,000 tons from their quarry at Port Bevis, near Baddeck. This quarry produces, like many other localities in Cape Breton, an excellent grade of rock. Selenite, the tabular crystallized form of gypsum, has been found to be an excellent substitute for talc in the manufacture of paper, and much enquiry has been made for this mineral in Nova Scotia. A large trade could be built up in this article, if it can be found in quantity and delivered at a price competing with talc.

Manganese mining as was expected has been dull, and prices low but recovering. About 130 tons have been shipped, valued at \$7,000. It came from Tenny Cape, Truro, and Walton principally, other places shipping small lots. Much enquiry has been made for a grade of this ore suitable for steel purposes, and it is stated that deposits have been found which will probably prove satisfactory.

The marble quarry at East Bay, Cape Breton, has got into operation in part, and a few hundred tons of marble have been shipped. It has been employed in a new building in Halifax, and is considered likely to be in demand. The usual quantities of lime have been burned at this place.

In round numbers 50,000 tons of coke have been burned at the Intercolonial and Acadia collieries, and at Londonderry and Ferrona. The People's Heat and Light Company are now entering the coke producing list. They will use washed Cape Breton slack, which will make an excellent coke, judging from the success which has attended their trials of the unwashed material. The iron ore production figures are not yet available for the year. The Pictou Charcoal Iron Company did not smelt during the year but mined about 15,000 tons, which were sold to Ferrona. At Torbrook, owing to the dullness at Ferrona and Londonderry, little was done during the latter half of the year. The Ferrona Company lost some time, but their operations were noted chiefly for the importation of iron ore from Bell Island, Newfoundland, replacing that from Torbrook. This was feasible, owing to the extremely low cost of quarrying and shipping the Newfoundland ore.

In copper there is little to report. Nothing was done at Coxheath, although the reconstruction of the company led to the hope that a definite start was imminent. For the River John and Pugwash district some prospecting was done by New York parties on the limited but rich pockets in the carboniferous measures. The results are reported as encouraging. It is possible that here more may be anticipated from beds impregnated with native or copper sulphides, carbonates, etc., than from the segregated deposits which are usually irregular if rich. The graphitic shales of East Bay were prospected and 170 tons shipped. These slates are said to hold about 60 per cent. of carbon and are expected to prove commercially valuable.

The extraction and export of tripolite (infusorial earth) from a locality at Bass River, near Truro, has been started, and about 400 tons shipped. This is valued at about \$8,000.00. The material is abundant and easily extracted.

Although the mining business in Nova Scotia does not present any startling features, in all directions prospecting and testing work has been done, and any change for the better in business circles will start mining matters in Nova Scotia, so that next year may show a decided advance.

#### Cost of Drift Gravel Mining.

We are glad to give space in this issue to a letter from Mr. John B. Hobson, M. E., Manager of the Horse Fly and Cariboo mines, giving data upon the cost of working cemented gravels in California, and expressing his belief that large deposits of similar material exist in the Cariboo country, B. C.

Mr. Hobson alludes to an editorial in the March issue of the REVIEW commenting upon his annual report for 1895, in which we expressed our doubts of the ability of a 20 stamp mill to crush 200 tons per diem, and stating that we had no record of milling at the low cost of 20 cents per ton. We frankly acknowledge that from the data furnished by Mr. Hobson it is evident that there are private records of milling gravels for less than 20 cents per ton, and duties of 10 tons per diem per stamp-head.

Undoubtedly there have been many changes and improvements made in the milling of cement gravels in California during the last seven or eight years. As, for example, in the case of the "Morning Star" mine cited by Mr. Hobson—in the Eighth Annual Report of the California State Mineralogist (1888)—the duty of the stamp at that time is given at  $4\frac{1}{2}$  tons per diem, using a screen with one-quarter inch round punched holes, and the cost of milling was over 25 cents per ton. In the milling of cemented gravels, such as those cited, it is customary to use screens with very much larger apertures than are used in the milling of gold quartz, the majority of the mines using round punched screens with apertures varying from  $\frac{3}{16}$  to  $\frac{1}{4}$  of an

inch in diameter, others using an iron wire screen with meshes  $\frac{1}{8}$  of an inch square, as at the "Breece & Wheeler" mine.

This custom, coupled with the fact that many of the gravels mined, though too hard to hydraulic, are easily shattered by a blow such as that given by a stamp accounts for the high duty obtained.

It has been suggested that, as fine stamping is not necessary, and many of the mines use riffles or mercury wells, the steam stamp would be more economical in use, where water power is not available, than the gravity stamp. We are not aware of any use of the steam stamp for such purpose, the one tried at the Homestake mine, in quartz ores, having been abandoned on account of imperfect saving of the gold.

While on this subject of costs, however, we would beg to remind Mr. Hobson that there are several conditions extant in California which do not obtain in British Columbia and the lack of which must necessarily increase costs over similar propositions in the Golden State, viz.: the cost of labor in California to-day is given at from \$2.00 to \$3.00 per day. Where in Cariboo can similar labor for like wages be obtained? Also there is a surplus of cold weather in British Columbia, with five months or more during which there will probably be no water power in the Cariboo country, and the necessity of heating the mill and running it by steam power during that period will materially increase the figures of cost per ton milled over those in California. Should the usual dry spell in summer come on, water power would again fail.

In the article by Russell L. Dunn, M. E., in the Report for 1888 above mentioned on "Drift Mining in California," we find a statement of cost of *mining* gravels in which the figures run from 37 cents per ton for uncemented gravel at the Manzanita mine to \$1.95 per ton for cemented gravel at the Dardanelles. We also find the statements (p. 769) that the cost of *milling* with steam power is 35 cents per ton in the Paragon mill and in the Dardanelles, with steam power, 33 cents per ton.

In regard to the "Spanish" mine, which is made to do duty so very many times in cases in which there is no parallel, we may state, for the information of our readers, that its ore-body consists of a very wide belt (90 feet and upwards) of soft talcose slate containing small veinlets and streaks of rusty quartz. The vein proper, which is solid quartz four feet thick, lying on the footwall, is never mined, being too poor to pay for working.

The wide soft slate belt is mined by a combination of open cutting and stoping and employs largely Chinese labor, whereby cost of mining is reduced to about 25 cents per ton.

The milling is effected by grinding in Huntington mills, which is *verbum sat* to those of our readers who are gold quartz men. No hard quartz nor rounded cements, with "niggerheads" can be milled in such fashion.

The nearest approach to the conditions of the Spanish mine are found in some of the auriferous slate belts of Nova Scotia.

#### The Crow's Nest Railway.

The early construction of a railway through the Crow's Nest Pass in East Kootenay, B. C., to connect Nelson with the Eastern Railway systems at Lethbridge, N. W. T., is exciting widespread interest, and with the Resolutions urging its construction from so many Boards of Trade and other bodies interested in the development of trade in that part of Canada, it is difficult to see how Parliament can refuse to make provision for its being built at its next session. The Minister of Railways has just been through the Mining District of West Kootenay, and its marvellous mineral richness will no doubt convince him that irrespective of Eastern trade connections, increased railway communication is a crying necessity.

A strong feeling exists in the West that the construction of the road should be undertaken as a Government work, and the line leased to the Canadian Pacific Railway Company or some other corporation, but we believe it would be folly for the Government to build such a line without being in possession of one or other of the terminals.

Topographical reasons have been urged for construction by the Government, but our information derived from reliable sources, is that if any other railway company desires to build through the Pass there is ample room for the road-bed of two railways.

We believe the line should be built and operated by the Canadian Pacific Railway Company, and further that if Parliament grants that company financial assistance for the purpose, provision should be made for equitable adjustment periodically of freight rates by a commission composed of business men who should be absolutely free from any partial entanglements which might call for the support and influence of the Canadian Pacific.

There are immense coal fields on the western slope of the Rockies, which will be pierced by the proposed railway. The coal has been pronounced by competent experts as of the best quality for coking purposes, and we understand that a company which owns a part of these lands is preparing to open mines and construct coking ovens, so that with the advent of the railway the smelters in Southern British Columbia may at once be supplied with a fuel at less than half of what is now paid for it. The transport and fuel questions disposed of, the Kootanias should become the most active mining and smelting districts in the civilized world.

## EN PASSANT.

Our heartiest Christmas and New Year's greetings to all our readers.

With our next issue the REVIEW enters upon the fifteenth year of its publication, the first number having been printed by Mr. F. J. Foukes in January, 1882. It was subsequently acquired by Mr. E. Grant Powell and published by him, somewhat spasmodically, until 1886, mainly in the interests of Canadian phosphates, at that time a flourishing industry in the Ottawa Valley. In August, 1886, the present editor took hold, gradually expanding its field of operations as a journalistic enterprise until to-day it occupies the position not only of the oldest established, but the only official exponent of the mining industries of every province in the Dominion. Anyone who will compare a number of the REVIEW as it is now with its earlier issues will readily admit that the improvements and progress made are of a solid and substantial character. In 1882 the paper was a diminutive pink quarto of eight pages; to-day we print 62 pages. Its circulation then was confined to the Ottawa Valley and to those interested in phosphates; to-day it is found in the office of every mining company, mine operator and mining engineer throughout the length and breadth of the Dominion, while a large issue is dispatched every month to the United States, to Great Britain, to Germany, Holland and even to far off India and Australia. In a young country whose mineral industries are so diverse, in a mineral territory extending over so wide an area, the publication of the REVIEW has been no easy task. We have, however, been fortunate in having associated with us an excellent staff of contributors and correspondents in every province and in every mining camp, the best and most reliable men in the profession, and it is to the co-operation of these gentlemen that we are indebted, and our readers are indebted, for the growth and expansion of the REVIEW. Next month we hope to present our readers with photographs of some of those who have contributed materially to the success of Canada's representative mining journal. Our endeavor, as in the past, will continue to be

directed to calling attention to the resources of our country and the splendid opportunities they offer for remunerative investment, to promote knowledge of the science and art of mining, to record the progress of our industries, to expose fearlessly quackery and fraud, and to do everything in our power to promote the welfare and the development of mining—the greatest of Canada's industries.

Our next issue will contain a verbatim report of the proceedings of the meeting of the Mining Society of Nova Scotia, held on the 16th instant.

To date close upon thirty papers have been promised for the Inter-Provincial Conference of Mining Engineers and Mine Owners, to be held in Montreal on the 3rd, 4th and 5th of February next. The subjects announced since our last issue include: "The Gold Bearing Deposits of the Eastern Townships of Quebec," by Mr. Robt. Chalmers, of the Geological Survey; "On the Occurrence of Iron Ore in the Interior of Labrador," by Mr. A. P. Low, of the Geological Survey; "A new use for Scrap Mica," by C. H. Mitchell, Toronto; "The Liability of Directors for Statements contained in a Prospectus," by Mr. J. Bawden, Kingston; "The Gold Bearing Lodes of Cayoosh Creek, B. C.," by Mr. G. F. Moncton, M. E., Vancouver, B. C.; "Moss litter," by Mr. T. W. Gibson, of the Ontario Bureau of Mines; "Mines and Mine Management," by Mr. Robt. Archibald, M. E., Joggins Mines, N. S.; "Underground Photography" (illustrated by calcium light), by Mr. G. R. Mickle, M. E., Sudbury, Ont. Other contributors include Mr. J. H. Susmann, M. E., Montreal; E. D. Ingall, A. R. S. M., Ottawa; J. F. Willson, St. Catherines, Ont.; C. H. Taylor, M. E., Montreal, and Dr. A. P. Coleman, Toronto, from whom the titles of the subjects to be treated have not as yet been advised.

For the convenience of delegates attending from the Maritime Provinces, arrangements have been made with the Intercolonial Railway for transportation from Halifax and intermediate points to Montreal and return for one single fare. The Quebec Central Railway has also extended the same privilege for delegates attending from points on their line. The Canadian Pacific and Grand Trunk Railways have arranged to carry delegates at a greatly reduced fare on the ordinary certificate plan. The indications point to this meeting being the most representative gathering of Canadian mineral operators hitherto held in the Dominion.

In consequence of the above conference the General Mining Association of the Province of Quebec has postponed its annual meeting, which is ordinarily held on the second Wednesday in January, until the 1st and 2nd of February. A feature of this meeting will be the competitive prize essays to be read by mining students from McGill, Kingston and Toronto for prizes offered by the Association.

With "typical Western gall" a sheet published in Rossland, B. C., has appropriated the title that for close upon fifteen years has adorned this publication. Needless to say an Injunction has been applied for and an action entered for suitable damages for the infringement of our copyright. We merely mention the matter so that our readers may not credit to us statements reproduced from this Rossland sheet in the daily press and credited by shrewd promoters and brokers to the "MINING REVIEW." These gentry apparently desire to trade on the reputation of this paper as a conservative, old established, and the only official organ of the mining industries of the Dominion. As indicated elsewhere in this number, we have a very high opinion of British Columbia as a mining field and have great faith in its future, but we have no desire to have attributed to us statements calculated to sell stock in many of its absolutely worthless undertakings.



We desire to return our heartiest thanks to Mr. C. M. Percy, M. E., F. G. S., for an exceedingly kind and altogether too flattering sketch of the editor of the REVIEW in the last number to hand of his valuable paper, "The Science and Art of Mining." Of the REVIEW and the MANUAL Mr. Percy writes:—

"The paper at that time (1886) was a diminutive pink sheet of eight pages principally devoted to booming the properties of its then owner—a successful operator in Canadian phosphates; Mr. Bell took the literary reins, entirely altered its policy and worked it as a purely journalistic enterprise. The outspoken criticisms and exposures of worthless undertakings naturally attracted a good deal of attention—not always of a refreshing character—and during the ten years that Mr. Bell has had control he has been honoured with about one action for libel each year, every one of which has been abandoned before going into court. An upright editor has his troubles and suffers a good deal of wicked annoyance and unrighteous expense; it was ever so, . . . I had no knowledge of the CANADIAN MINING REVIEW in the earlier days; I am well acquainted with it now; and, as what it purposes to be, I pronounce it a mining journal not surpassed in the English language, or any other language. The Canadian mining community are justly proud of it, and we at home in England highly appreciate it. . . . In 1890 Mr. Bell published the "Canadian Mining, Iron and Steel Manual," which has appeared annually since, and the seventh issue is now in preparation. With this valuable book my readers are well in touch, and I need only repeat here what I have more than once written in this journal, that for interesting and valuable information on Canadian mineral industries and resources it could hardly be excelled. No person can know industrial Canada without it; anyone may understand industrial Canada with it."

The Sudbury coal-fakirs are dying hard. The last issue of the *Sudbury Journal* says: They (the geologists) said that nickel could not be found at Sudbury, and we have the largest known deposits in the world. They said anthracite could not be found in the Rocky Mountains, and it was proved that they were wrong. They said gold could not be found in Algoma, in paying quantities, and the fact that it is has been demonstrated. They have also said that coal could not be found in Algoma, and they probably won't believe there is until they burn and use coal shipped from within twenty miles of Sudbury. Perhaps the editor of this paper will be so kind as to cite his authority for this remarkable statement. Needless to say to our readers it has absolutely no foundation in fact.

Our old friend Ahn, of Sudbury notoriety, who now cuts, by-the-way, quite a figure among the nabobs of Rat Portage as a "mineralogist and mining broker," is reported by the *Globe* to have said in a recent interview with a representative of that paper:—

"Every investor in small or large sums should be careful that the men in the business are reliable. That country is swarming with butchers and bakers and real estate agents who know nothing of mines, and buy properties on their limited personal knowledge. The property is no good, but they put it on the market."

Coming from one with such an intimate acquaintance with the trade in jewellery and trinkets, and whose claims to be a mining expert have been very pithily described by Dr. Stephen H. Emmens, to be "founded upon a *peculiar* rather than an extensive knowledge of chemistry, mineralogy, metallurgy and mining" this exhortation of Ahn's sounds curiously like "the pot calling the kettle black."

In view of the reported rich strike at the Regina Mine, Lake of the Woods, the plan of the workings and the photograph of the mill and chlorination works which are reproduced elsewhere will be of interest. At a depth of 207 feet the vein is reported to have widened to six feet, yielding on assay as high as \$92 per ton. In making his re-

port to the shareholders this time last year, Mr. W. G. Motley, the manager, at that time, prognosticated; "In making my calculations of the future profits of the mine, I take the value of the ore at \$25 per ton and in consequence of the natural advantages for carrying on operations mining and milling can be reduced to almost a minimum, and should be carried out for \$2 per ton, but for the purpose of this report I will take it at \$3 per ton. Operating with a 10 stamp mill and treating 25 tons per day, taking 300 working days in the year, will give a net profit of 25 x 300 x 22 equals \$165,000 per year."

We unite with everyone interested in the success of the Lake of the Woods in the hope that these results will be more than realized. The success of General Wilkinson and his confreres will do much to create confidence among English investors in that country as a field for investment under capable management.

On and after 1st January next, the Montreal office of the REVIEW will be at Room 2, Windsor Hotel. All correspondence should, however, be directed, as in the past, to the editorial offices, Slater Building, Ottawa, Ont.

It is reported on good authority that a deal is in progress whereby the graphite mines in Ottawa county will be taken over and worked on an extensive scale by a wealthy American Syndicate. There is little doubt that such an enterprise, if capably managed, will yield handsome returns, the mineral having been proved to be quite equal to the best Ceylon in quality, while the deposits are large and cover a very wide area. During the past year, five mines have been worked for this mineral.

The office premises of the Ingersoll-Sergeant Rock Drill Company of Canada and the Dominion Wire Rope Co. Ltd. at Montreal were destroyed by fire on 9th instant. This, of course, does not interfere with the producing capacity of the works, which are situated in another portion of the city. A temporary office has been opened in the Temple Building, St. James St.

An excellent hint to that unscrupulous class, the "salters" of mines, whose field is happily becoming more limited in the light of better and more intelligent investigation of mining properties, came to light in an exhibition recently, at Edinburgh, Scotland. The exhibit arose over the much-discussed question as to how gold was originally deposited in quartz, and Mr. J. C. F. Johnson of Port Adelaide, Australia, who has given much attention to the subject, showed some specimens of non-auriferous rock into which he had introduced gold artificially, and in such a manner that the experts present were unable to detect the handiwork. Mr. Johnson has for years been experimenting with the various salts of gold, and the result is some remarkable specimens of manufactured auriferous quartz which, when broken, show the gold through every lamination of the rock. This discovery of how gold was deposited may prove of value in suggesting an economical method for its extraction but the agents of the investors should be guarded that the work of nature is not copied by those who have gold mines to sell and are not above "salting" them.

To a constant reader of Western mining papers, a significant feature during the past month has been the number of letters of enquiry and complaint that have been printed. The "Rossland Miner," as being easily the first amongst the "boomster" sheets, has had the greatest number. Complaints from Poonman, Hill Top, Josie, Vulcan and other shareholders are beginning to be frequent, and our contemporary must answer the questions addressed to it in a more satisfactory manner, or we fear it will lose its reputation for "justice and impartiality in answering questions relating to mining prospects in Rossland."

We note in our exchanges two different items which we think should be correlated as being of primary significance. One is an editorial estimate by the *Rossland Miner* that the pay-roll of Rossland amounts to \$2,500,000 a year, or, roughly, \$200,000 a month. The other is that the biggest month's production Rossland ever had was for October, and was valued at \$175,000, the unavoidable inference is that even with its largest monthly production, Rossland shows a balance of \$25,000, on the wrong side. Should the camp be forced to a self-sustaining basis where would it be?

A shining example of the prevailing inbecility in regard to shares in mining ventures is afforded by the prospectus of the "Great Northern Mining Exploration and Development Corporation of Ontario, Ltd.," now being advertised in the daily press and distributed to those lambs who will stand losing a little more wool. This incorporation proposes (1) to make a metallurgical centre of the town of Sault Ste. Marie, (2) to act as brokers and promoters of prospects "which may come into their (*sic*) hand for sale," (3) to develop an indeterminate number out of 50 veins which are situated—? the prospectus does not say where.

The absurdities of the whole scheme are well exemplified in its first proposition, to put up a custom stamp mill with chlorination and cyanide plant at such a spot as Sault Ste. Marie, which has no mineral centres nearer than Sudbury on the east, a distance of 200 miles, Jackfish to the north, distant 400 miles by rail, and Rat Portage on the west, nearly 1,000 miles by rail; while its assessibility by water from any "mineral centre" is yet to be proved.

For ourselves, if the "future of the company is an absolute certainty" as the prospectus states, we can see no reason for selling stock at 25c. on the dollar, as the sum of \$12,500 is all that is asked for at present. Moreover, why is so large a capital as \$475,000 required for a company which has "nothing to lose?" Seriously are the business men of Canada gone mad, that the promoters of such a prospectus, with such transparent language, should expect them to buy their shares? We cannot believe it.

A very elaborately garnished prospectus of "The Lake Harold Gold Mines Co. Ltd." has been placed on the REVIEW's table, in which the public are invited to subscribe for 300,000 shares at 15c or \$45,000 which amount is to be devoted to the future development and equipment of the mine and "for other purposes."

It strikes us as something peculiar that a mine which has had \$27,000 spent upon a five stamp mill and upon development which now equals 422 ft. of shafts and drifts, from which nearly \$7,000 was realized, and which, from Mr. Chewett's report, "requires no further machinery but a large pump," and which has \$5,850 *nett* in sight should require the large sum of \$45,000 for "further development and machinery;" the "other purposes" must require the money, and we advise intending investors to get further information about these "other purposes" before placing a dollar in the enterprise. \$27,000 plus \$7,000 from proceeds makes the very large total of \$34,000, which in any other country would be ample to open up veins averaging 2 ft. in width and worth \$13 per ton, so that a 5 stamp mill could be kept busy.

That Prince of "boom" sheets, the *Rossland Miner*, is sometimes sharply recalled to strict veracity, and suffers a clipping of its wings by its B. C. contemporaries.

An amusing and characteristic sample of the process is the following, clipped from the *Nelson Miner* of November 7th:—

In its last issue the Trail Creek *News* indignantly tells the Rossland papers that "they can't boom Trail." It appears, according to the *News*, that there has been a mistake made in regard to the present and prospective capacity of the Trail smelter and Rossland papers, feeling that the interests of Trail intimately concerned them, published

a glowing account to the effect that the Trail smelter had increased its capacity to 600 tons per day. The *News* says:

"The management of the smelter has no intention of doubling the size of its buildings or of doubling the capacity of the plant. They have ordered one 250 ton blast furnace the exact size of one of their seven furnaces and its installment will not increase the payroll at the smelter 100 names by any means. \* \* \* The smelter has no need to double its capacity yet awhile. The mines of Rossland are not producing over 300 tons of ore per day, or about 450 tons of ore, lime rock and coke, as the Nelson smelter counts its work. The capacity of the smelter to-day is 500 tons, and the new furnace will bring it up to 750 tons—but it will seldom, if ever, be run to that capacity."

The item from the *News* is evidently from an inner circle which knows whereof it speaks.

In the face of such figures, the *Miner's* declaration that "the plant is now being enlarged so as to treat 600 tons of Rossland ore and 300 tons of Slocan ore every 24 hours" must considerably shake public faith in the omniscience of that journal. It would be a good idea for the editor to don his yellow leggings again and acquire a more intimate expert knowledge of Rossland's mines than he displays in his boom articles, and also freshen up his arithmetic.

In the issue of October 23rd, in an editorial replying to the *Kasho Kootenai*, the *Rossland Miner* states that the shipments from Rossland for that month will exceed 8,000 tons of a value of nearly \$300,000. As a matter of fact, 5,037 tons were shipped and the value was \$175,000. Surely an estimate made on the 23rd of the month for that month, by one having an intimate knowledge of Rossland mines should come nearer than 300 tons.

But the significant part of the *News* item, all of which we commend to the study of the *Rossland Miner*, is the statement that "the smelter has no need to double its capacity yet awhile," and that the smelter will "seldom, if ever," be run to its full capacity.

The erudition of the staff of the *Rossland Miner* must be put to the stretch to answer the numerous letters of enquiry and complaint printed in its columns. If it is to maintain among its subscribers a reputation for "justice and impartiality," and as a "reliable authority," which "Vulcan" thinks it has, it must have a little more definite knowledge than is evinced by the "think—inclined to believe—it would appear," which characterise its replies, and it must stop printing what "the Rossland public thought" and have an opinion of its own. Otherwise we fear that an apology on the lines that "the Rossland public has had greatly exaggerated ideas" will not soothe the fretting shareholder. For ourselves, we should be surprised to learn that the Rossland public had any ideas that were not exaggerated. Imagine the satisfaction it must be to a buyer of one of Rossland's stocks, after learning that the company in which he has shares has no title to a property to find that the *Miner* is "well satisfied," in spite of the fact that "the management has not been paying much attention either to the property or the interests of the stockholders," that when the president's attention is called to the condition of affairs "they will promptly be straightened out." Great Scott! what a president and what a company—when the president's attention has to be called to the fact that his company has no miner's license and has no property standing on the records in its name? And yet the omniscient expert editor does not know of any worthless stocks in the market!—and prates of Rossland working "with most gratifying success" to prevent "wild-catting."

Take off your coat, brother Reeves, turn up your sleeves, and go to work in this new field for you. You've as hard a task as the Augean Stables. Begin with "Vulcan," follow with "Hill Top," "Poorman" and so on to the end of the very large list.

Captain Wm. Teague, in a paper before the Mining Association and Institute of Cornwall, at Camborne, on "Shaft Sinking," said he

had no doubt in his mind but that, if any mining property was to be successfully developed, particular attention must be paid to shaft sinking, and the keeping down of what was generally known as the sump shaft. He had come to the conclusion that a round shaft was preferable to a rectangular one. His reasons for that decision were:—(1) No form of shaft was so safe as a round one when it was bricked up. (2) It could be sunk with less trouble, and consequently with greater speed. (3) By means of brickwork tubing could be successfully carried out. (4) Rock drills could be used with greater advantage than in any other form of shaft. He did not favor wire ropes for guides, for in any many of their mines the water had such a bad effect on iron that they would not answer for three months. He certainly approved of wood runners for guides.

The increased use of electric power during recent years has led to a largely-increased demand for mica for insulating purposes. But the producers of mica have not found in the electric demand any relief from the state of affairs which was a continual source of loss to them before it began. Large sizes and good shapes of mica, such as are required for insulation purposes, were always marketable, but the difficulty remained of disposing of the waste or scrap which forms so large a percentage of the output of mica mines and accumulates so rapidly at mica-cutting works. Through the ingenuity of Mr. H. C. Mitchell, of Toronto, this waste mica has now a value, though no doubt a small one, as compared with the merchantable sizes. It is being utilized as material from which to manufacture coverings for boilers and steam pipes to lessen the loss of heat by radiation, mica being a good non-conductor of heat as well as of electricity. The scrap mica blocks are first put through a series of corrugating rolls which loosen the laminae; these are finally separated from each other by air-currents, after which the sheets are again put through a process which corrugates them singly. They are then laid between light galvanized wire netting, made into webs of a thickness suitable for the particular purpose they are intended to serve, and stitched with wire on a machine the first of its kind yet made. The flexible web of mica is covered with canvas stiffened at the back with millboard, and rounded into the desired shape. The covering when finished is fastened on the pipes by firmly lacing the edges together. Mr. Mitchell will give fuller particulars of this useful invention at the forthcoming meetings in February of the Canadian Mining Institute.

Mr. John E. Hardman, S. B. M. E., has, since his return from British Columbia, been laid up with a painful accident to his knee. Mr. Hardman will reside in Montreal for the winter.

Mr. F. Cirkel, M. E., manager of the new works of the Ontario Graphite Co., at Ottawa, is rapidly recovering, we are glad to learn, from an illness which has confined him to the house for four weeks. Apropos of his refinery, we understand that experiments made in one of the largest German pencil works have proved exclusively that the Ottawa Company's graphite, mined at Black Donald, Ontario, is especially well adapted for this line of manufacture, and the company has received an order for 40 tons to be shipped immediately.

Captain Robert C. Adams, of Montreal, will leave for England early in the New Year with a view to securing capital for his mining enterprises in British Columbia. The genial captain has, we are informed, recently acquired six locations on the north fork of the Salmon river, B. C., said to have greater surface indications than anything heretofore found in the Trail Creek district.

Electrically-driven rope haulage at the Eintracht Colliery, near Steele, in the Ruhr district, forms the subject of an article in *Gluckauf* of September 5th, by M. Dickmann, who compares the expense of

horse and mechanical haulage at that colliery. In the last quarter of 1894 the cost of horse haulage for 78,880 ton-kilometers (48,905 ton-miles), including horses, grooms and drivers, shoeing, repairs to tubs, cleaning the track, supervision and repairs, came out at 32 pf. per ton-kilometer (5c. per ton-mile). Against this, in the first quarter of the present year, the cost of rope haulage with 75,139 ton-kilometers (46,586 ton-miles), including the same expenses as above over the difference between the figures given per ton-kilometer, in addition to enginemen, men for hitching on and releasing the tubs, splicing ropes, two ropes worn out, oil and steam, came to 23 pf. per ton-kilometer (3.5c. per ton-mile). This last result will be still more favourable when all the horses are superseded by rope haulage. The system of signalling enjoined by the mine police is an electric-bell arrangement by which it is possible to signal the engineman from any point in the haulage plant. The electric transmission of power with accessories was carried out by the Allgemeine Elektricitats-Gesellschaft, of Cologne, which has also electrically lighted the landing and engine-room.

Another instance of the remarkable interpretation of the law respecting the admission of free mining machinery has come under our notice, the Lillooet, Fraser River and Cariboo Gold Fields Company having been held up for duty on an Otto Aerial Tramway purchased from Fraser & Chalmers for use at their mine in the Illecillewaet district, B. C. As this is distinctly mining machinery of a patented type, not manufactured in Canada, it seems difficult to understand why the Department should have given a decision so manifestly against the spirit and meaning of the Act.

The influence of electric currents on magnetic mine surveying instruments have been made the source of some interesting investigations recently in Germany. The experimenter, W. Lenz, selected a point underground at a depth of 1,420 feet below an electric railway. A series of delicate observations were made by day and night, and on comparing these with the magnetic records considerable irregularity was found. The results recorded during the night were found to accord with correct readings, but in the day-time variations amounting to several minutes were detected at short intervals. The tests seem to show that accurate magnetic observations in mines liable to such disturbing influences can only be made at night, or when their effect is least. Even surveyors' safety lamps free from iron were found to exert an influence on the magnetic needle, this being apparently due to the thermo-electric currents set up by the different temperatures of the parts. Of six lamps examined only two, when cold, caused no deflection of the needle, while all acted when hot, the variations so caused varying from 30 seconds to over two minutes. These tests would appear to explain the discrepancies that occasionally occur in mining surveys, and show the importance of paying regard to the possibly disturbing influence of any electric machinery in the neighbourhood, as well as to that of the surveyor's own accessories in the shape of lamps, &c., while they also indicate the best means of minimising such sources of inaccuracy.

In a comparison of the methods of British and Canadian mining companies the advantage is certainly on the side of the old country in at least one important fact. It seems to be the desire, as it is the general practice, to give the greatest publicity to every detail concerning the operation of the mine, condition of the property and the state of the company's finances. Stockholders are at all times given free access to all books, accounts and reports and full statements are published periodically. To just what an extent the English statutes are a factor in promoting this publicity we are not informed, but if it is "all on account of the law," a vigorous application of similar legislation should be administered to some of our Canadian companies. Many

incorporations on this side of the water resort to every device to keep themselves and their rainbow prospects before the public until they have disposed of their treasury stock and pocketed the public's cash, when a mighty change is wrought and a policy of secrecy and mystery ensues. There are honourable and shining exceptions to the rule, but in Canada there are companies that regard the intrusion of a newspaper reporter as a piece of outrageous impertinence, even though their stock is widely distributed in the hands of people whose only convenient source of information is the press. A little more publicity would certainly result to the advantage of the minority shareholders.

The study of light and the problems connected with it has resulted within a short time, in the development of much really valuable information. The Roentgen X-rays give tangible evidence of marvellous power. The manner in which tissues are penetrated by this light, and the deep bony parts photographed, is really most remarkable. In practical surgery, the application of the X-rays is of vast importance. Foreign bodies in the parts, at almost any point, are demonstrated with a clearness of vision, most interesting and peculiar. Foreign bodies thus defined are readily removed, and almost instant relief from suffering given. The march of science is evident in these days nowhere more than in the imponderable agents, heat, light and electricity. The work of E. P. Thompson, M. E., on the X-rays is a most able and instructive addition to the literature of this entire subject, the final outcome of which will no doubt be a most prolific source of investigation, based on the brilliant discovery of Roentgen, undoubtedly one of the master minds of the century.

We beg to call the attention of the *Rossland Miner* to an interview with Mr. Clarence J. McCuaig, a broker in mining stocks, anent Rossland, published in the *Montreal Gazette* of December 14th.

This broker has just returned from Rossland, and acknowledges that "a good many wild cats are being offered." He also ingenuously acknowledges that in the interview with Mr. John E. Hardman, S.B. M.E., published in the *Gazette* of November 21st, Mr. Hardman "had told the truth." Probably this will account for the abortive character of the *Miner's* column of attempted reply to Mr. Hardman's statements. An amusing feature of this interview is the broker's opinion that Mr. Hardman "should have qualified his remarks," although he told the truth. This is in line with another stockbroker's complaint against Mr. Hardman's statements, viz: that they "were not enthusiastic enough."

What broker's ideas are regarding "qualifying the truth" we can imagine: "A twisting and perversion of the facts to suit the sale of Rossland stocks." In this interview experts are favored with the suggestion that they should point out "properties which seem to give strong grounds for the hope that they will become mines"—(the italics are ours). In our experience engineers of repute do not dwell on "seemings," "strong grounds" and "hopes," but on facts. Up to date, the *Gazette's* interview with Mr. Hardman remains the most impartial and truthful statement anent Rossland yet printed.

Among our illustrations this month will be found an excellent reproduction of a photograph of the new 30-stamp mill, erected by the New Egerton Company at Fifteen Mile Stream, Nova Scotia, and a view of the surface works of the Moose River mines, Musquodoboit Harbor, operated by the veteran, Mr. Damas Touquoy. Both of these mines have yielded handsome returns to their owners for many years.

Through an oversight, there appeared in a recent issue, the statement that the coke ovens which are being built at Halifax, Nova Scotia, are of the Otto-Hoffmann type, and we have seen statements to the effect that the ovens which Henry M. Whitney and associates are to

build in Boston are also of the Slocum type, which is entirely different in construction from the Otto-Hoffmann. The Slocum ovens are horizontal flue ovens, each oven being entirely separate, so far as the flues are concerned, from the others, every oven being separated from its neighbor by a pier wall. The Otto-Hoffmann are vertical flue ovens, usually one flue being common to two ovens, though as recently built, there is a division wall in the flues. Mr. Henry M. Whitney, who is the moving spirit, both in the Halifax plant, which has been built, and the Boston plant, which is to be built, has, after a thorough investigation of the various forms of ovens, selected the Slocum oven, not the Otto-Hoffmann oven.

Mr. Harold Kingsmill who, for some time, acted as correspondent from Rossland, B.C., is no longer associated with this paper. In future our correspondence from Rossland will be contributed by a thoroughly reliable mining engineer from whom, this month, we publish an interesting budget of notes.

The Spanish mine in Nevada county, Cal., is believed to have broken all records in the matter of cheap production, and recent statements concerning the cost of its operation have given rise to an interesting discussion. The ore carries but 75 to 80 cents per ton and the cost of mining and milling is but 45 to 50 cents. This is accomplished by reason of the nature of the ore and favorable location of the outcrop. It is so soft that it can almost be dug out with the fingernails and it is taken from open cuts and run through Huntington mills quickly and cheaply.

On September 23rd a 72 in. by 18 ft. horizontal tubular boiler was shipped from Pittsburg to the Orford Copper Company. There was nothing peculiar about the boiler aside from the fact that it was the first nickel steel boiler ever successfully built. The steel for the boiler was made by the Carbon Steel Company, who are to be congratulated on their success and enterprise. The boiler is an experimental one, and its test will be watched with great interest both by steelmakers and boilermakers.

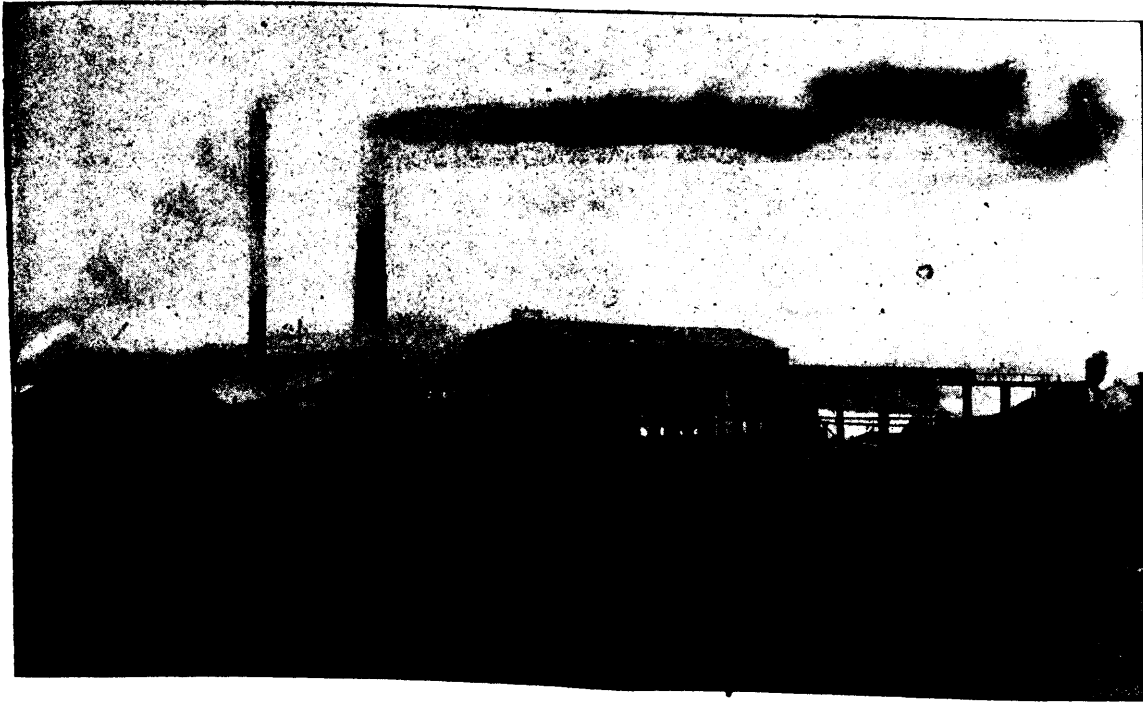
From a reprint of an article by Mr. Edgar G. Tuttle, we learn the following important matter regarding the sizing and washing of coals containing such impurities as are specifically lighter than iron pyrites, or heavy slate. The treatment, the writer recommends, is such as would remove impurities that have a specific gravity only a little greater than coal itself. The impurities to which he refers are such as bone and feldspar, and as the separation of refuse of this character is attended with considerable difficulty in the construction of a plant that will effectually do the work, we find that considerable attention is given to sizing.

For the removal of iron pyrites and heavy slate, sizing is not of such prime importance, because then a piece of relatively small refuse can be separated from relatively large pieces of coal, but when the specific gravity of the coal and the impurities nearly approximate, then sizing is essentially necessary, or otherwise very little good can be affected by the process. Again, where the lighter class of impurities have to be separated, sizing must be done in many grades; and separate jigs for the special upflow adapted to the particles that are to be treated have to be provided, and in the apparatus for sizing, provision must be made to do the work expeditiously and cheaply. For this reason Mr. Tuttle recommends the sizing to be done wet, because it can be done with screens of a smaller pitch than those required for the dry process.

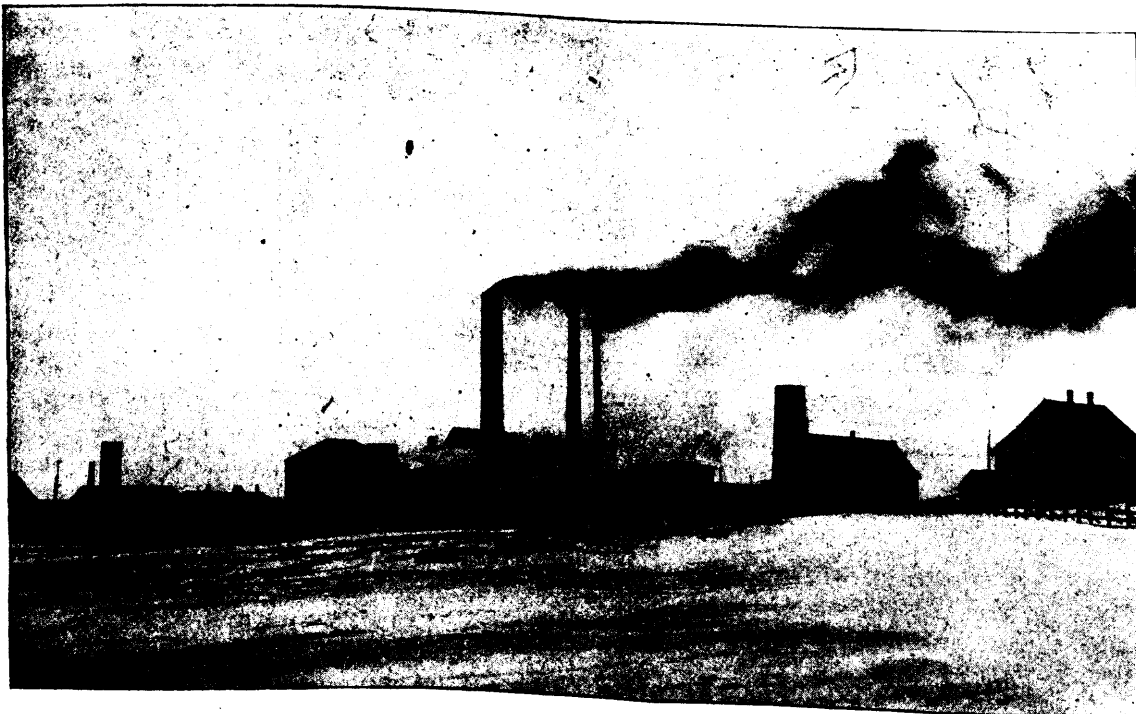
Mr. Tuttle's paper exhaustively treats on the dimensions of the different sizes of revolving screens, elevators and jigs, and he is also careful to explain with the aid of diagrams the relative location of the screens and jigs for treating the different sizes of the coal to be dressed.



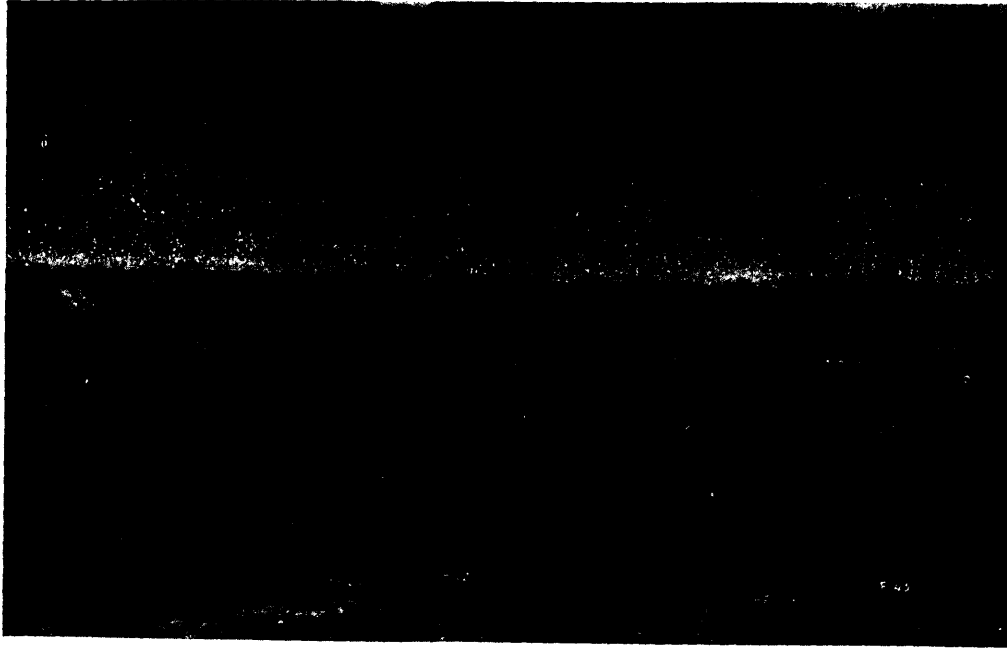
MR. JOHN F. CALDWELL, WINNIPEG.  
Owner and operator of the Sultana Gold Mine, Lake of the Woods, Ont.



Cumberland Railway and Coal Co. No. III Slope, east side, Springhill, Nova Scotia.



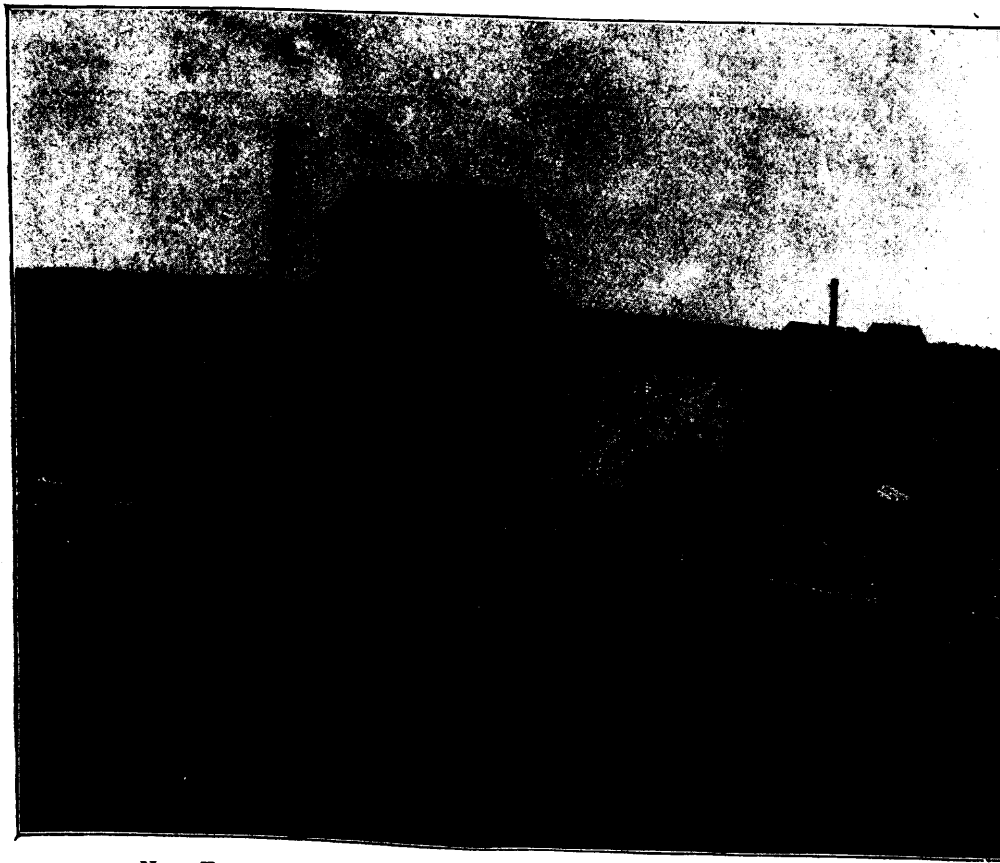
Cumberland Railway and Coal Co. No. 1 Slope, Springhill, Nova Scotia.



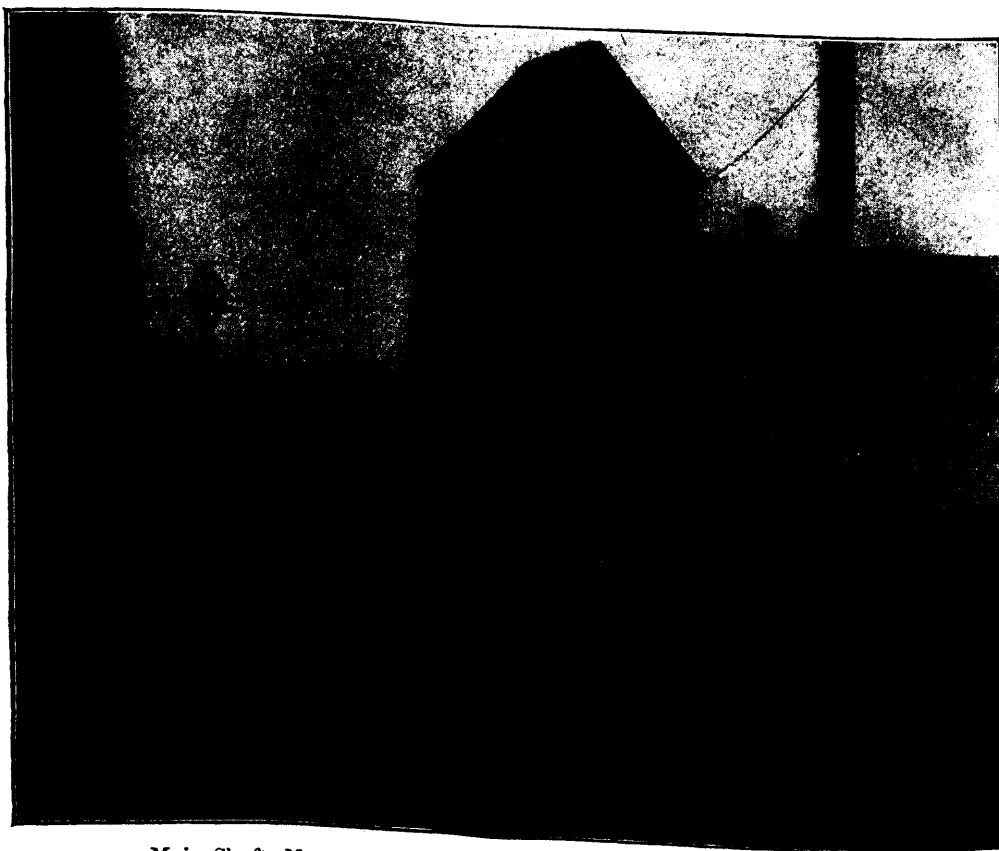
Surface Works at Touquoy Mine, Moose River, N. S.



Barrel Quartz Vein, worked by Mr. Damas Touquoy on the dome of the local (north) anticlinal,  
Moose River, N. S.



New Egerton Gold Mining Co., Fifteen Mile Stream, Nova Scotia.  
New 30 Stamp Mill and the Old 15 Stamp Mill.

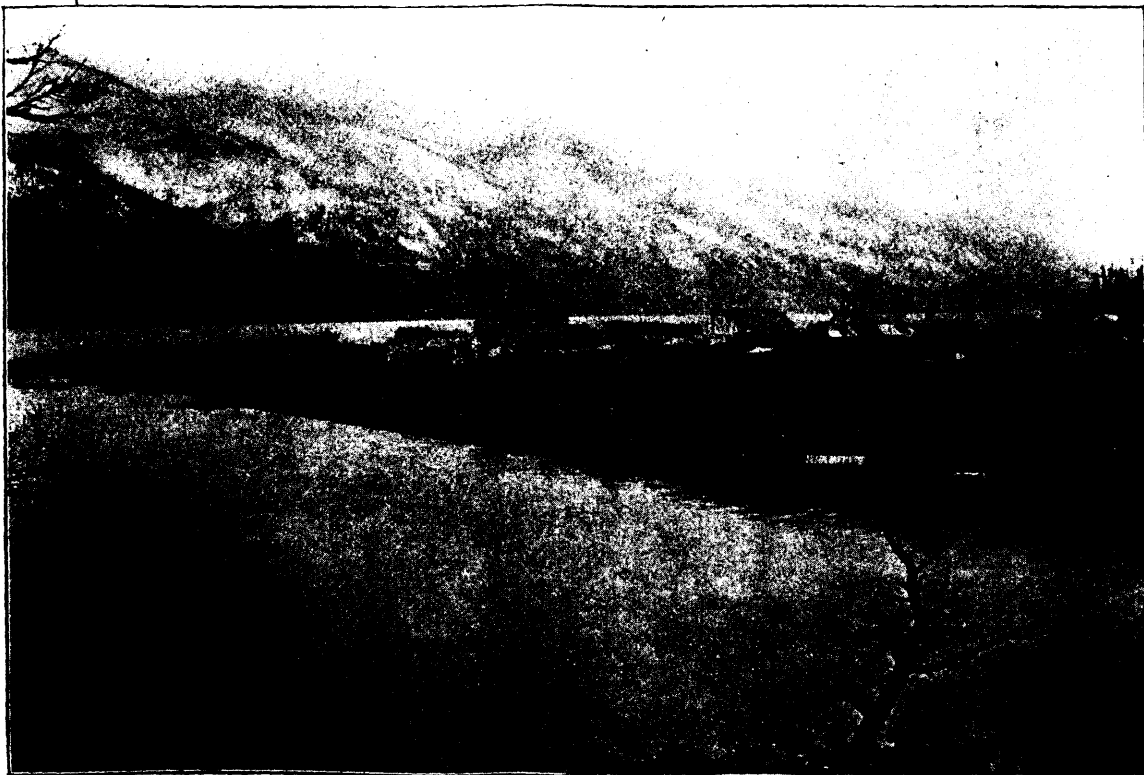


Main Shaft, New Egerton Mine, Fifteen Mile Stream, Nova Scotia.

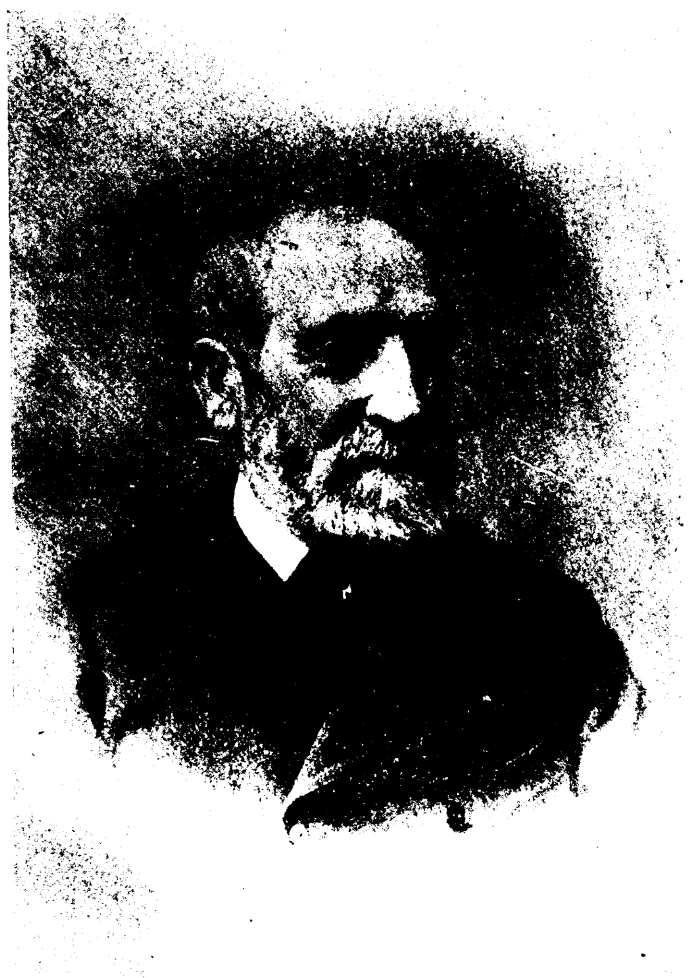




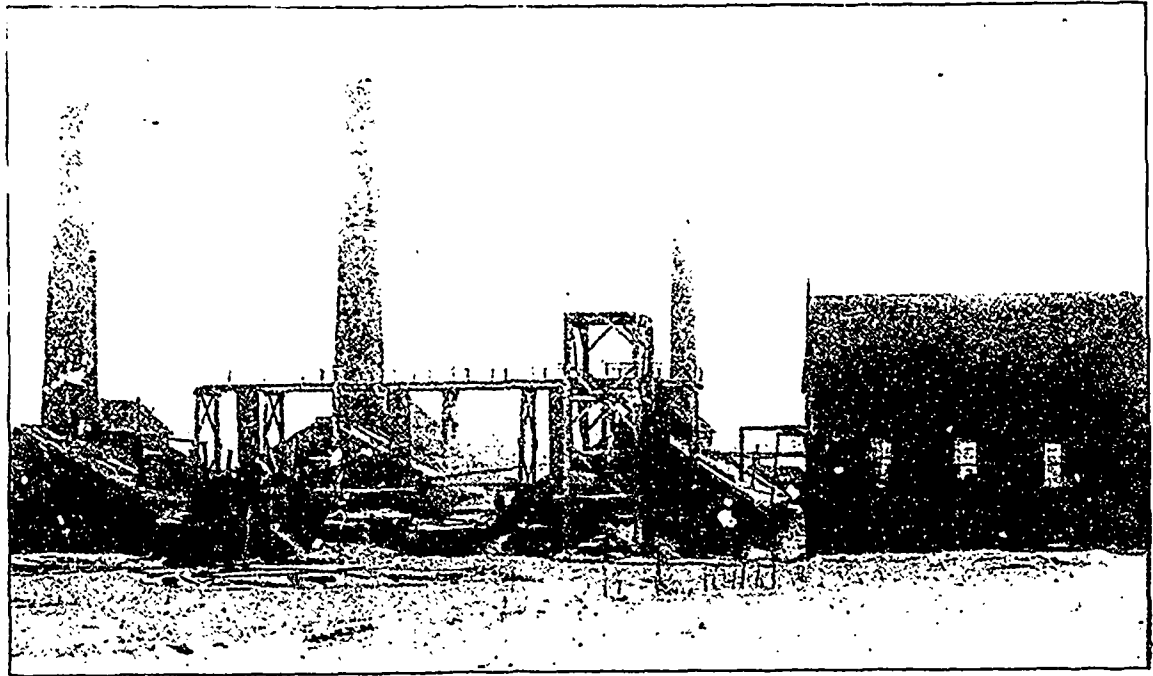
Regina Gold Mine and Mill, Lake of the Woods, Ontario. View showing Cyanide Building, Stamp Mill, Shaft House and Engineer's Shop.



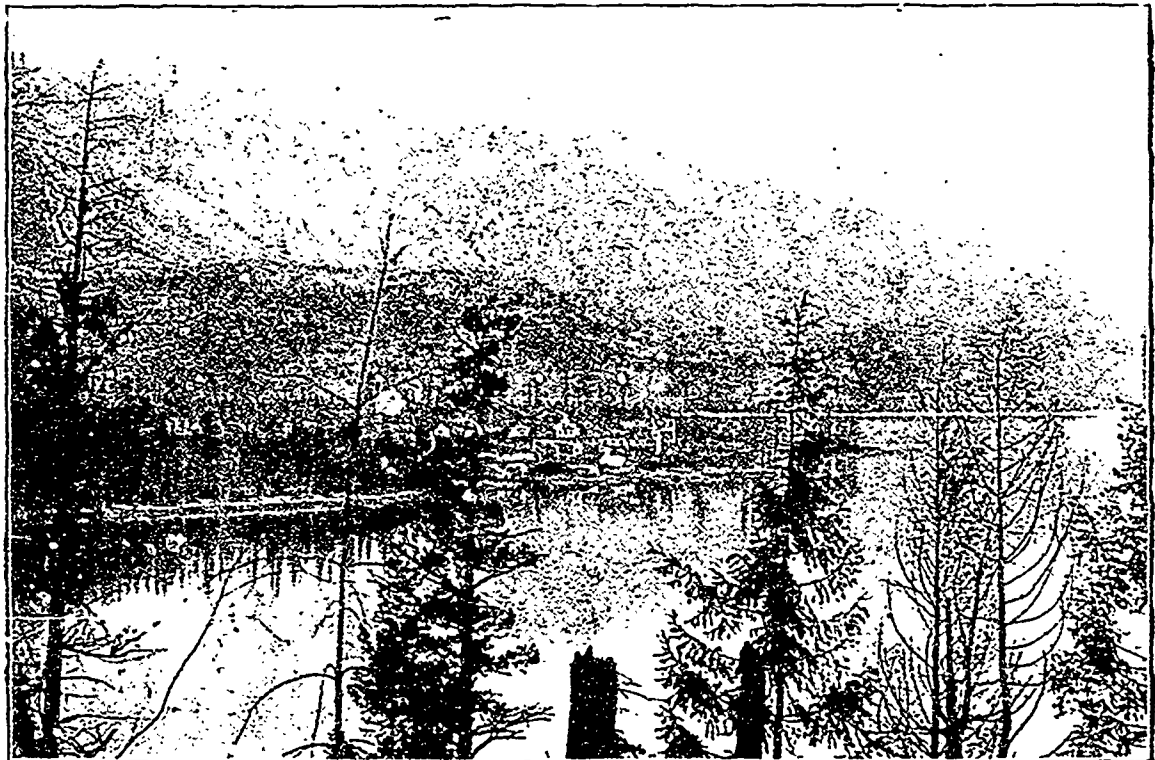
Kaslo, British Columbia. General view east.



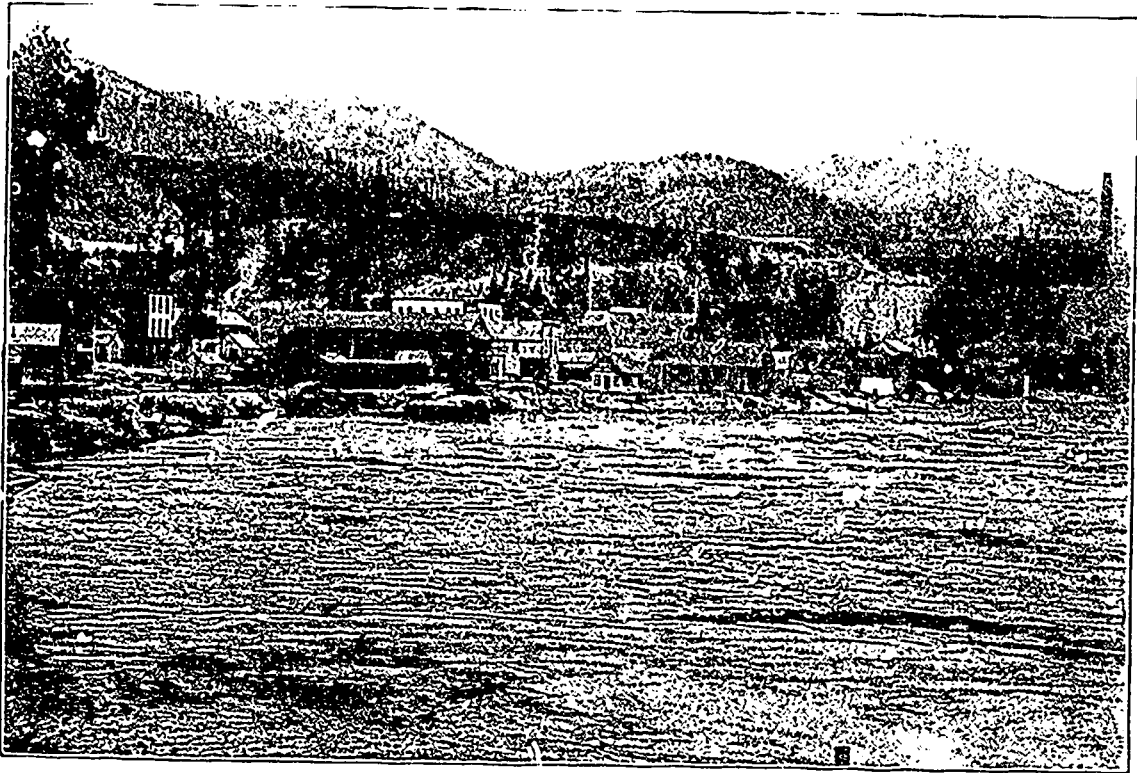
Mr. Damas Touquoy, Moose River, N. S.



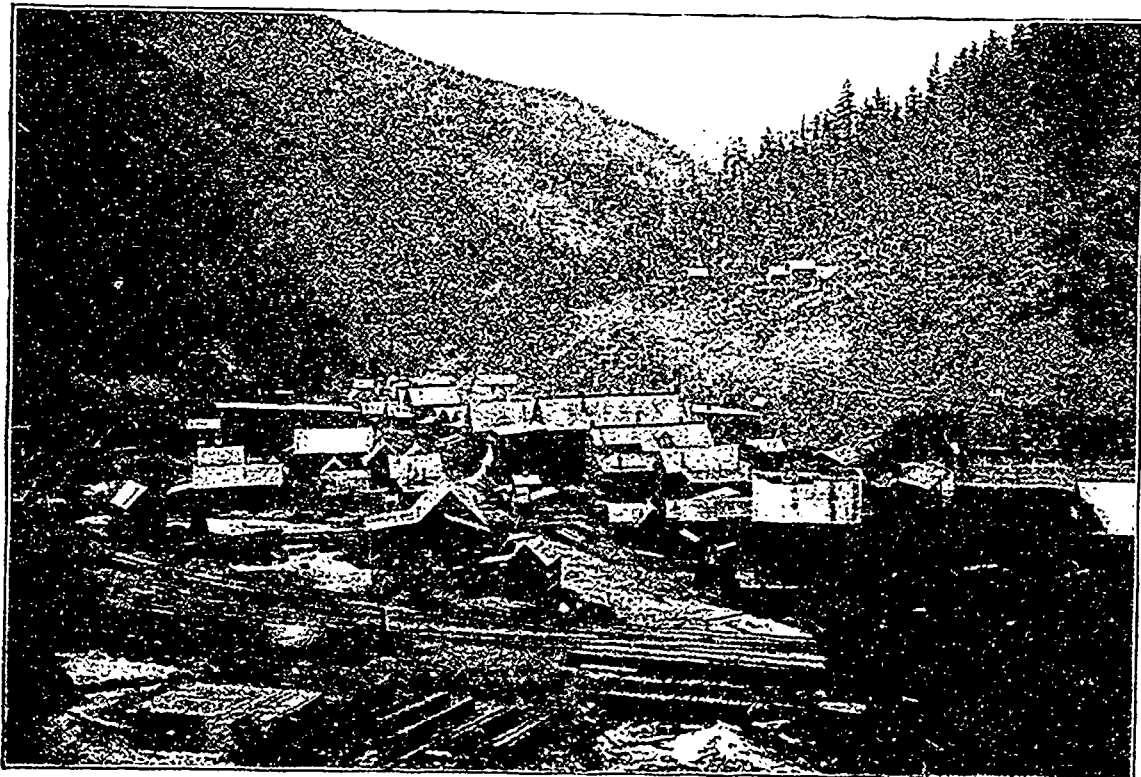
Cumberland Railway and Coal Co. No. II Slope, Springhill, Nova Scotia.



The Town of New Denver, B. C.



Trail Creek, British Columbia—showing Smelter.



Sandon, British Columbia. General view, 1896.

## CORRESPONDENCE.

**The Cariboo and Horse Fly Hydraulic Companies.**

## THE COST OF MILLING CEMENTED GRAVELS.

SIR,—The cold weather set in on us here on the 6th inst. and compelled us to close down the mine for the season. The total output of gold for this season's work at the Cariboo Hydraulic mine is 7,426½ ounces; value estimated at about \$127,734.00.

I consider this a very good result, considering the short and extremely dry-water season and the difficulties encountered in the tremendous slides of rock and top material that consumed much time, labor and water to remove from the working pits.

The removal of these immense masses of waste material interfered greatly with the progress of our work, and rendered it impossible for us to get the lower bench of high grade gravel opened and the product for the season up to our expectations.

The results of the three short runs that we made after the removal of the slides will satisfy you that my predictions for the "Cariboo" will be realized in the near future. Following are the results in detail:—

	Ounces gold.	Valued at
Aug. 25th, Run No. 5, water used 108 days.....	4,745.50	\$81,622.00
Oct 18th. " 6. " 14 " 20 hrs.	2,078.00	35,741.00
" 27th, " 7. " 25½ "	319.25	5,491.00
Nov. 8th, " 8. " 27 "	284.00	4,880.00
Totals.....	7,426.75	\$127,734.00

The frost struck us so suddenly and heavily on the 6th that we could only clean up 252 feet of one branch of our sluices before everything froze up solid.

Our South Fork Ditch Extension is now completed and we are now, and will be next season, in much better shape for effective work than we have been. This piece of ditch is 60 feet higher than the old ditch house, the South Fork reservoir to the sand box and our new sand box is sixty feet higher than the old. This gives us a more effective head for piping against present high banks, while the old ditch and sand box will be used to force water through a Giant to wash the lower bench of high grade gravel.

The "Cariboo" has been the most difficult mine to open that I ever met with in all my experience, but, notwithstanding that fact, is the richest gravel mine in the world.

At Horse Fly we did well in the early part of the season, while the gravel continued free; but later on the cemented gravel closed down to bedrock, and is so hard that it will not yield to bank blasting. It is unconquerable by the hydraulic process of working. The bottom stratum of gravel is of high grade, but if we would place the Horse Fly mine on a paying basis, and bring that enterprise to ultimate success, we must adopt the drifting and milling process to crush the cemented gravel and liberate the gold from the cement.

Referring to your criticism of the Horse Fly report in CANADIAN MINING REVIEW of March, 1896, you say "We also have our doubts of 20 stamps crushing 200 tons per day, and we have no record of milling even by water power at the low price of 20 cents."

For the purpose of enlightening yourself and your readers on the subject of milling cemented gravels, I give you the following statement recently received from the Hon. Jacob H. Neff, of Colfax, Placer County, California, President and Manager of the "Morning Star Cement Gravel Mine," located at Iowa Hill, Placer County, California:—

Number of stamps, 10.
Number of men employed in mine and mill, 70.
Cost of timber for 12 months, \$3,050.
Cost of general supplies, powder, &c., for 12 months, \$6,056.
Number of carloads of cemented gravel milled in 12 months, 35,000.
Cost of mining and milling per carload, \$1.45.
Dividends declared for 12 months, \$121,200.
Average yield of cemented gravel per ton, \$4.90.
Cost of mining per carload of one ton, \$1.33.
Cost of milling per carload of one ton, 12 cts.

Weight of stamps, 850 lbs.  
 Size of screens, 3-16th inch, round holes.  
 Drop of stamps, 6 to 8 inches.  
 Drop of stamps per minute, 95 to 100.  
 Power used, Dodd's Sigmoidal 36 in. water wheel, operated with 15 miners' inches of water delivered under a head of 470 feet.  
 Duty of the 10 stamps per 24 hours, 120 tons.  
 Water used in battery, 8 miners' inches.  
 Columbus Waterhouse, Esq., of Sacramento City, California, owner of the Cemented Gravel Drift Mining property, adjoining the "Morning Star," produces the following results with a 10 stamp mill crushing cemented gravel:—

## COLUMBUS WATERHOUSE'S MILL.

Number of stamps, 10.  
 Weight of stamps, 1,150 lbs.  
 Drop of stamps, 6 to 8 inches.  
 Drop of stamps per minute, 95.  
 Size of screens, ¼ inch, round holes.  
 Water used in battery, 8 miners' inches.  
 Duty of 10 stamps for 24 hours, 80 tons.  
 Cost of mining and milling per ton, \$1.85.  
 The cemented gravel in this mine is similar to that in the "Morning Star" adjoining. The difference in the duty is probably caused by the holes in the screens used in the Waterhouse Co's. mill being of smaller diameter.

The Dardanelles Mining Co., of Forest Hill, Placer County, California, crushed 54 tons of cemented gravel per day in a 5 stamp mill, at a cost of 16½ cents per ton.

The Bruce & Wheeler Co., of the same place, crushed in a 10-stamp steam power mill 90 tons of cemented gravel per 24 hours, at a cost of 10 cents per ton.

The Live Oak Mining Co., of the same place, in a 5-stamp water power mill crushed 60 tons of cemented gravel per 24 hours, at a cost of 10 cents per ton.

By reference to the 8th Annual Report of the State Mineralogist of California, page 442, you will find a statement of the result of working the "Spanish Mine," where the cost of mining is 25 cents per ton, cost of milling 25 cents per ton, and the gross yield of the ore runs from 70 cents to \$1.25 per ton. The "Spanish Mine" is owned and profitably worked by Mr. Bradley, Manager of the Bunker Hill and Sullivan Mines near Wardner, Idaho.

The above quotations from reports of the work of stamp mills should satisfy you that my estimate of 20 cents per ton for the auriferous cemented gravels of the Horse Fly mine is conservative.

There are in British Columbia extensive deposits of cemented auriferous gravel and beds of very favorable looking conglomerates, in the Quessnelle River region, that may, upon examination, prove to be auriferous.

The publication of the above data may be of some interest to the readers of the REVIEW as well as to those intending to explore for, or to work cemented auriferous gravels, conglomerates or low grade free milling veins of auriferous quartz, slates or schists.

Yours &c.,

JOHN B. HOBSON,

Manager

Cariboo and Horse Fly Hydraulic Mines.  
 QUESNELLE FORKS, B. C., 1st Dec., 1896.

[We refer to Mr. Hobson's letter editorially in this issue.—Ed.]

**The Largest Nugget Found in Australia.**

SIR,—Referring to page 159 of your July issue respecting "the largest nugget of gold found in the Victoria gold field, N. S. W.," weighed 669 ounces, Ballarat is not in N. S. W. but in the colony of Victoria, and the "Welcome Nugget," the largest ever found in the world, was found at Bakery Hill, Ballarat, Victoria, on the 15th of June, 1858.

Yours &c.,

A. R. C. SELWYN.

OTTAWA, 6th Dec., 1896.

**The Seine River Gold Fields.**

SIR,—As certain passages in the interview with Mr. Geo. W. Stuart, published in your October number, were not only misleading to the public but absolutely incorrect concerning his visit to the Seine River gold fields, I would respectfully request you to insert this letter in reply to some of his statements.

Mr. Stuart arrived at Mine Centre in the early part of October and left there about October 15th. During this time, and not for two weeks after his departure, did over one half inch of snow fall, which was not sufficient to deter others from visiting the country after his departure, including Byron N. White, Manager of the Slocan Star Mine, B. C., Capt. Hooper, late of the Rabbit Mountain Mine, Geo. H. Ham, Advertising Manager of the C. P. R., G. H. Campbell, Electric Street Railway, Winnipeg, Wallace McLean of the Toronto *World*, Mr. A. Horton of the *Hansard* staff, M. S. Magee, M. E., and many others.

Mr. Stuart's twenty miles of canoeing in reaching Mine Centre is something we are unable to find out about here, as it is a fact that he arrived by steamboat entirely.

In regard to that passage wherein he cautions the public in general to "keep their heads" he probably was acting on this same plan when he paid, without a thorough knowledge, \$6,250 for the Randolph property, 80 acres, further pledging himself to pay \$18,750 within six months. In this I congratulate him, because there were others who followed (and did not find the snow interfering) who would gladly take this proposition off his hands, allowing him a very reasonable rate of interest for his valuable judgement and hardships through which he passed.

The developed property, which he admits is rich, he claims is in the altered granite; further, is it not a fact that the property aforesaid, and upon which he paid so readily his retainer, is in the Diabase, commonly called "Greenstone."?

Mr. Stuart's time here was too short to form any correct idea of the country, and I regret that he did not meet some of the prospectors, who not only have a thorough knowledge of this country but also many others. These same prospectors have been the means of opening up other countries which he probably has never seen and which have afterwards been the means of a livelihood for "engineers." It is an easy matter for these engineers to follow a well blazed trail without a pack.

In justice to the country kindly ask Mr. Stuart if he will endorse your article, if so I will be pleased to answer him further and also invite him back for a more thorough investigation and pledge him our support.

I am satisfied that he was sufficiently impressed to drop the nest egg. There is nothing in Nova Scotia in richness that will equal this country. Here we do not have to look for "blind" ledges, it "pans" from the top.

Yours &c.,

JNO. W. THICKENS,  
Prospector.

MINE CENTRE, ONT., 1st Dec., 1896.

SIR:—

The letter of your correspondent signing himself John W. Thickens, U. S. A., I have seen. The cause of his ire is so obvious it is scarcely worth noticing, except to show the public there is at least one "Ananias" somewhere about the Seine River. It is consoling, however, to see that this fellow, who is evidently in a state of *non compos mentis*, comes from the U. S. A. I judge he has not been on this side long, and trust the good moral sense of the mining community in the district will quickly head him off. I met none such during my pleasant visit to that section of the country.

On October 12th I took the little American steamer "Lloid" at Fort Francis and left her at the international line near Rainy Lake city; from this point I reached Mine Centre "by Canoe;" two of my companions were Mr. Preston, merchant, and Mr. R. H. Wiggins, of Mine Centre. The trip, both while on the steamer and by canoe, was pleasant, and the scenery magnificent.

On the 16th, four days later, I visited the Ferguson Mine, and received very courteous attention from the management during my visit.

The same day I crossed from Bad Vermillion Lake to Little Turtle Lake, with Mr. B. Winning, Mr. Dan McPhee and Mr. John Rodie. On this day there were "five inches of snow on the ground" in this section which had fallen the night before.

I paid no money for my property, nor obligated myself to pay any for myself or anybody else. I neither bought for myself or for anybody else any property in Western Ontario.

During the interview with your reporter I did not mention the canoeing incident, or the snow disparagingly, although the latter interfered some with my work. I was given to understand the ground would soon be bare again and the weather milder before winter would set in in earnest.

Yours, etc.,

GEORGE STUART,

Truro, N. S., 5th December, 1896.

**COMPANY NOTES.**

**Nova Scotia Steel Co.**—The last report to the shareholders, being for the year ended 30th June last, states: "The improvement in prices referred to by the Directors in their last report was sustained until about the end of December last, but they regret that since that time prices in the United States have been much weaker, and in order to secure the business necessary to keep the works fully employed lower prices had to be accepted. Owing to the large increase of tonnage the results of the year's operations were considerably better than for the previous year. The demand for foundry pig iron having receded to almost the point touched during the severe depression of eighteen months ago, this was especially felt in our western market. Though the prices of iron and the prospects in the United States are still unsatisfactory the outlook in England and the continent is better than it has been for years, and your Directors hope an improvement in the United States may not be long deferred. In view, however, of the uncertainty produced by over-production, and the silver agitation in the States, and the importance of the company maintaining a strong financial position, your Directors do not recommend that any dividend be declared at present. Your Directors are pleased to report that the anticipated advantages of amalgamation have been fully realized. The supply of pig iron being entirely under their own control enables them to reduce the cost of finished steel, and thereby secure orders which otherwise would have gone past them. This is shown by the increase in the sales of the steel department. It will be noticed that of the bond issue authorized by the company but \$94,000 have been disposed of. Your Directors have made no special effort to push their sale. The gross profits of the company for the year ended 30th June, 1896, amount to..... \$111,960 61

Less interest on bonds, floating debt, &c.....	39,480 10
	\$72,480 51
To this must be added the balance of profit and loss account on 30th June, 1895.....	91,482 22
	\$163,962 73
Half-yearly dividends of 4 per cent each on the preference stock were declared by the Directors and paid on 10th September, 1895, and 10th March, 1896.....	82,400 00
Leaving at the credit of the profit and loss account on the 30th June, 1896.....	\$81,562 73
Your Directors recommend that the amount be distributed as follows:—	
Reserve for bad debts.....	\$2,500 00
Furnace renewals.....	10,000 00
Depreciation.....	20,000 00
	32,500 00
Leaving a balance to be carried forward to the credit of profit and loss account.....	\$49,062 73

**Red Point Gold Mining Co.**—A meeting was held in Rossland last month at which J. K. Clark was elected president, J. Fred Ritchie, vice-president, and P. G. Nash, secretary and treasurer. At the same meeting a contract was let to drive a 300-foot tunnel, the same to be completed by March the 2nd. Diamond drill holes have been driven showing the property to be a valuable one.

**Poorman Gold Mining Co.**—An assessment of one cent a share has been levied by this company. This is the company formed from a part of the original possessions of the War Eagle Company. The shareholders are the same as the War Eagle. The following statement concerning the affairs of the company has been made by the management: "The present management of the Poorman Gold Mining Company took charge of the Poorman fraction mine about the 1st of January, 1896. Some work had been previously done upon the claim, which had shown up a

small chute of ore assaying on top about \$40 in gold. The Poorman Company had no money in its treasury and it was thought, judging from the quality of the ore on the claim, that enough ore could be shipped to pay all expenses incident to mining it and leave a small surplus for further development, with the hope always that the ore body might widen and contain higher values. Development work was begun in February by sinking a shaft. The ore body, as depth was gained, became somewhat lower in grade and more mixed with waste. A tunnel was driven at about the same time to tap the shaft about 80 feet below the surface. This tunnel was finally completed and connection made with the shaft. The management was disappointed in the quantity as well as the quality of ore encountered, but they have kept the work going in a prudent way, hoping the ore body would improve so as to enable the Poorman Company to pay back the money advanced to it by the War Eagle Company. The management of the Poorman and War Eagle Company being the same, it was deemed best to keep the work going, as it was confidently expected that an ore body would be found sufficient in quantity and grade to pay up the Poorman indebtedness, and thus avoid an assessment. Work was continued in this way from month to month, sometimes making a little money and sometimes not. Finally, as an act of justice, it has been deemed best to levy an assessment to pay up the indebtedness of about \$3,000 due to the War Eagle Gold Mining Company, and at the same time leave a balance in the treasury of the Poorman Company of \$2,000 to push development a little further. Below is given a statement of the finances of the Poorman Gold Mining Company: Disbursements: Mining, \$5,748.65; office, \$216.88; general expense, \$486.66; assaying, \$221.91; hauling ore, \$450.57. Total, \$7,124.67. Receipts: Sales of ore, \$4,105.16; money loaned by War Eagle, \$3,019.39. Total, \$7,224.67. In the item of general expense is included costs of patenting the Poorman fraction and incorporating and registering the company. The management has endeavored to be very economical in all expenditures made. The officers of the company have never drawn one dollar of salary, with the exception of the secretary, who has been allowed \$25 a month. Only the actual cost of supplies and labor in the mine have been charged."

**War Eagle Gold Mining Co.**—We are officially informed of the following dividends paid to date by this company: 1895: February 28th, \$32,500; June 14th, \$50,000; August 5th, \$50,000. 1896: April 8th, \$25,000; October 15th, \$30,000. The output during the past three years has been 199,776 tons; 1895, 10,408,545 tons, 1896, 806,182 tons.

**Cariboo Gold Fields, Ltd.**—The balance sheet for the half year ended 30th June last shows:—

LIABILITIES.		£	s.	d.	£	s.	d.
To capital authorized:—							
50,000 £ ten per cent preference shares		50,000	0	0			
50,000 £ ordinary shares		50,000	0	0			
		100,000	0	0			
To capital issued:—							
50,000 £ ordinary shares issued as fully-paid, in part payment of properties under agreement of November 21st, 1894			50,000	0	0		
20,452 £ preference shares issued			20,452	0	0		
20,452 £ unissued							
To 10 per cent. debentures			8,000	0	0		
To sundry loans:—							
L. & S. Western Bank		1,000	0	0			
Bonner, E.		850	0	0			
Cundall, A.		850	0	0			
Collins, E.		50	0	0			
			2,750	0	0		
Piggott & Co., Ltd., due for plant			427	1	3		
Income tax on debenture							
Interest			2	6	2		
			31,631	7	5		
ASSETS							
By purchase of properties, water rights, &c							
Pipe Line plant		5,552	18	9	56,447	6	6
Eye Opener plant		246	8	11			
Sundry plant		165	4	10			
Barkerville salaries paid in London		718	8	8			
" travelling		230	0	0			
" expenditure as vouched to 31st Dec., 1895		11,075	0	0			
Cash since		5,900	0	0			
		23,878	1	2			
Less gold obtained and remitted		257	16	7	23,620	4	7
London expenditure:—							
Office furniture		9	19	0			
Stationery account		67	0	7			
" Barkerville		24	10	0			
General expenses, registration of company, bank charges, bank cables, &c.		90	19	2			
Petty cash and cables		85	2	6			
Office: Rent and salaries		219	10	0			
Law costs		44	19	0			
Brokerage		23	8	8			
Debenture interest to 31st December, 1895		69	3	4			
		654	1	3			
Less transfer fees		7	18	6			
			646	2	9		
Cash at London & South Western Bank			890	0	1		
Beeton & Co., H. C.			18	13	6		
			81,631	7	5		

**Montreal Hydraulic Gold Mining Co. of Cariboo.**—This company, incorporated in 1895 with an authorized capital of \$250,000, is being reorganized. It is proposed to increase the capital to \$1,000,000, in shares of \$1, and to offer 250,000 shares of this stock at 80 cents per share (which stock will be full-paid and unassessable), amounting to \$200,000. The present company will transfer the mine to the reorganized company for the remainder of the capital stock fully paid. It is proposed that the subscribers to this \$250,000 of stock (fully paid up) shall have re-embursed to them out of the first net earnings of the mine the amount paid by them, and that debentures expressed to be so payable, aggregating \$200,000, shall be delivered to the said subscribers proportionately to their subscriptions, and in addition to their stock certificates. When the debentures shall have been paid off, as provided above, all the shares shall then rank *pari passu* for dividends. The property consists of sixteen claims, covering about two thousand acres, and extends about five miles along the Quesnelle river. During 1895 and 1896 a good deal of prospecting was done, sinking 567 feet of shafts and in driving 1583 feet of tunnels, all of which work was through gold-bearing gravel, gold being found from the surface down as far as the explorations were carried, a distance of from 100 to 150 feet. In his report to the company, Mr. Thomas Drummond, M. E., who has been in charge of the work, says: "The work done shows that there is a large amount of rich gravel at the upper end of the channel, in the vicinity of the old Chinese working; that there is a deposit of top gravel over a large area of the channel which yields an average of 15 cents for a depth of 30 feet; that there are various extensive bodies of gravel at lower levels ranging from 10 to 56 cents per cubic yard; that even the fine sandy gravel averages about 3 cents; that the average depth of gravel for full width of valley depression, 1,500 to 2,000 feet wide, is about 175 feet, and that we have immense quantities of gravel existing in place which can be easily washed; that, as a whole, the deposit yields gold from grass roots to bed rock; that the gravel is all easily washed, no hard material having been found; that the water supply is practically unlimited and the dump unusually good."

**The Cariboo Mining Milling and Smelting Co.**—At a meeting of the directors of the company, held at the offices of the company in Spokane last month, a dividend of two cents a share, or \$16,000, was declared, payable on December 7th. This is the thirteenth dividend declared by the company since February, 1895, a total, including the present dividend, of \$125,401.34. President Monaghan stated that 10 cents a share had been paid this year since February. The mine has been thoroughly developed, and up to the present there is about 2,500 feet of work in tunnels, shafts, drifts and winze, besides a large amount of surface work. The company's property consists of the Cariboo and Amelia claims in Camp McKinney, Yale district.

**Byron N. White Co.**—This company, operating the Slocan Star Silver-lead mine, has declared a dividend of 5 cents per share, payable on December 1st. This is the fourth dividend declared by the company since a year ago last August, and swells the amount paid to \$300,000, or three-fifths of their capitalization. With this dividend, \$250,000, or one-half of the capitalization, has been paid this year. There are but few mines in the world which can show such a record.

**Golden River Quesnelle Co., Ltd.**—At the ordinary meeting of shareholders held in London last month, the following report of the year's work was submitted by Major Dupont, Managing Director:—  
"I beg to report, for your information, upon the progress of work in connection with the enterprise of the Golden River Quesnelle as follows: 1. The gaining of the gold in the gravel bed and riffles of the South Forks river, (the property by a special act of the legislature of British Columbia of this company) is to be attained by the construction of a dam, to hold back the water of Quesnelle lake, and enable the gravel of bed of stream, and riffles of the rocky channel to be cleaned up. 2. The evidence of great riches awaiting the company when this is effected is so convincing that there cannot be any doubt as to extraordinary profitable results. 3. The Cariboo hydraulic mine, which is a comparatively small portion of the gravel bank on the South Forks river, above the level of the river, has already yielded this year \$81,600 from a comparatively few days' washing of the paying gravel. The manager of that mine pointed out to me one branch only of his sluices, from which he cleaned up \$46,000 as the result of fifteen days' washing. A further clean up will take place in this mine before the close of the season, and the manager anticipates better proportionate results than in the previous wash-up. These results were obtained from the top gravel, the banks being of such extraordinary height (from 400 to 600 feet) that it is not only dangerous but impossible to wash the lower gravel until some hundreds of feet of the upper gravel has been hydraulicked away. The manager estimates that he has not worked down the banks to within 100 feet of the bed rock, and he is confident that, when able to wash this lower 100 feet he will clean up \$1,000,000 per annum. Our river, for a large area, has eroded 400 to 600 feet in depth of this same gravel, and the gold contained in it must be in the gravel bed and riffles of the river, and as to this we have corroboration in the statutory declarations of two divers who have examined the bed of the river in different places, and in the statutory declaration of Mr. Faden, superintendent of a dredging company, who dredged a channel 10 feet wide across the river. The discoveries this season of further extraordinarily rich auriferous banks in the Quesnelle district increases the confidence that our enterprise must result in a phenomenal success. Several very strong financial companies have been formed to commence very extensive work in connection with these banks. 4. The all-important

feature of our enterprise being the construction of a dam of assured stability it has been determined not to do the work by contract but by the company, under the constant supervision of its own engineer, thus ensuring the work being done in the most efficient manner. 6. It is believed also that a saving will be effected in the cost of work, as, owing to the isolated region in which the work is to be done, and the cost of getting in supplies and plant, a very large margin for profit would be included in any contractor's tender. 7. Mr. Joseph Hunter, C. E., has been appointed engineer in charge of the works. He will reside at the works and personally oversee and conduct them. 8. It is a matter of congratulation to the shareholders that Mr. Hunter has accepted the position of resident engineer at the works, as his experience and ability not only fit him for the position, but, being a large shareholder in the company, he has large pecuniary interests in the results. 9. The work is now fully under way, and all energy will be exerted to push it to completion, if possible, in time to obtain results before the flood water commences next season—about the 10th to 15th May. The winter season is not the most favorable period for rapid work, as the days are short and occasionally too inclement for men to work. 10. Supplies and plant have had to be sent from the coast to Ashcroft by rail—a distance of 200 miles—and teamed or sent in by pack trail from there, a distance of 200 miles further. 11. A road in the works had to be made connecting with a public road—5 miles in length. 12. Buildings have had to be erected for store houses, bank houses and mess room and kitchen for men, frost-proof houses for storing potatoes and other vegetables, powder magazine, office and living house for engineer and office staff. 13. A portable saw mill has had to be got in. 14. Authority from your board to commence work was cabled me on 3rd ultimo, and I have now to report that since that date the work above indicated has been accomplished, and, in addition, the site for the race way has been cleaned of timber, a number of shafts or pits have been sunk to determine the nature of ground in which race way is to be cut, in order to avoid rock work as much as possible." \* \* \*

The secretary explained that the report broke off abruptly here and was evidently only a portion of the report, the concluding part being by some accident missing.

**Reco Mining and Milling Co.**—At a recent meeting the following officers were elected by the Reco Mining and Milling Co.: J. M. Harris, President; S. M. Wharton, Vice-President; F. T. Kelly, Secretary-Treasurer. The Reco has 5,000 feet of tunnels, and the owners state that they have 2,000,000 in sight. A concentrator will be erected early next year which will enable the company to work their largest lead to better advantage. During the winter seventy-five men will find work in the mine, and in order to accommodate that number, or more, large buildings are now being erected.

**Omineca Consolidated Hydraulic Mining Co.**—At a meeting of the shareholders held last month in the office of the secretary, Mr. J. P. Bethune, Victoria, B. C., Captain Black submitted a report of his season's work. The ditch completed this year to supply water to the company's leases on Manson creek is four miles long, and seven men have been left to work during the winter getting ready for the plant to be placed in position for the coming season's operations. The Omineca Prospecting Company, composed practically of the same members as the hydraulic company, have leases on Germansen creek, which, it is said, can easily be supplied with all the necessary water for hydraulic purposes from Germansen lake. The ground Captain Black reports as prospecting very well indeed, and as evidence of good faith he brought back with him several hundred dollars in gold dust, most of it course—one nugget being worth \$30.

**Ontario Gold Mines Co., Ltd.**—The following is an extract from Manager Foley's last report to the shareholders:—

"Below please find measurements up to December 1, 1896: North shaft, depth 210 feet; north drift, 100-foot level, 37 ft 8 in, south drift, 100-foot level, 61 ft 7 in—width of vein 24 in; north drift, 150-foot level, 68 ft 3 in, south drift, 150-foot level, 165 ft 7 in—width of vein, 21 in; north drift, 200-foot level, 77 ft, south drift, 200-foot level, 66 ft 4 in—width of vein, 26 in.

On the 150-foot level an upraise or winze was started in the south drift, 46 ft from shaft, and carried 21 ft 8 in December 1.

On the 150-foot level a winze was started in the south drift, 75 ft from shaft, which measures 18 ft 5 in, to December 1.

On the same level a winze was started in the north drift, 32 ft from shaft, measuring under same date, 19 ft 5 in.

On the 150-foot level a cross-cut to Jumbo vein was made at 160 ft from shaft in south drift, and has been carried 52 feet, and Mr. Foley states that the vein must soon be reached, as there remained only 19 ft December 1.

No. 5 shaft, depth 114 ft, north drift 62 ft, level 47 ft 6 in, south drift, 62 ft, level 47 ft 6 in, south drift, 62-foot level, 83 ft 2 in; width of vein, 25 in.

As previously stated the new Lucky Joe vein is being opened up, and every indication points to its being one of the most valuable veins on the property, and as depth is reached the vein strengthens and gives every indication of increased richness and permanency. The sinking on this vein has reached a depth of 22 feet, and a drift has been started south, measuring, December 1, 16 ft 7 in, the width of the vein being 16 in.

During the season the following test pits have been put down on other veins, namely:

A.L. 74, northeast shaft, vein No. 9 31 ft, width of vein, 4½ ft, assays running from \$8 to \$66.

A.L. 74, No. 3 shaft, 10 ft, width of vein 3 ft 4 in, assay values from \$6 to \$31.

A.L. 74, No. 1 shaft on west vein, 12 ft, width of vein 20 in, with assay values from \$5 to \$16.

A.L. 75, No. 1 shaft, 16 ft, width of vein 15 in, with assays from \$7 to \$43.

A.L. 75, No. 3 shaft, 14 ft, width of vein 3 ft 4 in, assays running from \$8.50 to \$72.

A.L. 75, No. 4 shaft, 19 ft, width of vein 22 ft, assay values of 75 pound samples averaging \$62.

A.L. 76, No. 1 shaft, 13 ft, width of vein 20 ft, assays running from \$2 to \$6.

The stamp mill is complete barring three Frue vanners and ready to turn on steam, and as soon as Mr. Foley returns to the mines after the incorporation of the new Canadian company the crushing will be started at once.

The three additional Frue vanners were delayed by Fraser & Chalmers, and did not leave Chicago until October 25, and while the mill could run with the one vanner in place, Mr. Foley did not consider it advisable to run it without these additional vanners, as the concentrates are of too high-grade to lose by running them into the tailings.

The vanners, etc., are now on the way, and will reach the mines within ten days, the ice being, for the first time this year, in condition to sustain heavy loads."

## CONCENTRATES.

(From our Correspondents).

### British Columbia.

#### ROSSLAND DISTRICT.

Development work is progressing on a great number of properties, and the showing as a whole is favorable. Ore is almost ubiquitous. Nature was bountiful when she deposited her sulphides here, but now and again she forgot to put in that little pinch of gold, after which we are all delving. The claims that hold sulphide deposits are legion, but less numerous are those that have been demonstrated to contain shipping ore, and after all it is the "pay chute" that makes the mine. Nevertheless, when one owns a good strong vein, which, however, will not assay, one is excusable if he pushes on his work in the hopes of striking a pay chute; and this is often done and the basis on which numerous stock companies are formed. This will also furnish an explanation why the holders of numerous treasury stock certificates may expect to be disappointed some day because of the non-appearance of dividends. It takes a good deal of money to put a mine on a dividend-paying basis in this country, as the rock is very hard, and it also takes some money to prove that your prospect is not worth mining; consequently the man who bought treasury stock to develop good ore is likely to come out better than the man who bought treasury stock to look for good ore. That the people have faith in the ground is evidenced by the fact that they have bought machinery that will valuate over one million dollars, which is certainly a large amount, considering the youth of the camp.

The Le Roi Company on December 1st declared a dividend of \$25,000, bringing the total of its dividends at present to \$250,000, the first having been paid in October '95. Another dividend of \$25,000 is promised on December 24th.

The War Eagle has shut down its stopes for the present. In fact neither the Le Roi nor the War Eagle are working at their full capacity, because of the inability of the Trail Smelter to handle the ore. The smelter recently begun work to increase the capacity of its plant to treat 100 tons of ore per day, intending to handle both Slocan and Rosslund ore; but at present there is difficulty in procuring the necessary fuel to treat the Rosslund output.

The Red Mountain Railway is expected to be completed within a few days, and as soon as it is able to carry freight the exports of ore will largely increase over what they have been previously, as several outside smelters have made successful bids for the ore, and the dumps are only awaiting the completion of the road as the cheapest route for shipment.

Considering the size of the camp there is comparatively but a small amount of stoping ground opened up. There are a number of properties that have a shaft or a tunnel in shipping ore, but only a few have a definite ore body blocked out ready for stoping. This may be explained, in a measure, by the fact that development work has been going on but a short time, still the owners of good ore have not always shown the energy one might expect from a man who intended to make a mine of his property.



The Le Roi, War Eagle, Centre Star, Josie, Columbia and Kootenay, Nickel Plate, O.K., Golden Drip and possibly the Jumbo have ore bodies ready to be stoped.

The Golden Drip, adjoining the O. K., was stoped for \$500,000 a few days ago. This claim has a vein, four to five feet wide, with a pay streak that will average a foot in width. There is an ore-body blocked out 65 ft. x 50 ft. The ore is free-milling, even more so, by appearance, than the O. K. ore, of which, it is claimed 80 per cent. is caught on the plates and in the battery.

A company has been formed to tunnel Red Mountain. This enterprise, if successfully consummated, cannot but be most beneficial to the camp, and in particular to the mine owners of Red Mountain. The idea is to start a tunnel at about the level of the town of Rosslund, on the southeast slope of the mountain, and drive through its base to the opposite side, a distance of 5,000 feet, thus furnishing a drainage canal, an outlet for the ore at a point convenient for shipment, and tapping the ore bodies at considerable depth. It is to be hoped this project may be accomplished, and we may live to see Monte Cristo Mountain, Columbia Mountain and Deer Park Mountain treated in the same way. The tunnel is to be 8 ft. x 8 ft. in the clear, with a double track for electric cars. A charter has been granted the company, whose stock is divided into 50,000 shares, at \$10 a share.

The region north of Red Mountain and Monte Cristo Mountain has lately been coming in for its share of attention. So far, this section has been able to show large ore bodies, but they have not been of shipping grade. The Lander on Rock Creek was recently bonded to some Ottawa capitalists who are now sinking a fifty foot shaft on the vein which, on the surface, has a very strong showing, being about sixty feet wide, with thirty feet strongly mineralized. This ore as far as developed is also low grade, but it is to be hoped that a large pay chute will reward the exploiters.

Reports are frequently appearing in the papers relating to various new processes for treating our low grade ores. These reports are generally so vague in their explanations that it is impossible to judge from them the value of the processes; and no experiments appear, as yet, to have been made on a working scale or any scale that would demonstrate the value of the processes from a commercial standpoint. That some method for profitably extracting the gold from the low grade stuff will, in time be in successful operation, seems reasonable to believe, for the metallurgist has seldom failed to enlarge the miner's market, and the sooner such methods are in operation the sooner will mine owners get returns for their ore and consequently the greater will be their encouragement to do development work. There are large quantities of ore here assaying \$5, \$10 and even \$15 per ton, which will not pay to mine under the present conditions of smelting charges and freight rates. Ore of this class is not confined to properties which have no better rock, but occurs in considerable quantities in the paying mines and is left untouched. This grade of ore may vary widely in its chemical composition; that is, we may have almost solid sulphides assaying the same as very siliceous ores, or ores that do not carry above 5 per cent. sulphides; such ores, for instance, as would occur in the waste dumps. Consequently any process based on the chemical composition of the stuff would be confined to one class: either the siliceous or the basic. However, when the question has been solved and four or five dollars will cover the cost of treatment, the individual or company who gets his plant installed first, will be able to make a goodly profit on the low grade ore already on the dumps. The value in the waste dumps may be accounted for by the difficulty in distinguishing rich rock from poor by the eye. As a consequence, close sorting is almost impossible, and some of the pay rock is bound to make its way into the waste; and *vice versa* doubtless some of the low grade will often pull down the average of the shipments.

The Columbia and Kootenay company have shown commendable energy in developing their property since the installation of their twenty drill compressor. The property is being exploited by tunnels from one of which there is an air shaft to the surface opening up a considerable block of ore which assays above shipping value. Stoping will shortly begin on this block. The dyke which cuts the vein proved to be forty feet wide in the long tunnel and has just been passed. The first shot after passing the dyke showed ore.

The O. K.'s new ten stamp mill, built by the Jenckes Machine Co., has been completed and proves to be a very satisfactory piece of work. The pulp, after passing over the plates, is divided into four classes or sizes by a hydrometric classifier, and each class is treated on a Frue vanner. The tailings of the vanners are to be treated on a Woodberry concentrator. There was some difficulty in running the mill at first, because of the freezing of the water, but the supply flume has since been put underground and the building well battened; and at present about 25 tons per day are being milled. The O. K. ore is a very pretty quartz, carrying galena and chalcopryrite, 10 per cent. of it is smelted, and of the remaining 90 per cent. that is run through the mill, 88 per cent. is caught on the plates and 12 per cent. in the concentrates.

The St. Elmo tunnel, which was begun on consolidated St. Elmo ground in order to gain greater depth, is now in 260 ft. and within about

40 ft. of the St. Elmo line. The face of the tunnel has a very strong showing of ore, which will run eight per cent. in copper, but very little in gold.

It would seem that the formation of a stock exchange would be an excellent way of benefitting the camp. It has been urged that since neither Batte nor Spokane can support a stock exchange, neither can Rosslund, but the arguments advanced would not apply here. The prices of stock would drop! Very likely, but if they did they would more nearly approximate their proper value. The public would gain by the arrangement, as the public is paying for the development, while the added confidence and prosperity of the public would as surely be reflected to Rosslund. As it is now, to a stranger, the prospectus of a poor company, and the talk about a poor property will look as well and sound as well as the prospectus of a good company, and the talk about a good property and for that reason many good buys are passed over and many poor purchases made. Now, an exchange with an investigating committee composed of thoroughly competent and reliable men would tend to eliminate this feature and inspire confidence. There are a great many brokers here and a great many brokers in outside cities dealing in Rosslund stocks. These men could form themselves into a trustworthy corporation of this kind that would reflect nothing but credit and good to the camp. Of course it would be a little hard on the "curb-stone brokers," but they have other resources and by no means pin their faith to stock certificates. Your mining investor does not spend his money from any philanthropic motives, and whether it be that he buys to sell or buys for dividends, he is wary of buying a second time after his confidence has been shaken, and for this reason great wealth may lie securely locked in the ground for want of capital to take it out. A mining exchange simply tends to place mining on a solid commercial basis, and on such a basis mining should be no more risky an investment than any other business. It is the possibility of encountering suddenly great wealth that breeds the organisms of "gold fever."

Some high assays have been got lately from the South Belt, but high assays unfortunately do not make mines. The Deer Park was getting \$100 and \$200, and almost \$300 assays and one claim showed a result of over \$900. Still the cold fact remains that if at shipping time all ore shows a smelter return of \$25 or \$30, it is very satisfactory ore.

The Mayflower has its machinery in place and the mine is looking very well. The principal values come from silver and lead.

G. O.

Rosslund, December 15th.

#### BOUNDARY CREEK.

Mr. James Brady of Vancouver, for a Mr. Hoan of Montreal, has been in recently completing his report on the "Sunset" Deadwood camp, and deciding on the most advantageous points at which to commence development. A very good tunnel site has been located, and it is understood that work will be started shortly. The bond is for \$16,000.

Herbert Cuthbert of Victoria has purchased two claims in the camp for the British Canadian Gold Fields Co.—the "Ira Lenora" and the "Luella." Although the claims were little developed at the time of purchase, the indications on both were fairly promising. A contract for a 50-foot shaft has been let on the "Luella" and 40 feet of work on the "Ira Lenora."

The Boundary Creek Mining and Milling Co. are developing their properties. On the "G. A. R.," the ore has improved considerably in gold and silver tenure with recent work.

The Parrott Smelting Co. have suspended work temporarily on the Stem-winder. The property is fairly well proven now at any rate, and with the advent of a railroad or smelter, will no doubt become a steady producer.

The report seems current about camp that Mr. Renger, who holds the bond on the Skylark, is about to relinquish it. Among those informed on the matter, however, it is known that no such move is entertained, and the remaining payment will be made when due.

The working force on both the "Mother Lode" and the "No. 7" has been increased during the past week.

The shaft is being steadily continued on the Old Ironsides under contract.

It is the intention of the Republic Mining Co. to re-commence work on their properties early in January. The work will be done on the "Last Chance," under the management of W. T. Smith.

Camp Fairview appears to be suffering from an epidemic of stock companies. In most cases the promoters, in acquiring properties, have

apparently—following a well known physical law—proceeded in the "direction of least resistance," with the result, that, with few exceptions, those now stocked are to put it mildly among the less promising and less developed claims of the camp. That some of these may eventually turn out well is however quite possible.

One promoter, we understand, improved on the methods of the others by engaging a man by the day to stake vacant quartz outcrops in the camp, and in this way acquired some twenty-five claims.

Good properties are however, not so scarce at Fairview but that the camp will go ahead on its own merits, regardless of the rise or fall of such companies, and in this connection we are glad to hear that the installation of a stamp mill and cyanide plant is contemplated for the "Smugler."

Mr. Renger has made the remaining payment and has taken up the Skylark bond, the full amount of the bond it will be remembered was \$15,000.

Leslie Hill, for Mahon, MacSharlane & Mahon of Vancouver, has bonded the remaining half interest in the Jewel for \$15,000, 10 per cent. down, and the half in the Denero Grande for \$20,000. He now has all the Denero Grande under bond and  $\frac{1}{4}$  of the Jewel.

Greenwood City, 15th December 1896.

HARRY A. GUESS.

#### SLOCAN DISTRICT.

The recent heavy snowfalls have practically settled the question of what properties shall be worked this winter. In several cases the exceptional depth of snow at this time of year has quite put an end to projected development. But this state of affairs is apt to occur each year in West Kootenay. Since people will persist in undertaking new developments just at the time the snow makes all work difficult and expensive.

An ineffectual attempt has just been made to get to work on some Leman Creek properties, which were recently bonded to Eastern Canadian people. Over five feet of wet snow, with more falling every day put a stop to trail-making.

There are still a good many of the migratory variety of expert left in the Slocan. Their operations are very much curtailed by want of trails. Nothing can be seen here between November and May, except the face of a shaft or tunnel. Yet even under such poor guarantee, claims continue to be bonded. The camp is becoming "fashionable." Anything goes. Where a year ago a mining expert could not be induced to set feet even if one offered to pay his expenses out.

The Alamo and Idaho concentrator, known as the Slocan Milling Co., has closed down for the winter. This is not on account of the mines, which are looking well and have lately paid a \$20,000 dividend, but because of the delay and expense of milling, running flume and tramway during the winter season. The flume is much exposed to the weather and is made of inch and a half lumber, ground in forms on the bottom, causing the water to rise and spill over, this cuts away the foundations, causing bad breaks and mud-slides, also the ice particles interfere with the discharge upon the Pelton wheel. The mines connected with it will keep on taking out ore and storing it.

The Slocan Star flume taking water from Cody Creek is well protected from excessive frosts, which interfere so much with the water supply, and it is not likely there will be any trouble in that quarter. Meanwhile the mill is being run by steam.

The chief producing mines of Payne Mountain have begun their usual active winter shipments, chiefly by raw-hiding, but also having some extra waggon roads, as an advance on last year. The Noble Five tramway will not be in running order for a considerable time. Meanwhile their mill is being pushed to completion.

The Last Chance has declared a dividend of \$20,000, without making as much talk about it as a \$20,000 Le Roi dividend causes. Also the Slocan Star, another of \$50,000, bringing their total paid in 1896 up to \$250,000, which, with \$50,000 in 1895, makes the best record for West Kootenay so far. This, with expenses for mill, flume and tramway, makes a fair showing.

It is reported that the "Alpine Group" and "Ocean Group," both on the summits between Kootenay and Slocan Lakes, have been bonded to Alex. Dick of Joggins, Nova Scotia. These groups are well spoken of, but are at present somewhat removed from centres of active development. The Alpine Group is a free gold property, and is properly tributary to Kootenay Lake. It is probable that the block of country between Slocan River and west arm of Kootenay Lake contains a good deal of gold. All the ore bodies south of Ten Mile Creek on Slocan Lake are more or less auriferous both free and base gold being associated with other dry ores.

The Enterprise Neepawa, Bondholder and Dalhousie all being actively developed on Ten Mile Creek are looking well. Ten Mile Creek has established itself as an ore producer and Four Mile Creek is following suit.

It is understood for a certainty that the contemplated railway extension down Slocan River will be put through without much delay. This will help along the good start which has been made round Slocan Lake during the past season. It is probable that a boat service will be established between Roseberry and Slocan City to replace the building of the line along the Lake Shore for the present. A boat 125 feet long is now being built by the C. P. R. for that purpose.

The Kohance Creek claims under bond to Rufus Pope have been developed to some extent. These claims, although being worked from the Kootenay Lake side, were discovered by prospectors from the Slocan side. Their situation is such that they can ship to either lake, being on the summit. The main ore of these properties is a rich galena, somewhat of the same character as that of the Two Friends Mine. There are also a set of cross quartz leads which carry very rich argentite ores. The country rock is granite.

The Two Friends Mine one of the Springer Creek shippers, has been lately stocked. The number of shares is 800,000, par value 30cts., and shares offered at par. This gives a capitalization of \$240,000.

Sandon has lately had two banks established, branches of the Bank of B. C. and the bank of B. N. A. These have been needed badly for some time, considering the volume of business conducted at that brisk little town. The site of this town is somewhat constricted by the adjacent mountains, which mountains, however, contain an exceedingly large number of high grade silver lead ore-bodies. Beds in this desirable place are now going at \$3 a night. This beats Rossland.

A branch of the Bank of B. C. has also been established at Kaslo, and it is not unlikely that the Bank of Montreal will begin business in some Slocan town, as it has at present no branch in this division.

A new strike of rich ore is reported on the Arlington. This claim is on Springer Creek. It was bonded last winter to John A. Finch for \$50,000. A shaft was sunk and drifts run on each hand, after which the bond was thrown up. Cooper and Fielding, the locators, resumed work on the drifts and are said to have come across some more of the very rich ore found on the surface.

Work has begun on the Lilly B., another Springer Creek property, not far from the Arlington. It has been bonded recently to J. Gilhooly for \$30,000.

The winter season now entered upon shows nothing but progress in the whole Slocan country. The late elections caused no alarm, nor the temporary fall in silver of some four or five cents. In fact there has been a steady increase in development and in the activity of outside investors. The mines continue to pay to work and the most developed ones pay dividends. These dividends coming from silver mines are no doubt as much appreciated as if their producers were fashionable gold mines, and they talk for themselves.

But besides these silver lead mines of the Slocan proper, it must be remembered that the southern Slocan country carries workable gold veins. These continue southwards until the auriferous portion of the Slocan adjoins that of the Nelson, Waterloo and Trail districts. Hence the Slocan is not an isolated silver mining camp, but is an extension of the southern districts and is naturally very accessible from the south.

Having proved by prospecting that these divisions form one continuous mining and mineral area, it is possible that further prospecting will join the Slocan mineral belt to that of the Lardo. In fact there is but little doubt but that each mining camp will so extend its boundaries that very few barren areas will be found to interfere with a great regional development.

Slocan City, 15th December, 1896.

J. C. G.

(From our New Denver correspondent.)

Raw-hiding and shipping are now in full swing from these mines which have ore on the dump and facilities for getting it out, consequent on the descent of the snowy mantle which naturally covers the ground at this period of the year. It is universally taken for granted that with the present progressiveness which is apparent in every direction, this will be far and away the busiest season ever known in the Slocan. One result of the extremely cold weather which we have been getting of late, is to cause considerable difficulty in obtaining water supplies for operating the concentrators in the district, and on this account the management of the one near Three Forks have deemed it advisable to close down during the winter.

After agitating for months in vain for the establishment of a chartered bank in the Slovan, the desirableness of the situation has suddenly become apparent to those most nearly concerned, and in accordance with the old saying that it never rains but it pours, we now find ourselves fairly inundated with these institutions. The Bank of British Columbia has opened branch offices at both Sandon and Kaslo, and not to be *behind-hand*, the Bank of British North America immediately followed suit by also locating in the town first mentioned. With so much business transacted daily these cannot fail to be of immense benefit to the citizens.

The Slovan Star has declared another dividend of \$50,000, making a round quarter of a million distributed among the fortunate shareholders as net proceeds for the year's work.

The Last Chance, which announces probable ore shipments aggregating a thousand tons for the winter, has also entered the ever increasing list of dividend-payers, one of \$20,000 being recently declared.

The Slovan Lake properties are rapidly forcing their way into prominence; it is rumoured that an offer of \$250,000 was made for the Enterprise on ten mile creek a short time since, but further particulars are unobtainable. With this mine and the Two Friends permanent shippers, and others in various stages of development shipping intermittently, the future of the district seems assured. Small preliminary shipments from the dry ore belt are constantly finding their way to the smelters with highly gratifying results, the returns in many instances showing gold in amount equalling and sometimes surpassing the silver contents.

The bonding and stocking of undeveloped properties goes merrily on, and judging by indications it would seem to be only in the infantile stage as yet. In this connection it is interesting for these in the immediate locality to compare the statements made in prospectuses with actual facts as revealed by personal examination. It would be instructive to know on what basis some of the company promoters estimate the value of their ore dumps which are always reported lying somewhere on the property; because in practice it is found well-nigh impossible to do so with any degree of accuracy, even after numerous trial shipments have been made. I have noticed by the way, that these dumps dwindle considerably, and have even on special occasions entirely evaporated under the influence of my desire to examine them for myself.

The important workings referred to in eloquent language in the prospectuses are by curious and oft-repeated coincidences usually inaccessible at the time of my visit. In other instances where ore had actually been shipped from the property, I observed that undue prominence was given to the shipments which gave phenomenal returns, and those which showed more moderate values were omitted altogether; this, of course, is deception pure and simple, as it leads one to suppose that the whole of the ore is of the value mentioned.

It is surprising what singular and persistent apathy the provincial government displays towards this section of the country. The growing importance of the mineral industry is still but feebly understood by them, and instead of exhibiting a commendable spirit of co-operation in supplying the urgent needs of the district, public munificence has to be invoked in order to provide suitable means of communication between one mining centre and another. A sleigh road has recently been built, mainly by private enterprise, to connect Silverton with New Denver, and now subscriptions are being invited towards the cost of construction of a waggon road between New Denver and Three Forks.

It is imperative in the interests of British Columbia and the Dominion generally, that all who pose as authorities on our mineral wealth should tell the plain unvarnished truth to the outside world. In a recent issue of the *London Mining Journal* a writer innocently remarks, that although New Denver has nothing to do with mining, its scenery may be fittingly compared to the finest in Switzerland. Perhaps the correspondent who is responsible for that statement will be kind enough to inform us what he considers contrives to support New Denver, if the mines do not. It can hardly be called a manufacturing or agricultural centre and its inhabitants certainly do not live on the scenery however beautiful and incomparable it may be. As a matter of fact, New Denver is the recognized centre of the Slovan country, and the only town in it where the government sees fit to establish a recording office, so that a large proportion of the mining business of the district must necessarily be transacted there. In the *Engineering and Mining Journal* of November 21st, we are indirectly informed that there are three smelters and six concentrators now at work in the Slovan. Neither statement is correct; there are at present but three concentrators in the district all told (although others are in course of construction) and of these only one is now in active operation. But even allowing this remark to be merely a little premature in its import, we should very much like to know where the three smelters referred to are to be found, as so far I have failed to locate even one of them. The writer has evidently confounded the Slovan with the Kootenay; but permitting the broader view, there are only two smelters now at work, neither of which is at present capable of treating Slovan ores.

Anyone at all cognizant of the conditions existing here to-day, must of necessity be aware that a local smelter capable of treating argentifer-

ous galena is the first requisite towards a largely increased output from the mines. Perversion of facts or mis-statements of this kind published in the two leading mining journals of the world are liable to reflect seriously on our national integrity, and we regard it therefore as our clear duty to correct any such tendency, however much it may appear at first sight to redound to our credit or further material interests.

New Denver, 15th December 1896.

H. W.

#### MISCELLANEOUS.

Considerable damage was done by fire to a portion of No. 4 mine, Wellington Colliery, this month. The mine has been flooded and the fire extinguished. Fortunately there were no casualties.

The output of the North Star Silver Mine near Fort Steele has been very satisfactory, approximating 6,000 tons for the ten months. At last report, 2,500 tons had been shipped to U. S. smelters.

A. S. Gross, a mining man from Seattle, Wash., who, during the past season, has been in charge of the mica mines at the Tete Juan Cache, reports — "I arrived at the mines August 23rd, and set all hands to work preparing for the opening of the cut. After clearing out the drift of snow we commenced to take out mica blocks. We found the overhead wall cracked and carrying stained water, which dripped over the face of the mica and caused iron rust to permeate the blocks, but as we worked away from the wall the quality of the blocks improved. But for the coal giving out I believe we could have secured first-class mica in large quantities. In fact we left the face of the cut studded with mica blocks so thick that it was impossible to use or insert a drill without destroying some mica. Although a slide, yet the indications were of such permanency that I believe it would take months before it would be worked out. The space left where the slide occurred is now covered with debris from the glacier above, leaving the main vein visible to the naked eye for two miles. The width I should judge to be from 30 to 60 feet on all the main veins. The croppings, samples of which I now have, were taken from one of the three veins I examined that I believe is fully 40 feet wide. This is the vein that I should have cut and opened had I been prepared to remain, but lack of coal and provisions compelled me to break camp after a stay of 15 days. The location for a new camp at the last named vein is a most excellent one both from a standpoint of convenience to fuel and water as well as from vantage ground and nearness of work from camp. The trail, which is now almost impassable and is over 300 miles from Kamloops, can be made first-class and more accessible by a reasonable outlay and reduced to about 150 to 175 miles. Work at the mines could be carried on all winter after shelter is provided for the men. I believe a better class of mica could be secured from the main vein after cross-cutting it than anything so far found in the slide from which the mica came now in your possession."

An important and exceedingly promising section of this province is the Shoal Bay district on the coast, about ten hours' steaming from Vancouver, where large deposits of mineral are now receiving attention. To briefly mention one or two, special attention should be given to the properties of the Gold Hill Mining and Exploring Company, situated on Phillips Arm, The Chance Mining Company, on Valdez Island, and the Northern Belle Company of Seattle, Thurow Island. On the Chance property, 300 feet of tunnelling and shafting have been done and the body of ore in sight now justifies the highest estimates that have been placed upon the value of the mining possibilities of that district. The quartz, a silica carrying copper and iron pyrites containing gold, silver and copper, has assayed as high as \$75 to the ton and smelter returns from a trial shipment, gave \$31 in gold to the ton. At Phillips Arm, a body of ore containing at least 10,000 tons has been exposed between the tunnel at water level and the upper working and a man-of-war could be anchored within twenty yards of the mouth of the tunnel. In large quantities the ores can be transported to the smelters of the coast cities for 50 cents a ton, and if a concentrating plant be erected on the property the total cost of mining, milling and concentrating will not exceed \$5 per ton. It is estimated by experts that 40 stamps, milling 100 tons per day can be kept busy for 50 years, and all this has been lying there untouched, almost unthought of, while on the surface men have for years been engaged in other pursuits less profitable and more arduous.

On the White Pine and Electric properties, belonging to the Northern Belle Company of Seattle, a tunnel has been driven and is now in a distance of 140 feet, showing a rapidly and uniformly increasing width of seam. The ore is similar to that of the Chance Mining Company's, and of equal richness. The quantity is almost incalculable, and the work which has been done shows what can be accomplished by men who understand their business and have the facilities wherewith to do good work, do it properly.

#### Ontario.

##### LAKE OF THE WOODS.

Mining operations still continue very active, and a considerable number of new properties are now being opened up and new camps are being erected for the purpose of property prospecting and developing some of the many locations taken up during the past summer. A considerable quantity of snow has already fallen, more than usual for this

time of year, and though this does not at all interfere with the development work still it renders travelling more or less difficult.

During the past two months there has been a very considerable influx of capital, both English and American, as well as Canadian, and, differing from the usual course in the past, it is for the most part being expended in a practical manner in opening up and developing claims.

The Sultana is of course working to its full capacity with most gratifying results to the owner, Mr. J. F. Caldwell, who continues his policy of enlargement and expansion in the direction of increased machinery and facilities for handling his ore as the condition of his mine warrants.

Work is being pushed on the "Master Jack" shaft which is now down close on one hundred feet, and the reports from that property are quite promising.

Operations are still continued at the "Jennie Leigh," and a second shaft is being sunk to further test the permanency and regularity of the vein, and from present appearances this is one of the most promising properties in the district.

A good deal of trouble has developed lately from the actions of that species of individual operating in this district properly designated as the "mining lands hog." No sooner does a hard-working, patient prospector discover a good claim than this individual appears and upon some more or less flimsy pretext puts in a claim for the property, and though in most cases his claim is not such as can be substantiated at the Crown Lands office still he causes a good deal of needless worry and delay, and afterwards succeeds in his original object of being bought off. It would not be a bad idea to publish a list of these gentlemen's names, and officials of the Department should be made aware of these attempts being made and some means adopted to prevent it.

During the last week there has been very persistent rumors of a rich strike at the "Regina," and as the main shaft is now down to a considerable depth, over 200 feet, there is very little doubt that this mine is turning out quite satisfactory to its owners.

The ice on the Lake of the Woods is very bad this year, the heavy falls of snow before the ice had formed rendering it quite unsafe, and a number of teams have already been in the lake through bad ice, consequently it is impossible for some time to transport heavy machinery across the lake.

Prospectors are arriving daily from the Seine and Manitou countries, and report great activity throughout those districts. The Saw Bill is said to be exceeding the most sanguine expectations of the company.

A mining exchange has been formed and incorporated at Rat Portage as a joint stock company under the name of "The Rat Portage Mining Exchange." The Directors are: George Dreury, President, J. M. Savage, C. W. Chadwick, T. R. Deacon, D. L. Mather, Walter Ross, N. C. Westerfield, S. V. Halstead, R. Ross Sutherland, J. E. Rice and C. S. Morris, all prominent business men of Rat Portage and Winnipeg, and the institution will no doubt be a success and an assistance to those dealing in mining stocks and lands.

Mr. J. Burley Smith, M. E., has commenced active work on the Yum Yum.

#### MISCELLANEOUS.

The bog-iron ores found in South-western Ontario are attracting a good deal of attention at present. Wm. Edgar, of Hamilton, will take out five tons a day in the Township of Howard, Kent Co., during the winter. A farmer near Hamilton reports ore of good quality at Capetown, Ont.

*Sarnia Canadian*:—"H. Porter, in charge of the oil operations of the American syndicate in Sarnia township, has returned from Pennsylvania, and is now making arrangements to pump the McGregor wells. A pumping rig will be put on to No. 2 well on the McGregor farm, and the well will be pumped for ten days as a test. If it holds out as an oil producer under the test pumps will be put into the other two wells, and all of them will be run long enough to make a thorough test of their capacity.

Archibald Blue, Director of Mines, Ontario, has received from Joshua Legg, of Leeds county, a sample of celestite, *strontium sulphate*, from a vein in Lansdowne township, in that county. The vein is 26 inches wide, and shows up for a quarter of a mile. It is an old location, and has been exploited by shafts at various times during the past seventy years. The material is used in connection with the preparation and refining of beet-root sugar, and also in preparing certain salts for colored lights in pyrotechnic displays.

The Hart Emery Wheel, Co., of Hamilton, is treating a lot of corundum from the new and valuable deposit reported from Carlow, Hastings county, noted in our last issue. The results will be published in a Bulletin by the Bureau of Mines.

Much interest has been excited by the opening up of a number of new wells at Bothwell. Messrs. Carman and Fairbanks have sunk five wells on the Goodyear farm, and from one of these the yield averages 75

barrels per day. A power plant is being put in here capable of driving 35 wells. There is a storage capacity on the ground for 1,000 barrels, and it is being supplemented by 3,400 barrels more.

The Walker Oil and Gas Co., notice for incorporation of which is noted elsewhere, has also taken upon an extensive territory in the new field. Four wells have been put down but only one is worked at present, the output being about 40 barrels per day. Two drilling rigs are at work. On the Murphy property, on the east side of the river, a well has been sunk and is yielding even more abundantly than the other well of the company.

On the Brewer properties the lessee, Mr. John Puddicombe, has put down two wells, yielding at present from 8 to 10 barrels per day.

On the Sussex, Lutz and Gesner properties Mr. Alex. Elliott is operating six wells, five of which average 6 barrels per day. The sixth well yields 50 barrels per day.

The Ohio Oil Co. operates on the McRitchie farm. One well has been sunk and another was nearly completed at last advice. Mr. J. A. Davis, who is in charge of the work, says the rock is close-grained and that the wells will be permanent. On an eight days' test the finished well furnished 12 barrels per day in each 10 hours' run. As soon as four wells are put down a power house will be built and a jerking rig put in.

The Detroit Oil Co. has 400 acres under lease and work is being carried on under the supervision of Mr. F. W. Wright, of Windsor. Two wells are producing and a third is being put down.

The Samuel Rogers Oil Co., of Toronto, has leased several hundred acres, including the Bloom farm. One well is being put down at present.

There are altogether over 30 drilling rigs at work along the oil belt, the following being some of the operators: Crawford & Barry, Americans; Thomas E. Clarke, banker, Bothwell; C. Willard, Allegheny City; Hoskins & Bernie; John D. Noble, Petrolea; J. R. Minhinick, London; William Webster, Reeve of Mosa, Wyoming, Barnes & Fort Orange Oil Co., Toledo; R. H. Dunham, representing a Hamilton syndicate; The American Oil Co. and Mr. Kershaw, Olean, N. Y.; Hurst & Howard, Glencoe; George W. Barnes Oil Co., Cleveland; R. H. Block, Ohio; Mr. Lefebvre, Bothwell; A. Yager, Petrolea; E. H. Perkins, Cleveland, J. W. Coats, Olean, N. Y.; M. J. Woodward, Petrolea, and Dillon & Wilson, Grand Rapids, Mich.

The Yellow Jacket Mining Co. of Toronto are now operating on La Seine River with excellent results upon claims 773 P, 241 E and 243 E. The ores from which were near surface averages \$12. Since work commenced there every available inch of land has been surveyed.

Considerable interest is taken locally in the development by a Port Arthur syndicate of the "Mocan" claim, situated about 2½ miles west of the Empress mine on Jackfish Bay. Our correspondent writes: This property shows a vein of ten inches on a terrace of a higher hill, about 180 feet above the valley, but widens out gradually to nearly seven feet, 100 feet farther down of the steep slope of the hill, where a drift 6 x 7 feet is commenced. This vein showed some free gold on the surface, but in the unaltered ore from the drift I have discovered none so far. The officers are: President, G. W. Thompson; secretary, W. C. Dobie; treasurer, G. J. Hodder; managing committee, Geo. Clavet, J. J. O'Connor and D. F. Burk.

Following are the shipments of Canadian crude and refined, reduced to crude equivalent, over the two railways for the month of November:

GRAND TRUNK.		
Crude.	Refined.	Equivalent.
Bbls.	Bbls.	Bbls.
46,965	22,830	75,040
MICHIGAN CENTRAL.		
Bbls.	Bbls.	Bbls.
8,001	10,317	28,794
Total equivalent.....		103,834

According to advices from Port Arthur, reports reaching there from the Rabbit Mountain silver mine say that everything on that property is in good shape, and the chances are that the mine will soon be turning out bullion. A gang of men, under Mr. W. Leany of Woodside Bros.' foundry and machine shop, Port Arthur, has been engaged for some time in refitting, cleaning, and in other ways putting the vast amount of machinery in order for use, the mine having been closed down. A gang of eight men are now at work pumping out the shafts of the mine, which have become filled with water. Capt. Dan McPhee, one of the owners of the mine, is superintending the work and hopes to have active mining work started shortly. The Rabbit Mountain mine is three miles west of the once famous Beaver mine, and is right in the heart of the silver group which some years ago were turning out hundreds of thousands of dollars' worth of the bright metal.

(Continued on back form.)

**MINE DRAINAGE.**

BY HANS C. BEHR, MECHANICAL ENGINEER.\*

*Leaded Joints.* Leaded joints are usually adopted on pipes which are not liable to be disturbed in position, such as those for water supply on the surface. For such cases they make the most suitable joint. The

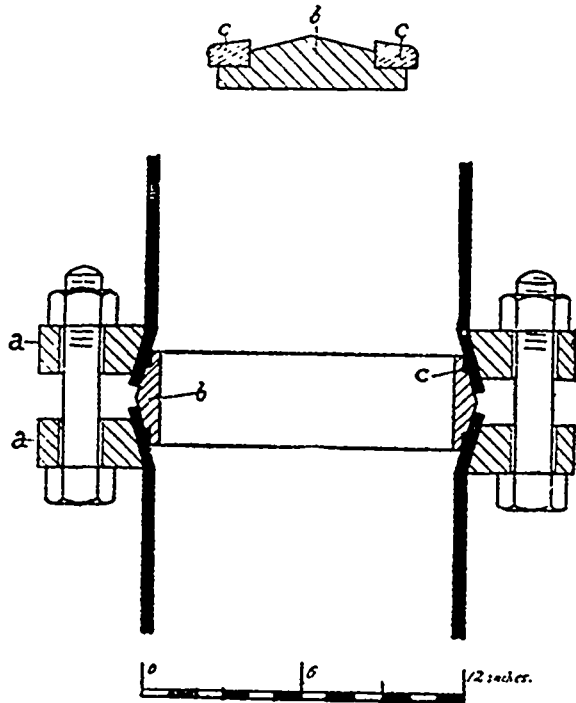


FIG. 8.

lead serves both for securing the connection and as packing. A lead joint much used for riveted pipe is shown in Fig. 9. The ends of the pipes abut on each other; and an internal sleeve prevents the lead from flowing into the pipe. An outer sleeve, usually welded, holds the lead, and must be sufficiently strong to resist pressure and caulking. Fig. 10 illustrates the Converse patent leaded sleeve-joint for wrought-iron pipe. The rivets serve to lock the pipe into the sleeve by their entering the recesses shown in the cut. Fig. 11 illustrates the pouring clamp, which fits the pipe and sleeve, and does away with the necessity of clay to form a mold for the lead when poured. After pouring, the lead is caulked firmly into place.

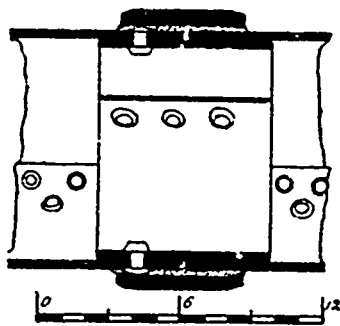


FIG. 9.

*Packing.* The material commonly used for securing tightness of flanged steam-and-air, as well as water-pipes, in mines, is the so-called

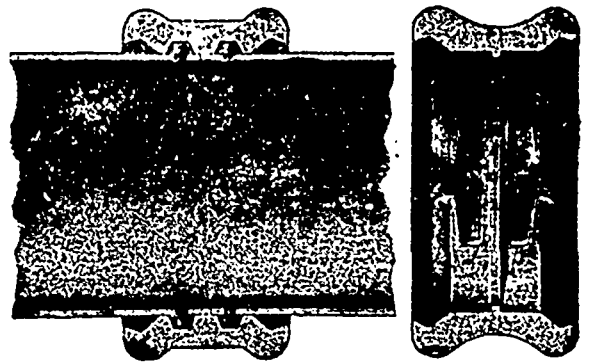


FIG. 10.

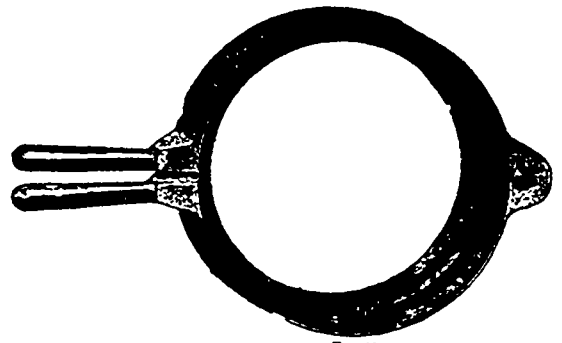


FIG. 11.

sheet-rubber packing, composed of alternate layers of rubber and canvas. For water pipes the gaskets are made of a thickness, ranging from 1/4 in. for small pipes, to 3-16 in. or 1/2 in. in larger pipes. Where the flanges are rough, thicker rubber must be used than where faced. In steam pipes the rubber is usually not over 1-16 in. thick, in order to present less surface for the deteriorating action of the steam and hot water. It is always economy to use the best grades of sheet rubber. Rubber gaskets, if they have been in place for some time, particularly where subjected to heat, adhere very firmly to the flanges, and usually tear on being removed, thus necessitating new ones. Adhesion may be prevented by rubbing graphite on the surface of the gasket before putting in place. For heavier pressure the flanges are sometimes made in pairs "male and female," as at a, Fig. 4, the recess being somewhat deeper than the thickness of

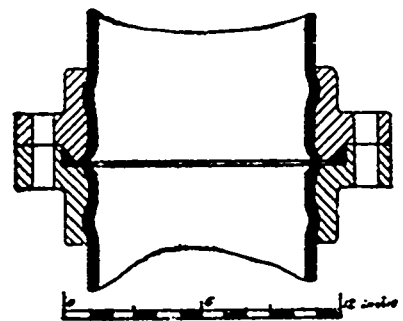


FIG. 12.

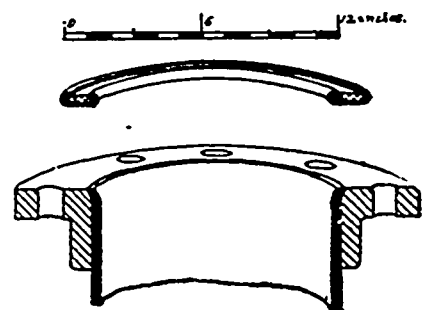


FIG. 13.

the rubber which is laid in it, and which is prevented from being blown out by the inclosing ring of metal. The packing shown in Fig 12 is particularly adapted for heavy pressures, but requires continuous rubber rings, of circular or square cross-section, to obtain the best results.

**Lead Gaskets.** For heavy pressures, where rubber is liable to be forced out of the joint, sheet-lead gaskets are sometimes used between water-pipe flanges, these being usually machined in such a manner that their faces present a close succession of annular ridges, which sink into the lead and grip it tightly. Lead gaskets are, however, not sufficiently elastic for most purposes, and are liable to leak upon the least crowding out of line of the pipe. These gaskets are also sometimes used with male and female flanges, as shown in Fig. 4.

**Elastic Copper Gaskets.** A very efficient and durable gasket for steam-pipes is shown in Fig. 13. It is made of a ring of thin-copper, the inner and outer edges being turned over the corresponding edges of a rubber gasket. The copper is about 1-32 in. thick, and the rubber 1-16 in. These gaskets are best made small enough to go inside the circle of bolts in the flange.

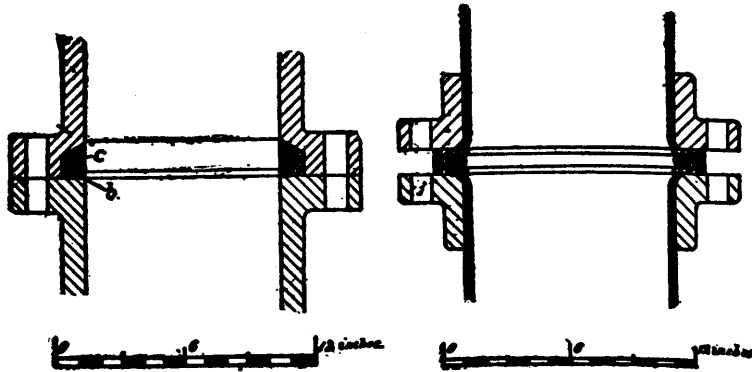


FIG. 14

FIG. 15

A flange-packing used for a head of 1,700 ft. at the Mayrau shaft Kladno, Bohemia, and which has been very satisfactory, is shown in Fig. 14. Here one of the flanges is recessed at *a* to admit a ring *b* of leather, rubber, or metal, of L-shaped section. This elastic ring is held in place by a rigid metal ring *c*, the whole forming a packing similar to that used for hydraulic-press plungers. (Modifications of this form will readily suggest themselves; for example, that in Fig. 15, which could be used with ordinary flanges by inserting a forged distance-ring between them so as to form the space for the packing.)

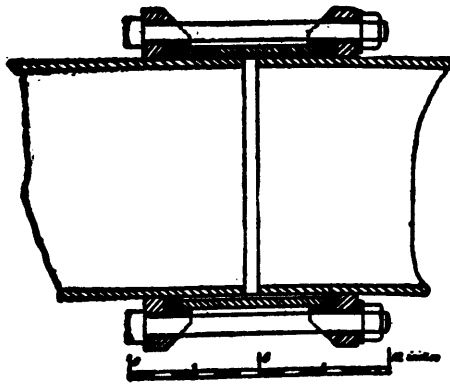


FIG. 16

In the Paris compressed-air power transmission system, plain cast-iron pipes without flanges or spigot ends are used for the mains. The sections are connected by the Normandy joint, which consists of a sort of double stuffing box, and is shown in Fig. 16. It is very flexible, and almost absolutely tight under the 80 lbs. pressure used. The pipes are not turned at the joint, but are put in as they come from the foundry. With some modifications this joint is also suitable for higher pressures in column-pipes.

**Expansion Joints.** For long pipes, particularly in shafts, inclines, and levels, and for pipes rigidly fixed at the extremities, expansion joints must be used. The most common form of expansion joint consists merely of a stuffing box, as shown in Fig. 17, or of a recessed spigot end containing hydraulic packing, as in Fig. 18. The end of the pipe entering the stuffing-box must be smooth, and is best made of brass. For steam-pipes in shafts, expansion joints are particularly necessary, and for these the one shown in Fig. 17 is the proper form. The form Fig. 18

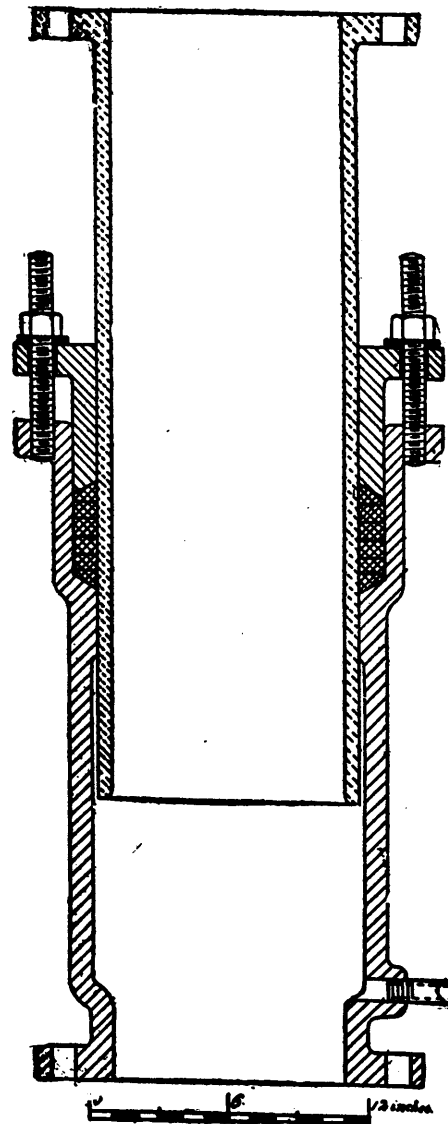


FIG. 17

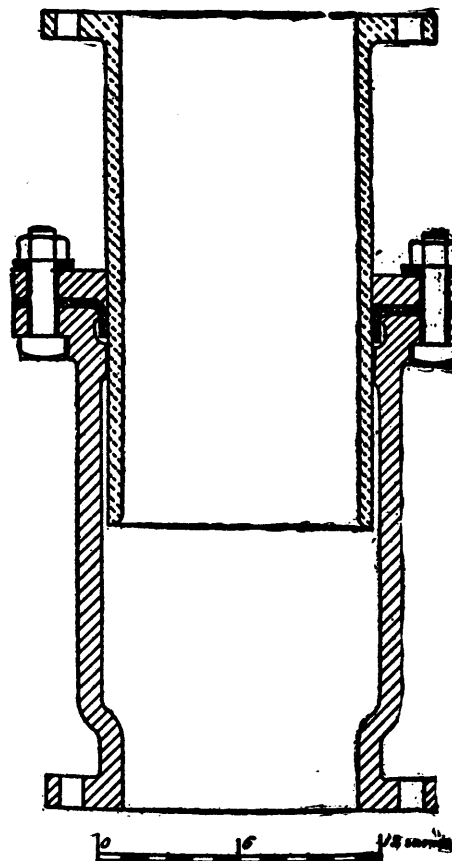


FIG. 18

is only adapted for water pipes. Stuffing-boxes in shafts and inclines should always be placed so that the gland is on top, since, if placed otherwise, they are almost sure to leak. Expansion joints are usually troublesome, and should be carefully looked after. For steam-pipes, or where the water is hot, the expansion will necessarily be greater than for the ordinary variations due to climatic temperature. Both these variations can always be calculated; those due to settling of ground or timbers cannot. Ample range should therefore always be provided, so that the expansion joints will not pull out of the stuffing-box, which would be a serious matter with a steam-pipe under ground.

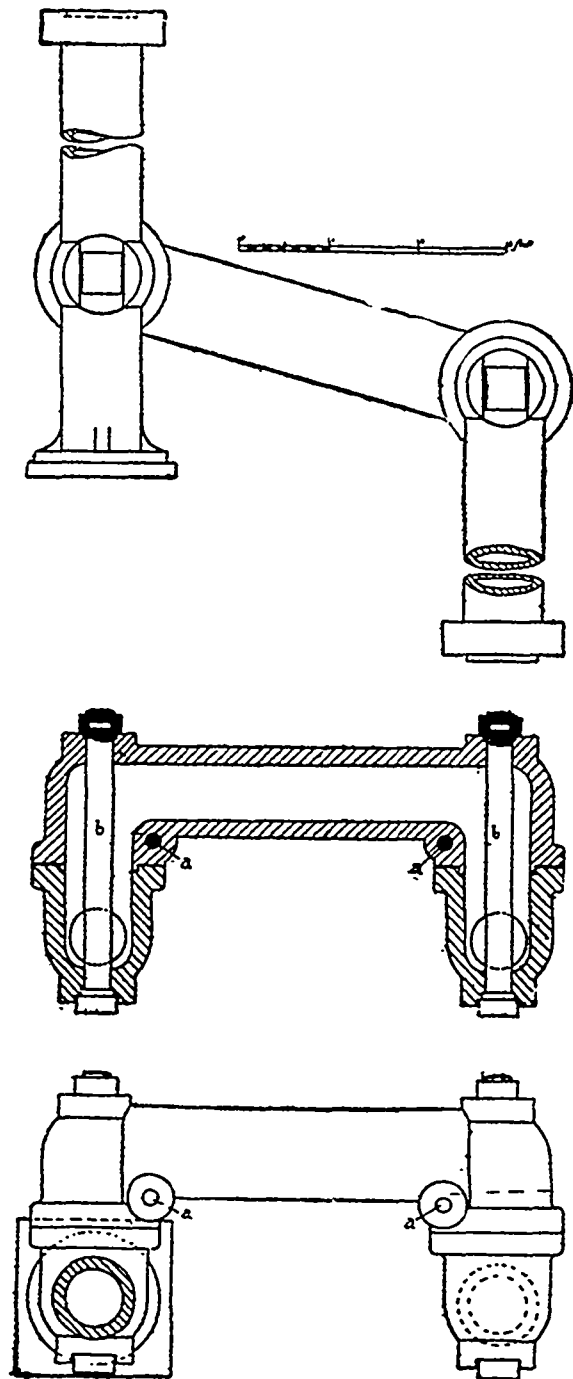


FIG. 19.

An expansion joint composed of a double swiveling pipe-section, shown in Fig. 19, was used at the "Combination Shaft," Virginia City, Nevada, on a cast-iron pipe under very heavy water pressure, and gave good satisfaction. One of the pipes rests with a pedestal on a support in the shaft, the other being free to move. The bolts at *a* are inserted to reinforce the casting at the dangerous section. No packing was used between the faces of the casting. The threads of the swivel bolts *b* were packed by winding wicking around a groove, cutting part of the thread away. Where the range of expansion is not great, U-shaped pipes are sometimes used in steam-pipes to give them a certain amount of elasticity, or a corrugated section of pipe made of copper, brass, or wrought iron is used. Such joints are, however, not suitable for long pipes, on

account of the large number required to allow for the variation in length. Water-pipes having slip joints usually do not require any expansion joints.

Water-pipes laid in trenches at the surface do not require expansion joints. These are needed where pipes are laid over long bridges or trestle work, as they are there exposed to changes of temperature. Large pipes should not be carried by wire cables or suspension bridges, as both of these sway the pipe and cause strains and leakage.

*Pipe Supports.* Pipes in a vertical shaft should have their weight well supported, and they must also be stayed laterally to be kept in line. In the Cornish system, with pumps not over 250 ft. apart, the columns are usually stayed at intervals of about 50 ft. by clamps of wood or iron. Generally, these rest on beams laid across the wall-plates of the shaft timbering, the beams often serving at the same time as supports for pump-rod guides. Such a stay is shown in Fig. 20.

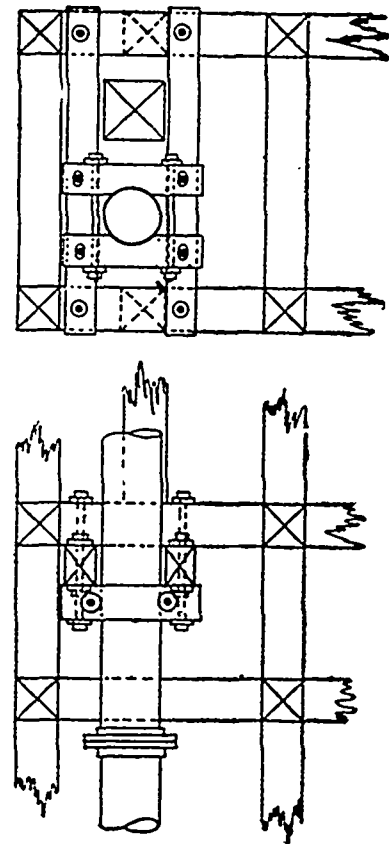


FIG. 20.

Posts are frequently inserted between several sets of shaft timbers below the pipe supports, so as to distribute the weight of the pipe on a number of wall-plates. Sometimes the pipes are clamped directly to the wall-plates with an intervening saddle-piece, as shown at *a*, Fig. 21, which represents a heavy form of such a fixture used where a goose-neck or offset-pipe on the top of the pump clack-chamber connects to the column-pipe. The weight of the column-pipe is sometimes also carried rigidly by an adjustable bolt support (Fig. 22) clamped to the pipe below a flange above the offset-pipe over the clack-chamber. There should be only one such rigid connection on the pipe, so that the latter can expand and contract. All supports and stays should be frequently looked after, particularly where the shaft is in bad ground and liable to be crowded out of line.

Water-pipes in inclines are usually laid along the lower side, resting simply in wooden saddle-pieces, which serve both as weight support and lateral stays. Steam-pipes are usually hung from the roof of inclines.

*Bends and Elbows.* Pipes should be well supported at bends and elbows, because, in addition to the effect of the weight, the unbalanced pressure of the water tends to crowd the pipe toward the convex side. Short bends in riveted pipe are often made up of sheets riveted up like the pipe. In flanged welded pipe, short bends are made of castings. Where the velocity is great, the bends should have as large a radius as possible, especially if the bend be through a considerable arc. Slight

bends in flanged pipe are often made by inserting between the flanges of two sections of pipe a ring with inclined faces, on each of which packing is placed, as in Fig. 23.

Elbows used with the ordinary screwed pipe have too short a bend and offer too much resistance for high velocity of flow. In case of high velocity, it is advisable, therefore, to use special fittings. The ordinary malleable iron pipe-fittings are also unsuitable for many cases, and special cast-iron ones, which are less liable to split, are used for work requiring special care. Some machine shops that make a specialty of screwed-pipe work manufacture fittings of this kind, particularly elbows of larger radius than the ordinary trade fittings.

the excess of atmospheric pressure plus any available head on the suction pipe over and above the resistance due to valves and pipes. The suction-pipe, for single pumps particularly, should be as short as possible, making the mass of water which must be put in motion from rest at each stroke a minimum, so that its motion will be accelerated in the shortest possible time. Where a number of pumps operate through the same pipes in rotation or regular succession, so that the water in the suction and discharge-pipes is always in motion, the size of the pipes may be reduced. Where the height from the suction level to the highest part of the space, the volume of which is affected by the pump-displacement, is great, the suction-pipe must be larger than where this height is small, because the available acceleration due to excess of atmospheric pressure is less. Since the mass of water to be accelerated is greater in the former case, the admissible pump speed will in general also be reduced. It is evidently necessary that all pipes be tight against leakage, but with suction pipes this is particularly so, in order to prevent air from being drawn in, which would reduce the efficiency of the pump. Where water

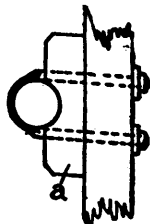
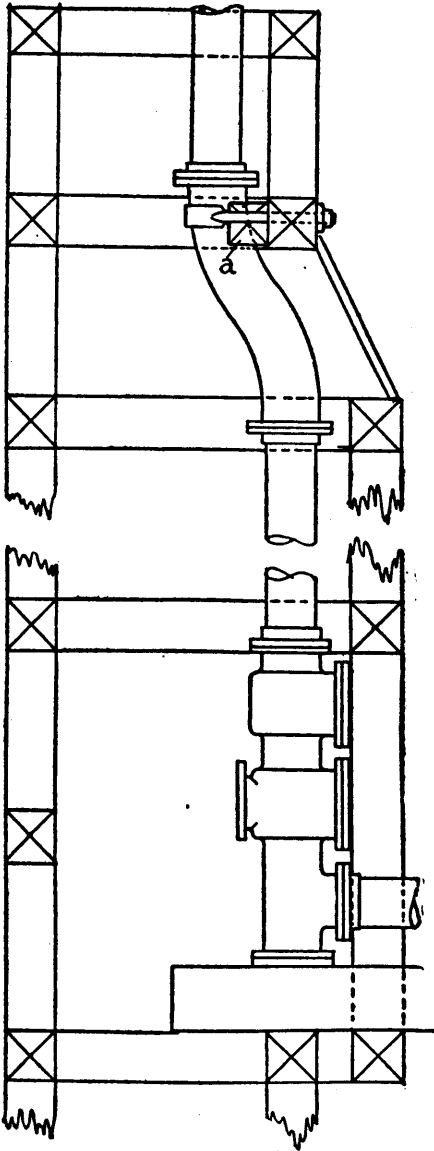


FIG. 21.

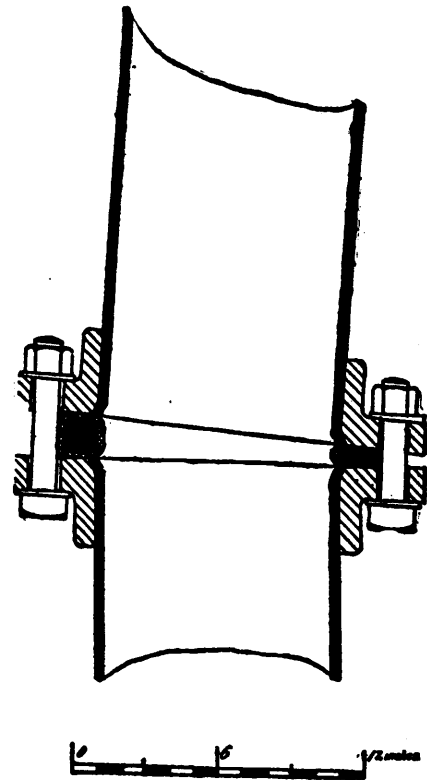


FIG. 23.

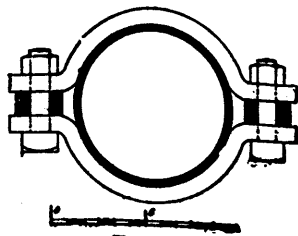
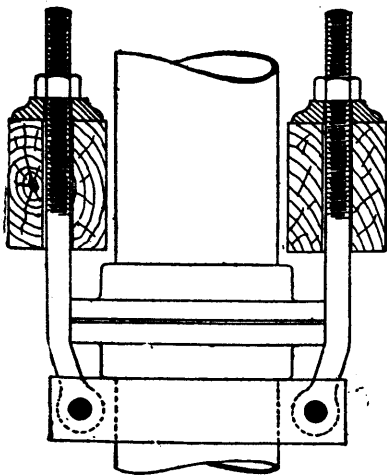


FIG. 22.

*Diameter of Water Pipes, and its Relation to Velocity of Flow.* The diameter of the suction pipe of a pump should always be such that the velocity of flow required by the speed of the pump can be maintained by

is forced through a line or column of pipe by a reciprocating pump, and where, therefore, the water in the pipe is alternately started and permitted to come to rest, the velocity of flow cannot be allowed to be great; otherwise, the column of water will continue its motion for a short interval after the pumps have reached the end of their stroke, and will then fall back when the pump-piston is already on its return-stroke; the effect being to close the discharge-valve with a blow, whereby the entire column of water is arrested more or less suddenly. This is very liable to occur in the Cornish system, where air-chambers are rarely used, on account of the difficulty of applying them of proper size. In direct-acting pumps, which make a greater number of strokes per minute, air-chambers correct this evil to a great extent by equalizing the flow of water and making it continuous.

The least size of pipes is sometimes determined by other conditions; as, for instance, in Cornish sinking pumps, where it is desired to remove the bucket through the column-pipe.

In general, the discharge-pipe need not be larger for double-acting pumps than for single-acting ones of half the capacity, because the velocity of flow is the same, the water, being, in the latter case, at rest half of the time. Greater velocity may, with the same freedom from water-ram, be given to a short column of water than to a long one.

To be continued.



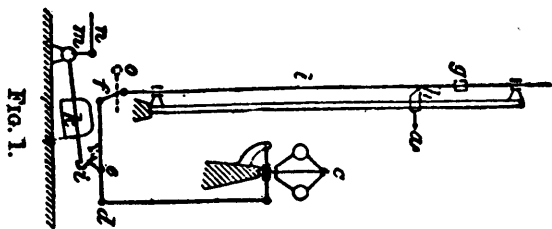
### Safety Apparatus for Winding Engines.\*

The safety apparatus which appear to have given the best result are wedge brakes; but they have the defect of again becoming relaxed if the detached end of the rope should engage in the timbering. The claw arrangement of Gerlach und Bomeke meets this difficulty, because the shoes are fastened by a loosely-engaging hook, so that they can only be released if the cage is drawn up. This arrangement, however, has another disadvantage, that it cannot be used with the new forms of stop arrangement—those in which it is not necessary to draw up the cage a little from the stops before letting it down; but this difficulty the author considers he has overcome by his arrangement of wedge brake, in which an arm forming part of the wedge moves in a slot, and may be turned by the freed end of the rope to the extent of the slot's length without releasing the wedges, while it slackens the brake shoes so soon as the cage hangs freely from the rope, on the stops being taken off.

The author's rope clamp has also brought a remedy for the heaviness and clumsiness of safety rope attachment, inasmuch as it renders unnecessary the many accessory parts. It also proved trustworthy during some experimental trials, with sudden loading so as to give a shock, carried out at the Royal Testing Station, Charlottenburg. In the case of double rope connection with this clamp, the authorities permitted men to be wound without the employment of a claw arrangement, and also relaxed the injunction to arrange the rope pulleys at a greater height, when they saw that, by the addition of this rope connection, a sufficient distance was afforded between cage and pulley.

The regulations require that winding engines be provided with an indicator, showing visibly to the engineman the position of the cages in the shaft; a warning bell for sounding before the lift is commenced, and a brake by which the winding engine can be brought to rest with sufficient promptitude. Attempts have been made to counteract the dangers arising from the cage being drawn up too high—which occurs more frequently than is generally supposed—by the automatic putting on of the steam brake and by the addition of self-acting catches near the rope pulleys. It happens, however, that all such contrivances fail, or come into action too late, if the cage is drawn up over the pit bank at too great a speed.

For reducing the speed in a lift, attempts have been made to obtain the application of the steam brake whenever the necessary slackening of speed is not effected about 20 m. (21½ yards) below the pit bank, and apparatus for this purpose has lately been constructed at the Gleiwitzer-Hutte in accordance with the Muller patent, the principle of which is shown by the accompanying diagram (fig. 1).



Parallel with a vertical indicating hand, *a*, are two rods, *b*, that can be moved in a longitudinal direction by the governor, *c*, which is driven off the shaft of the winding engine, the limit of its course corresponding with a rope speed of about 7 m. (23 ft.) per second, when the end, *d*, of the lever, *d, e, f*, is raised, thus drawing down the rods, *b*, and with it the movable striker, *g*, for a distance proportional to the travel of the sliding ring. The striker is, however, so constituted that it will engage, about 20 m. (21½ yards) below the pit bank, with the finger, *h*, of the lift indicator if the rope speed is still higher than 7 m. (23 ft.) per second, thus raising the rods, *b*, and the acting point, *f*, of the lever, *f, e, d*. The point, *d*, will become a fixed point through the action of the governor, so that the fulcrum, *e*, and therefore the link, *i*, will be raised, the weight, *k*, released and, by the system of rods and levers, *m, n*, the steam brake put on. The lever, *o* (shown dotted), must be thrown into gear when men are being wound, so as to prevent the rod, *b*, from being drawn down. If the speed in such case should become so high that the governor slider rises, either *o* or *f*, as the case may be, will become the fixed point, and the link, *i*, will, in this case, also release the weight, *k*, and put on the steam

brake. Although a greater degree of safety is afforded by this invention, there still remains the disadvantage that the cage can come up at too high a speed; and the Froebel safety apparatus goes a step farther, by bringing about a gradually diminishing speed up to the pit bank. Its principle, illustrated by fig. 2 of the diagram, is as follows.

Two horizontal spindles, *a*, are made to revolve through bevel gear, by the winding engine, on each of which spindles a nut, *b*, is moved in the same manner as in several appliances for actuating warning bells and steam brakes. Between this nut and the tappet, *c*, and touching the latter, hangs a wedge, *d*, consisting of two equal parts, that is raised and lowered by the governor. If at any point the speed of the cage should exceed what it ought to be, the wedge will be, pushed forward between

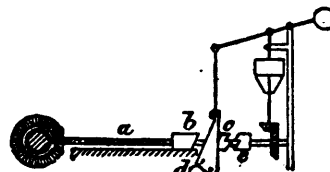


FIG. 2.

the nut and tappet to such an extent that *c* will become coupled with *e*, whereby the steam brake will be brought into action. The disadvantage of this arrangement is that the disengagement which can be obtained by the wedge is too slight for ensuring a sufficiently rapid action.

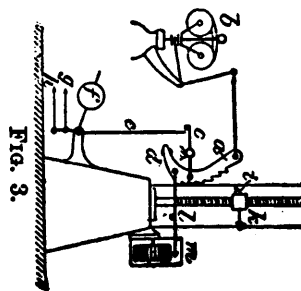


FIG. 3.

The safety apparatus shown by fig. 3, made at the Eintrachthutte, and a model of which was shown to the meeting by its inventor, the author of the paper, consists essentially of a curved swing piece, *a*, carried by the releasing lever, *c*, and capable of being turned on its axis by the governor, *b*, to an extent corresponding with the winding speed. If the lever, *c*, is moved, the link, *e*, will be released and the weight, *f*, will through the draw-rods, *g* and *h*, put on the brake and cut off the steam. The moving round its axis of *c*, and the release will take place if either a tooth of the swing piece, *a*, should engage with the hand of the lift indicator, or if the lever, *d*, which forms the continuation of *a*, should press upwards against *c*. The hand, *i*, and the swing piece, *a*, will come into contact if, during the lift, the speed is not sufficiently reduced; and, on the other hand, *d* will strike against *c* if, at any point of the lift, the maximum speed be exceeded. When men are being wound a flap or distance-piece is added between *c* and *d* reducing the distance between these two points to what will correspond with a rope speed of 4 m. per second; and at the same time a dial, visible from a distance, will give a signal that everything is ready for the lift. The style, *l*, is moved backwards and forwards with the swing piece, *a*, and shows on a card, carried by the drum, *m*, moved by clockwork, the variations in speed. As soon as *c* is released, *l* will also be thrown out of gear, and the style will in that case make a cross mark by which each occasion of the safety apparatus coming into action will be indicated and recorded.

It will be seen that the apparatus may be relied upon in all its parts, that it is simple and accessible for inspection, and that it in no way incommodes the engineman; one governor is sufficient for all the movements, which are independent of springs and adjustment; the lever actions are simple and powerful; there is only a single disengaging lever with falling weight, while chains and belts are excluded.

\*From a communication by Herr Baumann to the Upper Silesian Association of German Engineers, published by *Gluckauf*.

## Coal Cutting by Machinery.

By W. BLAKEMORE, Vice-President of the Mining Society of Nova Scotia.

### INTRODUCTION.

The subject of coal-mining by machinery must on all grounds be considered one of the most important topics of the moment. Of late years the force of competition, both at home and abroad, together with the depressed condition of the coal and iron industries, has made it a matter of increased importance to consider any and every means that would tend, however slightly, to reduce the cost of mining coal. The chief result of these conditions has been to develop enormously the use of all kinds of mechanical appliances, for in this, as in every other industry, in spite of the opposition which has invariably met the introduction of new machinery, it has eventually been fully established that a good machine both increases the production and reduces the cost of the article manipulated.

No class of machine has met with more hostility at the moment of its introduction than coal-cutting machinery, and so strong and persistent has been the opposition that, had it not been for the reasonable forbearance and patience of those who had confidence in the result of their experiments, there is little doubt that coal-mining by machinery would have been almost as puny an infant in other countries as it is at the present moment in Great Britain. Quiet persistence and intelligent perseverance have won the day, and within the last ten years it has been fully demonstrated upon the continent of America that suitable machines are in the market for cutting coal under almost any existing condition to greater advantage than by the old and laborious method of hand picks. The writer has no doubt that, in spite of the conservative views of his fellow-countrymen, it is only necessary for them to become fully acquainted with these machines, and with their entire adaptability to the requirements of mining in Great Britain, to ensure their ready acceptance and to inaugurate an era of cheaper mining that will to some extent lighten the burdens under which colliery proprietors have unfortunately been groaning for the last few years.

It has been the writer's good fortune since 1893 to be connected with the Dominion Coal Company, a corporation possessing both the capital and the enterprise to give a thorough and exhaustive trial to the best modern appliances obtainable. In connection with coal-cutting by machinery, the writer thinks he may fairly claim that they have gone into the matter, and fully tested the capacity and the value of this system of mining more thoroughly than perhaps any other firm. In saying this, he is not unmindful of the fact that an enormous tonnage of coal is cut by machinery in Pennsylvania, Ohio, and other American States, but the company have been privileged to test a greater variety of machines, and especially to secure the first longwall mining machine made upon an entirely new plan (the Mitchell), which bids fair to outstrip any of its competitors.

Out of nine working mines, the company are using machines at five, having upwards of seventy working. For the purposes of this paper, the writer thinks that it will be more profitable if he confines his remarks to the operations at the Dominion No. 1 mine, because it is a new one, especially laid out for the purpose of machine-mining, and the whole of the work, including the driving of headings, widening of haulage-roads, and opening up of working-places, has been done entirely by one or other of the machines to be hereafter described.

*Motive Power.*—It would be interesting to give some account of the surface-works in connection with the inauguration of this system, but the writer must be content with briefly stating that the motive power originates with a battery of three Babcock and Wilcox boilers, each of 210 nominal horse-power, and working at a pressure of 100 pounds per square inch. One boiler supplies steam for the hoisting-engines, fan, pump, etc.; and the other two for the air-compressors. The latter are very massive, and replete with the latest improvements, Corliss valves, etc. The air-compressors were manufactured by the Ingersoll Rock-drill Company of Canada, and are compound, the high-pressure cylinder being 22½ inches in diameter and 42 inches stroke, and the low-pressure cylinder 44 inches in diameter and 42 inches stroke.

The combined indicator-diagrams of the high and low-pressure cylinders, show a very satisfactory efficiency, that of the engine being 94

per cent., and of the air-compressor 77 per cent. The valves of the high-pressure cylinder cut off rather too soon, causing a loop in the low-pressure indicator diagram, but with a slight readjustment, which has since been made, the results are perfectly satisfactory. The air is maintained at a steady pressure of about 80 lbs. per square inch.

The air after being compressed is passed through a series of large pipes underneath the floor of the engine-house and between the foundations. This space is kept full of cold water, constantly circulated by means of a small pump, and the air when it passes into the mine is quite cold, its temperature being about 50 degs. Fahr.

The circulating pipes are 12 inches in diameter, and the main column of pipes leading from the engine into the mine is a wrought-iron tube (8 inches in diameter) with flanged joints. This main-pipe is carried down the north deeps for a distance, at present, of 2,000 feet, and down the south deeps for a length of 1,000 feet. Thence a pipe (4 inches in diameter) branches along the south levels for a distance of nearly 2,000 feet, and from this pipe, at various stations, there are branch pipes (2 inches in diameter) conveying the air into the working-rooms. At the bottom of the deep, there is a cylindrical air-receiver *E* (13 feet long and 2 feet in diameter) and at a point 1,000 feet down the deep, there is an air-receiver *B* (10 feet long and 4 feet in diameter). The air when delivered at the working-places is dry, a temperature of 48 degs. Fahr., and a pressure varying from 2 to 3 pounds less than that at the air-compressor.

Up to the present time, it has only been found necessary to work one air-compressor, the number of machines operating in the mine not exceeding twenty. The capacity of each air-compressor is estimated at nearly double this. In fact, a Stanley header, a longwall machine, a pump, and three or four boring-machines have already been worked at the same time as twenty coal-cutting machines, by one air-compressor.

A general idea of the plan of the mine, and the mode of producing the power required, is illustrated in Fig. 1 (see Plate).

*Description of Coal-seam.*—The mine is opened in the Phalen coal-seam, which is semi-bituminous, hard in the holing, with a quantity of iron pyrites running at the base of the seam. The thickness varies from 8 to 8½ feet, and the dip is uniformly 1 in 14.

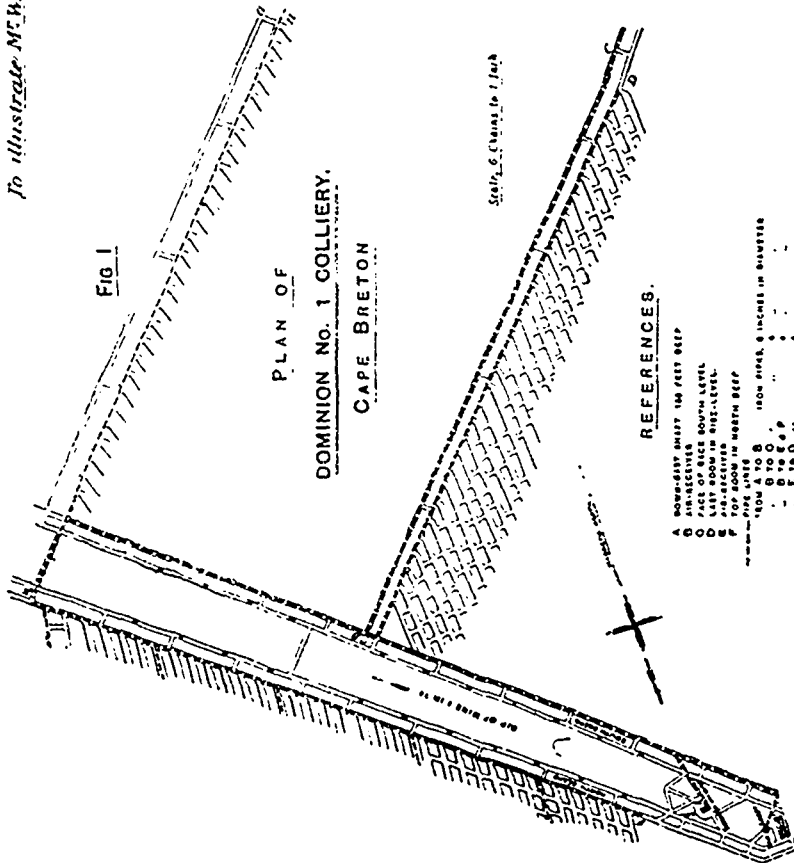
### STANLEY HEADER.

The Stanley heading-machine, being familiar to many of the members, will need little description.\* This machine was used in driving the main roads from the shaft on the south side. There were two machines, each with cylinders 8 inches in diameter by 6 inches stroke, and making 250 strokes per minute, under a working-pressure of 80 pounds to the square inch. The weight of each of these machines, without the conveyor, was 4,000 pounds. As the main haulage-roads from the shaft were driven on the full dip of the seam, considerable quantities of water had to be overcome, greatly impeding the work of the machines, and reducing the rate of progress very much below what it usually is upon a level. When working, it averaged about 15 feet per shift of eight hours. This progress, however, would have been much less but for the excellent addition recently made to the Stanley header, in the shape of a conveyor, which catches the coal at the face, elevates it to the tail-end of the machine, and that at sufficient height to dump it automatically into the tubs. Fig. 2 shows the machine and the conveyor. When the Stanley header turned off at 1,000 feet from the shaft to work upon the south level, the result was very different, an average length of about 20 feet per shift being made; and, as testing the utmost capacity of this machine, it may be interesting to know that a record run was made of 30½ feet in eight hours. The diameter of the bore was 6 feet, and three men were required in attendance, two at the face and one at the tail of the machine. The blast was made after every 2 feet of cut.

After two years' experience, and constant use of the Stanley heading-machine, the writer is of opinion that for rapid driving under favorable conditions, such as are found in a level seam of coal, and little or no water, nothing can compete with it. The speed which can be maintained is extraordinary, and the circular cut gives such a strong passage with the minimum of friction for the ventilating air-current. On the other hand, the weight of the machine makes it very expensive to move. The moment it ceases boring coal trouble begins, as it takes a large gang of workmen to dismantle and move it around. It also refuses to proceed

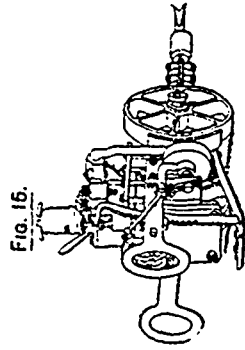
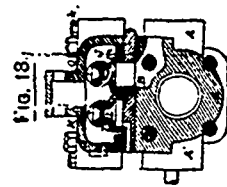
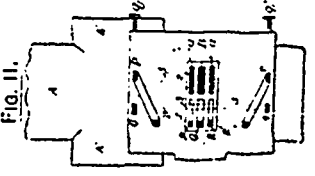
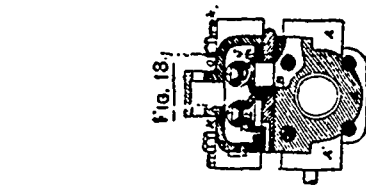
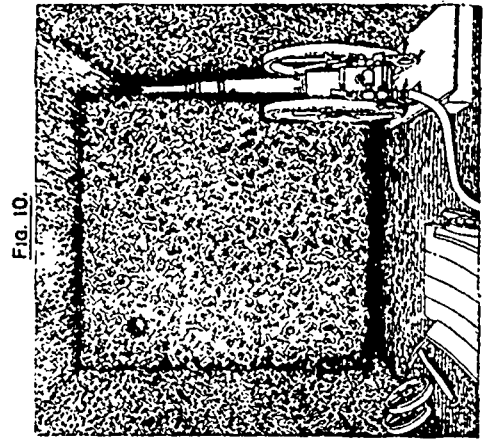
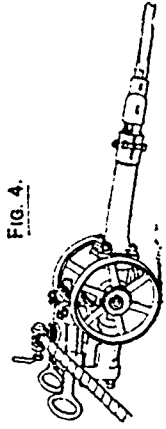
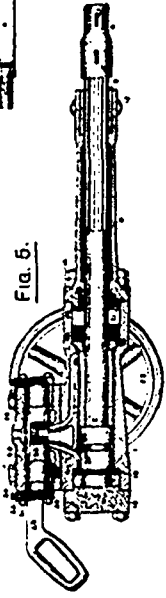
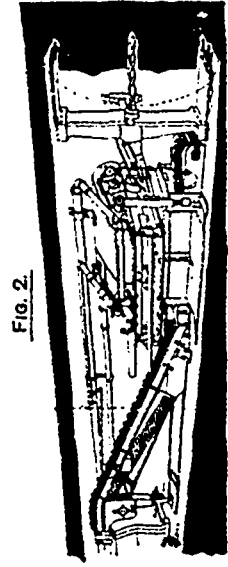
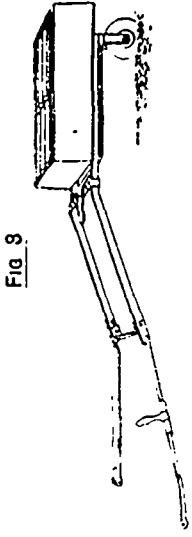
\*Trans. Fed. Inst.; vol. 1., page 124.

To illustrate Mr. W. Blakemore's Paper on Coal-cutting by Machinery.



REFERENCES.

- A DOWN-BEAM DRIVE 120 FEET DEEP
- B AIR-RECEIVER ROOM ON LEVEL
- C AIR-RECEIVER ROOM ON LEVEL
- D LAST ROOM IN BIRTH DEEP
- E AIR-RECEIVER ROOM ON LEVEL
- F AIR-RECEIVER ROOM IN BIRTH DEEP
- G TO G
- H TO H
- I TO I
- J TO J
- K TO K
- L TO L
- M TO M
- N TO N
- O TO O
- P TO P
- Q TO Q
- R TO R
- S TO S
- T TO T
- U TO U
- V TO V
- W TO W
- X TO X
- Y TO Y
- Z TO Z
- AA TO AA
- BB TO BB
- CC TO CC
- DD TO DD
- EE TO EE
- FF TO FF
- GG TO GG
- HH TO HH
- II TO II
- JJ TO JJ
- KK TO KK
- LL TO LL
- MM TO MM
- NN TO NN
- OO TO OO
- PP TO PP
- QQ TO QQ
- RR TO RR
- SS TO SS
- TT TO TT
- UU TO UU
- VV TO VV
- WW TO WW
- XX TO XX
- YY TO YY
- ZZ TO ZZ
- AAA TO AAA
- BBB TO BBB
- CCC TO CCC
- DDD TO DDD
- EEE TO EEE
- FFF TO FFF
- GGG TO GGG
- HHH TO HHH
- III TO III
- LLL TO LLL
- MMM TO MMM
- NNN TO NNN
- OOO TO OOO
- PPP TO PPP
- QQQ TO QQQ
- RRR TO RRR
- SSS TO SSS
- TTT TO TTT
- UUU TO UUU
- VVV TO VVV
- WWW TO WWW
- XXX TO XXX
- YYY TO YYY
- ZZZ TO ZZZ
- AAA TO AAA
- BBB TO BBB
- CCC TO CCC
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- EEE TO EEE
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Scale, 2 Feet to 1 Inch.

at the first sign of material stronger than the coal in which it is working. In such a case, and in the event of unevenness in the floor of the seam, there is no alternative but to draw it back, and cut through the difficulty by some other means.

It is necessary also that the coal-seam shall be thicker than the diameter of the cut; unless the roof or floor be softer than the coal, in which case, of course, part of the cut can be taken in that. This, however, means spoiling all the slack that is made in cutting. The last difficulty experienced with the Stanley header is not fairly chargeable to the machine, but is the result of other conditions, viz., that if a double haulage-road be required, say for the endless-rope system, or wide enough to pass-by, when the Stanley machine has finished its work, the initial stage only is completed, and the widening-off process has to be performed either by hand or by some other machine.

The writer is of opinion, from his own experience, having regard to the numerous delays resulting from the causes previously stated, that it is possible in any case where a double-road is required, to complete it as expeditiously and at less cost with one of the percussion-machines than by using the Stanley header in the first instance. There is also the further consideration that in no large mine would a circular road (6 feet in diameter) be sufficiently large for ventilating purposes, even into one principal district. At the Dominion No. 1 mine, it has been found necessary to enlarge the lower level, which was driven by the Stanley header of the size stated, and which is used solely for ventilating purposes.

#### MITCHELL LONGWALL MACHINE.

The Mitchell longwall machine has been recently invented, and the one used at the Dominion No. 1 mine is the first made. The writer considers it to be the best longwall machine yet invented, especially suitable for use in many British mines, and he will therefore give a somewhat detailed account of its construction. This machine is the joint production of an American engineer, Mr. J. L. Mitchell, and the Sullivan Machinery Company. Its weight is 4,000 pounds. It has two cylinders, each 6 inches in diameter, by 8 inches stroke, and the normal rate of working is 250 strokes per minute, with an air-pressure of 80 pounds to the square inch.

The machine propels itself along the face, making an undercut either in the coal or in the fireclay, or similar soft material underneath, by means of a projecting bar or arm, and a revolving chain, cutters being fixed in the links of the chain. The bar projects at right angles from the side of the machine, and may be regulated to any depth of cut from 3 to 6 feet, but the writer has found in practice that 5 feet is the maximum safe cut to make with the present machine. The vertical height of the cut is about 3½ inches, and this represents all the slack which is made in process of working.

The machine, although heavy, is not bulky, being compactly built. It will pass through an opening 30 inches high and 30 inches wide, but in a longwall face, where cogging is resorted to, it would be safe to reckon that it would work comfortably in a space 4 feet from the cog timber to the face of the coal. There is a novel steering device (Fig. 3) attached to the rear of the machine, which enables it to follow a face not perfectly straight in track, if required, as the machine is kept up to the face by means of a lever attached to the steering-gear.

The machine is mounted upon a shoe 2½ feet wide and 7 feet long. The feed-drum is 20 inches in diameter, and constructed to hold 200 feet of ½ inch wire-rope, which is attached to an anchor post set at such a distance in front as the rope will reach. The machine can be advanced the full length of the rope without stopping. It requires the services of two workmen, one in front to see that the rope winds regularly upon the drum, and to clean away any small coal that may have collected in advance of the cut. The foreman has charge of the machine, remaining at the rear so as to control the throttle and steering-gear lever, and at the same time he closely observes the running of the machine.

The engine is enclosed. The gearing runs in oil, so that there is very little danger of dust working into and cutting the movable parts. The power is transmitted through spur and bevel-gear wheels to the chain. A sprocket wheel located near to the shoe, maintained upon a vertical shaft, drives the cutter-chain. An idler-wheel is arranged with an oil receptacle in the hub to carry the chain around the end of the bar. The face of the bar is protected with hardened tool-steel. The chain links are made of malleable iron with steel links and rivets, each 1 inch

in diameter, so as to give strength and durability to the chain. The friction-clutch is arranged in the drum so that it can be thrown out of gear, and in order that any desired tension can be maintained.

The machine, of course, will cut in only one direction, and, unless it is possible to continue around the face in a circular route, it is necessary to haul it back to the starting point for the next cut. Although it will make itself an undercut, the writer does not consider it desirable to impose this strain upon the machine, as the resultant gain is very slight. It is better to cut the first opening by hand, and so insert the machine ready for its work.

The rate of progress is remarkable, the writer has repeatedly tested it, and finds that it will cut whilst in full work an average of 1 lineal foot per minute, but it is not desirable, nor indeed practicable, to keep it running under this strain, as at half the speed, or rather working half the time, it will undermine a sufficient quantity of coal to satisfy any reasonable requirements, and indeed as much as can be handled in any given district. If continued to run at top speed, the cutters become heated. The better plan is to let it run for ten or fifteen minutes, and then slow up. In this way, a uniform daily undercut has been maintained of about 200 lineal feet, 5 feet under, with the attendance previously specified.

As showing the utmost capacity of the machine, in one test run of eight hours, a cut was made of 300 lineal feet, 5 feet under; and with another machine of the same make, the cut was 500 lineal feet, 3 feet under, in each case, working out to 1,500 square feet in eight hours. But the former figure is as much as can be relied upon in ordinary working.

It will be seen from these remarks that the Mitchell longwall machine is speedy, efficient, and economical, where the conditions are favorable for its use. Of course the flatter the seam the better. At the same time there is no doubt that it will work well on a slant, where the inclination is not too great, as the shape of the cutter tends to hold the machine to the face, and this tendency can be further increased by the aid of side jacks.

Like every other machine, it has its disadvantages. Weight is one, but this, however, is not so great an obstacle as might be imagined, and certainly much less than in the case of the Stanley header, as the machine is more compact, and the bulk considerably less.

Like the Stanley and all other rotary machines, it objects to foreign metal in the strata, and in case it meets with a piece of rock or anything materially harder than the coal, the cutters are apt to break or to refuse to make any progress. The same difficulty occurs when the floor of the mine is uneven, but by examining the face in advance, and noting the approaching inequality in the floor, the longwall machine can be made to mount the shoe, and to elevate the cut so as to pass over the obstruction, if the latter be not too high. It, however, sometimes happens that it is preferable to draw out the machine, and to cut past the obstacle by hand-labor.

There is a further disadvantage which must inevitably arise with all machines that only cut a narrow groove in the coal: viz., the narrowness of the cut prevents the coal from falling sufficiently to break it when blasted. Of course this disadvantage depends to some extent upon the texture and thickness of the coal, and it has been found necessary in the case of the Phalen coal-seam to wedge a piece, varying from 9 to 12 inches, from the upper side of the groove before blasting. This allows the coal to fall and topple over sufficiently to break it ready for loading. However, when all the disadvantages are weighed, there is no doubt that the facility with which this machine can be taken along a narrow face, the ease with which it is operated, and the low cost of attending it, stamp it as the machine of the future in any longwall working properly designed for the admission of mining machinery.

#### INGERSOLL-SERGEANT MACHINE.

The writer will now describe a different type of machine, the percussive, a comparatively light, portable, and cheap machine, designed for room work, but, as circumstances have proved, equally applicable to narrow work or headings. Of this type, there are three varieties in use at the Dominion No. 1 mine, viz.: the G 4, improved Ingersoll-Sergeant, the Harrison, and the Yoch. The two former are so much alike (the only difference being in details of manufacture) that one description will answer for the two. The writer will therefore describe the Ingersoll-Sergeant machine, which came out at the head of the list in a severe test lasting a fortnight, conducted at the above mine in August, 1895.

Trans. Fed. Institute of Mining Engineers of Great Britain.

**CONCENTRATES.**

**ONTARIO.**

Continued from page 262.

At the Sawbill Lake Mine the shaft is down about 95 feet. Work of drifting on the vein in both directions from the shaft at the 69 foot level has commenced.

A correspondent writes. "The Canadian Gold Fields Company appears to have secured, or to have purchased the old Canada Consolidated mine at Marmora. They are putting up a large building about a quarter of a mile from the mine and are going to put in three Ball mills, one "Ascom," one "Niagara," and a third, kind unknown, having in all a capacity of 35 tons per day. They are also putting in leaching vats, the process is called the Sulaman Seed, and is a bromo-cyanide one. The old shaft of the consolidated is pumped out, and there is said to be a big showing of mispickel ore. Mining rights over 10,000 acres have been secured, and if the metallurgical process proves satisfactory a lively time may be expected at Marmora."

The Crystal Gold Mine at Lake Wahnapiatae will be equipped with a small stamp mill as soon as the winter roads are suitable for hauling in the machinery.

**Quebec.**

The mineral exports from the Port of Montreal as per customs manifests for this year to date include :

Asbestos, 2nd grade, 3,030 tons of a value of.....	\$229,671
Asbestos, 3rd grade, 694 tons of a value of.....	26,255
Mica, 21,755 lbs. of a value of.....	2,968
Phosphate, 278 tons of a value of.....	2,780
Nickel, 4,000 lbs. of a value of.....	650

Or of a declared value of..... \$262,574

The mineral exports from this Port of Sherbrooke for the eleven months ended 30th ulto, include :

Asbestos 1,647½ tons of a value of.....	\$74,975
Chromite 1,988 tons of a value of.....	22,841

The exports of Asbestos from the Port of Quebec for the same period amounted to 970 tons of a value of \$46,299.

A strong syndicate is being organized in Quebec to carry on a thorough and systematic development of the gold fields of the Eastern Townships.

Dr. James Reed did some work this year upon the old Harvey Hill Mine, and shipped a car load of ore therefrom to the works of the Orford Copper Company.

Mr John Blue of the Eustis Mining Co. has returned from a professional trip to Mexico.

The Mica business is and has been dull for several months. Some small shipments have been made to England. A revival of trade is looked for after the New Year.

Work is progressing on the following properties by the Dominion Mica Co. At the Phosphate King in Templeton, the Lake Girard Mine, which has again been pumped out; Chubbock Lot at Wilson's Corners. The Phosphate King and Lake Girard will likely be closed down by the end of this month.

The Blackburn Bros. continue to get a satisfactory output from their old mine in Templeton.

Lewis McLaurin is working with a small force of men in the same district.

The Vavasour Mine has been re-opened with a small gang of men, principally prospecting.

H. Baumgarten states he has purchased Judge Dugas' mine at Templeton, and has a force of 20 men working. The output is very good so far.

We understand that a strong effort is being made to establish a central office and selling agency for the various mica mines in the Ottawa district.

Such an agency would, in our opinion, be of great service, and a saving of money and office work to the miners. This would be the means of attracting buyers to the city, where they could see samples and be furnished with all the information as to the output of various mines, etc.

There is nothing worthy of mention to report from the Asbestos Mines. The Bell's Company, King Bros., Johnson's Company have each had a fairly good season, and the output has been large. A strong force is at work at Danville.

The exports of mica from the Ottawa Valley for eleven months, ended 30th ulto, reach 357,277 lbs. of a value of \$31,894. As we have pointed out before, this valuation is very much underestimated.

The Bristol Iron Mines, Pontiac County, operated under lease by Emis & Co. of Philadelphia, have recently resumed shipping, about 1,033 tons, having been exported to the United States. The ore is a superior magnetite.

There is some activity in the production of Feldspar, near Templeton Station, on the C. P. R. Something like 451 tons of a value of \$1,199.00 having been exported to the United States to date.

The exports of Graphite from the Ottawa district as per Customs returns were of a value of \$891.00.

There is some talk of the Walker Mining Co's graphite mill near Buckingham being thoroughly overhauled, and an experienced and capable engineer being placed in charge of the work. The Graphite is of a very superior quality, and its deposit extensive, but its management hitherto has not been good and a large sum of money has been dropped by its owners. In capable hands, there is no reason why this old property should not be made to pay.

**New Brunswick.**

There is not much of interest in mining matters in New Brunswick, but it looks as if there might be something accomplished next summer if all goes well and the attention of some of the capitalists who are now all taken up with Ontario and British Columbia schemes directed this way.

The developments of Mr. R. G. E. Leckie on the Mill Brook Mine, near Bathurst, in Gloucester county, seem fairly satisfactory. It is said the vein there is a large belt or body of pyrrhotite, carrying galena, zinc blende and gold. Tests made show from 10 and 12 ounces of silver and upwards per ton with gold values from \$2 to \$4 per ton. There is every chance that a little more development and placing of proper machinery to treat ore will result in a handsome paying mine in the district, and we trust the prediction may be fully realized.

Operations were suspended at the Point Wolfe Mines, in Albert county, on the Bay shore, for a time. Recently word was given out that a new and important find had been made rich in copper and gold and of large size. How correct this is I cannot say, but work of development is steadily going on and considerable territory has been taken up. It is stated the owners and promoters have spent fully \$10,000 in development. I will try and send you more full and correct accounts at a later date.

The chances are that if all goes right the Manganese Mine, on Judson mountain, may be sold to some Ontario capitalists at no distant day. Negotiations in that direction are now being carried on.

The sulphuret property in Albert county known as the Mineral Vale may be taken in hand by an English company in the near future, if the inquiries, tests, &c., now in train be considered satisfactory by the company's expert and agent. It is said that the property can be made to pay well if properly developed and the ore treated correctly. Further particulars later.

No word has been given to the public lately as to the exploiting of the company with headquarters at Woodstock, N. B., who for some time past have been testing for gold on the large reefs of quartz on the borders of Northumberland and Carleton counties. The inaccessibility of the district is against the work somewhat, but that will not count if the presence of gold in paying quantities can be established. This company controls a very large area.

It is said the existence of coal in paying quantities at a point known as "The Gorge," quite near Moncton, is believed to be correct. Messrs. J. and C. Harris, of Moncton, and other parties propose giving it a test, and a diamond drill may be put at work there very shortly. E. N.

Sharpe of Spring Hill mines is positive the coal exists there in good quantity. It is to be hoped that the matter will prove successful, as it would mean much for Moncton and New Brunswick generally.

H. H. Dewart, of Toronto, John T. Gilmour, Geo. Hugo Maurer, Alexander Dixon, of the same place, Wm. H. Boorne, of Vancouver, Hon. A. W. Atwater, of Montreal, and R. C. Tasker, of West Bay City, Michigan, are seeking incorporation under the New Brunswick Joint Stock Companies' Act as "The Smuggler Gold Mining and Milling Co." They ask for powers to acquire mineral lands in New Brunswick and Yale district, B. C.

The Elkin Coal Company, Ltd, has received a charter. Capital, \$10,000. The incorporators are: J. P. Illey, Philadelphia, C. E.; E. G. Evans, C. E., H. J. Fowler, T. A. Peters, Hampton, N. B.; J. Edward Elkin, of Coal Creek, N. B.

The Government of New Brunswick gives notice that a diamond mine to be purchased by it can be had by parties desirous of testing mineral properties in the province, the cost of transportation and conducting boring operations to be borne by the parties using the drill. It is understood the use of drill is free to responsible persons making application for same.

NEW BRUNSWICK, Dec. 15th, 1896.

#### QUARTZ.

### Nova Scotia.

From our own correspondents.

At Sydney Mines and the Dominion Coal Co. shipments for the month of December are keeping up wonderfully and are likely to exceed the estimated quantity, in fact it will not be surprising if the tonnage this month establishes a record. Up to date returns justify the expectation that little short of 80,000 tons will be shipped before the end of the year. It is very gratifying to see promise of the early season sustained, and especially to hear that the prospects for 1897 are good.

Considerable excitement has been occasioned in Cape Breton by the result of recent explorations in the backlands between Cow Bay and Cochrane's Lake, where an excellent seam of coal, 6 feet thick, has been proved, and in the judgment of experts is likely to be the Mullen's seam. If on further investigation this is found to be correct, it will establish a connection between all the coal areas of the Eastern coal field, and will double the land area of workable coal. This seam underlies the whole of the Dominion Coal Company's property. Mr. Hugh Fletcher, the well known geologist, is down in Cape Breton inspecting the trial pits and boreholes which have revealed this seam.

A few months ago it was rumored that a company had been formed for exploiting the Tracey seam at False Bay Beach and some semblance of truth was imparted to the statement by the presence of a mining man from the States, who was very busily enquiring for coal areas in that district, and in one instance at least it was reported that he had actually acquired an important property. Nothing, however, has been heard of the matter this fall, and the popular impression is that John has gone to the land of U. Z., or as some will have it "Hussey." No doubt his services as well as all the capital he can command would be welcome at Broad Cove, where development has not been very rapid this year.

We hear that the mines which have been operated by Mr. John Greener, near North Sydney, for the past two years have been acquired by a company who were to erect a good shipping pier and to push a larger tonnage of coal into the market in 1897.

While the Dominion Coal Company is rapidly extending the use of coal cutting machinery, it seems that other firms are not finding it so satisfactory, and Messrs. Burchell Bros., who have had several machines at work in their 4 ft. seam at Kelly's Cove, are abandoning their use after the present season.

The main deeps, which have been driven to prove the existence and probable extent of a submarine area of the Hub seam, have reached the coast line. A uniform degree of inclination has been maintained about 5°, and the conditions are such that there is now no doubt as to the fact of a large workable area of this valuable coal. As the land area is nearly exhausted, the company are to be heartily congratulated since this seam is likely to be in special demand for their Halifax and Boston gas trade.

"It is an ill wind that blows nobody good," and while the miners of Cow Bay have been experiencing hard times for the last two years in consequence of the falling off in the demand for Gowrie coal, they have been deriving considerable benefit this summer and fall from the work done in connection with the erection of a large coal-washing plant near

Morrison Lake. As many as 200 men have been employed at one time, and the work has extended over six months. It is now approaching completion, and Dr. Slocum expects to have it in operation by the end of the year. If successful in cleaning Gowrie Slack from impurities, it is likely that the demand for gas and coking fuel from this mine will increase, and that next season will be the best since 1894.

After lying idle for more than a month on account of the breakdown of the pumping appliances and the temporary flooding of the mine, Victoria has re-started under better auspices than at any time in her career. New boilers, a large steam-range, and a new pump, all of them now working well, should give this mine a good chance to redeem the unfortunate and unprofitable past.

In the Boston office of the Dominion Coal Company to-day reposes a small wooden box, which bears a direct relationship to the success of an enterprise that will eventually involve some millions of dollars. It contains nothing less than a consignment of the first drawing of coke from the new Whitney ovens at Halifax, N. S., and the product was made during the recent visit to the plant of President Henry M. Whitney himself. This batch of coke is by no means a "sample" lot, for it was hastily manufactured from some unwashed slack coal that happened to be at hand when the fires were first started, and, therefore, contains most of the original impurities. Since its presence at the local office was known, there has been quite a pilgrimage thither of State street people interested in Mr. Whitney's pipe line scheme, and Treasurer Tudor has been kept busy handing out "souvenir" lumps of the coke.

Never probably since the early days of gold mining in this province, has there been a greater feeling of confidence than there is just at the present time. To our certain knowledge there are several people, representing capital investigating gold mining propositions in Nova Scotia and we are pleased to say that some of these propositions consist of the large low grade belts which we have always contended will be the future stable gold mining industry of the province. These properties, when formerly worked, were worked in small lots of ground by people with small capital and oftentimes still smaller knowledge of mining; the natural consequence was, that when the oxidized portions of these leads were worked away a more refractory ore was met with which refused to be reduced by the methods in vogue, and the people with small amount of knowledge came to the conclusion that gold was no longer in these veins in sufficient paying quantities, and so the mines were abandoned, to be afterwards consolidated by people who knew their worth, but unfortunately did not possess the means to work them on a scale which they knew was necessary for successful operations. To convince capitalists (who for the most part are not mining men) of these facts is perhaps one of the hardest things imaginable, and but for the dogged perseverance of some few people, who working against large odds, have by pluck and perseverance made many of the old abandoned mines pay, and thus restored the feeling of confidence in the industry which prevails to-day. The people who are now investigating Nova Scotian properties, differ considerably from the early investors, who were willing to buy a hole in the ground without attempting to trace the vein or have tests of its value estimated. The modern investor wants the property properly examined by an expert, and this has often to be followed by a working bond, so that the chances are now greatly in favor of building up a staple and lasting industry. Of course, so long as the world lasts, there will be wild cat schemes in mining, and to our certain knowledge one is at the present time being floated or rather trying to be floated in Montreal. It is a consolidation of Nova Scotian properties, and on the Directorate are the names of people who we are morally certain if they knew the nature of the proposition, would rapidly have their names removed.

Cheticamp is still the ruling passion in Nova Scotia and several hundreds of areas have been taken up since our last issue. We have seen some of the pannings, and there is no doubt that the fascinating yellow metal is there; as to the quantity per cubic yard no estimations have to our knowledge as yet been made with any degree of accuracy. That Cheticamp has been a bonanza to the Mines Department, there can be no doubt, and we sincerely hope the investor may also reap the harvest.

Speaking of the Mines Department, is it not time that our government did something to encourage metalliferous mining. The governments of every other province in the Dominion are offering substantial inducements for the encouragement of metalliferous mining, while our government pockets royalties and rentals and offers nothing in exchange. That this is to a great extent the miner's own fault, we will readily admit, for we feel sure if some propositions were put before the government from the mining men, they would be willing to move and do something for the encouragement of which should be second only to coal mining in this province. Major Leckie, the president of the Mining Society of Nova Scotia, will have some very valuable suggestions to offer in his address to that society at its coming meeting, and these suggestions coming from a man of Major Leckie's knowledge of the needs of an undeveloped country, will, we are sure carry the greatest possible weight with the local government.

The sad delusion that Nova Scotia has nothing but free milling gold has done much to hinder the advance of the industry. Had we been a

convert to that theory, our ideas would have been badly shattered during the last few weeks. We have recently had the opportunity of seeing samples of ore containing good paying gold so locked up in the ores of the baser metals that in some cases they form nothing but a smelting proposition. Nor are these ores only to be found located in one spot, but they may be found right through the province and the prospector seeks some aid to assist him in detecting their value.

We are pleased to be able to state that one more mine owner has come to the conclusion that the stamp mill is not able to save all his gold. Mr. Clarence H. Dimock is the latest convert, and he is putting in three Frae vanners in the Northup mine, together with mechanical sizers.

The Richardson Mine has struck better ore again, and the returns for last month were over 300 ounces. This mine, under the management of Mr. C. F. Andrews, has done much to prove the value of our low grade ores. Mr. Andrews has successfully demonstrated that anything over a \$2 can be worked at a profit, provided the ore is in sufficient quantity. The expenses of mining and milling the ore (by steam power) were only \$1.05 per ton, and it is beyond question that this could be considerably reduced by the addition of extra stamping capacity.

The returns from the North Brookfield mine have shown a falling off of late, but we would draw our readers' attention to the fact that the management have been concentrating their attention on the erection of an extensive new plant, and when complete it is probable that the returns will be larger than ever.

A find of fabulously rich ore has been made by Mr. Archibald at Uniacke; the ore is of a heavy nuggety nature, and in some of the specimens Mr. Archibald brought to the city it was a little difficult to know whether the gold or the quartz predominated.

We had a call from Mr. Oxley, the first finder of gold in Newfoundland, who brought a number of very handsome specimens with him. The ore differs totally from the majority of our Nova Scotian ore, being a white quartz, carrying considerable quantities of galena and copper pyrites and is essentially a smelting proposition. A curious feature is that the country rock at a considerable distance from the vein carries gold. One sample assayed by Johnstone & Matthey of London gave 8 dwt 12 grains per ton, while another sample assayed by Mason of Halifax gave 6 dwt 12 grains; the former being on the long ton, and the latter on the short one.

Further attempts are to be made in the near future to locate the break in the celebrated Plough lead at Wine Harbour.

We hear with pleasure that the old Napier property at Wine Harbour is to be reopened under competent management.

The Brookfield Mining Associates are seeking incorporation.

We understand that the American Syndicate who took an option on the property adjoining the Libbey property at North Brookfield are behind in their payments and may have to forfeit the property.

Development work is still being vigorously carried on at the properties owned by the Golden Group Co. at Montague.

There has been a considerable run on areas in Lunenburg Co. during the last month.

Two more companies have started operations in Goldenville. The success of the New Glasgow Co., is likely to restart a good deal of work in that district.

The Dufferin Mine at Salmon River is being pumped out, and active mining operations will soon be started there.

The Tudor Gold Mining Co. at Waverley has resumed operations.

Mr. Graham Fraser, is developing some iron ore properties at Indian River, Cape Breton. The ore will be used at the Ferrona Works.

The first crushing at Beaver Dam under the new syndicate is to take place on the 20th, and the result is looked forward to with considerable interest.

## Mining and Smelting in Nelson, B. C.

The winter season, with its usual accompaniment of snow, has come upon West Kootenay a little earlier than usual, and, in consequence, the prospectors are compelled to leave the hills (which have had their white mantle on for some weeks) and take up their winter's quarters in the town till next year's Spring shall enable them to again visit their claims and seek, let us hope successfully, for more.

Much work has been done during the past season; many small prospects have been developed sufficiently to prove that already the vein is likely to be permanent in character and valuable commercially, while innumerable other locations have been made about which neither the locator nor anyone else knows anything.

It is perhaps rather a harsh statement to make, but it is the fact that many of those who have been prospecting for years are still so unacquainted with common minerals that they consider a slight stain of iron (and much more so of copper) sufficient grounds for staking out 1,500 feet square and calling it a mine.

There would not be very much harm in this proceeding perhaps, as the country is big enough for many thousand more such claims, only with the rather too fanciful ideas held by the locators, they refuse to part with their prospects (on which even the assessment has not often been done) to those who would purchase at a fair value, excepting at an utterly absurd figure. This of course hurts not only themselves individually but does not help the country on at all, as it deters capitalists from entering into the field.

An instance occurs to the writer's memory which took place no later than last summer. A prospector had brought some uncommonly nice copper ore to town, which assayed very well. Some gentlemen who were disposed to make a deal with him went and saw the claim and found it nearly inaccessible, and a little doubtful as to continuity. However, being willing to take chances, they offered to bond the claim for over ten thousand dollars. Possibly \$200 worth of work had been done. Their offer was scornfully rejected, as was also one from another party who offered to do such tunnelling and other work as would prove whether it was a continuous ledge or not, and put into shape for shipping ore, if possible, for a quarter interest. No one, a free miner less than all, begrudges the prospector every cent he can make for he certainly earns it, but at the same time a small copper-stained piece of diorite is not a copper mine, nor is a brown iron-stained quartz always a gold mine, and it is unreasonable to suppose that capitalists do not want a better proof than such indications of the return they are likely to get from their investments. Let us hope that wiser counsels will prevail in the near future to the joint benefit of the "hardy prospector" and of the province.

As regards Nelson district itself very few mines have shipped ore this last summer, and very few will be doing any work this winter, except a little tunnelling or other development work.

The Silver King, on Toad Mountain, is of course *facile princeps*, both on account of its extent and the quality of the ore produced. At present the mine is sending 120 to 150 tons daily to the smelter (also belonging to the Hall Mines Co.), and this quantity will be more than doubled when the new machinery installed this fall is in full working order. The value of the Diamond Drill has been conclusively shown at this mine, and by its aid the management are in possession of sure information as to the locality and, to a great extent, the quality of their ore body. Acting on the information so obtained, they have wisely driven a long tunnel at a much lower point on the mountain side to tap one of the large bodies of rich ore whose existence was proved by the Diamond Drill. This course will obviate the expense of sinking to the ore from the old main tunnel and raising the ore to the higher level for the purpose of delivering it again to the ore bins at the lower level, from whence the Hallidie ropeway conveys it to the smelter.

Next in order to the Silver King probably the Poorman mine will rank, on account of the valuable product—gold-yielded. The gold is partly free milling and partly in combination with iron pyrites; there is a complete outfit of stamps, vanners, &c., and the mine can be worked all the year round. There are one or two other reputed gold mines in the immediate vicinity of Nelson. The Fern mine and the Athabasca group may be mentioned, on both of which properties it is intended to carry on development work during the winter.

Some very good samples of ore were exhibited last fall said to have come from Sproule creek and from Kokanee or Yuill creek, but those claims will have to wait till next summer before much is done to develop the properties recorded, and the same can be said of many other projects from which locators brought in samples.

The increase in the size of the Hall Mines smelter at Nelson, so as to enable the company to treat other ores than their own in large and regular quantities, will be a great help to small claims in the neighbourhood, as a few tons can be packed down or conveyed by water at a small preliminary expense, and the profits derived from each shipment will not only pay the cost of further work but we hope will also leave a decent margin for the struggling mineowner.

A very curious idea is extremely prevalent among those who send sample lots—5 or 10 tons or more—of ore to a smelter, the idea being that the ore in question is smelted by itself in a clean (presumably) furnace, and that the money paid for the ore is what the smelted product actually realized in the market. The fact is that every parcel of ore offered to a smelter is carefully sampled there and a very large proportion taken and passed through the rolls or other crushing apparatus. This large proportion is then spread on the sampling floor and most thoroughly mixed together by men trained to their work, and probably one-half then taken and further crushed—this operation being regularly repeated, dividing and further crushing—till a sample of a few pounds

weight remains. This is then crushed finer, and after again being thoroughly mixed is divided, and perhaps a pound or two ground extremely fine; and this is the sample of the whole carload, or of the quantity originally delivered, whatever the amount was. This fine sample is then assayed; and from the assayer's results on this sample the whole shipment is paid for; hence the imperative necessity for careful, skilled sampling and for still more careful and skilled assaying.

When this last operation is concluded, no matter with how much care and ability it has been conducted, there is usually a most emphatic kick from the mineowner: "It never ran so low as that," or "Mr. so-and-so gave me \$50 in gold and you find only a trace," or "There must be a mistake and it must be resampled," &c., &c., all of which is very cheering to the painstaking assayer. The reason is that mineowners persist in cheating themselves by picking good specimens and giving these to the assayer; then, when the shipment comes out much lower, they are disappointed at the result, though no system of sampling at the mine can be so accurate as that employed by the sampling works, which possess every facility for the work, and where men specially trained to the work conduct every step of the operation.

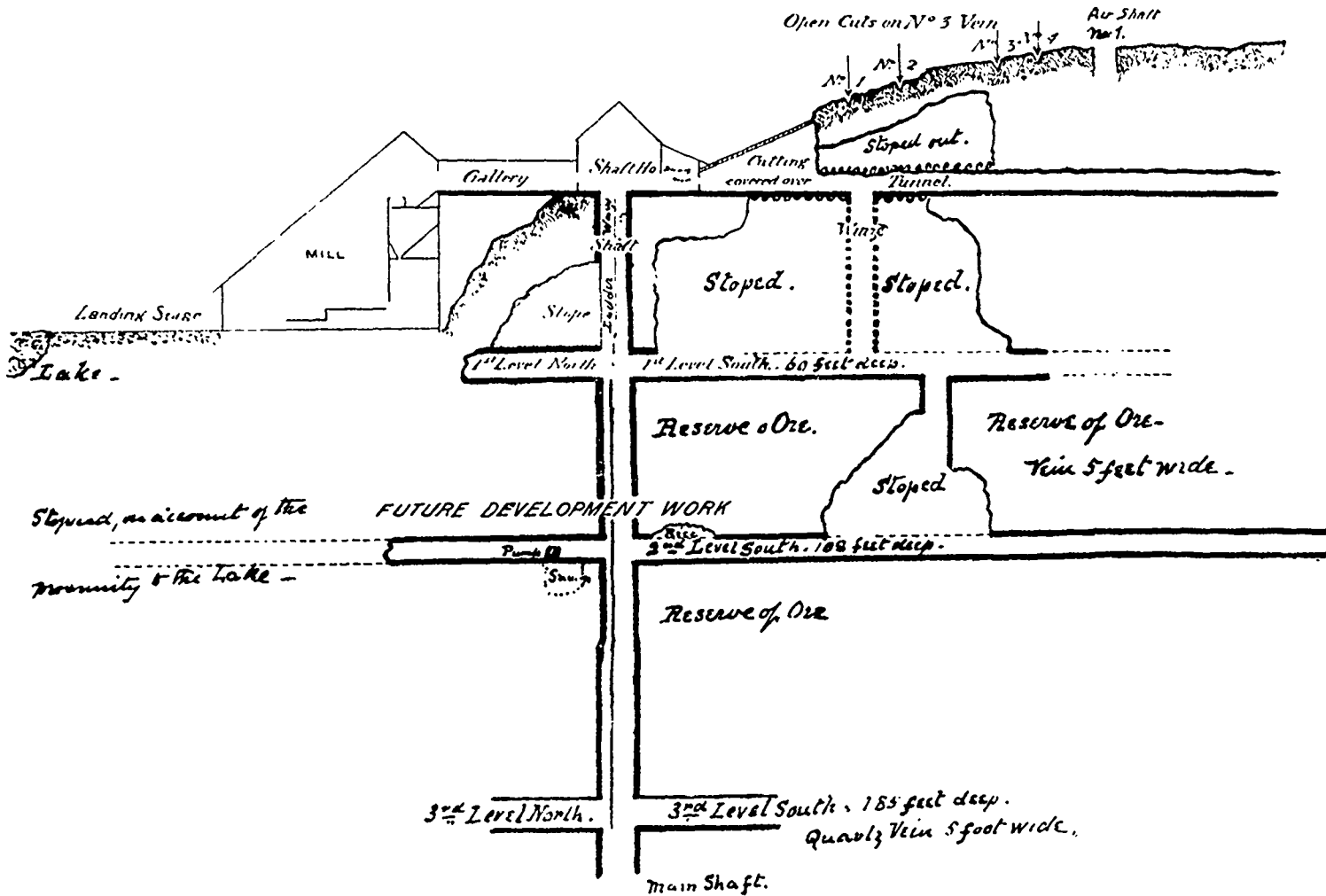
In conclusion, we can look back with satisfaction on the work connected with mining and smelting that has been accomplished even in this district during the past year, and we have also every reason to look forward with every feeling of confidence to the coming year, when at least some of our long deferred hopes seem in a very fair way to be

realized. British Columbia has been too long forgotten and neglected and the same may be said of many other districts removed from so far as the east is from the west; but now all seems to point most abundantly to an era in the mining industry in our wide Dominion which will astonish the remainder of the world by the exhibition of our hitherto unexampled riches.

A. H. HODGKIN.

NEWSON, B. C., December 12th, 1896.

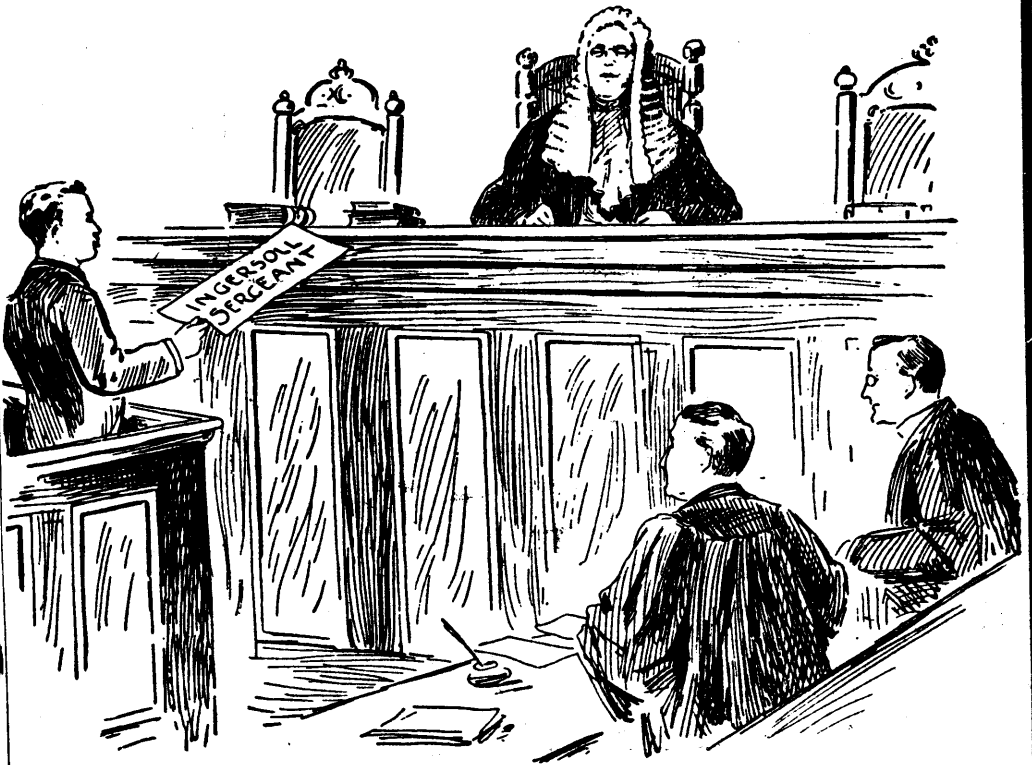
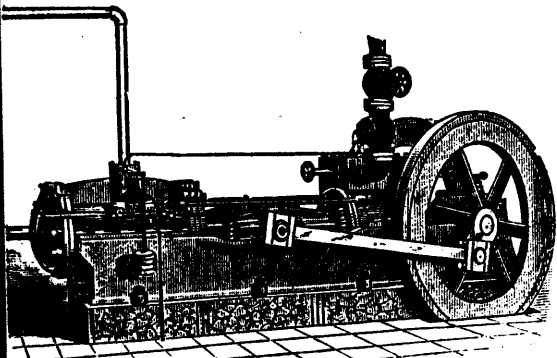
**The largest Air Compressor in Canada:** The Canadian Rand Drill Co., have recently shipped to the Le Roi Mining Co., at Le Roi, B.C., the largest air compressor which has ever been built in Canada. The engines of this compressor are of the Corliss type, made compound condensing. The two steam cylinders are 22" and 40" in diameter, by 36" stroke, while the two air cylinders are 22" and 31" diameter crank shaft, which drives the machine is 12" diameter; the fly wheel is 40" in diameter by 40" face. It took six flat cars to tranship this compressor, and it went forward in one solid train over the Northern Pacific road. This is the third air compressor of the Rand make that the Le Roi Mine is running. The capacity of the big machine is forty drills; mine at present is running about twenty-eight, all of the Rand Giant type.



Regina Gold Mine (Lake of the Woods). Underground workings at 30th November.



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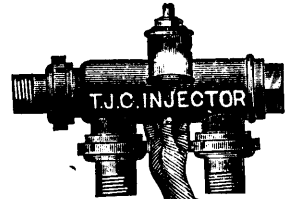
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(b) *The Removal of the Duty on Explosives.*

*Resolution by Mr. J. Burley Smith, Rat Portage.*

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For further information see the calendar of Queen's University for 1894-95, p. 117.

4. *Prospector's Course.*

The School offers to Mine Foremen, Assayers, Prospectors and Mining Men generally, Special Courses of Instruction beginning January 8th, 1896, and continuing eight weeks.

5. *Extramural Classes for Prospectors and Mining Men.*

Lecturers will be sent to Mining Centres to conduct Classes in Elementary Chemistry, Mineralogy and Geology as applied to the discovery and winning of valuable minerals.

The School is provided with well equipped Laboratories for the study of Chemical Analysis, Assaying Blowpiping, Mineralogy, Petrography and Drawing. In the Mining Laboratory recently built the operations of Crushing, Amalgamating, Concentrating, etc., can be studied on a large scale.

The BRUCE CARRUTHERS SCHOLARSHIP (value \$200 per annum) will be awarded in May. Its object is to aid one who has had some experience in amalgamating, etc., in acquiring a good education in Mining Engineering. The conditions of the award will be made known on application to the Director or the Bursar.

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

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

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

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

### MINES OTHER THAN GOLD AND SILVER.

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

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

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

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

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

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

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

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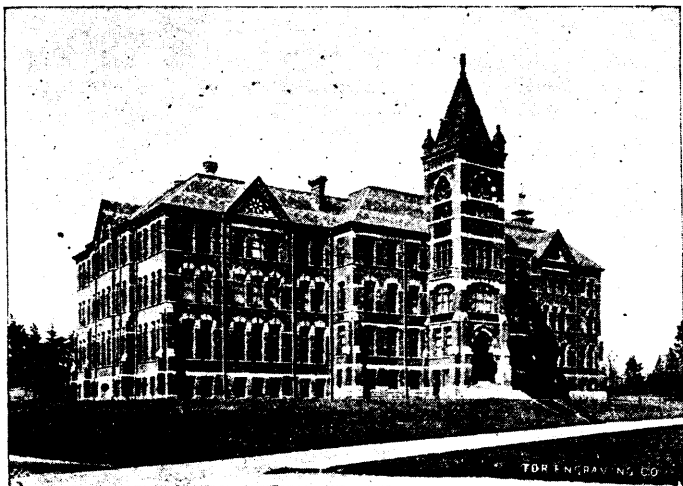
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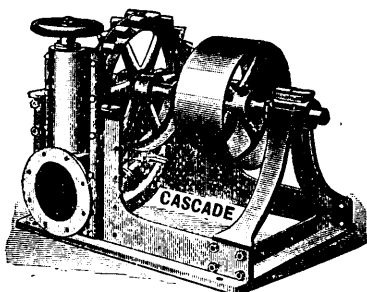
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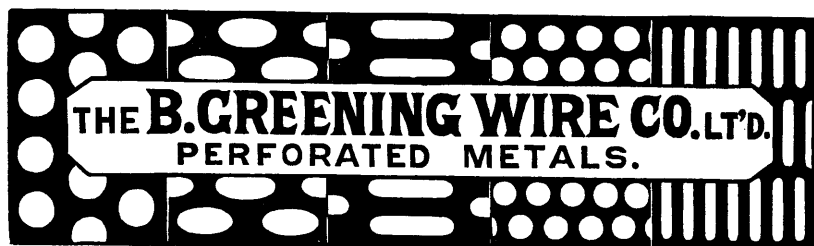
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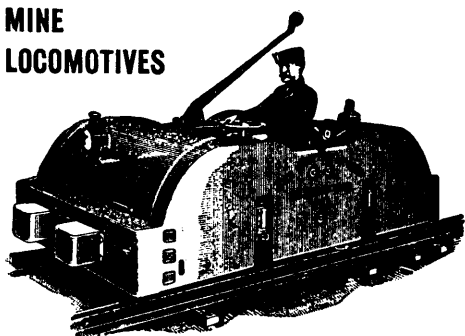
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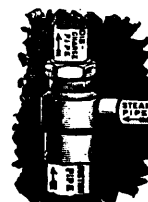
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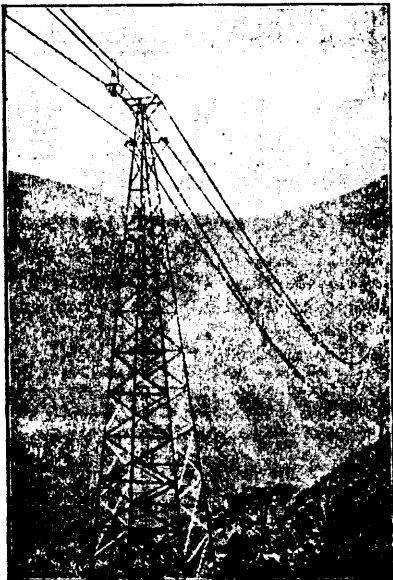
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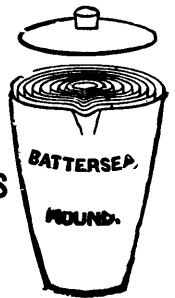
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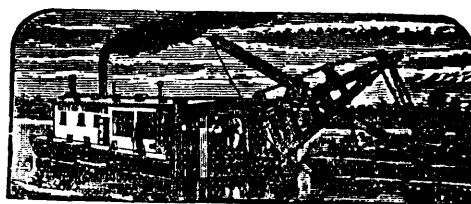
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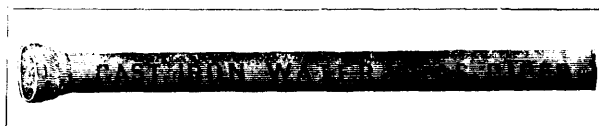
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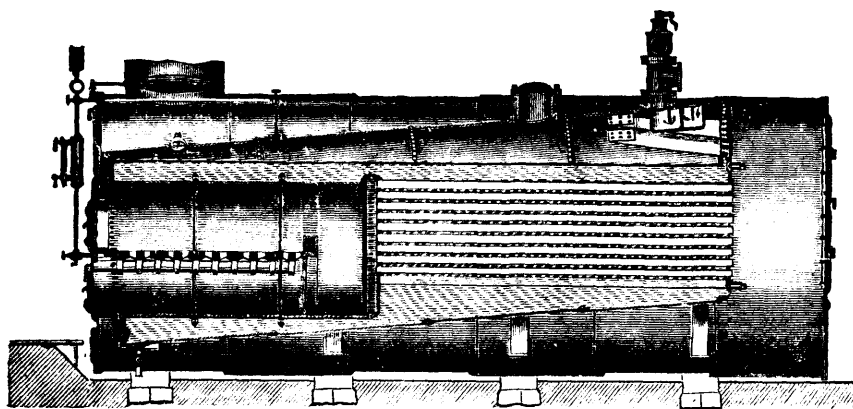


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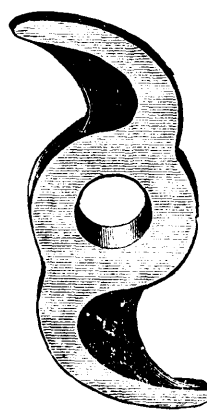
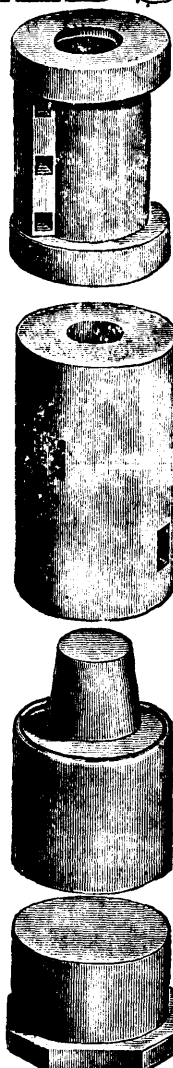
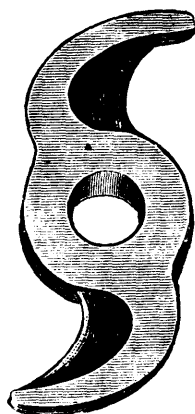
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