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# MINING RECORD

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## BRITISH COLUMBIA MINING RECORD

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## EDITORIAL NOTES.

Imports of lead into the United States from Canada in February of this year were 2,686 tons, against 383 tons in 1903.

In its Mining Stock Report of 6th inst. the New York *Engineering and Mining Journal* stated that British Columbia Copper Co.'s shares "showed expansion, selling at \$7.55 @ \$8," and that Granby Co.'s stock "came forward at \$5.875 @ \$6.125."

The first steam shovel for use in Atlin camp has been purchased and is to be forwarded at once, so that advantage may be taken of as much of the ensuing season as shall be practicable. Negotiations for another of these useful machines, for use in the same camp, are reported to be proceeding in San Francisco.

An amendment to the County Courts Act has been passed providing that all mining cases may be tried in the County Court, thus affording a less costly method of procedure than in the Supreme Court. Dr. Young, who introduced this amendment, described it as the most important piece of legislation he had been able to bring about since his election.

According to statistics compiled by the Phoenix *Pioneer*, Boundary mines produced nearly 231,000 tons of ore during the first quarter of 1905. Of this quantity 139,000 tons were from the Granby Co.'s mines, about 43,000 tons from the the B. C. Copper Co.'s properties, 47,000 tons from the Montreal and Boston Co.'s mines, 1,000 tons from the Oro Denoro, and nearly 1,000 tons from the small high-grade properties about Greenwood.

The Waihi, New Zealand, correspondent of the London *Mining Journal* says that in the Waihi district "the dredging industry continues to yield a large amount of gold, and in quite a number of instances sound dividends are paid to shareholders. To carry on dredging operations successfully, the work is best done by small companies, who manage much more economically than if the company's operations were in the hands of a large staff as a management. The whole secret of making anything pay, especially mining, is that there should be no drones, but all workers."

In the Transvaal, South Africa, the committee of Rand consulting engineers, to whom the subject of the standardisation of mining machinery was referred, has appointed various sub-committees to consider the different classes of machinery and plant which can with advantage be standardised. In this direction it is believed many economies can be effected. Both the local government and chamber of mines are interesting themselves in the subject.

The unique gold-saving machine, invented and patented in New Zealand, described and illustrated in this month's *MINING RECORD*, will, doubtless, interest many of our readers either resident in one or other of the placer gold regions of the province, or in any way concerned in the recovery of alluvial gold. It is always well to know what other people are doing, particularly those possessed of originality that enables them to find success in a departure from ordinary methods.

Advices received from Midway, in the Boundary district, are in effect that three sites suitable for the erection and operation of smelting works, immediately contiguous to that town, are under option to representatives of well known mining and smelting companies. It is stated that one of the officials of the British Columbia Copper Co. is now in Montreal with the object of making an arrangement with the Midway Co., which has its head office there. This statement has not been confirmed by any one connected with the B. C. Copper Co., yet it is known that it is quite likely to prove correct.

It is stated that the long-standing litigation between the War Eagle and Centre Star mining companies, as plaintiffs, and the Rossland Miners' Union and Western Federation of Miners, as defendants, has been amicably settled, the plaintiffs agreeing to forego their right to enforce their claims for damages and costs, \$30,000 given in their favour by the Supreme Court of British Columbia, and accepting \$1,000 in full of all claims. While the action of the defendants in compelling the plaintiffs' employees to join in a sympathetic strike, thereby closing down the latter's mines and occasioning much loss, was illegal and the penalty it brought was justly inflicted, the magnanimity now displayed by the management of the plaintiff companies should have the effect of promoting harmony between employers and employed, to their eventual mutual benefit.

From Nelson comes information to the effect that it is the intention of the Flathead Valley Oil Lands Development Company, a British Columbian organization with which Victorian and Nelson people are prominently associated, will next month commence drilling for oil on its property in the Flathead section of South-east Kootenay. It is stated the company is making provision for a preliminary expenditure of about \$20,000, this to include the purchase, transportation and installation of the requisite drilling plant, and the sinking of three wells. It is expected that

oil will be met with at between 1,100 and 1,500 ft. depth.

A press despatch from Greenwood, in the Boundary district, gives Mr. H. T. Pemberton, manager of the Montreal & Boston Consolidated Mining & Smelting Company, as authority for the announcement that it has been definitely decided to double the capacity of the company's smelter at Boundary Falls, by the erection of two more blast furnaces, thus bringing the treatment capacity of the works up to between 1,200 and 1,500 tons per diem; also to put in a converter plant, large enough to convert into blister copper all the matte made at these works. The more extensive equipment and development of the company's Rawhide mine is also to be undertaken.

Several American capitalists interested in the Britannia mines, at Howe sound, lately paid a visit to that property and to the smelter at Crofton, Vancouver Island. This visit has since been stated to have resulted in the smelting company obtaining a contract for the treatment of all the Britannia ore. One important effect of this will probably be the continuous operation of the Crofton smelter from June 1, next, which will benefit the commercial interests of our coast cities. The installation of an aerial tramway, concentrator, and other equipment for the Britannia mines is well forward, so that it is probable all will be in readiness for the shipment of ore on a comparatively large scale late in the spring or early in the ensuing summer.

The basis on which *The Northern Mines, Ltd.*, was organized in Vancouver last month and incorporated calls for commendation. The authorized capital is limited to \$50,000 and there are no promoters' or vendors' profits to be paid, or preferential shares allotted. Half the capital stock is being offered for subscription, the remainder being held for the benefit of the company in the event of its sale later being found advisable. Modern methods are to be adopted in working ground, on Spruce creek, Atlin, that has been proved by individual miners with only limited appliances to be workable at a profit. Some particulars of this promising venture are printed elsewhere in this number of the *MINING RECORD*.

The Hon. R. J. Seddon, Premier of New Zealand, has made an important announcement with regard to the new goldfields policy of the government. It appears that the services of a Canadian geologist have been secured with the object of conducting geological surveys in the mining districts. It will be the duty of this official to also indicate where shafts or tunnels should be sunk or driven in mineral ranges. It is impossible for local companies or individuals to spend the necessary money in prospecting work, and so the New Zealand government, taking a leaf out of the book of the West Australian government, will carry out this work. Mr. Seddon himself is of opinion that the results will justify the expenditure. What a sur-

prise it would be to prospectors and small companies were a similar announcement to be made in British Columbia.

The Canadian Pacific Railway Company is experimenting with hard coal from its Bankhead colliery, near Banff, in one of its passenger locomotives running between Laggan and Canmore, Alberta, on its transcontinental line. Such advantages as comparative freedom from dust, cinders and smoke, which blacken the cars and sometimes cause passengers inconvenience and annoyance, are claimed, while a maximum of heat is obtained from this class of fuel. If it be found that greater economy is to be secured by the substitution of hard coal for the soft coal now in general use, the fire-boxes of many of the locomotives employed on the Albertan and British Columbian sections of the railway will, notwithstanding the large expense involved, be changed to meet the requirements of the more desirable class of fuel.

Last month some of the newspapers of the upper country published a forecast of what was represented as being impending trouble between the Crow's Nest Pass Coal Company and its employees. It was stated that the agreement between the company and the men in its employ would expire on April 1, inst., and that there would then be trouble for the company. As a matter of fact, the company's contract with its men was for three years from April 1, 1903, unless either party to that contract gave sixty days' notice on or before April 1, 1905, of intention to terminate it. No such notice was given by either party, so the contract stands. The recklessness of some newspapers in giving publicity to yarns made out of whole cloth is much to be deplored.

What is claimed to be the record for windlass hoisting in the Klondike, and probably in the world, was recently made on Gavin Gulch, near Grand Forks. In the presence of 15 other miners, who appointed judges and a timekeeper, Chas. Cook, a man weighing about 140 lb., is stated to have made good his boast that he could raise from a shaft on Gavin Gulch 50 buckets in an hour, which work ordinarily takes from three hours and a half to half a day. In an hour, less 15 seconds, Cook had hoisted 55 buckets of dirt, dragged the buckets to the edge of the dump, emptied them and returned them to the bottom of the shaft. Unfortunately, neither the depth of the shaft nor the size of the bucket used, was given in the account published in one of the Dawson papers, but the test of strength and endurance was stated to have been thoroughly genuine and well-authenticated.

Another of the fairy tales that periodically demonstrate the liveliness of imagination of a certain class of newspaper men in Vancouver was sent out from that city a week or two ago. In February we called attention to some ridiculously incorrect statements, also from Vancouver, relative to the value of the ore produced daily by the Iron Mask mine, at Kamloops,

and the Nickel Plate mine, Similkameen, respectively. The latest little fiction given publicity is thus dealt with by the *Ashcroft Journal*: "The Vancouver . . . of a few days ago came out with the startling announcement that Mr. Stuart Henderson had sold the B. C. Development properties to an English syndicate for \$1,000,000. This is part of the property together with the Maggie claim which was bonded to Mr. M. K. Rodgers for \$160,000—just \$840,000 less than \$1,000,000. Try again, friend . . ."

The known occurrence of platinum in several districts in British Columbia gives an especial interest to the information published by the United States Geological Survey and re-printed on another page, concerning the search for this metal. Last November the *MINING RECORD* printed an article on *The Occurrence of Platinum*, which quoted from published observations of Professor R. W. Brock, of the Geological Survey of Canada, and Professor James F. Kemp, of Columbia University, New York, both gentlemen having given close attention to occurrences of platinum in this province. It is to be hoped that renewed efforts will be made to recover this metal wherever it is known to occur in paying quantities in British Columbia, the demand for it being constant and increasing, especially since the Russian sources of supply have largely been unfavourably affected by the condition and fortunes of the Russian Empire.

A deputation, consisting of Mr. W. A. Galliher, M. P., Mr. J. L. Retallack (representing the Associated Silver Lead Mines, British Columbia), and Mr. Cornish (representing the Carter Lead Corroding Works), last month waited on the Hon. W. S. Fielding, Dominion Minister of Finance, and asked that the duty on corroded or white lead be increased to 30 per cent. It was pointed out that while the present duty on pig lead is 35 per cent, that on corroded lead is only 5 per cent, consequently Canada imports all its corroded or paint lead. The imposition of the higher duty asked for, and the establishment of lead corroding works, already arranged for at Montreal, will, it is contended, provide a domestic market for 8,000 or 9,000 tons of lead produced in British Columbia. The corresponding necessity for an increase in the duty on imported mixed paints was also urged. The Finance Minister promised consideration of the representations made to him.

The article on "Transportation in Mines and Systems of Power Supply," prepared for last month's *MINING RECORD* and unavoidably held over, appears this month. While British Columbia has not as yet many mines big enough to require such plant and machinery as that the use of which is advocated, in view of the rapid development of some of the metaliferous mines of the province the subjects dealt with must soon have the close attention of their respective managements. The larger collieries of British Columbia have long been using steam, air, or electricity for

transportation in their mines, and recently a step in a similar direction was taken by the management of a Boundary district copper mine. That others will ere long find it more profitable to do likewise is a foregone conclusion. Our thanks are hereby accorded to *The Engineering Magazine*, New York, for kind permission, readily given, to reproduce the information contained in the article under notice, and for the loan of three of the blocks used in illustrating it.

It is claimed that the ores of Republic camp, Washington, can be successfully treated by grinding them to 60 and 70 mesh, after which careful concentration will produce one ton of concentrates from 35 to 36 tons of ore, this one ton of concentrates carrying from 60 to 66 per cent of the value. By carefully classifying, 90 per cent of the tailings from the concentration can be cyanided by percolation with a very dilute cyanide solution operating through a long time; 70 to 86 per cent of the gold remaining in the sands after concentration can be extracted. The slimes can be briquetted with the concentrates and make a product desirable to the smelter. The cost of such treatment, if carried out on a sufficiently large scale, can be brought within \$2.15 per ton of ore. While these experiments point to a possibly profitable method of ore treatment, enough work has not yet been done to carry out all the necessary details.

The Atlin-Juneau wagon road project is being persistently supported by the Atlin district board of trade and by the district mining and commercial interests generally. The Juneau chamber of commerce also appears to be alive to the importance of establishing road communication between the mining camps of Atlin and Juneau, and recently it sent a delegate to Atlin to there interview the local board of trade and inform its members what the people of Juneau are prepared to do towards constructing the American end of the road; also to ascertain what action the Atlin people were taking in this matter. On being informed that it was intended to have a survey of the route made as soon as possible, the member for the district having stated that he had secured from the government an appropriation for this purpose, the visiting delegate gave positive assurance that the citizens of Juneau were ready to build their end of the road as soon as they were satisfied that the Atlin people will carry out their part of the undertaking.

To remedy what was regarded as leaving an opening for an improper use of opportunity to secure lands or mineral claims that had been forfeited to the Crown, the Hon. R. G. Tatlow last month, when amendments to the *Assessment Act* were being considered by the local legislature, obtained the following addition to section 70:

"147b. To strike out of section 147 all the words of said section after the word 'sale,' on the fifteenth line thereof, and to substitute therefor the following words:—

"The Chief Commissioner of Lands and Works is

hereby authorized and empowered to dispose of all lands and mineral claims which have been forfeited to the Crown under the provisions of this Act to any person at a price not less than the price of similar lands under the '*Land Act*,' and on such terms and conditions as he may consider right in the interest of the Province, and according to the descriptions in the original Crown grants thereof, and subject to the reservations contained therein, and such lands shall at no time be open for pre-emption under the '*Land Act*,' or for location under the '*Mineral Act*' or '*Placer Mining Act*.'"

Important additions are being made to the plant and machinery at the Granby Consolidated M. S. & P. Company's smelting works at Grand Forks, Boundary district. Electric furnace feeders have taken the place of the mechanical feeders previously in use, with results that, while proving thoroughly effective from a metallurgical point of view, make for economy to an extent hardly credible were it not authoritatively vouched for. With the works running at their full capacity, the saving is at the rate of about \$80,000 per annum, the services of fully 80 men being dispensed with. Two new blast furnaces, of larger treatment capacity than any of the six already in use, are to be installed; a new compressor engine, having a capacity one and a half times greater than that of the engine now operating the converter plant, and admitting of the running of three converters at one time instead of only one, as at present; and additional electric power plant, are included in the extensions arranged for at this up-to-date establishment.

So many mis-statements concerning the condition of the plant of the Hall Mining & Smelting Company's smelter at Nelson have been made of late that we have pleasure in publishing in this number of the *MINING RECORD* some particulars of these works. It will be observed that the furnaces were originally designed so as to admit of their being adapted for lead-smelting whenever such change should be found necessary, the contingency of a possible failure of the local supply of copper ore having been kept in view by the metallurgist who built and equipped the smelter. It is evident that many improvements have been effected and additions of modern facilities made, so that the works may fairly be regarded as suited to the present requirements of the district from which supplies of ore for reduction are drawn. As conditions shall warrant further betterments they will doubtless be made so as to keep pace, as far as shall be practicable, with the improved metallurgical practice characteristic of these progressive times.

With characteristic energy the Crow's Nest Pass Coal Company, Ltd., has made arrangements to replace the trestle and tipples destroyed by fire at its Coal creek colliery, near Fernie, on March 11, ulto. The new structure to be built across the valley to connect the several working mines at Coal creek with the tipples will be of steel, and it will be equipped

with the most modern improved coal-handling appliances obtainable. Immediately prior to the time the fire took place the Coal creek mines were producing about 1,800 tons of coal per diem. This large supply was suddenly and without any warning cut off, yet such is the producing capacity of the other collieries in the Crow's Nest Pass district owned by the company that by the end of March there were no arrears of orders, all engagements having been promptly met and not a single order for either coal or coke lost. In fact, a more serious drain upon the company's resources could have been met without difficulty. Such a position is eminently satisfactory, ensuring, as it does, an uninterrupted maintenance of the supply of coal and coke to the mining and smelting districts that obtain their fuel from this company.

Mining engineers are not always given credit for good work done by members of their profession. Occasionally, though, a well-merited tribute of appreciation of their valuable services is published, as witness the following from a recent number of the *Mining and Scientific Press*: "Twenty years ago nearly all underground transportation was done by men who pushed single cars loaded with ore to the stations. Here and there was found a mine where a locomotive of some sort had been introduced to replace the trammer, and the cars were hauled from some central point in trains. Now nearly all the large mines have either mechanical, electric or compressed air haulage plants in successful operation. All of these improvements are the direct result of the efforts and demands of the mining engineers and not of the labouring miners. These and many other mechanical devices, as well as improvements in the system of mining, have lowered the cost of mining step by step, until we see to-day mines successfully and profitably operated which would have fallen far short of it even a decade ago. The outcome is that work is afforded thousands of miners who otherwise could not be employed."

In a letter to the *Atlin Claim*, Dr. H. E. Young, M.P.P. for Atlin district, writes as follows, for the information of his constituents: "As regards hydraulic leases, the government intends that all statutory requirements shall be carried out, and I am happy to say that conditions in the future will be much more equitable than heretofore. The government has given me every assurance that the cause of complaint shall be removed as fast as possible, and further, the gold commissioner has been instructed to give two weeks' public notice of all cancellations.

"People holding leases should be forced to live up to the requirements in the same way that placer miners are compelled to do. At the same time, I wish to say to those who have invested money and made an effort to comply with the law, that it is not the intention of the government to place any bar in the way of development of the district. But it is the intention of the government to throw open all land which has been illegally held and to give two weeks' notice of such

intention, so that all may have an equal chance of re-staking."

The chairman, at the annual meeting of the Bank of British North America, held in London, England, last month, in the course of his address to stockholders, said, "The mining industries of British Columbia have shown considerable activity during 1904, and a rough estimate compiled by the Provincial Government values the mineral output at \$19,775,000. This gives an increase of more than \$2,000,000 over the production of 1902 and 1903, but just falls short of 1901, when the output reached \$20,000,000. This increased production has not, however, been accompanied by any better results for the shareholders in either the Canadian companies or those established in the United Kingdom, and in all alike, profits, where existing at all, have been meagre in the extreme. Efforts are now being made by influential persons in Canada and the United Kingdom, representing some of the principal companies in the Rossland camp, to bring about an amalgamation of interests, and should these efforts meet with success, there should be brighter days ere long. In the Yukon, on the other hand, the output of gold showed further diminution, barely reaching \$10,000,000 in 1904, compared with \$11,000,000 in the preceding year. The population of Dawson is also considerably less than it was a year ago; but this is by no means surprising, for in placer mining camps, as the auriferous ground is worked out, the miners move on to more attractive fields of labour; and so it has been in this case, the exodus to the gold fields of Tanana and Fairbanks having been on a large scale. Apart from fresh discoveries that may be made, either of alluvial or quartz, the future of the camp appears to depend chiefly upon an adequate water supply, and efforts are being made towards the attainment of this object. Whatever may be the output for the future, it is interesting to look back on the results of the camp, since it first came prominently into notice seven years ago, for during this period the value of gold recovered has certainly not been less than \$100,000,000. These figures must surely entitle it to rank amongst the wealthiest placer mining camps in the world."

It is the custom of the *Mining and Scientific Press* to publish mining news from this Province under the heading of "British Columbia," and from other parts of the Dominion under that of "Canada." Occasionally an item from British Columbia is placed under the latter head, but why not let all be so dealt with? It is not clear to the uninitiated why Alberta and Yukon Territory should be shown as in Canada and British Columbia be differently treated. We appreciate the prominence given to this province in that influential mining journal, but would like to see it made plain to uninformed foreign readers that British Columbia is in Canada. This suggestion has been prompted by seeing addresses on communications from other countries with the words "British Columbia, U. S. A."

## THE PROPOSED LE ROI AMALGAMATION.

IN its issue of March 23, ulto., the New York *Engineering and Mining Journal*, under the heading, "The Rossland Consolidation," discussed the proposed amalgamation of "the leading mining enterprises in the Rossland district." We do not regard the article as intended either to throw cold water on the scheme so energetically advocated by Mr. Geo. S. Waterlow and those working with him to obtain better financial results from their mining and smelting enterprises, or to in any way depreciate the mining interests of Rossland camp. There is, though, so much that is incorrect in the article that, having in view how very important it is that confidence in the le-le-mining industry of British Columbia (already improving as regards Boundary mining enterprises) shall be further restored, we have taken one after another most of the statements made and endeavoured to more correctly show the actual position. The indented paragraphs contain the statements referred to.

"It has been known for some time that negotiations were pending for the amalgamation of "Le Roi mine with the War Eagle and Centre Star properties. More recently the names of "the Snowshoe and the Kootenay mines have "been included in the scheme."

The Snowshoe was one of the properties originally proposed to be incorporated along with the three Rossland properties first above mentioned. The chairman of the fifth ordinary general meeting of the Le Roi Mining Co., held in London on January 31, last, in the course of his address to the shareholders said it was arranged that: "Mr. Brock . . . whom we had agreed to employ for the purpose so far back as May, 1904, should examine and report upon the War Eagle, Centre Star, Le Roi and Snowshoe mines without further delay." (Report of Fifth Annual General Meeting, p. 9.) Mr. Waterlow also mentioned the Snowshoe (p. 12 of Report) as being one of the properties proposed to be included in the amalgamation. As to the Kootenay mine—this had not been mentioned in connection with the proposed amalgamation prior to the Le Roi meeting, at which Mr. C. Williamson Milne, chairman of the Rossland-Kootenay Mine, said: "It is a curious fact that the Kootenay is the only mine that can supply the flux for the War Eagle, the Centre Star, and other mines, and I think the suggested amalgamation is good enough even for a wealthy little company like the Kootenay to consider the advisability of joining in, if these gentlemen will only regard it as worth while to invite us to go into the combine." (Le Roi Report, p. 29.)

"Le Roi has operated, in a rather intermittent "and expensive manner, the smelter at North-"port."

It has been contended, on behalf of the Le Roi Mining Company, that this statement is incorrect; that the Northport smelter has been almost constantly

operated; and that the cost of smelting there over a series of years has been less to the Le Roi Company than has the cost of smelting elsewhere been to other mines in the Rossland district. Mr. Waterlow said to the Le Roi shareholders (Le Roi Report, p. 14): "It was also asserted that operations at the Canadian Smelting Works could be carried on at \$1 per ton cheaper than at your own Northport smelter. I found this to be a fallacy, and that Mr. Goodell, your manager at Northport, reported that he could smelt as cheaply at Northport as in Canada, and gave me a price for doing so when his proposed alterations were carried out. He also wrote me, on my enquiry, that the scale of wages at Northport and in Canada, are as nearly the same as possible; and that there are no conditions prevailing in British Columbia which would prevent us from smelting Le Roi ore and Snowshoe ore as cheaply at Northport as at any smelter in British Columbia; and that the duty on coke is offset by the cheap limestone. On the other hand, it is maintained by some whose opinion is equally entitled to respect that present conditions are most unsatisfactory at Northport. Still there are many reasons why it would be advisable to keep the Northport works in operation even were the proposed amalgamation, including the Trail smelter, to be brought about.

"The War Eagle and Centre Star properties "have sent their product to the Trail smelter, "with the result that one-half the value of the ore "went to pay the Canadian Pacific Railway, while "the other half went to meet wages and supplies."

This statement is not necessarily a reflection upon the Canadian Pacific Railway. The first contract made by the Le Roi for treatment of its ore in the district was that (made in 1895) which led to Mr. F. Aug. Heinze building the original Trail smelter. This provided for a freight and treatment rate of \$11 per ton. Then the Northport smelter was built and its original contract with the Le Roi was at a freight and treatment rate of \$8 per ton. To-day the standard rate at Trail is stated to be \$4 per ton, and it is claimed that these works pay at least \$1.50 per ton more for copper content than was paid under either the old Heinze or Northport contract. In other words the present total rate is \$8.50 per ton more favourable than the first Heinze rate, and \$5.50 per ton better than that which obtained under the Northport contract until the purchase, a few years ago, of Mr. Jas. Breen's interest in the latter works. It is insisted that the Trail smelter did the best it could to reduce rates with as little delay as practicable, and the fact that the ore which was shipped to the smelter only netted the mines sufficient to cover the expenses should not be considered as indicating that the Canadian Pacific Railway had not done everything it could reasonably be expected to do in order to bring about maximum shipments of ore.

"The average tenor of Rossland ore is \$7 to "\$8 per ton."

If by this it is meant that the average value of the

ore shipped to the smelters is \$7 to \$8 per ton, the statement is incorrect. The gross value of Rossland ore varies from \$10 to \$12 per ton, as the published reports of the companies show. The average gross value of 162,110 tons of Le Roi ore mined and shipped to Northport during the last financial year of the Le Roi was \$10.94 per ton. It is true that 19,014 tons of second-class ore, shipped from the dump, averaged only \$7.52 gross. Centre Star's shipments during that company's last financial year averaged \$9.47 per ton for the 79,053 tons sold, and Wai Eagle's output last year of 61,064 tons averaged \$9.58 smelter's gross assay value. During the earlier years of production at Rossland the average value of 128,428 tons shipped during four years, 1894-1897, was \$32.05 per ton, but a much lower grade of ore can now be sent to the smelter without loss.

"If the Trail smelter is included in the scheme, the enterprise will be assured of the cheap coke controlled by the Canadian Pacific Railway."

While the Canadian Pacific Railway has coal mines (but no coke) at Bankhead, near Banff, along its transcontinental line, these are too far away to be considered as a source of fuel supply to the southern Kootenay and Boundary districts of British Columbia. The C.P.R. does not control any coke, but buys its supply for the Trail smelter from Crow's Nest Pass collieries. It has been proposed that the new combination acquire coal lands, and that a large sum be expended in their development, with a view to eventually securing its fuel supplies from its own coal mines. The coal lands proposed to be acquired are, it is understood, as yet undeveloped.

"Finally, by way of supplement, there is the suggestion to make an arrangement with the Granby Consolidated Company, in the Boundary district, which can furnish a fluxing ore, chiefly magnetite and chalcopyrite in a lime matrix, also suitable for smelting with the Rossland sulphides. This ore is, metallurgically, extremely docile. Unfortunately, from a metallurgical standpoint the Snowshoe ore would be useless as a base for the Rossland pyrrhotite because it carries an excess of silica, being, in this respect, less docile than the ore of the Boundary district, in which it is situated."

So far as known, there has been no suggestion on the part of those actively engaged in promoting the proposed consolidation to make an arrangement with the Granby Company. The opinion that the Granby can furnish a fluxing ore while that of the Snowshoe would be useless from a metallurgical standpoint, shows lack of knowledge of the actual position. The two properties are on the same hill or mountain, the Granby on its western slope and the Snowshoe on its eastern, with probably less than a quarter of a mile distance between them. The ores of the two mines are similar in character, so that one would be just as useful, or as useless, as the case might be, as the other. Our information is to the effect that Boundary ores, that is those of the larger mines, when smelted straight make about 46 per cent silica slag,

and that Boundary smelters buy such ores as those of the Emma and Oro Denoro, which contain an excess of iron, paying practically limestone prices for them. There is, therefore, little justification for the use of the word "fluxing" in connection with using Boundary ores with Rossland ores. Mr. A. J. McMillan, general manager of the Le Roi Mining Company, told the shareholders (Le Roi Report, p. 22, that: "During the last two years certain conditions have arisen in the Boundary enabling the smelters in that part of British Columbia to pay higher prices for a limited tonnage of Rossland ores than either of the smelters in the immediate neighbourhood of Rossland could afford to pay. . . . About 23,000 tons were hauled by the Canadian Pacific Railway right through the yards of its own smelter at Trail to the Greenwood smelter, 100 miles distant. Some 16,000 tons were hauled by the Great Northern Railway through Northport to the Granby smelter at Grand Forks. A metallurgist experienced in the reduction of both Boundary and Rossland ores, says: "As to the mixture of Snowshoe and Le Roi ores—it is true both have excess silica. Le Roi also has excess sulphur and alumina. Both ores must have either iron or lime. Lime is not only the cheaper but the only flux available in any certain and considerable quantities to either the Northport or the British Columbia smelters. A mixture of Snowshoe and Le Roi ores would cut down sulphur and alumina in the Le Roi, making it possible to use lime in the cheaper flux, a faster running furnace. Farther than this there are no fluxing qualities in either Snowshoe or Le Roi ore. That the advantage would be considerable I am sure no metallurgist would question."

"To bring the Granby ore to the smelters now in receipt of the Rossland output would mean a journey of 130 miles over a mountain divide."

This statement is only partly true. The railway distance by C.P.R. to the Trail smelter from Phoenix, where the Granby and Snowshoe mines are situated, is 112 miles and the haul is over a mountain divide. From Phoenix to Northport by the Great Northern Railway is 95 miles, with a down-grade all the way except, it may be, a slight up-grade following the Columbia river from Marcus up to Northport, but there certainly is no divide to go over.

"The Great Northern Railroad controls the business of the Boundary district, and also unites Rossland to Northport; the elimination of the Trail smelter would mean the diversion of traffic to Mr. Hill's system, while the inclusion of the smelter now managed by Mr. Aldridge might lead to the closing down of the Northport works."

Far from the Great Northern controlling the business of the Boundary district, it has only lately commenced to compete for the Boundary ore traffic, while the Canadian Pacific has been hauling ores from Boundary mines for five years. The Great Northern completed its branch to Phoenix about the first of the current year, and a few weeks later commenced to haul part of the Granby ore to that company's



smelter at Grand Forks, the C.P.R., however, continuing to haul a fair proportion. The Great Northern branch line is not yet connected with any other Boundary mine maintaining an output worth considering, while, on the other hand, the C.P.R. has spur lines to all the larger shipping mines in the district, and at the present time handles probably about twice as much of the Boundary tonnage as does the Great Northern.

The acceptance of the position of general manager of the consolidation by Mr. W. H. Aldridge, as contemplated, would not necessarily involve the closing of the Northport smelter, nor would it mean that he would work in the particular interests of either railway company or either smelter. The best interests of the stockholders in the consolidated company would, doubtless, be Mr. Aldridge's chief consideration.

In conclusion, it may be pointed out that the *Engineering and Mining Journal* is right in its statement that in the first place, the idea of placing the three big mines at Rossland under one administration was prompted by economy. In proposing this consolidation, Mr. Waterlow's idea was to get rid of over-capitalisation, reduce management expenses, increase combined tonnage and, as a result of these changes, "pay a handsome profit" to shareholders in the consolidated company (Le Roi Report, p. 12). The proposed inclusion of the Trail smelter (which, as well as its copper smelting business, has the larger part of the silver-lead smelting business of British Columbia and has works for refining silver and lead and facilities for manufacturing lead products), Crow's Nest coal lands, and, possibly, a big silver-lead mine, came later.

It is also a fact that the two railway companies above mentioned are greatly interested in the situation, but it is unlikely that either will be able to dominate it. If the amalgamation be carried out a division of the traffic will doubtless be arranged.

It is particularly unfortunate that both Mr. T. G. Blackstock and Mr. Waterlow should at this juncture be incapacitated by illness from continuing to actively promote the amalgamation they are mutually agreed would be in the best interests of the companies chiefly concerned. Whether others not favourable to it will succeed in their efforts to prevent it, remains to be seen. Meanwhile there is some satisfaction in the knowledge that a determined effort has been made to improve the position in regard to several of the larger mines of British Columbia, and it is hoped that existing obstacles may be overcome, and that eventual results will be to benefit the stockholders in the companies particularly and the mining and smelting industries of British Columbia generally.

#### THE BUDGET SPEECH AND THE TWO PER CENT MINERAL TAX.

**W**IDE publicity has been given to a statement relative to the two per cent mineral tax, alleged to have been made by the Hon. Minister of Finance in the course of his budget speech in the

provincial legislature last month. The statement referred to is as follows: "A possible solution might be the certified payroll of the mine exempted in addition to cost of freight and treatment with the two per cent tax raised sufficiently to meet the case and a rebate of fifty per cent of the tax made to all ores smelted in British Columbia." While there was a note to that effect among the papers of the Finance Minister, he is authority for a denial of having made that statement in his speech since he did not feel warranted in thus referring to that subject without the previous knowledge of his colleagues of his intention to do so.

The following report of the minister's utterances on the subject of mining and the two per cent tax on the occasion mentioned has been authoritatively vouched for as correct.

"The increase in mineral production for the past year was very gratifying. In the year 1903 the total production was under \$17,500,000, while for 1904 the lowest estimate was nearly \$20,000,000, and some reliable authorities placed it at about \$21,000,000. This increase in value also pointed to largely increased output, as the value of copper in 1904 averaged one-half cent per pound less than in 1903, and that of lead was very slightly higher. The principal increases were in lead, which doubled the output of 1903, and in coke.

"He hoped that in any amendment made in the future to the present system of taxing mines, the principle of rebated taxation would be applied to ores smelted in the province."

It may be added that the estimated production and value of copper and lead in 1904 the minister had in view, as compared with 1903, were as under:

—1903.—		
	Quantity.	Value.
Copper, lb. . . . .	34,359,921	\$4,547,535
Lead, lb. . . . .	18,089,283	689,744
—1904.—		
Copper, lb. . . . .	36,688,500	\$4,600,000
Lead, lb. . . . .	37,000,000	1,500,000

The revised production statistics will probably show that this estimate is about 22,000 lb. too high in copper, and nearly 1,300,000 lb. in excess of the actual output of lead in 1904.

Information has been received from Ottawa to the effect that there are several proposals before the Dominion Government that, if adopted, will tend to further the mining interests of Yukon Territory. These include the enlargement of discovery claims from 500 to 1,000 ft., and of ordinary placer claims from 250 to 500 ft.; a reduction of the fee chargeable for a free miner's licence, and, with a view to encouraging quartz mining, a remission for ten years of the royalty on gold and copper from quartz. Benefit will also be derived from the hydrographic survey of the Klondike and Indian rivers it has been decided to have made this season.

## TRANSPORTATION IN MINES AND SYSTEMS OF POWER SUPPLY.

IN its January "Third Labour-Saving Number," the *Engineering Magazine*, of New York, published a number of valuable articles on "Labour-Saving in Mining and Mechanical Transport," by writers specially qualified to deal with the subjects of their respective contributions. Dr. J. Bonsall Porter, who prior to being called to the chair of mining at McGill University, Montreal, had been engaged for years in consulting practice as expert to various railway, mining, and constructing companies, and in the examination of coal and iron properties, discussed in a comprehensive manner, "Methods of Underground Transportation," leaving the question of hoisting for later treatment; while Prof. E. H. Roberton, prominent in mining engineering in England, where, after years spent in engineering and mining, he was for some time demonstrator of mining at the University of Birmingham, treated the subject of "Power Generation

age in collieries, although the wheelbarrow and cruder devices remained in almost universal use in ore mines. The introduction of rope haulage and the gradual development of steam, compressed air, and electric locomotives or motors, with the varied results obtained by the use of these several methods, were dealt with at length, and then the question of relative cost was referred to, as follows: "Human haulage or tramming as practised so largely in metal mines, and somewhat in collieries, is very costly—averaging certainly above 20 cents per ton mile and often far exceeding this. Even power haulage is costly for the short distances common in metal mines, but wherever the traffic is at all heavy, it is far cheaper than tramming, and the recent rapid extension of electric and even rope haulage in Michigan and the West shows that managers are beginning to appreciate this fact. Horse haulage ranges between 2 cents and 20 cents per ton mile, but probably averages about 8 cents. Rope haulage on level roads costs about half as much—probably 4 cents is a liberal estimate—but



"Putters" or Trolley Boys in an English Coal Mine, early Nineteenth Century.

and Transmission for a Modern Mine." In the March number of the same journal, Mr. F. G. Henshaw, who after having been for a long period engaged in designing power plants, making expert tests, and outside construction, devoted much attention to the application of electric power to industrial works, took up the discussion under the head of "Systems of Power Supply for Mine Work."

Dr. Porter, after premising that, taking the mineral production of the whole world, underground mining produced not less than 1,000,000,000 tons of mineral (more than 20 per cent of which was coal), and the transportation of this material involved nearly 500,000,000 ton miles of haulage, and probably 70,000,000 ton miles of hoisting, submitted that these roughly approximate figures suffice to show that underground transportation is a subject worthy of the most careful attention of engineers and managers. Reviewing the progress of a century, from the time when much of the material mined was usually hauled in sleds or little wagons, or carried on the backs or heads of the work people from the working faces to the hoisting apparatus, he noted that concurrent with the simplification and cheapening of hoisting and pumping machinery, brought about during the first half of the nineteenth century, motives of economy as well as humanity caused a general introduction of horse haul-

when employed on steep grades it is more costly, as it combines hoisting with haulage proper. Electric and pneumatic haulage are both cheaper than the older systems, and both have shown extremely low costs, reaching say 1½ cents per ton mile in certain special cases; but these extreme figures cannot be properly compared with those given above for horse and rope haulage. It is safe, however, to say that, in services to which they are adapted, pneumatic locomotives are at least as cheap as endless rope and have the advantage of independence, while electric motors are probably one-third cheaper in the average than rope and appreciably cheaper than pneumatic."

Professor Roberton opened his part of the discussion by stating that "The question of power generation and transmission opens up a more extensive field of possibilities and uncertainties to the miner than perhaps to any other class of engineer. The costly plant that may have already been in operation some time, the possibility of introducing a factor of danger into works so far comparatively free from it, and the uncertainty in the case of electricity at least of future legislation that may nullify or hamper the good effects of a new and expensive equipment—all these are bound to exercise a deterrent effect on the engineer who meditates a new departure in the generation of power." Regarding power transmission he

observed: "In all mines the broad lines of choice for transmission of power, either over the surface works or underground, lie between steam, hydraulic, rope, compressed air, and electrical transmission; and a thorough investigation of the conditions to be met with, and of the effects required, must be instituted in each particular case, before choice can be made of the most suitable mode of power distribution. The conditions which differentiate mines from other classes of works in which transmitted power is required, may be briefly summed up as:—the necessity of carrying power down a shaft which is probably very damp, and through which there is a strong current of air constantly travelling; the long and tortuous ways through which it must be guided; the constant passage of men and animals, rendering neces-

at one time, but often separated by long periods of years."

"It is never wise to attempt to transmit steam in pipes through any considerable distance. Condensation and consequent loss in efficiency will take place, however carefully the pipes may be covered with non-conducting material; and in mine work, especially in the working shaft, any part of the steam pipe which may have become stripped has often to wait a long time for repairs, little notice being taken so long as the engines below ground are kept running. Mining engineers are just waking up to the fact that an accumulation of small losses like this means in the year an appreciable diminution in profits, and corresponding efforts are being made to reduce such leakage of power in working practice." \* \* \* \* \*



Horse Haulage in a Coal Mine, South Staffordshire, England.

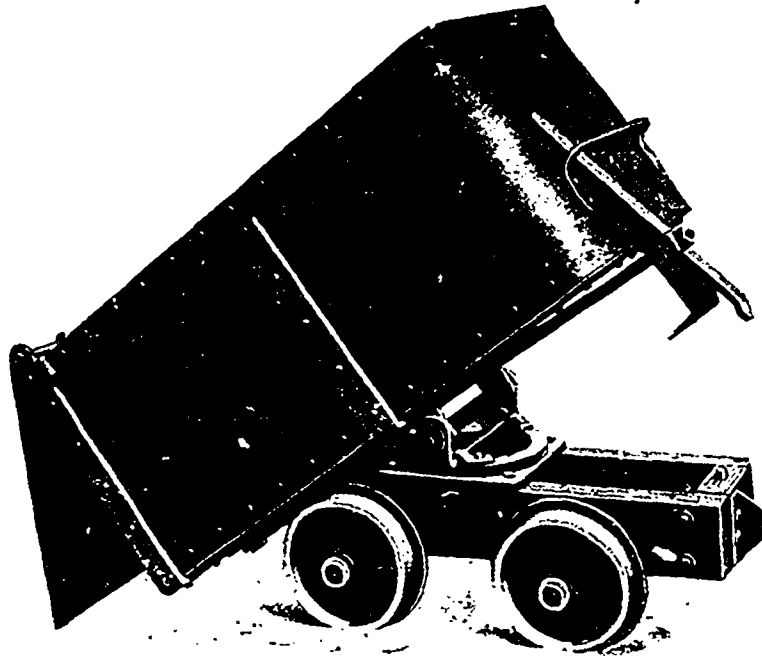
sary extra precautions against accident to life and limb; the possibility of injury to pipes or cables from falls of roof and sides; the comparatively rapid progress of the workings, especially in a thin seam of coal, necessitating devices for a continual increase in the distance through which the power is transmitted. All these conditions, which in themselves vary widely in different mines, must largely influence the engineer in his choice of power."

"As was to be expected, when labour-saving appliances were gradually making their way into favour, mining engineers chose the methods that were easiest in adaptation to existing plant and that cost least money to install. Such methods as pipe transmission of steam, rope transmission of power, and hydraulic pumping, were therefore the first that came to hand, as no special generating station was needed, and an old engine often sufficed for each purposed application of power. The idea of a generating station for the supply of power for all purposes was not thought of, or if thought of was dismissed, as the different appliances for the saving of labour were not all added

"Choice of power transmission depends on initial cost, cost of working and keeping in repair, and efficiency. In mine work the last item must be taken in its broadest sense, including not only a fair output of power for a given coal consumption in the boilers, but also the ability to overcome when necessary—and not infrequently—a resistance greater than the average. For this end the whole of the plant, generator or compressor, conductors, and motors, should be 'well up to' their work, a phrase that in mining parlance means roughly anything up to 50 per cent ahead of it. Naturally, in point of efficiency as efficiency is usually considered, such a plant does not compare with one that is designed and laid down with a view of an assured uniform output, but under conditions such as obtain in ordinary mine work ensures the cost of upkeep and repairs being kept within bounds. So far as actual efficiency in transmission is concerned over ordinary distances, electricity is preferable to compressed air, though the difference becomes less marked as the distance of transmission becomes greater. On the other hand, compressed-air motors

are generally simpler to understand and repair than electrical, and the fitting in of spare parts can easily and cheaply be effected in the mine. The joints of compressed-air mains, however, are liable to leakage, and the splitting of the main into several channels is

comment on the finding of a departmental committee appointed by H. M. Home Secretary, to enquire into the use of electricity in coal and metalliferous mines, and the dangers attending it, and to report what measures should be adopted in the interests of safety by

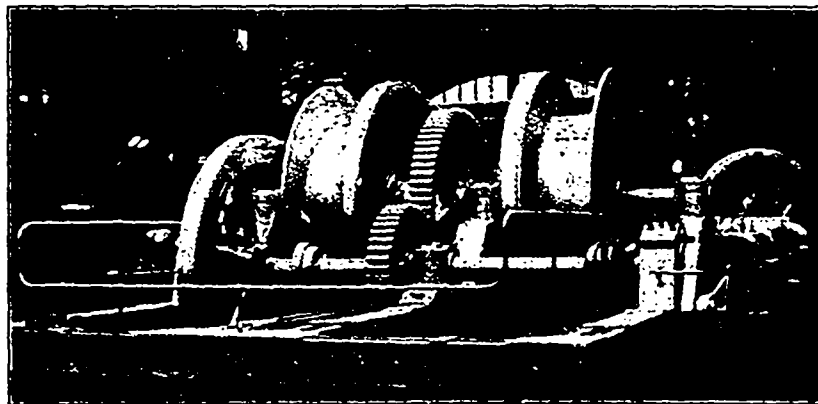


Modern Ore Car for Mine Use (Vancouver Engineering Works.)

not so simple a matter as in the case of electricity. A useful combination is often resorted to. Electricity is transmitted into a mine so far as is thought convenient or safe, and at this point an electrical air compressor is placed, which supplies power to machines

the establishment of special rules or otherwise. "This committee submitted as their finding the following four general principles which should govern the employment of electricity in mines:—

'1.—The electric plant should always be treat-



A Haulage Engine for Heavy Work (Fraser & Chalmers, Ltd.)

situated further in the mine. Thus two purposes are served. The economical transmission of power by electricity is effected, and the use of compressed air is secured in parts of the mine that might threaten danger to the use of electricity, or in machines that do not adapt themselves to electrical power."

\* \* \* \* \*

Professor Robertson concluded his article with brief

ed as a source of potential danger.

'2.—The plant, in the first instance, should be of thoroughly good quality, and so designed as to insure immunity from danger by shock or fire; and periodical tests should be made to see that this state of efficiency is being maintained.

'3.—All electrical apparatus should be under the charge of competent persons.

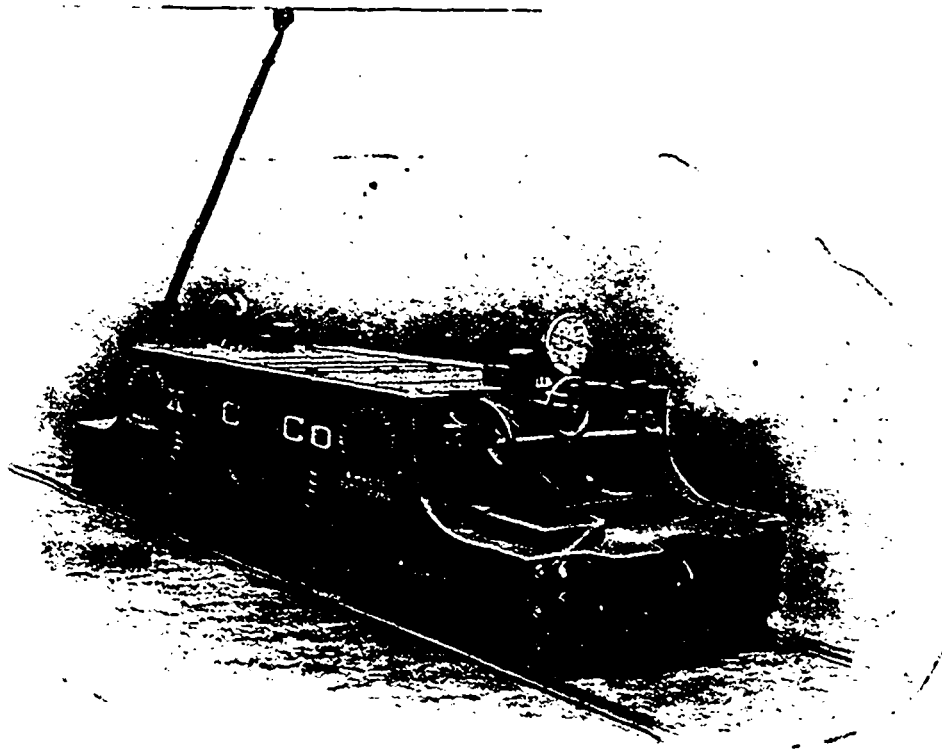
4.—All electrical apparatus which may be used when there is a possibility of danger arising from the presence of gas, should be so enclosed as to prevent such gas being fired by sparking of the apparatus; when any machine is working, every precaution should be taken to detect the existence of danger, and on the presence of gas being noticed, such machines should be immediately stopped.'

"In addition to the above, the committee drafted a list of special rules which they thought might with advantage be introduced into all mines. These, however, have not met with approval amongst the leaders of the mining industry. It is a well-nigh impossible task to draft a set of rules governing the use of electricity which shall be applicable to the varied con-

ditions to be met with in coal and metal mines. It should be sufficient to allow the mining engineer the same latitude of judgment as he already possesses in the matter of the installation of compressed-air or steam plants, knowing that he is directly responsible for the safe and efficient working of all apparatus under his charge, and for his own sake will not be likely to employ any agent that may create a tendency to danger in the conditions obtaining in his mine."

similar, with these additions:—The power must be transmitted through tunnels and rooms in proximity to workmen. There must be nothing to vitiate the surrounding air. The power and transmission appliances must be able to withstand moisture and explosive and sulphurous gases. They must meet special hoisting conditions in deep mines. The power must be well adapted to rock drilling. The system that has been found best for cities and factories should therefore be best for mines, if it can be made to meet these additional requirements in a satisfactory manner."

"In the generating plant, where few of these conditions begin to apply, the general requirements are of course extremely close to those of the general power plant, but the situation of mine or the char-



Electric Mining Locomotive (Canadian Westinghouse Co., Ltd.)

Mr. Henshaw treated the subject of "Systems of Power Supply for Mine Operation," in part, as under: "Power supply for mining operations is of prime importance, affecting as it does the output, cost of production, and even the life of workmen in one of the greatest industries. As compared with the power requirements of a city or factory, those for a mine are

acter of its allied workings may impose special limitations or offer particular opportunities."

"The steam engine, dating it from Watt's first patent, is one hundred and thirty-five years old, and with the utmost refinement in large powers has attained a thermal efficiency of 22 per cent; an extreme economy under ideal conditions would be 1 lb. of coal per i.h.p.hr., for the whole steam plant. No such efficiency can be obtained in practice, and 1.5 lb. of coal per i.h.p.hr. is about the best that can be expected under the most favourable conditions. The efficiency of steam turbines is about the same as that of the most economical piston engines, for the same kind of service."

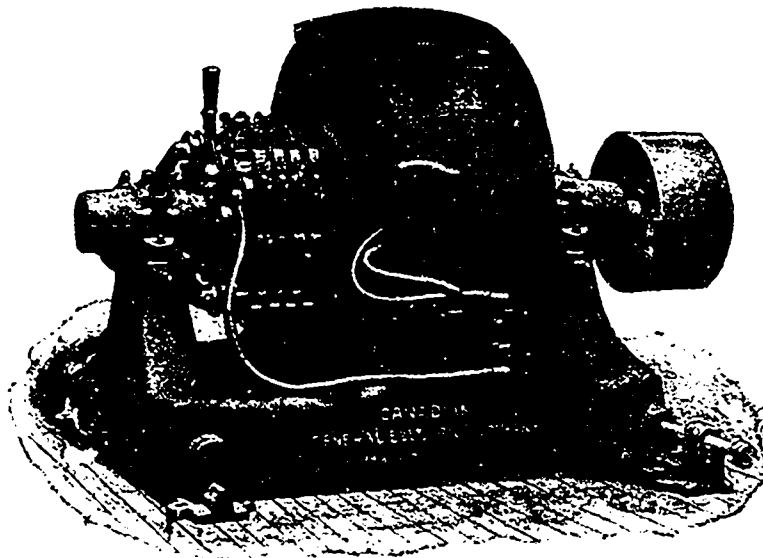
"The steam turbine has a considerable advantage over all piston engines in space and cost when used for driving dynamos, as the latter can be made much

smaller and cheaper on account of the high speed. This high speed is well suited to alternating-current dynamos, but generally objectionable for direct-current machines of the usual commutating type. The 'unipolar' type of direct-current dynamo is now being developed for direct connection to turbines and is very promising. The economy due to concentrating the power generation for a mine or several mines at one point is obvious." \* \* \* \* \*

"The gas engine is about forty-four years old, has attained a thermal efficiency of 26 per cent in small sizes, and with modern gas producers can develop an economy of 1lb. coal per i.h.p.hr., under conditions of practice. Gas engines as large as 1,500 h.p. were built five years ago, and their practical operation has been thoroughly tested in Europe. One might consider that the gas engine practically begins where the steam engine stops, as far as fuel economy is concerned.\*"

transmission may be utilized to bring power to the mine, there to be converted into electric or compressed-air power for distribution. Local conditions do not always lend themselves favourably to the construction of a pipe line, while there are practically no limits in the case of electric power lines. This is a plain engineering question, which must of course be decided for each case according to the local conditions, taking as the basic factors relative first cost, together with the advantages of a concentrated power plant at the point of distribution, *versus* a distant power station transmitting to a sub-station."

"Compressed air demands particular consideration, as not only does it come into the class of successful methods of power distribution, but it is peculiarly well adapted to mine work, and has, in fact, been developed chiefly for that purpose, and for civil-engineering works of the same general nature." \* \* \*  
"It is, however, hardly necessary to cite instances to



Canadian General Electric Co's Standard Motor.

\* \* \* \* \*

Omitting from the present discussion rope transmission and steam, and considering the three successful methods—high-pressure water, compressed air, and electricity—Mr. Henshaw continued:—"Of the three, electricity has so far exceeded the others in the extent and magnitude of its use, that it can hardly be said to have a rival in the general field. The distribution of hydraulic power has been in use in nine cities of England for many years, but compared with electric plants these undertakings are insignificant. These hydraulic plants would doubtless have done better had the impulse wheel been developed earlier and thus given them a simple and efficient motor. The exhaust water is an objection that puts the hydraulic system out of consideration for distribution, except possibly in some surface workings."

"Where high natural heads are available, hydraulic

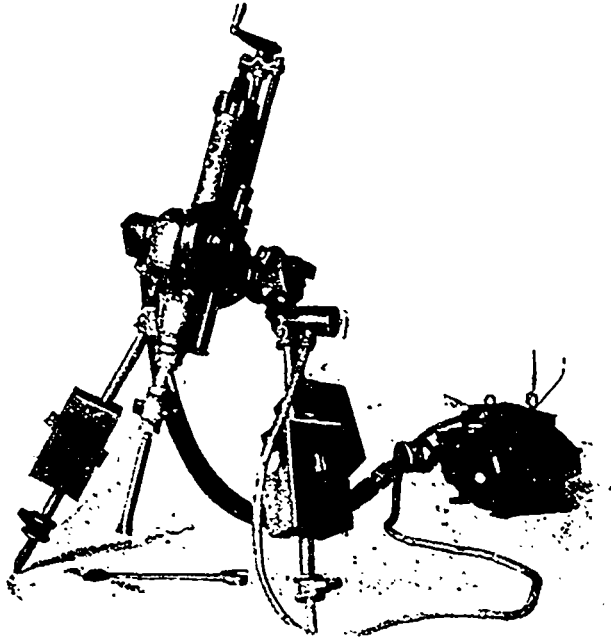
demonstrate the importance of compressed air for power transmission, and the discussion resolves itself into a consideration of the merits and limitations of compressed air and electricity. Considering these two agencies from the point of comparative advantages in transmission, and taking Prof. Unwin's\* figures for air power, there is little to choose between air and electricity on the score of efficiency, though the loss from leakage, in practice, would probably be much greater with the former. But high-pressure air mains are less flexible, and probably more expensive in most cases, than electric power mains. Certainly compressed air could not be considered for transmission, unless it is also used for general distribution."

"The distribution of power, however, is largely the key of the whole problem. The reasons that have given electricity almost the entire field of general

\*See Dr. Mond's remarks on paper by H. A. Humphrey on Power Gas and Gas Engines, Inst. M. E., Dec., 1900.

\*The Transmission and Distribution of Power from Central Stations from Compressed Air.

power distribution might be considered sufficient to establish its universal use in mines. Such, however, is not the case, and the best practice to-day may be found in the combination of air and electricity. Evidently electricity is not considered as meeting all the special requirements of mine work. The reasons are not far to seek, and the question to be considered is,



Electric Machine Drill.

can electricity be made to do equally well the work for which air is now used?" \* \* \* \* \*

"The air-power system owes its existence in mines to the percussion drill. Electric power is not well adapted to develop reciprocating motion for rough work. The simple and rugged construction possible in a piston drill, and above all the elastic steam or air cushion, gives these agents great advantage over electricity. A number of electric percussion drills have been and are made, using either solenoids to develop reciprocating motion or converting rotary motion of motors to reciprocating by mechanical means. One form of the latter type might be considered electro-pneumatic, the drill piston being actuated by compressed air delivered by what may be called the motor-driven piston."

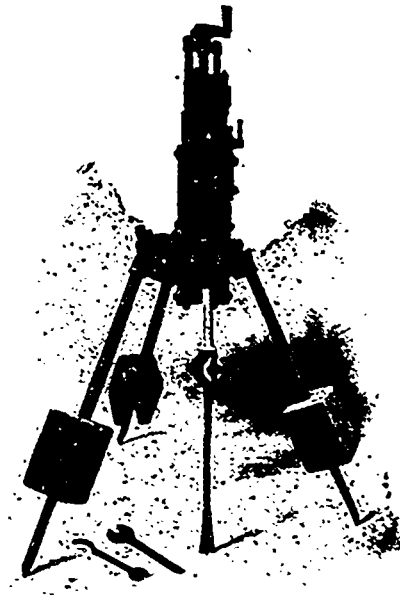
"The advantage of permitting the adoption of a single agent for all power distribution, and its high efficiency, are in favour of the electric drill; but in simplicity, strength to withstand rough usage, and general reliability, the air drill still holds its own. It is doubtful if the electric drill can be made to compete with the air drill strictly on its own merits, but at the same time it hardly seems to have received all the attention it deserves. From the nature of electric power, one would look for improvements in the direction of rotary drills."

"With the exception of the rock drill, there is little argument in favour of air versus electricity in mines. There are no problems in haulage to which the elec-

tric motor is not well adapted. The control of motors for very large winding machines is somewhat simpler with air than electricity, but the latter power gives a more uniform torque, equal or greater nicety of adjustment, and higher plant efficiency. For cable haulage up slopes, and for traction work, electric motors are well suited. The air locomotive has a limited mileage and requires a supply system at 500-lb. to 1,000-lb. pressure, which is costly, not altogether safe, and is too high for drills, hence making a double air-supply system necessary. The air locomotive is also more bulky and generally requires more head room than the electric locomotive." \* \* \* \* \*

"Air power is advocated as better than electricity in that it assists ventilation in mines. Ventilation by high-pressure air is not good engineering, and the power wasted in the air drills would make things better for the miner if expended in motor-driven fans drawing air from main headings ventilation shafts. Electric mains are better adapted to running through shafts, crooked tunnels, etc., than any other power conveyor. There is but one requirement—they must be insulated. Without going into details, it can be confidently stated that there are no difficulties in insulating conductors in mines that cannot be overcome by intelligent engineering using ordinary materials."

\* \* \* \* \*  
 "In respect to danger from shock, it may be said that this also has been exaggerated, it being human



Compressed Air Machine Drill (Canadian Rand Drill Co.)

nature to fear the mysterious. When a man is killed by a falling roof, dynamite explosion, or even by foul gas from a 'flaming' air compressor, the cause of death is understood. To be knocked over by simply touching a wire is uncanny and impresses the imagination. Up to 300 volts the danger from shock is nil, while above 500 volts it begins to be serious. It also happens that 500 volts is about the maximum for satisfactory direct-current motors, which are the type

best suited to traction work." \* \* \*

"While an exact statement as to the element of danger from shock due to the introduction of 500-volt pressure into mines cannot be made, it can be fairly said that this element does not add materially to the risks of mining. It is indeed a question whether the elimination of animal power and underground stables by substituting 500-volt traction would not, on the whole, increase the miner's expectation of life. To anyone familiar with the work now done in mines

and steel works by electric power the question of power distribution in the former is confined to the kind of electrical machinery and methods to be adopted."

camps in all directions from Nelson, which is the distributing point for the greater part of the lower Kootenay and Boundary country. To the north lie the Ainsworth, Slocan and Lardeau districts; to the east there are the several mining camps bordering on the main Kootenay lake, and, farther away, the chief silver-lead sections of East Kootenay; to the south are Ymir, Salmo and Erie camps, while to the west are the important mines of Rossland and the Boundary. With all of these mining districts Nel-



Stack of Silver-Lead Bullion. Hall Mining & Smelting Co's Smelter, Nelson, B. C.

and steel works by electric power the question of power distribution in the former is confined to the kind of electrical machinery and methods to be adopted."

#### THE HALL MINING & SMELTING CO.'S SMELTER AT NELSON, B. C.

(BY E. JACOBS.)

**T**HE Hall Mining & Smelting Company's smelter, at Nelson, on the west arm of Kootenay lake is advantageously situated for the receipt of custom ores, which are brought to it from mining

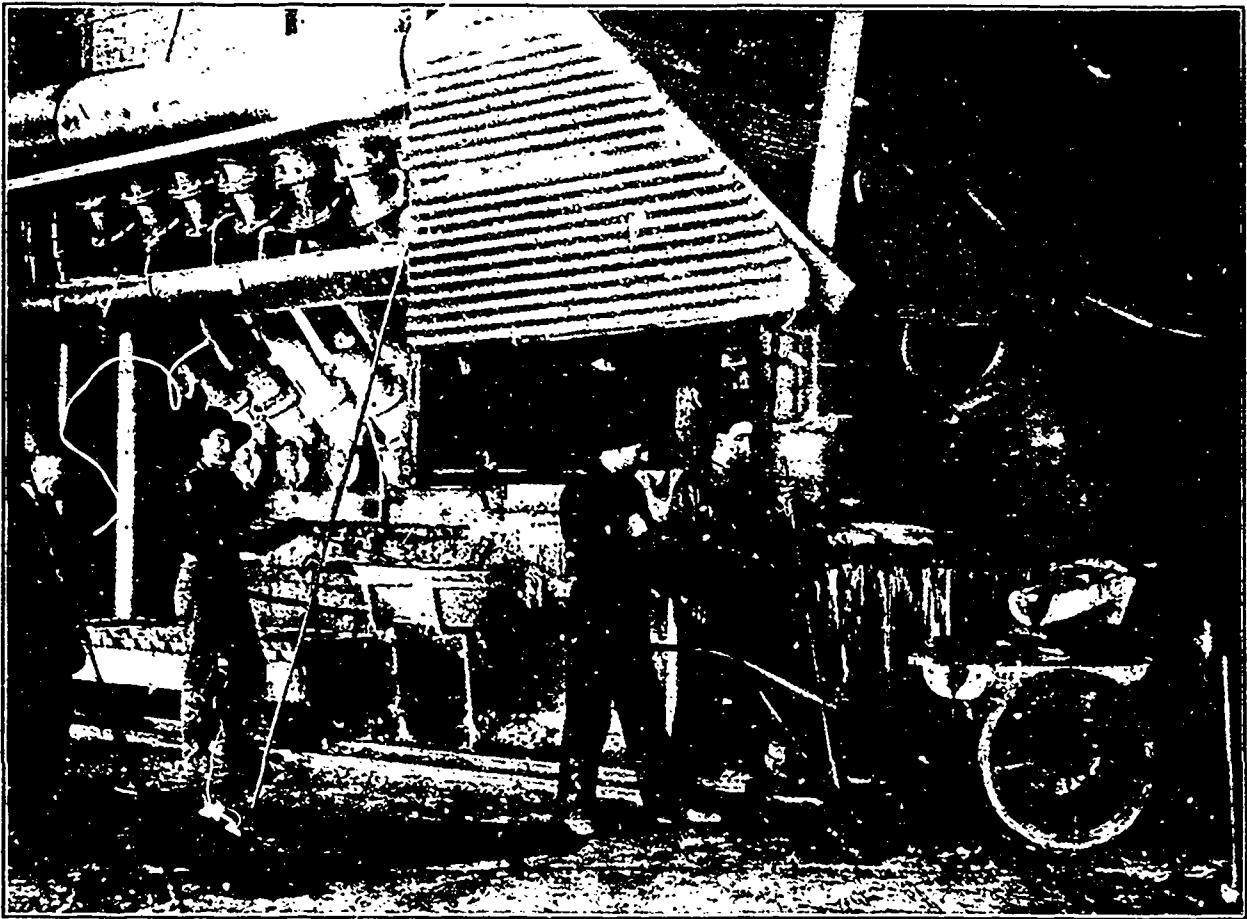
son has daily connection, either by rail or water. Ores from Ainsworth mining division are conveyed by water, steamers running between Nelson and Kaslo. From the Slocan they are taken either by C.P.R. (rail and steamer) via Slocan lake, or by the Kaslo & Slocan railway to Kaslo and thence by steamer. From the Lardeau the route is by C.P.R. (rail and steamer) over alternative routes—one down Trout lake, thence to Lardo by rail, and from there to Nelson by water, and the other via the Arrow lakes to Nakusp or Robson, where railway connections are made. From Kootenay lake points steamers carry ores, and from East Kootenay the Crow's



Nest railway brings them to Kootenay landing, whence the loaded cars are transferred on big scows to Proctor and hauled thence by rail. Ymir and other camps to the south send ores and concentrates over the Nelson & Fort Sheppard railway, while Rossland and the big Boundary district have close connection by Canadian Pacific railway between the mines and Nelson. Rossland, however, does not send its ores to Nelson, these going to Trail or Northport, nor is the Boundary a source of any considerable tonnage to outside smelters, having its own copper reduction works to treat the great bulk of its large production of copper-gold ores. Nevertheless, Nelson is cen-

tation from the mines to the smelter were provided by the construction, at a cost of about \$50,000, of a Hallidie aerial rope tramway, 23,250 ft. in length, having a total difference in elevation between terminals of 3,750 ft., and an average carrying capacity of 132 tons in 10 hours.

The smelting works, as originally erected and equipped, were designed by Mr. Paul Johnson, E.M., who also supervised their construction and operated them until his resignation in 1897, when he was succeeded as superintendent by Mr. Robert R. Hedley, metallurgist, who has been in charge nearly eight years. The works were built for the purpose of



Pouring Molten Metal into Moulds.

Lead Smelting Furnace.—Hall Mining and Smelting Co's Smelter, Nelson, B. C.

Drawing off Slag.

trally situated, which advantage generally secures for its smelter a fair share of the available custom ores.

The Nelson smelter was built in the latter part of 1895 by The Hall Mines, Limited, an English company owning the Silver King group of mines, situated on Toad mountain, about five miles from Nelson. The Silver King was the earliest mineral discovery in the Nelson district. It was accidentally found in 1886, located in 1887, and in 1893 was sold to the incorporators of The Hall Mines, Ltd., which company afterwards acquired the adjoining property of the Kootenay Bonanza Company. Means of transpor-

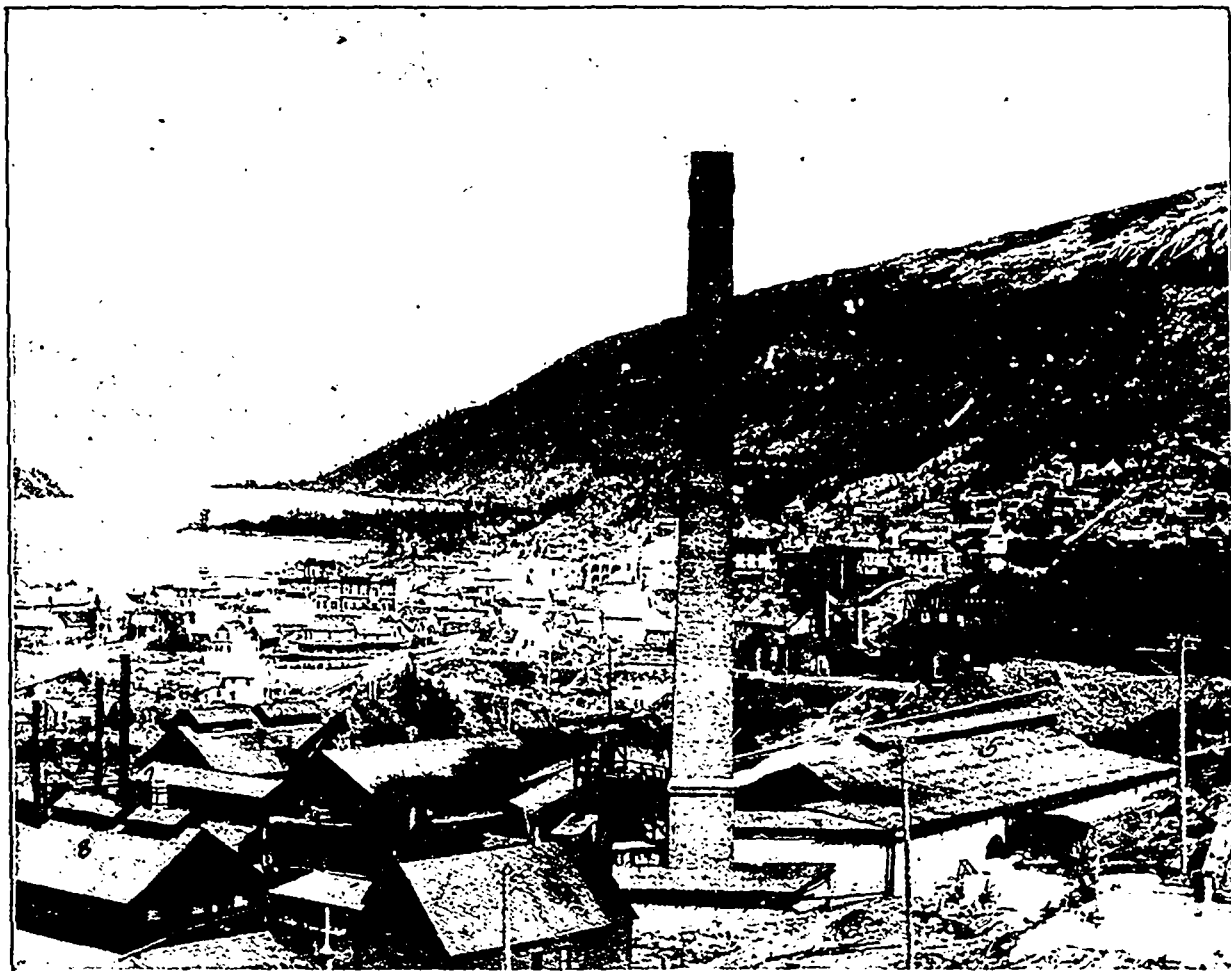
smelting the product of the Silver King mine, which was a copper-silver ore. The record for the first year's work was as follows. From January 14, 1896, to January 1, 1897, one 42 by 100-in. furnace was in blast 255½ days and smelted nearly 30,000 tons of Silver King ore, which returned an average of 21 oz. silver per ton and 3.7 per cent copper.

The Silver King mine was extensively equipped and was worked on, what was at that stage of the development of the district, a comparatively large scale, and for years it was productive. By 1900, though, the output of the mine had been much de-

creased, and eventually, in the early part of 1902, the production of ore by the company having meanwhile become unprofitable, the directors suspended mining operations. Prior to the reconstruction of the company (the Hall Mining & Smelting Company having been organised in 1900 to take over the property of the Hall Mines, Ltd.,) the original company tried lead smelting in a more or less experimental way, with the object of determining whether the con-

and in this way the plant has been in large measure modernised and rendered thoroughly efficient, so that good metallurgical results have been attained and all classes of ores received have been treated economically and completely.

The smelter was built on a high bench or hill-side near the lower end of the ropeway, on the outskirts of the town of Nelson, and one-quarter of a mile from the Kootenay river, or what is here known as



Hall Mining & Smelting Co's Smelter, Nelson, B. C.—General View.

1. Ore Bins, Silver King. 2 Laboratory. 3. Ore and Coke Bins. 4. Sampling Mill. 5. Mechanical Roaster and Briquetting Plant. 6. Crusher Plant. 7. Blast Furnace. 8. Merton and Hand Roasters. 9. Boarding House.

ditions were favourable to making the works a custom smelter. The results were such as to influence the management to include in its operating policy the purchase of any ore offering, and one furnace was altered to adapt it for lead-smelting, and other necessary changes in, and improvements to, the plant were made. Later, the supply of copper ore, excepting small shipments, having practically ceased, the other furnace was similarly adapted to the requirements of lead ores and dry ores, and the work of the smelter has since been almost altogether confined to these ores. Since reconstruction about \$160,000 has been spent by the company on improvements and renewals,

the west arm of Kootenay lake. The works as at first constructed included 7 bins of 1,000 tons each at the rope tramway terminal and a 2-car gravity tramway 400 ft. long to the smelter ore bins; bins for coke and fluxes; sampling works having crushers, rolls, samplers, etc., in a two-storied building 40 by 60 ft.; furnace room with two water-jacketed blast furnaces, one 42 by 100 in. at the tuyeres and another 44 by 144 in.; dust chambers of brick on a stone foundation, 175 ft. long, 8 ft. wide, and 10 ft. high, leading to a red brick smoke stack 177 ft. high from its base and nearly 200 ft. above the furnaces; engine room; solid masonry water supply reservoir, capacity 150-

000 gallons, elevation 50 ft. above the smelter floor; and other necessary buildings and equipment. The smaller furnace was blown in on January 14, 1897, and the larger on September 5 of the same year. Both American and European coke was used; the American coke, obtained from Wilkinson, Washington, contained a high percentage of ash—18 to 19 per cent—and cost delivered at the smelter \$13.40 per ton; the Welsh or Cardiff coke cost \$15 per ton delivered, while some imported from Westphalia cost rather less. The European coke came by sea to Vancouver and thence by rail and river steamer.

When visited last year the plant consisted of a sample mill, with bucking room for final preparation of samples; a well-equipped laboratory and assay office; two blast furnaces, one 42 by 100 in. and another 44 by 144 in.; one mechanical double-hearth, straight-line roaster, and three large hand roasters. Two blowers, driven by a 100-h.p. induction motor, supplied air for the blast furnaces. In case of accident to the electric plant, steam power was available for this purpose.

The sample mill was equipped with the customary crushers and rolls, and provided with an automatic device for cutting out a sample from a shipment of ore. The mill was operated by a 50-h.p. induction motor.

The blast furnaces had a treatment capacity of from 180 to 200 tons of lead charge per diem. The water jackets were of wrought steel. The slag was automatically removed by water granulation. The matte produced in the blast furnaces was crushed, rolled and screened in a well-designed sulphide mill, in order to reduce it to a suitable condition for roasting.

The mechanical roaster was of the O'Hara type, and was designed to save labour as far as possible. As the roasted product was discharged it was mechanically conveyed to the briquetter house, where it was automatically mixed with lime and passed through the briquetting machine, which made it into bricks for charging into the blast furnaces.

The machine shop contained lathes, shapers, drilling machines, and all other tools needed. Wherever possible work was performed automatically. Motive power in all departments was derived from Canadian General Electric induction motors, of which there were eight, aggregating more than 300 h.p. Electric power was obtained from the hydro-electric power station of the West Kootenay Power & Light Company at Bonnington Falls, distant about 11 miles west of Nelson, and it was delivered at the smelter at a pressure of 550 volts.

That very considerable improvement has been made in smelting facilities and in the plant generally during several years last past is evident from the following brief review of the changes and improvements effected:

The first considerable step taken was the erection of a mechanical roaster and briquetter, the construction of which was started in the autumn of 1900. This roaster was of the double-deck straight-line

type, which, at that time, was considered the most economical.

Twelve months later the installation of electric power was arranged for, and within a short period, a complete system was installed, whereby each department was provided with its electric motor, supplied by power from Bonnington Falls.

Later on, when through failure of the Silver King mine ore supply it was found necessary to discontinue copper smelting entirely, a general system of improvement was planned and put into force, as conditions seemed to warrant and circumstances permitted. Both furnaces were fitted with crucibles and adapted to lead smelting. The track system was improved with a view to economy in handling.

During the past 18 months conditions appeared to improve, and there being a promise of an abundance of ore to keep both furnaces in constant operation, a large expenditure in labour-saving additions to the plant was made. This is especially notable in the bin system; and provision was made for handling by gravity the coke and fluxing-ores. The former is discharged direct from cars into a capacious bin, which delivers directly to the furnace charge barrows.

The fluxing ores, which are of iron and lime, and are a considerable and constant factor in the business, are discharged from railway cars into a hopper bin, thence elevated by skip to a crusher, which delivers by endless belt to gravity bins convenient to the furnaces, at which point they are automatically sampled.

Bins were also constructed to receive the St. Eugene concentrates direct from the cars, thereby economizing further. Another set of six bins receive fine lead and gold concentrates, or other roasting ores. These deliver by gravity to cars beneath, and thence by elevators and tracks to all roasters.

All other ores purchased must, of necessity, be bedded, in order to get a suitable mixture when charging the furnaces. It is, therefore, not feasible to handle these through gravity bins, but they have to be shovelled from the floor and wheeled to the furnace. The system, however, has been arranged for the greatest convenience and necessary grades minimized.

The sampling mill has been provided with an automatic sampling device for custom ore, which, however, makes but one cut, the old hand system of coning and quartering being adhered to after that, because it is considered more accurate and reliable, though a little more costly.

A yard has been laid out and paved for the calcined product of the hand roasters and tracks and elevators transport the ore direct in cars from the roasters to this floor, which is convenient to the blast furnaces.

The latest improvement is a Merton roaster, now in experimental operation. It is anticipated this roaster will do better work at a lower cost than others. Its merits were thoroughly investigated before it was adopted. The furnace is compact, occupying a floor space of about 9 by 35 ft. It has three decks in the body of the furnace and one exterior hearth.

The great advantages claimed for the furnace are that the system of rabbling is such as to lift and turn over every particle of ore with every revolution, exposing it more thoroughly to oxidation than any other system. Further, the exterior hearth makes it possible to obtain any degree of heat or oxidation.

The management of the company, which since reconstruction has been in the hands of Messrs. R. R. Hedley and J. J. Campbell, the former under the title of smelter manager and the latter as agent and business manager, has in intention an improvement in the method of handling the furnace products, especially matte, and in preparation therefor is erecting on a small scale a bag house in which to filter the furnace fumes, these to be collected by means of a powerful fan and suction pipes. The draught funnels heretofore in use over everything that gave off fumes drew these away and into the stack, so that trees and grass grew luxuriantly about the office and close to the smelting works. The further improvements now arranged for will, it is anticipated, have the effect of giving the men working about the furnaces a still clearer atmosphere, practically free from fumes.

#### PRESENT OUTLOOK FOR THE SMELTING OF ZINC ORES IN THE UNITED STATES.

THE *Iron and Steel Trades Journal*, of London, England, lately published the following notes by the well-known zinc specialist, Mr. Walter Renton Ingalls:

"Zinc smelting in the United States may be divided into eastern and western practice. Eastern zinc is chiefly from the old workings at Franklin Furnace, N.J., Friedensville, Pa., or the Bertha Furnaces in Virginia. The ores are lead free and make a very pure spelter, which commands a correspondingly high market price.

"In 1892 some small zinc furnaces were erected in Indiana, using natural gas as fuel, but with the failure of the wells they were closed. In 1895, following the discovery of natural gas at Iola, Kansas, zinc smelting was begun, and there are now in that State 20 plants with 60 ovens and about 37,500 retorts, with a yearly consumption of about 5,000 tons of ore per oven. At first the gas was very cheap, but when the owners began to recognise the value of their property, prices rose. With the increased use of the gas the pressures began to fall, and the plants were compelled to purchase larger rights to secure themselves in their supply. In none of the plants was the gas consumption measured, but by calculating from the fuel requirements of similar ores, it has been estimated that about 1,200 cubic metres of gas, costing about \$90, are necessary per ton of ore.

"The increased cost of natural gas, combined with the increased labour rates, both at the smelters and at the mines of the Joplin district, have worked together to raise the cost of zinc in the United States. In 1902 and 1903 this steadily increased until, at the end of the latter year and for the first half of 1904, the

demand sunk so rapidly that to stimulate it prices had to be reduced to such an extent that any further reduction would have forced the mines to close.

"At present the main source of ore is the Joplin district. The new sources in Colorado, British Columbia, and Wisconsin are, however, entering the market and must react unfavourably on the prices of Joplin ore. The main line adopted seems to be the recovery of by-products, through roasting for sulphuric acid, and the smelting of lead and silver-bearing ores, with furnaces either located on outlying parts of the natural gas field or utilising gaseous fuels made from coal."

#### THE CONVENIENCE OF THE SMALL MOTOR.

THE usefulness of small electric motors is becoming more generally recognized. As they can be used to advantage about mines and smelters, the following from the *New York Electrical Review* may prove of interest to readers of the *MINING RECORD*:—Whichever way one turns in these days of widespread electrical activity, the small motor is seen quietly doing its work at high efficiency and with great reliability and convenience. The store windows of our large cities are full of apparatus silently and steadily operated by an unobtrusive little motor tucked away beneath the shelf, but it is in exhibitions that the full force of these advantages is felt in comparison with the old method of driving apparatus by belting from rigid line shafts, wastefully propelled by belted steam engines and accompanied by an utter lack of flexibility but a plentiful supply of dirt and noise.

An instance of the convenience of the small motor for exhibition purposes was seen in the recently held automobile and power boat show at Boston. Many of the exhibitors desired to illustrate the exact working of the engines, gearing and transmission shafts, reverse levers and clutches of their respective machines. The problem was easily solved by belting a small motor to the mechanism, raising the automobile itself from the floor on a supporting frame or set of blocks and turning on the current. Where the machinery was exposed, either under glass or without covering, the operation was shown with the utmost facility.

Even among the supply exhibits the small motor was kept busy. Sprocket wheels were set up and hung with chains that were kept in motion by a small motor; a special lathe was propelled in a similar way; cyclometers and speed indicators were made to revolve; sign flashes, wheels equipped with different kinds of tires and even lubricator pumps and filters were operated by the same power. Throughout the exhibition it was evident that the ease of installation, compactness, operating safety, simplicity and convenience of the small motor were heartily appreciated, and in the manifold applications of this clean, reliable power, the exhibition was full of special suggestion.

## YUKON MINING NOTES.

It is reported at Dawson that good pay has been found on Selwyn river, on claims which a man named Swinehart has been prospecting for some time.

A cross-cut is being driven from a 165-ft. shaft on the Bald Eagle, Big Skookum, which runs near the productive hill known as Gold Hill, situated opposite Grand Forks. It is expected that the lode will be reached shortly and that the quartz will run high in gold.

The winter having been an exceptionally mild one and the average thickness of the ice on the Yukon river only between 24 and 30 in., it is expected that the ice this year will break earlier than usual, and that the river will be open to navigation and mining operations in full swing early in the summer. Already the number of unemployed men in and about Dawson is comparatively small, for preparations for the season's work are in progress on many properties. The spring clean-up of dumps accumulated during the winter will shortly be commenced, and extensive operations connected with the opening up of much new ground will further absorb available labour. Besides mining work, the construction of the Klondike Mines Railway is in hand, grading having been commenced and the preparation of material for the railway begun. More men will be put on construction as the season advances and bridge work can be undertaken. The first big bridge to be constructed will be a Howe truss, having three spans between four large stone-filled, wooden-crib piers. There will be two 100-ft. spans and one 80 ft., and the superstructure will be of wood and iron. The total length of the bridge will be 330 ft. The building of the piers will be pushed before the spring freshets bring high water.

A miner who lately reached Dawson from the Forty-mile country claims to have discovered at Mosquito crossing what is known as the "white channel" of the Klondike. He states that the character of the dirt is similar to that of the famous "white channel," and that he found outcroppings of it along a stretch fully two miles in length. The dirt he panned gave good prospects in colours.

Good pay is reported to have again been struck on Eureka creek, which was regarded as having been worked out. The old miners seem to have overlooked this paystreak, which dipped under a bench. Bedrock is 35 ft. deep, and the stratum of pay gravel about 4 ft. thick. On discovery, drifting has proved the pay streak there to be at least 35 ft. wide. On one of the claims the pay dirt runs two to three cents a pan. Some 30 men were working on the creek when the news of the strike was brought down.

Two nuggets of gold recently found in the vicinity of Hunker creek have been attracting attention. The larger one, weighing 26 oz. 5 dwt., was found in Mint gulch, a tributary of Hunker creek. The gold is entirely free from quartz and is of an estimated value of \$16.20 per oz. The second nuggets came from

the property of the Klondike Consols; it weighs exactly 7 oz. and is of similar quality to that of the larger nugget.

Reliable reports from Duncan creek, Stewart river, indicate that the deep gravels of that district may occasion a production to rival the palmy days of Bonanza and El Dorado. No shaft has yet reached bedrock except on Hiatt creek, where the average depth to bottom is not over 20 ft. The deepest shaft on Duncan in February was 139 ft., with no sign of bedrock. The water is very heavy, and many shafts have been flooded.

A miner in from Stewart river, brings the information that there are 25 men working on Henderson creek and 20 on Thistle creek. Some of the workers on Henderson have rich pay, and all on both creeks have good dumps that promise to clean up well. A number of men have started for Big Gold, a tributary of Sixty-mile river. Many from Glacier and Miller creeks have staked ground. Other tributaries of Sixty-mile, believed to be equally as rich as Big Gold, will be prospected next summer, that part being regarded as the coming section of the territory for rich diggings.

All the stages coming in from Whitehorse are bringing passengers, most of them being men who have been outside for the winter and are now returning for the season's work on their claims. Owing to the breaking up of the ice and the bad state of the roads for staging, fares were to be raised \$25 to \$50 from April 1. When the travelling shall again be good rates will probably be reduced.

The promoter of the railway from Chena to Fairbanks and the creeks has left Dawson for the Tanana. The company that will build the line has 180 tons of rails at Dawson and 800 tons more at the mouth of the Hootalinqua, the latter having been started from Whitehorse too late last season to admit of their being taken through to Dawson before navigation closed.

News has been received from Fairbanks of a stampede for the scene of some new discoveries on several streams about 100 miles up the Tanana river from Fairbanks. On Tenderfoot creek coarse gold, averaging 11 cents to the pan, is reported to have been struck at a depth of three feet. At Little Delta it averages 10 cents, and along Gerstle river 8 cents a pan. The showings generally are stated to be better than at Fairbanks, and the whole country for miles is being staked.

## A NEW GOLD-SAVER.

FROM the recently-received New Zealand official publication, "Papers and Reports Relating to Mining, 1904," the following description and illustration of McLeod and Hurley's patent "Dividend" Gold-savers has been taken:—

"So many forms of gold-saving plates have existed for the past fifty years with very little improvement in the principle of construction that an original idea, involving a radical departure from old ideas, is interesting and worthy of record. The designers have

started out with the task of saving fine gold—not necessarily black-sand gold, although that is part of their programme for the future—and in ignoring coarse gold, they have, perhaps acted wisely. The trouble on dredges and with sluicing claims is not that the coarse gold is lost, but that the fine gold is lost, and in proportion to their success in winning the finest samples of gold, will the savers replace other plates and justify their name. It is claimed that at the tail of save-alls and in streaming down, these savers have proved to be far superior to any other appliances yet used for saving fine gold, and that so

to 2½ in. in thickness, and 1 ft. square, the cells or holes going through them, so that they are really false bottoms resting on the push or matting of the ordinary tables.

"The cells, by their distinct shape and aided by the current of water carrying 'wash' with it, set up a motion peculiarly their own, the result being a series of eddies each directed towards the one object in view, namely, that of precipitating the gold to the bottom of the cell and lifting the 'wash' which has been treated over the top rim of one cell into the successive cells, where it will again and again be



McLeod and Hurley's Patent "Dividend" Gold-Saver.

far on the main spread of tables they are, at any rate, as good as present appliances. It is hoped to be able to demonstrate by experiments, now proceeding, that when the savers have been nicely adjusted to the water conditions on the main tables, they will be as effective as on the save-all.

"It is not claimed that for black sand they have done any more than save exceedingly fine gold, much of which was amalgamated through contact with the silvered plates. Further trials are to be made with black sand, but at present the inventors are pushing their experiments in the direction of the finest gold in ordinary wash. The plates used are from ¾ in.

treated until it finally drops back into the river or tail-race.

"In these savers the 'wash' is led down a gentle slope towards the bottom of each cell, which it enters in such a way that the whole of the contents of the cell feel the influence of the eddying water. The interiors of the cells are constructed so as to retain all gold which reaches the bottom, and the immediate effect is the formation of a skin of concentrates over the particles of gold at or near the bottom of the cell. These concentrates are constantly in motion, and the strength of the current at the base of the cells is far less than at or near the top, the result being a

settling or precipitation of the gold and the carrying off of the 'wash,' leaving the gold behind. In the ordinary pattern there are thirty-two cells to a square foot of saver, but for black sand the savers will contain perhaps several hundred cells to each square foot. At present the problem being worked out is the adjustment of the depth of the cells to the requirements of 'wash,' and this must necessarily take time and money before the adjustment becomes perfect.

"The advantages claimed for the savers are as follows:

"1. Being made of cast-iron (and later probably this will be hardened) the wear-and-tear is reduced to a minimum.

"2. Being plates, they can be put down on plush or matting exactly as expanded metal is put down, except that they are heavy enough to remain in their places without being nailed or otherwise fastened.

"3. Each cell is by gravitation automatically doing the work of the miner when 'panning off,' and to have (say) ten savers on a dredge means that 320 cells are 'panning off' continually and passing on what each has finished to the cell next below.

"4. Perpendicular 'dead riffles' catch and hold the finest of the light gold.

"5. All 'wash' entering the cells is kept moving in such a manner that the gold is precipitated, whilst the 'wash' is carried on over the top into the next cell, and so on.

"6. The savers may be lifted separately, and may be used either along the ends of the save-all and tables, or may cover the save-all and tables from the tail upwards for a few feet or more.

"7. Where the flow of water is insufficient to obtain the automatic motion required an outrigger may be placed at the tail of the tables and the savers may then be used on the outrigger which should be placed at an angle sufficient to give the necessary fall.

"8. The cost is very moderate."

The illustration shows a foot-square saver, the white portion representing plush or matting underneath the saver.

#### LOW-COST TUNNELLING WITH ELECTRIC DRILLS.

FROM Mr. J. B. Hobson, manager of the Consolidated Cariboo Hydraulic Mining Company, it has been ascertained that some low-cost tunnel-driving was done late last season in the course of development work at the company's big hydraulic mines at Bullion, Cariboo district of British Columbia. This was in No. 1 sluice tunnel, dimensions 10 by 10 ft., being driven in hard augite-diorite. The tunnel was started at the third point mentioned in the manager's report for 1903. When completed it will be 1,200 ft. long, about half of which length had been driven when last season closed. Beside the re-

maining 600 ft. of driving, about 100 ft. of raising will have to be done, to connect with the hydraulic excavation above, from which it will be an outlet to the dumps for the ground worked in that pit.

Costs during the earlier part of the work were higher than latterly, the men employed having become more accustomed to the electric drills used, and the ground better for driving. The machines in use were two No. 15 Gardner drills, driven by 2-h.p. electric motors. Costs from September 5 to November 17, inclusive, working two 8-hr. shifts per day, were as under:

	Sept.	Oct.	Nov.
Labour . . . . .	\$ 936.00	\$1,153.50	\$645.25
Powder . . . . .	389.00	316.80	150.24
Fuse . . . . .	15.59	27.72	29.10
Caps . . . . .	5.00	8.50	5.00
Candles . . . . .	8.10	8.10	6.35
Sundries . . . . .	41.23	268.77	49.05
Blacksmith . . . . .	91.00	40.00	35.00
Stable . . . . .	50.00	25.00	15.00
<b>Totals . . . . .</b>	<b>\$1,535.92</b>	<b>\$1,848.39</b>	<b>\$935.59</b>
Feet driven . . . . .	127½	174	92½
Cost per foot . . . . .	\$12.05	\$10.62	\$10.11

NOTE—October costs include \$209.58 for two Stowe flexible shafts, the life of which should extend over about six months.

#### TO SEARCH FOR PLATINUM.

OWING to the increased demand for platinum, the United States Geological Survey is about to make an examination of the platinum resources of the United States. It is proposed to collect the heavy sands from all placer mines in the United States where evidences of platinum have been observed. The samples thus obtained will be used in determining the best methods of extracting the various minerals which have economic value. It is hoped that the separation and sale of these useful minerals, such as magnetite, chromite, garnet, monazite, rutile, zircon, gold, platinum, etc., will in many places, become a permanent and profitable industry. As a preliminary step to this investigation, the Survey invites the owners of placer deposits to contribute for examination samples of material likely to contain platinum.

As a help to prospectors, the Survey publishes the following facts about the quality of platinum.—

Pure platinum is a silvery white metal with a specific gravity of 21.5. With the exception of iridosmium it is the heaviest metal occurring in nature. It is almost as hard as iron and is very malleable. Platinum does not amalgamate with quicksilver, is not dissolved by potassium cyanide when cold, is not attacked by acids, except the mixture of nitric acid and hydrochloric acid known as aqua regia. It is more difficult to melt than gold.

Native platinum has been found most frequently in gold-bearing sands. On account of its weight it re-

mains in the sluices with gold and other heavy material. It is most readily distinguished by the following characteristics:

(1) Its great weight. In panning it remains behind even gold in the pan.

(2) Its white color. It is whiter than lead and is distinguished from amalgam by its smooth surface, whereas the surface of amalgam as seen under a good glass is rough.

Native platinum is usually very impure; occasionally it contains so much iron and so many other impurities as to be dark in color and not easily distinguished from chromite, with which it is commonly associated. It frequently contains iridosmium, which occurs as flat, angular scales, while platinum grains are usually rounded, like gold dust. Platinum grains are usually smaller than gold grains. Large nuggets are very rare.

#### A SPECIAL FORM OF SLAG-CAR.\*

(By L. J. W. Jones and B. H. Bennetts, Tacoma, Wash.)

**T**HE removal and disposition of large quantities of slag from blast-furnaces is a question of great importance in the design of works, and various methods have been devised, from time to time, in order to take the best advantage of local conditions.

In blast-furnaces treating copper-ores or lead-ores, it is necessary to use a fore-hearth, or matte-settler, in order to collect, if possible, every particle of valuable matte which, otherwise, would be carried away with the out-flowing slag. In all of these cases, the slag overflowing from the fore-hearth is caught in pots and then conveyed to the dump. If the slag is of no value and the necessary water-supply, grade and dumping-space be available, the disposal of the slag by granulation is by far the cheapest and best

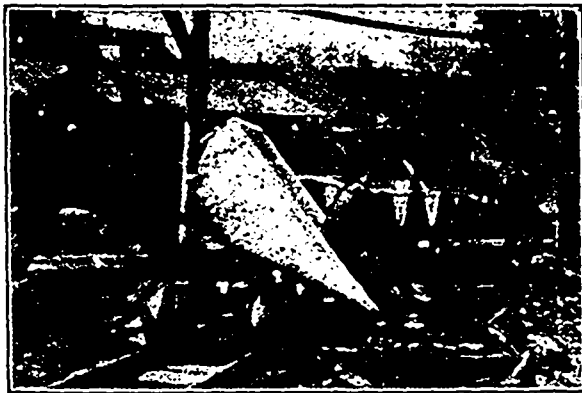


Fig. 1.—Method of Discharging the Slag-Car.

method. It involves a minimum of labor, both at the furnace and at the dump; and it permits a continuous

\*Transactions of the American Institute of Mining Engineers. Read at Annual Meeting, February, 1905.

outflow of slag from the furnace- or settling-pot, thereby avoiding frequent tapping and plugging. When the conditions of water-supply, grade and



Fig. 2.—Method of Discharging the Slag-Car.

dump-area will not permit slag-granulation, there are three other methods in common use. Large steel or cast-iron pots, or ladles, supported by trunnions on heavy cars which are moved by steam, air, or electric locomotives; some type of mechanical conveyor; and small pots or buggies moved by hand. The pots on the slag-cars are generally circular or oval in shape, and each one contains from 15 to 40 or more cu. ft. of molten material. The mechanism for tipping them is more or less elaborate; and, as a general rule, the slag is dumped alongside, and quite close to, the track. They are more or less costly to con-



Fig. 3.—Train of Slag-Cars and Electric Motor.

struct and to keep in repair, and, in order to use them to best advantage, it is necessary to have a good elevation of track above the dumping-ground; furthermore, the rails must be of heavy weight, and well-supported on heavy ties. Other disadvantages of the slag-pots are—1, that the slag cannot be removed continuously from the furnace, which must therefore be frequently tapped and plugged; 2, that the resultant cone-shaped masses of slag are unwieldy and difficult to handle; 3, that the slag is dumped at the side of the car only, and 4, that the pots cannot be brought close to the slag-spouts. For small plants the method of slag removal by large pots is too expensive, small



pots moved by hand, or larger pots of from 15 to 30 cu. ft. capacity, hauled by horse or mule, being generally used to convey the slag from the furnace to the dump.

In most of the older plants the tap-holes are only 4 or 5 ft. above the ground-level, and the height of the slag-pot and car is, therefore, limited to this small dimension. In plants of modern construction, however, as at Butte and Anaconda, Mont., the slag-spout is of sufficient elevation to allow the use of larger pots or ladles.

At the copper blast-furnaces of the Tacoma Smelting Company, at Tacoma, Wash., a fore-hearth, 14 ft. in diameter, was used to collect the matte. The slag overflowing therefrom was formerly granulated by a stream of water, resembling the practice at the Anaconda furnaces. The ground-level, however, was only a few feet above tide-water, which required the use of a belt-elevator in order to gain sufficient height so that the granulated slag could be washed into the Sound. The water-supply was small, and there was so much trouble with the belt elevator that its use was finally abandoned. Another reason for its abandonment was the fact that the granulated slag could not be used for filling-in or building purposes, and the company needed to reclaim a large area of ground, in order to provide for an extension of its plant. After experimenting for some time, we designed a special slag-car, to run over the 18-in. gauge industrial railroad with which the works was equipped, of the following description:

As is shown in Figs. 1 and 2, the pot itself, shaped like a rectangular scoop, has the discharge-end projecting well beyond the centre of the car, so that when the pot is turned and tipped the slag will be thrown well clear of the tracks. The cast-iron pot, weighing about 1,100 lb., is mounted on a cast-iron turn-table, supported by a I-beam truck, equipped with 2-in. square axles bolted to the frame, with the ends machined down for the journals. The wheels of chilled cast-iron, 11 in. in diameter, have roller bearings which are held in place by heavy cast-iron washers; and a wide tread. Each car complete weighs 1,510 lb. and holds 1,600 lb. of slag. The cost of each car made in the shops of the company was \$75. So far they have been in use for 18 months; and, apart from the removal of a few bowls which were cracked through carelessness, no repairs have been needed. The pot is dumped quite easily, as is shown in Fig. 2.

A train of slag-cars, generally 12 in number, is drawn by an electric motor to the dump. The motor man without detaching the cars, trips the latch, revolves each pot on its turn-table to the desired position by means of a long iron-bar fitting into a socket at the back of the pot, and, by raising the bar, the pot is tipped and its contents discharged. The shell, or solidified crust, next to the sides and bottom, is released and discharged by tipping the pot with a jerk; but if the pot be gently tipped, the shell will remain in it. Fig. 3 shows a train of slag-cars and the electric motor.

A special advantage of this shape of pot is that the cars may be run in a continuous line without any intervening space between adjacent pots. This arrangement is of great value in receiving slag from a furnace which discharges continuously. There is no spilling or slopping on the truck or track. One man can haul out to a distance of 1,000 or 1,500 ft., tip and return to the furnace, 30 of these cars per hour, which is equivalent to 576 tons of slag per day. The slag, either liquid or solid, may be dumped forward, backward, or to one side or the other of the truck; in the latter case the slag is thrown at least 2 ft. beyond the ties; and, by using rails as skids, the solid slag-cake may be landed 18' or 20 ft. from the track. The cars are connected by an automatic coupler, which holds them at a given distance apart, and enables the train to be pushed or pulled without lost motion. Moreover, the automatic coupling-device removes the danger which is present when the cars are connected by hand.

Sixty of these new cars are now being used in the lead and copper plants of the Tacoma Smelting Company, replacing the older and more troublesome methods formerly used.

These cars, slightly altered, are used for casting base-bullion from lead furnaces. The dross can be separated more easily and the resultant bullion is cleaner than that made in the ordinary manner of casting.

#### DEVELOPMENT AND PROGRESS IN EAST KOOTENAY.

East Kootenay may fairly claim to be one of the most progressive of the mining sections of the province. It is a big district with large and valuable natural resources among which minerals take a prominent place. For years lack of railway transportation prevented development, but gradually this chief obstacle to the utilisation of its resources has been, and is still being, overcome. First, the construction of the Crow's Nest railway provided an outlet east and west for the coal and coke products of one of the most remarkable coal basins known. Next, the Crow's Nest Southern railway, now under the control of the Great Northern Railway Company, gave access, via Jennings, Montana, and the Great Northern system, to the markets of Washington, Idaho and Montana, to fuel from the Crow's Nest Pass Coal Company's collieries at Carbonado (Morrissey creek) and near Fernie (Coal creek), and when completed to Michel will afford similar advantages to the coal mines there, which heretofore, when shipping their products to Montana, have had no alternative to the route via Lethbridge and the Sweet Grass and Great Falls lines. Then, last year the granting of the bounty on lead resulted in the re-opening of the St. Eugene mine, at Moyie, the most productive silver-lead mine in Canada; also to the remodelling and completion of the lead smelting works at Marysville and preparations for working the Sullivan Group Company's mines near Kimberley. Now, the survey of the route of

the proposed Kootenay Central railway and the prospect of its construction are renewing interest in the mines of the Windermere division. Again, the preliminary work in progress in connection with the installation of a hydro-electric plant for the development of power on Bull river, in the neighbourhood of Fort Steele, and the extension of hydraulic and other placer-mining operations on other streams in that section of East Kootenay, are adding their quota to the advancement of the mining industry of the district. In other ways, as well, development and progress are evident, so that it is manifest the characteristic optimism of the several newspapers published in East Kootenay has a substantial basis. That the most sanguine anticipations may speedily be realised and the enterprise displayed by those expending large sums of money be amply rewarded, are sentiments that will find ready concurrence among all well-wishers of that highly-favoured district.

ANNUAL REPORT OF DOMINION SUPERINTENDENT OF MINES.

The following are excerpts from the annual report of the Dominion Superintendent of Mines, Dr. Eugene Haanel, for the fiscal year ending June 30, 1904.

*Dominion of Canada Assay Office.*—During the year 24,516.36 oz. of bullion, valued at \$385,152, representing 381 deposits, were received and assayed. These deposits were derived from the following sources:

Sources—	Deposits, No.	Weights, Oz.	Values.
Yukon . . . . .	70	3,391.97	\$ 53,764.60
British Columbia . . . . .	289	19,310.11	302,041.02
North-west Territories . . . . .	4	1,380.04	842.28
Ontario . . . . .	15	47.35	21,978.83
Alaska . . . . .	3	386.89	6,525.27
	381	24,516.36	\$385,152.00

From this table it is seen that 76.4 per cent of all deposits were obtained from British Columbia, and only a little over 18 per cent from the Yukon.

From the following table, which shows the business done by the Assay Office since its establishment.

Fiscal Years—	Deposits, No.	Weights, Oz.	Values.
1901-1902 . . . . .	671	69,925.67	\$1,153,014.50
1902-1903 . . . . .	509	36,295.69	568,888.19
1903-1904 . . . . .	381	24,516.36	385,152.00

it will be observed that the business done has steadily decreased. The causes operating to produce this decrease, which have been given in my report for the fiscal year 1902-03, remain unchanged.

*Government Indebtedness to Canadian Bank of Commerce.*—From one of the accompanying statements, it will be seen that the Canadian Bank of Commerce received from the Dominion of Canada Assay Office during the fiscal year under review, gold bars to the value of \$385,152 and realized from the sale of these bars and clippings \$386,798.96, showing a difference of \$1,646.96 in favour of the government. After deducting extra assay charges paid by the bank, express charges on bars sent to San Francisco, and

the commission due the bank for marketing the gold bars received from the assay office, the total amount of the government's indebtedness to the Canadian Bank of Commerce for the fiscal year was \$384.90.

The Seattle Assay Office does not receive bars under 500 fine, and all such bars had to be sold to the Selby Company, in San Francisco.

*Receipts and Expenditures.*—From another statement showing money received and expended by the Dominion of Canada Assay Office, and from the detailed statement of expenses of the assay office during the fiscal year, it will be seen that the expenditures amounted to \$11,681.27, and the earnings, including extra assay charges, special assay charges and value of sweeps and recovery of grains to \$1,888.16: The unexpended balance of the appropriation of \$18,000 amounts to \$7,417.25. The percentage of net expenses to the total deposits is 2.5425 per cent.

*Changes in the Staff.*—Mr. Charles S. Hurter resigned his position on August 30, 1903, to accept the position of Chief Assayer of the Tyece smelter. Mr. J. Walter Wells, B.Sc., formerly assayer for the province of Ontario, was appointed, October 31, 1903, to succeed Chas. S. Hurter as chief assayer. Mr. Wells was obliged, on account of ill-health, to resign his position on April 30, 1904. The business of the office not being pressing, it was deemed advisable in the interests of economy to dispense with the services of one assayer, and Mr. J. B. Farquhar, whose work as assistant assayer had been very satisfactory, was appointed chief assayer on July 1, 1904.

*Collection of Gold Dust and Nuggets.*—The collection of gold dust and nuggets ordered to be made from the Yukon, British Columbia and the North-west territories for exhibition at the World's Fair at St. Louis was assembled for us by the Canadian Bank of Commerce and handed over by the manager of the bank at Vancouver to the Dominion of Canada Assay Office for assay.

The collection consists of 75 specimens of gold dust from the Yukon territory and 13 specimens of gold dust and five nuggets from British Columbia. The bank did not succeed in obtaining nuggets from the Yukon territory, but as regards the occurrence of gold in the placers of the Yukon territory the collection represents almost every creek producing gold.

The collection, although not specially a show collection,\* is of great educational value, and should, therefore, after the exhibition, find a conspicuous place on the shelves of the museum. It will be impossible to replace it in a few years, since the placers from which the specimens were obtained will then be worked out.

THE YUKON.

*Quartz Mining.*—The agreement made between the government and Mr. Matheson, the contractor, to erect a modern 2-stamp mill, together with a concentrating plant, has been carried out, and has been certified by the government mining engineer as satisfac-

\*This collection received the gold medal at the Louisiana Purchase Exposition at St. Louis, U.S.A.

tory. The amount to be charged customers for trial runs has been fixed by agreement between the commissioner and the contractor at cost price plus 10 per cent to cover repairs. Very little milling has been done since the erection of the mill, on account of the great distance of the mill from the localities of the ore deposits and the consequent heavy freight charges.

Very little development work in connection with quartz deposits was done in the territory during the past fiscal year. The only notable exception was the sinking of a 150-ft. shaft and cross-cutting on the Violet group. The ore carries on an average \$9 in gold per ton. The company has made arrangements to erect a stamp mill having a capacity of 100 tons per day.

#### THE MINERAL RESOURCES OF VANCOUVER ISLAND.

**A** GENERAL report on the chief resources of Vancouver Island was recently prepared, by a resident well qualified to deal with this subject, for a company contemplating large expenditures that would materially assist in the further development of the Island and the utilisation of its resources to a very much larger extent than is now being done. While the report as a whole covered a much wider field, the following extracts relating to minerals and water powers have been made as likely to prove of more interest to readers of the MINING RECORD than the parts dealing with other resources.

##### COAL DEPOSITS.

First among its natural resources are the great coal measures of Vancouver Island, extending from Ladysmith north to Union, 75 miles or more. Sufficient of them are developed and improved to insure a long lease of life to the mines that are now being operated, and to their extensions. For instance, the Extension Mines, 11 miles from Ladysmith, from which the highest grade coal for domestic purposes on the Pacific coast is shipped, are known by borings and general prospecting to extend nearly to the city of Ladysmith. As representing this industry it might be mentioned that the coal shipped from the Island, to date, amounts to 19,940,587 tons, with a value of \$60,203,285, and the coke to 149,556 tons, with a value of \$947,780; a total of \$61,151,065.

##### METALLIFEROUS MINING.

On the west coast of the Island, beginning at East Sooke, mineral has been found and small shipments made from San Juan, Port Renfrew, Alberni, Uchucklesit, Clayoquot, Kennedy Lake, Taferno Inlet (Deer Creek), Bedwell Sound (Bear River), Trout River, Clayoquot Sound, Sidney Inlet, Ahousat, Abatlasett, Nootka, Kyuquot and Quatsino, while in the middle of the Island at Central Lake a large deposit of mineral has recently been discovered.

The schist beds lying to the south of the coal measures and commonly known as the Mt. Sicker schist belt, extend from Mt. Sicker up to the Nanaimo lakes. These have been opened and worked at seven points, along a distance of 40 miles, namely,

at Mt. Sicker, Mt. Brenton, Chemainus, Majuba, Rhinehardt, Nanaimo lakes, and Englishman's river. Owing to the fact that the land is heavily timbered, prospecting is necessarily slow and expensive, so great importance must be attached to the cutting of trails inland from the railway. As the result of making a trail, three years ago, from Ladysmith six miles out, several mineral locations have been made in that vicinity, including the Majuba, and extending west to the Rhinehardt and Nanaimo lakes property. It would appear to be of the first importance to cut trails in order to open up the country to the prospector. The opening up of this mineral belt and the development of the mineral claims will follow the construction of a branch road, and the route from Mt. Sicker and Mt. Brenton up the Chemainus valley appears the most feasible, as it would follow along the line of the claims mentioned to the Nanaimo lakes, on to and including Alberni.

It is stated that the Nanaimo lakes' properties have large showings of ore and would undoubtedly make producing mines with railway facilities, but not until these are provided can they ship out ore for treatment. Another mineral section is at the Campbell river upon what is known as the reserve of the Esquimalt and Nanaimo railway grant. The total quantity and value of the metallic mineral product to date of Vancouver Island and vicinity is given by the Provincial Mineralogist, Mr. W. F. Robertson, as 275,322 tons of a value of \$4,378,370.

##### WATER POWER.

Of water power, some large and permanent streams are found with natural falls: some again can without great expense, be developed. It seems safe to assume that great water power can be secured comparatively cheaply at various points on Vancouver Island. Particularly is this the case in the northern part of the Island.

#### ON UNIFORM MINING STATISTICS IN CANADA.\*

(By Eugene Coste, E.M., Toronto, Past President of the Canadian Mining Institute.)

**I**T is, I think, admitted by the members of this institute that an uniform annual presentment of mining statistics by the mining bureaus of the different provinces of Canada would be an immense advance in the interests of the mining industries of the country. The dominion government could then readily publish annually through the Section of Mines of the Geological Survey, or otherwise, complete uniform mining statistics of the whole country, simply adopting the uniform tables of the different provinces. A great deal would thus be gained and nothing could possibly be lost.

For this most important reason and for other reasons set forth in my short paper on this subject, which I had the honour to present to this institute two years

\*Read at Annual Meeting of Canadian Mining Institute, held at Montreal, Quebec, March, 1905.

\*\*Journal of the Canadian Mining Institute, Vol VI., p. 408

ago,\*\* permit me to suggest the adoption of the annual publication by the mining bureaus of the following two tables:—

TABLE A—MINERAL PRODUCTION.

In which the first marketed products of all mines, quarries and concentrating mills would be recorded by quantities valued at the places of production.

TABLE B—MANUFACTURED PRODUCTS FROM MINERALS.

In which the quantities of metallic or other manufactured products from smelting, metallurgical, chemical, or other works, would be recorded as finally produced and marketed at these works and with the value they are sold at, at these works.

A short correspondence between the heads of the different mining bureaus would soon establish the place for each mineral or manufactured product whether in Table A or Table B, and we would then have the perfect uniform presentment so greatly desired, and which would be of so much value to us all and to the country.

I append below for illustration, a list of the present annual products of Canada thus grouped in two tables, A. and B., according to their more or less advanced state of manufacture, but, as I have just said, the heads of the mining bureaus might conceive and agree on a better grouping of the products. From time to time new products will, no doubt, have to be added to one or the other of the tables, and it is quite possible, of course, that I may have omitted some of the products now being marketed in the country and which complete mining statistics should cover.

TABLE A—MINERAL PRODUCTION.

<i>Product.</i>	<i>Product.</i>
1. Actinolite	17. Mica
2. Asbestos, different grades	18. Mineral water
3. Asbestic	19. Molybdenite
4. Baryte	20. Moulding sand
5. Chromite	21. Natural gas
6. Coal	22. Ochre
7. Corundum	23. Ores of any metals when sold as such
8. Feldspar	24. Peat
9. Fire clay	25. Petroleum, crude
10. Gold	26. Phosphate
11. Granite	27. Platinum
12. Graphite	28. Precious stones
13. Grindstone	29. Pyrites
14. Limestone, for flux	30. Salt
15. Gypsum	31. Sands and gravel
16. Marls	32. Stones, all sorts

TABLE B—PRODUCTION OF MANUFACTURES FROM MINERALS.

<i>Product.</i>	<i>Product.</i>
1. Aluminium	9. Fertilizers
2. Arsenic	10. L. oil
3. Bricks, all sorts	11. Lime
4. Carbide of calcium.	12. Mattes or metal of any other mineral
5. Cement	13. Nickel matte
6. Coke	<i>Product.</i>
7. Copper matte	14. Nickel-steel
8. Ferro-chrome	

15. Oils (refined)	17. Pigments
Illuminating oil	18. Quicksilver
Lubricating oil	19. Pottery and terra cotta
Benzine and naphth.	20. Phosphorus
Gas, fuel oils and tar	21. Sewer pipe
Paraffine and wax candles	22. Steel
16. Pig iron	23. Sulphuric acid
From Canadian ore	24. Tiles and drains
From foreign ore.	25. Zinc

I suggest the annual publication of these two tables by the mining bureaus of the different provinces in addition and independently from the way the statistics have been presented by these bureaus in the past, as, for the sake of comparisons, or for other very good reasons, it might be found by these bureaus desirable to continue their annual presentation of other tables with fine values "or otherwise" exactly as done before.

PRODUCTION AND PROFITS OF THE CROW'S NEST PASS COAL CO., LTD.

NOW and again erroneous statements are published relative to the source from which the Crow's Nest Pass Coal Company, owning and operating the Coal Creek, Michel and Carbonado collieries, in the Crow's Nest Pass district of South-east Kootenay, has obtained the money distributed among its stockholders as dividends during recent years. These mis-statements have appeared even in influential journals. So that any misapprehension as to whether or not this company's distributed profits have been earned in the ordinary course of its coal-mining, coke-making and other legitimate business, may be removed, the following statistics, taken from the published accounts of the company, are presented here. As regards production, the quantity of coal shown below is the gross product of the mines, of which about 1,100,000 tons were made into coke and the balance disposed of as coal. The financial statistics are self-explanatory.

*Production of Coal and Coke.*—The output of coal has increased year by year, as shown by the following table, which also exhibits the production of coke:

Year.	Coal.	Coke.
	Tons of 2,000 lb.	Tons of 2,000 lb.
1898 .. .. .	8,986	361
1899 .. .. .	116,200	29,658
1900 .. .. .	232,345	73,496
1901 .. .. .	425,457	125,085
1902 .. .. .	441,236	120,777
1903 .. .. .	661,118	167,739
1904 .. .. .	742,210	245,118
Totals .. .. .	2,627,552	762,234

(Note—The output and earnings in 1902 were unfavourably affected by a series of adverse circumstances, the most serious of which was a disastrous explosion, which wrecked the two chief producing

mines at Coal Creek colliery. These mines were not fully restored until February 1, 1904.)

The published balance sheets of the company for the years 1898-1904 (that for 1899 excepted), are given below:—

<i>Assets.</i>	Feb. 28, 1898.	1900.
Mines, real estate, plant, development, etc . . . . .	\$1,428,421.75	\$2,266,015.65
Accounts receivable . . . . .		67,005.42
Cash on hand and in bank . . . . .	71,578.25	37,501.62
	<u>\$1,500,000.00</u>	<u>\$2,370,523.69</u>

<i>Liabilities.</i>		
Capital stock, paid up . . . . .	\$1,500,000.00	\$2,000,000.00
Bills and accounts payable . . . . .		181,649.17
Profit and loss . . . . .		188,874.52
	<u>\$1,500,000.00</u>	<u>\$2,370,523.69</u>

Note.—Accounts for year 1899 were not published. On December 31, 1899, profit and loss account showed a credit of \$47,810.42.

<i>Assets.</i>	1901.	1902.
Mines, real estate, plant, development, etc . . . . .	\$3,086,415.61	\$4,252,175.10
Accounts receivable . . . . .	245,285.06	229,031.13
Cash on hand and in bank . . . . .	115,000.00	147,500.00
	<u>\$3,446,700.67</u>	<u>\$4,628,706.23</u>

<i>Liabilities.</i>		
Capital stock, paid up . . . . .	\$2,500,000.00	\$2,841,472.50
Bills and accounts payable . . . . .	367,183.26	774,221.77
Profit and loss . . . . .	217,017.41	138,303.21
Premium on new stock (Reserve Fund) . . . . .	300,000.00	812,208.75
Dividends accrued . . . . .	62,500.00	62,500.00
	<u>\$3,446,700.67</u>	<u>\$4,628,706.23</u>

<i>Assets.</i>	1903.	1904.
Mines, real estate, plant, development, etc. . . . .	\$5,418,435.51	\$5,064,201.25
Securities owned . . . . .		479,984.48
Accounts receivable . . . . .	313,660.79	472,431.08
Cash on hand and in bank . . . . .	66,551.31	47,863.68
	<u>\$5,798,647.61</u>	<u>\$6,064,480.49</u>

<i>Liabilities.</i>		
Capital stock, paid up . . . . .	\$3,450,490.00	\$3,478,400.00
Bills and accounts payable . . . . .	395,265.64	533,250.05
Profit and loss . . . . .	145,078.13	203,320.44
Premium on new stock (Reserve Fund) . . . . .	1,725,735.00	1,764,600.00
Dividend accrued . . . . .	82,078.84	86,910.00
	<u>\$5,798,647.61</u>	<u>\$6,064,480.49</u>

It is to be noted that though the balance sheet shows the capital as "paid up" all the cash received by the company on account of the first \$1,500,000 was the sum of \$85,000 from the Canadian Pacific Railway Company, under an agreement connected with the transfer of the railway charter. Of this amount there was expended prior to February 28, 1898, \$3,388.09 on machinery, plant and supplies, and \$10,033.66 on organization, development and operating expenses to that date. The asset "Securities owned," shown separately for the first time in 1904, represents the company's interest in subsidiary companies—the Crow's Nest Pass Electric Light & Power Co., Ltd., and the Morrissey, Fernie & Michel Railway Co.—formed for the purpose of taking charge of some of the coal company's necessary auxiliary projects. The capital stocks of these subsidiary companies are owned, practically exclusively, by the parent company. The former supplies light, power, water and telephone communication, and the latter possesses short branch railway lines connecting two of the company's collieries with the main lines of railway.

*Net Profits and Dividends.*—The follow tables show the net profits made by the company and the amount of the yearly dividends at ten per cent per annum paid, during four years 1901-1904.

Balance at credit of profit and loss on		
December 31, 1899 . . . . .		\$47,810.42
Net earnings for year 1900 . . . . .		141,064.10
" " " 1901 . . . . .		270,848.39
" " " 1902 . . . . .		171,285.80
" " " 1903 . . . . .		310,492.28
" " " 1904 . . . . .		406,049.56

Total profits . . . . . \$1,347,550.55

Disposed of as under:—

Total of dividends 1901 . . . . .	\$242,705.50
" " 1902 . . . . .	250,000.00
" " 1903 . . . . .	303,717.36
" " 1904 . . . . .	347,807.25

Less total dividends paid . . . . . 1,144,230.11

Balance (undistributed profits) December 31, 1904 . . . . . \$203,320.44

### THE DETERMINATION OF COPPER, ARSENIC AND ANTIMONY IN LEAD BULLION.\*

(By Howard C. Parmelee, Denver, Colorado.)

THE methods set forth in this paper involve new points in analysis, but rather represent the adaptation of well known reactions, to meet special conditions. It is the custom at some lead smelters to require the determination of copper, ar

\*Read at the January meeting of the Western Association of Technical Chemists and Metallurgists.

senic and antimony on a sample of bullion representing the monthly output. This may be conveniently carried out as follows:

*Sampling.*—As the bullion is loaded for shipment, each bar is sampled in several places with a punch. These punched samples are subsequently remelted and cast into a bar about 4 by 12 by  $\frac{1}{2}$  in., this bar representing the carload. Samples weighing somewhat more than 1 A.T. are now punched from the bar for assay, and the clippings which the assayer discards in trimming his sample to weigh 1 A.T. are reserved. Finally the month's accumulation of these clippings is again melted, cast into a bar, and punch-sampled for the analysis. A thoroughly representative sample is thus obtained.

*The Analysis.*—Treat 10 g. of the sample in a No. 3 beaker with 50 c. c. dilute nitric acid (1-4). Dissolve the lead at a gentle heat and then evaporate down to incipient crystallization. Add 25 c. c. hot water, boil and filter while hot to avoid the crystallizing of any lead salt on the filter.

*Residue.*—The substance on the filter contains almost all the antimony as insoluble oxides. Transfer this to a beaker with about 10 c. c. water. Add 2 c. c. HCl and 1 c. c. HNO<sub>3</sub>, and heat gently until the antimony is dissolved. Then filter through the original paper—wash thoroughly with hot water and evaporate to dryness, avoiding a temperature much in excess of 100° C. Redissolve with a solution of tartaric acid (1 g. in 10 c. c.) and a few drops of HCl. Boil and add to the original solution as indicated below.

*Solution.*—This contains the copper, arsenic and traces of antimony, and should not amount to over 150 c. c. Add HCl in quantity calculated to precipitate the silver present, and sufficient H<sub>2</sub>SO<sub>4</sub> to precipitate the lead. Add immediately and with rapid stirring 50 c. c. alcohol. This will facilitate the rapid and compact settling of the precipitates which should be allowed to stand three hours. Filter under pressure on a Hirsch funnel or a Witte plate—decanting carefully. Wash by decantation three times with a solution of alcohol and HCl (4-1), finally throwing the entire precipitate on the filter and pumping dry. Boil the alcohol from the solution—reducing the volume to about 100 to 125 c. c. Neutralize carefully with ammonia, add 2 c. c. HCl, bring the solution to boiling and pass H<sub>2</sub>S gas through the hot solution for forty-five minutes.

Filter off the sulphides and after washing transfer to the beaker, using the smallest possible quantity of water. Add 10 c. c. (2 g.) KOH solution and heat until the arsenic and antimony are dissolved. Filter through the original paper and wash carefully, keeping the filtrate to about 40 c. c.

To the solution—containing the arsenic and antimony add 1 g. KClO<sub>3</sub> and 50 c. c. HCl. Boil clear and filter. Make the filtrate ammoniacal, add about one-third of its volume of ammonia, and precipitate the arsenic with magnesia mixture. The arsenic is then determined in the usual manner.

The filtrate from the arsenic is boiled to expel the excess of ammonia, when a large excess (25 c. c.) HCl is added. Cool the solution, add an excess of

KI and titrate the liberated iodine with sodium thio-sulphate solution. If the same titrating solution is used as for the determination of copper by the iodide method, the calculation may be made on the basis of 126 Cu. equals 120 Sb.

Copper is determined in the residue insoluble in KOH solution, by oxidizing with HNO<sub>3</sub> and proceeding by the iodide method.

*Conclusions.*—Among the advantages which the foregoing offers, may be mentioned the ease with which a large bulk of lead is gotten rid of; the separation of practically all the antimony in the first operation, thus avoiding the possibility of retaining it in the lead precipitate, and the determination of all three elements on the same sample.

#### COMPANY MEETINGS AND REPORTS.

##### CARIBOO CONSOLIDATED (1904), LTD.

In October, 1904, the Cariboo Consolidated, Ltd., and the Gold Lands Corporation, Ltd., were amalgamated. A brief report of the extraordinary general meeting of shareholders in the former company, held in London, England, last October, at which the amalgamation and the incorporation of a new Cariboo Consolidated, Ltd., were approved, appeared in the *MINING RECORD* for November, 1904.

The first ordinary or statutory meeting of the Cariboo Consolidated (1904), Ltd., was held in London on February 22, 1905, Lieut.-General Sir James Bevan Edwards, R.E., K.C.M.G., C.B., (the chairman of the company), presiding. The chairman said: I think we have every reason to congratulate ourselves on the success of the amalgamation of the two companies. I may inform you that the debentures were paid off by shares at par, and the remaining shares have been over applied for, the result of which is that we have something like \$100,000 additional capital.

I will now explain as to the work done since the annual meeting of the old company, held on July 29 last. I then stated that up to that date the work on Lightning creek had been carried out so far without a hitch, not only without delay, but in advance of the estimated time. Since the end of July the west drive has been extended 55 ft., the main bed-rock tunnel driven 267 ft. up the channel, and No. 1 east cross-cut a length of 256 ft., which carries it practically across the channel, making altogether a total of 578 ft. This does not seem a large amount of work to have carried out in five months, but 208 ft. of this was through extremely wet gravel, requiring the greatest care to prevent a run and consequent wreck, where the progress was naturally slow. The work of these five months was, however, of considerable importance, because we are now able to form a tolerably correct idea of the gold values of the bed-rock gravels. The water met with has prevented the gravel from being worked in bulk, but the difficulties caused by it are nothing more than those encountered in every work of this nature. They can only be overcome by the expenditure of both time and money.

About 600 ft. up stream from our shaft there is an old shaft which about 30 years ago was sunk to bed-rock, and from it a tunnel was driven several hundred feet up the channel. The water coming down the channel, or just above the bed-rock, and under the boulder clay, finds its way into this tunnel and old shaft and becomes a reservoir with a considerable head of water above our tunnel and cross-cuts, and until this water is tapped and drained it will not be possible to work the gravel. When pumping began in April last the level of this water was 139.79 ft. above the bottom of our tunnel. Steady pumping reduced it to 63.65 ft. above the bottom of the tunnel by the beginning of November, and lowered this head of water 76.14 ft. At this level it had reached the minimum hydraulic gradient below which it could not be lowered till we put another cross-cut into the gravel near the old shaft.

It is not the quantity of water which causes delay in unwatering the channel, but the difficulty of getting at it. The pumps have not been worked up to half their capacity, yet they have lowered the water to the extent mentioned. If, however, further proof be necessary of their ability to handle the water we are meeting with, it is shown from the accident which happened on January 4th, through the breaking of the crank shaft of the pumping engine. This accident obliged us to suspend work till February 10, when the machinery had been repaired. The works filled with water up to the surface, but 72 hours' pumping was sufficient to empty the shaft, tunnel and drives and recommence work on the tunnel.

The tunnel must be prolonged 144 ft. and then No. 2 east cross-cut can be commenced. It will have to be driven about 100 ft. before it breaks into the gravel. Barring accidents this should take till the end of April. Directly the cross-cut enters the gravel the water will be rapidly lowered, and every foot it advances across the channel towards the old shaft should help to get rid of the water. If all goes well, and there is no set back, we should break into the old shaft towards the end of June and gain complete mastery over the water and begin to work the gravel.

As regards the gold values of the gravel, the work of the last few months derives its importance from the fact that it has put us in a position to form a fair idea of the relative value of the gravel; and I may at once tell you that the indications are very favourable, and that the gold in the channel may exceed our most sanguine expectations. The gold obtained in the west drive, from the crevices in the bed-rock below the gravel, was at the rate of an ounce to the yard cube of bed-rock. The manager reported on June 17: "It is a splendid-looking washed gravel, firm and tight, carrying very high gold values." On June 21 he cabled: "West drift now in 100 ft.: bed-rock value increasing to \$14 per cubic yard." On July 1: "It is splendid wash gravel, carrying high gold values." On July 4 he cabled: "Bed-rock value continues to improve; \$22 per cu. yd." On July 8: "The values are improving each set." On August 27 work was discontinued on this drive on account of the large quantity of water encountered.

The amount of gravel which can be taken out daily when we are able to work it will depend, firstly, upon the capacity of the shaft and machinery to handle it; secondly, upon the number of men employed; and, thirdly, upon the rate of the development and draining of the channel. The capacity of the shaft and machinery are equal to handling a large amount of gravel; the number of men depends upon the supply of labour, but the rate of development is limited by the driving of the main tunnel, which will probably only average 3 ft. a day. However anxious we may be to get good returns of gold, it would be very bad policy to work out the channel at such a rate, that in time it would overtake the development, as we should then be obliged to suspend working the gravel—possibly for many months—until the development got well ahead again.

Making allowance for our being able to work both up and down the channel, and also that we should start with probably 800 ft. of channel dry and ready to work, it would not be safe to work out the channel at a greater rate than 4 ft. a day. The channel should yield \$500 per foot, and if it continue to do so our prospects for the future cannot be considered otherwise than most encouraging, especially as we have five miles of old channel in our Lightning creek leases which have never been worked. To work this length of channel will require at least three or four more shafts, and I think the recent accident to our machinery should teach us a lesson, which we would do well to bear in mind, which is, that as long as we rely on a single shaft we shall be always liable, either from accident or not being able to keep the development well ahead of the workings, to be obliged to close down for an indefinite period, which could not be otherwise than most detrimental to the position of the company. With only one shaft to rely upon we should be like a vessel on a less shore, riding to a single anchor, so that when a gale came she might at any moment be cast

on the rocks. As soon as we reach the producing stage from our present shaft, I think it would be wise to drop another anchor, and as soon as possible, a third—in the shape of a second and third shaft, and so place our company in safety and its business on a sound commercial basis, which it can never be so long as we have to rely upon a single shaft. These additional shafts would greatly increase our profits and allow us to maintain a constant output of gold, and work out the channel at a constant definite rate.

When I first visited Cariboo in 1902, the company was in a position—which to say the least was by no means encouraging. Its capital was fast melting away, and no definite results were within sight. The question was, what could be done to save it, including, of course, the interest which the Gold Lands shareholders had in it. We had numerous drifting, hydraulic and dredging properties, scattered widely about the country, and hardly any of which we felt justified in working, and for these we were paying heavy rentals. It was absolutely necessary to decide at once upon the best course to pursue, and in this Mr. Melbourne Bailey gave us great assistance and valuable advice. The result was we decided to take in hand and work the properties in Lightning creek, and by doing so we stand now, I trust, on the eve of making a great success. Mr. Bailey, who has been our local manager, working under the direction of Mr. Thompson, the consulting engineer, was appointed engineer and manager, and the favorable position we are in to-day is mainly due to him. He has had very hard work—night and day for the last two years, on a salary which must be considered very moderate for so expensive a place. I feel sure the board will have the cordial and unanimous assent of the shareholders to giving him a substantial increase when we reach the producing stage.

After some discussion as to calls outstanding, and so on, the chairman said, in reply, that the board appreciated greatly the confidence of the shareholders. The proceedings then terminated.

#### WAR EAGLE CONSOLIDATED M. AND D. CO., LTD.

The annual meeting of the War Eagle Consolidated Mining and Development Co., Ltd., convened for February 28, in Toronto, Ontario, was adjourned for a month, owing to the absence in England of Mr. T. G. Blackstock, the vice-president. At the adjourned meeting in March the business was restricted to receiving the annual report of the late general manager, Mr. E. B. Kirby, E. M., on the company's mining property at Rossland, B.C., together with the usual statement of the accounts, statistics and production, and the re-election of directors. The following constitute the directorate: Messrs. Geo. Gooderham, president; Thos. G. Blackstock, vice-president; W. G. Gooderham, A. E. Gooderham, Geo. T. Blackstock and W. H. Beatty, all of Toronto; Chas. R. Hosmer, Montreal, and Jas. Cronin, Moyie, B.C. The report and accounts follow:

#### Manager's Report.

Explanatory Note: The values given are based upon the price of 12 cents for copper instead of 16.25 cents, as in former reports. It is the usual practice of mines in pricing and recording ore to use the "Full Assay Value" instead of the "Smelter's Gross Assay Value," which is less. While the plan is often preferable, it has so far been more convenient at the War Eagle mine to use the latter value, which as shown by the table opposite, has on shipping grades ranged from \$2.60 to \$5.07 less than the full assay value.

In the War Eagle main vein most of the development work during the year has been directed toward the development of the south branch beyond the fault in the west end of the mine, and on the seventh level west this exploration resulted in the exposure of an ore body 125 ft. long, 18 ft. wide at the level and extending to a point about 60 ft. above the level. The average grade as opened was \$9.25 smelter's gross assay value.

Between this and the eighth level, 175 ft. below, is an area of ground of considerable prospective value, since on the

downward extension of the ore shoot a quantity of pay ore was taken out several years ago. At present active development is under way to show the continuity of the ore between the two levels and to put it in shape for stoping.

In addition to the above, much work has been done in the old workings above the fourth level, and a considerable tonnage of pay ore taken from them. On the cross vein development has been prosecuted on the second, third and fourth levels, directed toward the exploration of an ore shoot previously stoped on the second level. No pay ore has yet been found, although the possibilities of this area are not yet exhausted.

During the year 2,220 ft. of headings have been driven and 61,064 tons of ore produced. This averaged \$9.58 smelter's gross assay value, with average assay contents of: Gold 0.414 oz., silver 0.89 oz., copper 1.21 per cent. The reserves of smelting ore at present are estimated at about 23,000 tons, averaging \$8.50 smelter's gross assay value.

The mining operations resulted in an excess of receipts over expenditures of \$88,153.93, of which \$27,797.78, was applied to interest on the indebtedness and \$19,903.98 was written off for depreciation, leaving the \$40,452.17 as shown on the profit and loss statement.

The cost of ore production has been brought down to \$2.24, and the total cost of mining, including development work, to \$3.00 per ton. It will be noted that these figures are considerably lower than any record attained in the past history of this mine.

We have been fortunate in retaining an unusually able staff, and I take pleasure in expressing my appreciation of their earnest co-operation. The chiefs of departments are Mr. Carl R. Davis, E.M., superintendent, and Mr. Charles V. Jenkins, in charge of the purchasing and accounting.

*Details of Development.*

Second Level.—(265 ft. in depth measured on the vein.) On the south end of the cross vein winze No. 215 was sunk 95.5 ft. on the vein to a point 116.5 ft. below the level. Vein as exposed is low grade, averaging \$3.20 smelter's gross assay value.

Third Level.—(392 ft. in depth measured on the vein.) The cross vein on the level south has been developed by 254.5 ft. of headings from 215 winze. The net result of this work is an ore shoot 30 ft. long, 6 ft. wide, and probably extending to the second level above; averaging \$5.15 smelter's gross assay value. The third level west on the War Eagle vein has been extended 185.5 ft. to a point 613 ft. from the shaft. The heading is in a fault fissure to 480 ft. point, thence to the 535 ft. point the vein as shown is of no value. It averages \$3.75 smelter's gross assay value from 535 to 560 ft. point, terminating against a fault; the remainder of the level being in country rock. Several short cross-cuts from the level were, however, made. Nothing of value was shown. No. 396 intermediate west drift from 302 raise was extended 35 ft. on the vein. No values.

Fourth Level.—(504 ft. in depth measured on the vein.) On the cross vein north level, No. 470 raise was extended 61.5 ft. to a connection with stopes above. The vein as exposed averaged \$3.25 smelter's gross assay value. An intermediate level from No. 463 stope was advanced 90.5 ft. on the vein. From 0' to 74 ft. point, vein averaged \$11.17 smelter's gross assay value. In addition to the above, 65 ft. of development was done at various points on the vein with indifferent results.

Fifth Level.—(629 ft. in depth measured on the vein.) On the north branch of the vein 280 ft. west of the shaft cross-cut No. 573 cross-cut was extended 27 ft. through the vein, which proved it without value at this point. 592 west intermediate drift was extended from 591 stope 93.5 ft. on the vein. The vein was below the pay limit. In addition to the above, 49.5 ft. of development was done at various points on the level.

Sixth Level.—(754 ft. in depth measured on the vein.) The main level west on the south vein was extended 285 ft. to point 565 ft. west of the shaft cross-cut. As opened in by heading, the ground is broken and generally barren of

values. Various cross-cuts aggregating 63.5 ft. were made from this level, but nothing of value was found. From the 385 ft. to the 394 ft. point, the main level west averaged \$3.28 smelter's gross assay value, due no doubt to the upward extension of the seventh level ore shoot.

Seventh Level.—(881 ft. in depth measured on the vein.) On the south branch vein, the main level west was extended 337.5 ft. to a point 500 ft. west from the shaft cross-cut. To the 360 ft. point the values are below the pay limit; from the 360 ft. to the 485 ft. point the vein, 18 in. in width, averages \$2.25 smelter's gross assay value. At 414 ft. west from the shaft, cross-cut winze No. 775 has been sunk 17 ft. on the hanging wall side of vein, which so far has been of low grade. Pay ore may be expected as the winze approaches the footwall side of the ore body. At 385 ft. west of the shaft cross-cut, raise No. 788 was put up 44.5 ft. on the vein, averaging \$0.50 smelter's gross assay value, to a point 60 ft. above the floor of the level. On the north vein, winze No. 723 was advanced an additional 63 ft. on the vein, averaging \$7.03 smelter's gross assay value. The 724 west drift from bottom of winze was advanced 104.5 ft. on the vein averaging \$3.05 smelter's gross assay value.

Eighth Level.—(1,057 ft. in depth measured on the vein.) On the north vein the level west was extended 236.5 ft. to a point 270 ft. from the shaft cross-cut. In addition 46 ft. of cross-cutting has been done. This work shows the vein for a length of 100 ft. to be 40 ft. in width and heavily mineralized, but unfortunately without any value.

*Assets.*

Mines and mineral claims . . . . .	\$1,699,329.39
Cash on hand and in bank . . . . .	392.36
Stores on hand . . . . .	10,135.50
Machinery, buildings and equipment . . . . .	1,418,801.05
Furniture of offices . . . . .	1,520.00
Stocks of other companies . . . . .	190,305.82
Accounts receivable . . . . .	25,898.58
Unexpired insurance . . . . .	946.15
Profit and loss . . . . .	237,822.75

\$2,308,151.61

*Liabilities.*

Capital stock . . . . .	\$1,750,000.00
Bank of Toronto, Rossland, overdraft . . . . .	96,378.66
George Gooderham . . . . .	451,667.44
Accounts payable . . . . .	10,050.00
Unclaimed dividends . . . . .	55.51

\$2,308,151.61

*Profit and Loss Account.*

	Dr.	
To Balance . . . . .	\$278,274.92	
" Costs of mining . . . . .	\$182,787.73	
" Diamond drill prospecting . . . . .	7,222.43	
" Interest . . . . .	27,797.78	
" Investigating ore processes . . . . .	744.22	
" Legal expenses . . . . .	550.65	
" Mine accidents . . . . .	123.00	
" Managing director's salary . . . . .	2,500.00	
" Toronto office expenses . . . . .	757.41	
" Mine examinations . . . . .	1,920.48	
" Sundry expenses . . . . .	350.43	
" Depreciation of plant, machinery, etc. . . . .	19,903.98	
		244,658.11
		<u>\$522,933.03</u>
		Cr.
By net proceeds from ore sales . . . . .	\$290,919.40	
Less provincial ore tax . . . . .	5,818.37	
		285,101.03
" Transfer fees . . . . .	9.25	
" Balance . . . . .	237,822.75	
		<u>\$522,933.03</u>





WAR EAGLE MINE

Table of Mine Costs.

Twelve Months Ending December 31st, 1904.

	Development Work.			
	Sinking Small Shaft.	Raising.	Drifting.	Ore Extraction.
Total advance, feet .....	175.5	106.	1938.	....
Ore stoped, tons .....	.....	.....	.....	53,048.
	<i>Cost Per Foot—</i>			<i>Cost Per Ton.</i>
1. Drilling .....	\$ 7 45	\$ 7 17	\$ 4 23	\$ 0 46
2. Blasting .....	1 87	2 13	98	05
3. Explosives .....	3 52	2 93	2 54	16
4. General mine supplies .....	67	43	39	04
5. Mine lighting, candles .....	25	21	16	02
6. " " electric .....	23	18	15	02
7. Smithing .....	65	33	41	04
8. Trimming and shovelling, direct .....	3 15	1 87	1 56	28
9. " " " apportioned .....	96	75	55	12
10. Timbering, labour .....	1 61	2 35	....	29
11. " " material .....	60	81	....	12
12. Machine drill fittings and repairs .....	1 16	92	75	08
13. General mine labour .....	1 66	1 35	1 03	13
14. Hoisting, underground .....	4 79	....	34	01
15. " " main shaft .....	1 68	2 16	1 17	24
16. Compressed air .....	1 42	1 32	1 02	11
17. Mine ventilation .....	29	24	18	02
18. Assaying .....	48	52	14	05
19. Surveying .....	39	12	18	02
20. General expense .....	3 32	2 29	1 99	27
	<u>\$36 15</u>	<u>\$28 08</u>	<u>\$17 77</u>	<u>\$ 2 53</u>

Statement Showing Values and Smelter Charges Per Ton to December 31st, 1904.

For the Fiscal Year Ending:		Real or Full Assay Value, Total metallic contents at full New York quotations.	Indirect Smelting Charge, Difference between New York quota- tions and Smelter's price for the metals.	Direct Smelting Charge, Including freight from mine.	Total Smelting Charge Direct and indirect.	Smelter's Gross Assay Value Deducting indirect charges only.	Smelter's Net Value After deducting both the indirect and direct charges from the real assay value (i.e., net value of ore f.o.b. cars at mine.)
	1894	\$43 54	\$6 03	\$12 50	\$19 13	\$36 91	\$24 41
	1895	47 33	7 41	10 87	18 28	39 92	29 05
	1896	36 97	5 79	9 89	15 68	31 18	21 29
January 20th to September 30th .....	1897	27 64	4 33	9 96	14 29	23 31	13 35
12 months ending September 30th .....	1898	26 63	6 62	7 50	14 12	20 10	12 51
15 months ending December 31st .....	1899	21 63	4 91	6 25	11 16	16 72	10 47
12 " " " " .....	1900	19 08	4 68	6 08	10 68	14 40	8 40
12 " " " " .....	1901	20 71	5 07	6 00	11 07	15 64	9 64
12 " " " " .....	1902	18 79	4 21	4 91	9 12	14 58	9 67
12 " " " " .....	1903	13 00	3 13	4 56	7 69	9 87	5 31
12 " " " " .....	1904	12 18	2 60	4 46	7 06	9 58	5 12

PRODUCT OF WAR EAGLE MINE  
Statement Showing Values and Smelter Charges Per Annum to December 31st 1904-

For Fiscal Year Ending	Year	Net Tonnage	Real or Full Assay Value Total metallic contents at full New York quotations.	Indirect Smelting Charge Difference between New York quotations and Smelter's price for the metals.	Direct Smelting Charge Including freight from the mine.	Total Smelting Charge Direct and Indirect	Smelter's Gross Assay Value Deducting indirect charges only.	Smelter's Net Value After deducting both the direct and indirect charges from the real assay value (i.e. net value of ore f.o.b cars at mine)
1894		48	\$ 2,053.56	\$ 321.39	\$ 586.62	\$ 908.01	\$ 1,732.17	\$ 1,145.55
1895		9,982	472,363.51	73,925.33	108,486.32	182,412.15	398,437.68	289,951.36
1896		8,920	329,777.86	51,611.07	88,222.41	139,833.48	278,166.79	189,044.38
1897		7,406	201,682.83	32,034.22	73,753.42	105,786.64	172,643.61	98,896.10
1898	January 30th to September 30th	28,875	759,709.10	188,964.87	213,990.25	402,955.12	570,744.23	356,843.98
1899	15 months ending Dec. 31st	73,936	1,599,565.45	302,808.98	462,482.92	825,291.92	1,236,756.47	774,473.53
1900	"	9,886	188,593.58	46,310.60	59,315.66	105,626.26	142,382.98	82,967.32
1901	"	10,864	411,497.69	106,732.54	119,185.27	219,917.81	310,705.15	191,579.88
1902	"	21,455	403,193.33	90,386.95	105,412.94	195,799.89	312,866.38	207,393.44
1903	"	60,093	780,672.20	187,594.89	274,115.11	461,710.00	593,077.31	318,962.20
1904	"	56,760	691,287.53	147,199.43	253,168.70	400,368.13	544,688.10	290,919.40
		4,304*						
		297,225	\$5,843,393.64	\$1,281,890.77	\$1,758,628.64	\$3,040,519.41	\$4,561,505.87	\$2,802,877.23

\*Tonnage to Mill not in footings as no returns to date

Ore Sold.

	Tons.
Stoped ore to smelter .....	48,780
Stoped ore to mill .....	4,304
Stopping figured on .....	53,084
Ore from development to smelter .....	3,009
Ore from dumps, etc., to smelter .....	4,971
Total ore production .....	61,064

THE NORTHERN MINES, LTD.

The Northern Mines, Ltd., has been organised in Vancouver, and incorporated with an authorised capital of \$50,000 in 10,000 shares of \$5 each. The directors are Messrs. G. E. Macdonald, Vancouver, president; D. G. Stewart, Atlin, vice-president; A. H. Bromly, M.I.M.E., Atlin, managing director; R. D. Featherstonhaugh, Atlin, superintendent, and A. J. Kappele, Vancouver. Mr. R. B. Parkes is secretary; the company's registered office is in Vancouver, and the mine office at Atlin.

The company has been organised to operate placer mining ground in the Atlin district. There are no promoters' nor vendors' profits to be paid, nor preferential shares allotted. Half the capital is offered for subscription. It is intended to use a steam shovel in handling the gravel to be worked. The cost of the steam-shovel and plant, completely installed and ready for operation, will be about \$16,000.00, but it is desired to raise additional cash capital for the purpose of securing the requisite ground for this season. As several owners have agreed to place their claims at the company's disposal on a share basis, it is estimated that \$5,000 will be sufficient to secure ample ground for immediate operation. As the usual difficulty of water shortage experienced in hydraulicing will not appertain, the working season will be somewhat lengthened, and should average about five months.

HILLSIDE SILVER MINES, LTD.

The annual general meeting of the Hillside Silver Mines, Ltd., was held at Kaslo on March 31, ult. The statement of accounts showed assets and liabilities as under:

Assets—

Mining property (consisting of four crown-granted mineral claims .. . . . .)	\$65,180.05
Share capital on hand (unissued stock) .. . . .	84,016.58
Bills receivable .. . . . .	453.13
Cash in Bank B.N.A., Kaslo .. . . . .	350.24
	<u>\$150,000.00</u>

Liabilities—

Capital stock (authorized) .. . . . .	\$150,000.00
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The report explained the conditions which prevented operation of the property at present and also the probability of its being leased shortly, so as to make it a producer. The report and accounts were adopted.

Messrs. Chas. Behrman, E. E. Chipman, A. T. Garland, John Keen, A. S. Minnion, Geo. Stott and Robt. Stinson were re-elected directors, and Mr. O. T. Stone auditor. The directors afterward appointed Mr. Keen president and Mr. Chipman vice-president.

VANCOUVER ISLAND EXPL. & DEV. SYNDICATE.

The Vancouver Island Exploration & Development Syndicate, developing the Victoria mineral claim, situated near Ladysmith, held a meeting in Victoria on the 8th inst. There were present Messrs. E. Dewdney, A. W. Vowell, Wm. Chapman, S. Erb, A. Lindsay, H. Cecil, J. Brown, W. T. Williams, A. R. Springett, W. A. Stevens, A. Macgregor, J. L. Beckwith, representing 84,500 shares. The following directors were elected: Hon. E. Dewdney, Messrs. H. Cecil (manager), W. A. Stevens, J. L. Beckwith, Sam Erb, W. T. Williams and R. T. Elliott. Mr. Beckwith was appointed president, Mr. A. Lindsay auditor and Mr. Rowland Machin secretary-treasurer.

## VANCOUVER POWER CO., LTD.

The half-yearly ordinary general meeting of the Vancouver Power Company, Ltd., was held at the offices of the company, Vancouver, B.C., on April 6, 1905, for the following purposes, namely:

To receive and consider the statement of accounts and balance sheet as at December 31, 1904, and the reports of the directors and auditors thereon; to elect directors, auditors and other officers and to transact the ordinary business of the company.

## MAUDE HYDRAULIC CO., LTD.

A special general meeting of the shareholders of the Maude Hydraulic Co., Ltd., will be held at the office of the company, 541 Hastings street, Vancouver, B.C., on May 3, 1905, for the purpose of considering proposals for the disposal of the company's property.

## BLACK DIAMOND MINING CO.

At a meeting of the Black Diamond Mining Company held in Vancouver on April 3, the following officers were elected: President, Capt. McSpadden; vice-president, Mr. G. F. Burpee; secretary, Mr. A. C. Brydone-Jack; treasurer, Mr. T. Wilson; directors, Messrs. Thos. Duke, John Hendry, T. Wilson, J. Deal and J. W. Hackett. The company owns 11 claims in close proximity to the Britannia mine and the showing so far disclosed is promising.

## DIVIDENDS.

The Reco Mining & Milling Co., of Sandon, Slocan, has paid its second dividend this year; amount \$19,164.

The St. Eugene Consolidated Mining Co., operating the St. Eugene mine, at Moyie, East Kootenay, paid a two per cent dividend in March; amount, \$64,040.

The Canadian Gold Fields on 10th inst distributed \$12,000 among its shareholders.

## PERSONAL.

Mr. John Kirkup, gold commissioner for Rossland district, has returned to Rossland after spending a fortnight in the coast cities.

Mr. Lorne A. Campbell, general manager of the West Kootenay Power & Light Co., owning the hydro-electric generating station at Bonnington Falls, Kootenay river, and associated power system, visited Victoria early in the month in connection with an important extension of his company's operations now being prepared for.

Mr. M. K. Rodgers, general manager of the companies operating the Nickel Plate mine, 40-stamp mill and other industrial enterprises in the Similkameen, has returned to Hedley from a business visit to the coast.

Mr. C. Vernon Jenkins, for years accountant and purchasing agent for the Centre Star and War Eagle mining companies, Rossland, left that city for Missouri two or three weeks ago. Before his departure Mr. Jenkins was the recipient of several handsome and valuable presents from Rossland friends, in appreciation of his services there in the public interest.

Mr. W. Yolen Williams, late mine superintendent for the Granby Con. Mining, Smelting & Power Co., has been making a tour of Italy.

Mr. E. J. Roberts, manager of the Sullivan Group Mining Co., prominent in connection with the recent reconstruction and completion of that company's lead smelter at Marysville, East Kootenay, has resigned that position to become chief executive officer for Mr. D. C. Corbin, who is at the head of the undertaking to connect Spokane, Washington, by rail with the C.P.R. Co.'s Crow's Nest railway, East Kootenay.

Mr. W. H. Aldridge, chief of the Canadian Pacific Railway Co.'s mining and metallurgical department, is reported to have recently examined localities, near the City of Vancouver, at which there are indications of the existence of coal.

Dr. J. Bonsall Porter, professor of mining at McGill University, Montreal, Quebec, has been invited to deliver an address before the meeting of the British Association for the Advancement of Science to be held at Johannesburg, South Africa, next August.

Mr. A. C. Garde, late resident manager of the Payne Consolidated Mining Co., Sandon, Slocan, has been travelling in the East. After visiting Toronto, Montreal, Detroit, and other cities, he went south.

Mr. J. B. Hobson, general manager of the Consolidated Cariboo Hydraulic Mining Co., has returned to Bullion, where is busily engaged in preparing for the ensuing season's hydraulic mining.

Messrs. N. J. Cavanaugh, of the Slocan Star mine, and Louis Pratt, general manager of the Last Chance M. & M. Co., have been collecting large samples of Slocan district zinc ores for inclusion in the exhibit the Dominion government is arranging to make at the forthcoming Exposition at Liege, Belgium. Mr. J. Obalski, inspector of mines for the province of Quebec, has been appointed to take charge of the Dominion exhibit.

Mr. S. W. Gebo, manager and vice-president of the Canadian-American Coal & Coke Co., of Frank, Alberta, having disposed of all his coal mining interests in that locality, is leaving for Lewiston, Montana, where he will have the management of a large coal mining enterprise. Mr. Gebo has been closely identified with the Canadian-American Co., from the time it commenced operations at Frank, towards the close of 1901.

Mr. W. E. Zwicky, general manager of the Rambler-Cariboo Mines, Ltd., has returned to Kaslo after having spent several weeks visiting the mining centres of Colorado and Montana.

Mrs. Lenora McDonald has been gazetted acting deputy mining recorder at Olalla in place of her husband, who has been granted leave of absence.

General Chas. S. Warren, at one time prominently connected with mining properties in Rossland camp, has been elected police magistrate of the city of Butte, Montana. With the mayor-elect, he ran on the anti-trust ticket and obtained a large plurality.

Mr. Emil F. Voigt, C.E., of Voigt's camp, Similkameen, has returned from his visit to the East.

Mr. W. C. McDougall, manager of the Olalla Copper Mining & Smelting Co., recently stated that his company's mining properties at Olalla are idle owing to lack of transportation facilities.

Mr. J. L. Wortham, of Paris, Texas, manager of the Bonanza Gold Dredging Co., operating in the Klondike, was in Vancouver early this month.

Colonel William W. D. Turner, who with his brother, former United States Senator George Turner, made a fortune out of the sale of the Le Roi mine, Rossland, B.C., to the British America Corporation, died at Los Angeles, California, U.S.A., on April 2.

Mr. Geo. S. Waterlow, of London, England, when coming west on another visit to British Columbia in connection with the proposed mine and smelter amalgamation, was taken ill and was removed from the Canadian Pacific Railway train to the Calgary Hospital, where he was operated on for appendicitis. Late reports state that he is recovering.

Mr. John P. Cosgro, formerly mechanical superintendent at the War Eagle and Centre Star mines, Rossland, has been given charge of the hoisting engine department of the business of the Allis-Chalmers Co., of Chicago.

Mr. E. A. Bradley, manager of the Marshall-Shelling Mining Co., and the American Mining Co., has returned to Revelstoke from a trip to the Big Bend country, where his companies have mining properties.

Mr. Albert J. Hill and John McKenzie, of New Westminster, were in Victoria several days recently. They were members of the board of examiners of candidates for licences to act as provincial land surveyors.

Constable William H. Vickers has been gazetted deputy mining recorder for the Atlin Lake mining division, at Discovery, Atlin district.

Mr. L. Metzgon, late mine superintendent at the Ivanhoe, Sundon, Slocan district, has gone to the Cocur d'Alenes, Idaho, U.S.A., to there take charge of an important mine.

Mr. Donald G. Forbes has returned to British Columbia. It is stated that he will resume charge of the mines and 20-stamp silver mill of the Great Western Mines, Ltd., and Silver Cup Mines, Ltd., in the Lardeau district. He was accompanied on his return by Mr. Geo. Attwood, consulting engineer for those companies.

#### THE MICHIGAN COLLEGE OF MINES

The Michigan College of Mines will hold its second annual class-day exercises in Houghton and Hancock, Michigan, U.S.A., on Saturday, May 5. The principal feature of the event will be the address by William G. Mather, of Cleveland, Ohio, president of the Cleveland-Cliffs Iron Company. The student body of the Michigan College of Mines at present averages approximately 200. The environment is a strictly mining atmosphere, and the principles of mining and metallurgy practised in the Lake Superior iron and copper mining districts represent the highest attainments in these lines of industry.

#### COAL NOTES.

Mr. Elijah Heathcote, of Morrissey Mines, Carbonado, has been gazetted a member of the board of examiners for the Morrissey colliery, and to act as secretary to the said board, in place of Mr. J. K. Miller, resigned, such appointment dating from April 1, 1915.

Coal prospects at Enderby, Okanagan district, are reported to be promising, a 20-ft. seam of coal having been met with at a depth of 30 ft. The coal is described as being of good quality, burning freely and giving out a strong, steady heat.

The customary spring exodus of men from Crow's Nest Pass coal mines to Alberta, has lately been taking place. A number of men owning ranches in the Territories find winter employment in the Crow's Nest collieries and spend the summer on their own properties.

The Crow's Nest Pass Coal Company has decided to use concrete blocks for the walls of its new office building to be shortly erected at Fernie. Suitable stone was not obtainable in the vicinity, so concrete was chosen as being the best material available.

The provincial Legislature has passed the amendment to the *Coal Mines Regulation Act*, brought in by Mr. J. H. Hawthornthwaite, providing for an 8-hour day from bank to bank, or surface to surface. An amendment by Mr. R. Hall, proposing that in shaft coal mines the 8-hour day should be from bottom of shaft to bottom of shaft, was rejected.

Imports of coal into the United States from Canada for the two months of 1915 ended February 28, were reported at 206,231 tons as compared with 238,160 tons for the corresponding period of 1914, thus showing a decrease of 31,929 tons. Most of these imports were British Columbian coal, received at Californian ports. There was a large decrease in Australian coal received this year in California, the tonnage having been only 15,745 tons as against 48,796 tons in January and February of last year—a decrease of 33,051 tons.

Replying to the communication recently sent to him by the Associated Boards of Trade of Southeastern British Columbia regarding the selection by the Dominion Government of 50,000 acres of coal lands in East Kootenay, Hon. Clifford Sifton, Minister of the Interior, wrote the secretary of the Associated Boards: "Your letter of February 28 has come to hand, inclosing copies of certain resolutions of the Associated Boards of Trade. That portion of the resolutions which indicates that the government has in any way been mistaken or misled in regard to the selection of 50,000 acres of coal lands is founded upon entire mistake.

The best qualified expert geologists and coal mining experts were employed for the purpose of making the selection, and expended the greater part of from two to three years in carrying out a conclusion. The conclusion at which they arrived was that the 50,000 acres of land recommended to be selected finally, were considered the best selection that the government could make under the terms of the act. I have no doubt that this conclusion was justified by the facts."

In answer to the question: "How many coal licences were issued in each electoral district of British Columbia during the year 1914, and the amount of revenue derived therefrom?" the Hon. Chief Commissioner of Lands and Works stated for the information of members of the Provincial Legislature that 950 licences had been issued, the revenue therefrom having been \$88,500. These licences cover an area of, approximately, 698,000 acres. The number of licences for each district is shown in the following table:

District.	Number of Licences Issued.	Revenue.
Yale . . . . .	63	\$ 4,500
Similkameen . . . . .	29	2,700
Atlin . . . . .	13	650
Skeena . . . . .	55	5,000
Cariboo . . . . .	4	400
Comox . . . . .	9	900
Alberni . . . . .	5	500
Kamloops . . . . .	2	200
Fernie . . . . .	770	73,050
Totals . . . . .	950	\$88,500

#### COMPANY NOTES AND CABLES.

*Alaska-Mexican*.—February: 120-stamp mill ran 29 days; crushed 17,993 tons ore; estimated realisable value of the bullion, \$27,177. Saved 345 tons sulphurets; estimated realisable value of same, \$21,066. Total, \$48,243. Working expenses for month, \$33,454.

*Alaska Treadwell*.—February: 240-stamp mill ran 30 days (300 stamp mill did not run); crushed 34,076 tons ore; estimated realisable value of the bullion, \$51,705. Saved 829 tons sulphurets; estimated realisable value of same, \$54,133. Total, \$105,838. Working expenses for month, \$75,389.

*Alaska United*.—February: Ready Bullion claim; 120-stamp mill ran 30½ days; crushed 18,820 tons ore; estimated realisable value of the bullion, \$20,557. Saved 302 tons sulphurets; estimated realisable value of the same, \$8,319. Total, \$28,876. Working expenses for month, \$26,185.

*Arlington, Erie*.—March smelter returns from the Hall Mining & Smelting Co.'s smelter, Nelson, for 107 tons of ore were: Gross contents: gold, 296 oz.; silver, 628.09 oz.; average per ton, gold, 2.766 oz., silver, 5.87 oz. Net cash receipts from the smelter were \$5,066.30; expenses for the month, \$2,836.44.

*Le Roi*.—The following cable has been received from Rossland: "Shipped from the mine to Northport during February 1,546 tons of low grade ore for the purpose of testing and 9,909 tons of specially selected ore containing 4,020 oz. of gold, 4,381 oz. of silver and 293,500 lb. of copper; estimated profit on this ore after deducting cost of mining, smelting, realisation and depreciation, \$26,500. Expenditure on development work during the month \$7,250. Development of the mine continues to be satisfactory, particularly on the 900 and 1450 levels."

*Le Roi No. 2*.—The mine manager cables for February: "Shipped 1,615 tons. The net receipts are \$48,475, being preliminary payment for 1,646 tons shipped; \$4,441 being deferred payment on 1,340 tons previously shipped; \$52,806 in all."

*Tyce Copper*.—February: Smelter ran 23 days; smelted—Tyce ore, 5,325 tons; custom ore, 529 tons; total, 5,854 tons. Matte produced from same, 519 tons; gross value of contents (copper, silver and gold) after deducting costs of re-

fining and purchase of custom ore, \$76,398. *Office Note.*—From information received by mail to-day the board regrets to learn that, owing to the partial caving-in of the workings at the 105-ft. level, the monthly output of the mine will have to be reduced from 5,000 tons to 2,000 tons until such time as the developments in the lower levels result in the discovery of further ore bodies. Up to the present time the developments below the 200-ft. level, down to the present workings at the 600-ft. level, have not proved the existence of ore bodies, and it is now intended to sink without delay to the 800 and 900-ft. levels.

*Tyce Copper.*—March: Smelter ran 10 days; smelted 1900 tons of Tyce ore, giving returns, after deduction of freight and refining charges, of \$33,086

*Ymir Gold.*—February: 30 stamps ran 25 days; crushed 2,000 tons ore containing 520 oz. bullion; estimated realisable value (gross), \$5,863. Concentrates, 135 tons shipped, gross estimated value, \$4,000. Cyanide plant, 1,500 tons of tailings producing bullion having estimated gross value of \$1,219. Sundry revenue, \$75. Total, \$11,157. Working expenses, \$11,850. Loss, \$693. Expended on development, \$200.

The Athabasca-Venus, Ltd., owning the Athabasca and Venus gold mines, situated near Nelson, is in liquidation Mr. J. J. Cambell, of Nelson, has been appointed receiver.

CERTIFICATES OF INCORPORATION.

*Northern Mines, Ltd.*, with a capital of \$50,000, divided into 10,000 shares of \$5 each.

*Bulkley and Telkwa Valley Coal Co., Ltd.*, with a capital of \$1,000,000, divided into 10,000 shares of \$100 each.

*Continental Power Co., Ltd.*, with a capital of \$50,000, divided into 10,000 shares of \$5 each.

*Interior Power Co., Ltd.*, with a capital of \$25,000 divided into 5,000 shares of \$5 each.

*Second Relief Mining Co., Ltd.*, with a capital of \$500,000, divided into 500,000 shares of \$1 each.

*Edward Baillie Syndicate, Ltd.*, with a capital of \$40,000, divided into 400 shares of \$100 each.

*Greenwood Fremont Mines, Ltd.*, with a capital of \$250,000 divided into 1,000,000 shares of 25 cents each.

*McKinley Mines, Ltd.*, with a capital of \$2,000,000, divided into 2,000,000 shares of \$1 each.

*West Coast Power and Light Co.*, with a capital of \$50,000, divided into 50,000 shares of \$1 each.

*Malahat Lime Co., Ltd.*, with a capital of \$15,000, divided into 15,000 shares of \$1 each.

REGISTRATION OF EXTRA-PROVINCIAL COMPANY.

*American Mining Co.*, with a capital of \$50,000, divided into 5,000 shares of \$10 each. The head office of the company in British Columbia is situate in Imperial Bank block, Revelstoke.

NEW REGISTRATION IN ENGLAND.

*Kamloops Mines, Limited.*—Registered February 22, by Edell & Gordon, 4 King street, Cheapside, E.C. Capital, £135,000, in £1 shares. Objects: To acquire upon the terms of an agreement between Kamloops Mines, Limited, and its liquidator, of the one part, and this company of the other part, the undertaking, assets and liabilities of the said old company, and to carry on the business of miners, smelters, etc. No initial public issue. The number of directors is not to be less than two nor more than ten. The first are: G. T. Symons, F. V. Marmont, C. E. Tempest, E. P. Milstead, and C. E. Pulling. Qualification, £100. Remuneration, £100 per annum (chairman £150) and 10 per cent of the net profit after 15 per cent. dividend has been paid, divisible. Registered office: 18 Leadenhall street, London, E. C.

APPLICATIONS FOR CERTIFICATES OF IMPROVEMENT.

Mineral Claim.	Mining District.	Applicant.
Butterfly.....	Ainsworth .....	Edward Dedolph
Dazy.....	Ainsworth .....	Edward Dedolph
Good Hope .....	Atlin, G. Pollay and John Kirkland	
Pretoria.....	Fort Steele.....	John Porter Bailey
Reward .....	Grand Forks.....	M. F. McMynn
Twins.....	Grand Forks.....	A. B. Campbell, J. S. C. Fraser, William Austm, C. M. Oliver.
Pmt.....	Grand Forks.....	F. Newby
Montezuma.....	Grand Forks.....	H. C. Cayley
Oldie.....	Grand Forks.....	L. Vaughan
Lillie K.....	Grand Forks.....	A. B. Campbell, J. S. C. Fraser, W. Austm, C. M. Oliver.
Bryan.....	Grand Forks.....	L. Vaughan
Bunker Hill.....	Grand Forks.....	Neil McCallum and Ella Clark.
Alpha.....	Grand Forks.....	Harry McLaren
Garnet.....	Greenwood.....	Kenneth C. B. Frith
Garnet Fractional.....	Greenwood.....	Kenneth C. B. Frith
Robert L.....	Greenwood.....	Isaac H. Hallett
American Eagle.....	Greenwood.....	John P. McLeod
Ruby Fractional.....	Greenwood.....	Geo. Cook and M. McMynn.
Logan.....	Greenwood.....	F. M. Elkins
Minneapolis Fraction.....	Greenwood.....	Kenneth C. B. Frith
Fremont.....	Greenwood.....	Elizabeth Galloway and R. Wood.
Moonshine.....	Goat River.....	M. M. Grothe
Sunset.....	Goat River.....	M. M. Grothe
Nina.....	Lardeau.....	Hugh N. Baird, R. Peddie, F. A. Crane, J. B. S. Magor.
Phyllis.....	Lardeau.....	Hugh N. Baird, R. Peddie, F. A. Crane, J. B. S. Magor.
Little Johnnie.....	Lardeau.....	J. A. Darragh
Lost Cup.....	Lardeau.....	Hugh N. Baird, R. Peddie, T. A. Crane, J. B. S. Magor.
St. Joe.....	Lardeau.....	Geo. S. McCarter
Iron Dollar.....	Lardeau.....	J. A. Darragh
Carbonate Hill, Fractional.....	Lardeau.....	J. A. Darragh
Carbonate Hill.....	Lardeau.....	J. A. Darragh
Little Lottie.....	Similkameen.....	A. E. Howse, E. P. Lowe and Jas. Brown.
Happy Jack.....	Similkameen.....	A. E. Howse, E. P. Lowe and Jas. Brown.
Frisco.....	Slocan.....	C. S. Rashdall
J. W. Hill.....		
New York.....		
Oregon.....		
Smelter.....		
United.....		
Verde.....		
No. 14.....		
No. 21.....		
No. 33.....	Similkameen.....	M. A. Voigt
No. 35.....		
No. 39.....		
No. 37 Fractional.....		
No. 41 Fractional.....		
No. 47 Fractional.....		
No. 48 Fractional.....		
No. 49 Fractional.....		
Number 2.....		

Silver Tip.....	Slocan.....	W. G. Clark
Electric.....	Slocan.....	W. S. Drewry
Shareholder.....	Slocan.....	W. S. Drewry, Oliver T. Stone, John F. McIntosh, Robert Williams.
C. D. ....	Frout Lake.....	James J. McGlone
C. H. ....	Frout Lake.....	James J. McGlone
Doubtful.....	Frout Lake.....	James J. McGlone
X. Y. Z. ....	Frout Lake.....	James J. McGlone
Bluejay.....	Frout Lake.....	James J. McGlone
L. B. ....	Frout Lake.....	James J. McGlone
Conqueror.....		
Cyrus.....		
Daniel.....	Victoria.....	J Bentley, et al
David.....		
Maud.....	Frout Lake...	Charles W. McCrossan
Anna.....	Trout Lake...	Charles W. McCrossan
Joseph.....	Trout Lake...	Charles W. McCrossan
Sunset.....	Trout Lake ..	Charles W. McCrossan
Revenge.....	Trout Lake.....	George S. McCarter

### MACHINERY NOTES

A bucket elevator and a gold dredge are advertised in this number of the *MINING RECORD* as for sale.

The White Bear Mining Co., Rossland, has purchased through Mr. G. C. Hinton, a 400-h.p., three-phase, 60-cycle, electric induction motor, which will be used to operate the compressor plant.

In connection with the Le Roi Mining Co.'s experimental plant for concentration, a lot of the machinery has been received at the mine and is being installed, but as the electric motors will not reach Rossland until late this month or early next, it is not expected that the concentrator will be in operation until some time after the middle of May.

The owners of a mineral claim on Loughborough inlet have arranged to bring from Rat Portage a small second-hand steam power plant for use in prospecting this coast mining property. Mr. Wm. F. McCready, of Vancouver, is in charge of the operations.

The West Canadian Collieries, Ltd., is installing additional plant and machinery at its Lille colliery, situated near Frank, South-western Alberta. The tippie there is being equipped with automatic dumps, shaking screens, picking tables, and other appliances, to bring its capacity up to 2,000 tons per diem.

The "knock-down" hull of a dredge, for the Canadian Klondike Mining Company, is to be built at the Pacific Coast Lumber Company's mill, on Coal Harbour, Vancouver. When completed it will be sent north in sections.

The Bonanza Gold Dredging Co., which holds leases for a large area of ground in Yukon Territory, is stated to have placed an order for the construction of a large dredge, designed along similar lines to those of the most modern of the dredges at work in California.

The St. Eugene Consolidated Mining Company has ordered from the Jenckes Machine Company, of Sherbrooke, Quebec, a 30-drill air compressor, the 20 drills at present in use in the St. Eugene mine, at Moyie, being insufficient for development requirements. The new engine will have a capacity of about 3,000 cu. ft. of free air per min. A 60 by 60 ft. building, to house this machine, is being erected. More steam boilers, of a total capacity of about 500 h.p., have also been ordered; when these shall have been installed the total boiler capacity will be 330 h.p. The new plant is to be put in next July, so as to be available for operation, if practicable, by August 1. Fourteen new 2-ton

ore cars were lately obtained, from a Kootenay manufacturing firm, for the St. Eugene.

The Northern Mines, Ltd., has purchased, through Messrs. Rochussen and Collis, manufacturers' agents for mining machinery and supplies, Victoria, a 26-ton Vulcan Iron Works Co.'s (Toledo, Ohio), traction-wheel, standard steam shovel, for prompt delivery. Messrs. A. H. Bromly, managing director, and R. D. Fetherstonhaugh, superintendent, spent several weeks investigating the merits and capabilities of the steam shovels of four different manufacturers, finally deciding to purchase a Vulcan machine, as being best suited to their requirements. The shovel will be employed on Spruce creek, Atlin.

The Western Fuel Company, Nanaimo, lately ordered from the Canadian Rand Drill Company, of Sherbrooke, Quebec, a 12 by 18 Jenckes double-cylinder, single-drum, hoisting engine, and a 30-drill air compressor, both to be installed next June. The compressor, which will be used to provide air power for pumping and for operating coal-cutting machines, will be of the following description: Class B 3, compound steam, compound air; steam cylinders, 20 and 30 by 30-in. stroke; air cylinders, 20 and 32 by 30-in. stroke; capacity, 2,513 cu. ft. of free air per min. at normal speed of 90 rev. Steam cylinders fitted with Meyer cut-off, balanced valves, and all piston rods with metallic packing. Low-pressure air cylinder to have mechanically-operated Corliss inlet valves. Between low and high-pressure air cylinders the air will pass through the latest type of Rand water-tube intercooler, which reduces the air to within 15 degrees of the temperature of that of the cooling water, condensing all moisture, which is separated before the air enters the high-pressure cylinder. At 100 lb. air the i.h.p. is 437; approximate weight of engine, 82,000 lb. This machine is an exact duplicate of one previously supplied by the same manufacturers and which has been running at the Nanaimo colliery about 12 months.

### TRADE NOTES AND CATALOGUES.

"Little Wonder" air hammer rock drills have been used with such success in a Texada Island mine that other coast mines are about to give them a trial.

Mr. E. C. Berghoefer, representing the Link-Belt Machinery Co., of Chicago, Illinois, well-known manufacturers of coal-handling plant and machinery, recently visited Fernie, to obtain particulars of the 880-ft. steel trestle, tippie, and other plant the Crow's Nest Pass Coal Co., is about to put in to replace that recently destroyed by fire at its Coal creek colliery.

The Canadian Rand Drill Co. and the Jenckes Machine Co. have jointly opened an office in Vancouver, with Mr. Chas. Sangster in charge. Mr. Sangster was for a long period in the Rossland office of these companies, so is familiar with the class of machinery required by British Columbian mines.

A handsome booklet issued by The Wellman-Seaver-Morgan Co., of Cleveland, Ohio, describes the Dewhurst patent slag ladles and cars, of which they are sole American builders. These appliances have been extensively adopted in leading smelting plants in Great Britain and elsewhere. Their special features are shown and the details of their mechanism explained.

The Canadian Westinghouse Co., Ltd., Hamilton, Ontario, has issued two new circulars, Nos. 1098 and 1099, respectively. The former illustrates the company's switchboard indicating instruments, and the latter its bi-polar motors—type R. for direct current circuits.

The Canada Foundry Co., Ltd., of Toronto, Ontario, manufacturers of air and gas compressors, recently sent us Bulletin 26, illustrative of the company's straight line compressors and air receivers. This contains useful descriptive information and several exhaustive tables.

We have received an advance copy of a publication entitled "Church Lighting by Electricity," the Westinghouse Companies' Publishing Department has prepared for the Nerust Lamp Co., of Pittsburg, Pa. It deals with the prob-

lem of how to light a modern church most effectively, and is of especial interest to all concerned in this question.

The Joshua Hendy Machine Works' catalogue No. 16 on Gold Milling Machinery is descriptive entirely of machinery of their own manufacture, some of which is shown in a number of fine half-tone reproductions. There is in this catalogue much that is worthy of the attention of all engaged in the milling of gold quartz and gravel, as well as of those who contemplate the installation of such machinery.

*Vancouver Portland Cement Co.*—The Vancouver Portland Cement Company, which last month commenced to manufacture Portland cement at its works, Tod creek, near Sidney, Vancouver Island, is reported to have secured an important contract, through its Vancouver agents, to supply the Corporation of the City of Vancouver with cement, to be used chiefly in putting down new footpaths in that city. The price is given as \$2.75 for each 375 lb. (equivalent to a barrel), delivery to be made in sacks.

*Cammell, Laird & Co., Ltd.*—The report of the directors of this Sheffield, England, company for the year 1904 states that the net profits amounted to £185,730, making with the undivided balance brought forward £212,466. The directors recommended a final dividend in respect of the year 1904, of five per cent. on the ordinary shares, making for the year 7½ per cent. The company is offering for subscription £400,000 in 4½ per cent debenture stock at 102½ per cent.

*Canada Foundry Co., Ltd.*—A press despatch from Toronto states that the Canada Foundry Company, of that city, is about to acquire the Bertram Engine & Shipyards Company, described as the greatest shipbuilding enterprise in Canada. The directors of the former company have authorised the issue of \$2,000,000 worth of stock, of which it is intended to place \$500,000 on the market immediately.

*Hadfield's Steel Foundry Co., Ltd.*, Sheffield, England.—

The profits for the past year amounted to £76,866, and, with the balance from the previous year, there was an available total of £92,107. It is recommended that a final dividend of 2s. per share and a bonus of 1s. 6d. per share be paid on the ordinary shares, making, with the interim dividend paid, 22½ per cent for the year, and leaving £15,607 to carry forward. The whole of the additional issue of £50,000 ordinary shares offered at £1 10s. premium had been taken and the premiums added to the reserve fund, making it £195,000.

*Canadian General Electric Co.*—The directors of this company at the annual meeting gave notice of an intention to increase the capital by \$900,000. A special meeting will be called to give the necessary authority. The business of the first two months of the current year was the largest in the history of the company for any similar period. From January 1 to March 5 contracts to the amount of \$1,007,000 have been closed by the electrical department, and \$381,000 by the foundry department. These amounts added to the total unfinished business carried forward from 1904, make a gross total of \$4,118,000. The company's profits for the past year amounted to \$582,519.00, as against \$512,210 for the previous year. Considerable sums have been expended in creating the locomotive department, which is now on a normal manufacturing basis.

*Canadian Westinghouse Co., Ltd.*—The first annual meeting of this company was held at Hamilton, Ontario, on March 28 ult. Mr. H. H. Westinghouse, vice-president, presided. The directors submitted the balance sheet for the year 1904, together with the profit and loss account to that date, showing a profit of \$160,599.26 from operations since the date of organization, November 1st, 1903, a period of fourteen months. Manufacture has been carried on during this period only in the air brake department, the business of the electric department, prior to the completion of the new plant, being exclusively of a selling nature. The new manufacturing plant has been practically completed, the in-

# FOR SALE.

## Dredging Plant, and Claims on Tranquille Creek

Near Kamloops, British Columbia.

One mile of the Creek leased at present and more can be obtained.

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In moving the adoption of the report, Mr. Westinghouse expressed the company's satisfaction with the results of the first year's operations, and the expectations of a large and growing business in both the air brake and electrical departments.

The following were elected directors of the company: George Westinghouse, H. H. Westinghouse, Hon. J. M. Gibson, Frank H. Taylor, Warren Y. Soper, L. A. Osborne, T. Ahearn, George C. Smith, C. F. Sise and Paul J. Myler.

At a subsequent meeting of the directors, Mr. George Westinghouse was elected president; Mr. H. H. Westinghouse, first vice-president; Mr. Frank H. Taylor, second vice-president; Mr. Paul J. Myler, third vice-president and treasurer, and Mr. John H. Kerr, secretary.

#### PUBLICATIONS RECEIVED.

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- American Institute of Mining Engineers*, New York, U.S.A. Bi-Monthly Bulletin (March, 1905). Section I. Institute Announcements, Section II. Technical Papers.
- Technical Press Association*, London, England (*Association de la Presse Technique*, Brussels). The Engineering Press Monthly Index Review, December, 1904. Record of Engineering Literature.
- Les Mois Scientifique et Industriel Revue Internationale D'Information*, Paris, France. Mining and Metallurgical Part of February Number.
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- Daily Mining Record*, Denver, Colo., U.S.A. Annual Statistical Edition for 1904.
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- Canadian Mining Institute*, Montreal, Canada. Journal of the Institute for 1904, containing the Papers and Proceedings of the Meetings of Institute; Vol. VII., pages 530, illustrated. Also Papers (unrevised), being parts of Vol. VIII.

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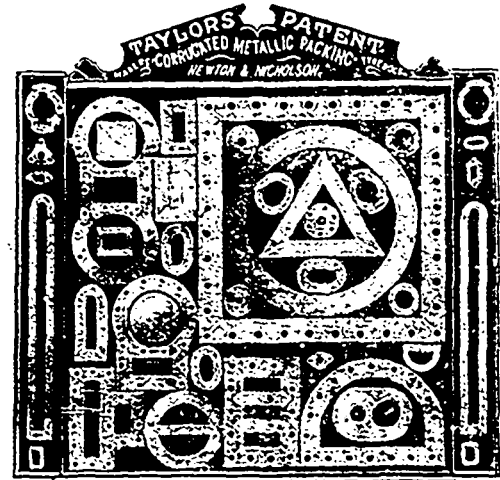
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