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THE MONTH.

THERE is a pleasing delusion widely prevalent in Great Britain that the investor in mines can be protected against loss and fraud by the *ipse dixit* of a mining engineer, provided only he relies on a "real" mining engineer and not upon a spurious one. At the same time he is becoming dimly conscious that he is not being so protected at the present time, and that the

number of letters after a man's name is not a guarantee of technical knowledge, ability, or reputable character; but merely of a certain advertising pushfulness by which the individual has introduced himself into certain societies, by no means distinguished for exclusiveness, but all betraying a certain eagerness after fees. The matter has even reached the phase of public discussion. It was recently taken up by Mr. Moreing, president of the Institute of Mining and Metallurgy who said in the course of an address before that body the other day that if investors "saw a mining expert referred to in a mining prospectus they should look him up in the list of members of the institution, and if he did not appear there the odds were very great that he was not a qualified mining engineer, that he was not eminent, and that further enquiries were necessary."

With all due respect to Mr. Moreing and the Institute of Mining and Metallurgy, we consider that this statement is a complete inversion of the course which should

be pursued by investors. When they see an expert referred to in a prospectus who is designated as a Member of the Institute of Mining and Metallurgy there is a good *prima facie* case for further investigation of his career and capabilities.

The remarks of Mr. Moreing have drawn forth a letter from Mr. J. D. Kendall, who points out the inefficiency of the test of such membership and says: "What is wanted to place the mining profession on a proper basis is some impartial test of knowledge which all members must pass before they are allowed to practice whether they belong to a technical society or not."

How this test is to be applied Mr. Kendall does not say. But it is quite obvious that, as the mining investments of Great Britain extend over all the world it would be impossible to impose uniform regulations applying to the profession in different countries, and if promoters chose to quote engineers of Colonial or American standing, it would be impossible to prevent them doing so. It might be possible to create a body of engineers, membership in which would be such a guarantee of competence that investors would insist on having a member connected with every enterprise to which they would subscribe, but to do so would be a task of very great difficulty. Of course a test of knowledge and competence is highly essential, but in successful mining enterprise there are more factors involved than mere technical knowledge of mining engineering. There is first the acquisition of the actual facts about a mine and the lucid and comprehensible description of these facts. This is properly the work of an engineer. With all due deference to a learned profession this does not require nearly as much technical knowledge as is generally supposed, and it does require much more practical experience than is frequently obtainable. It involves questions of labour, freight, treatment, power and organisation which differ in every locality, and with regard to every mine, as well as those in respect to formations, ore in sight and values. It involves, in short, factors with which no amount of technical training will enable a man to grapple, unless he conjoins therewith practical experience and a clear head.

In the second place there is the necessity for a judgment as to the price to be paid for the mine. This is a judgment which should be founded on the engineer's report, not contained in it. It requires commercial, not technical or scientific, training and bent of mind. Yet wrong judgments upon this point are responsible for more loss in mining than incorrect reports. In the third place there is a judgment as to the capital on which

the mine will pay dividends, and the proportion of that which should be working capital. Here again we discover a fruitful source of loss to investors. Now the ideal mining prospectus should be such that its conclusions should be self evident to the ordinary commercial intelligence such as the investor, or those who advise him, may be supposed to possess. He certainly requires a guarantee that the original facts are correctly stated. For that guarantee he looks to the character of the promoters and the name of the engineers they have employed. If any test, such as suggested by Mr. Kendall, could be applied it would be highly beneficial, but it is gravely to be doubted whether it could be successfully applied or not. There is a class of men known as mining experts, as opposed to mining engineers, who profess to pass judgment upon all three factors in successful mining enterprise we have outlined and to do so authoritatively. Naturally they are an excessively dangerous class of persons to have anything to do with. But there is such a strong tendency among human beings to depend upon authority instead of upon their own judgment that mining experts have received quite a vogue, and many a company has been promoted upon the unsupported fiat of one of these gentlemen. As an interesting commentary upon the condition of the profession of mining engineering in Great Britain, Mr. Hess of the *Critic* proposes to bring out a Black Book of engineers as a companion work to his most useful Directory of Guinea Pigs. This, indeed, may have the effect of the killing of some bogus engineers, but it will not touch the process by which they are evolved. However, as a fruitful field for his exertions the mining history of British Columbia during the last ten years may be recommended to Mr. Hess.

At the present time there is a tendency in some quarters to believe that the outbreak of hostilities threatened between the American Smelting and Refining company and the lead producers of the United States may result in some advantage to the silver-lead mines of British Columbia. The American Smelting and Refining company has been paying 4 cents and latterly 3.90 with a bonus on restricted production to the American mine owners. It now proposes to drop to 3.50 or 3.40 cents. There is talk of the mine owners in the Cœur d'Alene district combining to smelt, refine, and market their ore themselves in competition with the trust, and the theory is that this would send the trust to Mexico and British Columbia in search of ore. If this took place the benefit derived by the British Columbia mines would be of a most temporary character, for such internal competition breaking out in the United States would, immediately it became operative, send the price of lead in the United States down to the European level plus the duty. It might even send it lower, although the effect of such a movement as that would be speedily remedied by exportations. However, the British Columbia mines would not be benefitted for any length of

time, if at all. In fact it is a little difficult to appreciate how producers could be permanently benefitted by any competition stimulating production when more of the commodity was already being produced than the market could absorb. Of course, if the price offered for lead ore by the Smelting and Refining company fell so low that the Cœur d'Alene mines could not for the time being live under it and were closed down, that would relieve the market, and be of advantage to those British Columbia mines which carry a higher grade of ore. But it is questionable if the large producers in the Province are of much higher grade than the Idaho mines.

Our mines are apparently not in a position to take the best possible advantage of the open market which at present exists, not to mention the Canadian home market. The British Columbia lead miner receives about 1.50 cents for 90 per cent. of the lead in his ore. The consumer or exporter buying in Great Britain pays, even at present prices, 2.50 cents for the lead. At least \$25 a ton is absorbed by foreign industry out of every ton of lead produced in this Province. Let Canadian industry capture that sum of \$25 a ton and share it with the Canadian miner, and then it will be time enough to look for favours from the American Smelting and Refining company. We send lead bullion to San Francisco refiners who sell it to English brokers who export it to Montreal consumers. The Montreal importer pays \$25 a ton more for the lead he uses than the British Columbia miner receives for the lead he produces. Our industry will never be placed on a secure basis until we seek the available markets ourselves directly and make the most of them instead of being, as we are at present, a mere makeshift for the industry of the United States when it happens to require an increased supply of raw material.

Up to the end of the month of September the Dominion Iron and Steel company, of Sydney, N. S., had already marketed 42,000 tons of pig iron this year. 25,000 tons were exported to Great Britain, 15,000 tons sold in Canada and 2,000 tons sent to the United States.

The total consumption of pig iron in Canada during 1900 was 167,169 tons of which 65,330 tons were imported, 67,221 tons manufactured in Canada from foreign ores, and only 34,618 manufactured from Canadian ores in Canadian blast furnaces. It is obvious from the above figures that a great and beneficial change is taking place in this industry, and that Canada is destined to become a country capable not merely of producing sufficient iron and steel to supply the home market, but also of establishing an important export trade. The active works in Canada in 1901 are (1) The Nova Scotia Steel company; blast furnace at Ferrona, Nova Scotia; (2) The Hamilton Steel and Iron company, Hamilton; (3) The Canada Iron Furnace company, Midland; (4) The Dominion Iron and Steel company; furnaces at Sydney; (5) The Canada Iron Furnace company, Radnor; (7) The Drummondville furnaces. In addition to these the Lake Superior Power company are build-

ing at Sault Ste. Marie, Ont., a very extensive plant for the manufacture of pig iron, steel and steel rails, the latter the first established in Canada. The aggregate capacity of the seven furnaces now in active operation is 440,000 tons and the capital represented by them is \$24,500,000, which will be increased to \$35,000,000 by new plant now building.

This remarkable industrial development has been largely brought about by the policy of the government in aiding the manufacture of iron and steel by a bonus. The progressive attitude adopted also by the Provincial government of Ontario to the Lake Superior Power company, has had its effect in stimulating the development of our great iron resources, and retaining in Canada the enormous sum hitherto drained out of the country to provide for the needs of the manufacturing industries in the matter of iron and steel, apart from the possibilities already opening up of a profitable and extensive export trade. We look forward to the day when the people of British Columbia will awake to the necessity of fostering and encouraging the manufacture of iron and steel in a similar manner.

The discovery of new diggings on the Horsefly river has revived interest in the proceedings and whereabouts of an interesting bankrupt company promoter, Mr. Adolphus Drucker, ex-M.P., of Northampton, England. When it was announced that Mr. Drucker was conducting prospecting operations upon the Crooked river in British Columbia it was considered that this development of his career displayed a certain amount of poetic justice, and was a tribute to the eternal fitness of things. When this announcement was denied and the gentleman was stated to be in Switzerland, it was generally admitted that he was either in British Columbia or Switzerland, or at some intermediate point. And although there were quite a number of people in England who would dearly have liked to lay hands on Adolphus Drucker, ex-M.P., if they could have done so conveniently; their interest in Mr. Drucker did not go so far as the ransacking of Switzerland and British Columbia and the intervening territory to find him. In certain quarters Mr. Drucker, however, has lately been accredited with having discovered a new and promising gold field in British Columbia, and a certain glow of hope has illumined the breasts of his numerous and angry creditors that Adolphus would realise in his own person, the conception of the colonies, popular among the sixpenny magazines, as a Tom Tiddler's ground for the black sheep of the Old Country. If a certain story is to be believed Mr. Adolphus Drucker, ex-M.P., was, under Providence, the agent of the discovery of the new Horsefly diggings. It is certain that he has been in the neighborhood, for there is a cabin known as "Drucker's cabin" some nine miles from the new discovery, and it is said that growing tired of exploration, he sold his supplies at a sacrifice to the men who actually explored the new territory and discovered the new creeks.

This may be so or it may not, but so far as we have been able to discover, there is no evidence that Mr. Drucker is in any way interested in, or to any extent likely to be benefitted by, the new discoveries.

The annual report of the Hall Mines Ltd., is an exceptionally favourable and encouraging document, and even better than anything contained in the report is the account of operations since the close of the financial year. In the light of this report it is clearly to be seen that the difficulties this fine property got into were entirely due to the policy adopted by the board of directors and to inefficient management. An attempt was made to press the production of the mine beyond the limits assigned to it by Nature in the size and continuity of the ore bodies. The inevitable consequences followed. The ore supply failed and much of the capital invested in the mine was wiped out. But for the pluck of some of the shareholders in facing a long and arduous period of reconstruction it might all have been lost. Now, however, the mine is again paying its way and there is no reason why, with careful husbandry of its resources and proper attention to development work, satisfactory dividends should not result from its operations. There can be no doubt that many of the troubles of this mine were directly due to extravagant estimates of its ore reserves, and their value made by experts who examined it at the time of its flotation. We have heard that the ore in sight was estimated at 50,000 tons of an average value of \$100 a ton, and that statements of this kind were embodied in reports on which the original company based its operations. If so, it is easy to understand how an entirely wrong measure was taken of the mine. But it is not easy to understand why, long after it was known in British Columbia that an excellent property was being rapidly driven into bankruptcy, the policy of the company was not altered before its resources were exhausted. The customs operations of the company appear to have been carried on practically at cost. This has been due to the satisfactory condition of the lead market affecting both the regularity of an ore supply and the selling of the resultant bullion. There is reason to anticipate, however, that the miner may still continue to be affected, the smelter is now in a position to reap profit from its work. A smelter is only injuriously affected while and immediately after the market falls unless, indeed, the supply of ore is cut off altogether. This does not appear to be likely as the tonnage of silver-lead ore produced in the country is now again upon the increase.

There is not very much to be said about the now issued report and balance sheet of the Enterprise Mines, Ltd. The Enterprise mine was purchased by the London and B. C. Goldfields from Messrs. Finch & Campbell, of Spokane, and resold by that company to the Enterprise Mines, Limited, for £130,000, £90,000 in

shares and £40,000 in cash. It started in business about eighteen months ago with a subscribed capital of £130,007 out of an authorised capital of £150,000. From the point of view of independent shareholders the mine has been, and still is, a most unsatisfactory investment. It is difficult to see how it could have been otherwise. No working capital whatever was provided and it was early discovered that working capital was necessary, as the ore was not susceptible to hand sorting as had been predicted in the engineer's reports. Now, however, there appears to be good reason for expecting that the mine will be placed on a permanently self-sustaining basis, that is, provided that the mill justifies anticipations of its ability to handle the ore without ruinous loss of value. The general consensus of opinion moreover, not merely as officially inspired, but also among the people interested in mining in the Province, is that the mine never looked better than it does at present. That being so, the shareholders may reasonably look for returns, but the wise investor will, for some time yet at least, look upon these returns rather as a redemption of the capital he has in the mine than as an inducement to buy shares in it at an advanced price.

An interesting discussion has been raised by the recent issue of 80,000 £1 shares by the Tye Copper company in London, at what practically amounted to a 40 per cent. discount, the immediate payment of a commission of eight shillings per share having been offered as an inducement to subscribers. As the English company law forbids the issuance of shares at discount, the seeming evasion in this instance has again given the press the opportunity of pointing out the ease by which a man may drive a coach and four through any Act of parliament. It appears the issue has been made in accordance with a section of the Companies' Act, 1900, relating to the disclosures of underwriting commissions in the prospectus of a company. The section says:

"Upon any offer of shares to the public for subscription, it shall be lawful for a company to pay a commission to any person, in consideration of his subscribing or agreeing to subscribe, whether absolutely or conditionally, for any shares in the company, or procuring or agreeing to procure subscriptions, whether absolute or conditional, for any shares of the company if the payment of the commission and the amount or rate per cent. of the commission paid, or agreed to be paid, are respectively authorised by the articles of association and disclosed in the prospectus and the commission paid or agreed to be paid does not exceed the amount or rate so authorised."

This section, as our New York contemporary, the *Engineering and Mining Journal*, rightly remarks, "was really intended to apply to underwriting agreements and to the payment of commission to financial agents for placing shares. It covers even the limiting case of paying a commission of 19s. 11d. to subscribers of £1 shares, an operation which is equivalent to the issue of £1 shares at one penny. The articles are originally fixed by the promoters and are subsequently under the control of three-quarters majority of the shareholders, so that if the promoters and shareholders generally agree to the policy of issuing shares at a discount in this way there appears to be nothing to prevent them doing so."

A Revelstoke contemporary endeavours to excuse and explain Mr. Dunsmuir's behavior in connection with the foreclosing of the mortgage on the Noble Five mine, at Cody, on the following grounds:

"Some time ago Mr. Dunsmuir refused to advance any more money, but offered, and did surrender 90,000 shares of his stock to the company. These shares were sold for a nominal figure, and the proceeds spent in developing the Noble Five property from the No. 3 tunnel of the Last Chance. The work done there proved encouraging and it was represented to him that, if he would advance money to carry on the work, he would be paid from the proceeds of the ore sold.

"On this understanding he advanced \$2,500 in September, which Mr. Macdonald, the manager, said he hoped to be able to repay by the end of the month. During the interval the Last Chance people made a claim that the ground the Noble Five was working belonged to them, and would not allow the ore to be shipped, and instead of the \$2,500 being repaid to Mr. Dunsmuir he had to advance, on October 7th, \$4,000 more, and to continue to carry on development work would take considerable more money, which he did not feel disposed to advance. There is also the dispute with the Last Chance people which will, no doubt, mean a law suit before it is settled."

While this statement of the case may be veracious, it is not quite the version generally accepted; and in any event does not justify Mr. Dunsmuir's conduct in failing to keep faith with the investing public. That is, always providing, as we have previously stated, that Mr. Dunsmuir accepts the responsibility for the pledge given to shareholders in his name by his confidential agent, Mr. B. J. Perry, at the general meeting in March last. There can be no such thing as extenuating circumstances in a case of this kind. If a man once passes his word to pursue a certain course of action surely he has no other alternative to continue in that determination at whatever cost or inconvenience to himself.

Complaints are perennial against the injury done to the development of the Yukon country by excessive litigation. Thus we have Sir Thomas Tancred quoted by the *Yukon Sun* as follows:—"The procuring of water to work some big hydraulic concessions is merely a matter of money. There are no insurmountable engineering obstacles. But capital will not come here, rich as the country is, when conditions are not settled. People must know that they are not to be molested by continued legal proceedings over small matters before they can proceed. They want to know whether they are standing on their heads or their heels. Money will go to West Africa, where the climate is not so healthy and the mines not half so rich, merely because it is not harassed."

That is very true but it must be remembered that the sudden discovery of enormous wealth and its expropriation, must give rise to difficulties in defining individual rights, particularly when many of these rights involve questions of the ownership of water supply, in all countries the most intricate and difficult department of jurisprudence. When we compare the conditions prevailing in the Canadian Yukon with those of the Alaskan Yukon we have every reason for self congratulation. At the same time excessive litigation is a great evil. It is not an evil which can be overcome by any means, save even-handed justice, promptness and exactitude, in the administration of the law.

The Slocan district is undoubtedly recovering from the partial paralysis induced by the action of the American Smelting and Refining company at the beginning of this year. It is claimed that during the month of October more ore was shipped than during any month of October since the Slocan was discovered. The output is estimated for that month at 3,300 tons, and there is no reason to believe that it will show any diminution during the last two months of the year. If it does not, then the last quarter of the present year will add 10,000 tons to the sum total from that district. This will bring the production to within a measurable distance of the output of last year, and is particularly encouraging on account of showing what can be done even in the present very unsatisfactory condition of the silver and lead markets. So often has an era of steady production been prophesied for the Slocan country, and so often has some unforeseen circumstance blighted the legitimate hopes of those engaged in the industry of mining there, that any forecast of the future has become hazardous in the extreme. Still, at the present time, it looks as though the progress of the district was assured, if only from the fact that it is now showing evidence of progress, and that there is no further drawback or difficulty under which it could suffer which could be either imagined or invented.

A most interesting return from a shipment of ore from the Triune mine in the Lardeau illustrates two things, the very high grade of some of the ore discovered in that district and the enormous charges and deductions to which ore mined in places so remote from railway transportation is subject. The shipment comprised 414 sacks of ore, the gross weight of which was 49,776 lbs. nearly 25 tons. The sacks weighed 1,200 lbs., and the moisture deduction was 4.3, leaving a net weight of 46,487 lbs. of ore. The smelter assays per ton, of the shipment, (the basis of the purchase price) were .40 ounces in gold, 345.6 ounces in silver, and 53.8 per cent. lead. The total gold values were 9,297 ozs., at \$20 per ounce for 95 per cent., or \$176.64. The total silver values were 8032.95 ozs., at the exceedingly low price of 57 1-8 cents per ounce, for 95 per cent., or \$4,359.38. The total lead values were 25009 lbs., at the dreadfully low price of 1.482 cents per lb., for 90 per cent., giving the owners only \$334.25. The gross values, therefore, were \$4,870.27, the total charges, at \$21.00 a ton for freight and treatment from the Landing, were \$488.11, leaving net values of \$4,382.16. Out of this the cost of mining, packing to Ten-Mile, freighting to the Landing, and the Provincial ore tax has still to be deducted.

The situation at Rossland and Northport does not grow any clearer as time goes on. It may, and we hope it is progressing to a permanent and satisfactory settlement, but there are so many tangled threads in the skein that they can only be unravelled by pure conjecture.

The trouble with the unions, the course of the stock market in London, and the questions as to the conditions of the mines and smelter and their business, produce a situation of some complexity. To further confuse affairs there is the circumstance that each fact as it occurs is immediately interpreted to suit the sympathies of one side or the other to the dispute, so that its causes and meaning probably undergo an unconscious process of mental distortion before people outside of Rossland have an opportunity of considering them. During the last month, the resignation of Messrs. Bernard Macdonald and Bela Kadish, the visit of Mr. Frecheville, the appointment to, and immediate departure from, Northport of Mr. Labarthe, of Trail, the heavy drop in Le Roi shares in London, and in spite of all the considerable tonnage of ore shipped and mined, are all facts which show that the action in the Le Roi drama is moving rapidly to some denouement. Although to make head or tail of these facts, and of their relations to one another, is beyond the wit of the ordinary observer.

Some of the English financial papers have been booming the Giant mine, at Rossland, in a way not warranted by the position or prospects of the property. Of course a company cannot be held responsible for what newspapers say about its property, but the puffs in question have all the ear marks of having been inspired by the "shop" which has the shares of the Giant in charge. The Giant property possesses a well-defined outcrop of pyrrhotite on which a shaft has been sunk to some depth, but if any paying ore has been taken from this shaft we are not aware of it. Above this outcrop there is an irregular showing of arsenical iron in a silicious gangue carrying traces of molybdenum, or some such material, which is supposed to carry tellurides of gold. From this outcrop the shipments of ore from the Giant have been made, and they have returned satisfactory values. There is no reason to believe that the Giant will not make a good mine when it has been developed and equipped, but to compare it with developed mines which have a tonnage of ore in sight, and to recommend the purchase of shares in it on an investment basis is a mere playing upon the ignorance of actual conditions so common among English investors.

The project has been revived of organising a general Mining Association, to cover the interests of the mining industry over the whole Province of British Columbia. The question of the advisability of such a course is complicated by the existence already of the Mine Owners' Association which has headquarters at Nelson. If a general association were organised it would have to be either independent of, or amalgamated with, the present Mine Owners' Association. If it were independent of that body it would be regarded as hostile to it, and we question under which set of circumstances an association would be of least general use — hostile to,

or amalgamated with, the present Mine Owners' Association. There can be no doubt that a general association modeled after the Californian Association would be of great benefit to the mining industry of the Province. But it may be well to delay the project until the present Mine Owners' Association is willing to be absorbed into such a body, or until it has itself gained such influence and conferred such benefits on the mining industry that it has absorbed into its own ranks all those engaged in the industry of mining in the Province.

A newspaper report places the output of the Atlin district at 600 ounces of gold in excess of last year, and at the same time gives a conservative estimate of the value of the output as \$300,000. The value of the output from the district last year is estimated in the Minister of Mines Report at \$450,000, \$150,000 more than the estimate made for this year. It would appear that more gold has paid royalty this year than last, because more stringent measures were adopted to collect the tax. But whether there has been in reality an increased or diminished production is hard to say. Fewer miners have been at work although the per capita production certainly, is understood to have been more satisfactory. Until mining operations in Atlin are conducted on a larger scale than at present, working on most of the creeks must continue to be restricted by a scarcity of water except during the period of the spring freshets, lasting for perhaps six weeks or two months in a season. This, notwithstanding, evidence goes to show that under ordinarily favourable conditions, the ground is sufficiently rich to pay handsome returns on moderate investments of capital in hydraulic undertakings in this field.

We are informed that an American syndicate, which secured a thirty-day option on the Van Anda mines and smelter at Texada Island, has, after investigation, decided to exercise the right to purchase and the property has consequently, for a second time, changed ownership. In the course of the recent tests a large chute of exceptionally high-grade ore was encountered in the Cornell mine, and altogether the prospects as regards the successful operation of the property under new auspices are exceedingly bright. We are glad to note that the services of Mr. Thos. Kiddie, a mining engineer and metallurgist of admitted ability and experience, as general superintendent, are to be retained. Meanwhile the acquisition this year by American capital of the Britannia and Van Anda mines, probably the two most important copper properties in the British Columbia coast districts, is particularly significant in view of the present situation of the copper market in the United States.

A development of railway enterprise in the Yukon is promised for next year, which seems not only entirely feasible but should have a most beneficial effect in light-

ening the cost of mining on the various creeks. The proposal is to connect the mines with Dawson by an electric railway, which will supersede the present expensive system of roads and trails. If the project is carried through successfully it should have an important bearing on reducing the cost of working ground in the Yukon, and be of considerable assistance in solving the all-important problem on which the future of the Klondike depends. It is meanwhile not generally known that the present cost of transport from Dawson to the mines, a distance of probably twenty or thirty miles, is nearly if not quite as great as that of carriage from Victoria to Dawson, a distance of fifteen hundred miles, notwithstanding the high rates charged over the White Pass railway.

In reference to Mr. Labarthe's resignation from the management of the Northport smelter, a well-informed Rossland correspondent, who has no connection whatever with the Le Roi companies and regarded as a more or less disinterested spectator of the dispute now in progress between employers and men in that district, writes :

If it is necessary for you to make any reference to the Northport affair, I hope you will not be guided by either street reports or incorrect press dispatches. The union, which has been practically defeated, has been looking for some opportunity to claim a victory, or some encouragement in order to keep their men out on strike. When they found that men were going from Trail to Northport, they used every means of persuading them not to go. Failing in this a number of them met the Trail men at the train and gave them a royal reception, for the purpose of carrying out the rest of their play, which was to notify non-union men of the fact that they (the Trail men) were either union men or union sympathisers. The result of this was that the union men working in the smelter (supposed to be non-union men) worked up such a feeling that had Mr. Labarthe accepted the position it would have precipitated a second strike at Northport. Under these circumstances he very wisely decided not to accept the position.

The union have been so persistent in this play, and have carried it out so ingeniously, that responsible people and merchants in Rossland are still thoroughly convinced that the men from Trail were practically union men.

Of happenings in the Ymir district during the month our special correspondent writes :

An important deal has just been consummated in the acquisition of the well-known Union Jack group, situated on Porcupine creek, near Ymir, by a syndicate of Cincinnati capitalists. A company has been incorporated under the name of the Active Gold Mining Co. of British Columbia, with a capitalisation of \$1,500,000 and development work has been already started. The property, which consists of five claims, is traversed by four distinct veins of free-milling ore, varying in width from six to sixteen feet, and assaying from a few dollars in gold to \$29.

The London and British Columbia Goldfields have secured a bond on a rich free-milling vein in the neighbourhood of the Yellowstone mine near Salmo. This vein was uncovered less than four weeks since and practically no development work was done upon it. The surface indications, however, are so exceptionally favourable, that a large price is justified, and the figure at which the bond was taken is reported to be \$35,000 with a preliminary five per cent. cash payment. A force of men have already been sent up to commence operations. Meanwhile the ground in the neighbourhood of the rich vein has been the scene of some small excitement and has already been extensively staked. The main vein averages about six feet in width, and visible gold appears to be freely and evenly disseminated throughout that width.

Arrangements have now been completed whereby funds have been secured for the erection of a stamp mill on the Wilcox mine, seven miles from Ymir. A large quantity of rich ore has been stoped, some of which is now being prepared for shipment to the smelter.

The report of the Queen Bess Proprietary, Ltd., foretells a reconstruction without a possibility of avoidance.

The mine has been unable to produce sufficient ore to meet the expenses of development, and unless the three months further development which has been arranged results in the discovery of a bonanza shoot, the mine will be on the rocks, and the shareholders face to face with the necessity of providing more capital. It is certainly to be hoped that the extensive underground development undertaken by this company will bear fruit before the company is irretrievably ruined. The discovery of ore in the lower levels might not make reconstruction less inevitable, but it would make it more successful.

The Granby Consolidated company expects to have its new copper converter in operation in January. A contract has been entered into with the B. C. Copper company for the entire matte output of the Greenwood smelter which at present amounts to between 20 and 25 tons a day. This matte, together with the product of the Granby smelter will be reduced to blister copper 92 to 98 per cent. pure and the product shipped to New York for refining and the separation of the gold and silver. By this means a saving of from 25 to 40 per cent. in the freight rate across the continent will be made, which will more than counterbalance the increased cost of converting matte under the labour and other conditions which prevail in the West as compared with the East.

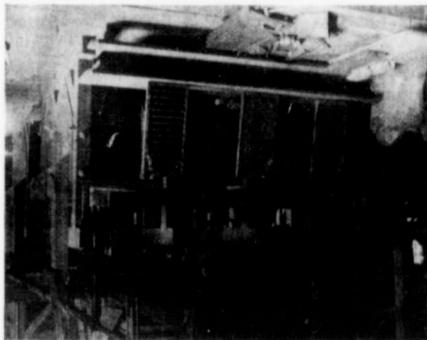
The well-designed concentrator erected at Lowrie by the Lillooet and Fraser River Goldfields, and comprising part of the exceptionally fine equipment of the ill-fated Lanark mine, has been bought by the Payne Min-



CONCENTRATOR BUILDING AT THE LANARK MINE.

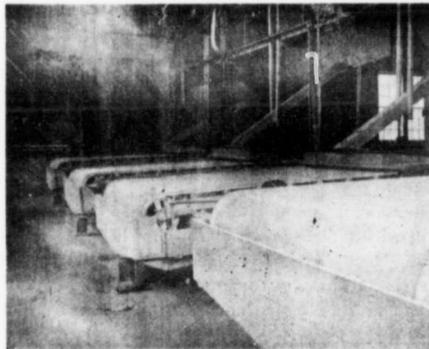
ing Co., of Sandon, and not only the machinery but the greater part of the massive timbers used in the construction of the mill are being removed this month by the purchasers. Not long since the Lanark aerial tram line was sold to the Molly Gibson Co., of Nelson, and consequently no land mark now remains to remind one of the abandoned enterprise at Lowrie but the remnants of a flume line, and the deserted hotel and miners' cottages

at the foot of the hill. The concentrator plant which is being set up at the Payne mine is to be housed in a building 50 x 130 feet, the machinery consisting of a



JIGS IN LANARK MILL.

rock breaker, three sets of rolls, elevators, revolving screens, with ten jigs and four 6-foot Frue Vanners. The nominal capacity of the mill is 100 tons in 24 hours. It is stated on apparently good authority that the dumps and the back fillings of the Payne mine contain a suffi-



Frue Vanners in Lanark Concentrator, recently purchased by the Payne Co., of Sandon.

ent tonnage of ore to maintain a concentrator of this capacity in steady operation for three years. It is proverbially of little avail to lament over "spilt milk" but it is nevertheless sad to reflect that but for the incompetence of the mining engineer in charge, the Lanark mine fiasco would never have occurred.

Some very successful placer operations have been conducted on a small scale in the Ymir district during the past summer. On the North Fork of the Salmon river a number of men have been working throughout the season, and are reported to have made very handsome profits during that period. Hall creek, eight miles north of Ymir, has also been the scene of successful placer working this year, and quite recently a nugget valued at \$100 was found in this vicinity.

The illumination of the cities of Vancouver and Victoria upon the occasion of the visit of the Duke and Duchess of York last month was quite one of the most pleasing features of the reception arrangements, and it is something to boast that in these relatively small towns of a country which, to home-staying Britishers at least, is embracingly known and characterised as "wild and woolly," the illumination of public buildings and streets, offices and shops by electricity, compared, in the opinion of a qualified expert, more than favourably with similar displays of the more populous cities of Eastern Canada. In Victoria, the most beautiful effect was produced by the outlining of the central portion and part of the wings of the Legislative Buildings in light; some, though unfortunately not by any means an adequate, idea of which may be gathered from our illustration. The photograph was taken from the roof of the Victoria post office, and the imperfections noticeable in the reproduction were caused by halation from the powerful arc lamps in the vicinity. The work of wiring the building was undertaken by a local firm, the Hinton Electric Company, Limited. Two thousand lamps were altogether used in this illumination, those on the main building being of 10 c. p., and on the wings, of 6 c. p. For the same lighting 110-volt circuits was utilised, while a pressure of 1,000 volts was employed in connection with the lights on the building itself.

The accompanying photograph shows a pack train conveying a first consignment of mica from claims in the Big Bend district to Golden. During the past summer several mica occurrences have been tentatively worked in this region and also at Ice river, east of

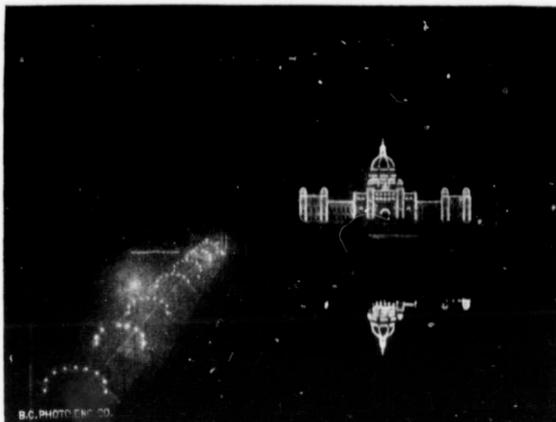


PACK TRAIN TRANSPORTING MICA FROM CLAIMS IN BIG BEND COUNTRY.
—Photo by L. H. Estell.

Golden. In the elbow of the Big Bend of the Columbia river, some twenty-four claims have been located, on veins from two to three hundred feet wide, in a mica-schist formation. At Ice river a number of locations

have also been made, and a trial shipment of a ton of mica was forwarded to England this month.

Satisfactory progress in mining development continues to be made in the Kamloops district, which is



ILLUMINATION OF LEGISLATIVE BUILDINGS, VICTORIA, OCT. 2, 1901.

rapidly coming into prominence as a mining centre. Of the more important happenings during the past month our special correspondent writes:

A 40-h. p. boiler has been recently installed at the Iron Mask, and the new pump has been put in place at the 300-foot level. A shaft house has been erected and an extension made to the bunk house. A contract for 150 feet of work is also under way on the Chieftain, shipping ore has been met in the drift 50-foot level. This group of claims is now owned by the Chieftain Copper Mines of B. C. Ltd. Messrs. Fowler and Carter have put up winter quarters on the Last Rose of Summer and the claim will be worked all winter. The high-grade ore taken out is being sacked for shipment. The dredge on the North Thompson has for some time now been working in good ground.

It is to be regretted that the Ben D'Or Mining Co., Ltd., which for the past two years has been operating a group of mines in the Bridge River district of Lillooet, has been recently compelled to go into liquidation. The property is undoubtedly valuable and has been intelligently enough developed, but circumstances have been against its successful operation, notably as regards the excessive costs of transportation of supplies over the rough trail between the mine and the nearest railway station. Despite the many difficulties the directors made a plucky endeavour to place the property on a self-supporting basis, but the handicap proved too great and the enterprise, which would unquestionably have succeeded under reasonably favourable conditions, now helps to swell the list of British Columbia mining failures. The directors themselves, being also principal shareholders, are the chief sufferers and as such are entitled to sympathy rather than condemnation, but they will, long ere this, have realised the imprudence of engaging in mining, even when possessing a moderately rich free-milling vein of ore, with an inadequate working capital.

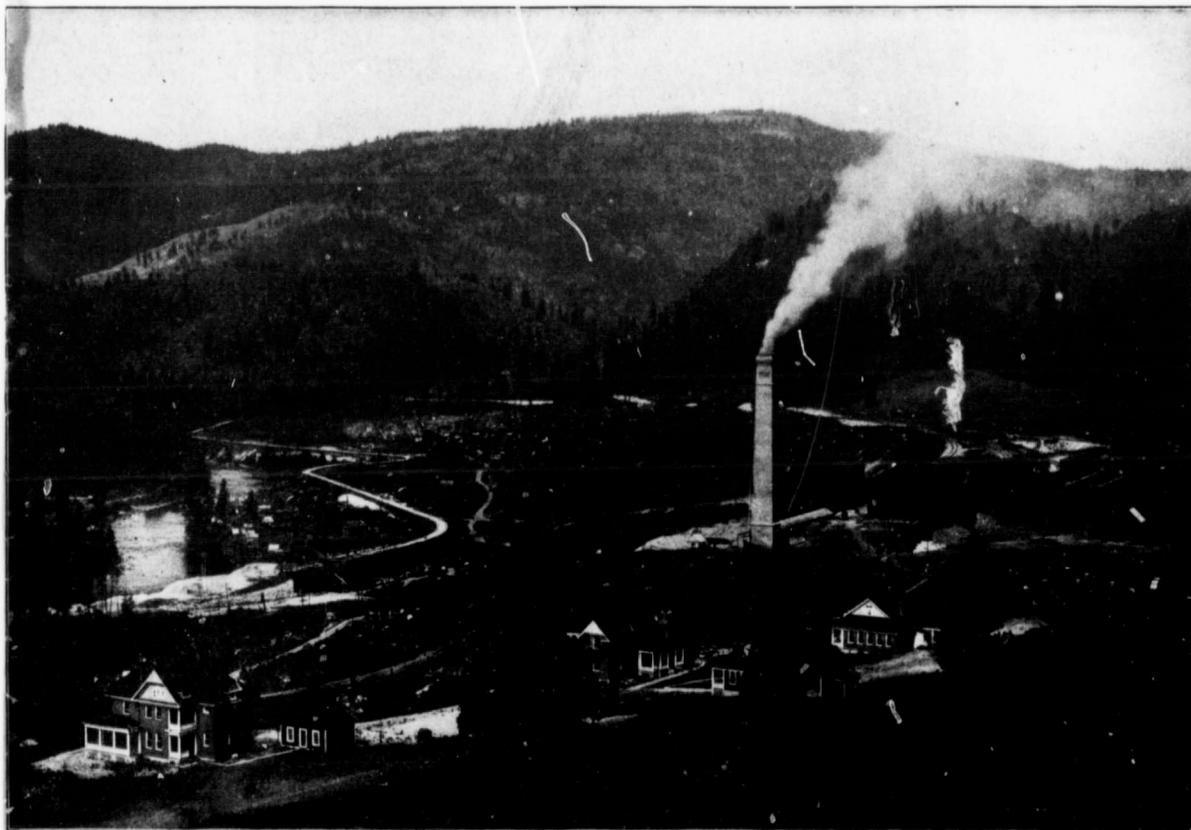
THE ADDITIONS TO THE GRANBY SMELTER.

A CORRESPONDENT to the MINING RECORD writes: Completion of the additions the Granby Mining, Smelting and Power Company is making to its smelting works at Grand Forks has been delayed by the strike of American steelworkers. Substantial progress has been made, though, with the erection of buildings and the putting in position of such of the new plant and machinery as has been received at the smelter.

The additions to the plant include two furnaces, two

ones, will be set 39 feet apart, centre to centre, and room is being left for two more, which the company has decided to add early next year, so as to increase the daily treatment capacity of the works to 1,800 or 1,900 tons.

The matte-converting plant will be placed in a building having a structural steel frame covered with corrugated iron. The frame of this building has been erected and two 10-ton converter stands will be put in as soon as received. Room is being provided for two more converters, whenever such enlargement shall be found necessary. Between the converters and the fur-



THE GRANBY SMELTER—GENERAL VIEW OF WORKS.

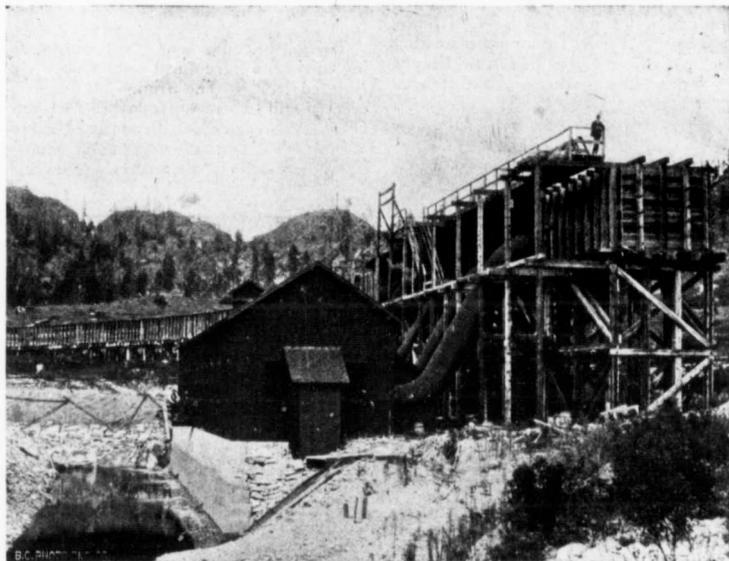
converters, one turbine wheel, electric generators and motors, hydraulic-power appliances, another sampling mill, complete, and numerous accessories to these several additions. For the housing of these, either existing buildings are being enlarged or new ones erected.

The furnaces that have been in operation at the works for the past year are double-decked, steel-jacketed furnaces, 44 in. x 260 in., with nine 6-in. tuyeres on each side, each furnace having a nominal daily treatment capacity of 250 tons. Their actual capacity, in consequence of the self-fluxing nature of the ores treated, has been found to be about 310 tons each 24 hours. The two new furnaces are to be similar in size and make to those now in operation. The new furnaces, like the old

naces two traveling cranes will be operated. A 10-ton crane will carry the matte ladles, some of which are of 5-ton and others of 8-ton capacity, from the furnaces to a tilting furnace holding 25 tons and which will serve as a reservoir for the molten matte. A 40-ton crane, besides handling the converter shells and other heavy plant, will convey the red-hot matte from the tilting furnace to the converters, where it will be submitted to a process that will result in a 98 per cent. copper product being turned out. Accessory to the converters are appliances for relining the shells, including a Dodge crusher and a pair of rolls for crushing quartz, and mud mill for mixing the clay and crushed quartz which composes the lining.

Near the converter building is a separate building in which are being installed the blowing engines and hydraulic pump for the converter plant, each having its separate electric motor.

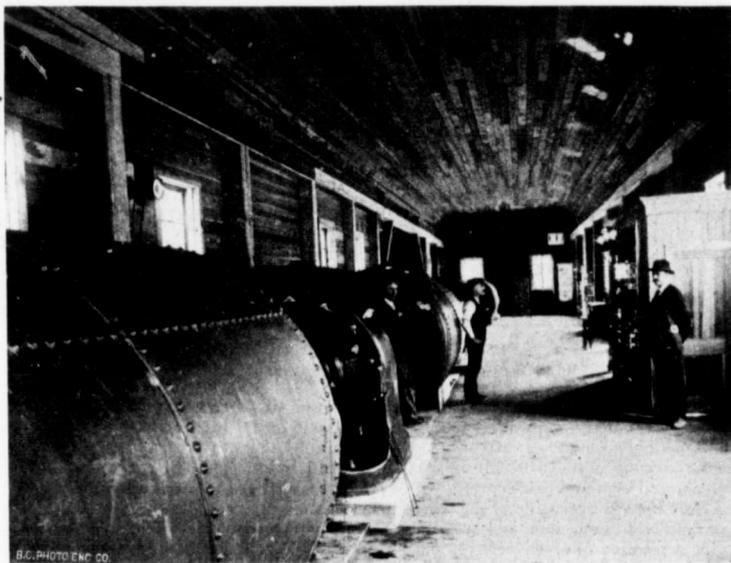
having a capacity of 750,000 gallons each 24 hours. The new sample mill has bigger machines and a larger capacity throughout than the one already in use. More ore bins have been built, bringing the total ore storage capacity of bins and bunkers up to about



THE GRANBY SMELTER—EXTERIOR OF POWER HOUSE.

In the power-house is being placed a fourth 16-inch

er capacity throughout than the one already in use. More ore bins have been built, bringing the total ore storage capacity of bins and bunkers up to about



THE GRANBY SMELTER—INTERIOR OF POWER HOUSE.

turbine wheel, direct connected to a 440-volt Westinghouse generator, and a third double-action triple pump

12,000 tons. A fourth Connorsville blower is being put in the furnace-blowing room. Another automatic

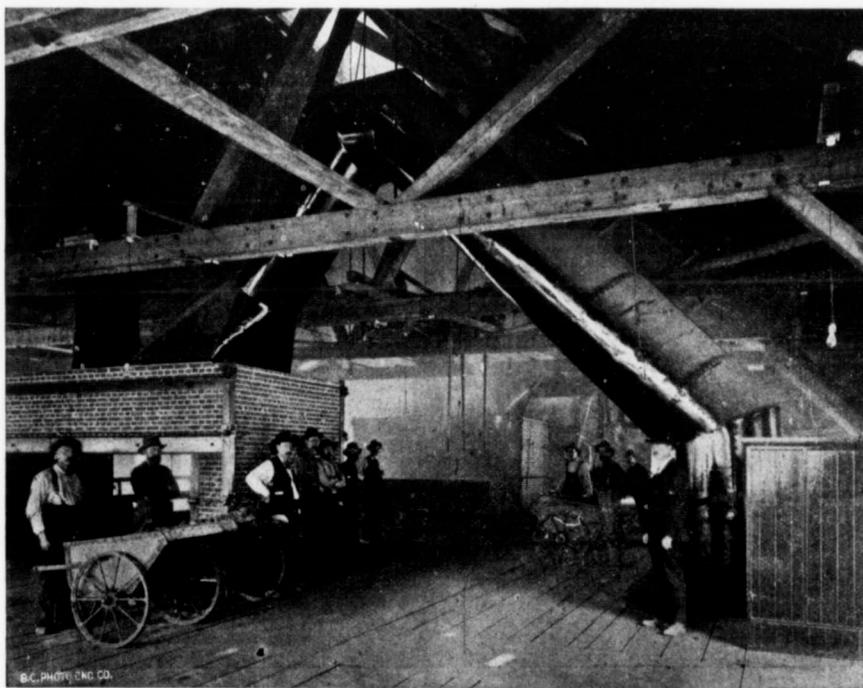
charging car is to be placed on the furnace feed floor. Electric power is being substituted for steam in the machine shop. The flue dust chamber has been extended 200 feet, and other additions and improvements have been made to keep pace with the steadily increasing demands that are being made upon the capacity of these important reduction works.

In view of the successful operation of the works as at present constituted during the past year the following description from the official records of the superintendent, Mr. A. W. B. Hodges, will doubtless prove of interest :

The power-house, which is within 1,000 feet of the smelter building and about 100 feet below it, is 117 feet long and 30 feet wide. All the batteries are built on one long concrete foundation. The power for the blowers,

to overhaul one battery. By this arrangement they are practically equal to duplicating engines. A single 10-inch turbine wheel developing 40 horse-power net is directly connected with one Westinghouse four-pole lighting generator of 22.5 kilowatts capacity at 125 volts. This is for lighting the entire plant and is self-contained.

One single 13-inch horizontal turbine water-wheel, which will develop 55 horse-power, is belted to a triplex pump of a double-action type, having a guaranteed capacity of 750,000 gallons each 24 hours, against a maximum pressure of 100 pounds to the square inch, or against a 200-foot head. This pump will furnish water and pressure to granulate the slag as it runs continuously from the furnaces and was built by the Stilwell-Bierce & Smith Vaile Co., Dayton, Ohio.



THE GRANBY SMELTER—FURNACE-FEEDING ROOM.

sampling works, etc., is furnished by a duplicate set of 16-inch turbine water-wheels, operating under an effective head of 45 feet to develop 240 horse-power. These are mounted in pairs on horizontal shafts and are cased in a steel flume mounted on beams. These wheels are connected with the flume by a steel intake pipe, 4 feet 6 inches in diameter, and discharging into a single draft tube, 16 feet long, set 45° downward inclination. The wheel used is the New American, made by the Dayton Globe Iron Works.

These two pairs of turbines are each directly connected with one Westinghouse alternating-current generator, having a capacity of 108 kilowatts at 250 volts. During the day all are in use, running at three-quarters capacity, but they are so arranged that one battery will run the works during the night, giving an opportunity

The original smelter plant consisted of two double-decker, steel-jacketed furnaces, 160 by 44 inches. The total height of the furnace, from the charge to the furnace floor, is 14 feet. The jackets come within 18 in. of the charge floor. These furnaces were designed and guaranteed to smelt 500 tons per day. The actual capacity has greatly exceeded this amount, the average being about 600 tons, and often exceeding 700 tons. The furnaces are set in a building 10 x 104 feet, and are 39 feet apart from centre to centre. The downtakes of the furnaces are connected with the big flue chamber 10 x 10 feet on the inside, and 800 feet in length. The stack is 11 x 11 feet, inside measurement, and 153 feet high. The blower room is 50 x 58 feet, and is 12 feet from the furnace building. It contains three No. 8 Connorsville blowers, one for each furnace, and one in re-

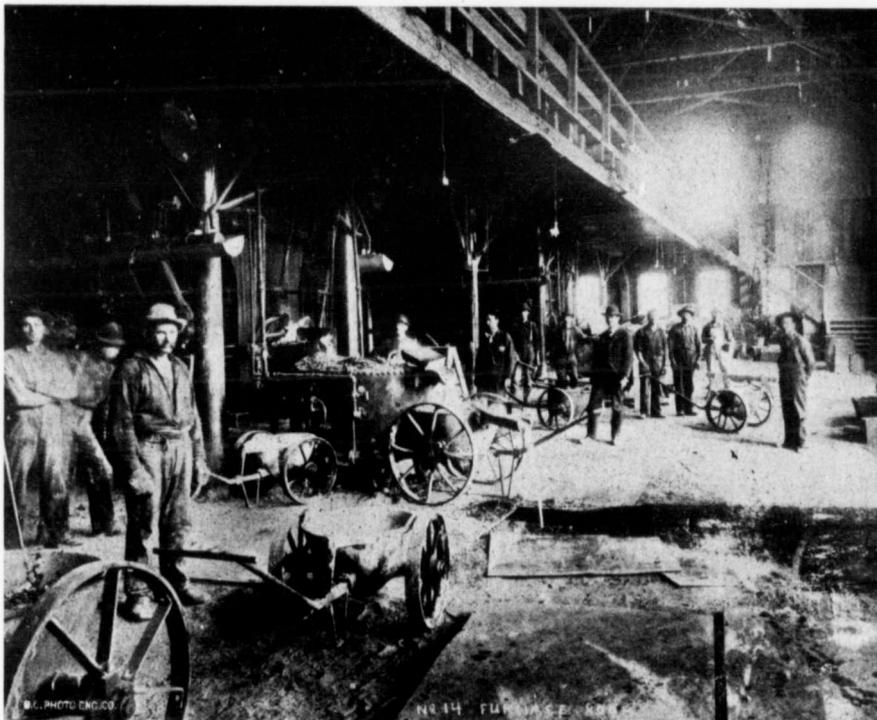
serve. There is room in the building for another blower which has been ordered with the new plant. Each of these blowers is driven by an 88-horse-power variable speed Westinghouse induction motor, which is belted directly to the motor.

It is well to mention just here that the entire smelter and works have been duplicated and are now in process of erection. It is unnecessary to add the Gates Iron Works have been the makers of the duplicate plant as well as the original.

The main sampler building is 64 x 70 feet, and is surrounded on three sides by ore bins. The ore train as it comes into the smelter will be carried by an incline to a series of receiving bins parallel to the front of the samp-

again sampled by a Snyder sampler and then delivered on steel plates, where it is again cut by hand, and then goes to a fine sample grinder.

The matte will soon be treated by a complete matte-converting plant now on order, but up to the time the new plant is installed the matte will be shipped after being brought up to 45 or 50 per cent. copper. This shipping matte, after having been cooled is crushed by a 7 x 10-inch Blake crusher, which is placed in one corner of the furnace building on the furnace floor. This crushed matte is raised by an ordinary cup elevator to a special matte sampler. This matte sampler building is built on the corner of the furnace building and is 26 x 30 feet. The building is so arranged that the crushed matte can be sampled automatically or by hand.



THE GRANBY SMELTER—FURNACE ROOM.

ling works, 23 feet above the main floor, and 33 feet distant. These receiving bins will have a total capacity of 1,000 tons. The bins are filled directly from the cars, which have a bottom dump. During the day the ore is taken from the receiving bins by small iron cars, which dump into No. 5 Gates gyratory crusher. This crusher has its opening a little below the floor of the sampling works and crushes a ton at a time. After this rough crushing, which reduces the ore to the size of a man's fist, it is elevated to the top of the building by a continuous steel bucket elevator. It is next sampled by a Snyder automatic sampler. The bulk of the ore is distributed to the bins on three sides of the sampling works by a special cast-iron spout. After being cut the sample passes to a 7 x 10-inch Blake crusher. Once more it is cut by a smaller Snyder sampler, and the sample is delivered to a set of 18" x 10" rolls after which it is

The lower part of this building contains four bins holding about one car of matte each.

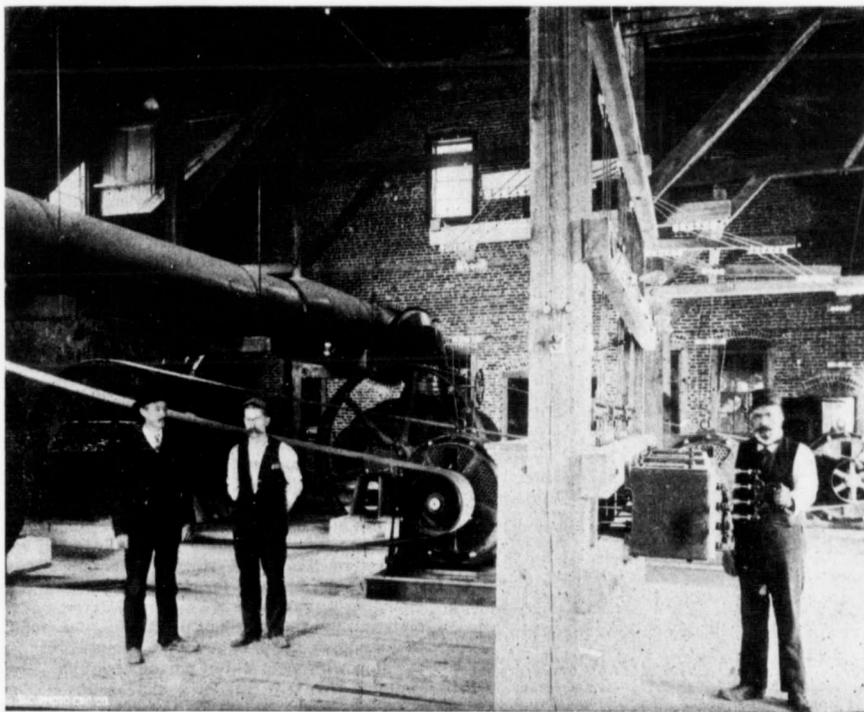
When the works are increased in a year or two it is proposed to put in a matte-converting plant and to ship converted copper. Next spring a roasting plant and, if it is deemed desirable, a Briquette machine will be installed. Plans have already been drawn up for a roasting building and Briquette plant 60 x 128 feet, but nothing will be done until it is known exactly what capacity will be required. In any case roasters cannot be delivered for six months. For the present 50 per cent. of the ore will be roasted in piles.

The works contain a carpenter shop, and planing mill 42 x 48 feet. The machine shop, 28 x 50 feet, contains two lathes, drill press, planer, bolt cutter and pipe machines. There is also a blacksmith and repair shop 28 x 40 feet, containing punch, shears, forges and steam

hammer. A warehouse 30 x 100 feet, where supplies can be loaded and unloaded directly from the cars, will be a great convenience, especially as the smelter company furnishes all supplies and do all repairs for the several mines.

Behind the smelter and at an elevation of about 100 feet above the works is a 100,000 gallon tank which is supplied with water through an eight-inch steel riveted pipe extending from the pump in the power-house, a distance of about 2,000 feet from the tank. This water is used principally for granulating the slag as it runs continuously from the settler in front of the furnace. All the machinery is run by Westinghouse induction motors. There is a 75-horse-power motor for the samp-

The property here referred to is situated in one of the northern counties of California, where hydraulic mining is still permitted by the courts. The water-right belonging to the mine is a good one, furnishing water during about nine months, whenever there is an average rain-fall, and a fair proportion of the precipitation is in the form of snow. The ditch, about 11 miles in length, is cared for during the rainy months by two men, and during the rest of the year by one; and the water cost last season, delivered at the mine, 0.69 cent per miners' inch. The season commenced in November, 1899, and ended the last of July, 1900. During this time, 655,657 miners' inches (an inch equals 1728 cu. ft. in 24 hours) of water were used for piping, and for sweeping the



THE GRANBY SMELTER—BLOWER ROOM.

ler, a 30-horse-power motor for the matte sampler, a 15-horse-power motor for the machine shops, and a 10-horse-power motor for the elevator in the main furnace building.

NOTE ON HYDRAULIC MINING IN LOW-GRADE GRAVEL.*

BY WILLIAM H. RADFORD, SAN FRANCISCO, CAL.

HAVING worked some rather low-grade gravel during the past season at a small profit, I give the actual figures, in the hope that other mining engineers interested in this line of work may be thereby induced to do the same, in order that we may get more data on this little-ventilated subject.

* From a paper to be read at the Mexican meeting of the American Institute of Mining Engineers, November, 1901.

bed-rock at the end of the season. From actual surveys, this amount of water washed down 1,251,399 cu. yds. of material, consisting of pay gravel lying on the bed-rock, and varying in thickness from a few inches to 8 ft., and practically barren top material, consisting of mountain slide, carrying considerable broken rock, clay and soil. The banks varied in height from 50 to 130 ft., the average height being 63 feet. The grade of the sluices was 7 in. to 12 ft., the boxes being paved with blocked riffles 11 in. deep. Long bed-rock cuts extended from the heads of the sluices to within a few feet of the banks, and were kept practically to grade as the work advanced. At first, electric drills were used on this work; but as it was found that heavy blasting shattered the rock too much, and caused slips, these drills were abandoned, and hand drilling was substituted. The bed-rock cuts, run in black slate of poor quality, had to be constantly watched, and in places timber-

ed, to prevent accidents. Electric lights were used in the mine during the night time, and in the tunnel while cleaning-up was going on. Seven clean-ups were made in the sluices during the season, and at the end of the run the bed-rock which had been uncovered was well swept and everything piped down into the bed-rock cuts; these were run down and carefully cleaned and creviced up. The result of the season's work was \$31,618.49, showing a value of only 2.52 cents per cu. yd. for the material washed. The bullion obtained came from the following sources:

		Per cent.
Sluices.....	\$27,315.40	86.39
Bed-rock ditches.....	3,811.23	12.05
Undercurrents, (2).....	491.86	1.56
	\$31,618.49	100.00

The undercurrents were run only three months and a half.

The cost of operation for the season was \$27,511.64, which, deducted from the \$31,618.49 of bullion produced, left a profit of \$4,106.85.

The total cost was made up as follows:

	Cost.	Cost per cu. yd.
Care of ditch, reservoir, and siphon:		
Labor.....	\$2670.99	
Supplies.....	115.55	
	\$2736.55	\$.00223
Washing (piping).....	2401.05	.00192
Drilling in bed-rock cuts:		
Hand drilling.....	1050.91	
Electric.....	269.62	
	1320.53	.00105
Timbering bed-rock cuts.....	157.39	.00012
Electric lighting.....	598.62	.00047
Sluice building and repairing:		
Labor.....	1045.70	
Supplies.....	35.50	
	1081.20	.00086
Blacksmithing.....	644.02	.00051
Cleaning-up.....	968.79	.00078
Moving pipes and "giants".....	98.85	.00071
Breaking rocks and clay.....	6124.91	.00490
Clearing ground for piping (cutting brush).....	158.37	.00012
General expenses, watching sluices and odd jobs.....	3088.69	.00250
Supplies used in mine.....	3015.37	.00241
Taxes, office expenses, legal expenses, surveying, salaries.....	4267.31	.00341
	\$27,511.64	\$0.02198

A resume of the season's work is as follows:

Period.....	9 months.
Water used.....	655,657 miner's inches.
Material washed.....	1,251,399 cu. yds.
Cubic yards per miners' inch.....	1.91.
Area of bed-rock uncovered.....	7,314 acres.
Bullion produced.....	\$31,618.49.
Average yield per inch of water.....	4.82 ct.
Average yield per cu. yd. of gravel.....	2.52 ct.
Average yield per sq. ft. of bed-rock.....	9.8 ct.
Yield per acre.....	\$4323.00.
Average height of bank washed.....	63 ft.

The washing of such poor gravel during the past season was due to the fact that the company was finishing up work on one of the benches before moving to another place, and in doing this, had to wash a large proportion of "rim-gravel," that is, gravel not in the channel, and usually of low grade. Though the profit obtained was small and the final result could hardly be considered a very satisfactory one, still it shows that, under fairly favourable conditions, gravel of quite low grade can be worked at a profit.

NOTE BY THE SECRETARY.—Comments or criticisms upon all papers, whether private corrections of typographical or other errors or communications for publication as "Discussions," or independent papers on the same or a related subject, are earnestly invited.

ELECTROLYTIC REDUCTION OF COPPER IN GERMANY.*

BY FRANK H. MASON.

EVER since the invention of the dynamo, electricians have endeavored to perfect methods of obtaining copper through the action of an electric current upon chemical solutions of pulverized ores, or of the concentrates produced by smelting or precipitation. Millions have been spent in such experiments, and the result is as yet so equivocal and indefinite that only an expert versed in the whole science of electro-metallurgy can discuss the subject intelligently. In Germany, the principal workers in this field have been Siemens & Halske, the eminent electrical manufacturers of Berlin, and Dr. Carl Hoepfner, who, about 1890, invented a process for precipitating copper and other metals from chloride solutions upon metallic discs (cathodes) forming part of an electric current and revolving in a bath of such solution.

The process of Siemens & Halske dates from Sept., 1886, and it was applied in an establishment in Genoa about ten years ago, for the purpose of refining a matte containing 30 per cent. copper, 30 per cent. sulphur, and 40 per cent. iron. After some months operation the plant was shut down, and subsequently after certain technical difficulties had been overcome, was again started up, but with what success it is impossible to ascertain. A similar plant was erected at Stollberg, near Aix-la-Chapelle, but was discontinued in 1894. In June 1890, Siemens & Halske finished and put in operation a large plant for electrical refining of copper at their works in Martinikenfelde, near Berlin, but after a few months it was shut down or turned to the refining of other metals. The same firm has erected electrolytic copper-refining plants at Oker and at Goslar in the Harz mountains copper districts, which seem to have been more successful, since Fischer, in his "Technology" of 1900, says of the plant at Oker that with six machines, each working with a current generated by seven to eight horse-power, there is obtained a product of 500 tons of copper per annum. At Goslar, where the process of Siemens & Halske is practiced in its most modern and improved form, the daily cost of operation, including wages, cost of current, interest on value of material, wear and tear of plant, etc., for refining one ton of copper a day, is put at 74.90 marks (\$17.82) when working with a current of 30 amperes, and 58.95 marks (\$14.02) when the energy is increased to 100 amperes.

The Hæpfner process for obtaining copper and other metals directly from the ore or concentrate by electrolysis was first described in 1891. Several plants have been erected to put it in operation, all of which have been more or less unsuccessful when applied to copper.

The latest of these was built at Papenberg in 1898, but no authentic account of its industrial success can be obtained. The same process was tried in America with copper-nickel matte from Sudbury, Canada, but resulted in failure, for the reason that the metals produced were spongy and below the merchantable standard of purity.

Under the process, copper ores or concentrates are pulverized and then dissolved in a chloride solution, which is treated in tanks made of wood impregnated with asphalt and lined with sheet lead. The anodes are of carbon, the cathodes of sheet copper, and they are separated in the bath by a diaphragm of cloth. The solution being decomposed by the action of the electrical current, the copper is deposited in crystals of pure metal on the cathode, while the chlorine thereby released

* From a United States Consular report.

ed remains in the stream of solution directed against the anode, and by combining with the protochloride forms bichloride of copper. The solution thus charged is then withdrawn from the tank, heated, and used in leaching fresh ore to obtain the original solution. The leaching process is a cycle, in which the solution is pumped up and passes through the pulverized ore again and again without addition of chemicals, and it is claimed that Rio Tinto ores containing 3.37 per cent. copper 91 per cent. of the copper can be leached out in four hours, while only three per cent. of the iron pyrites in ore is dissolved. The leaching process is quickened by agitating the mixture of ore and solvent either in revolving drums or in stationary tanks by the injection of currents of air. Professor Schnabel gives the efficiency of this process at 90 pounds of copper in 24 hours for each horse-power converted into electrical current and passed through the precipitating circuit, but he declines to indorse the process as practically useful when applied to the refining of copper.

From all that can be learned of text books or by inquiry through experts, Americans have very little to learn from Germany in respect to the electrolysis of copper. Whether it is due to the greater practical ingenuity of American mining engineers, or to the greater purity and richness of their ores, the refining of copper by electrolysis seems to have attained a more extensive and successful development there than in this country. The enormous demand for electrolytic copper is, however, a potent stimulant to producers, and many able metallurgists, backed by liberal capital, are still working at the problem.

THE MAGNETIC CONCENTRATION OF ORES.

THE Wetherill process of magnetic concentration has proved very efficient in the treatment of ores of a certain class and a machine of this type, of which we present an illustration, recently installed in the works of the Kootenay Ore Purchasing Co., is a very valuable addition to the equipment of that establishment. In a paper read before the Applied Sciences Society of McGill University, Professor E. Andrews has given a most comprehensive and interesting description of the principle by which the Wetherill process differs from all other methods of magnetic concentration. This difference lies in the circumstance that the Wetherill process makes use of a much more highly intensified magnetic field, whereby minerals and chemical substances of such low magnetic permeability that they have heretofore been regarded as non-magnetic, are separated from one another, and from substances which are entirely inert under the influence of the magnets. Professor Andrews proceeds to discuss the subject in detail as follows:

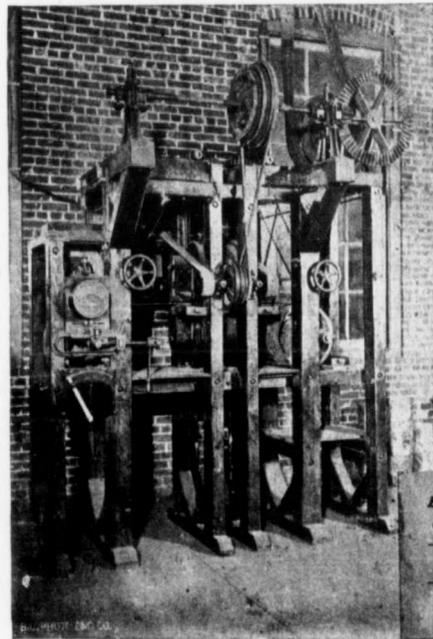
"As early as the beginning of last century physicists had noted the magnetic properties of other substances than those easily attracted by ordinary magnets, such as iron and magnetite. Faraday carried on a set of very exhaustive experiments, making use of the most delicate physical apparatus, the results of which he published in 1846. He showed that all matter, solid, liquid, or gaseous, was magnetic, i. e., either attracted or repelled by the poles of a magnet. He accordingly made the division into paramagnetic and diamagnetic substances, the former being those attracted, and the latter (by far the greater number) those repelled.

"The paramagnetic substances, including the majority of mineral species, may be divided into two classes: (1) Those that are highly magnetic; (2) those that are

only feebly so. The first class is complete with the substances iron, nickel, cobalt, magnetite, and pyrrhotite. Some idea of the gap between these two classes will be given by the following table, taking the magnetic attractability of steel at 100,000:—

Magnetite	65,000
Siderite	120
Hematite	93
Limonite	72

"Knowledge of the paramagnetic property of those substances of the second class has been one of great scientific interest, and has been made use of to some extent in the mineralogical laboratory, but Mr. Wetherill has been the first to employ it for commercial pro-



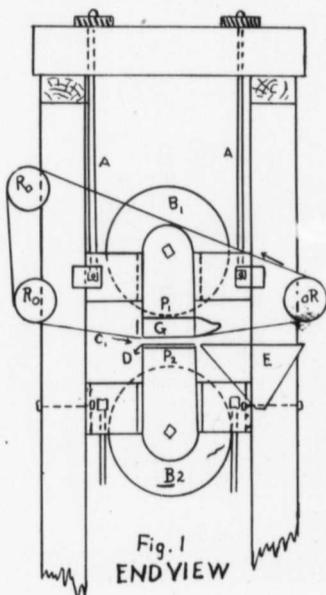
WETHERILL CONCENTRATOR.

Recently installed at the works of the Kootenay Ore Purchasing Co., Kaslo.

cess. The object he had in view in inventing the machine was the treatment of franklinite ore of Sussex county, New Jersey. This ore is a mixture of franklinite, willemite, and calcite, with smaller amounts of zincite, fowlerite, tephroite and garnet. The problem was to obtain the zinc-bearing minerals, willemite and zincite, as free as possible from the franklinite, garnet, tephroite, and fowlerite, the iron-manganese bearing minerals, the presence of the latter being fatal to the direct production of metallic zinc. After much experimenting Mr. Wetherill succeeded in accomplishing this result successfully in 1895. The machine as placed in the McGill laboratories differs from his original type, both in the form of their magnets and their position with regard to the necessary belts, whereby the ore is brought into the magnetic field, and the products discharged. The McGill machine is intended for experimental work, and as far as the writer's knowledge goes is of a different design to any that have been used in practice, though the physical principles of the process are, of course, precisely the same.

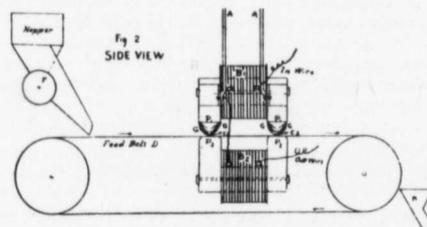
"Figs. 1 and 2 illustrate the arrangement of the mag-

nets and belts. $P_1 P_2$ (Figs. 1 and 2) are the pole pieces of two electro magnets, and $B_1 B_2$ the cores and spools of these magnets. The following information has been supplied by the makers:—Each spool is wound with 35 layers of No. 12 Browne & Sharpe gauge D.C.C. copper wire. The two spools average 115 turns of wire per layer. The two magnets are so wound as to give with four amperes of current an exciting force of 32,200 ampere turns. It has been found by experience that a greater number of ampere turns for a pair of magnets with cores and pole pieces of the size employed in this machine does not increase the intensity of the magnetic fields to any noteworthy extent. The cores and pole pieces are of wrought iron, and are of the following dimensions:—Cores, 6 inches in diameter 12 3-8 inches long; pole pieces, total length 12 inches, width 6 inches and 5 inches thick. The upper pole



pieces are tapered at the bottom to 45 degrees on each side. What would otherwise be the angle of the pole piece of the first pole is rounded to a radius of $\frac{1}{2}$ inch. The pole piece of the second pole is correspondingly rounded to a radius of $\frac{1}{4}$ inch. The lower pole pieces have their upper long edge rounded to a radius of 1 inch. This pointing of the pole pieces of the upper magnet is perhaps the most important feature of the machine, as by reason of it is produced the highly intense magnetic field, which is the peculiar feature of the machine. The bringing of the pole pieces to a point or rounded edge forces a great number of lines through this contracted area, thereby producing a very highly intensified magnetic field. GGGG are pieces of brass screwed on to the sides of the pole pieces of the upper magnet to afford a smooth rounded surface for the cross belts $C_1 C_2$ to run on. In operation the ground ore is fed regularly on to the feed belt D, which carries it into the field of the magnets. The magnetic particles are attracted by the intense field of the upper magnet, are picked up from the feed belt, and cling to the cross belts $C_1 C_2$, which move along the face of the pole pieces at right angles to the direction of D. The magnetic particles cling to the cross belts as long as

they remain where the magnetism is intense enough to hold them, then they drop from the belt into the hopper E. These cross belts are made of one thickness of canvas, coated with rubber and are quite thin. The non-magnetic portion of the ore remains on the belt D, and is carried over and deposited in the hopper K. The lower magnet is fixed, bolted to the frame, while the upper is hung from the rods AA, and can be moved up and down at will. The intensity of the magnetic attraction acting on the ore on the belt can be adjusted by altering the distance of the magnets from the belt, or by changing the amperage of the current passing through the magnets by means of a rheostat. A third adjustment can be made by changing speed of the feed belt, which has of course a most important effect on the capacity of the machine, the layer of ore to be separated being necessarily very thin. By making the proper adjustments a whole series of minerals can sometimes be successively picked out of an ore or rock. Beginning with low amperage and the magnets a good distance from the belts, we can gradually increase our amperage and move the magnets nearer the belt, thereby getting a series of minerals of gradually diminishing magnetic permeability.



“I will now give some results that have been obtained with the machine at McGill. A test was made on a sample of franklinite ore. The ore was crushed through a sieve of ten meshes to the inch, and then divided into several sizes by screening, and each size passed separately over the machine. The result was that in each case a magnetic product was obtained containing nearly all the franklinite and other iron-manganese minerals, the zincite and willemite passing into the non-magnetic tails, which were practically free from iron-manganese materials. This is precisely the separation that Mr. Wetherill sought in inventing the machine.

“One of the most interesting applications of the concentrator is in the separation of zinc blende and galena, a problem that has long been the bugbear of mill men the world over. In the case of an Ontario lead ore a middle product of mixed zinc blende and galena was formed by jigging. By crushing small enough to divide the blende and galena into separate particles, and passing the ore through the magnetic separator, a practically complete separation of the blende and galena was obtained, the blende being the magnetic product. It is said to have been made use of successfully in treating the tailings of the Broken Hill mine in Australia. These consist of zinc blende, with a certain amount of galena, rhodonite, garnet and a quartz gangue. The material is crushed to pass through a 20-mesh sieve. The products were:—(1) Magnetic heads containing all the rhodonite and garnet, and a small portion of the zinc blende. (2) Almost entirely zinc blende, but carrying 7.7 per cent. lead. (3) Quartz gangue, carrying the rest of the galena and a little blende. It is probable that with finer crushing the second product could be made to go considerably lower in lead, the lead being

probably present as galena included in grains of blende. The machine has also been made use of for extracting the magnetic constituents from a corundum ore from Hastings county, in separating the various constituents of some rock from the Villeneuve mica mine, and in the concentration of certain black sands from placer workings. The machine seems to be adapted to the following work:—(1) The separation of certain zinc minerals from the other injurious constituents of an ore, as at Franklin. (2) The enrichment of red and brown hematite ores. (3) The concentration of a silver-lead ore with a limonite gangue. (4) The concentration of manganese ore. (5) The separation of a mixture of apatite and rutile. (6) The removal of a rutile and garnet from a monazite sand. (7) To obtain pure garnet from garnetiferous rocks and schists. (8) Garnetiferous copper ore from Mexico. (9) Corundum ores from which garnet and other deleterious ferruginous minerals were to be removed. (10) Ores containing siderite, as in cryolite from Greenland."

THE POSSIBILITIES OF IRON AND STEEL MANUFACTURE IN BRITISH COLUMBIA.

ON the 19th of October the *Mining and Scientific Press* of San Francisco, published an article on the possibilities of iron and steel manufacture on the Pacific coast. In order to deal effectively with the facts therein contained, from the British Columbia standpoint, it is necessary to reproduce the article in question which reads as follows:—

"The possibilities for profit from iron and steel manufacture on the Pacific coast seem now to be sufficiently close to realization to make their discussion timely and pertinent. The old conditions, which made the early attempts in the industry failures, have given place to new conditions which would tend to make the business successful. Consumers of iron and steel will buy where they can buy cheapest. The problem on the Pacific coast for local iron and steel manufacture is solely the supply to the consumers on the Pacific coast and points reached by water routes from it of these metals cheaper than their manufacture elsewhere can supply the consumers. This, then, involves a comparison of costs.

"Iron and steel are manufactured in Pittsburg at a flat operative cost, which does not include any profits or earnings on capital, of \$7.50 and \$12.50 a ton, respectively. These are the lowest figures, and \$8.50 and \$14.00 would be closer ordinary practice. Taking the lowest figures above, and adding freight by rail to the Pacific coast, which amounts to \$13.40 a ton, the present flat costs at point of delivery to the consumer are \$20.90 and \$25.90 a ton, respectively. Sea freights via Cape Horn added to rail freights from Pittsburg to the Atlantic could not lessen these figures much. It is possible that rail freights could be reduced to \$10.00 a ton, making the respective costs per ton for iron and steel \$17.50 and \$22.50 at the point of delivery to consumers. These last it would seem can be considered the figures of flat costs which Pacific coast manufacture can rise to and still be on even terms with Pittsburg manufacture.

"For the trans-Pacific markets in China, Japan, Siberia and the Philippines, the present sea freight charges for transportation from Pittsburg via New York and Suez canal average \$12.50 a ton. Reducing the charges, which pay profits, to the flat costs, which the ownership of the steamship lines by the iron and

steel manufacturing businesses would bring, the transportation per ton from Pittsburg would cost by rail to New York \$2.40, by water not less than \$6.50—a total of \$8.90. This last figure added to the Pittsburg costs makes the costs at the points of consumption in the Orient \$16.40 and \$21.40 a ton, respectively. Present freight charges from the Pacific coast to the countries across the Pacific average about \$10.00 a ton. These charges reduced to flat costs can be reduced to \$3.00, provided a return freight business is developed. A return freight business already exists by the Suez route. Here it has to be made. This return freight business can be made by the transportation of coke for use in the manufacture of the iron and steel. Coke can be made in China and Siberia, possibly in Korea as well, to cost on board ship \$1.50 a ton or less. Adding to this \$3.00 for freight and 75 cents for import duty the cost of coke at the blast furnaces would be \$5.25 a ton. With the freight on iron and steel from the Pacific coast to the eastern Asia countries costing \$3.00 a ton, the cost of manufacture here to be even with Pittsburg would be \$13.30 for iron and \$18.40 for steel. These last figures, it would seem, can safely be taken as an upper limit of cost of manufacture on the Pacific coast to successfully compete with manufacture at Pittsburg. They are \$5.90 a ton higher than the Pittsburg costs. The Pacific coast has iron ore deposits of enormous extent and superior quality. They can be laid down at the blast furnace as cheap as at Pittsburg. The same mechanical economies that have reduced costs at Pittsburg are equally practicable here. The difference in the end then comes down to the difference in the cost of labour and fuel. With coke from China or Siberia at \$5.25 a ton the difference in fuel cost would be per ton of iron between \$3.50 and \$4.00. The difference in labour cost which would have a constant tendency to disappear could not exceed 75 cents a ton. Deducting these two from the \$5.90 margin, there is still a possible margin in flat competitive costs in the common Oriental market of \$1.25 to \$1.50 a ton. In the Pacific coast market the possible margin is from \$2.35 to \$2.60 a ton.

"The preceding has considered the entire proposition of iron and steel manufacture on this coast from the safe standpoint of the known. It is possible and probable that Alaska may be able to supply coke at a lower cost than the Chinese estimated on. It is possible that California petroleum may be successfully used as a substitute for coke and at a lower cost. In either case the Pacific coast industry would not have to take into account the Asiatic market, but could be developed for the home market. British Columbia coke from Crow's Nest Pass could hardly be delivered on the Pacific coast cheap enough to keep the cost of iron and steel production within the limits noted above."

It will be observed that for purposes of comparison between Pittsburg and San Francisco, which is the point on the Pacific coast presumably meant by the *Mining and Scientific Press*, everything is reduced to flat competitive cost in both cases, and all profits on the mining and transportation of ore and the mining and transportation of fuel are eliminated. Upon this basis there is, according to this authority, a margin of \$1.25 to \$1.50 a ton in favour of the Pacific coast for iron and steel designed for the Oriental market, and of from \$2.35 to \$2.60 a ton for an iron designed for the Pacific coast market itself. If it be granted that those figures provide a basis upon which the manufacture of iron and steel on the Pacific coast may be expected to supersede their manufacture at Pittsburg for the local and Oriental demand, it is certainly open to compare the advant-

ages of British Columbia as compared with San Francisco as the seat of such an industry. In the manufacture of iron and steel, as in the manufacture of other things, there are four factors to be considered, first, the accessibility of raw material, in this case ore; second, the accessibility of fuel; third, the accessibility of the market, and fourth the cost of labour.

In the comparison between British Columbia and California the cost of labour may be eliminated, because, although it is an important factor as between the East and the West, it is of small importance between two western points.

As regards accessibility of ore supply the *Mining and Scientific Press* is somewhat vague. It contents itself with saying that iron ore can be laid down at a smelting point on the Pacific coast as cheaply as at Pittsburg. Whereas it is certainly true that ore can be laid down at a smelting point on the coast of British Columbia much more cheaply than it can be laid down at Pittsburg, for the simple reason that Nature has already laid it down in quantities not likely to be exhausted for many years to come. The broken coast line of British Columbia has brought it about that not one but several large known deposits of iron ore abut directly upon navigable water. It is very possible that in speaking of the availability of iron ore the *Mining and Scientific Press* had in view these very deposits in British Columbia. If so, it is hardly likely that an iron industry will be established at a point whither both ore and fuel have to be transported long distances in preference to another point possessing equal advantages in other respects and adjacent to the supply of either ore or fuel, or both. Besides which it is the settled policy of Canada to prevent her resources from being utilised simply as a supply of raw material for industry and manufactures located in the United States. The industrial future of the Pacific coast depends entirely upon the extent to which it can control the markets of the Orient and the carrying trade of the Pacific with its manufactures of iron, copper, lead, silver and wood. It is quite obvious that that portion of Canada bordering on the Pacific, if it possesses the most convenient and extensive resources of this nature is not going to permit their entire benefit to be wrested from its people. This has become an important question in portions of Eastern Canada; it is becoming daily of greater importance in connection with the silver, lead and copper industry of British Columbia; and it is worthy of observation that the industrial awakening of Canada characteristic of the last decade, has been coupled with the assertion of an aggressive industrial independence of the United States. So far then as regards ore supply as a basis for an iron and steel industry British Columbia is in a much better position than California.

As regards the accessibility of fuel the *Mining and Scientific Press* bases it on a conjectural supply of cheap coke from China or Siberia, not that the possible supply is conjectural but the supply at the price quoted is so to a large extent. If the problem of establishing a successful iron and steel industry upon the Pacific coast depends on the possibility of laying down coke at San Francisco for \$5.25 a ton or, allowing a profit to the miner, at \$6.00 a ton, then the question so far as British Columbia is concerned depends upon the price at which coke can be laid down on the coast of British Columbia. The *Mining and Scientific Press* is probably right in saying that Crow's Nest Pass coke cannot be laid down at any point on the Pacific coast at so low a price. But the Crow's Nest Pass does not by any means exhaust the area of good coking coal in British Columbia. There are large deposits of excellent coking coal in the Nicola valley which can be mined as cheaply

as those of the Crow's Nest Pass and from which coke can be laid down at the coast within the flat cost mentioned. This is without the northern coal areas of which less is accurately known being taken into account.

As regards market, British Columbia is equally as well situated as any other part of the Pacific coast except, of course, that the protective duties levied by the United States would, to some extent, prevent Canadian iron and steel from entering that market. In fact it may be said that British Columbia is more favourably situated than any portion of California could be as it lies on the direct trade route for all Oriental merchandise imported into North America and for much which goes to Europe. Consequently a more regular and complete system of return freights can be organised from British Columbia ports. It would therefore seem as if the opportunities for the establishment of an iron and steel industry on the Pacific coast are more within the range of practical effort at the present time in reference to British Columbia than to any other point. So much so that the opinion may be hazarded that the opportunity only awaits the advent of someone bold enough to grasp it.

THE ELECTRICAL BURNER FOR BLAST FURNACES.*

By F. L. GRAMMER, PUEBLO, COLO.

IN these days, when anthracite is less extensively used as a blast-furnace fuel than it was a generation ago and managers endeavour to maintain regular and known ore mixtures, the "freezing" of tuyeres, cinder-notch or iron-notch is infrequent; and consequently the oil-burner or "kerosene blowpipe"† is seldom employed; and furnace foreman have, to a considerable degree, forgotten their former cunning and persistency in the use of the drill and the sledge. Still, in starting new or abandoned plants with untrained labour, and in running some of our large 100-ft. furnaces, slips, resulting in very cold furnaces, may occur, even under experienced managers.

During my superintendence of the Cleveland, Ohio, blast furnaces, such a misfortune, owing to a dearth of trustworthy foremen, was experienced; and our electrician, Mr. Thomas Martin, proposed to open the tuyeres and cinder-notch by means of the heat of the electric arc. We have heard that the surface cracks or marks developed in rolling heavy plates have been closed by electric welding, as by a soldering-iron, and also that an electric burner has been employed at some German blast furnaces; but the experiment was quite novel to us; and I think it constituted one of the first, if not the very first, successful application of this device, for the purpose named, in the United States.‡

* From a paper to be read before the American Institute of Mining Engineers at the Mexican meeting, 1901.

† See Mr. Witherbee's paper on "Removing Obstructions from Blast-Furnace Hearth and Boshes," *Trans.*, xiii, 675; also Mr. Gayley's paper on "A Chilled Blast-Furnace Hearth," *Trans.*, xiv, 779; and Mr. Lee's "Note on the Opening of a Chilled Hearth with the Coal Oil Blowpipe," *Trans.*, xv, 417. The last-named paper was presented 15 years ago; and I believe nothing on the subject has since appeared in our *Transactions*—a striking evidence of the changed conditions of blast-furnace practice.

‡ The principle was very clearly stated in 1891 by Prof. J. W. Langley (*Trans.* xx, 255), who said that in the course of experiments upon fusion in an electric-arc furnace, it happened on several occasions that the arc from the end of a carbon rod struck squarely in the centre of a lump of steel about as large as a hen's egg, and that "in a very few seconds that arc would bore a hole through that piece of steel, the

In the construction of the circuit, we attached one wire to a pipe, feeding a cooling block of the furnace wall, some distance from the point where the burner was applied. The current from this wire passed either through the crucible or through the circumferential shell. The other wire after running through a resistance coil immersed in a barrel of water, was attached to clamps holding the carbon, the latter being inserted in an iron pipe, provided with a wooden handle, and applied at the desired point by the goggled operator.

Our first experiments were not very successful. We used 1.5-in. carbons, 1.5 ft. long, not being able at the moment to obtain larger ones. Subsequently, we had carbons made 4 and 6 ft. long; and with these we burned a hole through 18 in. of cold iron in five minutes. A current of from 400 to 500 amperes did the work; but 1000 amperes (at 80 volts) gave better results. Our two dynamos were Genre Electric, with 110 K. W. capacity and 220 volts. We reduced the voltage by means of a resistance coil of German silver wire.

The results were so satisfactory that permanent wires were strung up to the furnaces; § and "hard holes" at tapping time, requiring slackening of wind, are now an evil of the past.

Water-blocks sometimes leak and flood a side of a furnace, closing several tuyeres and causing one-sided working. But by putting blanks on the penstocks temporarily out of use, the blast can be kept on the furnace while the closed tuyeres are burned open. Several furnaces on the lake fronts used it successfully, after hearing how it had assisted us.

The electric current employed is not dangerous to the workman; and the apparatus, unlike the oil blowpipe, is always ready for service. It can be applied instantly to a black, cold surface, without the need of any blast pressure — a boon which will be appreciated at single stacks, where the freezing of the tuyeres may have made it difficult to get the necessary pressure, by affecting the gas supply to the boiler house.

The saving in oil, worn-out men, drills and time, commends this simple and effective burner as the best.

We may say of this apparatus what used to be said of a dress coat or a pistol—that "it is not needed often but when it is needed, it is needed awfully!"

Plants not equipped electrically can use the power of a neighbouring municipality or other works, employing a rotary transformer to obtain the desired current.

Both the holder of the burner and the curious spectators should wear the darkest glasses, such as are worn by heaters — or twelve hours of great suffering will be the penalty.

A Bryn Mawr graduate, in describing the Bessemer converter, which she had just seen for the first time, remarked that she was much impressed with the "Intense Molecular Activity" there displayed. This pedantic but accurate description applies with still greater force to the electric arc burner, as those who are so foolishly enthusiastic as to watch it with unshielded eyes will be forced to confess.

NOTE BY THE SECRETARY.—Comments or criticisms upon all papers, whether private corrections of typographical or other errors or communications for publication as "Discussions," or independent papers on the same or a related subject, are earnestly invited.

corners of the steel being still so cold that, when seen through the dark spectacles that one had to wear, they appeared to be black." I am informed that a similar device has been used by safe robbers.

§ The low potential requires a heavy copper wire.

COMPANY MEETINGS AND REPORTS.

DUNCAN UNITED MINES.

THE first ordinary general (statutory) meeting of the Duncan United Mines, Limited, was held last month at Winchester House, Old Broad street, E. C., Mr. Alexander McNab presiding. The secretary, Mr. George H. White, having read the notice convening the meeting, the chairman said:

Gentlemen,—This being merely the statutory meeting of the company, there is, of course, no business to be done, and I do not propose to take of much of your time with my remarks. We have furnished you with our report up to 27th September, and relative audited accounts, in compliance with the regulations of the new Companies Act. The accounts speak for themselves, and from these you will see that 108,492 shares in all were allotted up to that date. The liquidator of the Duncan Mines has, as you know, power under his agreement to sell the remaining shares of the company, and no doubt more of them will be taken up in the near future. The cash received on account of application and allotment does not include a considerable part of the sum payable on allotment of shares, which had not been received at the date the accounts were made up, the final allotment having only been made that day. As regards the programme of work, it is our intention to proceed at once with the development at depth of the Poorman mine, and the necessary instructions have already been given to our engineer at Nelson. We propose in the meantime to limit our operations strictly to this object, and, until this work has been done, to expend none of our funds on the development of our other properties. With the object of keeping down expenses we have reduced the cost of our offices both here and at Nelson considerably, as well as the expenses of our staff generally. The Poorman mine is to be developed by sinking a shaft on the vein to a depth of 300 feet below the present workings and by running three tunnels therefrom on the vein at depths of about 100 feet apart. The station for the shaft has already been excavated, and our engineer, Mr. Woakes, is commencing the sinking. We are having a new compressor plant installed, with a capacity of eight large or twenty-four small drills, as may be required, which can be worked either by water power or electric power, from the West Kootenay Power Company, whose wires pass close to our mill. The compressor plant which we had before was so severely damaged by an accident that it was not advisable to repair it. The new plant is expected to be installed within forty days, and in the meantime an old compressor of small capacity, which we bought with the Poorman mine, will be used. Should the developments of mine at depth bear out the results above, we will then proceed to increase the mill capacity to forty stamps, but until it has been proved to our satisfaction no money will be spent upon additional equipment beyond that required for sinking the shaft. In the present workings of the mine there are several thousand tons of ore in sight, and the ends of the three lowest levels continue in good ore. We have an excellent showing of ore all along the sole of the lowest level, and it only requires a continuance of this ore at depth to ensure the mine being run at a substantial profit. As the sinking proceeds you will be informed of the results from time to time, through the medium of the financial newspapers.

Mr. Mitchell proposed a vote of thanks to the chairman, which was seconded by Mr. Murray Bett and carried.

The chairman acknowledged the compliment, and ex-

pressed the hope that when they met in another year the directors would have a much better report to lay before the shareholders. The company's engineer was very sanguine that they have a very good property in the Poorman-Granite, and he, the chairman, hoped his anticipations would be borne out.

The proceedings then terminated.

QUEEN BESS PROPRIETARY COMPANY.

The fourth ordinary general meeting of the Queen Bess Proprietary Company was held in London on Tuesday, October 29th. The fiscal year of this company ends on March 31st, and although the report of the directors shows a tidy balance upon the year's operations they did not feel warranted in declaring a dividend. The mining operations of the company show a balance on the right side of £5,891 4s. 6d. and to this is added interest on deposits, etc., amounting to £331 7s. making a total of £6,222 11s. 6d. The deductions made from this include London office expenses of £1,088 7s. 3d. mine management £1,437 15s. and sundry expenses of £1,725 15s. 10d. which leaves the profit on the year's operations of £1,970 13s. 5d. Against this the directors decided to reduce capital expenditure by writing off £498 11s. 10d. for depreciation. This brought the balance down to £1,472 1s. 7d. to which was added the credit balance of £428 9s. 5d. brought forward from the previous year. This gave a total balance of £1,900 11s. from which the directors wrote of £1,500 development, leaving a balance of £400 11s. to be carried forward to the next account.

In their explanation of the accounts the directors express regret that the condition of the mine did not permit of larger shipments being made, the increase over the previous year being but 125 tons. A further factor which affected the results was the continuous fall in the price of lead, representing about £4 per ton, and as about 600 tons of lead were extracted from the ore they point out but for the price of lead the result would have been much more satisfactory.

Development work upon the property has been followed up energetically. The main tunnel was extended to 1,670 feet, and the main shaft from tunnel No. 5 connected therewith, and intermediate levels Nos. 6, 7, 8 and 9 were started. In the No. 6 the ore shoot was found and various raises put up to connect with tunnel 5, but up to the date of making the report the ore had not been found in tunnels 7, 8 and 9, nor in the main shaft. In this connection the engineer of the company, E. R. Woakes, is cited as of the opinion that a bad fault has occurred between tunnels 6 and 7, but that the ore shoot found in the upper levels was continuous in depth, coupled with this a suggestion that prospecting work be continued in the main and lower tunnels with a view to finding it.

The output of the mine for the fiscal year was 733 tons of galena of a gross value of £12,087 7s. and 677 tons of carbonates of a gross value of £5,595 6s. 7d. Of this there were 220 tons of ore on hand of a value of £2,145 3s. so that the actual output of the property for the year 1,180 tons of a value of £15,537 10s. 7d. The gross value of the galena per ton was £16 9s. 6d. and of the carbonates £8 5s. 3d. The average cost per ton of mining, sorting, haulage, etc., is given as £3 14s. 6d. and the cost of freight and treatment £4 19s. 9d. making a total of £8 14s. 3d.

An interesting feature is the report of the directors to the effect that the increase of 11s. 8d. in the cost of mining, sorting, haulage, etc., is due to the higher

wages granted by the terms of settlement of the strike. This would be interesting as bearing on the increased cost of mining as a result of the strike compromise were it not for the fact that the directors also state that the Queen Bess faulted badly. This admission opens up the question as to whether the increased cost per ton was due entirely to the advance made in the wages of the miners, or whether the increase was in a measure due to the increased trouble of finding the vein in the lower levels or the searching for it since it does not appear to have been found.

The report of the directors suggests the necessity for some outlet for the ores of the Province other than that offered by the United States smelter trust and the few independent smelters in the United States. The directors recite that great difficulty was experienced during the year in getting ore smelted, owing to the action of the American smelters, and that as a result many of the mines in the district had to close down. They themselves consider they were fortunate in obtaining a contract (at the Nelson smelter) for smelting all the company's ores at slightly increased charge. This, they explain, accounted for the increased cost of freight and treatment, amounting to 2s. 1d. per ton.

HALL MINING AND SMELTING CO.

The report, balance sheet and profit and loss account of the Hall Mining and Smelting Co., Limited, which were submitted to the shareholders of the company at their annual meeting held on Thursday, October 31st, last.

The report covers the first year of the company's operations following its reconstruction, and shows a net loss on the year's operations of £3,689. In connection with this statement it is worth remembering, however, that during the whole of the period covered by the report there were but 5,243 tons of ore shipped from the mine, the bulk of which was used at the smelter merely as a flux for the treatment of customs ores. Since July 1st, however, and up to October 9th, the shipments from the mine to the smelter have been regular, averaging close upon 100 tons a day, the total for the period being 9,300, the net proceeds from which were \$101,920, or a shade better than \$10 to the ton. With a full year covering a regular shipping period it is easy to understand that a more favourable showing would have been made, the record of the mine for the three months following the completion of the fiscal year indicating net returns to the mine from the proceeds of ore shipments of something over \$350,000 per annum. This improvement is not alone due to the tonnage, as the value of the ore for the three months following the completion of the fiscal year has more than doubled that shipped during the whole of the fiscal year.

In their report the directors set out that the sum of £24,728 6s. 4d. were spent in mine development, of which £5,156 10s. 4d. were charged against revenue, and they expressed their concurrence with Captain Gifford in his opinion that the results attained were very satisfactory.

With reference to the smelting branch of the company's business the directors set out that the large furnace was in blast 268 days, and the small furnace 105 days, and treated in the aggregate 21,657 tons of purchased ore. The result of the smelting operations would have been more satisfactory but for the decline in the price of silver and lead which, commencing in the early part of the year, was continuous throughout the whole of the fiscal year. The decline in the price of these metals was severely felt by the mines upon whose

output the smelter was dependent, some of which closed down, thus materially affecting the smelter returns. The directors point out, however, that the results show the business to be inherently sound, and under normal conditions should yield a good profit. The smelter manager's report is referred to as stating that the company's connection as a customs smelter was considerably increased and strengthened, that arrangements with railways for the carriage of ore have improved, and that with the prospect of continuous work the board looked forward to good results during the coming year.

In explanation of the debit balance shown in the accounts the directors refer to the fact that on the beginning of July there being sufficient ore in sight, the board decided to convert the small furnace which had been smelting lead ore into a copper furnace for the treatment of Silver King ore, and the profits resulting to the mine therefrom, from July 1st to September 30th, were estimated at £12,500, while in addition the returns from the smelter to the same date were approximately £4,000 so that the debit balance shown in the accounts was already more than provided for.

The report of Captain Gifford, the mine manager, is of interest as showing the work that has been done since the reconstruction of the company. It sets out that the work of pumping out the mine was commenced on July 16th, and completed on August 16th, 1900. Several months were lost after this was done, as it was found that the machinery in the mine was not adequate to the work of sinking the main shaft, and it was not until the 26th of the following January that sinking of the main shaft was resumed. Since the mine was unforked 2,772 feet of work has been done in it. Of this the main shaft accounts for 208 feet, raising 162 feet, winze sinking 128 feet, and drifting 2,274 feet. All of the drifting has been done on the 6th, 7th and 8th levels, no work of any kind having been carried above the 5th level. In addition to the above work 1,871 feet of diamond drill boring has been done in the search for ore bodies.

In speaking of the work done on the No. 6 level Captain Gifford says the work on No. 6 level west, across the vein, was suspended after 110 feet of drifting had been done in search to see if the ore found in winze K would continue south, but without success. A small bunch of ore was found at this level, but after sinking on it for 57 feet it pinched out.

No. 6 Level, East, South Vein.—In testing the ground to the north of the old drift run east by the former management, at five feet north of said drift and 160 feet east of the shaft, a good body of ore was found which in spots carried high values, from which several thousand tons of good paying ore may be expected. To open this up 140 feet of drifting has been done and the indications are that the west limit of the high-grade shoot has been found. The length of this shoot between the fifth and sixth level is about 250 feet, with an average width of 4½ feet. The ore shoot which contains the best values is at the west end of this ore body, on an average of about 45 feet in length and 6 feet in width. The vertical depth of the ore body had not been ascertained at the time the report was written, but the indications were that the rich ore would go to the 7th level, if not below. The character of this ore as found in the rich shoot is bornite and grey copper, with considerable chalcopryites. There are no regular walls to the ore body and the course of the ore is very erratic and uncertain, but sufficient work has been done to show that it extends below the level of the present lowest drift, No. 8 level, east.

No. 7 Level, West.—About 415 feet of work has been done on this level to ascertain if the cross veins, as found in the fifth and 6th levels, extended down. When the mine was last operated by the Hall Mines a diamond drill hole had been run in from the then end of the furthest workings west at a horizontal distance of 98 feet, and 5 feet of core was taken out which assayed 64 ounces silver and 5.7 per cent. copper. On resuming work this ore body was drifted for. It was found to be very bunched and erratic. It was drifted on for 70 feet when it cut out entirely. A raise was put in on it but the streak was so narrow that a continuance of work upon it was not warranted. A winze was sunk 44 feet on it, when finding the ore nearly pinched out work was suspended.

No. 7 Level, East, South Vein.—A crosscut was started south from the end of No. 7 level east, to ascertain if the south vein ore body continued down. The crosscut was run 135 feet. At about 90 feet a good body of ore was found and was drifted on east for a distance of 80 feet, and west for a distance of 70 feet. The ore found bore the same character as in the levels above, no walls, very bunched and very erratic in its course. When first cut the width of ore was 14 feet, but it narrowed down, when drifted on, to 4 feet. A careful estimate of the ore found at this level was 10 ounces silver and 5 per cent. copper. The length of the ore body at this level is 250 feet.

No. 7 Level, East, Main Vein.—About 240 feet has been drifted east on the main vein, but no ore of sufficient value to pay expenses was found. The lode so far as drifted upon averages about 8 feet in width, and at certain points small stringers of high-grade ore were found but not in paying quantities, yet the ledge showed marked improvement in character in comparison to what has been shown up by drifting on the same vein in the No. 6 level.

No. 8 Level.—A crosscut was run about 330 feet nearly due south from the main shaft, to ascertain if the cross vein ore bodies extended down, but without finding anything. About 210 feet from the shaft the south dyke was cut through. At a distance of 180 feet from the shaft, a drift was started east to search for the south vein ore body. At a distance of 260 feet from the crosscut a bunch of ore was cut through about 13 feet in width, the assay value of which was 14 ounces in silver and 4½ per cent. copper.

Main Shaft.—The main shaft has been sunk from the No. 8 level station 108 feet. No. 9 and No. 10 stations have been cut and drifting from these points has been started to find the values of the main south veins at this depth. To ascertain this about 450 feet will have to be driven on the 9th level, and about 550 feet on the 10th level, assuming there is no change in the dip of the veins.

In speaking of the ore reserves Captain Gifford points out that it is not an easy matter to make calculations as to the amount of ore in sight in such ore bodies as there are in the Silver King, and for this reason in making an estimate he has endeavored to be as conservative as possible. He estimates that there are in the No. 6 level 10,400 tons of an assay value of 16 ounces silver and 4.5 per cent. copper. Between No. 6 and No. 7 levels 6,000 tons of an assay value of 12 ounces silver and 3.5 per cent. copper. Between No. 7 and No. 8 levels 3,500 tons of an assay value of 14 ounces silver and 3.5 per cent. copper. Total 19,900 tons. He offered no estimate as to what might be found below No. 8 level, yet from the time the ore was cut there the drifting has shown that the best ore was in the bottom of the drift.

With respect to development work Captain Gifford says the only work he can outline is the running of the 9th and 10th levels, as everything with regard to the future will depend upon the results of the work in these levels. He recommended the installation of a 30-drill compressor to be operated by electric power from Bonnington Falls, a quotation having been received from the power company for the supplying of power at the rate of \$40 per annum per horse power. He further recommends that the tramway be operated in one length as was done when it was first installed, which would effect a saving of \$7,000 per annum in the maintenance of the outer station. He concludes his report with the observation that considering the fact that work was started in July last, without a pound of ore in sight, and that active development was not commenced until January 26th, the result of operations have been very satisfactory.

Accompanying the report is a cable message forwarded by Captain Gifford bearing date of October 9, which is much more encouraging than anything contained in the report itself. This shows that the value of the ore in the 6th, 7th and 8th levels has considerably increased and that the net returns to the mine from ore shipments for a period of 100 days prior to that date had been over \$1,000 a day. The message reads: "Estimated reserves of ore (broken down) in stopes at that date, 1,200 tons; average assay value 18 ounces silver and 5 per cent. copper. Tons of ore in bins, 980; average assay value, 24 ounces silver, $5\frac{1}{2}$ per cent. copper. No. 10 level, east drift, 305 feet. No. 9 level, east drift, 303 feet. No. 6 level stope, vein 5 feet wide; average assay value 26 ounces silver, $5\frac{1}{2}$ per cent. copper. No. 7 level stope, vein 5 feet, average assay 40 ounces silver, $7\frac{1}{2}$ per cent. copper. No. 6 level stope, vein 6 ft. average assay value 25 ounces silver, $5\frac{1}{2}$ per cent. copper. All the stopes looking well. The net proceeds from 9,300 tons of ore smelted since July 1, \$101,820."

The accounts of the company show a net loss upon the year's operations of £3,689 8s. 4d. There was a profit on the small mining operations of the year of £537 8s. 5d. and of £474 8s. 7d. on the smelting operations, but the general expenses of the company in British Columbia and London, debenture interest, preliminary expenses, and loss on exchange brought out the net loss of £3,689 8s. 4d. as above stated.

THE NEW FAIRVIEW CORPORATION, LIMITED.

The following report has been submitted to shareholders:—

Enclosed you will find a statement of the affairs of the corporation to September 30, 1901. Since that date a large amount of cash has been received on the assessment, and all liabilities mentioned in this statement have been paid, excepting the bills payable (not yet due) amounting to \$299.30, and the loan from Mr. Gooderham, which has been further reduced by \$10,000, leaving a balance of \$17,407.74 still due him.

The number of shares in the (old) Fairview corporation subject to call was 3,020,044, and the total possible assessment \$90,601.32. Already over 900 shareholders, representing 84 cent. of the issued capital of the old Fairview corporation, have applied for shares in the new corporation, and \$55,000 have been received on the calls. All of the large shareholders have applied for the new shares and it is probable that the total number of lapsed shares will not exceed 300,000, as many shareholders have expressed their intention of applying for their pro-rata shares and paying the assessment. The expression of opinion at the annual meeting was in favour of every possible

opportunity being given to those shareholders who have not yet paid their assessment to do so, and notices have been sent them to this effect. If the number of shares unapplied for does not exceed 300,000—as is considered probable—the assessment will realise the sum of \$81,000. This would leave a balance in the treasury after paying all liabilities, including current expenses.

During the four months the new corporation has been in existence a large force of men has been engaged upon the erection of a stamp mill and machinery, water-pipe line, boarding and bunk houses, etc. It will probably take a whole month to complete the work in hand, but the mill is nearly completed and it is proposed to run through the dump ore while waiting for the completion of the other work when the mill will be supplied with ore from the mine. All the machinery has been erected in such a manner as to secure the most economical handling and treatment of the ore.

Some work has recently been done on the coal lands owned by the corporation, and the coal extracted, which is of fine quality, is in use at the Stewwinder mine. Your directors have in view the possible further development of these coal beds and arrangements are now in progress with that end in view. It is thought that the value of this important asset of the corporation can be best established by core drills, but the steps taken will of necessity depend upon the funds available.

At the annual meeting held at Fairview on October 18th, the following directors were elected for the ensuing year: Richard Russell, Fairview, B.C.; W. W. Beer, Nelson, B.C.; Thomas Ellis, Penticton, B.C.; Alfred H. Wade, Penticton, B.C., and G. Frank Beer, Nelson, B.C. At a subsequent meeting of the directors the following officers were elected: Richard Russell, president, managing director and treasurer; R. W. Beer, vice-president, and T. D. Pickard, secretary.

THE ENTERPRISE MINES, LIMITED.

The report of the directors of the Enterprise Mines, Limited, for the eighteen months ended December 31st, last, states that although the company obtained possession of the property immediately following its incorporation, (May 15th, 1899), it was not until the end of Feb., 1900, that work could be started at the mine, prior to which the only work carried out was the shipment of the ore already mined and the erection of the necessary buildings for the men, etc. Actual working soon revealed the fact that to sort the ore by hand was both expensive and wasteful, and consequently steps were taken for the erection of a suitable concentration mill, pending which shipments were restricted and work principally devoted to the further development of the mine. The accounts show a profit of £5,908, the whole of which has been employed in the meeting the cost of further development, the erection of the concentrator and other capital expenditure. A complete compressor plant for machine-drill work has been installed, which, together with the concentrator, is driven by water power, requiring no fuel and very little attendance. Early in August last the mine superintendent estimated the quantity of ore in sight as being sufficient to keep the concentrator supplied with 50 tons daily for 500 days. This quantity has been further increased by subsequent developments.

CYANIDE PLANT AT THE ATHABASCA MINE.

The latest report of General Manager E. Nelson Fell gives the following description of the cyanide plant erected at the Athabasca mine, near Nelson, British Columbia:

Having by means of prolonged experiments satisfied ourselves that the process was applicable to our needs, we decided to adopt the following plan: (1) Settling tanks; (2) straight percolation, assisted by vacuum; (3) deposition on zinc shavings; (4) acid treatment for refining the product; and at the end of June we completed the designs for a plant on the above plan, of sufficient capacity to treat 35 tons daily, which is in excess of our needs at present.

The plant consists of: One stock solution tank, diameter 4 ft., stave 6 ft.; two solution tanks, diameter 10 ft., stave 6 ft.; two settling tanks, diameter 14 ft., stave 10 ft.; five leaching tanks, diameter 18 ft., stave 4 ft.; two gold solution tanks, diameter 10 ft., stave 6 ft.; twenty-four zinc boxes, each 1 cu. ft. capacity; one clean-up tank, diameter 6 ft., stave 2 1/4 ft.; one clean-up tank, diameter 4 ft., stave 6 ft.; one vacuum filter box; one Hampton zinc lathe; one solution pump; one vacuum pump.

The settling tanks are provided with automatic distributors, annular launders for overflow, and three-side discharge doors each. The leaching tanks are fitted with filters and centre discharge doors, and the excavation was made in such a manner that the failings can be sluiced out through the bottoms of the tanks. The zinc boxes are square sheet iron buckets, each having a capacity of 1 cu. ft. of zinc shavings; each one is independent of the other and can be handled by an iron bail. The building is heated by steam through 3,000 feet of 1-in. pipe and the condensed water is returned to the boiler. The pumps and lathe are worked by means of an endless single rope drive from one of the shafts in the mill; the distance covered by the rope drive is 142 ft. The building is 100 ft. long, 62 ft. wide and 73 high.

It is situated immediately below the mill and the tailings pass directly into the settling tanks. Outside of the building a tank has been built of sufficient capacity to receive two days' supply of tailings in case of an accident. Work was commenced on the plant on July 1st and proved more difficult and costly than was anticipated, owing to the bad character of the ground. The work of excavation was heavy and elaborate precautions had to be taken to prevent the mill above from collapsing. In consequence of the bad ground the strength of the masonry walls had to be correspondingly increased. The principal retaining wall is 12 ft. thick, 23 ft. 6 in. high and 82 ft. long. In all 1,198 yards of rock masonry were built, requiring 370 bbls. of cement. About 160,000 feet, of sawn lumber and 90,000 feet of hewn timber were consumed.

THE NEW PLACER DISCOVERIES AT HORSEFLY.

ALREADY much interest is being taken in the recently reported discovery of rich placer ground in the Horsefly district of Cariboo, and next spring a large influx of miners and prospectors to this new field is to be expected. The following information from the *Ashcroft Journal* as to routes and manner of travel is therefore of value:

"First—Ashcroft, the starting point for Eureka, Empire and Fraser creeks, is on the main line of the Canadian Pacific railway, 290 miles east of Vancouver. The distance from Ashcroft to the creeks is 190 miles or thereabout.

"The mode of travel is by horses and wagons or saddle horses, or on foot.

"From the main Cariboo road to Harper's Camp, the nearest town to the new creeks, there is a choice of routes, all wagon roads. The first road branches of at

the 108-Mile house and is 93 miles from Ashcroft; the next at the 115-Mile house, 100 miles from Ashcroft, and the last at the 150-Mile house, 135 miles from Ashcroft. The average distance from the main road to Harper's Camp is about 40 miles. The mode of travel next spring from Harper's Camp to the creeks is likely to be by trail and water. It is seven miles from Harper's Camp to the foot of Horsefly lake. The lake is 30 miles long. There are some boats on it now but there will be more next year. Near the head of the lake a trail is taken through the pass to the forks of the Horsefly river. Either a wagon road or trail will be built through this pass in the spring. The distance is about 12 miles. Thirteen miles farther up the South Fork is where the discoveries are. To sum up the distance from Ashcroft it is from 190 to 220 miles to Eureka creek according to the route taken.

"There will be no unusual hardships to be encountered by anyone going in next spring. With the exception of 65 or 70 miles, there is a good wagon road and comfortable stopping places, and those who think that 70 miles of roughing it is too much better stay at home.

"How early to go in depends upon the season, but anyone contemplating the trip should be ready to leave Ashcroft late in April or early in May."

Meanwhile one of the best accounts, because it comes from an absolutely dependable source, yet published of the new finds, has been contributed by Mr. R. H. Campbell, the well-known Cariboo mining operator and engineer, in a letter to a San Francisco mining contemporary. Mr. Campbell writes:

"You have no doubt noted the reports that a rich placer find has been made on the head waters of the Horsefly river, in Cariboo district. As usual in such cases, the first accounts published are more or less exaggerated, and some of the publications are misleading and calculated to cause undue excitement and disappointment to many who will try to get to the new El Dorado before it is possible to do so. I will aim to give you the conditions and situation that exist at the present time. There is no doubt about the richness of the creek, which the discoverers named Eureka creek. There are also indications of rich creeks in the vicinity, as the gravel extends for a distance of 12 or 15 miles.

"The Horsefly river is a stream about 100 miles long emptying into Quesnelle lake, and is a part of the watershed of the Fraser river. It heads on the dividing range that divides the Clearwater, a tributary of the North Thompson river, and the Horsefly country. Eureka creek, on which the discovery was made, is a tributary of the South Fork of the Horsefly, and is about 200 miles north of Ashcroft, on the Canadian Pacific railroad. It is reached over the Cariboo wagon road from Ashcroft to this point, a distance of 150 miles, thence by trail about 65 miles up the river, or by way of Horsefly lake and trail. It has been known for many years that there existed an extensive system of ancient or dead river channels covering a large area of country. They are traceable for 40 miles up the Horsefly. These ancient channels, though known to be rich, require large capital for development. Several companies have been operating in the district for several years and considerable gold has been taken out, and there has also been some extremely rich gravel discovered, but the output thus far has not been sufficient to attract mining men with capital.

"About 60 miles above the mouth of the Horsefly the river forks, the branches running off into high mountains. At the forks and for a few miles up the South Fork, quite extensive deposits of gravel exist. Some prospecting has been done there and locations made. In June last the owners of the leases took parties in

with a view of making a sale of the ground, not being able to equip it themselves. After prospecting the ground thoroughly they were so well pleased that they took a bond on the property for \$22,000, running until the 10th of November, 1901, when they expect to close the deal. Some of the present owners of the leases decided to go up the South Fork on a prospecting trip. After a difficult tramp of eight or ten miles they came into the present Eureka creek, where they found good prospects on the surface, in a few hours panning out over an ounce. Their provisions being about gone, they made locations, named it Eureka creek, started out for a fresh supply of provisions. On their arrival at this camp it made considerable excitement. As they had the gold to show, it was believed the find was genuine. They returned at once to do more prospecting. Quite a number soon went in and soon the whole creek was located.

"Other creeks were found that prospected well on the surface, but, there being no trails, it was impossible for a man to carry tools, bedding and grub enough to last him more than a couple of days; so, very little prospecting has been done as yet. It is unfortunate that the discovery was made so late in the season, as the elevation is over 5,000 feet, and the snowfall will prevent any more prospecting until spring. The discoverers on their return did more prospecting and, from what gold they got, believe they can make from \$20 to \$40 a day to the man on the creek.

"The gold is of good quality, some quite coarse. They report the entire country covered with quartz. On Eureka creek, where the discovery was first made, and Fraser creek, which is some four miles above, immense quantities of quartz boulders cover the beds of the creeks. The formation is slate, with granite lying to the north.

"Along the main South Fork below these creeks for ten or twelve miles there are extensive benches, all of which prospect on the surface. There is plenty of timber and water and the ground is covered with a heavy coat of moss. Many men have gone in to make locations, but little or no work can be done until trails are made and supplies got in.

"At the present time it is simply a climb over fallen timber and underbrush. They could only make a mile an hour with the loads carried. It is simply madness to try to get in there now, as storms have already set in and much snow has fallen. There is hardly a doubt but there will be extensive placers discovered in the spring. Enough has already been done to attract the attention of prospectors next year, when there will, no doubt, be a great many go in.

"There seems to be quite a territory that has never been prospected. There is not the least sign that there has ever been a white man on these creeks. Not a pick mark, axe mark, or the evidence of any camp fire is anywhere to be seen. It is quite likely that 1902 will do as much to bring 'Old Cariboo district' before the world again as 1862, when Cariboo first had her big boom."

RECENT PUBLICATIONS.

The Miner's Pocket-book: A reference book for Engineers and others engaged in metalliferous mining; by C. G. Warnford Lock, F. G. S., M. Inst. M. E., etc.; Fourth edition (illustrated); London, E. & F. N. Spon, Ltd.; New York, Spon & Chamberlain, 1901.

LOCK'S *Miner's Pocket-book* is regarded by all mining engineers as the standard and most valuable work of its kind published. Anything therefore approaching a review or criticism here would be entire-

ly superfluous and we merely content ourselves with wondering why it should have been considered necessary to "almost entirely" re-write a book that has already run through three considerable editions. The circumstance may be attributed to Mr. Lock's extreme conscientiousness, although at the same time we do not pretend to say that the value of the work has not been vastly increased by the recent revisions and additions. On the contrary, the substitution of data relating to underground operations in place of relatively less important matter and expansions in other directions are most undoubted improvements, and will be certainly appreciated as such. In the fourth edition of the *Pocket-book* there is, by-the-way, a significant little paragraph which reads as follows: "Comments and criticisms will be gladly accepted for future editions, and may be addressed to the care of publishers." It is possible that here is one of the causes which have contributed to Mr. Lock's pre-eminent success, both as an author of standard works on mining and as a mining engineer. He not only does not fear criticism, but he is prepared to profit by it.

Mechanical Ventilators: Report of the committee of the North of England Institute of Mining and Mechanical Engineers, and the Midland Institute of Mining, Civil and Mechanical Engineers; by M. Walton Brown: London and Newcastle-upon-Tyne; Andrew Reid & Co., Ltd.: 1900.

This useful report describes the result of a number of experiments conducted under the auspices of a committee of the above-mentioned scientific societies in respect to the comparative efficiency of different types of ventilators in use at six representative British collieries. Some of the conclusions arrived at were that "if the speed of the centrifugal ventilator remains constant, that (1) the volume varies inversely with the resistance of the mine, and becomes *nil* when the resistance of the mine is infinite, or when the inlet from the mine is closed; that (2) the volume increases when the orifice of the face or (and) the orifice of the mine is increased; (3) the volume varies with the speed of the centrifugal ventilator if other conditions remain constant; and that (4) the volume produced by small ventilators can never equal those produced by large ventilators, as the orifice of the ventilator, which measures the resistance of the fan to the passage of air, must necessarily be less for a small than for a large ventilator. The report contains a number of valuable formulæ, tables and diagrams.

Tunnelling: A Practical Treatise, by Charles Prelini, C.E., with additions by Charles S. Hill, C.E., associate editor *Engineering News*, illustrated. New York, D. Van Nostrand Company.

From our point of view we are disappointed to find no direct reference in this otherwise comprehensive treatise, to mine tunnel work, although the mining engineer will find much in Mr. Prelini's work to advantage and interest him. The author opens the subject by a allusion to the art of tunnelling as employed by the ancients, mentioning one or two striking instances of clever engineering performed so long ago as 700 or 800 years B.C., of which the proofs still exist, and tracing the evolution of tunnel building through subsequent ages he points out that the art of tunnelling was really first brought into its present prominence by the development of the steam railway, when two tunnels were built on the Liverpool & Manchester railway in 1820-26, and "this was the beginning of the rapid development which has made the tunnel one of the most familiar of engineering structures." The book is divided into twenty-five chapters in which, in the first few, such considerations as methods of timbering, lining, hauling in

tunnels, blasting, explosions and drilling are discussed. There are also interesting chapters on tunnelling through hard rock, and soft ground, with descriptions of the Belgian, German, English and American, Italian and Pilot methods. The questions of accidents, repairs, relining, ventilation, lighting, costs and time required for tunnel work are comprehensively viewed. As the author explains in his preface, the need for a comprehensive work on tunnelling for the use of students and others was sufficiently demonstrated to him by the circumstance that only two books on this subject had previously been published, one far too voluminous and costly for the beginner, and the other "a magnificent exposition of the English method of tunnelling, but . . . too old for anyone who looks for the most modern method of tunnelling" as the art has greatly progressed since the author's death.

We have to express our thanks to the editor of the *Ferguson Eagle*, Mr. Pettypiece, for a copy of a very excellent map of the Lardeau Mining District, including Fish creek and Upper Duncan river, printed in three colours and showing, properly indexed, the situation of mining claims—to the number of 1400—in this territory. Upon the completion of the branch line of railway, now under construction, from Lardo on Kootenay lake to the Northeast arm of the Upper Arrow lake, many doubtless of these properties will become important producing mines, for there can be no longer room to doubt the unquestionable richness of the field.

FINANCIAL CONDITIONS IN LONDON.

(From Our Own Correspondent.)

THE London stock markets are, at the present moment, in a very dull and depressed condition and prices are with difficulty maintained at even their current reduced quotations. The regrettable prolongation of the war, the fears that it may drag on for a still further period and mean additional taxation are, of course, the chief factors in the position, but there are others which are equally baneful. Monetary developments in London culminated last week in an advance in the official bank rate to 4 per cent., this being in large part due to the unfavourable financial conditions both in Paris and Berlin. Then there is the Franco-Turkish affair, trouble apparently brewing in South America, and finally the Chancellor of the Exchequer's rather doleful speech on November 4th. All these things combined are enough to check any favourable developments if there were any. Unfortunately the only favourable feature in the position is the attractive level at which prices now stand, and which must sooner or later induce considerable purchases on behalf of investors. But at the present moment we are all in a fog, literally and figuratively. No one is disposed to express any very decided opinion as to the immediate future of the markets and in these circumstances I need not tell you that the mining section is not particularly cheerful. South Africans naturally remain dull, while even West Australians have failed to maintain their recent flicker. The weakest element in this market has been furnished by the newly created West African department where speculation had been carried to dangerous limits. The heavy fall, in many cases amounting to pounds per share, in all the leading companies, resulted in embarrassment and the forced closing of accounts of prominent operators. Added to the generally unfavourable conditions governing the markets, it is not surprising

perhaps to find that the mining market generally remains in a very dejected condition. So far as British Columbia shares are concerned much interest has been taken in the developments in connection with the London and Globe. This corporation which had been for some ten months in the hands of the voluntary liquidator has now been taken over by the court, and will be liquidated by the official receiver. At the last, although it had been expected that the Whitaker Wright section would make a bold effort to defeat the Stock Exchange creditors petition, somewhat unexpectedly the directors of this notorious corporation did not oppose the petition and so the London and Globe Finance corporation is joined with the Standard Exploration and the British America corporations in the official receiver's department. Lively times are predicted, and until the whole thing has been cleared up and forgotten I do not see very much prospect of the British public showing over much affection for British Columbia securities. The London and British Columbia Goldfields subsidiary, the Enterprise, held its meeting the last week in October, and at that meeting Mr. Wethered gave an interesting account of his recent visit to the property. At the second ordinary general meeting of the Hall Mining and Smelting Co., Lord Ernest Hamilton explained the present position of the company, and pointed out that the condition of things that they had to face had been quite abnormal and that it was not likely that they would ever be called upon again to assist in such a steady and persistent fall in the price of the metals. The meetings have also recently been held of the Queen Bess Proprietary Co., and British Canadian Goldfields, of Klondyke. The Hon. J. H. Turner, late minister of finance for British Columbia, who has just arrived in this country to take up the post of Agent-General for the Province, and is temporarily staying at the Hotel Metropole, proposes shortly to open a suitable office in London for the agency of British Columbia. I had a chat with Mr. Turner the other day and find that as soon as practicable he intends to take an office in London worthy of the Province. Probably at first it will be a temporary one, as I gathered from Mr. Turner that he hopes to be able to obtain a portion of one of the imposing new buildings to be erected in Trafalgar Square. Mr. Turner has, of course, been very busy in making arrangements in connection with his residence in this country in his new capacity, but was very ready to talk about matters in connection with the Province. When I saw him he looked remarkably well and apparently ready to carry on energetically the duties appertaining to the position of Agent-General. Those interested in British Columbia hope that Mr. Turner's arrival in this country will be the means of a revival of interest in British Columbian matters. That Mr. Turner will do all in his power to facilitate this much-desired development is undoubted.

AN IMPROVED ORE CAR.

WE reproduce herewith an illustration of the Hendy Improved Mining and Ore Car, manufactured by the Joshua Hendy Machine Works, of San Francisco, which is remarkable for its lightness, strength and durability. The bodies of these cars are built of sheet steel, and fitted with a false bottom with wood lining, which acts as a cushion and serves as a protection. The cars are also hot riveted throughout—both as regards the frame and body, no bolts being used in their construction to jar or wear loose. They are constructed to dump the load either on the side or end, and when dumping the body deflects to a proper

angle to insure a complete discharge of the contents. The wheels are heavily chilled and fitted with dust caps on the outside and a collar on the inside, which prevents the dirt from getting into the journals. The axles are of round steel, and run loose in the boxes, and the



wheels in turn running loose on the axles. This method of construction makes them very easy running. The cars are made in four sizes of 1,000 lbs., 1,200 lbs., 1,600 lbs. and 2,000 lbs. capacity, respectively. They are manufactured and kept in stock by the Joshua Hendy Machine Works, of Nos. 38 to 44 Fremont street, San Francisco, the well-known manufacturers of high-grade quartz mining and milling machinery, who will furnish catalogues and prices upon application.

THE ATHABASCA MINE AND CANADIAN SHAREHOLDERS.

THE attempt to reconstruct for a second time, the Athabasca Company in London, has been effectually frustrated by the action of a Mr. E. E. Weber, of New Westminster who, with the knowledge and consent of other Canadian shareholders, applied for and obtained an order from the courts for the winding up of the concern. In the petition supporting the application for the winding up of the company, it is stated that the debts of the company are in the neighborhood of \$50,000, the greater proportion of which is owing to people in this Province. It is further stated as believed by the petitioner, that it is the intention of the liquidator of the Athabasca, who was appointed at a meeting of the company held in London on the 7th of August, to convey the property of the company to a new company to be formed, which new company will pay for the same by the issue of stock assessable to the extent of five shillings or more on the pound, which assessment if made will produce \$125,000 or more. This call, it is set out, is excessive and unnecessary, and payment thereof will be beyond the means of many of the shareholders of the company, and that through failure to make payment of such call such shareholders will lose their interest in the company. The petitioner further sets out his belief that in the event of the company being wound up that its property could be sold at a price which would pay all of its indebtedness and leave a considerable margin to divide among its shareholders.

The granting of the winding-up order by the courts will seem to set at rest the repeated reports that an early start is to be made in the resumption of work at the mine, and that when it does resume either the Canadian or English shareholders, or both, will be out of it. Locally, the opinion seems to be that the English shareholders are anxious to proceed with reorganisation with sufficient assessment on the stock to wipe out all the liabilities and leave a substantial margin for development purposes, but that the Canadian shareholders are more concerned in getting out of the concern without further loss.

PATENT OFFICE REPORT.

MR. ROWLAND BRITTAIN, patent attorney Vancouver, forwards us the following list of patents issued to British Columbia inventors during the past month:

C. Cliff, New Westminster, Canadian patent on the Construction and

Method of soldering the covers of butter cans. Under this patent the tinned surfaces of can and cover are brought together at the outer edge of the can, so that the heat of soldering is not communicated to the contents, and the work is effected in a quicker and more efficient manner.

C. Ramos, Vancouver, Canadian patent on a Gold Gravel Washer, is for the rapid washing and concentration of gold from the gravel, and is particularly designed to handle the dirt in large quantities.

W. Nelson Le Page, of Vancouver, whose name has been associated for some time on this coast with efforts for the recovery of glue, etc., from the fish offal of the canneries, received his Canadian patent on an Improvement in Dryers to effect the more rapid removal of moisture from the fish guano residue.

B. C. Riblet, Nelson, a U. S. patent on a Tramway Derrick, an Automatic Bucket Loader, and also an Automatic Dumping Bucket, all for wire-rope tramways.

D. J. Matheson, Nanaimo, Supplementary Door Fastener which may be readily carried in the pocket, and being inserted from the inside between the jamb and the door, effectually prevents the door being opened from without.

CATALOGUES, CIRCULARS AND TRADE NOTICES.

COAL MINING MACHINERY AT FERNIE.

OF late several important additions have been made to the machinery equipment of the Crow's Nest collieries, and other improvements in this direction are immediately contemplated. Orders have recently been placed with the James Cooper Manufacturing Co., of Montreal, for three compressors each capable of compressing 1,400 cubic feet of air per minute and of operating ten coal-cutting machines. One of these is now on the way, while the remaining two are building at Montreal. The Crow's Nest Co. is also installing two 40 h. p. engines and two 75 h. p. hoisting engines.

HERCULES WIRE ROPES.

Messrs. the A. Leshea & Sons Rope Co., inform us that they have removed their Chicago office from South Canal street to 137 Lake street. In the warehouse at this latter address a large and complete stock of wire, manila, sisal ropes, packing waste, pulley blocks, sheaves and wire fittings and other supplies will be carried. This firm, as of course our readers are aware, are the sole manufacturers of the famous make of wire rope known as the "Hercules," in addition to which the firm are also sole manufacturers of Patent Flattened Strand Wire Rope and Patent Aerial Wire Rope Tramways. The factory, main offices and warehouses, are at St. Louis, but branch offices and warehouses have also been established at Chicago, New York, (92 Centre street), and San Francisco, (85 Fremont street).

A NEW STEAM STAMP MILL.

We have received from Mr. J. C. Y. Crofts, M. I. Mech. E., of Nelson, the British Columbia representative of the manufacturers, Messrs. Hathorn & Co., of London, England, a pamphlet of a new steam stamp mill which with crusher, feeder, plates, pump and one complete set of spares (shoes, dies, amalgam plate, one cylinder and stem) is sold, delivered at Nelson or Vancouver, at the sufficiently moderate price of \$2,350. We hope shortly to give a detailed description of this plant, which is seemingly exceptionally adaptable to the needs of prospectors and others in connection with the operation of free-milling prospects in the initial stages of development.

BELT CONVEYORS.

The recently issued new catalogue of the Robins Conveying Belt Co., of 18-21 Park Row, New York, is a most excellent example of artistic printing and workmanship. The booklet contains in all seventy-two pages, a heavy plate paper being used on which the exceptionally fine and numerous illustrations show to very great advantage. These illustrations are for the most part half-tone reproductions from photographs of typical installations—a collection of seventy-six views—while parts and arrangements of the system are also illustrated. Robins Belt Conveyors are successfully applied to the following services:—

Carrying ashes, broken stone, cement, chips, clay, coal (anthracite), coal (bituminous), coke, concrete materials, culm, earth, excavated material, gravel, limestone, ore, (copper, gold, iron, lead, zinc, oxide, oyster shells, pyrites, rock, sand, slag, tailings, waste; at boiler houses, cement plants, chemical works, coal breakers, (pockets, shipping piers, storage yards, washeries), coke plants, concrete mixing plants, contractors' operations, copper mines, crushing plants, culm banks, cyanide plants, expositions, gas works, gold mines, iron mines, lead concentrating plants, magnetic separating plants, power houses, pulp and paper mills, sand and gravel plants, stamp mills, steel and iron works, stone crushing plants, and on dredges.

THE FAIRBANKS CO'S BRITISH COLUMBIA BRANCH.

The Fairbanks company, Montreal, have opened an office at 514 Granville street, Vancouver, in charge of Mr. A. C. McDonald. This step was found necessary on account of the firm's large and increasing business in British Columbia. The Fairbanks company are now sole

western agents for Robb Engineering company, of Amherst, N. S., as well as for the Canadian Radiator company, of Port Hope, Ontario.

ELECTRICITY AT THE HALL MINES.

An agreement has been entered into by the West Kootenay Power and Light company to supply the Hall Mining and Smelting Co. with electrical power for the operation of the works at Nelson. The motors required under the contract have been ordered, and the change will be made as speedily as possible, the expectation being that electricity will have superseded steam within three months. The West Kootenay Co. is to supply a total of 285 horse power, and the change will effect a substantial saving to the smelter on power account. The motors ordered are as follows: A 100 h. p. motor to operate two blowers, a 50 h. p. for the rock breaker, one of similar capacity for the sampler, another for the mechanical roaster, installed at the smelter early in the year, and a 15 h. p. motor for a hoist which is to be placed in the smelter shortly.

An interesting feature of the outfit is that the assay office at the smelter is also to be operated by electricity, this being a decided novelty. The plant will be composed of the following apparatus: Three 1200-watt immersion coils for the heating of water in tubes; four 12 x 18 enamel plates for evaporating solutions and for dryers; two 12 x 18 enameled plates for bringing solutions up to and maintaining a gentle boil; and eight 12 x 12 enameled plates for drying baths.

The total horse power in motors to be installed will be 265, with an additional 20 horse power for lights and for the apparatus required in the assay office.

MINING RETURNS AND STATISTICS.

THE COAST.

ORE shipments from the Lenora mine, Mount Sicker, via Lady-smith and Union, during the month of October aggregated 1,196 tons.

ROSSLAND.

The following table gives the monthly production from this district during 1901 to date, as compared with the shipments last year:

	1901. Tons.	1900. Tons.	Increase Tons.
Shipments for January (revised).....	30,894	24,933	5,061
" February "	26,778	6,060	19,818
" March "	34,172	279	33,893
" April "	40,160	6,834	31,296
" May (estimated)	47,000	25,704	31,296
" June "	32,000	17,161	14,839
" July "	6,000	17,396	*11,399
" August "	1,000	19,417	*17,417
" Sept'r "	7,390	24,830	*17,440
" Oct. "	180,30	15,822	12,208
" Nov. "	20,680	24,661	*4,281

The ore production from the Rossland mines for the eleven months of the year to date approximates 268,500 tons.

* Decrease. † Increase.

BOUNDARY DISTRICT.

The tonnage of ore shipped by Boundary district mines during the month of October, so far as has been ascertained from the mines, is as under:

	Tons.
Old Ironsides and Knob Hill group	13,578
Mother Lode	6,480
B. C.	2,440
Snowshoe	49
Winnipeg	40
King Solomon	280
No. 7	60
Sunset
Jewel	290
Total	23,168

Shipments during 1900 and for ten months of current year ending October 31st, were as follows:

	1900	1901
Old Ironsides and Knob Hill group.....	64,535	187,890
Mother Lode	5,504	70,329
B. C.	19,494	65,656
City of Paris	2,000
Golden Crown	2,240
Winnipeg	1,100	775
King Solomon	1,210
Athelstan	1,200	550
Carmi	885
Snowshoe	338	734
Brooklyn	150
Jewel	160

R. Bell	480
No 7	775
Sundry shipments	1,000
Sunset	450
Total	98,781

Grand total to date.....	452 383
Shipments during November approximate 34,000 tons.	

SLOCAN DISTRICT.

The total amount of ore shipped from the Slocan and Slocan City mining divisions for the year 1900 was, approximately, 35,000 tons. Since January 1 to Nov. 16, 1901, the shipments have been as follows:

	Total.
Payne	1,808
Last Chance	1,250
Slocan Star	3,486
Ruth	279
Bosun	420
Hewett	1,876
American Boy	1,286
Ivanhoe	1,157
Sunset (Jackson Basin)	681
Sovereign	117
Wonderful	84
Arlington	4,608
Two Friends	40
Enterprise	520
Hartney	140
Black Prince	155
Goodenough	215
Miller Creek	20
Reco	279
Sunset (Can. Gold Fields)	53
Silver King	14
Noble Five	59
Red Fox	103
Antoine	16
Queen Bess	1,199
Monitor	480
Corinth	81
Bondholder	26
Rambler	2,500
Surprise	200
Kaslo Group	10
Chapleau	15
Speculator	10
Ajax	10
Soho	60
Emily Edith	40
Phoenix	23
Alpha	40
V. & M.	20
Marion	22
Ruby	1
Esmeralda	6
Hampton	2
Capella	22
Fourth of July	12
Tamarac	5
Mary Durham	5
Buffalo	5
Sweet Grass	2
Total tons	23,408

The shipments of ore from Slocan mines over the Kaslo & Slocan railway through Kaslo for the month of October were as follows:

	Tons.
Whitewater, to Trail	558
Slocan Star, to Trail	502
Rambler, to San Francisco	327 1/2
American Boy, to Trail	165
Reco, to Trail	106
Last Chance, to Kootenay Ore Co	100
Washington, to Nelson	63 1/2
Sunset, to Trail	62
Bismarck, to Nelson	16 1/2
Antoine, to Kootenay Ore Co	15
Silver Glimmer, to Trail	10
Total	1,925 1/2

The value of the October shipments through Kaslo may be approximated at \$134,750.

Shipments over the C. P. R. for the same period, were: Slocan Star, 294 tons; Minnesota Silver Co., 120 tons; Payne, 65 tons; Reco, 30 tons. Total 509 tons. The value of the month's output, including that from the Slocan City division, is estimated at \$350,000.

LARDEAU.

Lardeau ore shipments to date are estimated at 3,110 tons of ore, representing a value of nearly \$450,000, a good beginning, all made during about eighteen months and in the absence of railroad facilities. Only very high-grade local mines have as yet been able to ship to any extent from Lardeau points, and a local smelter is also increasingly needed. The largest shippers to date are the Silver Cup, credited with an output of \$180,000 in all, the Nettie L. with \$146,000, and the Triune with \$82,000.

ATLIN DISTRICT.

The Atlin district produced 600 ounces more gold this season than last. That is the showing made by the gold commissioner's report. Royalty was paid on but 12,120 ounces as against 12,490 ounces for 1900. This does not include exemptions and gold smuggled out by the owners in order to prevent paying royalty. The more conservative estimates as to the actual output of Atlin places the amount at \$300,000. As shown by the commissioner's records the yield by creeks was: Pine and Willow, 5,330; Spruce, 2,308; Boulder, 2,640; McKee, 1,013; Wright, 283; Graham, 103; Otter, 143; Gold Run, 31; Birch, 270; total, 12,120.

YUKON DISTRICT.

The gold exports from Dawson for the months during which the export law has been in effect were as follows:

June.....	\$5,918,000
July.....	9,725,000
August.....	3,000,000
September.....	3,000,000
October (to 15th).....	1,400,000
Total.....	\$23,043,000

To this must be added shipments made earlier in the year before the system of export certificates came into force.

The gold production of Yukon territory, according to official figures, is as follows:—

1885-6.....	\$100,000
1887.....	70,000
1888.....	40,000
1889.....	175,000
1890.....	175,000
1891.....	40,000
1892.....	87,500
1893.....	176,000
Payne.....	125,000
1894.....	250,000
1895.....	300,000
1896.....	2,500,000
1897.....	10,000,000
1898.....	16,000,000
1899.....	22,275,000
1900 (unreserved figures).....	—
Total.....	\$52,313,500

1901 DIVIDENDS.

The following mines in the Kootenay district have paid dividends during 1901:

	Amount.	Rate.	per cent.
Bosun, Slocan.....	\$ 12,500	5	"
Centre Star, Rossland.....	105,000	3	"
Le Roi, No. 2, Rossland.....	144,000	5	"
North Star.....	135,500	10½	"
Payne, Slocan.....	78,000	3	"
St. Eugene, East Kootenay.....	210,000	6	"
Rambler-Cariboo.....	25,000	2	"
Ymir, Nelson.....	192,000	20	"
Total for 1901, \$902,000.			

RECENT CABLES.

Le Roi No. 2.—The manager cables 5th November: "Monthly shipment of ore 4,456 tons. Contents 2,151 ozs. gold, 5,500 ozs. silver, 100 tons copper. Gross approximate value \$79,000. Estimated profit \$29,000."

Bosun Mines.—Bosun mine: Telegram from the manager reports returns from smelter for 60 tons galena shipped during the month of October, \$1,946.

Velvet, Rossland.—Cable: "North drift at 400-foot level is now in 22 feet, with average width of ore two feet. South drift is in 20 feet, thence a crosscut has been driven 18 feet to pick up the reef, which has been accomplished, and a drive south on the ore body is about to be commenced. Adit level—South drift is now in 192 feet, and should connect with 300-foot level within next fortnight."

Kootenay Mining.—Manager cables: "Expect to commence operations during next week."

Hall Mining and Smelting.—Output of smelting ore from the Silver King for four-weekly period ended October 21: 3,086 tons, averaging 27.78 oz. silver per ton and 6.50 per cent. copper. Approximate gross value of contents £19,150.

The B. C. Exploring Syndicate, Limited.—Under date October 9,

Captain J. Argall forwards the following information, which will be interesting to the shareholders:—"Kamloops: The large lode 40 feet wide, to the hanging wall shows up very fine and will average fully 6 per cent. copper throughout with fair values in gold and silver. We have sold up to date approximately \$2,000,000 worth of ore."

"Frederick Arm: We have encountered the ore body in the rise over No. 4 tunnel at 92 feet. This shows the ore to come down below No. 3 a distance of 67 feet, and then dip quite flat N. W., into the mountain. We hope to connect this rise with the winze sinking below No. 3 within the next few days, when we will be better able to decide the nature of the lode and where it may again be encountered in No. 4; at present, to say the least, it looks distinctly encouraging."

Ymir.—The secretary of the Ymir Gold Mines, Limited, announces that the estimated operating profit on the mine for September amounted to \$30,700 (£6,330), which exceeds the profit made in any previous month. The board have declared a further interim dividend of 1s. per share, free of income tax, which was payable on Nov. 1st, last.

AN ASSAYERS' ASSOCIATION.

A MEETING of certificated Provincial assayers was held this month in Nelson for the purpose of organising a British Columbia Association. Arrangements were effected and the following officers were elected: President, Mr. Herbert Carmichael, provincial assayer, Victoria; vice-president, Mr. Alex. McKillop, Nelson; secretary-treasurer, Mr. J. Cuthbert Welsh, Trail. Council—Mr. A. A. Cole, Rossland; Mr. H. Harris, Nelson; Mr. Thomas Kiddle, Van Ande; Mr. D. Lay, Kimberley; Mr. H. W. Mussen, Nelson; Mr. Wm. F. Robertson, provincial mineralogist, Victoria; Mr. G. Sundberg, Greenwood; Mr. Howard West, of Sandon.

THE GREENWOOD SMELTER.

A GREENWOOD correspondent writes: Some time in January the second blast furnace for the local smelter will be ready to be "blown in" and the capacity of the plant doubled. With the two furnaces going about 900 tons of ore will be handled daily. The smelter was "blown in" Feb. 18 of the present year. From that date to Oct. 31 it has treated 91,715 tons. To come down to months the last two will suffice to give an idea of the daily tonnage treated. In Sept. the total amounted to 11,823 tons, or a daily average of 393 1-10 tons. For Oct. the total was 12,660 tons, being an average of 408 tons a day. On Oct. 18 Mr. Paul Johnson, M.E., manager of the smelter, believed he established a world's record for a single-blast furnace of the size in use here. On that day 504 tons of ore, coke and slag were run through. Of this amount 450 tons were ore.

COAL EXPORTATIONS.

THE foreign coal shipments from the Vancouver Island collieries for the ten months ending October 31, aggregate 689,007 tons. The shipments in October were divided as follows:

	Tons.
New Vancouver Coal Co.....	33,269
Ladysmith.....	14,607
Union.....	5,355
Total.....	53,231

Two hundred tons of coke were also shipped from Wellington during the same period. For the three weeks ending Nov. 20th, the New Vancouver Coal Co. shipped 22,798 tons of coal to Californian and Alaskan ports.

The present output of the Crow's Nest collieries is between 1,500 and 2,000 tons per diem.

THE LOCAL STOCK MARKET.

THE sensational feature of the month has been the remarkable slump in Cariboo-McKinney which declined to 13 on the Toronto Exchange, after selling in October at 30. The reason of this heavy fall in the price of a stock which has heretofore been held in considerable favour, has not yet been satisfactorily accounted for, although several explanatory and generally contradictory rumours have been circulated. One of these and probably the most plausible, is to the effect that a Toronto bank which held a large block of shares as collateral security for a loan to a client, desiring to realise, suddenly threw offerings on the market which, being in an exceptionally timorous condition, became absolutely panicky, and a regular rush to sell ensued. Another report has it that the slump is directly due to clever "bear" manipulation, while a third is to the effect that recently developments in the 600-foot level at the mine have proved disappointing. So far as the last statement is concerned, it is a well-known fact that the vein of the Cariboo is, and has from the commencement of operations been, subject to frequent faultings, and even if the report in question has any foundation in fact, there is no immediate cause for shareholders to experience any special uneasiness. Meanwhile in the last week or so a slight re-

