THIS MONTH. } THE CANADIAN MINING EXHIBIT AT PARIS—(Part 2).

BRITISH COLUMBIA MINING RECORD.

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BRITISH COLUMBIA
MINING RECORD

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THE MONTH.

IN the *Engineering Magazine* for December Mr. Mortimer Lamb has collected all known data about the admittedly vast deposits of iron ore in British Columbia. The statement made some years ago by Dr. G. M. Dawson that the iron ores of British Columbia "wait to realize their true importance, merely the circumstances which would render their working on a large scale remunerative," is quoted and the comment made, "That conditions are now favourable for the development of these resources would appear from the interest that is being shown and the enquiry that is being made at the present time, by men intimately associated with the iron industry in the United States concerning the extensive bodies o. magnetite found on Vancouver and the neighboring islands and mainland." One of these favourable indications is undoubtedly that a periodical like the *Engineering Magazine* should take the trouble to illustrate and describe the iron resources of our province.

IRON RESOURCES OF THE PROVINCE.

The industry of mining iron ores in British Columbia is as yet almost ludicrously infantile. The annual production has never exceeded 2,000 tons, but it is interesting to know that the metal, or at least four-fifths of it, incorporated in the framework of the U. S. warships Olympia, Monterey, Charleston and Oregon, and now circling the globe as part of these mighty engines of destruction, was mined in British Columbia. To quote from the *Engineering Magazine* :—

"Although discoveries of large bodies of iron-bearing ores have been made in various localities of the Province at intervals since 1872, no annual production has much exceeded 2 000 tons, and on only one or two occasions has the aggregate output of one year reached that figure. The productive sources have been limited to three, or more properly speaking two, mines; one, the Glen Iron mine, on the line of the Canadian Pacific Railway, at Cherry Bluff, near Kamloops, and the other the Puget Sound Iron Company's properties at Texada Island. In the case of the former the product has been exclusively used for fluxing purposes by the smelters at Tacoma, Revelstoke and Nelson, while the Texada ore has been shipped to Irondale, Washington Territory, and there smelted with a mixture of from 1-9 to 3-10 of bog ore, making an excellent foundry pig, which was subsequently marketed in San Francisco and utilized by the Union Iron Works in the construction of the U. S. warships Olympia, Monterey, Charleston and Oregon. In addition to the two mines mentioned, more or less extensive bodies of iron-bearing ores have been discovered at Sooke, Chemainus, and Barclay Sound on Vancouver Island ; at Rivers and Knight Inlets on the Mainland coast; on the Queen Charlotte Islands and also in several localities of the inland districts of Similkameen and Cariboo.

"The Puget Sound Iron Company's property of 2,700 acres is situated on the south-west side of Texada Island. The ore-mass, which on the surface varies in width from 20 to 25 feet, is an irregular contact deposit between limestone and granite, traceable northward for nearly four miles along a ridge following the coast line, and distant from it a quarter to three-quarters of a mile. Sufficient development work has been done to expose an ore-body estimated by experts as representing 5,000,000 tons of commercially valuable iron in sight. In the course of development at one point copper in the form of solid pyrites was found in irregular bunches and stringers in the magnetite, but with increased depth this disappeared. Analyses of the ore have been made on several occasions in the laboratory of the Canadian Geological Survey, one result showing 68.40 per cent. of iron with only .003 per cent. of phosphorus, but a more detailed test gave :

Iron	69.85
Manganese	Trace
Silicious matter	2.75
Sulphur	.06
Phosphoric Acid	Trace
Moisture	Trace

After describing the other known deposits of iron in the Province the article concludes as follows :

"At present the extent of information available in respect to the iron deposits of British Columbia, has more of a scientific than of a practically commercial interest. As exploration, however, is usually governed by practical considerations, it is probable that those deposits of which anything is known bear but a meagre relation to those of which nothing is as yet definitely ascertainable. It is not too much to say that British Columbia possesses enormous potential recources in her iron deposits, but that these resources must wait for commercial development upon the development of those industries which stimulate a demand for iron. Sooner or later the political reasons which led to the construction of United States battleships on the Pacific Coast for which, as we have seen, British Columbia iron was partially utilized, will give place to commercial reasons connected with the development of trade on the Pacific necessitating the building of a large mercantile marine. Sooner or later manufacturing industries, with their constant demand for iron, which is their base, will be brought into being to supply the ever increasing market of the Orient. When these things happen, British Columbia, with its abundant coal and lumber, in direct connection with its iron, must become the seat of a great iron industry. Meanwhile these resources are chiefly attractive to those who combine in a very rare degree the gift of foresight and indomitable patience."

With the exception of its happy indifference to the gender of British Columbia this is a dignified and logical summary of the position.

There are numbers of people in British Columbia possessed of a more or less superficial knowledge of Australian mining law who believe the province could with advantage introduce some features of the Australian system, particularly those which demand from the claim holder greater exertions in developing his property. The conditions under uhich mines are located and developed in Australia are as follows :

AUSTRALIAN MINING LAW.

Armed with his miner's right, the prospector maps the outcrop till sufficient color warrants a location. He then has the right to mark out a prospecting area 160 yards square to hold the ground while he investigates its merits. This " pegging out " will hold the ground for thirty days, at the end of which time he must register his claim (cost $2.50) at the nearest registrar's office. This affords a clean title till payable gold is struck, when notice must be given to the Warden and a lease applied for. A lease, of course, may be applied for on any ground without first holding it as a prospecting area, which is designed for the poor man only. When a lease is desired, the area wanted is defined by corner pegs, trenches and cleared lines as nearly correct as possible; notices of intention are posted and application made for the lease within ten days of marking. The fees must be paid on application, $5 per acre per year rental being deposited for the first year in advance, together with the fee for survey, from $20 to $50. At the end of thirty days the application is heard in open court, when all objections are considered. If no valid objections are sustained, the lease is recommended by the Warden and issued later by the Minister of Mines. Immediately upon its recommendation the labor conditions come into force. For the first six months one man for every twelve acres ; after that, one man for every six acres, must be constantly employed for eight hours five days in the week, four hours on Saturday. A lapse of three days in the labour conditions renders a lease liable to forfeiture on the application of any person applying for the same and proving the default. The case is tried by the Warden in open court and his decision is handed to the Minister for decision. The fulfillment of the labor conditions is part of the consideration paid to the government for the lease."

Such a system may be suitable to a country where nothing is looked for on the surface except free milling quartz, but would promptly asphyxiate prospecting and development in a country dependent on silver, lead and copper mines. Imagine a claim owner in the Boundary country four years ago face to face with a rental charge on his claim of $250 cash per annum plus the obligation of keeping eight men continuously at work at an expense of $800 a month. Would that have aided the development of the country ? Not at all. Prospectors, mining men, capitalists and investors would have with one accord turned their backs on the country shouting a unanimous non possumus. It is possible that greater compulsion might be used with advantage towards claim owners in British Columbia to make them work claims ; but legislative interference in this direction must be gone about very cautiously and circumspectly. The inducements so far held out to the prospector to acquire property rights in his discoveries have not been more than sufficient to secure the exploration of the province. To reduce them might not have by any means a beneficial effect. Though to the superficial observer it might seem that the immediate outcome would be a larger amount of development work done. It is perhaps necessary to remind those who see an advantage in these Australian rigours that mining in Australia is in a very backward condition compared with mining in the United States, where the theory of government has always been to leave the prospector, speculator and capitalist as free as possible to work out their own salvation, and the government's one idea to get rid of its mineral resources as quickly as possible into the hands of the individuals who discover them. To a new country the question is one of grave importance. It is always as well to remember that to every shield there are two sides.

Anyone in the habit of reading the English mining, or we should say the financial press, for what we understand as a critical mining journal does not seem to exist in England at all, and the work undertaken by such here, is there one of the functions of the financial press, cannot but be struck by a painful remoteness from a knowledge of mining conditions as they actually exist in British Columbia. It is rather a want of apprehension than of comprehension. It gives the onlooker the impression that the mining investors in Great Britain are looking at British Columbia through a fog. What they see is curiously out of proportion somehow and distorted. There is a great difficulty in analysing just in what this want of apprehension consists, but a few concrete examples may serve to illustrate it.

To begin with a very gross example. Some time ago a letter was published in one of the leading Lon-

don financial papers rating the board of directors of the Le Roi company soundly for a number of sins, but among other things because they did not move the smelter to the mine at once in order to save the freight charges on the ore. The author of this letter did not apparently know that the Le Roi was near the top of a mountain, and that it was on the whole easier to allow gravitation to carry the ore down hill than to carry fuel and flux and pump water up hill. As an illustration of our present subject, however, it is not remarkable that a fool wrote this letter, but it is remarkable that its patent maniacal absurdity did not appeal to the clever and well-informed men in charge of the newspaper in which it was published.

Another example. Some time ago the manager of a property which cost £15,000 cash reported to his company that he had acquired certain claims by location useful to the company in connection with its tramway and mill. The company was promptly felicitated by the press on the fact that its property was doubled in size without further cost. About this phrase "doubled in size" there is nothing absolutely wrong. Geographically considered it is correct. But would anyone cognizant of mining conditions in British Columbia have ever dreamed of making use of the expression in connection with such a transaction?

Another example. On this occasion the scribe was patting the Boundary country on the back (a very laudable occupation) and wound up with a sentence something like the following, we forget his exact words:—"These mines are doing very well, though of course they cannot compare with the large English-owned mines in Rossland, Ymir and the Slocan." It is quite true the Boundary mines are doing well; it is quite true there are great mines in Rossland, Ymir and the Slocan owned in England. But the incongruity of ideas involved in the bunching together of the mines in Rossland, Ymir and the Slocan, and more particularly the mines in those places which happen to be owned in England, and then comparing them as a whole with the Boundary mines as a whole, passes everything it has ever been our fortune to meet with. It is irresistibly reminiscent of the address to a convicted culprit:—"Prisoner at the bar, Heaven has blessed you with health and strength, instead of which you go about the country stealing ducks."

Another example, more excusable perhaps but not less unfortunate. It happened to be explained that the Le Roi output was limited because the Le Roi smelter was not large enough to treat all the ore the mine could produce. Immediately came a rebuke and a demand couched in the awful, severe and minatory language which a journalist uses in public towards those whose boots he would willingly polish by a process of osculation in private; Why did the management of the Le Roi dare to treat the ore of other mines in the smelter when it was not big enough to handle the output of the Le Roi? The explanation that the Le Roi ore had to be mixed with other ore differing in character to secure the best smelting results is ample and satisfactory, but, and here is the point, it should surely not have been necessary.

The "immediately contiguous to" of the chairman of the Kootenay Mining Company has been referred to elsewhere. Malice might interpret this as a deliberate *suggestio falsi* on that worthy gentleman's part. It is, however, certainly more charitable and probably more accurate to set it also down to that remoteness of apprehension we have been trying to illustrate. Examples might be indefinitely multiplied. In fact this mysterious inadequacy in apprehending conditions here as they are, seems to be rather pervasive of the whole public consciousness in the old country than sporadically apparent in isolated instances. It is a vague, impalpable, but very real thing, and forms a decided and appreciable bar to the introduction of English capital into British Columbia, and to its profitable employment here when introduced. If any means exist by which that bar could be removed it would be well worth while to find them out.

Last month we referred to the puffing in England of the Nimrod Syndicate in connection with a consolidation of placer claims that Syndicate had acquired on McKee creek, in the Atlin district. The reason for this puffing has now become apparent in the issue of a subsidiary company to acquire those claims at the insignificant consideration of £60,000. The capital of the company is £75,000 but of that £15,000 is appropriated for working capital. Are these claims worth £60,000? Will they be worth £75,000 after £15,000 have been spent in bringing hydraulic power to bear on them? These are questions which the future alone can answer. We do not know what these claims cost the Nimrod Syndicate, but are satisfied their cost was not less than £1,000 and may have been twice or three times that, but £4,000 at the outside. The main claims were sold by a man who had been working them for two seasons. He had discovered apparently that the pay was very narrow and limited to spots. He was glad to sell out for a small price. Yet there is a distinct attempt to insinuate in the advertising by the company that the whole area is of practically uniform richness. Our object is not by any means to protect the British shareholder. If he cannot protect himself he must take the consequences. So far as we are concerned the Nimrod Syndicate, or any other syndicate, can float wildcat companies till the skies fall. But we do wish to protect the mining industry of British Columbia from such vampires, who use the resources of the province as an augur to tap the veins of the English people. The property acquired by the Nimrod Syndicate is good property so far as we know. The enterprise as a small private concern is as likely to give good returns as anything in Atlin. This makes it particularly exasperating that it should be "wild catted" so ruthlessly in London.

In connection with our remarks about the Nimrod Syndicate and its latest subsidiary company, the following from the *London Mining Journal* will be read with interest:

"At the recent discussion which took place at the meeting of the Institution of Mining and Metallurgy on the mining laws, the representative of the Victorian government (Mr. Stirling) took occasion to call attention to the system of over capitalization by London financiers, to whom that colony has to come for the means to develop its mineral resources. That system is eating out the soul of the mining industry in that colony. This practice of over capitalization, he said, with emphasis, was such that no mines in

the world could bear. This is an important question, affecting both the present and future of the mining industries in the many colonies which help to form our greater empire."

An illustration is given. A company purchased a property in 1886 in Australia for £1,000 cash and a number of shares. The capital of the company was £120,000, working capital £40,000. In 1896 the same property was recapitalized at £350,000 working capital £100,000. Recently the same property has been again recapitalized at £750,000, working capital £50,000. Angels and ministers of grace defend British Columbia from operations of that character! The Australian colonies feel the bad effects of this kind of thing more than British Columbia does. They are almost wholly dependent on British capital. British Columbia is not. Both the United States and Eastern Canada, where capital is accumulating very rapidly, which is both adventurous and business-like, are available.

The report of the Highland Mining Company is most satisfactory reading. It is the report of a company started in a business-like way for business-like objects and meeting at the outset with substantial encouragement. The company purchased its property for cash, capitalised at a moderate sum, and has the property in running order within four months of taking hold. Whether the anticipations of the chairman that an annual profit of 50 per cent. will be realised we do not know. If there is ore enough in the mine they should come within measure of fulfillment. Doubtless a company so practical in other respects has satisfied itself as to the extent of its ore reserves and the rapidity with which they can be made available to maintain shipments.

We observe in the report of the meeting of the Kootenay Mining Company, Ltd., now operating the Columbia-Kootenay group at Rossland the chairman of the company made the statement that the property of the company was "immediately contiguous" to the established Le Roi mine. The Century Dictionary gives as the meaning of contiguous "touching; meeting or joining at the surface or border." Webster gives the same definition, but goes on to remark: "This word is sometimes used in a wider sense, though not with strict propriety, for 'adjacent' or 'near' without being absolutely in contact." There can be no doubt, however, as to the sense conveyed by the phrase "immediately contiguous." We quite agree with Webster. In describing the relation of the Columbia-Kootenay group to the Le Roi mine it has been used with far from strict propriety.

The Mount Lyell Copper Mining Company, whose head offices are in London, and whose mine is in Tasmania, treated 150,735 tons of ore last year of which the average value was 2.81 per cent. copper, 2.3 oz. silver per ton and $1.80 gold per ton. From this kind of ore dividends of $618,750 were paid, so that the company paid a dividend of $4.10 on every ton of ore mined. Still there are people who say that the low grade copper mines of the Boundary country will not pay. Upon an output of 150,735 tons of ore averaging 2.81 per cent. copper this company ran a converter and exported its copper in the form of blister copper. Still there are people who say that British Columbia cannot support a copper converter, and sneer at the idea of the Granby Smelting Company adding one to its plant at Grand Forks. The Mount Lyell Company is under contract to sell its entire product for three years to the Baltimore Copper Company, an American concern. British Columbia is at least as favourably situated towards the American copper market as is Tasmania.

Since our paragraphs dealing with the Nimrod Syndicate were written the balance sheet of that company has come to hand. It shows a large but purely fictitious profit. The total amount spent on buying and developing properties is under $40,000. Yet we have an asset consisting of shares in various companies taken at par of $450,000. To manufacture currency by printing and engraving is called coining; to manufacture assets by printing and engraving share certificates is also called coining money. This company has spent $15,000 or more in mining in America and in the neighborhood of $17,500 in general expenditure in America and London. The result has been about $2,500 worth of gold bullion and $450,000 worth of paper assets valued at the same price as the gold bullion.

After going to 9 1-4 Le Roi's have fallen to 7 1-16. The cause is said to be a raid by bears. As a matter of fact we pointed out some time ago that the Le Roi books being made up to the 30th June the report for the year ending on that date could not show exceptionally brilliant results. The Le Roi, however, has been shipping ore heavily during the last half of the year and has besides increased its ore reserves. If the bears monkey with Le Rois they will infallibly get their fingers burnt. It is quite within the powers of the directors to pay an interim dividend of 7½ per cent. for the six months ending 31st December and thus turn the tables on the ursine fraternity.

The estimate of the year's production of the Slocan by our own correspondent at 32,000 tons, valued at $2,750,000, is very satisfactory, and is probably as near the mark as it is possible to come in the present condition of the province's statistical records. It need not be inaccurate even if it does not correspond with the Minister of Mines Report, as that document begins the mining year with the 1st of December. It compares with 21,507 tons, valued at $1,740,372 last year.

A persistent rumour is afloat that the Le Roi, Le Roi No. 2 and Great Western mines are to be amalgamated. On the basis of the market value of the shares such a consolidation would be exceedingly inequitable to the Le Roi shareholders. They are simple beyond the ordinary if they have anything to do with it.

In his address to the Canadian Bankers' Association Mr. E. S. Clouston, president of the Bank of Montreal, made a fierce onslaught on the proposal to establish a branch of the Imperial Mint in Canada. As reported, Mr. Clouston made two statements which are incorrect. He said it is well known that the Australian mints are run at a loss. That is incorrect, as a reference to the last annual report of Sir Horace Seymour, comptroller of the Royal Mint,

quoted in last month's MINING RECORD will show. He is also reported to have said that the banks are prepared to pay the miner as much for his bullion as he can realize by shipping the metal to an American mint. That is not the case. The bank requires and exacts a profit on the transaction. The American mint does not. A miner can get more for gold in Seattle than he can in Victoria or Vancouver.

The reception accorded to the Christmas Supplement of the British Columbia Mining Record was cordial in the extreme. Every copy available was sold out immediately on publication and orders are being received daily which it is impossible to fill. As we already have pointed out it was impossible to risk a very large issue of such a costly number on the chance of its selling well. It might have fallen flat. It was an attempt to give in a popular way a bird's eye view of the mineral industry in British Columbia. It was an entirely new experiment. Nothing of the kind had ever been attempted before in British Columbia or elsewhere that we know of. The experiment succeeded. Many thousands of people, through reading it, will have a clearer idea of mining in British Columbia, and of the conditions of life in this province than they had before.

The Ashantee boom is making great progress on the London market. It may be all right, but it does not look all right. That country must be very rich if mining can be made profitable at all under the natural conditions prevailing there. To justify the present inflated prices of exploration and promotion company shares the country would require to be a veritable Golconda. In some photographs of the mines there was not a dump anywhere visible which represented a shaft 20 feet deep. And such prospects in a wholly unproved country are being valued and sold for hundreds of thousands of pounds!

The question of a mint in Canada may be summed up as follows: No one is very anxious for a change in the currency system of the country if it can be shown that the present is the safest, best and most economical. Everyone is very anxious that the trade in the output of the Klondike and other northern gold districts should be retained in Canada and not wholly absorbed by the United States. If this can be done without establishing a mint good and well. If it cannot then at all costs let us have a mint.

During the year 1900 the output from metalliferous mines has very nearly doubled in value. It may be estimated at $11,500,000. Under the statistical system, or want of it, in vogue in this province, no official figures are available for any period later than 30th November, 1899. Publications dependent on official returns are still referring in gloomy terms to the condition of the mining industry.

A Colorado paper of some weight congratulates the State on the fact that negotiations for the sale of the Camp Bird mine to an English promoting syndicate have fallen through. It says that foreign capital is welcome, but that foreign capital with foreign management has seldom resulted in benefit to the mining industry of the State. Its remarks are occasioned by the Independence fiasco.

KASLO.

(Contributed by G. O. Buchanan).

THE following was unavoidably crowded out of the matter descriptive of the towns of British Columbia in our Christmas Supplement, but it is so interesting and so well put that no apology is needed for inserting it in the columns of the MINING RECORD.

The real reason for the existence of Kaslo and the basis of her hopes of future prosperity remains to be dealt with. In the fall of 1892, ten tons of ore from the Dardanelles mine, was brought to Kaslo by pack train by Mr. E. E. Coy. Mr. Coy accompanied the ore to Tacoma and returned with $5,000 in gold coin as the proceeds of the shipment. From that time until the present date the value of the ore shipped through the port of Kaslo has been twenty millions of dollars.

In 1893 the price of silver dropped suddenly from $1.00 per oz. to 48 cents.

In 1897 the duty upon lead going into the United States was suddenly increased from $15.00 to $30.00 per ton.

In 1899 the length of the shift worked by miners was suddenly reduced from 10 to 8 hours.

Each of these shocks paralyzed for the time the silver-lead mining industry. From each of them the industry has recovered.

The output to-day from the mining camps tributary to Kaslo is greater than ever before, and the indications are for a continual increase to a limit which is not yet in sight.

The industry is now getting its second wind. Aside from the fortuitous conditions artificially created to which allusion has here been made, many of the mines first worked were forced to suspend for lack of capital for systematic development.

The Dardanelles and the Freddie Lee, the earliest of all shippers, having long been and still are idle. The Noble Five, the Washington, the Reco, the Good-enough and the Lucky Jim are not now shipping.

It is not conceded that in any of these properties the ore bodies have been exhausted, but the high grade ore that could be taken out with a long handled pick has been mined and those interested have preferred suspension of work, or gradual development to a sacrifice of the properties.

In regard to some of these mines most encouraging reports are now in circulation. What is of great encouragement to Kaslo is the fact that the area of active mining is gradually spreading toward her boundaries.

The South Fork of Kaslo Creek has been, during 1900, the scene of great activity. The Bismarck, through the enterprise of Messrs. Gerrard, McAnn, McKay and Sampson, all local men, has become a property of great promise. Some ore of good grade has been shipped, and work is going on in an ore body which shows continual improvement.

The Cook, a claim belonging to the Excelisior Syndicate of French capitalists, represented in Kaslo by Mons. Flutot, is also showing high grade ore and some of the claims under development by the companies represented by Mr. Mansfield are highly spoken of. The True Blue and the Dayton group, which are within four miles of the town, are prospects of good promise, and in the case of the Leviathan group and some others across the lake from Kaslo, hope has not been abandoned. And the facility with which every requisite for the operation of smelting works upon a large scale can be assembled at Kaslo indicate it as a site of such works in the near future.

MINING AND SCIENTIFIC NEWS.

Mining is no new idea in the Philippines. The natives have been getting out coal and using it since 1827.

During the last statistical year the commercial ratio of gold to silver in the United States was at the average price of silver, 1 to 34.44.

The world's production of silver during 1898 was $105,364,505; in 1899, $104,100,163. The value of silver consumed in the industrial arts during the latter year was $52,990,500.

In nine years Cripple Creek has produced $83,000,000 worth of gold. Public companies have distributed $15,249,571 in dividends. Close corporations and lessees are estimated to have made profits of $5,000,000 in addition.

On account of ants wooden poles cannot be used in the mining districts of South Africa for telegraph, telephone and power transmission electric wires. Iron poles are used altogether, also iron arms, with iron pins in the insulators.

Fritz August Heinze has elected the governor and judges of Montana for four years. He has elected a legislature for two years pledged to an eight-hour miner's day, the destruction of the company store system and the downfall of the Amalgamated Copper Company.

The largest ore crushing machine in the world is the "Gates Gyratory Breaker, No. 9," manufactured at the Gates Iron Works, Chicago. It weighs 150,000 pounds. It has three receiving openings, each 20 inches by 48 inches; the hopper is 14 feet 6 inches in diameter; the main shaft is 21 inches in diameter. Its capacity can be stated as ranging about 150 tons per hour upwards. The machine gives a production of about 4-inch cubes.

"Molten wood" is a new invention by the inspector of forests at Lemur, France. By means of dry distillation and high pressure, the escape of developing gases is prevented, thereby reducing the wood to a molten condition. After cooling off, the mass assumes the character of coal, but shows no trace of the organic structure of that mineral. This new body is hard, but can be shaped and polished at will. It is impervious to water and acids and is a good insulator.

There is probably no department of industrial progress in which Americans are so universally acknowledged to be leaders as in the design and construction of machinery and machine tools, and, in glancing over the inventions of the nineteenth century, their claim to this distinction is supported on every hand. Whether in wood or metal working, they are conspicuous, not only because of numbers, but for the quality and value of their inventions. The Paris exposition contained a striking illustration of this truth, in the action of foreign manufacturers in adopting American patterns.

In America it is customary to sink the shaft and run levels at every 100 feet. This has been long taught in the great mining schools of Germany, and has become the established custom in the United States. In South Africa experiments demonstrated that it is not always the best policy to run levels every 100 feet or to continue sinking a shaft in order to find a new ore deposit. Some of the great mines of South Africa have been remarkably successful in holding on to ore bodies by prosecuting development beyond the ore deposit rather than by returning to the main shaft and sinking it another 100 feet.

Commercial platinum loses weight when heated in air, and much more so in oxygen. Wires of it were electrically heated in tubes containing separately, hydrogen, carbonic oxide, and carbonic acid gases, but there was, practically, no loss in weight. In oxygen, however, a wire weighing 1.7 grammes lost in one hour 0.0232 grammes, the metal being deposited further along the tube as a mirror, which, however, was not entirely soluble in *aqua regia*, and which differed in some other respects from the original platinum. The experimenter, Mr. R. W. Hall, thinks that the loss in weight is due to the chemical action of oxygen in attacking and removing certain elements from the platinum.

The steamship Cowrie, of the Shell Transport & Trading Company, has arrived in the Thames with a cargo of oil, having steamed all the way from Koetei, in Borneo, to London—9,250 miles—using nothing but liquid fuel. The boilers for supplying the steam for the pumps discharging the cargo are fired by the same material. The oil is not burned by a thin layer of incandescent coal, as is the case in some systems, but is pulverized or reduced to spray by means of a steam jet at the furnace door, where it is delivered from furnace tanks above the boilers. The Cowrie was formerly fired with coal, and her conversion to liquid fuel has been attended with advantageous results.

The outcrop reefs in South Africa, of course, start directly on the surface; the first row of deep levels are about 800 feet to 1,000 feet deep. Most of the first row are producing mines now. The second row of deep levels vary from 1,800 feet to 3,500 feet in depth; that is, vertical depth before striking the reef, and most of those are in a state of development. The shafts have been sunk to the reef and they have been developed along the reef and they will probably be producing within a year or so. And the third are the reefs where the vertical depth of the shaft would be from 4,500 to 6,000 feet deep. They are just starting in to sink the fourth row of deep levels, where they will get the 7,000 to 9,000 feet shaft.

The weight of steam, or feed water, required per horse power in different types of engines varies from 14 pounds in triple expansion condensing engines to 40 pounds in simple non-condensing engines. This feed water is evaporated to steam in a boiler capable of changing an approximately uniform weight of water per hour. Under such condition it requires more boiler plant to furnish the steam for a 100 H. P. simple non-condensing engine than for a 100 H. P. triple expansion condensing engine. Therefore, in order to rate boilers commercially, a standard unit of boiler power has been adopted and is stated as follows: A commercial horse power is equivalent to an evaporation of 30 pounds of water per hour from a feed water temperature of 100 degrees F. into steam at 70 pounds gauge pressure.

While the iron ore deposits of the Lake Superior region are generally described as "practically inexhaustible," the fact is well known to the keenest gentlemen in the ore-producing business that the annual tonnage being sent out for the past few years has developed a few things that must not be underestimated. The region is now sending out something like twenty million tons, as against a single million not so many years ago. It is divulging no secret to say that the fancy Bessemer ores of the older ranges are fast disappearing, having been shipped in seasons gone by, and it is apparent to those who keep well informed upon the conditions at the mines that the consumers of iron ores will have soon to be satisfied with ores containing more of phosphorus and less of iron than they have been in the habit of using, and insisting upon. In a few years, despite the great gains which have been made to former mining territory, there will be a cry for the fancy Bessemers which the consumers have been so persistently fed with of late, and to secure which more than one good mine was spoiled.

THE FUTURE OF SILVER.

(By D. B. Bogle.)

NEVER since 1893 has the interest of silver mining presented so hopeful an outlook as it does now at the beginning of 1901. During 1899 the value of the silver produced in the world decreased from $105,000,000 in 1898 to $104,000,000, or, to use language more accurate if less precise than that of figures, the output of silver remained practically stationary. During the present year the demand has exceeded the supply and there has been a steady, gradual increase in the price from in the neighborhood of 60 cents to in the neighborhood of 64 cents an ounce; and we learn towards the close of the year that buyers are exercising great caution in filling their abundant orders lest the price should be hastily marked up against them, and that there exists an ample demand for all the silver produced at current prices, that in fact more would be readily absorbed if more were to be had.

When the whole question of the great decrease in the price of silver which took place seven years ago, is carefully analysed with that freedom from the extraordinary passions then aroused which is given by the lapse of time, it will probably be admitted that the cheapening of the cost of production had more to do with the decrease than anything else. Silver had become really cheaper relatively to gold than a ratio of 16:1 would indicate. Consequently it was an artificial situation which was being bolstered up, and the catastrophe which finally occurred was the inexorable law of supply and demand bursting through the trivial conventions of man. According to the measure in which the artificial situation had been persisted in, was the measure of the unnecessary and lamentable consequences of the catastrophe. One of these consequences was a temporary depression of silver below its normal value in reference to gold. It is very unlikely that silver would have even shown indications of recovering its normal relation to gold in so short a period as seven years unless other circumstances than the demand for it had conspired in its favour. Since 1893 gold has undergone a great cheapening in relation to all commodities on account of the enormous increase in the annual supply of it which has taken place. At that time, or shortly before it, all the gold produced was being consumed in the arts and manufactures, in fact it was shrewdly suspected by many that more was being consumed in this way than was being produced. Thus not only was no gold being added to the stock in the world, but its stock was even being trenched upon to supply the industrial demand. This state of affairs which was fraught with considerable danger to a society based on lending and borrowing in gold, has happily been removed; its removal has, as might have been expected, resulted in a rise of the prices of all commodities measured in gold—all, rather except silver. The turn of silver is at hand now. Just so soon as it is really made patent that less silver is being produced than the world is able to consume and willing to pay for, speculation will take hold of the silver market and the price will rise by leaps and bounds and remain up until the pressure of production again strikes a balance. This will not be accomplished for some time. Copper is now 17 cents a pound, but people investigating copper mines do not calculate whether the ore will pay at 17 cents a pound but whether it will pay at 12 cents a pound, before they invest capital which they cannot resume without profitable operations extending over a long period of years. If such prudential calculation affects a steady market like copper how much more is it likely to affect a volatile market like silver. The great rise in the price of silver which, if the signs of the times are not delusive, is inevitable, will not therefore lead to the rapid exploitation of mines whose ore will only pay at the highest price, but to the rapid and confident development of all mines whose ore does or may be expected to pay at the present price of say 64 cents. Consequently the gross amount of silver produced will increase comparatively slowly, but the profits on the mining of such silver ores as pay now will be enormously enhanced, and a most beneficent impulse be given to the industry of silver mining as a whole.

No part of the world will benefit more by this stimulus than British Columbia. None has a greater abundance of rich silver resources. It is hardly too much to say that in British Columbia we have been mining lead and not silver since 1893. If any doubt this let them observe the effect which the sudden increase in the duty on lead by the United States had upon our silver-lead industry, an effect more marked than that caused by a considerable decrease in the price of silver. No statement used to be more common in the early days of the discovery of the Slocan than that silver might fall to 25 cents an ounce and still be mined there at a profit. Yet it is questionable if, leaving out of account odd discoveries of rich pockets of ore, silver can be mined on a large scale in the Slocan with a greater than the average run of profits on the capital invested. The chutes of rich ore are variable, require as a rule a large amount of dead work, comparatively to their size, for their discovery, and when opened necessitate the breaking of much waste rock to win the metal and most careful and elaborate sorting. The poor, or concentrating ore, is like that class of ore everywhere, it requires economical and scientific handling, and, while the profits under favourable circumstances may be large does not offer a wide margin between profit and loss per ton. If the price of silver remained stationary, or even declined, the tonnage of ore mined in the Slocan would probably fall but little. But if the price of silver manifests a substantial gain the effect will be remarkable and immediate. Capital will be sunk in the mines to a larger extent than hitherto, and their productive capacity increased. Every inducement will be offered to explore so rich a country, both on the surface and underground. The Slocan will then realize to the full the hopes formed of it in early days.

If that is true in regard to the Slocan it is still more applicable to the region round Kootenay Lake, to East Kootenay and to the Lardeau. These districts, which have long languished for lack of capital, will soon find it knocking at their doors. Evidence of improvement in this respect is already visible, and the tide has barely turned in favour of silver yet.

The silver resources of British Columbia are not by any means restricted to the places mentioned. The easiest thing to open up a new country upon, one remote from transportation, is gold. The next easiest is silver. Copper and lead are more valuable resources possibly after perfect means of treatment

and transportation have been provided. Men, however, will go to the North Pole after gold but not a hundred miles from a railway after copper or lead. But gold is a scarce metal compared with silver. Consequently let a renewal of interest in prospecting for silver be established and it will exercise a great effect in opening up new mining districts in the province and give a stimulus to the development of all our mineral resources, gold, silver, copper and lead.

These things are, of course, rather obvious than requiring elucidation provided that a considerable enhancement in the price of silver takes place. The danger of prophecy is great. I remember very well a brochure entitled "The Future of Silver," written by a certain Professor Suess, which was translated and printed for private circulation by the United States Senate, in I think 1892, and of which through the kindness of a mine owner, who was not too deeply engaged in garnering millions to take a keen interest in economic questions, I secured a copy. Having lent this book to some one else I never saw it again and consequently cannot refer to it now. Shortly, however, the theory of the learned Teuton was that the centre of gravity of gold production was moving ever further afield, which is quite true; that no matter what the demand for gold might be its supply could not be greatly increased, which is entirely false; and that men, finding gold inadequate, would fall back upon silver as their standard of value and medium of exchange. Everything he said about gold might equally well be said about every other commodity under the sun. To buttress his arguments he made remarks about South Africa that were totally unjustified. Cripple Creek and Klondike had not appeared upon the horizon. But his theory, as peculiarly applicable to gold, has been most completely disproved by the development of processes to treat sulphide ores containing gold in a cheap and effective way. These have placed gold as to the limits of its production upon precisely the same footing as every other metal. His conclusion might have been correct had the conditions he premised been borne out by events. But as it was, South Africa and Western Australia and Klondike and Cripple Creek, not to mention the base ores of Leadville and countless other camps in North America, were veiled from his eyes and in consequence he made a fearful mess of his predictions. In spite of this awful example of the futility of scientific prophecy, it is possible at the present time to hazard the opinion that the rehabilitation of silver, foreseen by Professor Suess, as the result of a cataclysm, our civilization could hardly stand, will come about through more natural occasions and in more beneficent degrees, and that the first symptoms of its new day are visible now on the commercial horizon. But lest I should awaken the mania of the currency fanatic, gold or silver, let me hasten to explain that by rehabilitation I refer only to its value in terms of gold, not the uses to which it has been or may be put.

Experiments are being made in Russia with a new fuel, "petrolized peat." Ordinary peat is impregnated by special methods with crude petroleum or with petroleum residue. The product is said to be impermeable to moisture, and does not absorb it even after being left in water; it does not dry to a powder like common peat, and its heat-giving value is almost equal to that of coal.

RESOURCES OF THE SKEENA AND OMINECA DISTRICTS.

THE village of Port Simpson, which lies some 20 miles north of the point where the waters of the Skeena River flow into the Pacific Ocean, has long been a post of the Hudson Bay Company. But what brought Port Simpson first into general public notice was the survey of a route for the Canadian Pacific Railway away back in 1877-78. At that time it was a toss-up whether our great national highway would find its Pacific terminus at Burrard Inlet, where Vancouver City now stands, at Bute Inlet or at Port Simpson, some hundreds of miles further up the coast. It was, as is well known, the intention of the Mackenzie administration then in power in the Dominion to build the railway across the Northwest Territories, the then "Great Lone Land," by way of the valley of the North Saskatchewan River past Edmonton (at that time the capital of the Territories), thence through the Rocky Mountain range by way of the Yellowhead pass, and so on to the Pacific Coast by the easiest possible route through northern British Columbia to a terminus at either Bute Inlet or Port Simpson. The latter point possessed this decided advantage over its rival that it would shorten the route of trans-Pacific steamers to the Orient very appreciably. The distance from Port Simpson to Yokohama is approximately 4,450 statute miles, while that from Waddington, on Bute Inlet, to the same point is 4,836 miles, an advantage in favour of Port Simpson of 386 miles. The survey party of the Skeena River route in 1877 was accompanied by Dr. G. M. Dawson, of the Dominion Geological Survey, and the report made was extremely favourable. Dr. Dawson, in his report to the Government observes: "In considering the advantages of Port Simpson or Kitimaat as the terminus of a transcontinental railway, it is important to bear in mind that by virtue of low altitudes and consequently easy gradients, together with the comparatively moderate character of the works required to reach it, this terminal point offers advantages which would enable a Canadian line to defy competition for trade with the Orient, these points being fully 500 miles nearer to Yokohama than Holmes' Harbour, at the mouth of Puget Sound, the proposed ultimate terminus of the Northern Pacific Railway, while the advantages it possesses over San Francisco is correspondingly greater." However, the final location of the line of the Canadian Pacific Railway was through Kicking Horse Pass and down the Fraser River Valley to the terminus at Port Moody, since changed to Vancouver City. Thus Port Simpson narrowly escaped having bestowed on it the benefits which have gone to create the splendid city now so rapidly building up on the shores of Burrard Inlet.

But Port Simpson, or at all events the route via the Skeena River to the Pacific Ocean, is now again attracting the attention of ambitious railway builders and promoters. The developments of the past decade have done much to show that in the northern portions of this province, bordering on the 60th parallel, we possess a mineral country of large extent and marvellous richness. Then, also, to the eastward of the Rockies, the valley of the North Saskatchewan is beginning to fill up with prosperous agricultural settlements, which require only the facilities of an east

and west railway to be multiplied almost indefinitely. The project of a second great transcontinental railway, running through the northern portion of Canada, is now well afoot, and once begun it may be expected to be prosecuted with great vigor.

It is, however, to the head of Kitimaat Arm that the railway promoters now seeking a charter are asking an alternative route, and such are its advantages over the more northerly route that there seems no doubt that it is the real objective point.

With all these prospects of early railway construction in view, the public will be interested in learning some definite particulars of the country the new highway will traverse. The Skeena River from its

Black Jack Town, Capital of Omineca.

mouth to Hazleton, the highest point to which it is navigable by steamers, and where the swift waters of the Bulkley or Watsonquat river join it from the south, is about 175 miles in length, following the sinuosities of the stream. Fifteen miles from the mouth is Port Essington, a small fishing and trading village, and 90 miles above Essington to the westward of the Big Canyon to Kitsalas, where some very important discoveries have been made in gold, silver and copper bearing ledges, and on which some development work has been done, showing the ledges to be of wide extent and the ores of fairly high grade. The channel of the river is broken for the greater part of its course by a myriad of islands. Many of these are subject to overflow at high water, and all of them support a magnificent growth of poplar or cottonwood affording great stores of material for the manufacture of a paper pulp not surpassed anywhere. The valley of the river is wide at many places, and the soil and climate well suited to agriculture.

The geological formation along the Skeena from its mouth to near Kitsumgallum River, which flows in from the north some distance below the canyon already mentioned, consists of gneissic or highly crystalline schists or granite, these rocks belonging to the metamorphic series of the coast ranges. Above Kitsumgallum, mesozoic rocks with occasional granitic intrusions prevail. They are at first almost exclusively volcanic in origin, porphyrites, but further up are largely replaced by hard sandstones and argillites.

A small steamer owned by the Hudson Bay Company plies on this river from Port Simpson to Hazleton, making several trips every summer carrying general freight and passengers, but principally for the purpose of facilitating the Company's trading operations. The river opens for navigation about the first of May, and the Hudson Bay Company's steamer makes her first trip up to Hazleton as soon thereafter as possible. There is a period of high water in June from about the 10th to the close of the month, during which the river becomes a torrent and impossible to navigate. During July and August the water is at its best stage for navigation, the water in September being usually too low to permit the steamer to ascend. By the removal of a number of the most prominent obstructions, a work that would not be very expensive, the Skeena might be made navigable from May to October, and a start was made by the Dominion Government in this work last year, a gang of men being employed all summer at and near the canyon.

The difficulties of navigation, however, must always remain formidable, and the popular route into the country will hereafter undoubtedly be via Kitimaat Arm. Last year the Provincial Government cut out a trail from the head of the Arm across to the Skeena, reaching the river at Copper River, near the Canyon, a total length of 47½ miles, and thence on to Hazleton, a further distance of 60 miles, there is an easy country to go over. From Kitimaat to the Skeena it is a comparatively open country, lightly

Manson Creek showing Dump and Pit, Arctic Slope Co.

timbered with poplar and spruce on the hillsides. The valley of the Skeena beyond the Canyon is wide. For 15 or 20 miles below Hazleton, and for some miles above that point the hills do not approach the river within two or three miles on each side. The land is of good quality for agriculture, and is covered with a light growth of poplar, birch and spruce. Dr. Dawson observes that at the time of his visit, he saw a fine crop of oats almost ripe on July 31 and also abundant crops of potatoes, carrots, cabbage and other vegetables. An old fisherman, located near the Canyon, yearly cultivated about 8 acres, and apples, cherries, plums, small fruits and vegetables of all kinds grow and mature in great luxuriance. Half

way up from the Canyon to Hazleton there is an Indian village close to which the Rev. Mr. Tomlinson, wide areas of excellent land, now occupied here and sion there, has quite a farm under cultivation. He raises some live stock, poultry, etc, and every year reaps heavy crops of grain, hay and vegetables of all kinds. Around Kitsumgallum Lake, out of which the river of the same name takes its rise, there are wide areas of excellent land, now occupied here and there only by a few Indian stragglers. The valley of the Kihoonga River to the north also is wide and fertile, and the summer climate all through these valleys is perfect. It will thus be seen that the region affords opportunities for successful agriculture of a

Prospecting Black Jack Claim, Arctic Slope Co.

most inviting character, and there can be little doubt that before very long, when a railway is constructed, the whole of this land will be taken up and profitably cultivated. The opportunities for stock raising on a more or less extended scale are also considerable. The building of a wagon road from Kitimaat Arm to the Skeena would do a great deal to expedite the development of the district.

The village of Hazleton, situated at the forks of the Skeena, where the Bulkley (or Watsonquah) River flows in from the south, is a point of much importance. The Hudson's Bay Company have had a post there for many years, and besides this there are several other dealers in general merchandise located there. During the winter time Hazleton is made the headquarters for most of the miners who find employment during the summer in the placer mines of the great Omineca district to the east. Bulkley River, from its source to its mouth at Hazleton, must be well on to 100 miles in length. It is through the valley of the Bulkley that the course of the Vancouver and Yukon Railway is laid out, and through this valley and northward past Hazleton must come the railway which will connect the people of the United States overland with their possessions in Alaska. It is a part of the only feasible route for such a railway, and it will afford a line extraordinarily easy of construction considering the mountainous nature of the country it will traverse. Taking all these matters into consideration—the junction of two such important lines, one running northward from the United States into Alaska, with another, the most northerly transcontinental line—it will be seen what an important point Hazleton may yet become.

The valley of the Bulkley is chiefly notable for the extensive deposits of high class coal which are known to exist there. In 1892 Provincial Land Surveyor Poudrier laid out a number of townships for agricultural settlement along the valley of the Bulkley, and from the report which he has made on the district the following interesting extracts are made: "About one-fourth of the whole valley averages from 5 to 10 miles in width, and consists of prairie and open land. These openings have been formed only of late years by fires, the slight growth of timber formerly standing being succeeded by areas of magnificent grass lands. As much as three and four tons of hay to the acre can be cut from these lands."

Dr. Dawson, speaking of these same grass lands, observes that the roots of the grass intertwine and form a sod, so that it would not be killed off by allowing cattle or sheep to crop it closely, as bunch grass is, and an official of the H. B. Co. informs the writer that where the grass has been burned off, timothy and red top have been sown, both varieties doing finely. The soil all through the valley is rich, composed of from 2 to 5 feet of alluvium underlaid with clay sub-soil. The spring opens in April and by May 1st the snow has disappeared as a usual thing. The summer is hot and dry, and light frosts occasionally occur. Oats, barley, potatoes and turnips mature finely. According to the flora of the country,

Giant at Work, Arctic Slope Co.

the valley should have a climate equal if not superior to Quebec, and the summer is longer. In winter the warm Pacific winds clear the snow off two or three times. Of timber there is not much.

The same authority states that the geological formation along the Bulkley from its mouth to its source may properly be determined as belonging to the Mesozoic age and the greater part to the cretaceous. Outcrops of coal occur in different localities along the river and also along its numerous small feeders. The coal is generally a compact, hard and brittle substance of a very dark brown or black color. Different assays made give an average of carbon of 58 to 62 per cent., leaving very little ash,

which is of a redish color, and the coal makes a fine firm coke. The coal possibly belongs to the lower Cretaceous, but more likely to the Jurassic age, as is indicated by the fossil remains. In the mountains adjacent a few seams of low grade galena have been found, and alluvial gold in small quantity in the river banks and bars.

Since Mr. Poudrier's report was made eight years ago, considerable areas of these coal lands have been taken up under license for prospecting, and some work has been done to determine the value and extent of the seams. Two of the seams have been shown, according to the report of a gentleman who

Cut Through Bank, Arctic Slope Co.

inspected them for English investors, to be respectively 17 feet and 12 feet in thickness and to lie in a fairly level bed.

In the development of this north country the coals of the Bulkley are likely to play a large part, not only for use as fuel for railway and other purposes, but in the smelting of the ores already mentioned as existing on the Skeena River, and also those which are known to exist in the great Omineca country to the east.

The trail for Omineca leaves the Skeena at Hazleton—a fairly good pack trail on rising land. A distance of 60 miles brings the traveller to Babine Lake, a beautiful stretch of navigable water 98 miles in length from north to south and 2 to 8 miles wide, abounding in trout, whitefish, ling, etc., and salmon in season. A wagon road portage of 12 miles from Babine Lake to Stuart Lake carries the traveller from the Skeena to the Fraser River waters. Stuart Lake is about 50 miles long from its northern to its southern extremity, and being surrounded with large areas of arable land, a good deal of cultivation is done. From Babine Lake a fairly good pack road 30 miles long, recently improved by the Provincial authorities, reaches north Tatla Lake, which is crossed by a ferry. On the east side of the latter lake there is an immense deposit of conglomerate rock extending all the way up to Bear Lake, a distance of fully 60 miles. This rock is very similar in appearance to the rocks of the Rand, and its similarity is further marked by its being of a distinctly auriferous nature. Free gold in more or less quantities is found all through it, and altogether this gigantic "prospect" is certainly of such an interesting character as to warrant some closer attention being paid to it. A pack trail 28 miles long beyond Tatla Lake lands the traveller across the divide at Tom Creek, whose waters flow northward into the Pacific Ocean. Here one enters the great alluvial mining country of the Omineca.

It was in the late sixties and the seventies that placer mining was most extensively carried on in the Omineca, the miners coming northward from the rich diggings that had been discovered and exploited in Cariboo during previous years. During the decade of 1870-80, the yearly production of placer gold averaged about $35,000 according to the reports of officials. After 1880 mining in the Omineca gradually declined, and it has not been until recent years that renewed interest has been taken in it through the commencement of hydraulic operations on a somewhat extended scale—an interest which now promises to result in a great and profitable industry.

The Omineca district is situated near the 56th parallel of latitude and is in the drainage basin of Peace River. The area within which the greater part of the mining has taken place is scarcely more than 70 miles in greatest diameter, and includes the upper portions of Germansen, Omineca and Manson Rivers and their tributaries, among which may be mentioned Beaver, Quartz, Vital, Duck and Jim May Creeks, which have all been more or less worked. The area is hilly rather than mountainous, and is

43rd Co's Giant

nearly everywhere covered by the dense northern forest. The headwaters of Findlay River have always been considered particularly promising. The "fine" gold, which is found and has been mined along the whole upper portion of the Peace River, has doubtless been carried through the mountains by that stream, and is derived from the wide belt of dark shale and schistose rocks which run along the western flanks of the Rocky Mountains in this portion of their length.

Many specimens of arquerite have been found in the Omineca, particularly in Vital and Silver Creeks. This metal is referred to by the miners as silver, with

which its appearance is identical. It consists of silver combined with mercury, as high as 68 per cent. of the former and 15 per cent. of the latter being returned by the assays. The average would be 3 or 4 per cent. lower in both constituents. In the immediate neighborhood of the gold deposits many large veins of argentiferous galena have been discovered, showing assay values in silver of 30 to 125 ounces to the ton, and an average of 50 per cent. of lead. These leads only await the introduction of facilities for cheap transport and smelting in order to become most important factors in the mining industries of the district.

But the chief interest at present centering in Omineca is based on the splendid opportunities for successful mining of alluvial gold by hydraulic process. Several large companies are already at work there, and something over 200 leases have been granted by the Provincial Government of areas of about 80 acres each for hydraulic mining. The work so far done consists of prospecting the leases and of installing the necessary plant. Next year the actual work of mining will be begun. Among the companies operating —a company, of which Dr. Powell, of Victoria, is a prominent member—has secured a series of hydraulic leases on Vital Creek, and last year some superficial work of prospecting was done. Last season the ground was investigated by Mr. J. Hill, of San Francisco, an engineer of large experience in hydraulic mining in California, who went in via Naas River accompanied by a number of California miners. He spent the whole summer on Vital Creek, and on the report of his operations will depend the character and extent of the plant which it is proposed to install to work the company's properties. During the past three years or more the 43rd Mining and Milling Company have been at work, under the management of Colonel Wright, on their extensive properties on Kildare, Slate and Manson Creeks. They have a long ditch and flume constructed, the former 11 feet wide at the top, 4 feet at the bottom and 3 feet deep, and the flume 6 feet in width and 3½ feet deep. Besides this about 1,400 feet of steel pipes are in place, also two elevators and monitors. Another concern, the St. Anthony Company, is composed of people from Santa Barbara, Cal., and the work is in charge of C. A. Thompson. A large quantity of steel pipe and several monitors are now on the property. Another company operating on Manson and Germansen Creeks with good prospects of success is the Arctic Slope Hydraulic Mining Company, Ltd., under the management of Captain Black, C. E. This company has 28 leases of 80 acres each. Eleven miles of ditch and flume have been installed, besides necessary steel pipe and three monitors. Actual operations in gold saving were only begun in September of last year; but heavy and unexpected frost compelled the suspension of operations before the final clean up was effected. The company's ground has been thoroughly tested during the last two seasons and it is in possession of data now which leave no doubt as to the great value of the property.

Mr. E. G. Tilton, of Victoria, has a property on Manson four miles below Black Jack town, to work which the plant was imported last season and is now on the ground. Three miles of ditch and flume have been constructed and prospects are very fair for profitable work next season. The tests by panning have given most satisfactory results. Altogether the probabilities of the Omineca district becoming an important factor in the mining industry of the province are very bright.

BLAST FURNACE FUEL.*

(By Capt. C. C. Longridge. M.Inst.M.E., M.I.Mech.E., Etc.)

THE best blast furnace fuel is coke, which should be hard, moderately porous, low in ash, and free from dust. Where a highly oxidizing atmosphere is desired, volatile matter is unfavourable, and coke with over 2½ per cent. of such matter is not so suitable. The amount of ash in coke usually varies from 10 per cent. to 12 per cent., and in calculating a charge, the ash ingredients should be taken into account. The quantity of fuel is calculated at so much per cent. of the charge, that is the ore, matte, remelting slag, flux and fuel ash. The percentage of coke used depends on the ore, the flux and the blast pressure. The richer the ore in lead, and the more fusible the gangue and flux, the less fuel needed. A ferruginous charge, therefore, requires less fuel than a calcareous one; and a coarse, open ore, less than a dense, fine one. Again, the use of a strong blast, producing better combustion, tends to reduce the coke consumption. The average quantity of coke used now is from 12 per cent. to 15 per cent. of the charge, occasionally rising to 22 per cent. For matte and smelting the average is rather higher, varying from 16 per cent. to 17 per cent. A variation of as much as 5 per cent. in the fuel consumption may be caused by weather or altitude. As the height above sea level increases, not only is more power needed to compress the air blast to a given pressure, but its expansion within the furnace, and its consumption of heat, and therefore fuel, becomes greater.

Charcoal, made from hard wood and used in lumps, is a good reducing agent for oxidized ores, though not so well suited to charges in which these form only a small percentage. Its bulk, also porosity and freedom from ash tend to keep the charge open, and, therefore, favour quick smelting, without recourse, as in the case of coke, to a strong blast. On the other hand charcoal easily breaks up in handling, and crumbles and decrepitates in the furnaces; hence it cannot bear the heavy burden used in large furnaces. Crushed charcoal, as fuel, is worthless, not only increasing the flue dust, but rendering the slags impure. The average consumption of charcoal is from 20 per cent. to 28 per cent. of the charge, not unfrequently rising to 30 per cent. or even 40 per cent.

Mixtures of coke and charcoal in the proportion of about three to one, make a good fuel for lead smelting, and this mixed fuel, weight for weight, will smelt more than coke alone. Nevertheless, with modern high furnaces of larger size and with slags rich in lime, there are many advantages in using coke alone.

A mixture of coke and coal, in which non-caking or only slightly bituminous coal in lumps, nut or pea size, up to the extent of about 25 per cent. is present, has been used with generally good effect. But the amount of fuel consumed is increased by 1 per cent. or 2 per cent., and the mixture does not appear to work well with ores containing copper and arsenic.

*Mining Journal.

Anthracite of goose-egg size has been used for mixing purposes. When employed to replace 60 per cent. of the coke, the furnace capacity is reduced by 33 per cent., but the working remains normal. With charges containing 7.5 per cent of zinc, this mixture has been found to produce fewer wall accretions, than when coke alone is used.

Wood yields insufficient heat for blast furnace smelting. But dry, hard wood, in 12 inch billets, has been used to replace, to a small extent, charcoal or coke. Wood gas made in the Riche generator is said to be well suited for reverberatory work.

As regards the possibility of applying water gas to the blast furnace, the reader is referred to an article entitled "Blast Furnace Smelting by Water Gas," published by the writer, in *Engineering*, August 17.

THE MINER'S INCH.

THE CANADIAN ENGINEER.

A SERIES of 235 observations were recently made in the hydraulic laboratory of McGill University with a view to a determination of the miner's inch, and the results of these observations were laid before the Canadian Society of Civil Engineers last month in a paper by Thomas Drummond, B. A., Sc. The records will be very useful in the mining regions of Canada as furnishing data for delivering water at mines. The "miner's inch" of water, it may be explained, is an arbitary measure adopted for selling water in mining districts, and is defined as the amount of water discharged by an orifice 1 inch square (or the equivalent fraction of a larger orifice) with a head of from 6 to 9 inches. The variation in the head makes the definition rather vague. In British Columbia it is defined as being 1.68 cubic feet of water per minute, or that quantity of water which will pass through an orifice ½ an inch wide, 2 inches high, and 2 inches thick, with a constant head of 7 inches above the top of the orifice, and every additional inch shall mean so much as will pass through the said orifice extended horizontally ½ an inch. Mr. Drummond points out that as a definition, this is entirely wrong. In the first place, widening the orifice changes the coefficient of discharge, and therefore the discharge itself. In the second place, this orifice actually discharges 2,147 cubic feet of water per minute, instead of 1.68 cubic feet, this brings out a curious point, that certain shaped orifices with a thickness of 2 inches run full like a short tube, the vein is not contracted, and they actually give a greater discharge than they are supposed to give. The shape of the orifice has a perceptible effect upon the discharge. Circular orifices give the least discharge, rectangular orifices the greatest, and square orifices are intermediate. As the rectangular orifices become thinner, the width being the same, it will discharge proportionately more water. A 1x2 inch orifice, 2 inches thick, is just on the margin between flow with contraction and full bore. If fixed in the vertical position, with longest diameter vertical, the vein contracts. If fixed in the horizontal position, with the longest diameter horizontal, it will also contract, but if rubbed with the fingers on the edge it will run full for a time and then contract again. If kept running full in this way, it will discharge about 1 cubic foot of water per minute more than when full contraction takes place.

Mr. Drummond's measurements lead him to the following conclusions: "There are difficulties in the way of delivering absolutely exact quantities of water, and these quantities cannot be measured out as a pound of tea is weighed over the counter. The definition of the module or unit, however, should be correct within a reasonable limit of error. If it is a definition of a single miner's inch from an orifice of one square inch, it should go no farther. If the inch is defined as being some practical part of the discharge from a larger orifice, it should go no farther than the capacity of that orifice, and as it is an unknown quantity to the outside world, the discharge should be given in cubic feet per minute. Convenient discharges are 1½ and 2 cubic feet. The flow under low heads is irregular. Heads of 1 foot or more are not convenient because the water is delivered from ditches or flumes where the depth of water is never great. The question thus resolves itself into a choice of a standard module or unit from a flow under two conditions: (1) With a low head of 6¼ inches above the centre of the orifice, giving a discharge of 1½ cubic feet per minute, with the advantage that it is already partially recognized as the miner's inch, and with the disadvantage that the flow is irregular. (2) With a head of 11½ inches above the centre of the orifice, and a discharge of 2 cubic feet per minute, the flow being much more regular, but the quantity discharged new to the people. Definitions of both inches are given, but the author favours the last.

Definition No. 1 of the Miner's Inch. The water taken into a ditch or sluice shall be measured at the ditch or sluice head. It shall be taken from the main ditch, flume or canal, through a box or reservoir arranged at the side. The orifice shall be fixed vertically at right angles to the delivering water way, and the edges and corners shall be sharp. The vein shall be fully contracted. The distance between the sides and bottom of the orifice and the sides and bottom of the water-way shall be at least three times the least dimension of the orifice. The orifice shall discharge freely into air.

One miner's inch of water shall mean ¼ of the quantity which will discharge through an orifice two (2) inches wide, and two (2) inches thick, made in a two-inch plank, planed and made smooth. The water shall have a constant head of 7¼ inches above the centre of the orifice. It shall mean a discharge of 1½ cubic feet per minute.

In definition No. 2, the first part is precisely the same, the latter part is changed as follows:

One miner's inch of water shall mean one-quarter of the quantity which will discharge through an orifice two inches wide, and two inches thick, made in a two-inch plank, planed and made smooth. The water shall have a constant head of 11½ inches above the centre of the orifice. It shall mean a discharge of 2 cubic feet per minute. A one inch orifice may run full, but no experiments were made on this point. These discharges are from a standard brass orifice, and are actually .478 and 1.997 cubic feet per minute. The discharge through a wooden orifice 2 inches thick is slightly greater than for a standard orifice, these discharges should be exactly 1½ and 2 cubic feet per minute. No attempt was made to reduce the observations to a common temperature. The temperatures for the brass orifice varied between 31.7 degrees and 46.5 degreesF ., a range of 9.5 de-

grees F., with an average temperature of 48 degrees F. The temperature for the wooden orifices varied between 45 and 50 degrees F., with an average of 48 degrees F. The mean temperature for the whole was 45 degrees F.

THE CANADIAN MINERAL EXHIBIT AT PARIS.

ITS SUCCESSES AND HOW THEY WERE ATTAINED.

(By Angus K. Stuart.)

(Continued from last month.)

IRON.—Under this heading are shown 126 exhibits of iron ore and products of manufacure. The greater quantity of the ore exhibits come from Ontario, but British Columbia, Nova Scotia and Quebec are well represented and New Brunswick and the east coast of Hudson Bay also figure in the collection. There are two exhibits of iron manufactures. One by the Radnor Forges, Champlain County, Quebec, shows samples of the bog-iron ore and lake ore, charcoal pig iron of various kinds and wrought iron made from the latter. The second, that of the Nova Scotia Steel Co., New Glasgow, N. S., shows four samples of pig iron, also exhibits of haematite pig iron, basic iron, steel bars, angle iron and the fuels employed. These two exhibits give some idea of the importance of the industries they represent, a fact evidently appreciated by the international jury on metallurgy.

Exhibits of Building Stones and Coal.

The magnetite ores contain several specimens from British Columbia, originating from Barclay Sound, Texada Island and Kamloops. The specimens from Ontario are very numerous, and come from Thunder Bay and the counties of Peterborough, Haliburton, Hastings, Lanark, Frontenac and Renfrew. These were mostly furnished by the Ontario Bureau of Mines. The ores of the same class from the Province of Quebec consist of specimens from Megantic and Wolfe counties; those from Nova Scotia from Annapolis County and Cape Breton. There is also one sample from Nastapoka Island, on the east coast of Hudson's Bay.

Haematite Ores.—The collection of this class of iron ores is made up principally of specimens from Ontario and Nova Scotia. The former province has exhibits from Lake Huron, Michipicoten, Algoma and the counties of Peterborough, Hastings, Frontenac and Lanark, while those of the latter come from Cape Breton, Annapolis County. With the latter exhibit are also shown samples of magnetite from Daiguire, Cuba and haematite from the Wabana mine, New Foundland, also used by the Nova Scotia Steel Company. In this class of ore British Columbia is represented by one specimen from Arrow Creek (Goat River) and New Brunswick by a sample from Jacksontown. Quebec figures also in the list, sending specimens from Wright and Megantic counties.

Limonite and Bog-Iron Ores.—These comprise 13 specimens, of which 10 are furnished by Nova Scotia, British Columbia, New Brunswick and Quebec,

each contributing one specimen. The collection of iron ores also contains specimens of clay iron stone from Alberta; ilmenite, titaniferous iron and magnetic iron sand from Quebec and siderite from Nova Scotia.

With this collection of iron ores are also grouped exhibits of manganese, chromite, tungsten and molybdenite.

Manganese.—This exhibit comes from New Brunswick and Nova Scotia. From New Brunswick is a specimen of pyrolusite from Jordan Mountain, Sussex, sent by the Geological Survey. The Nova Scotia exhibit shows specimens of manganite, pyrolusite and bog manganese. The principal display is made by the Mineral Products Co., of Bridgeville.

Chromite.—The specimens of this mineral come entirely from the Province of Quebec.

Tungsten.—Two specimens, one (schoelite) from Beauce County, Quebec, the other (wolframite) from Cape Breton, Nova Scotia.

Molybdenite.—There are altogether eight specimens of this mineral, from British Columbia, Ontario, Quebec, Nova Scotia and the east coast of James Bay.

Coal.—The importance the coal mining industry has assumed can be well guaged by the fine exhibit made of Canadian coals here. The exhibit has been a great revelation to almost all classes of visitors to the exhibition and perhaps principally to representatives of foreign governments.

The exhibits are from British Columbia, Northwest Territories, Nova Scotia, New Brunswick and the Yukon, and are as follows:

Anthracite.—Exhibit from Anthracite, Alberta.

Bituminous Coal and Lignite.—From British Columbia (1) from the Southfield colliery, Nanaimo, by the New Vancouver Coal Mining and Land Company, bituminous coal; (2) from the Union Colliery Company of British Columbia, Comox, bituminous coal and coke; (3) from the North Thompson River, sent by Messrs. Sarel and Young, Kamloops, bituminous coal; (4) by the Crow's Nest Pass Coal Company, Fernie, samples of bituminous coal from Michel Creek and Coal Creek and coke from Fernie, B. C.

From the Yukon.—(1) Sample of lignite from Cliff Creek, Yukon River, sent by the North American Transportation Company.

From the Northwest Territories.—Samples of bituminous coal from Canmore and Lethbridge in Alberta, and of lignite from the Souris Valley, Assiniboia.

From New Brunswick.—One specimen of bituminous coal from Newcastle.

From Nova Scotia.—This collection contains samples of bituminous coal from the Sydney, Pictou and Cumberland coal fields. The Inverness and Richmond districts are not represented. The exhibits are as follows:

(1) From the Sydney mines, Cape Breton, sent by the General Mining Association, Sydney.

(2) Eleven specimens from the various collieries near Bridgeport, owned by the Dominion Coal Company, Glace Bay.

(3) Two samples from Sellarton, Pictou, shown by the Arcadia Coal Company.

(4) Exhibits of various grades from Springhill, Cumberland County by the Cumberland Railway and Coal Company.

(5) A specimen from the Joggins colliery by the Canada Coal and Railway Company.

(6) Coal from Chignecto, sent by J. Baird.

The exhibits of Nova Scotia coal have had a special importance here on account of there being a very great possibility of creating an export trade of this coal to Europe in competition with the United States coal from Pennsylvania. The rest of the exhibit consists of a specimen of anthraxolite from the Sudbury District, Ontario; one of albertite from the formerly famous Albert mine, New Brunswick, and samples of bituminous shales from New Brunswick and Nova Scotia. Added to these there are two exhibits of peat, one from Welland County, Ontario, by the Canadian Peat Fuel Company, of Toronto, the other from Miramichi Bay, Nova Scotia by the Geological Survey.

Petroleum.—The petroleum exhibits consist of samples of maltha and tar sands from the Athabasca River, sent by the Geological Survey; three samples of petroleum from Gaspe, Quebec, by the Petroleum Oil Trust, Ltd, and a magnificent exhibit by the Imperial Oil Company, of Sarnia, Ont. The latter consists of no less than five samples of crude petroleum and 59 products of distillation, including illuminating oils, benzine and naphtha, paraffin oils, gas and fuel oils, black lubricating oils, wool oils, refined waxes, grease, etc.

Nova Scotia Nuggets.

Minerals Applicable to Chemical Manufactures.—Under this heading are placed exhibits of pyrite and chalcopyrite from Renfrew County, Ontario and Sherbrooke County, Quebec. There are also exhibits of magnesite from Brome County, Quebec, celestite from Leeds County, Ontario and Chicoutimi County, Quebec; two samples of strontianite from Carleton County, Ontario and lithia mica from Wright County, Quebec.

Mineral Fertilizers.—This exhibit consists of specimens of apatite (phosphate) from Ontario and Quebec, among which may be mentioned is a large apatite crystal sent by Blackburn Bros., Ottawa.

Mineral Pigments.—In this group are shown iron ochres and baryta. There are two exhibits of the former, one (soft haematite ore) from Frontenac County, Ontario, the other from Champlain County, Quebec, and consisting of 12 samples of bog iron ore, powdered iron oxides, oxide paints, etc., sent by

the Canada Paint Company, Montreal. Of the latter (barite) there are four specimens originating from Quebec and Nova Scotia.

Salt and Brines.—This collection consists of exhibits showing brines and various qualities of salt suitable for commercial and domestic purposes. Out of six exhibits five come from Ontario and one from New Brunswick.

Asbestos.—This is quite one of the most attractive portions of the mineral exhibit—at least to the ordinary public—few of whom seem to have seen this mineral in its natural state. The exhibitors are the Asbestos and Asbestic Company, Danville, Que.; Bell's Asbestos Co. (Thetford mines) of Quebec and London, England, and Dr. J. Reed, Reedsdale, Quebec. The exhibits show the crude asbestos in rock, the various qualities of fibre, asbestic wall plaster and various manufactures of asbestos.

Mica.—With the exception of one very fine sample of muscovite from the Tete Jeaune Cache, British Columbia, this collection is made up entirely of specimens from Ontario and Quebec. The specimens are mostly phlogopites—an excellent mica for electrical and engineering purposes. Not only is the exhibit an exceptionally excellent one on account of the quality and size of the sheets, but it is interesting also on account of originating almost entirely from phosphate mines worked formerly for phosphate only. The collection is made up of 16 different exhibits, among which may be specially mentioned one of mica boiler and pipe covering by the Mica Boiler Covering Company, of Toronto and Montreal.

Graphite.—This industry is represented by six exhibits of graphite, four originating from the neighborhood of Ottawa and two from Nova Scotia. The exhibitors are the Ontario Graphite Company and A. McLellan, Ottawa, the Walker Mining Company, Buckingham, Quebec, and the Keystone Graphite Company, Grenville, Quebec; P. Waters, Whycocomagh, Nova Scotia and H. MacDougall, Grand Narrows, Nova Scotia. The largest exhibits are those from Buckingham and Grenville.

Other minor exhibits consist of specimens of fireclay from Comox, B. C., and Booklyn, N. S.; felsite from the Coxheath Hills, Cape Breton, N. S.; four specimens of felspar from Ontario and Quebec, sent by the Geological Survey; samples of soapstone and potstone from Brome County, Quebec and of talk from Hastings County, Ontario.

Materials for Grinding and Polishing.—Corundum—This display is made up of corundum, corundum crystals and various manufactures of corundum, emery wheels, etc. The exhibits, which are very exhaustive, are by the Ontario Bureau of Mines, the Norton Emery Wheel Company, the Prescott Emery Wheel Company and the Hart Emery Wheel Company. The natural product comes in each case from Hastings County, Ontario.

Grindstones and Pulpstones.—These exhibits consist of one very large sample of pulpstone from Newcastle, New Brunswick and two specimens of grindstones from New Brunswick and Nova Scotia.

Infusorial Earth.—This exhibit contains samples of infusorial earth and tripolite from Quebec, New Brunswick and Nova Scotia. The principal exhibit is by the Fossil Flour Company, of Bass River, Nova Scotia.

Garnet.—This consists of one specimen of garnet rock from Wakefield, Quebec, sent by the Geological Survey.

Minerals Applicable to Fine Arts and Jewelry.—This collection, though small, comes by way of a surprise even to Canadians. It contains a collection from different parts of Canada of 39 different cut stones and ornaments made by the Geological Survey, among which may be mentioned fine slates of labradorite and sodalite, also specimens of amethyst, lithographic stone, mountain cork and chemawinite (amber).

Materials Applicable to Common and Decorative Construction.—This portion of the exhibit, though to a great extent passed lightly by the general public is by no means uninteresting. The exhibits, which are very numerous, consist of specimens of granite, gneiss, serpentine, quartz andesite, conglomerate, sandstone, roofing slate, limestone, marble, lime, cement, shell marl, gypsum, brick and terra cotta, and come from all parts of the Dominion. The samples of building stone are in the form of cubes having one side polished and another rough dressed. Among these the excellent red and grey sandstones of Nova Scotia and New Brunswick are particularly noticeable as are also several columns of granite from Kingston, Ontario, St. Philippe (Grenville) Quebec and St. George, New Brunswick. The last named is quite equal in quality to Aberdeen granite and has been universally admired. The limestones and marbles consist principally of specimens sent by the Geological survey and the Ontario Department of Mines. There are a few specimens from British Columbia (from Beaver Cove, Texada Island and Kootenay Lake). The exhibits of lime and cement originate from Ontario, Quebec and New Brunswick. The specimens of gypsum and manufactures of gypsum come entirely from New Brunswick and Nova Scotia and give an idea of the importance this industry has attained in these Provinces.

The exhibit of bricks and terra cotta is very small and cannot be said to represent the industry in Canada. The exhibits are from Ontario and Quebec and the principal showing is made by the Milton Pressed Brick Company, of Milton, Ontario.

Quite one of the best features of the exhibit is the large collection of photographs and transparencies illustrative of mining operations of all kinds in every portion of the Dominion. The collection is a very large one made by the Department of Geological Survey, and it has been of great use when explaining mining usages of various kinds to people interested in Canada, and who know little or nothing either of the natural features of the country or the methods employed in any special industry. Among the most prominent and interesting of these views are those of placer mining in the Yukon and Atlin and on the North Saskatchewan River; of the principal gold, silver and copper camps of British Columiba, Nova Scotia and Ontario; of the graphite, asbestos, phosphate and mica industries and of coal mining on the Atlantic and Pacific coasts. There are some specially fine views of Rossland, Nelson and other British Columbia mining towns, also special albums of photographs sent by the mining departments of Nova Scotia, Ontario and British Columbia. The collection of maps, and especially geological maps, is also very large—though maps of the various Provinces and districts on a large scale are not so numerous as they might be. The literature sent over for distribution here was both of a practical and technical kind. The great mistake made, however, was that

unfortunately nearly every publication arrived very late in the day (some, notably the French editions, not until the middle of August) and that too few of them were in French and none, not even the smallest pamphlets, in German. The mistake made in not getting literature prepared, translated and printed and sent over here earlier can only be appreciated by those whose duty it was to distribute it. The British Columbia Mining Report was about the last to arrive. Perhaps some of this delay was unavoidable, but it is sincerely to be hoped that in the event of Canada (or any of the Provinces) ever taking part again in any foreign exhibition, that literature of all kinds will be prepared well in advance. To attempt to advertise or explain the resources of a country without literature at one's disposal is about as easy as sinking a shaft in the sea—especially when an exhibition is visited by large crowds.

Big Samples from British Columbia.

The following is a list of the principal publications sent in connection with the mineral exhibit, some of which (those marked S) were got out specially for Paris:

(S) Descriptive Catalogue (English and French) Geological Survey.

(S) The Economic Minerals of Canada (English and French), Dr. Dawson.

(S) Mines and Minerals of the Province of Quebec (English and French), J. Obalski.

Chromic Iron in the Province of Quebec (English and French), J. Obalski.

Gold in the Province of Quebec (English and French), J. Obalski.

(S) Les Industries Minerales de la Province de Quebec (French), J. Obalski.

Rapport sur les Mines de la Province de Quebec (French), E. D. Ingall.

Mineral Statistics and Mines (annual report, 1898) (English), E. D. Ingall.

Summary Report of the Geological Survey, 1889 (English), Geological Survey.

(S) The Minerals of Nova Scotia (English), E. Gilpin.

The Ores of Nova Scotia (English), E. Gilpin.

The Gold Measures of Nova Scotia and Deep Mining (English), E. R. Faribault.

The Preliminary Report on the Klondike Gold Fields (English), R. G. McConnell.

B. C. Mining Report, 1899 (English), W. F. Robertson.

Apart from these there is a large collection of bound volumes, including complete sets of reports of the Geological Survey, the British Columbia Minister of Mines, the Ontario Bureau of Mines, the Nova Scotia Bureau of Mines and the Department of Mines of Quebec, and many other publications more or less of a technical or scientific nature. As for mining publications, only two have been sent for distribution here—The MINING RECORD, Victoria, B. C., and the British Columbia Review, of London, England, both of which have been of immense service here. The most useful publication by a long way, however is "The Economic Minerals of Canada," by Dr. Dawson. This short descriptive paraph-

let of our mineral resources is exactly suited for exhibition purposes, being instructive and not too technical. It would most certainly be a very good idea to have it widely circulated in the British Isles. Of local (British Columbia) publications only a few reached here—copies of the reports of the Boards of Trade of Vancouver, Victoria and Greenwood.

LIST OF AWARDS.

Class 28—(Materials Relating to Civil Engineering)—Silver Medals (4), Cement—Toronto Lime Co., Limehouse, Ont.; Owen Sound Cement Works, Owen Sound, Ont.; Queenston Cement Works, Queenston, Ont.; and Messrs. Battle Bros., Thorold, Ont.

Class 63—(Working of Mines and Quarries)—Grand Prix (6)—The Geological Survey Department, the Canadian Commission, the Ontario Bureau of Mines, the British Columbia Department of Mines, the Nova Scotia Department of Mines, the Quebec Department of Mines.

Gold Medals—Nickel, The Canadian Copper Co., of Sudbury and Orford Copper Co. (joint); iron and bog iron ore, the Canada Iron Furnace Co., Montreal; coal, the General Mining Association, Sydney, N. S.; coal, the Dominion Coal Co., Glace Bay, N. S.; gold ore, the Montreal Gold and Silver Development Co., Salmon River, N. S.; gold ore, the Le Roi Mining Co., Rossland, B. C.; steel, the Nova Scotia Steel Co., New Glasgow, N. S.; coal, the New Vancouver Coal Co., Nanaimo, B. C.

Silver Medals.—Gypsum, the Albert Manufacturing Co., Hillsborough, N. B.; salt, the Windsor Salt Co., Windsor, Ont.; coal and coke, the Crow's Nest Pass Coal Co., Fernie, B. C.; case gold quartz, Messrs. Jack & Bell, Halifax, N. S.; coal and coke, the Union Colliery Co., Comox, B. C.; collection of minerals, L'Union Industriale du Labrador, Quebec; graphite, the Walker Mining Co., Buckingham, Quebec; asbestos, Bell's Asbestos Co., Thetford Mines, Quebec, mica, Wallingford Bros. & Co., Ottawa, Ont.; granite, Red Granite Works, St. George, N. B.; asbestos, Asbestos & Asbestic Co., Danville, Quebec.

Bronze Medals.—Pyrite and chalcopyrite, Nichol Chemical Co., Capelton, Quebec; pulpstone, C. E. Fish, Newcastle, N. B.; mica from Yellow head Pass, B. C., S. Winter & Co., Moncton, N. B.; mica, Blackburn Bros., Ottawa, Ont.; chromic iron ore, the Coleraine Chrome Manufacturing Co., Montreal; graphite, the Keystone Graphite Co., Grenville, Quebec; drill, the Mac Machine Co., Belleville, Ont.; brick, the Milton Pressed Brick Co., Milton, Ont.

Honorable Mention.—Peat, the Canada Peat Co., Toronto, Ont.; chalcopyrite, the Eustis Mining Co., Eustis, Quebec; infusorial earth, the Fossil Flour Co., Bass River, N. S.; granite pedestal, J. Brunet, Cote des Neiges, Montreal.

Class 64.—(Metallurgy) Gold Medal.—Nickel ores and smelting products, Canadian Copper Co., Sudbury, Ont., and the Orford Copper Co., (joint).

Silver Medals.—Ore and smelting products, the Hall Mines Smelter, Nelson, B. C.; ore and smelting products, the Canadian Smelting Works, Trail, B. C.; manufacture of graphite, the Walker Mining Co., Buckingham, Quebec.

Class 87.—(Applies Chemistry and Pharmacy) Bronze Medal.—Oxide paints, etc., the Canada Paint Co., Montreal.

MEDALS FOR COLLABORATORS.

Class 63.—Gold Medals.—Aubrey White, Deputy Minister of Crown Lands, Ontario; E. Gilpin, Jr., Inspector of Mines, Nova Scotia; W. F. Robertson, Provincial Mineralogist, British Columbia; A. P. Low, Department of Geological Survey, Ottawa.

Class 64.—Gold Medal.—E. R. Faribault, Department of Geological Survey.

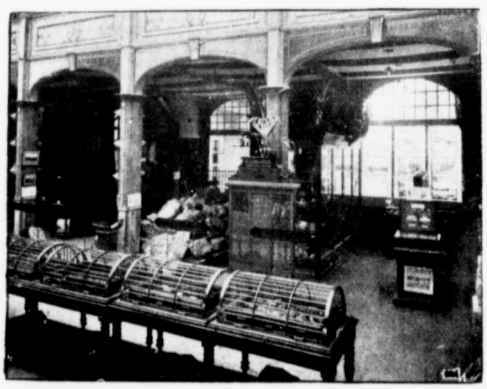
As will be seen from the above list the awards gained in the Canadian mining department were very numerous. At the same time it is rather difficult to fathom the reasons prompting a few of them, and also to account for certain omissions. The juries seem to have done their work very conscientiously, but to have had so many exhibits to judge, so much ground to cover and so little time at their disposal that they were obliged to act somewhat hurriedly. Under the circumstances, therefore, it would scarcely be good taste to make any further comment.

So much for the exhibit itself and its success here. As for the reasons why it has been so successful and has done so much to advertise our mineral resources, it can be safely stated that the greater part of the credit can be given to Dr. Dawson and the members of the Geological staff, who worked under him and who spared no effort to see that every possible branch of our mining industry was well represented. Of course, praise is also due to the Canadian Commission generally, and to the very many helpers and contributors in all parts of the Dominion, but there is absolutely no doubt whatever that the Department of Geological Survey is entitled to the lion's share of thanks—if any is coming—and I would like this fact to be understood in British Columbia.

As for the practical results of the general Canadian exhibition they cannot fail to be greater than your readers and the general British Columbia public have been led to suppose, unless, of course, advantage is taken of the good impression made here in order to float worthless properties. The mere fact that the Paris exhibition is not going to be a financial success is by no means a criterion by which any particular section of it can be judged. Although the figure of sixty million visitors will certainly not be reached (the number will probably total about forty millions) yet the opportunities given here of advertising the resources of a country have probably never been equalled in the world's history—especially on account of the very cosmopolitan character of the visiting public. Of one thing there is no doubt whatever, that is, that the Canadian exhibits here have been a very great revelation to the general public on the Continent, and have done wonders in partially dispelling the utter ignorance about our country, which it has been surprising to find even among the educated classes. Capitalists, government officials and representatives of all kinds of trades and professions have made the most minute enquiries about Canada and its various industries and resources and though it would be an exaggeration to say that the immediate results will be the placing of large foreign capital in the Dominion and increased foreign trade and larger immigration, still there is little room for not believing that these will be the ultimate though gradual sequence of the good impression made here. What appears to be most needed are reliable

commercial agencies on the Continent where practical information could be obtained any time. This is a matter the government might well look into, as the time is ripe for extending Canadian trade beyond its present limits.

Although an immense amount of interest has been taken here in all our mineral productions, the greatest amount of enquiries have been made about our coal, nickel, asbestos, mica, graphite and petroleum. From the extreme number of people of various nationalities continually asking for information about our coal, it appears evident that the present rise in the market price is expected to be maintained in Europe, and that Nova Scotia coal ought to find a ready market on the Continent if suitable ocean freight rates can be obtained. It appears also that Vancouver Island coal should be able to replace English steam coal to a large extent in South America. One of the difficulties experienced, however, has been that owners of mines of various kinds who have exhibits here have furnished little information as to the prices at which they are prepared to furnish



Steel Cases with Placer Gold Specimens.

their product, so that all that could be done has been to put enquirers here in correspondence with producing firms in Canada.

As regards British Columbia mining in general and especially that of a speculative nature such as gold, silver or copper mining, after obtaining as much information as possible from people who have had much experience in the French market it is quite evident that the role of Paris is simply to follow London. In the event of English companies operating in British Columbia or other parts of Canada making a success of their enterprises, French capital will undoubtedly buy up large blocks of their stock. French mining speculators, however, appear to fight shy of purely French flotations, and to prefer companies managed by the businesslike but much abused Britisher. Therefore, although eventually French capital will undoubtedly be invested in our mining securities, it is hardly likely to come first hand. However, some few purely French enterprises of a minor kind may possibly be undertaken. I regret to have to state however that there is every prospect of the smaller French investor being badly fleeced at the start, as many comparatively worthless concerns are liable to try to place their stock here and do us a great deal more injury than good. Several people here have already complained a good deal at not being able to receive information about the operations of local companies in which they hold stock. For the credit of Canadian mining it is to be hoped that any laws protecting foreign investors by preventing rank misstatements in a prospectus and necessitating printed circulars showing the exact financial status of companies and the publication (and distribution to shareholders) of their directors' reports will be most rigidly enforced. One shoddy concern, the shares of which were largely bought at boom prices in Paris last year, has already done British Columbia mining incalculable injury.

To return to the mineral collection: Quite one of the most gratifying features has been the immense amount of interest taken in it by technical people. This was the more noticeable at the period (during the summer months) when a great many Germans were visiting the exhibition. Of all nationalities they seemed to have the greatest thirst for information. The questions they put were all of a practical nature, and it was interesting to remark that few, if any, were without a special notebook for jotting down anything which appeared to be of the slightest value either from a commercial or scientific standpoint. Moreover, each one knew to a great extent, exactly what he wished to find out and wasted no time over the matter. The Germans came in great numbers here, and to all appearances solely for business reasons or to acquire technical information. Whether any special results will originate from all the minute enquiries they have made concerning our resources remains to be seen, but as (to my personal knowledge) the densest ignorance about Canada prevailed in Germany some few years back, the mere fact that our country is becoming better known there is something to be thankful for.

If this article were not already too long (and perhaps uninteresting) it might be pertinent to make some comparison between our mineral exhibit and those of other countries. As, however, it would be impossible to do so without going to considerable length, I will simply mention those which can be considered as rivalling our own. These are the exhibits of the United States, the Transvaal, Western Australia and Siberia. Other countries, have, however, very interesting collections, though on a much minor scale. Among them may be mentioned Hungary, Japan, New Caledonia and Greece.

The United States collection is magnificently "got up." Evidently no expense has been spared in making it attractive. It is, however, more a display of specimens than one of economic minerals. The most attractive portion of it is the special exhibit of the Standard Oil Company, which is a perfect marvel both as to detail and arrangement.

The chief attraction of the Transvaal is a stamp mill, which is always kept running. No matter whether ore or country rock is run through the crowd is equally satisfied, and the average spectator goes away thinking he knows all about gold mining. It is certainly a great drawing card from a purely advertising point of view and few people seem to visit the exhibition without seeing it. The other chief attraction is the effigy of Oom Paul, covered with wreaths and garlands sent by sympathetic people—such as the washerwomen of Boulogne.

The Siberian exhibit gives a very good idea of the very partially developed though enormous and diversified mineral wealth of Northern Asia. There is so much to interest one there that it is almost impossible to pick out any one thing specially worthy of comment without mentioning others. Perhaps, however, the exhibits of gems and gold specimens are the most attractive portions of this display, which is remarkable from every point of view.

The West Australian exhibit is without doubt the best gold mining advertisement in the exhibition grounds. It is practically that and nothing else. The collection consists of an enormous quantity of rich gold specimens of various kinds—among which may be mentioned very many samples of alluvial gold (mostly large nuggets), various oxidized lode formations showing ordinary free gold, "mustard" gold and "sponge gold. A great number of rich quartz specimens, the most interesting being those showing small crystals of gold; in fact, native gold in large quantities. The exhibits are immensely valuable, many of them being worth £100, several a great deal more. The largest nugget is valued at no less than £1,348 9s. There is also a very large display of telluroid and sulphide ores, auriferous pyrites, arsenical pyrites, etc., but the object of the whole exhibit (which is valued at £90,000) appears to be to show gold. There is also, however, a small amount of copper ore, coal, alluvial and lode tin and pearls. For a comparatively new colony, with a small population, Western Australia has a surprisingly large fund to draw on for advertising purposes, and in the opinion of many has hit upon the right plan of making an impression at an exhibition.

There are one or two suggestions and remarks I would like to make if I have not already encroached too much on your space. The Canadian mineral exhibit (or rather the actual arrangement of it) has come in for criticism by some practical mining men who have visited it, principally on account of no exceptionally large display having been made of our British Columbia gold, silver and copper ores, and on account of the court in general having (quite undoubtedly) the appearance of a museum. This to a large extent was unavoidable, as the exhibits were so very varied and numerous, and came from so many different mines, all of which wished for separate exhibition, that it was not possible, practically, to arrange the collection (as it consists) in any other way. What also appears to be a mistake to many is that larger ore specimens were not sent. This to a large extent is true, as crowds are certainly attracted by large exhibits. Big specimens catch the eye, and I am safe in saying that at least one half of the numerous enquiries made about our coal were due to the two enormous blocks sent by the New Vancouver Coal Company and the General Mining Association of Sydney. One has to consider that our resources are but little known and therefore "flaring" displays are needed at an exhibition. As such is the case, I would also suggest, (in the event of this collection being sent elsewhere) that the collection of free gold specimens be greatly enlarged, as for the ordinary masses of visitors this part of the collection is the greatest attraction. There are many other suggestions which might be made, one of which is that if models of gold nuggets are exhibited that they be shown separately from the real article. It may sound like an exaggeration, but as naturally, only models of very large nuggets are on exhibition, the crowd inspects them first, being attracted by their size and finding that they are only models are more disappointed than pleased, and not being accustomed to seeing native gold, come to the conclusion that the whole alluvial gold exhibit consists of models. Now, it is quite impossible for anyone to keep explaining all day long that "only a certain number of the specimens are models," etc.

Of course, in many other minor details it would be easy to profit considerably by the experience gained here in order to somewhat improve our system of advertising our mineral resources, but it is rather doubtful that whatever changes are made at any other exhibition that any greater success will be obtained by our exhibit than has been gained here. The effort made to attract attention to Canada and its hidden treasures has had, as a result, that nearly all who have seen our exhibits have gone away with a totally different idea of our country and the importance of our resources than they had before. This initself should be a compensation for the expense of making this Canadian exhibit the best mineral display here.

B. C. MINES AND THE LONDON MARKET.

THERE has not been quite so much doing in B. C. shares this month but the period under review has furnished several notable incidents, including a new issue by the White Pass & Yukon Railway, a lively meeting in connection with the B. C. Development Association and several sensational movements in the B. A. C. group. As the two first mentioned developments attracted only passing attention it may be as well to devote the space at my command to a few remarks on the Whitaker Wright companies and the rumors which have been afloat concerning them, dismissing general B. C. mining movements with the general remark that on the whole they close a little less strong on balance, this being due in part no doubt, to the disgraceful disclosures in connection with the Stratton's Independence mine, which was dealt in in the B. C. market, and the efforts to revive the West Australian market.

The B. A. C. group of companies have been rather prominent this month owing to the approach of the dividend and meeting period, and the circulation of various rumors concerning their immediate future. Probably the most interesting feature was the perusually supposed to be kept well posted on Mr. Whitaker Wright's intentions—notably the city article of the Daily Mail. A scheme was mooted for amalgamating the B. A. C. with "another leading B. C. Co." So far these rumors have not materialized into anything tangible, but it is highly probable that they have been set afloat as a ballon d'essai. It will not surprise anyone in the know to hear that a shuffling of the cards is imminent. According to all ordinary systems of book keeping the B. A. C. must have made large profits out of the flotation of the Le Roi No. 2, the Rossland Great Western, and the Kootenay mining companies, but then the methods of the group controlling the B. A. C. are not ordinary, and I am afraid that when the accounts are finally presented, the big fat dividend which the shareholders have been expecting will not be forthcoming, and only 10 per cent. paid, as last year, or possibly 15 per cent. The price of the shares has fallen back

to 16s. Another feature was the rumored intention to put forward proposals for amlgamating the Le Roi and the Le Roi No. 2. This may or may not have any foundation in fact, but it is significant that the purely artificial price of the latter remains at about £25.

The feature of the month, however, was the attack on Le Rois, particularly virulent at the beginning of this week. Mr. Whitaker Wright, as you will have learned from recent letters, succeeded in punishing the bears of the Le Roi No. 2 very severely and latterly he has been doing a little in the same line to keep in check those who have all along periodically attacked his Westralian interests. It was said to be in revenge for this latter that his relentless foes essayed the task of knocking down the price of Le Rois. Coming as it did when the group was unprepared, the attack had a marked effect, and Le Rois, on Monday afternoon, the 3rd inst., were offered at under £7. When the first shock of surprise was overcome support was forthcoming, but the price at the time of writing is no better than £7½. Tuesday morning's City articles were interesting reading. For instance the Daily Mail financial editor, who follows the Whitaker Wright movements very closely, put forward the following:

"The sharp fall in Le Roi shares was imputed solely to an organized attack by the bears, who had been caught somewhat severely by the rise in Lake Views. There was no other reason whatsoever. The meeting of the company will be held before the end of this month, when a dividend will be declared on the year up to the end of June, and, we understand, an interim distribution for the period which has since elapsed. In the five months since June 30th it is understood that the profits have been at the rate of 25 per cent. on the capital. Other British Columbians were to some extent influenced by the decline in Le Rois, which, however, closed well above the lowest point touched."

Another inspired "market correspondent" addressed himself to the Financial Times in the following language:

"You recently published an interview with the Hon. C. H. Mackintosh with respect to the Le Roi, in the course of which he gave some interesting information concerning the mine. Since then much has happened. Lake Views, contrary to bear predictions, have gone up in price, and, according to market experience, the bear clique, disappointed in desistence with which in certain quarters which are pressing Lake Views, this morning commenced banging Le Rois. This, in the absence of 'shop' support, was not difficult, and for a few moments the market manipulators got the stocks down to £7 sellers—a fall of ⅜ in less than ten minutes. Then the market steadied itself and the share closed round about 7½. It is believed in the House that the shop is a big bull of Le Rois; and the Lake View bears were of opinion that by banging Le Rois they would cause the shop to have considerable differences to meet and so indirectly aid their raid on Lake Views. The raid has not been so successful as they anticipated, and holders of Le Rois should bear the following facts in mind:

The Le Roi meeting will shortly take place—possibly on the 17th inst., when a final dividend will be declared. What this dividend will be is not yet certain, but it must not be forgotten that the accounts will be made up to the 30th of June only. Up to that period all the great cost of new machinery, development and the securing of the Northport smelter will have been included. From that date all is plain sailing, and I am assured that the company will be able to pay 25 per cent. per annum for many years to come. This should mean a substantial interim dividend also. With the inside knowledge in my possession I am aware that the total cost of mining and smelting does not exceed $7 per ton, and that the mine, with the new hoisting plant just installed can put out 1,000 tons per day with a net profit at the lowest estimate of $5 per ton.

"This is not reckoning among some 150,000 tons already shipped several tons of very high grade ore lying at the Northport smelter ready for treatment, and which goes from 2 ozs. to ½ oz. of gold per ton, or to the large quantities of equally rich ore at the mine, and not yet shipped.

"Knowing these facts, I feel it my duty to place them before your readers. The Le Roi has vast and practically inexhaustible bodies of ore in sight, and, as Mr. Mackintosh remarked just before returning to Rossland, 'The mine will outlive me by many years.'"

Now you will notice that on the same morning and after the attack in several material points the two correspondents curiously agree, viz., in the early approach of the meeting, the payment of a dividend for the year, and possibly an interim dividend as well, and the fact that the company is now on a 25 per cent. dividend basis.

COMPANY MEETINGS AND REPORTS.

KOOTENAY MINING CO., LTD.

AT the first ordinary general meeting of the Kootenay Mining Company, Limited, the chairman, Mr. Sinclair McLeay, said: "As this is the statutory meeting, required by law to be held within four months of registration, I have little to say to-day beyond reporting progress, and the fact that everything in regard to the company is in a very satisfactory condition. As you are aware, the company offered its capital for subscription in July last, and I am pleased to be able to state that it was all subscribed in cash, and the shares were allotted to about 2,000 applicants. Owing to the success of the issue your directors paid the purchase consideration to the vendors in cash, and allotted the whole of the shares to the subscribers, who, no doubt, have been gratified with their allottments. The company has been placed in unencumbered possession of the property, which, as you know, embraces over 126 acres immediately contiguous to the established Le Roi mine. There has probably been more development work done on this group of mines than on any other group in Rossland—not excepting the original Le Roi—and enormous bodies of ore have been exposed. It is true that this ore is of a lower grade than that of the other groups, but the quantity is so great, and it can be mined so cheaply, being practically a quarry, that the ore output need only be limited by the capacity of smelters to treat it. In regard to this question of smelting I have reason to believe that proposals of an interesting character will be put forward at the forthcoming meeting of shareholders of the Le Roi Company, not only in the interests of that

corporation, but of its sister organizations; in fact, the ore bodies of Rossland, in the Le Roi, and its sister companies, have developed beyond the most sanguine expectations of the directors, and it would appear that the group of companies, of which this is one, are practically all on one great vein or copper deposit that runs through the Rossland Camp. I cannot forestall suggestions that may be made at the Le Roi meeting, but I can assure you that you are the owners of a most valuable property, and that in my opinion you will have no occasion ever to regret having subscribed for the shares. They stand at a substantial premium, and this is not so much due to the oversold condition of the market as some people imagine, as to the remarkable developments of the mines. These Rossland groups combined would give promise of proving a second Anaconda or Rio Tinto. I congratulate you on the position, and I have great faith in the future of your undertaking. (Applause).

WHITE PASS AND YUKON RAILWAY.

At the third ordinary general meeting of the White Pass & Yukon Railway Company, Ltd., the chairman, in the course of his speech, said: "I can assure you that in our opinion the progress that has been made and the prospects of the undertaking are very satisfactory. You will remember that I told you, when I had the pleasure of addressing you about a year ago, that it had been determined to extend the line from Bennett City to the foot of the White Horse Rapids, so as to avoid waste of time and money involved in unloading freight from the Upper Yukon steamers on to the tramways, and reloading it on the Lower Yukon steamers, so as to deliver goods at a point where there is unimpeded navigation for steamboats to Dawson City and the mouth of the Yukon. This extension, a most important link in our system, has now been completed, and since early last August through trains have been running from Skagway to White Horse—a line of 112¼ miles. At White Horse the trains connect with the steamers of the Canadian Development Company, with which company an advantageous through traffic agreement has been made. I wish to express our sincere thanks to the Pacific Contract Company for the excellent manner, as well as the expedition with which their work has been carried out, as certified by Mr. Hawkins, our chief engineer, to whom was entrusted, by the contractors, the arrangement of all details of construction, and the work was carried out under his supervision and to his specification. I should also be neglecting my duty if I did not place on record the high appreciation we feel for the services of all our staff, and to express our sincere gratitude for the zeal and devotion they have shown, often under circumstances of very great difficulty. I should wish, also, to congratulate the shareholders upon the undoubted success of the enterprise in which we are interested. The indications that are before us seem clearly to demonstrate that it must result in a great success, both financially and commercially. From many points of view we may regard our enterprise with pride and satisfaction as a monument of scientific progress and engineering skill. I should like to call your attention to the balance sheet which is laid before you. With regard to the debentures you will remark that there are three issues of debentures made by the company, all carrying interest at the rate of 6 per cent. We have successfully arranged to convert these three issues into one consolidated issue of 5 per cent. debenture stock, affording us a considerable saving of interest. Holders of £435,000 out of £469,000 of securities actually issued have so far signified their intention of exchanging from the 6 per cent. to the 5 per cent. A public issue of this consolidated stock will be made in a few days, and considering the very large margin of profit in excess of the amount required to pay the interest on the debenture stock, we anticipate it will be well taken up. The balance of profit and loss account is £83,315, sufficient to have paid a satisfactory dividend, but this, in accordance with the sanction of the meeting last year, has been expended in the further construction of the railway. During last year we published in the English press particulars of the weekly traffic earnings as they were cabled to us from the other side; but, after very careful consideration, it was decided that it was not desirable in the interests of the shareholders or of the public to continue the practice this year, because any such publication would of necessity be misleading. For one thing, the contractors had an interest under their contract in the net earnings of the second portion of the line until it was completed and accepted from them on behalf of the local companies, and consequently the weekly earnings that could be published would not give a fair indication of the benefit that their company would derive from such earnings. And another thing, our railway is peculiarly circumstanced. The earnings during the months of open navigation on the Yukon are very large compared with the earnings during which time navigation is closed, and to publish the traffic during the busy months would, to the unitiated, give a totally false impression of the earning capacity of the enterprise for the whole year, and any one buying shares in ignorance of the fact that the traffic returns drop off almost entirely during the winter months might well have cause to complain of not being warned. It is proposed also during the winter months to overhaul and revise the traffic rates in time for the heavy work that we anticipate in the summer. When the railway has run for some little time, and it becomes a well known fact that the traffic returns for the very few busy months in the summer are not to be taken as an average for the whole year, we may revert to publishing the traffic returns. I am glad to say that the earnings have been very satisfactory, and I will go further and say that I believe that when the accounts of the local companies come to be made up at the end of the year, it will be found that the net earnings of this year, after deducting all charges for operating and maintenance, have exceeded £200,000. A considerable amount out of the earnings of this year may not be collected until next spring, for the earnings on through freight are not collected until the consignees at Dawson and elsewhere take delivery of the goods. Thus, at the present moment, there is not the cash in hand to pay an interim dividend, but it is hoped when all the earnings have been converted into cash, that it may be found possible to pay a dividend of perhaps 5 per cent. this winter or early next spring. (Applause.) From now on, however, unless anything very unforseen occurs, the net income should be available for dividends and reserves, for unless conditions in the Yukon change very rap-

idly there is no present intention of extending the railway beyond White Horse."

ARCTIC SLOPE HYDRAULIC MINING COMPANY, LTD.

The second annual meeting of the Arctic Slope Mining Company, Limited, which is operating on Manson and Germanson creeks, and Findlay river, in the Omineca country, was held on the 10th Dec., in the Board of Trade building, Victoria. The officers of the company were re-elected. They are as follows : President, Hon. F. Peters, Q.C., Victoria; vice-president and treasurer, Capt. Wm. Grant, Victoria ; secretary, Donald Fraser, Victoria ; manager, Capt. C. N. Black, M.E., Victoria ; directors—Hon. T. R. McInnes, Hon. F. Peters, Q.C., Capt. Wm. Grant, R. Erskine, Sir C. H. Tupper, Q.C., Victoria; G. C. Hinton, Vancouver; Col. S. W. Ray, Port Arthur.

The second annual report of the company, which was adopted at the meeting, says :

"Our staff left Victoria for Omineca in February, expecting to begin operations as soon as the weather would permit and arrangements were made for getting in our machinery and supplies at an early date. But owing to the quantity of freight going into that country, and the construction of the telegraph line to the Yukon and the transportation of the material for the line to Manson, which will be completed next year, our supplies did not arrive at Manson until late in the season, as will be seen by the reports.

" The delays in carriage of machinery which defeated the operations of the company last year and greatly retarded them this year cannot occur in future now that the plant is on the ground and some of it in actual operation. The supplies which were intended for use this season are also on the ground for next year. It will be seen from the several reports that our properties are much richer than ever we expected. These reports are confirmed by disinterested persons who have been in close touch with our properties during the past season.

" Mr. Loveridge, shortly after his arrivel in Omineca, made a report. The following are a few extracts from it :—' I had talked with a number of persons in regard to these properties during the last three years, but had no idea they were so extensive as they are. Either property is large enough to give many years work for all the water that can be put on them. I am quite positive there is is an old channel commencing above the junction of ' Black Jack ' and Manson Creek, and extending for a distance of about two and a half miles to Lost creek. This channel in some parts is from a half to three-quarters of a mile back from Manson creek. Where Lost creek crosses the channel, I am informed, $105,000 was washed out in a very small section of the creek. This gold undoubtedly came from this old channel. Every ravine which makes its way to Manson creek from this channel have been rich, and every bar and bench at the mouths of these ravines have been worked back to where the ground was from 10 to 14 feet deep. This was all done with pick and shovel, and in those days provisions were $1 per pound. Even on top of this channel work was done in the surface in the early days. All this indicates that this old channel will prove rich. It has done so at both the upper and lower ends, where it could be got at, and I think it will prove to be the same all the way through. On the other side of Manson creek there is another old channel. This has been proven by the many tunnels run in from the side of the creek. Some of these were from 300 to 400 feet long, and in every instance the bedrock pitched into the hill. From surface indications I do not think this channel is as long nor as wide as the channel on the right side of the creek. The gravel will be from 80 to 125 feet deep. It is readily washed and there are not many rocks. There is fair dumping facilities for both channels. By putting on all the water we can possibly obtain, we could not work out these two blocks of ground in thirty years. In your Manson creek property alone you have an immense hydraulic proposition, admirably situated as regards water, pressure and dumping facilities. What I have said in regard to Manson will cover the Germanson creek ground also, running parallel with the creek. The rim of bedrock between this old channel and Germanson creek seems to be thinner than that which separates the old channel on Manson creek from the creek. At quite a number of places this rimrock has slid into Germanson creek and left the channel gravel exposed. Wherever the gravel slid into Germanson creek and formed bars, they have all proven rich, and the gold has undoubtedly come from this old channel. We intend to do some work this summer on the lower end of this channel, where it comes out into Germanson creek. The gravel will be over 100 feet deep, and there are millions of yards of it lying very favorably situated for working by hydraulic process. I do not think you have any idea of the value and extent of the property in which you are interested. I only know of one hydraulic property in California which can compare with it in quantity of gravel in sight."

"Our properties, as you will see, are capable of great expansion, the ground and water supply being practically inexhaustible. Additional machinery could now be worked with good advantage, and there is no doubt this is the policy the company should adopt. The shareholders will have an opportunity of deciding whether at least a part of the machinery recommended by the manager may not be purchased. Owing to the tools and supplies being so late in arriving, our manager was unable to do any prospecting work at Pete Toy's Bar. We have reason to believe these claims are rich. It is very gratifying to contrast the present rate of freight with the rates paid in former years for transportation into Omineca. The pioneers paid as high as one dollar per pound. In 1896 the Omineca Consolidated paid 26 cents, in 1899 17 to 25 cents, this year 12 cents from Victoria to Manson with a prospect of still further reduction in the future. The reduction in freight, better roads, and now the construction of the telegraph line all tend to bring mining in Omineca a more profitable investment than it has been in the past. Railroad communication cannot much longer be delayed, even now some movement is made in that direction.

"F. PETERS, President."

FINANCIAL STATEMENT.

RECEIPTS.

Treasury shares sold	$16,859.00	
Gold recovered	3,335.32	
		$20,199.32
Liabilities current		13,934.80
Debentures guaranteed for Omineca Consolidated, due May 1		8,570.00
Total		$42,879.12

EXPENDITURE.

Wages, freight, plant and supplies	$28,802.55
Provincial government	3,288.00
Omineca Con. for Nansen creek claims	8,750.00
Accounts due to the Company	1,341.38
Expense acct. including incorp. fees	697.19
Total	$42,879.12

The assets of the company are as follows :—28 Mineral claims of 80 acres each, 2,440 acres, and 6,000 Miners' inches of water rights.

14½ miles of ditch	$35,500
Hydraulic plant	5,500
Saw mill	2,850
Saw logs	3,860
Electric light plant and tools	1,560
Opening mine, lumber and buildings	1,450
Supplies on hand	1,805
Accounts as per general statement	1,341
Total	$53,866

THE HIGHLAND (KOOTENAY, B. C.)MINING CO., LTD.

At the first ordinary general, or statutory, meeting of the above-named company, held at Winchester House on Nov. 19, Mr. Charles Edward Shepheard (chairman of the company) said: Great progress has been made with the equipment of the mine, and we are considerably in advance of the stage usually reached by a mining company after only four months existence. The company was registered on July 20 with a capital of £40,000 in £1 shares, and the prospectus was issued four days later. It was therein stated that the directors would not go to allotment on a less subscription than 24,000 shares. We went to allotment on July 30th with 25,007 shares subscribed, and since that date we have alloted a further 7,050 shares, bringing up the total shares subscribed for to 32,057. All these shares have been paid up to the extent of 15s., and several holders have already paid in full. The company has paid its own expenses of formation, and has incurred no promotion expenses whatever. There are no vendors' shares, and every share issued has been paid for. From the first everything in connection with the company has been paid for in cash. We bought the property for a cash price of £15,500, the negotiations being carried through by Mr. E. Woakes, who obtained a reduction from the original price of more than £5,000. We have paid for all the expenses of equipment, as they fell due, in cash, and arrangements have been made to similarly meet all existing contracts. After paying for everything so far as can at present be estimated, including additional ground acquired, we shall be left with a very satisfactory balance in hand. The property we originally acquired, which is all Crown-granted, extends to about 100 acres, but since then we have added to it two more claims covering, so far as we can judge at present, from 70 to 80 acres more. The smaller of these is the piece of ground adjoining the mill site which Mr. Woakes, recognizing its value to us, staked out under the name of the Rubber Neck, just before other parties who were after it. We are indebted to him for thus getting it without payment. The other claim, which we believe is upwards of 50 acres, is known as the Kootenay, and a glance at the plan will show you its value to us.

The chairman then proceeded to read extracts from a report, dated October 31st last, of Mr. Woakes,s. This report was most encouraging and comprehensive. "We believe," says Mr. Woakes, "that the Highland Mine does possess the conditions necessary to make a successful low-grade proposition. The mine is situated 1,200 feet above the Kootenay Lake, with which it is now connected by an aerial tramroad 4,600 feet long. The concentrator is situated on the shores of the lake where a wharf has been erected so that all ore can be taken directly from the lower levels of the mine and placed on barges on the lake at a probable cost of 20 cents a ton. When once the mine has established itself as a regular and large shipper it is believed that better rates can be obtained than have at present been offered. The former owners of the property had every confidence in the mine, and had spent quite large sums on its development; they, however, saw that to work it on a large scale so as to produce adequate profits would require a further considerable outlay of capital. Work was started at the mine on August 10th, the idea being to start to ship clean ore as soon as possible in order to take advantage of high prices now ruling, while due regard was taken for the future working of the mine. Everything is in a most forward state, and I hope to be able to cable you before the date of this meeting that ore has been shipped.

THE MONTH'S MINING.

REVELSTOKE.

(From Our Own Correspondent.)

THE report that the Prince Mining Co. had struck ore in their Standard Basin property turns out to be correct, and word has reached us that the copper vein has been cut in the lowest or No. 3 tunnel 150 feet below where it was found in the upper workings, so leading us to the conclusion that the ore body is probably continuous. This large property will make a good producing mine yet, but it will take time and work, and arrangements are now in progress to increase the working staff to prove up the vein with all reasonable speed.

THE BIG BEND.

With this exception the Big Bend district will be practically idle this winter, hence for any mining news it is necessary to look into the Lardeau, which is and will be busy enough.

In the more westerly part (the Fish River district) and particularly on Lexington Creek, there will be a good deal of work to be done this winter by the Imperial Mining Co on their numerous properties, more especially, perhaps, on the Imperial and Eagle groups. It is on one of the claims owned by this company that the free milling gold has been found in very considerable quantity, but the other known veins which are in the neighborhood will surely prove equally valuable when sufficient work has been done on them to make them shippers.

FISH RIVER.

The Lardeau River, with its numerous forks and tributaries will also see a lot of work this winter. The Silver Cup owners stated some time ago that they intended to ship 700 tons or so, but as they have followed up that statement by practically closing

down the mine it is possible that so much will not be accomplished. The reason for cessation of work is probably that it will be so much cheaper to ship the ore by the now assured railroad that it is more economical to wait a while.

The Nettie L. has not quite such a long haul, and the manager still hopes to get out fully 1,000 tons this season, though the hauling, freight and treatment amount to so high a figure that the ore has to be sorted carefully to make much profit.

Speaking of the cost of freight and treatment—for smelters always combine the two, it seems absurd on the face of it that the smelter should charge more for treating the ore as it increases in richness. They have less material to handle and consequently less loss with an ore carrying, say 70 per cent. lead compared with an ore carrying only 10 per cent. and yet the charges for treatment in the case of the 70 per cent. ore will be about $12.00 per ton more than the 10 per cent. The object seems to be to let the owner get as little as possible out of his ore, and for the smelter to take all the profit. A little wholesome competition, such as is already more than spoken about, might greatly help to alter this state of things. By way of illustration the following is an estimate for smelting made by people who didn't want to grab the whole of the values:

SMELTING CHARGES.

$14.00 per ton for ores carrying 10 to 15 per cent. lead.

$10.00 per ton for ores carrying 20 to 25 per cent. lead.

$2.50 per ton for ores carrying 35 to 40 per cent. lead.

And a premium of $5.00 per ton for ore carrying 55 to 60 per cent. ,,

There are, of course, intermediate values, but the above is a fair sample of the terms offered, and they are much more reasonable than the present method of fining the owner for everything he has in the ore till it looks as if country rock was the only thing the smelter needed. However, this cannot last for ever, as competition is sure to arise, and unreasonable charges will be a thing of the past.

CARIBOO.

(From a Correspondent.)

The Chicago National Mines Development Company have secured the Dutch Hill Mining Company's property at Big Bar, 42 miles northwest of Clinton, on the Fraser. They propose to install hydraulic power.

BOUNDARY DISTRICT.

(From Our Own Correspondent.)

Up to December 1st there had been smelted at the Granby Company's smelter, at Grand Forks, about 48,000 tons of ore. The first furnace was blown in on August 21, and the second on October 13. Each furnace has been in continuous operation ever since it was started. As the ordinary daily run is from 600 to 650 tons, it is estimated that about 20,000 tons will be treated during December. This will make the aggregate for rather more than four months about 68,000 tons. Nearly all of this ore is from the Old Ironsides, Knob Hill and Victoria groups of mines, situate at Phoenix, about 17 miles from the smelter; mines and smelter being connected by the Canadian Pacific Railway Company's Columbia & Western Railway, which was built into the Boundary district in 1899. Shipments of ore from these mines to the smelter commenced on July 11. Until August 24 five 30-ton cars per day were shipped. From August 24 until October 16 ten cars per day were sent out. On October 17 shipments were increased to 20 cars daily and this output has since been regularly maintained. The latest announcement is that the ore trains, which had previously included only ten cars each, have been increased to eleven cars. Two trains are run daily, so that twenty-two 30-ton cars, equal to 660 tons of ore, are now sent out every day. Including an extra train run on one day in November, the tonnage from this group of mines to the end of December will stand about as follows:

THE SMELTERS.

	Tons.
For July	3,150
For August	5,850
For September	9,000
For October	13,800
For November	18,300
For December	19,500
Total	69,600

There have been received at the smelter from other mines smaller quantities, say 10,000 tons in all. The ore is reduced to a matte containing 50 per cent. of copper. Most of this matte goes to New York, to be refined in Eastern refineries, and the remainder to Swansea, Wales. The first matte was shipped on August 29. Between 1,700 and 1,800 tons of matte had been sent out by the middle of December. November was the first month during which both furnaces were in operation for a full month and in that month 18,050 tons of ore were smelted and 704 tons of matte shipped. Although the nominal treatment capacity of the furnaces is but 250 tons each, owing to the singularly favourable character of the ore, which is self-fluxing, as much as 764 tons of ore have been run through the two furnaces in 24 hours, this constituting the record run to date.

The British Columbia Copper Company's smelter at Greenwood is nearing completion, but there is still little probability of its being in regular operation until after at least another month. Most of the plant and machinery has been received and the work of installation is well forward in all departments excepting in the sampling mill, where there is still much to be done with the machinery already on the spot, whilst the engine to furnish motive power for it has not yet arrived. The blast furnace is practically finished, the blast pipe is being connected from blower to furnace, and the water service is ready for connection with the water jacket of the furnace. The blast furnace house and the big dust flue have been completed and the 90-foot steel smoke stack has been raised. In the boiler, blower and engine house there is but little more to be done, the big boilers having been built in, blower and engine put in place and the dynamo and other electric light plant is being installed. About 5,000 tons of ore have been received from the Mother Lode mine and the Crow's Nest Pass Coal Company has been notified that a considerable quantity of coke is wanted, so as to have about a month's supply on hand when the furnace shall be blown in.

The Standard Pyritic Smelting Company is also busily engaged in installing its plant, which work is being done under the direction of Mr. James W. Neill, who for many years was manager of the Taylor & Brunton Ore Sampling Company, of Salt Lake, Utah, his connection with which he recently severed. The smelter buildings and ore bins are about finished and a spur has been put in from the Columbia & Western Railway. The trestles for the railway track up to the ore bins are being framed and will be raised by the end of December. The two 80-horse power boilers, feed water heater, blower and engine are in place, the sampling machinery is being put in and the furnace erected. The 250-foot flue dust chamber will be finished by the close of the year, by which time, too, the 100-foot steel smoke stack will have been raised. An electric light system for 180 lights is ready for installation. A dam has been placed across Boundary Creek and half a mile of ditch and flume have been constructed for water supply purposes. The general office and assay office have been built and the latter fully equipped. No definite date can yet be given as that upon which these works will be ready to make a start, but it is hoped that it will not be later than February 1. Meanwhile the company is arranging for a supply of ore.

ORE SHIPMENTS.

The Boundary district ore shipments to December 31 will total about 102,000 tons in the following approximate proportions:

	Tons.
Old Ironsides, Victoria and Knob Hill	69,600
B. C.	18,500
Mother Lode	5,000
City of Paris	3,500
Golden Crown	2,000
Winnipeg	1,200
Athelstan	1,200
North Fork Properties	700
Unenumerated	1,000
Total	102,700

The suggested increase in the output of the Old Ironsides and Knob Hill group, referred to last month, is not likely to take place for three or four months, there being no reasonable probability of the treatment capacity of the Granby Company's smelter being doubled within that time. Shipments during January from the producing mines of the district should be about as follows: Old Ironsides and Knob Hill group, 21,000 tons; B. C., 3,500 tons; Mother Lode, 3,000 tons; and possibly 1,000 tons from all other sources, or a total of 28,000 to 30,000 tons for the month. February should see an increase of quite 35,000 tons in all, for the Mother Lode should have its large hoist at work by the end of January, in which case the February output of that mine should be about 10,000 tons.

There is not much to be written of the Old Ironsides and Knob Hill group this month outside of mention of the fact that these mines are steadily maintaining a large total output and giving employment to about 250 men. Much more extensive mining operations are projected, but these are not likely to be undertaken until next spring. The resumption of work on the Dominion Copper Company's Brooklyn and Stemwinder mines at Phoenix, to which brief reference was made last month, has taken place. Both mines have been pumped out and development work is now in progress. A crosscut is being run at the 250-foot level of the Brooklyn southwards towards the company's Idaho claim, which adjoins. It is inintended to crosscut about 435 feet. The power plant at these mines is to be added to shortly, and after this shall have been done the working force of men will be increased. Some incorrect statements have been published lately to the effect that a controlling interest in the company had passed to a syndicate of New York capitalists represented by Mr. James Breen, formerly of the Trail and Northport smelters successively; also that the management intends erecting a smelter on the Kettle River south of the international boundary line. The writer has been informed by a prominent stockholder in the company that though Mr. Breen has acquired a large interest in the company he is not the representative of New York capitalists in this connection. The leading stockholders in the Dominion Copper Company include, besides Mr. Breen, influential Toronto men, among whom are Hon. G. A. Cox, president of the Canadian Bank of Commerce; Mr. J. W. Flavelle, a director of the same bank, and Mr. B. E. Walker, its general manager; Mr. Robert Jaffray, president of the Toronto Globe; Mr. E. R. Wood, managing director of the Central Canada Loan & Savings Company, Toronto; and Messrs. Mackenzie, Mann and Holt, the well known railway contractors. Mr. J. E. Boss, formerly of Spokane; Mr. E. J. Roberts, of the same city; Mr. Pat Burns, of Calgary, N. W. T.; Mr. W. T. Smith, of Greenwood and Mr. George W. Rumberger, mayor of Phoenix, are also largely interested in the company. As to the smelter, the assurance is most definitely and distinctly given that should the company build a smelter—which though probable, is not as yet warranted by the limited amount of development work it has so far been practicable to do in its local mines—it will be built in British Columbia and will have in addition to adequate facilities for the reduction of ore on a large scale, all the requisite plant and apparatus for turning out copper ready for the use of those requiring this metal for manufacturing purposes. Mr. J. E. Parker, for some time superintendent of the North Star mine in East Kootenay, is now in charge of the Brooklyn and Stemwinder mines. The Snowshoe, also situate near Phoenix, is adding to its power plant and is pushing on with development. It is anticipated that after the managing director, Mr. Anthony J. McMillan shall have conferred with his co-directors in London, whither he went last month, operations at the mine will be on a larger scale than at present.

Wellington Camp is not making a good showing at present. The Athelstan has ceased sending out ore for the time, its limited development not admitting of continuous shipping of ore except in small quantities. The Winnipeg is getting in more plant and conditionally that stockholders respond freely to the call made for funds, should soon be fairly started upon a course which will prove whether or not it can be made a profit returning mine. The Golden Crown is awaiting the provision of more capital ere work of much importance can be done on it.

Central Camp is to be the scene of more activity. For some time past the City of Paris has been sending out a little ore, but it was the only property in the camp at work. Now the No. 7 is keeping it

company, but not much can be done at this time until after snow shall have fallen to allow of machinery being hauled up the steep grades of the road to it. An air compressor reached Greenwood and a boiler is on the way in. It is hoped that before February closes this mine will be equipped with machine drills and steam pumps and hoist. It is owned by some of the more prominent stockholders in the British Columbia Copper Company, which has expended so much money in developing the Mother Lode mine and in establishing a smelter at Greenwood.

In Summit Camp the B. C. mine is continuing development work and steadily maintaining its output of ore, which by the end of December will have totalled nearly 19,000 tons of the highest grade of copper ore yet sent to the smelter in quantity. The main shaft is now down nearly 400 feet and a level is being run at about 380 feet depth. A district newspaper lately published a statement to the effect that the owners of the B. C. had acquired an option on the Athelstan, above referred to, but at the time of writing, their resident representative states that he knows nothing of it. The R. Bell, also in Summit Camp, is still at work with results stated to be encouraging.

It is stated that the Blue Bell and J. S. claims have been bonded for $67,000.

The Mother Lode, near Greenwood, is now making a very fine showing of ore at both the 200 and 300 foot levels. Three large stopes have been opened and these have further proved the existence of immense chutes of ore that yield average assay returns promising a good margin of profit from treatment in bulk. There are about 95 men on the pay roll and the work of installing the large compressor and hoisting engine is proceeding with expedition. The ore sampling and sorting plant is also well on the way towards completion. The big gallows frame will be finished before this letter appears in print and the building to house the big hoist and protect the shaft, will have been commenced. Both above and below grond much work is being done, and it is anticipated that within three months the daily output of ore will range from 300 to 500 tons and that there will be from 130 to 150 men at work on the mine, where buildings, plant and mine workings are all on a scale and of such a substantial nature as indicates permanence and the expectation of profitable returns. Other properties in Deadwood Camp at work are the Morrison, Buckhorn, Crown Silver, Greyhound, Great Hopes and Marguerite, but there is little in connection with any of these calling for particular mention at the present time.

A very brief reference may be made to Long Lake Camp. The Ethiopia has put in a 255 foot crosscut tunnel and done 50 feet of drifting. No underground work has been done in the Jewel mine for some time past other than keeping the workings clear of water. A wagon road was lately graded from the mine to the stamp mill site and it is expected that a reduction plant will be put in ere long. The mine manager, Mr. Gilbert Mahon, has been in Rossland for several weeks, between 200 and 300 tons of gold quartz ore having been sent over there for chemical treatment.

ROSSLAND.

With the closing days of the present year interest naturally centres in the output of ore from this and other mining divisions, from the whole province, in fact. Some forecasts have already been made, but practical data are yet wanting. The returns are necessarily incomplete, and they will not be forthcoming for some days yet, that is to say, the actual returns and not the forecast.

ROSSLAND OUTPUT.

For the 11 months and 22 days ending December 22nd of the present year, there were shipped from Rossland mines 216,793 tons of gold-copper ores valued at $3,468,688. Upon revision and in comparison with the official figures there will no doubt be a slight reduction both in the tonnage and in the amount, for some of the small shipments made cannot be regarded as of commercial importance as no bullion is reported, and two at least have disappeared from the list of regular producers, they having failed to produce ore of paying value.

The shipments of ore from Rossland mines have not maintained the weekly average claimed in earlier forecasts. Last week the output amounted only to 5,900 tons, and if 6,500 tons be the output from date until the end of the year, it will, in all probability, close the shipping account of Rossland mines for the year 1900, thus giving 223,293 tons, valued at $3,572,688 gross, but these figures are likely to be cut down to 220,000 tons, valued at $3,520,000.

The official figures last year were 172,665 tons, valued at $3,229,036. The gain of 1900 over 1899 so far as Rossland mines are concerned is nothing very great. Taking the probable net figures for the present year, viz., 220,000 tons and valuation $3,520,000, we have: 220,000—172,665=47,335 net increase of tonnage and $3,520,000—$3,229,086=$290,914 as the net gain in valuation, and this in the face of a decline in value of $1,00 per ton, at least.

As I have already intimated, the full data are wanting, but there is evidence enough now to satisfy the most sceptical that the ore production of the southern interior which comprises East and West Kootenay and Yale for 1900 will amount to at least 525,000 tons, with a total gross value variously estimated from ten and a half millions to eleven millions of dollars, with a possibility of those figures being slightly exceeded. This volume is nearly double that of last year. Many details are, of course, wanting, but they will be supplied. The great gains must this year be credited to the gold-copper ores of the Boundary district and the argentiferous lead ore production of East Kootenay, with the all round gains of the other mining divisions. With regard to progressive work in Rossland mines, very much has been done of late.

THE MINES.

Le Roi.—The condition of this mine is reported to be very satisfactory. A number of crosscuts have been made on the various levels and are being extended as far as the ore is found. Large quantities of ore have been blocked out, but the lack of smelter facilities has prevented the ore from being shipped. The new five compartment shaft is nearly ready, and nearly all the machinery intended for the new workings is ready. The new system will probably go into effect early next year, when an output of between five and six thousand tons per week will be made from this mine alone.

Le Roi No. 2.—There is nothing of importance to report. Sinking below the sixth level will not, it is stated, begin until next year.

Centre Star.—The extensive character of the surface improvements has already been reported. Much

work remains to be done on the carpenter's shop and engine repair shop. The usual development work is going on in the mine.

War Eagle.—Matters in this mine are quiet. Mr. E. B. Kerby the general manager has returned. Nothing important is likely to be done in this mine until after the new year.

Great Western.—The shaft is now down 675 feet and is to be continued to the 800 foot level, where the eighth station will be cut. The management reports pay ore on all the levels below the fifth. Extensive surface improvements are still going on.

Kootenay.—The shaft is down 1,065 feet. Ore shipments have not yet commenced.

Iron Mask.—Development work is being extensively prosecuted on all the levels below the 400 foot.

Giant.—The management is making small shipments.

St. Elmo.—The blacksmith shop recently destroyed by a snow slide is being repaired. This has interfered with development, which is to be resumed after the New Year.

White Bear.—The management is working in the direction of the Black Bear lead.

A careful examination of the present situation of Rossland mines indicates preparations for great progress in the early part of the new year.

SLOCAN.

(From Our Own Correspondent.)

At the dawn of a new century it is but natural that our thoughts should be of a retrospective character, and that we should inwardly survey the marvellous changes which have taken place in that relatively brief space of a hundred years. Whatever it may be to the rest of the world, however, we know that so far as the Slocan is concerned, and for that matter most of the other mining districts of the province also, it is a relatively long period, and I think we shall do well to confine our observations for the present to what has gone on during the preceding twelve months. It is not necessary to point out the great improvement which has taken place in the industry since this time last year, the termination of the disastrous labour dispute which interfered to such an extent with progress being still fresh in the public mind. In making comparisons we must recollect that the mines were practically deserted during the first two months of the year and suffering from the effects of a prolonged period of enforced idleness for some time after. Taking this into consideration, I think we can surely say that this has been the most successful year that the Slocan has witnessed. Unfortunately, we are not blessed with the facilities which our Rossland friends enjoy for collecting statistics, the shipping mines being much more numerous and widely scattered; which, combined with an evident reluctance on the part of mine managers and railway officials to furnish reliable information on the subject, renders any outside estimate of production however carefully compiled, little more than a mere approximation. From such sources as are available, however, I glean that it is doubtful whether the tonnage will equal that of '97, the banner year when the shipments amounted to over 33,000 tons. From all indications, however, it is practically certain that the total will exceed the 30,000 tons which constituted the output for '98. But for the cessation of work during January and February, and the lateness of the present season in furnishing snow for rawhiding, we should almost certainly have to chronicle a record year. As it is we are content to rest satisfied with what has been accomplished, confident in the assurance that if no mishaps occur, next year will show a marked increase in our output over any previous season. I estimate the production of 1900 at, roughly, 32,000 tons, worth somewhere in the neighborhood of $2,750,000, of which nearly 5,000 tons has been furnished by the lake district, being by far the largest contribution in its history. Of the remainder, some 18,000 tons is known to have been shipped over the K. & S. via Kaslo, leaving 9,000 as the proportion secured by the C. P. R., an estimate well within the mark. I give these figures for what they are worth, and under the circumstances must decline to be brought to book if the ultimate corrected returns work out within a couple of thousand one way or the other.

The general condition of the mines just now is exceedingly hopeful and encouraging, the only drawback in the way of heavy shipments being the lack of sufficient snow, which is a source of much disappointment to those who have been saving their ore for months awaiting the cheaper method of transportation which, in the ordinary course of events, should have been provided ere this.

Interest has been aroused in Sandon by the reports of fresh discoveries of high grade ore in the Reco, a property which paid wonderful dividends a few years back. The dimensions of the ore body at the Ivanhoe is beating anything previously encountered in the Slocan, so that there will be no difficulty in keeping their magnificent new mill, now happily in successful operation, well supplied with raw material. The Slocan Star, whispered long ago by the knowing ones to have completely played out, bobs serenely up with a dividend of $25,000, and the Monitor, at Three Forks, remarkable for the large gold values contained in its galena and zinc blende, is prepared to commence regular shipments for the winter. On the other side of the hill we find the Hartney impatient to begin rawhiding to the new wagon road recently constructed up Silver Mountain, and the Bosun pursuing the even tenor of its way as if such things as ore chutes giving out, veins becoming pinched or faulted and values disappearing with depth existed only in the imagination of stock brokers and others desirous of undermining the stability of our great industry.

About Silverton the Hewitt is making a name for itself not merely to the quantity and quality of the ore which is being mined, but by its unique character, which enables it to be treated at a lower cost per ton than has ever before been attained in this district.

From Slocan City we hear that the Arlington, now giving employment to seventy-five men, has increased its output to 1,200 tons since January, thereby heading the list of lake shippers. The Speculator, now under efficient management, is also showing great improvement, but for some reason or other the bond on the Mabou and Ohio has been allowed to lapse.

Perhaps the most important feature of the month, however, for that section has been the starting up of the machinery at the Chapleau, the operation of which means so much to the district in that it will either stimulate others to like efforts and so induce

capital to enter, or it will do irreparable harm to the camp by adding one more to the list of mines which have succumbed to unsuccessful attempts at solving the treatment problem.

HOW IT WAS DONE.

In 3 Scenes.

DRAMATIS PERSONÆ.

William Hatton, Mining Millionaire.

Peter Cynic, His Manager and Friend.

S. B. Raker, Financier representing Censure Syndicate, London.

L. Kickhard, Geologist.

Place	Time
Colorado.	19th Century.

Scene I.

(Private office of Suspender Mine. Time, evening. William Hatton in easy chair smoking. Enter Peter Cynic, in overalls and jumper.)

Hatton:—Is that you, Pete? Come in. Here's a chair. Take a smoke. Say, Pete, there's been a pretty smart man round me to-day; wants me to put a price on the Suspender. What d'ye think anyway?

Pete:—A mine's a pretty good thing to sell if you kin get more'n its worth, and a good thing to work if you kaint.

Hatton:—Well, but what d'ye think she's worth, anyhow?

Pete:—Wal', Bill, seeing its you and me like, I haint got no use for that there granite. She may be in it and she may not. My idee is she's cut off as clean as if she belonged to another man. Ye recklect that winze I started near the station on the 1,000 foot. Right on the vein. I stopped it. The drillings o' the last holes were as bald-faced granite as you ever seen; wouldn't assay nothin' to the ton. I had Conolly drillin'. He figured there was suthin' wrong, and sent for me, an' I plugged the holes. I never sees Conolly when he takes a pound or two of tooth fillins'. I guess that's right?

Hatton:—Umm! I suppose so.

Pete:—You know them crosscuts below the stoping levels? Plugged holes in the face of every one of 'em. Never shot till next day, an' always had the drillings tested.

Hatton:—What do you make of all that?

Pete:—Wal, its this a way. I reckon ye've got the pay chute of this here mine pretty well laid out. There may be more in her and there mayn't. God Amighty knows that. How much have you taken out?

Hatton:—Seven million dollars.

Pete:—An how much o' that's profits, like?

Hatton:—Hum! I guess about four and a half million.

Pete:—Wal, about half your ground's used up.

Hatton:—Pete! How is it you're not rich? You should be wearing diamonds in your hat.

Pete:—There's some as has no luck and has to work for others; and there's others as has luck and don't have to work at all. 'Night, Bill.

Hatton:—'Night Pete. You'll never be loser by me.

Scene II.

Same as Scene I. Time, 10:30 a. m. next day.

(William Hatton before roll top desk pretending to work. Chewing cigar unlighted. Enter Mr. Raker. Pete Cynic in doorway loafing.)

Raker:—Good morning, Mr. Hatton. What a pleasant morning. I should like to come and settle in Colorado. Such a lovely morning; so different from smoky old London, don't you know. But we have the money there, you know, Mr. Hatton. We have the money there and "Where the treasure is—" You know?

Pete:—(Aside) Yas, and whar the carcas is—

Raker:—Have you thought any over my proposal. Mr. Hatton. I represent practically unlimited capital. It is a shame that we poor English should not have a look in at the mines in this w[illegible] State. If there's one thing we do understand its working mines. Look at the Transvaal (Hiatus for lecture on Transvaal and the glory of its gold. Fill to taste from memories of any English mine promoter.)

Hatton:—Well, Mr. Raker, I'm but a plain man, and without much experience in mining or anything else except sawing wood. It would be very difficult for me to make an estimate of what the mine is worth. But you want to buy it. So I tell you between man and man that $10,000,000 takes the Suspender mine.

Pete:—(Aside) Tarnation blazes! Ain't the old man a daisy. He's a warm thing!

Raker:—Now, Mr. Hatton, that is what I want. Of course you understand that it will be necessary for me to have the value of the mine thoroughly investigated by a competent engineer. One cannot be too careful. The interests of capital are sacred. British capital is essentially timid, Mr. Hatton, essentially timid, and if I were to make a mistake think of the results to the mining industry of your State. Antagonize London and where are you?

Pete:—(Aside) I guess these gol derned Britishers were in partnership with God Amighty when He put the gold in the ground.

Raker:—Now, if you would just give me an option in writing until such time as—

Hatton:—Hold hard, Mr. Raker! You were remarking a while ago as how these London financiers you represent were the most honorable and high-toned gents to do business in the world, and I don't doubt it, sir; I don't doubt it for a moment, but no writings go on record giving you, them, or anyone a cinch on the Suspender until you're ready to part with the consideration. The mine's here; I'm here. Go ahead and examine all you want. What I have said about price goes.

Raker:—(Slightly disconcerted) That's right, Mr. Hatton. That's the spirit I admire. I'll go and wire Mr. Kickhard at once to come and examine the mine. (Exit.)

Pete:—(Coming forward) Bill, the deal's off.

Hatton:—Why, Pete? What do you mean?

Pete:—The deal's off. I knows Kickhard. There ain't no better minin' man in Colorado. He's as wise as an owl, and as cold-blooded as a fish. Kickhard! Thought he was goin' in for one o' them yellow-legged ducks with the colonial outfits. I tell ye the deal's off.

Hatton:—Pete, do you believe all he says about representing millions of capital and so on.

Pete:—I reckon its a good rule to believe half you see and nuthin' you hear, as they told the man who saw two moons in the sky and heard them conversin'.

(Aside) The old man's hankering after them ten millions.

Scene III.

(Same as before. Enter Raker, Kickhard, Hatton. Pete in the background. Time, two months later.)

Hatton:—Come in gentlemen. Come in and sit down.

Raker:—Perhaps, Mr. Kickhard, you will give us the summary of your report without details.

Kickhard:—According to the results of my sampling, there are $7,123,644.79 in sight. You have a wonderful mine, Mr. Hatton, a wonderful mine.

Raker:—That's it, Mr. Kickhard, a wonderful mine! That's the point, a wonderful mine! Surely it is not limited in resources to what is in sight, Mr. Kickhard? (Pete looks up rapidly at this question.)

Kickhard:—That is a question no engineer can answer.

Raker:—But surely Mr. Kickhard where there is such a vein so rich, such an extensive zone of mineralization, so to speak, it is not likely that the whole thing is contained in the small portion opened up.

Hatton:—You could write a good report yourself, Mr. Raker.

Raker:—(Turning pale in a fervent aside) God forbid! (Aloud) Is that not so, Mr. Kickhard.

Kickhard:—One may say that of every property.

Raker:—Good. That's the point; that's exactly the point. Lay stress on that, Mr. Kickhard; lay stress on that. Good-bye, Mr. Kickhard, good-bye. Your completed report will be ready in a week. Thank you, good morning. (Exit Kickhard) Mr. Hatton, we are in a position to come to terms. I represent, as you know, the Censure Syndicate, of London. As such I have unlimited wealth at my command. But London financial methods must be studied. They are absolutely the best in the world. It is needless to say that long experience has perfected them for the purposes they are designed to carry out.

Hatton:—What are these purposes?

Raker:—Why, ah! Ahem! Ahem! What should they be but to carry out to a successful issue such financial undertakings as I am about to propose to you involving the transfer into your pockets of ten million dollars. Two million pounds sterling, sterling, Mr. Hatton, good English gold.

Hatton:—Go on.

Raker:—Well now, what I am about to propose is this. I have already explained how delicate a machine the London market is, in which millions pass current every day except Sunday. But, as I was saying, one does not carry $10,000,000 in one's waistcoat pocket. So big a proposition must be carefully introduced on the market; a market must be made for it. Making a market, my dear Mr. Hatton, is THE mystery of London finance. No use trying to do anything unless you can make a market. If I give you the ten million dollars for the mine to-morrow I am out ten million dollars and there's the end of it unless I can make a market in London for the shares.

Hatton:—Excuse me, but wouldn't you have the mine?

Raker:—(Slightly disconcerted) Yes, true! Very good! Very good- I would have the mine, ahem! Yes! Quite so! But what I meant was I would be out the use of my ten million dollars until I could get them out of the mine. (Aside: Oh, Lord! these Yankees are dense) (Aloud) Now. Mr. Hatton, to come down to terms. What I propose is that I should promote a London company to work the Suspender mine. You take 90 per cent. of the shares and the Censure Syndicate takes an option on your 90 per cent. of the shares at $10,000,000 to extend over two years, making a substantial cash payment within a short time as a guarantee of good faith. (Aside: Just as soon as I can get a block of shares underwritten) During this time we make a market in the shares and long before it is up, probably, you are in receipt of your $10,000,000 and the mine is—

Hatton:—Whose?

Raker:—Why, the company's, of course. Now, I have tried to explain the nature of the proposal. Of course, I need hardly say that with such backing as the Censure Syndicate possesses in the market, your ultimately receiving the $10,000,000 is as certain as if you had them now. It is merely a delay absolutely necessary if we are to act in accordance with the best methods of finance; furthermore, you have the security of the mine for your payment as well as the well known financial reputation of the Censure Syndicate. Do you follow me?

Hatton:—(Rising and with dignity) No, sir! I do not follow you. You have the report of your own engineer that there are $7,000,000 in sight in the mine. By some hocus pocus you propose to pay me $10,000,000 and to do that and make a profit for yourself (If I correctly understand what you say about making a market) you mean to sell to other people at $14,000,000 or $15,000,000 what you buy from me at $10,000,000. Now, the profit in sight cannot be more than $5,000,000, so that what you propose is to sell to people for $10,000,000 the chance of further discoveries in this mine, people who do not know, and whom you do not mean to tell, that that is what they are buying. Now, sir, to do this successfully, you've got to make a damned swindler out of somebody, and I tell you right here and now, that though I'm rich, I'm honest, and you make no damned swindler out of me.

Pete:—(In a vigorous aside) Great Star Spangled Banner! Land of the Free and Home of the Brave! Wade in old man! Give him fits.

Raker:—My dear Mr. Hatton, that is an extraordinary outburst. I am sure your sentiments do you the greatest credit. I had not expected to find you on such a lofty moral plane. It brings us closer together. You, with such sentiments, would be an ornament to the city of London, where the level of financial probity is so high. But, my dear sir, you are under a complete misapprehension as to the drift and bearing of my remarks. You would only be responsible to the Censure Syndicate for the delivery of the shares upon terms specified in the contract. They only would be responsible as to the ways and means by which the money was raised to pay you, and with all due deference to Mr. Hatton, of Colorado, the members of the Censure Syndicate are able to maintain their own reputations. Besides, you are, I suppose, satisfied that the money would be eventually paid you.

Hatton:—I suppose that part of it is all right.

Raker:—And that a certain amount of financing involving delay is necessary in so large a matter?

Hatton:—Yes, I guess that is so.

Raker:—Well, then, I have to remind you that

in one of our earlier interviews you said that while you would give no written option, you would be found ready to deal on a basis of $10,000,000. I have now to discover whether your sense of personal probity is as high as you would have us believe, or whether, like many other people, you use it as a cloak to withdraw from an engagement you do not wish to carry out. (Aside: I got the cue from his talk. I have won the trick.)

Pete:—(Aside, dolefully) God's truth, he's got the old man foul.

[So the twig was limed and the little bird's feet were in the lime, but as the man at the machine has ceased calling for "copy," the reader must imagine the denouement for himself.]

ELECTRICITY IN MINING.*

ELECTRICITY is rapidly replacing steam and compressed air in mines all over the country. One after the other is taking up that kind of power, and it seems as if within a short space of time most of the underground work would be carried on by electric force. There is no doubt of its cheapness for drills, as compared with the other kinds of power, and it certainly is much more convenient. To bring steam or compressed air to the heading of tunnels, sometimes many hundreds of feet underground, it has been necessary to build long pipe lines, and to meet with delays through broken joints and many other accidents which are likely to happen to pipe lines. On the other hand, the electric power wires are flexible, do not require to be laid in any particular way, and are always ready for use.

One of the objections to the use of electricity instead of compressed air might be overcome without much trouble. In using the high explosives in the heading of a long tunnel where there is no means of ventilation, the pipe which furnishes the air for the drills is left open, and the gases from the explosion are quickly driven out of the tunnel, so that the men can get to work again in a short space of time. This has always been one of the great advantages of this method of drilling. This result can be reached as well with electricity by building a long exhaust blower at the mouth of the tunnel, using the electricity to drive it and clearing the tunnel of the noxious air in even less time. Thus would there be a gain in time usually lost while waiting for the air to clear, as well as economy in running the drills.

One of the latest applications of electricity is in the Cornucopia mines in Oregon. At present the mines are worked by steam and the fuel is wood. As the boilers at the mine require about fifteen cords of wood per day, the timber in the neighbourhood of the mine is practically exhausted, and the wood used in the future will have to be hauled a long way. The question of electricity was taken up and it was decided to erect a 500 horse power plant about two and a half miles from the company's property, on Pine Creek, where, by the use of a short flume, 300 feet fall of water is secured. The necessary works are nearly complete, and the wires are to be strung from the plant to the mines in a few days, and it is believed that the cost, compared with the present steam power will be but trifling. Although several wood choppers will be thrown out of work, they will find other employment on the extra drills and ore-breakers which will become necessary through the increased work practicable because of the new power.

In the Cripple Creek mining district in Colorado the electric drill is making more progress than in any other part of that mining belt. The Colorado Electric Power Company, which has its plant at Canyon City, has recently put electric hoisting engines in several mines, and has made contracts for lighting and furnishing power to others. A lot of electric drills have been ordered by the company, and within sixty days it is expected that they will be in operation in some of the mines. It is declared that the new drills will not only permit a saving of at least fifty per cent. in working cost, but will maintain a higher degree of efficiency. All points underground where the more cumbersome steam drill cannot reach the electric drill may be used with ease.

*Engineering and Mining Journal.

THE SOUTHERN CALIFORNIA OIL FIELDS.*

THE distribution of petroleum in California seems to be general, extending almost from one end of the state to the other. Petroleum has been found in many localities from Humboldt county at the northern boundary of the state to San Diego at the extreme southern end; in some sections, however, it is yet to be determined whether it exists in paying quantities or not. Active operations are now in progress in both of the boundary points above named, as well as in numerous other untried districts, and the next twelve months will, no doubt, witness the exploitation of much new territory. The best defined pools being operated in the state at the present time are the Kern River district, the Sunset and McKittrick fields in Kern county, Coalinga, in Fresno county, several extensive deposits in Ventura, the famous Newhall belt in Los Angeles county, Whittier, Puente and Fullerton pools near the dividing line between Orange and Los Angeles counties, and the Los Angeles field, located within the corporate limits of that city.

The real development of this district dates from 1893, although as far back as 1857 a couple of oil wells were put down and afterwards abandoned. Over 1,000 wells have been drilled since 1893. There are at this time 800 producing wells and probably twenty-five or more in process of drilling. The local belt averages nearly 600 feet in width and three and one half miles in length. This does not comprehend the western extension, which properly belongs to the same field and runs from the western city limits for a number of miles towards the coast in an unbroken line of development. Most of the city wells are from 500 to 1,400 feet deep, although some productive holes have been operated at less than 300 feet. The cost of drilling a well will run from $1,000 to $5,000 according to the location and circumstances. It is estimated that something over $3,000,000 is invested in productive oil wells in the city of Los Angeles. The aggregate output in 1897 reached about 1,400,000 barrels. In 1898 and 1899 the pro-

*New York Evening Post.

duction was a trifle less. The present rate of production is in the neighbourhood of 125,000 barrels monthly.

This oil is of a low specific gravity, varying between twelve degrees and twenty degrees. During the past five years the price of petroleum has fluctuated considerably, but now, owing to an increasing demand, prices remain firm at about $1,15 per barrel. This is mostly consumed at home being used almost exclusively for fuel instead of coal. A peculiar phase of the situation here has been the reversed situation of supply and demand. Consumers hesitated for a long time to convert their coal-burning furnaces into oil-burning, owing to the general fear that the supply would not continue, and this had the effect of producing a slump in the oil market, and the price of petroleum fell to a point where production was scarcely profitable. Later the extension of the oil fields and the positive assurance of a continued supply removed all doubts from consumers' minds and petroleum superseded coal almost entirely, with the result that prices rose in sympathy with the augmented demand.

Less than a year ago the Los Angeles pool was considered the most important in the state, but the developments of the past six months have demonstrated the existence of greater fields, whose rapid exploitation makes it next to impossible to follow with any degree of accuracy the amount or territory opened or the extent of its productiveness.

ZINC MINING IN THE UNITED STATES.*

THE total American production of zinc up to the close of 1899 has been about 1,450,000 tons, which, at an average price from first to last of $100 per ton, has yielded a total of $130,000,000 to the wealth of the nation.

We have been—as might be expected—considerable importers of zinc and manufacturers thereof, and are still to some extent.

The maximum was reached in 1872, when the imports had a value of $1,175,077. In 1898 they amounted to less than $1,000,000. On the other hand, the exports which in 1872 had a value of $26,606, in 1898 exceeded $2,000,000 and included not only sheet and ingot metal and manufactured articles, but more than 10,000 tons of Mississippi valley zinc ore, which left the country at ports on the Gulf of Mexico and went to Europe—principally to Belgium. Of course it is not expected that zinc smelters will allow this condition of affairs to last long. The fact, however, that American zinc ore can be sold profitably to European smelters in competition with ores from their vicinity speaks well for the richness of American mines, and the condition that the industry has attained. It should be stated in this connection, however, that the United States is a considerable importer of "zinc white" from Europe (to the extent of nearly 3,000 tons in 1898, worth about $600,000).

This is produced almost wholly as a bye product in working low grade argentiferous lead and zinc ores, and on that account is enabled to enter the country.

The United States has not yet reached the commanding position in the zinc mining industry that has been attained in that of iron, copper or lead. The following table, giving the world's production for 1897 and 1898, will show, however, that we are advancing to that place very rapidly:

	1897 Tons.	1898 Tons.
Belgium, Holland and Rhine..	206,150	211,020
United States	100,200	115,400
Silesia	105,000	109,150
France	29,900	29,850
Great Britain	26,200	30,400
Austria	10,170	7,950
Russia	6,450	6,230
Spain	5,980	5,950
Total	490,150	515,950

The developments of recent years in what is known as the Joplin-Pittsburg region, covering the adjacent corners of Missouri, Kansas, Oklahoma and Arkansas lead to the conclusion that the deposits there are of a very great extent, and can be worked with extraordinary economy.

A metal called cadmium is always found associated with zinc to a greater or less quantity. The two are as closely related as gold and silver or lead and silver. The cadmium, however, is always in small quantities. No attempt has ever been made to recover the metal in this country, but several of the European zinc establishments save it. The production of 1897 was under twenty tons, which was enough to supply all demands. The metal sells for $1.75 to $2 per pound, at which price there is a very handsome profit in saving it. The most extensive use to which it is put is in the manufacture of a silver cadmium alloy, which when used as a material for plating iron or steel presents a surface fully as attractive as silver, but which will not tarnish under atmospheric or other influences as silver will. Cadmium has also some desirable inherent qualities which are likely to make it very serviceable in the domain of electricity and electric-metallurgy and which have only recently been appreciated. It is likely, therefore, that its recovery in American smelting works will be attempted before long.

*By T. F. Van Wagenen, E.M., in Denver Mining Reporter.

TRADE NOTICES.

THE Canton Steel Company publishes a book of testimonials which make an imposing list. British Columbia mines and dealers furnish a respectable number. What is specially claimed for the steel is perfect uniformity of grade according to the brand.

A few hints are given to blacksmiths and tool dressers which we reproduce :

In answering the many inquiries, from men in camp, as to the best form for bits and method of tempering drills in quartz mining, I can only reply in a general way, as local conditions must be considered.

It is advisable, in shaping bits, to make as sharp a tool as the character of the rock will admit. Bevel the edge to a little sharper than 45 degrees angle. This will give strong edge and corners. Make the bit square along the cutting edge, but leave long taper,—60 degrees,—from bevel of the cutting edge, back on the body of the drill.

When you shape your drills leave them on the forge until all are finished, then heat to cherry red,

but not back on body of steel; dip in clean water, moving slowly down, then out, leaving heat enough in body of drill to toughen the bit by starting temper to straw color. Check color by cooling in slack tub. This method will give a tough, hard bit.

What should not be done is :—Heating drills two or three inches on body of steel. Dressing bit with crowning edge. Throwing steel into slack tub while it is yet red, for the body of steel is hotter than the edge. If this method is followed it is liable to make water checks, and spoil the steel.

Do not make bull bits. It makes too much work for the miner, for in putting down his holes a bull bit cushions on the pulp, taking off the effective force of the hammer or machine. A bit with good clearance passes through the pulp, and the full force of the blow is carried to the cutting edge of the bit.

A bit should cut and not pulverize. The corners do the work.

In tempering do not hold the drill still at one depth in the water, as this will cause water line and danger of the bit jumping off.

If the shanks to machine drills crystallize and break, heat the shank to low red heat and cover from the air in ashes or dry sand.

This will anneal, taking out the crystallization, and the shanks will cause no more trouble.

If you are having difficulty with your steel, of whatever brand, a letter addressed to the writer will be answered promptly, giving you the benefit of his experience with steel in practical mining.

P. P. BUSH,

1601 Seventeenth street, Denver, Colorado, General Western Manager.

THE CANADIAN GENERAL ELECTRIC CO., LIMITED.

The Canadian General Electric Company, Ltd., has recently acquired the business and manufacturing interests of the Royal Electric Company, of Montreal, also the sole rights to manufacture and sell the S. K. C. system of apparatus as formerly manufactured exclusively by the Royal Company in Canada, which is the same as that manufactured by the Stanley Electric Company, of Pittsfield, Mass. It is intended to handle this apparatus in connection with the well known class of apparatus of the C. G. E. type. The acquisition of the Royal Company's manufacturing business, places the Canadian General Electric Company almost, if not in second place, as one of the three largest electrical manufacturing companies in the world. The General Electric Company of the United States are far ahead of any other concern and the Canadian General Electric Company even manufacture a larger range of apparatus than they do, but not so large a total output.

MESSRS. FRASER & CHALMERS.

Messrs. Fraser & Chalmers, of Chicago, supplied the mill to the Chapleau Consolidated Gold Mining Company, Ltd., lately started. The mill is complete and modern in every respect. It consists of a grizzly 4x10, made of taper bars ¾x1 x3 inches, made with 1½ inch spacing bars and four tie rods. The crusher is a 7x10 Blake, with two ore gates and two automatic feeds of the Challenge type. The battery is of ten stamps, each weighing 850 pounds, all bearing parts being of steel and the mortars of the Homestake pattern. The cams and cam shafts are arranged for Planton keys. The copper tables are 59x96 inches and are placed on frames having a device for altering the incline of the plates, while the frames are on rollers and track to expedite their removal for the replacing of shoes and dies if necessary. The stamps have a capacity of two and one half to three tons of ordinary ore per day. After passing over the tables and the quicksilver traps the pulp passes into the Brown hydrometric sizer, where it is graduated and the different sizes of pulp discharged into Frue vanners from the gangue. The mill is operated by water power obtained from Lemon creek.

A. W. MORE & CO., LTD.

THE well known firm of A. W. More & Co., stock brokers and investment agents in Victoria, has been registered as a joint stock company as A. W. More & Co., Ltd. The necessary correction in the legal name of the concern has not been made in this month's advertising columns in the MINING RECORD, the advertising matter having gone to press too early.

MINING RETURNS AND STATISTICS.

COAST.

THE following is the November output from the Coast:

Mines	Destination	Tons.
Copper Queen,	Van Anda Smelter (per week round figures)	100
Marble Bay,	Van Anda Smelter	Not known
Lenora,	Everett	592
Monitor,	Everett	250

SLOCAN.

The customs returns of exports for the port of Kaslo for the month of November are as follows:

Ore (pounds)	15,774,000
Value	$112,093.00
Lead (pounds)	987,000
Silver (ounces)	131,155
Coal	3,146,200
Valued at	$3,143.00

Compared with September and October:

	Sept.	Oct.	Nov.
Ore (pounds)	14,137,000	13,262,000	15,774,000
Value	$176,392	$292,108	$112,093
Lead (pounds)	1,839,000	2,749,700	987,000
Silver (ounces)	196,430	333,141	131,155
Coal	3,892,000	5,127,900	3,146,200
Valued at	$3,897	$5,089	$3,143

Note: These figures, when compared month by month, show the most astounding discrepancies. They are either incorrectly compiled or reach the MINING RECORD in a mutilated condition.

Tonnage of ore via Kaslo during November:

Mine	Destination	Tons.
Whitewater,	Kootenay Ore Co.	1,064.5
Last Chance,	Kaslo Ore Co.	352.5
Payne,	San Francisco	495
Slocan Star,	Everett	81
Rambler-Cariboo,	Everett	145.5
Ruth,	Kootenay Ore Co.	96
Trade Dollar,	Kaslo Ore Co	61
American Boy,	Kaslo Ore Co.	59.5
Cube Lode,	Kootenay Ore Co	15
Total		2,370

Compared with October:

Mine	Tons Oct.	Nov.	Increase or Decrease.
Whitewater	573	1,064.5	I 491.5
Last Chance	485	352.5	D132.5
Payne	319	495	I 176
Slocan Star	120	81	I 39
Rambler-Cariboo	139	145.5	I 6.5
Ruth	100	96	D 4
Trade Dollar	40	61	I 21
American Boy		59.5	I 59.5
Cube Lode		15	I 15
Noble Five	32		D 32
Cork	20		D 20
Bismarck	17		D 17
Mountain Con.	21		D 21
Total	1,866	2,370	I 504

BOUNDARY DISTRICT.

The Granby smelter from August 21st to Dec 8th had treated 45,000 tons of ore, yielding 1,650 tons of 50 per cent. matte.

Shipments from Knob Hill and Ironsides to the Granby smelter have been as follows:

	Tons.
July	3,150
August	5,850
September	9,000
October	13,800
November	18,300
December	19,500
Total	69,600

Boundary mines have produced and shipped during the year (estimated):

	Tons.
Old Ironsides, Victoria and Knob Hill	69,500
B. C.	18,500
Mother Lode	5,000
City of Paris	3,500
Golden Crown	2,000
Winnipeg	1,200
North Fork Mines	700
Unenumerated	1,000
Total	102,700

Estimated total output for December of Boundary mines, 22,700 tons.

NELSON.

Granite mine: Mill run for November, 19.5 days; ore crushed, 679 tons; bullion and concentrates, $6,000, giving total extraction of $8.60 per ton.

Athabasca mine: Mill run for November, 29 days, 8 hours; tons milled, 465.

Value of bullion recovered	$5,345 67
Value of concentrates recovered	3,188 41
Total values recovered	8,534 08

Values recovered per ton milled, $18.35.

EAST KOOTENAY.

November.

	Tons.
St. Eugene	2,600
North Star and Sullivan	No figures procurable.

ROSSLAND.

Tonnage from 2nd Dec. to 22nd Dec., 14,682.

Detailed figures to close of year not yet available.

Estimated tonnage for year ending 31st December, 222,000 tons.

COAL EXPORTATIONS.

THE exports of coal from Vancouver Island collieries for November were as follows:

	Tons. Nov.	Oct.	Increase
New Van. Coal Co.	42,132	32,805	I 9,327
Ladysmith	20,935	24,237	D 3,302
Union	20,069	10,013	I 10,056
Total	83,136	67,055	I 16,081

For the first three weeks of December the New Vancouver Coal Company shipped:

Vessel	Destination	Tons.
8th S.S.	San Mateo, San Francisco	4,370
8th S.S.	New England, Alaska	54
10th S.S.	R. Adamson, San Francisco	4,491
13th S.S.	Titania, San Francisco	5,682
17th S.S.	San Blas, San Francisco	2,013
Total		16,610

METAL MARKET—DECEMBER.

SILVER.

THE average price of silver during December was 64.04c. During the early part of December the price remained at 64½c. Since the middle of the month 63½c to 64c has been the ruling quotation.

COPPER.

The market is very quiet. Prices are fairly well maintained.

LEAD.

Lead has been an active market at current prices.

LOCAL STOCK MARKET.

(Furnished by A. W. Moore, Broker, Victoria.)

THE feature of the coast is the reported sale of the Van Anda to an English company for half a million dollars. Van Anda shares were selling about two months ago @ ½ to ¾, but have recently sold @ 2 to 2¼. Considerable Van Anda shares have recently changed hands at the Coast.

Cariboo-McKinney has fallen to 60 cents asked; Waterloo to 3; Fontenoy to 2½.

In the Boundary district the Winnipeg has been made assessable up to 5 cents. One cent is now being called up and the shares are to-day quoted at 3 to 3½, with more sales in the West than in the East. Morrison has been in good demand around 2½ to 3 cents. Old Ironsides is quoted to-day 80 asked and 45 bid; Knob Hill 52 asked and 45 bid. It is reported that the Granby Smelter, the Old Ironsides, the Knob Hill and the Grey Eagle companies are about to be amalgamated into one company with a capital of $15,000,000.

Brandon and Golden Crown has fallen to 7 and the King to 4 asked.

Among Slocan and Nelson district stocks the Rambler-Cariboo has been considerably traded in

around 25 to 26; the Arlington has advanced above 50; American Boy has been sought after around 9 to 10; Noble Five has changed hands at 2¼ to 2½; Payne has fallen to 75 asked and 73 bid; Slocan Star, on the payment of a dividend, has advanced to $1.

Among Omineca district stocks the Arctic Slope (hydraulic) has been selling considerably @ 12 cents, whilst in Cariboo district stocks the Cariboo Hydraulic has been in great demand and the stock has advanced to $1.80 asked and $1.60 bid.

Among East Kootenay stocks the Crow's Nest has been booming, and sales are reported to have taken place in Toronto as high as $58. To-day's price is $59 asked and $55 bid. A great many Crow's Nest shares have changed hands in the East. The Crow's Nest Pass Coal Company owns one of the best coal fields on the continent of America. The company owns over 200,000 acres of coal lands in East Kootenay. North Star has changed hands around 90 and Sullivan has been selling around 14 to 15. St. Eugene has sold @ $1 to $1.05. The St. Eugene is making very handsome profits and should now be a regular dividend payer.

Among Rossland stocks the Iron Mask is beginning to be active again and several thousand shares sold to-day @ 30 to 30½. This company is only capitalized at $500,000 and it is generally understood that the mine has ore in sight worth the total capitalization. Iron Mask shares are now fully paid up. War Eagle is quoted to-day at $1.04 asked and $1 bid; Centre Star $1.40 asked and $1.33 bid. White Bear has been an exceedingly active stock of late and has been selling @ 4 to 4¼.

LOCAL STOCK MARKET FOR THE MONTH OF DECEMBER.

Prepared by A. W. More & Co., Ltd., Stock Brokers, Victoria, B. C.

Companies.	Week Ending Saturday, 8th December.				Week Ending Saturday, 15th December.				Week Ending Saturday, 22nd December.				Week Ending Saturday, 29th December.				Dividends.
	Highest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		
	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	
Athabasca	$ 6 00	$ 4 80	$ 5 50	$ 4 00	$ 6 00	$ 4 50	$ 5 50	$ 4 50	$ 5 75	$ 4 62½	$ 4 70	$ 3 00	$ 5 50	$ 4 00	$ 5 25	$ 3 00	
Brandon & Gol'n C	9	05½	08	04	09	05	09	04	09	04½	06	03	07	04	06	03	
Cariboo-McKin'y	64	45	58	30	65	48	55	48	60	40	50	40	60	48	50	40	
Cariboo Hydraulic	1 49	1 47	1 47	1 44	1 50	1 45	1 48	1 40	1 57	1 54	1 51	1 46	1 80	1 60	1 70	1 55	
Centre Star	1 49	1 45	1 45	1 40	1 49	1 44	1 45	1 33	1 47	1 42	1 40	1 33	1 40	1 33	1 40	1 30	1 c.
Crow's Nest Pass C	57 00	54 50	54 00	52 00	60 00	57 00	56 50	54 00	63½	59 00	60 00	50 00	60 00	55 00	59 00	55 00	
Dardenelles	02	01½	01¾	01	02	01½	01¾	01	02	01½	01½	01	02	01½	01½	01	
Evening Star	08	05	07	05	08	07	07½	05½	08	06	07½	06	08	06	07	05	
Fairview Corpor'n	02⅝	02⅜	02½	02¼	03	02¼	02½	02¼	02¾	02½	02½	02⅜	02⅝	02⅜	02½	02	
Fentenoy	04	02	02½	02	03	02	02½	02	05	02½	02½	02	03	02	02½	02	
Iron Mask	30	20	28	15	28	22½	26	18	30	26¾	26	22	34	30	32	27½	
I. X. L.	20	18	17	16	19	18	17	16	19	17	17	15	18	17	16	15	
Jumbo	25	20	20	17	25	20	18	17	24	20	18	17	20	16	17	15	
King, (Oro Denero	07	04	06	04	06	03½	05	02½	06	03½	06	03	04	03	03½	02½	
Knob Hill	60	46	54	45	55	50	52	46	58	48	50	45	54	46	52	46	
Mollie Gibson	35	26	27	24	30	26	27	24	30	26	27	25	35	25	26	24	
Noble Five	05	02½	03¼	02	04	02½	03½	02	05	03	03½	02	04	02¾	03¼	02½	
North Star	96	95¼	95	93	96	94	95	93½	96	94	93	89½	92	89	91	88	3 c.
Old Ironsides	70	45	65	35	70	49	50	35	80	60	70	55	80	50	80	45	
Payne	80	74	73½	68	79	75	74	70	85	81¼	80	77	79½	73	75¾	73	
Rambler	26½	25¼	25	24	26	25⅜	25¼	24	26	25½	25	24½	26	25	26	25	
Slocan Star	80	75	77	74	80	75	76	74	1 00	75	1 00	80	1 25	90	1 00	75	1 c.
Sullivan	17	15	15	14	16	15	15	14	16	15	15	14	16	14	15	14	
Tamarac Kenneth	05	04	05	04	05	04½	05	04	05	04½	05	04	05	05	04½	04	
Van Anda	02	01	01½	01	02¼	02	02	01½	02⅝	02¾	02¼	02	02¼	01¾	02	01½	
War Eagle	1 03	1 01	1 00	95	1 05	1 02	1 02	98½	1 05½	1 03½	1 04	1 01	1 04	1 00	1 03	1 00	
Waterloo	3	02⅝	02⅞	02½	03	02½	03	02	03	02½	02¾	02	03	02½	03	02	
Winnipeg	04	02¾	04	02	04	03	04	01½	04	03	03½	02¼	04	02	03¼	02	
St. Eugene	1 10	1 05	1 03	1 00	1 05	1 02	1 03	1 00	1 05	1 02	1 02	1 00	1 10	1 03	1 03	1 00	3 c.

LATEST LONDON QUOTATIONS.

(From the B. C. Review.)

Name of Company.	Paid up per Share	Mk. Up Price Sept. 25	Mk. up Price Oct. 9.	Price Last Week.	Price Oct. 8.	Price Oct 10	Price Oct. 12
Alaska Goldfields	f.p.	15-16	7/8	15-16	15-16	7/8	
Athabasca	f.p.	....	....	1 11-16	1 5/8	1 5/8	1
Atlin Lake	..	..	....	1 3-16	1 3-16	1 3-16	1 3-16
Brit. America Corp	f.p.	16/3	17/6	17/6	17/6	17/6	17/3
B.C.Develop't Assoc	f.p.	1 3/8	1 1/4	1 3/8	1 3/8	1 1/4	1 1/4
Dom. Mining, Dev	f.p.	3/32	1/32	1/2	3/32	3/32	3/32
Duncan Mines	f.p.	3/32	1/32	3/4	3/32	3/32	3/32
Enterprise	f.p.	15-16	7/8	7/8	7/8	11 6	11-16
Granite	f.p.	1/2	1/32	1/2	1/2	1/2	1/2
Hall Mines	f.p.	1/	6/6	76	6/6	6	6/
Klondike Bonanza	f.p.	7-16	1/32	1/2	1/2	7-6	7-16
Klondike Corp	.	....	....	3/9	3/9	3/9	3/9
Klondyke Consols	f.p.	1 1/8	1	1xd	1	1	1
Do. Gov. Con. (P'ty)	f.p.	1/2	1/2	1/2	9-16	9-16	9-16
Kootenay Mines	£5	....	....	6 5-16	6 5/8	6 3/8	6 3/8
Le Roi	£5	8	8¼	8 1/2	8 1/4	8 5-16	8¼
Le Roi No. 2	£5	20	20¼	19 3/8	20 1/4	20 1/2	20 3/8
London and B.C. Gds	f.p.	1 5-16	1 1/2	1 9-16	1 1/2	1 1/2	1 1/2
McDonald's Bonanza	f.p.	1/2	1/2	1/2	1/2	1/2	1/2
New Goldfields of B.C	f.p.	1 3/8	1 3/8	1 11-16	1 11-16	1 9-16	1 3/8
Nimrod	f.p.	5 1/2	6 1/2	6 5/8	6 3/8	6 1/2	6 3/8
Queen Bess Propriety	f.p.	5/8	3/8	5/8	3/8	1/2	1/2
Velvet	f.p.	1 1/4	....	1 7-16	1 7-16	1 1/4	1 1/4
Rossland Great W.	£5	....	....	8 1/4	8 1/4	8	8 11-16
Whitewater Mines	f.p.	3/8	3/8	11-16	11-16	15-16	1/2
Ymir Gold Mines	f.p.	1 3/8	1 3/8	1 13-16	1 13-16	1 3/8	1 3/8
Yukon Goldf'ld's new	f.p.	1/2	1/2	1/2	1/2	1/2	1/2

DIVIDEND PAYING MINES OF B. C.

SLOCAN DISTRICT.

Goodenough, to 30th June, 1899	$ 35,000
Antonie, to 30th June, 1899	10,000
Idaho, to 30th June, 1899	292,000
Jackson Mines, to 30 June, 1899	20,000
Last Chance, to 30th April, 1899	140,000
Monitor, to 30th June, 1899	40,000
Noble Five, to 30th June, 1899	50,000
Payne, to 31st Dec., 1900	1,100,000
Surprise, to 30th June, 1899	20,000
Reco, to 31st January, 1898	297,500
Ruth, to 30th June, 1899	165,000
Rambler Cariboo, to 31st December, 1899	60,000
Slocan Star, to 30th November, 1900	425,000
Two Friends, to 30th June, 1899	20,000
Washington, to 30th June, 1899	20,000
Whitewater, to 31st Dec., 1900	209,500
Queen Bess, to 31 July, 1899	25,000
Bosun, to 30th June, 1899	30,000

EAST KOOTENAY DISTRICT.

St. Eugene, to 31st December, 1900	$ 105,000
North Star	79,000

NELSON DISTRICT.

Fern, to 30th June, 1898	$ 10,000
Hall Mines, Ltd., to 31st May, 1899	1 0,000
Ymir, to 30th November, 1899	20,000
Athabasca, to 31st October, 1900	25,000

TRAIL CREEK DISTRICT.

Le Roi, to 30th November, 1900	$1,305,000
War Eagle, to 29th February, 1900	545,000
Centre Star, to 1st December, 1900	70,000

KETTLE RIVER DISTRICT.

Cariboo (Camp McKinney) to 30th June, 1899	$ 311,965

This list is incomplete, but is, so far as it goes, accurate.

DIVIDENDS DECLARED DURING DECEMBER.

Payne	3 cents per share
Whitewater	2½ per cent.