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BRITISH COLUMBIA MINING RECORD

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We have to request the indulgence of our readers for the delay in the appearance of this month's issue of the MINING RECORD. This delay was occasioned by a desire on our part to publish a verbatim report of the Mining Convention proceedings, but at the last moment it was realised that to await transcript of the voluminous notes would mean practically that there would be no March issue at all. The present issue is, therefore, published as usual, but next month we shall print a Convention Number, which will contain a full report of the speeches delivered and the resolutions passed at what was undoubtedly the most important and representative gathering of its kind that has ever been held in British Columbia.

THE MINING CONVENTION.

(By Clive Phillipps-Wolley.)

AS far as one's memory serves, and we admit that it is hazy, there was once a professor named Frankenstein who set himself to make a man, which (not "who," for it was a machine) should live to perform all the ordinary functions of a man, and of course be the slave of its creator.

The professor partially succeeded. His man walked, talked, and could do all manner of work, but it would not obey its maker. On the contrary, the Giant Creation took charge of its Creator.

That in a nutshell is to our mind the story of the greatest creation of modern times in British Columbia, the story of the Provincial Mining Association.

A certain number of extremely energetic and well meaning gentlemen, occupied for the most part in the mining of gold gravels, created this association for the general welfare and their own particular profit, which was reasonable. They even outlined for their creature a mind and intentions which might be announced to the world before its christening.

On the faith of these declared intentions, the creature found many sponsors and friends in all classes of the community.

Whether the creators quite meant all that they promised may be doubted now in view of the declarations made at the late convention with regard to the admission of labour disputes, the duty of advising the Legislature, etc., etc., but what they meant matters little.

They builded better than they knew. The great creature was stronger than its creators and insisted upon every letter of its constitution.

The miners, farmers, business men and others directly interested in the mining industry had been told by the parents of the association that its objects would be the general welfare of British Columbia, which would assuredly follow upon the prosperity of mining, and that this prosperity could only be attained by an abolition of unjust mining laws; the introduction of conditions likely to attract foreign capital; the settling of labour troubles; the education of our legislators in mining matters by specialists in mining, etc.

When the associates met to organize, they were nearly 300 strong and not only were all classes and all geographical divisions in British Columbia represented but from the pithiness of the debates it would almost seem as if the brains of the country were also represented.

But when the associates had been convened, it seemed for a doubtful day that the matters to be discussed were indeed as represented, but that the only urgent matters were the two per cent. tax upon gross output; the granting of Crown grants to hydraulic properties; the endorsement of the silver-lead miners' London resolution and several minor matters, all tending to lessen the burden upon the mine owner.

After listening attentively for a day the creature woke and proved that it was intelligent.

It said practically "the two per cent. tax is really a small matter. In the gross it only amounts to \$84,000 and the amount paid under it by some of the biggest of the grumblers is so small that I will spare their feelings by not calling for figures. But the incidence of this tax is unjust, and it may indeed be a bugbear which keeps out foreign capital and therefore I, because I believe these things and believe that the removal of the two

per cent. tax will cause an increase of mining which will cause an increase of population, and so of revenue (probably in excess of the \$84,000 which the Government is asked to forego) therefore, and because of all these things, I will recommend that the gentlemen who make the laws of British Columbia do abolish this tax. Again in discussing the troubles of the silver-lead miners, this association said "This seems a matter which has been well considered by those most interested and best informed upon the subject. Their demands appear to be reasonable. They don't want our advice, but they deserve our support. Let them have it."

But this creature (the association) added riders to everything and applied the same principle to all questions brought before it.

It decided that the laws relative to the silver-lead industry concerned first the silver-lead miners and therefore backed their petition, but when the mine owners wanted the code of signals upon which the lives of their employees depended altered against the wishes of those employees, the association said "No." The men most interested don't want this code altered, therefore hands off and let it alone.

When the two per cent. tax was protested the association assented to the protest, but it added this rider which the mining men had to affirm: "That with respect to the resolution passed dealing with the abolition of the two per cent. tax, this convention shall not be understood as being opposed to a fair and equitable taxation of the mining industry."

The farmers had good right to fear lest the taxes which were being taken off the miners might light upon their shoulders, but the creature was minded to be fair to the farmer and to deal out impartial justice to all men.

When it came to the Crown granting of placer ground, the creature for the first time showed its teeth. It suffers acutely, it would seem, from indigestion, and not being American, refuses to be hurried over its meals.

It was not opposed to the principle of Crown granting placer claims, but it did not know much about the matter and wanted to hear more, when therefore a few experts delivered their explanation which were not very explanatory and expected their arguments to "go without saying" and their dose to be swallowed without investigation, the creature, which is still young, did indeed swallow what it was asked to, but became so restless and irritable afterwards that it registered its annoyance and protest against "railroading" measures through its body, by an attempt to re-open the whole question, which was only abandoned on account of the greater importance of settling the Fernie strike.

There is a great deal to be said in favour of these Crown grants. On all the showings nothing can shut the country up more than it has already been shut up: every one is agreed that investing capital does seek greater security of tenure and that long column of recommendations which in the report follows the main contention *re* Crown grants, contains, if you read it, answers to almost all the objections which can be urged against the granting of them, but the creature was not allowed time to read those recommendations or to dis-

cuss them seriatim as it wanted to do, and had no appetite for mental food ready digested by some one else, or for the pretty poppy-cock about "untold millions and dear old prospectors," wildernesses which would blossom with cities, or even for that picture of Mr. Hobson, its papa, driving droves of shiny American millionaires in crush hats up the Cariboo road. Therefore it demurred but eventually became resigned again, remembering that after all the resolution in question only "urged that the Legislature should give its serious consideration to these recommendations."

But with regard to certain gross heresies the creature was emphatic.

It had been avowedly created to give advice, founded upon experience and special knowledge to legislators who were alleged to be insufficiently informed upon mining matters. The Minister of Mines had attended the creature's birth in all humility and had asked for its advice, and now certain of the creature's parents calmly affirmed that it was no part of the association's business to advise the Government.

"Then," replied the creature, "you have no business here at all."

But it may be that the parents meant more than this, for one of them brought in a motion which for audacity beats Bannagher. Here it is:

A. C. Galt and J. B. Hobson moved as follows:

"That having regard to the laxity which has heretofore prevailed in the Legislature of British Columbia in the enactment of laws and amendments to laws affecting the mining industry and the serious difficulties occasioned thereby, and having regard to the widely represented character of the association, and the fact that it includes within its membership many of the most competent authorities in this province to advise upon all matters affecting the mining industry, this association do respectfully urge upon the Government and Legislature of British Columbia the advisability of enacting that no legislation whatever affecting the mineral industry or any branch thereof shall be introduced unless the same has been approved by this association, or unless the association has been given a reasonable period, not less than three weeks, within which to consider and advise upon such intended legislation."

This would make of the association an Upper Chamber, or substitute an irresponsible, unelected body representing one interest only for the duly elected representatives of the whole people.

Of course the creature told its parents to mind their own business: to remember that they were an advisory and not a ruling body: that they had not even as many votes as the farmers, and that they had better lay this fool resolution upon the table.

On one other important point, the most important point of all, the creature disagreed with its creator and prevailed.

The reasons for its creation were principally the revision of unjust taxes, the advising of insufficiently instructed legislators upon special subjects within the knowledge of the association, and the settlement of labour troubles.

We have seen what happened with regard to the two first points. When the third came up for discussion

some of us were paralyzed by the opposition of certain important members to the admission of labour questions into the deliberations of the association, and others of us fairly gave up the conundrum when we seemed to gather from Mr. Hobson that the California association had not admitted the discussion of labour questions and yet had triumphed, especially in the allaying and eradicating of such troubles.

At this the creature winked loudly, and a voice we are beginning to know said, "Good old Hobson, but it won't go," and it did not. The creature said that the settlement of labour troubles was its peculiar province: that it was going down to Fernie right away to settle that trouble, and the Minister of Mines patted it on its back saying, "Good old horse, I'll pay your exes," and he did.

What, then, is the net outcome of the whole matter? We think that it is this. Thanks to a very whole-souled friend of British Columbia and of mining generally (Mr. Hobson) who being Irish, is naturally a little florid about his millions, the Mining Association has been born, and because it really is composed of all classes directly and indirectly connected with mining, and is not dependent upon votes which can be bought for its existence, it is wonderfully representative of the people, fair and level headed, anxious to get at facts for itself, intolerant of gas bags and people who want to do its thinking for it, and being British, suspicious of those who speak lightly of constituted authorities and precedent.

Altogether we believe that it has voiced exactly the mind not only of the mining classes but of those other classes whose interests have also to be considered. We have heard what the miners want and how far the farmers and others consider those wants to be reasonable. We have threshed out these matters before a body in which the mine owners and mine workers and the farmers, have sat side by side, and possibly the two first may have learned that the farmer would make the best possible referee between mine owner and mine worker, because his prosperity depends upon the peace between them and his sympathies are as much with the man as with the manager.

He himself is a small capitalist who in this country must do his own work or fail, *i. e.*, he is man and manager.

Our success so far amounts to this: We have formed a really representative body of the people who in British Columbia are interested directly or indirectly in mining: in that body we have formed committees giving all classes and all divisions reasonable representation: we have elected a Chairman who has our entire confidence: we have at our first meeting punctured the gas bag eloquent; smiled down the unconsidered accusations of the intemperate employee; sat upon the employer who wanted to run the whole show contrary to the wishes of those more vitally interested than himself; turned a deaf ear to the man who wanted to make party capital on the floor of our house; taught ourselves that what we want is short speeches with merit in them, and that what the public wants is a spirit of level headed, absolute fair play for all.

The world has been taught that life is strong in the mining industry of British Columbia: that it is quite brave enough to look its limitations and failures in the face and admit them; quite hopeful enough to believe that the remedy for them is simple and in its own hands, and quite sufficiently experienced and intelligent to form an adequate advisory board for legislators who want to legislate for the country's good.

We believe that the Government realizes the value to them of the new instrument if properly used and its danger to them if misused or neglected.

Finally, we have one word only of suggestion to our own association.

Would the gentlemen who "have recently been in contact with the vast aggregation of capital," and those who have many millions of European money behind them, as well as that gentleman who can pour himself several millions into Cariboo, come to stay with the writer and bring certified cheques.

Mr. S. F. Parrish, M.E., recently appointed General Manager of the Le Roi mine, at Rossland, is an engineer of wide experience and of great ability. For twenty-four years he was engaged in mining in Colorado, in charge of extensive operations at Leadville and



Mr. S. F. Parrish, M.E.,

elsewhere, filling the positions of superintendent and manager under the Crysolite Silver Mining Co. and the Yak Mining, Milling and Tunnel Company. Prior to his present appointment Mr. Parrish was in charge of the B. C. Chartered Co.'s mine at Eholt.

Our contemporary, *Iron Ore*, published at Ishpeming, Michigan, in a recent issue, very properly denounces a fraudulent undertaking known as the Labourers' Co-operative Gold, Silver and Copper Mining Company of British Columbia. The secretary-treasurer of this concern is a pious individual named Nylin, by trade a Baptist preacher. This person has issued a number of circulars in which in very glowing terms he describes certain prospects the concern has got hold of near Sicamous as mines of great value, at which there are hundreds of thousands of tons ready for shipment, and that the company proposes to erect a smelter without delay to treat this ore, which is also marvellously rich. The circular makes delightfully quaint reading. Here is an extract: "There are some people who would advise others not to make an investment. Such is only envy—'Envy, the rottenness of the bones, as the wise Solomon says (Prov. 14:30.)' And again, 'A number of investors in our company are Swedes and most of them Christians, who are going to give their dividends to assist missionary work.' That, in fact, is Mr. Nylin's object, he tells us, in turning company promoter, that he may raise enough money to go out and teach the Gospel in comfort. But he has since apparently changed his mind on this point, for we learn he is now living at great ease and splendour in Chicago, having doubtless found a sufficient number of the 'Lord's servants' to accept his special offer of 'a reduction of 10 per cent.' or an additional '\$2 in shares' for every \$20 subscribed. In addition to the undeveloped and probably quite worthless mineral claims at Sicamous, the concern has recently transferred its attention to Golden, where it is also *proposed* to establish a smelter and acquire a number of claims. A later circular states that 'shares have advanced from 5 cents to \$50,' but that as the company does not sell any of its treasury shares at present 'even if \$10 were offered,' Mr. Nylin generously proposes 'to give his friends a chance and has decided to sell some of his own shares at \$1 each. He has meanwhile founded a newspaper in his interests at Golden and has actually succeeded in imposing on some people. We have no hesitation in stating on the evidence that the Labourers' Co-operative Gold, Silver and Copper Company is a flagrant wild-cat, and that Nylin, its promoter, is a swindler of a very low and offensive type.

There seems to be fairly good proof that under normally favourable conditions gold dredging may be profitably undertaken in British Columbia. Thus from the report of one company engaged in this class of mining on the Fraser we gather that the change from a

incompetent to a competent manager resulted in a clean-up representing, instead of a loss on working expenses, a most substantial dividend on the capital invested. Unfortunately too many companies operating in the Province have not realized until too late that failure or unsatisfactory returns are largely attributable to faults of management and that is something no one can tell them. Reverting to dredging, it has now been clearly shown that the bucket dredge is the most suitable type to employ on the Fraser, and mistakes in this regard hereafter should not occur. Meanwhile, at the property leased by the company here referred to some interesting experiments were recently made by the engineer in charge in order to arrive at an idea of the distribution of gold in the river bed. In the place where he made his best hole the water was nine feet in depth; the first two feet below this gave 23 1-2 grains of gold per yard, the next two feet to grains per yard, and the next six had very low gold values, while the last six feet gave no gold at all, which seems to disprove the theory that the gold has settled down to bedrock.

We have always regarded the Ymir as one of the best managed mines in British Columbia. So it is from an engineering point of view. But whether the London management has been quite judicious is another matter. Apparently the company was forced into reconstruction as a result of the policy of applying all profits to dividends. Now that reconstruction has taken place, and a comparatively small sum of \$50,000 realized for development purposes, this same policy is to be continued. It is true the mine is in fairly good shape, since the lower tunnel connections were made, but nobody can pretend that the Ymir at present is in a secure position, and apart altogether from the question of advisability, it is open to doubt whether in the case of a mine so situated the occasional distribution of profits, which of course influences the share market, is even reasonably honest.

At the recent meeting in London of the Le Roi No. 2 Company the directors placed all the blame for the fiasco which attended last year's operation on the engineers, Messrs. Macdonald and Thompson. On a matter of record we are inclined to think that Messrs. Macdonald and Thompson would make a better showing than most of the gentlemen drawing fat fees as directors of the Le Roi No. 2 and such other concerns in which the movements of the Stock Exchange are more carefully considered than the condition of the mine.

THE TYEE COPPER COMPANY'S
SMELTER AT LADYSMITH.

THE smelting works of the Tyee Copper Company, Limited, are situated to the west of the town of Ladysmith and lying between the E. & N. Ry. and Oyster Bay, giving a water frontage of approximately 3,000 feet in length. A lagoon in the bay extending 1,000 feet in length by 500 in breadth, forms an admirable dumpage for slag for years to come, while on the outside of the lagoon there is deep water for dock purposes. The ground between high water

whenever the amount of ore procurable justifies the company taking this step. Two spurs of the E. & N. Ry. enter the property on the east, the lower one to the 37-foot level, for the shipment of matte, and the upper into the 51-foot level for the delivery of coke and coal. At the rear of the smelter buildings, also on the 51-foot level, are the burnt ore bins, of a capacity of 1,000 tons for the storage of burnt ore from the roast piles. The tramway, about 2,000 feet in length, connects the bins with the roast yards lying to the west.

The ore is conveyed from the Tyee mine in bottom dumping cars by the E. & N. Ry. Co. and delivered by them into two sets of bins at the roast yards, having



Smelting Building and Engine House.

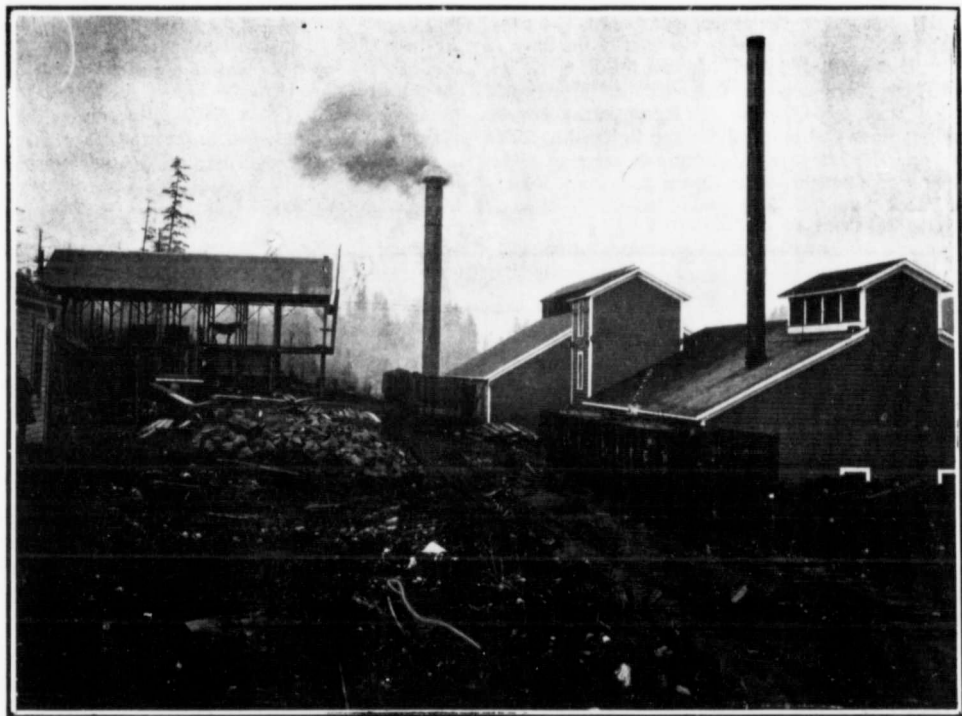
mark and the track of the E. & N. Ry. has been laid off in terraced form, which gives a gravity system throughout.

Although the plant as recently designed and constructed is of 200 tons capacity, the power house, smelting shed and dust chamber have been built for a capacity of 600 tons per day, so that nothing more than the actual machinery will be required to treble the capacity of the works, besides which some 60 feet of ground lying between the power house and smelting shed have been excavated ready for such extension. The buildings themselves, situated on the 37-foot level, have been placed sufficiently far back into the hill side to admit of the installation of a Bessemering plant

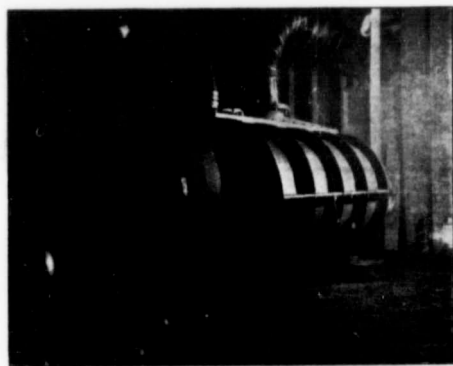
of a capacity of 1,600 tons. From this point the ore is trammed out over a series of six permanent trestles placed 60 feet apart and running north and south. At right angles to these trestles are six trenches four feet deep and forty feet apart, thus dividing the ground into beds 60x40 feet. The piles are built lengthwise with the cuttings so that half of each pile may be shovelled into the burnt ore cars on either side, thus reducing the distance to a minimum. The spreading of the ore over the ore beds is effected by means of a travelling bridge, placed between and at right angles to the permanent trestles and running on rails. By this means the ore can be dumped from the bridges onto any part of the pile, each series of trestles being provided with

one bridge, which is moved over one pile to the next, as required. The travelling bridge is the invention of the manager, Mr. Thos. Kiddie. Side dumping cars

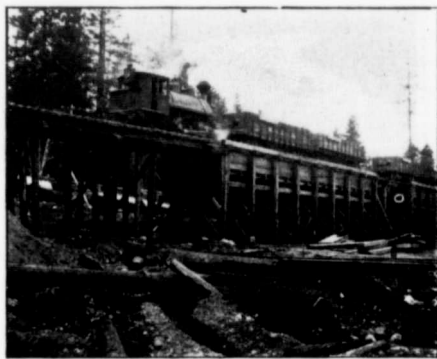
30 days' roasting. When sufficiently cold the ore is shovelled into two-ton cars standing in the cuttings and trammed by horse-power to the bunkers at the smel-



Smelting Building from the Rear, Showing E. & N. Track and Ore Bins.



The Blower.



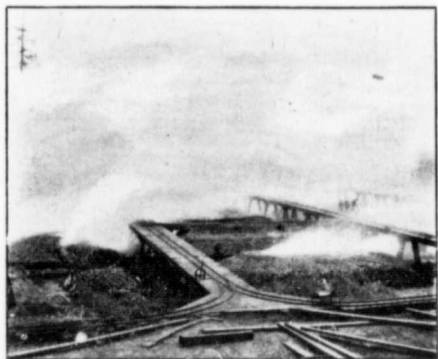
Ore cars unloading ore from the mine.

are used for running out the ore over the piles, the bridge forming a circuit between any two sets of trestles. In this manner the piles are built up and the bridge pushed forward to the next ore bed. The ore is put up in piles of 250 tons each and require about

ter, from the bottom of which bins the charges are drawn as required for the furnace.

The company have all the machinery on the ground for the erection of a large sampling plant which has been designed by Mr. Geo. Williams. This plant will

be installed in the near future and will be equipped with Snyder automatic samplers, crushers, rolls, grind-



Track Leading to Ore Piles.

ers and screens, the fuel being delivered from the ore track on the west side of the sampler.

Chalmers Company of Chicago, Ill., U.S.A., and provided with fourteen 6-inch Tuyeres and all the latest appliances known in the profession. In front of the furnace stands a large water jacketed receiver, into which the matte and slag run from the furnace, the slag overflowing into a second settler from which the slag runs into a jet of water under a sufficiently strong head to granulate it and flume it into the lagoon; the matte being tapped from the large settler at intervals and cast into slabs 3x2 feet and 2 inches thick. When cool it is roughly broken and shovelled to one side, ready for shipment.

In the smelter shed on the east are two matte bins, each of a capacity of 40 tons, bucket elevator, matte sampler, one 7x10 Blake crusher, sample grinder and hoist elevator.

The engine and boiler house on the east of the smelter shed and 60 feet distant, is 70x50 feet. In the rear of the boiler is the coal bunker 20x20, over which a spur from the E. & N. Ry. track runs for the delivery of coal for power purposes. An 80-horsepower boiler of the returned tubular type supplies the power for the Allis-Chalmers (Corliss) engine, which drives



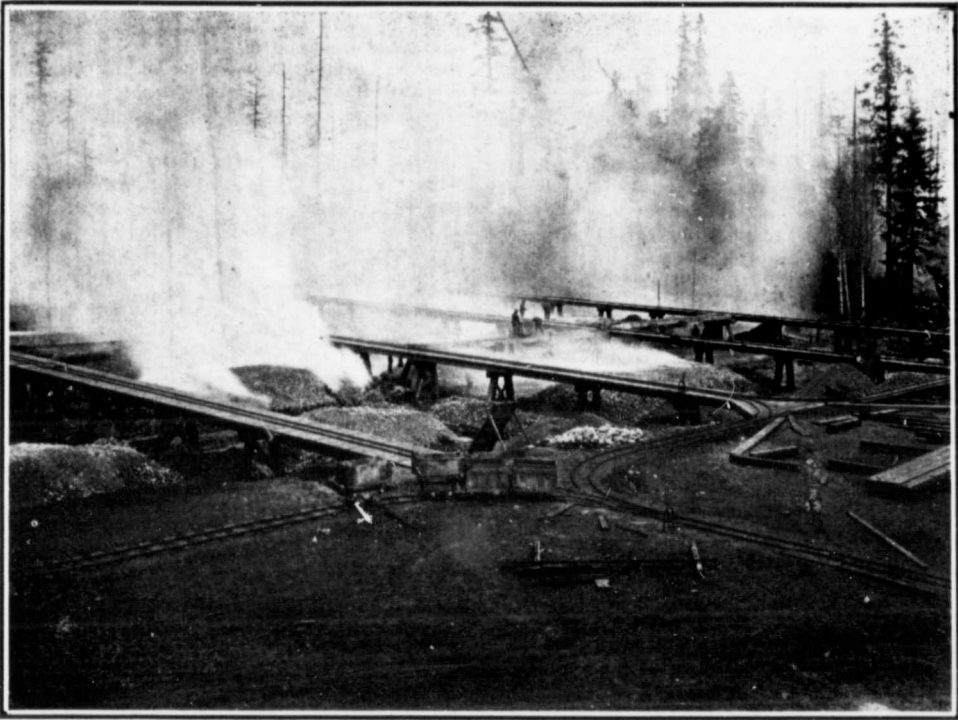
A General View of the Smelter.

The water supply for the works has been provided by the E. & N. Ry. Co., who have constructed a storage tank on the west side of the track, 60x30x8 feet deep, which is supplied by a flume one mile in length from the head of Rock Creek. This gives an ample supply of water for the furnaces and for the slotting of the slag at the smelter. A six-inch water main connects the water tank with the smelting works. The smelter building is 81 feet in length by 51 feet in breadth. The charging platform covered with steel plates being 14 feet above the furnace floor is carried on cast iron columns with concrete foundations. A ventilator 6x10 feet extends the full length of the building and gives ample ventilation. The building is constructed in a most substantial manner, the framework being of 12-inch squared timber, sided with rustic and provided with windows of ample dimensions. Towards the west end of the building stands the water jacketed furnace, 42x120 inches, built by the Allis-

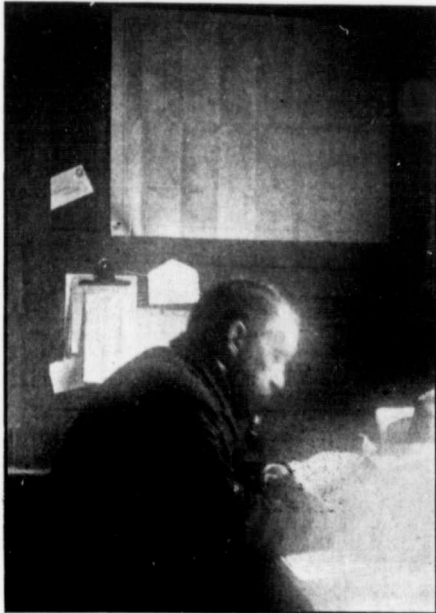


The Assay Office.

the No. 7 Connersville blower, crushers and elevators



The Roast Heaps, showing the method of distributing the ore.



Mr. Thos. Kiddie, the Manager, in his office.



Tapping the Matte.

in the smelter shed, the power being transmitted by means of a rope drive. All the machinery and power plant was supplied by the Allis-Chalmers Co. The engine, blower and boiler are set on concrete foundations of ample dimensions. An electric light engine and dynamo furnishes light for the plant, office and assay office, bins, etc., while a complete system of fire hydrants has been installed in each department.

The assay office is located to the east of the smelter, having a frontage of 46 feet, divided into three rooms, while in the rear is the furnace room, 20x16 feet. The front building is divided into balance room, assay room and analytical room, each 16 feet deep and heated with hot water. The interior fittings are polished cedar and plastered throughout. The furnishings and chemical apparatus are of the most complete kind, consisting of analytical and bullion balances, scales, platinum ware for the electrolytic determination of cop-



The Manager's House.

per and binettes, etc. In the furnace room stands the 30-foot stack divided into four compartments, while on either side are located the muffle furnace of the most improved type and a sand bath with hot air oven; all being fired from one side, while the openings are in the assay and analytical rooms respectively. In front of the stack stands a melting furnace, 16 inches square inside, used for experimental purposes. Abundance of light and ventilation are provided in each room, every detail being worked out for convenience of manipulation, making it one of the most complete, if not the largest, in British Columbia.

The works were built from the designs of the smelter manager, Mr. Thos. Kiddie, his son, Mr. John

Kiddie, C.E., being in charge of the construction, and Mr. Geo. Williams as mechanical engineer.

THE HISTORY AND PROGRESS OF MINING IN THE BOUNDARY DISTRICT.

(By E. Jacobs.)

(Continued from last month.)

SUNSET AND CROWN SILVER.

THE Sunset group is owned by the Montreal & Boston Copper Co., Ltd., of Montreal, Quebec, which was organized in 1901 to acquire the mining properties and other assets of the Montreal-Boundary Creek Mining Co., Ltd. The group consists of the Sunset, Crown Silver, C. O. D., and the Florence fractional claim, all adjoining and situate in Deadwood camp, about three miles west of Greenwood. The Sunset and Crown Silver were both located on June 2, 1891. They were bonded in 1897 by Mr. W. L. Hogg, of Montreal, who with his associates did a lot of development work on them, and organized the Montreal-Boundary Creek Mining Company to further develop them. The other two claims were acquired later. In the summer of 1899 Captain Harry Johns, who had previously been superintendent at the adjoining Mother Lode mine, assumed charge at the Sunset and ever since has directed operations on the group. The number of lineal feet of work done in development on the Sunset and Crown Silver totals 7,155 feet, of which 1070 feet represent sinking and raising done on the properties and the remaining 6,085 cross-cutting and drifting. The main shaft of the Sunset is 412 feet in depth and levels have been run at 100, 176 and 300 feet depth respectively. The Crown Silver shaft is 265 feet in depth and from this about 880 feet of cross-cutting and drifting have been done. The 300-foot level of the Sunset is a long tunnel driven to cut an ore shoot of higher grade than the main ore body and with the ultimate object of connecting with the Crown Silver workings. Owing to the rise in the hill the 300-foot level of the Sunset will be about 400 feet below the surface by the time it shall be under the Crown Silver shaft. A feature on the Sunset is a knoll of rock, the weathered exterior of which was much copper-stained. A tunnel driven through this knoll disclosed the occurrence here of a big body of low-grade ore, approximately 300 feet in length by 115 feet in width and estimated to contain above the 100-foot level about 250,000 tons of ore. The method of mining this is by opening underground a large stope or "glory hole" connecting with the 100-foot level by a series of chutes down which the broken ore is shot to be trammed to the main shaft and hoisted thence to the surface above the ore shipping bins. The power plant installed at the Sunset includes two 80-h.p. boilers, half of a 20-drill duplex Ingersoll-Sergeant air compressor, two air receivers, ten Ingersoll-Sergeant 3 1-4 machine drills, Jenckes double hoisting engine with 14 by 20 inch cylinders, two

mine safety platform cages, dynamo of 125 volts run by a 12-h.p. engine for electric lighting, well-found tool and repair shop, etc. The building improvements consist of ore bins with a capacity of 2,000 tons, comfortable bunk and boarding houses to accommodate about sixty men, men's cottages, villa residence for superintendent, assay office, boiler and engine houses, substantial head-works, etc. A double spur from the Deadwood branch of the Columbia & Western Railway affords facilities for shipment of ore, which is sent to the Montreal & Boston Copper Company's smelter at Boundary Falls, distant by rail about eight miles, and to which between 7,000 and 8,000 tons of ore were shipped from the Sunset during the latter part of last year.

EMMA.

Six or seven years ago a shaft was sunk 100 feet on the Emma claim, in Summit camp, then owned chiefly by Farrell and Midgeon, well-known mining men of Butte, Montana. A big outcrop of copper ore occurs on the property, but the grade is not high, though the constituents of this ore make it very useful for fluxing purposes. After a Crown grant was obtained for the claim no work of importance was done until the Hall Mining & Smelting Company, of Nelson, B.C., a few months since made an arrangement with the present owners (the Dominion Copper Co., Ltd., of Toronto, Ontario), to mine and ship ore from it. Two years ago a quarry was opened alongside the railway, which crosses the claim, and some ore shipped thence to Boundary Falls, but as the smelter did not start work this was dumped alongside the railway and lies there still. The Hall Company has expended about \$4,500 in plant and buildings and shipped 8,530 tons of ore, chiefly to Nelson. This ore was taken from a big cut made in the side of the hill just above the railway, this admitting of mining and shipping costs being kept very low. There appears to be a large quantity of ore available here, so that a much-increased output is anticipated for the current year. Later underground work will probably be done, to determine the extent and value of the ore at depth. The opening up of the Emma claim has encouraged an attempt being made to do similar work on the neighbouring Oro Denoro, owned by the King Mining Company, of Rossland, and on which shoots of ore, of a grade that under present smelting conditions can be mined and treated at a small margin of profit, have been encountered.

THE B. C. MINE.

The B. C. mine, situate in Summit camp, within a couple of miles of Eholt, the Boundary divisional point on the Canadian Pacific Railway Company's Columbia & Western Railway, is one of a group of mineral claims owned by the B. C. Chartered Co., Ltd., of Montreal, Quebec. The claims comprising the group are: B. C., Truckee, Reveille, Hilda, Vashti, Falcon, J. W., London, Daisy Fraction, B. C. Fraction and Novelty Fraction, together containing an area of 268 acres. The B. C., upon which most of

the development has been done, was located in the fall of 1896, and the following summer the work of opening up the mine was commenced. To the end of 1901 the footage of work done in underground development of the mine totalled 5,876 lineal feet, 1,106 feet being sinking and raising and 4,770 feet cross-cutting and drifting. The deepest shaft is down 400 feet. This mine was the first in the district to ship ore in quantity to a smelter. Commencing in January, 1900 its shipments during the first half of that year totalled 3,959 tons, and by the end of the year the output had been increased to 19,618 tons. Its production during 1901 was 47,517 tons, making an aggregate of 67,135 tons, having an average assay value of .015 oz. gold, 2.45 oz. silver, and 5.8 per cent. copper, wet assay. About four-tenths of this ore was treated at the Canadian Smelting Works, Trail, and practically the whole of the remaining tenth at the B. C. Copper Co.'s smelter, Greenwood. The price of copper having fallen the mine was closed down during eight months of 1902, but underground work was resumed in September and by the end of that year 14,443 tons of ore were added to the total output of the mine. A considerable reduction having been made in freight and treatment charges the "run of mine" was sent to the smelter, with the result that the average value of the ore shipped fell to 1.75 oz. silver and 4.1 per cent. copper for the 1902 product. A lot of surface trenching to bed rock was done last summer, resulting in some fair showings of copper ore being met with. The power plant at the B. C. includes four boilers, together about 225-h.p.; a straight line 4-drill Rand air compressor; half a Class G Ingersoll-Sergeant air compressor rated at 10 drills; one large and two small hoisting engines; two sinking pumps, an electric light engine and dynamo, and a full complement of accessories. A spur from the Phoenix branch of the Columbia & Western Railway gives the mine railway connection. Mr. S. F. Parrish, M.E., who was recently appointed General Manager of the Le Roi mine at Rossland and the smelter at Northport, Washington, has been in charge of the B. C. mine since the beginning of 1900.

WINNIPEG AND GOLDEN CROWN.

The Winnipeg and Golden Crown are adjoining mines situate in Wellington camp, about eight miles from Greenwood. Both were among the shipping mines of the Boundary during part of 1902, though their production, respectively, was comparatively small, and both are inoperative at the present time. The Winnipeg was located in the summer of 1895, and 1897 a company named the Winnipeg Mining & Smelting Company was incorporated to acquire and develop the claim. This company did a deal of work and shipped some ore to the smelters. Towards the close of 1900 the Winnipeg Mines, Ltd., was incorporated to acquire the assets of the old company. During 1901 this company shipped 1,040 tons of ore, and whilst operating in 1902 added 785 tons to the total production of the mine, which, including the output of 1900, is 2,901 tons, much of it ore running \$13 per ton gross, and consequently of a generally higher grade

than the average ore produced by Boundary mines. High assay values could be got from hand samples, but the best returns from carload lots were \$48 per ton from one car, and \$27 per ton from 57 tons, these being the gold returns from two lots from one vein. Silver varies from 1 oz. to 6 oz. per ton, and copper runs about 1 1-2 per cent. About 4,500 lineal feet of work have been done in underground development, two-thirds in sinking and raising and the remainder in cross-cutting and drifting. The deepest workings are 400 feet depth. The ore veins are numerous, but most of the work has been done on three of them, these yielding practically all the ore produced. The Winnipeg has an area of about 27 acres. A half-mile spur from Hartford Junction connects the mine with the Phoenix branch of the Columbia & Western Railway. The power plant installed included two steam boilers, two hoisting engines, a 14x22 Rand straight line air compressor, air receiver, steam pumps, machine drills, etc., but fire last summer rendered useless some of this machinery and the mine has not since been worked. Fortunately most of the mine buildings escaped destruction. Efforts are being made to arrange for a resumption of work.

GOLDEN CROWN.—The Golden Crown has had a somewhat similar experience to that of the Winnipeg, in that it was worked from 1897 to 1900 by one company and in 1901 passed into the possession of a reorganized company. The Brandon & Golden Crown Mining Co., Ltd., did nearly 2,500 feet of underground work, and shipped 2,241 tons of ore of an average good grade, and then it gave place to the Golden Crown Mines, Ltd., which has its head office in Brandon, Manitoba. The new company worked only a few months, during which its output of ore was 625 tons, making the aggregate of ore produced 2,866 tons. No. 1 shaft is 322 feet in depth, and levels have been run at 50, 100, 150, and 300 feet, the last-mentioned being about 900 feet in length. Work has been done on only three veins, the others crossing the property not yet having been opened up. The mine has railway connection similar to that giving the Winnipeg ore-shipping facilities. The power equipment includes two boilers together 100-h.p., a 12x18 Rand straight line air compressor, air receiver, hoisting engine, steam pumps, machine drills, etc. This mine was the first in the district to put a mine cage in its shaft.

OTHER COPPER-GOLD MINES.

The mines already dealt with are those that produced and shipped more or less copper-gold ore in 1902. Besides these there are some properties, on which copper ores occur, that were either inactive last year or did not ship any ore. The best known of these will have mention before the quartz mines of the district have notice. In Greenwood camp there are the Brooklyn and Stenwinder group, owned by the Dominion Copper Co., Ltd., of Toronto (above mentioned as owning the Emma mine) and the Gold Drop, belonging to the Gold Drop Mining Co., Ltd., of Montreal, Quebec. The Dominion Copper Company's claims include the Brooklyn, Stenwinder, Idaho, Montezuma and Stand-

ard, all in or near the town of Phoenix, and the Rawhide, distant about half a mile to the southward.

BROOKLYN AND STEMWINDER.—The Brooklyn and Stenwinder are among the oldest locations in Greenwood camp, the latter by Jas. Atwood and J. Scholefield on August 3, 1891, and the former by S. Mangott and J. M. Taylor on the following day. There is but little official information available relative to these properties. From other reliable sources, though, it has been ascertained that development work approximating between 3,000 and 4,000 lineal feet has been done on the Brooklyn, which has a shaft 268 feet in depth from which levels have been run at 150 and 250 feet respectively, whilst the adjoining Stenwinder has a shaft 344 feet in depth, but only a comparatively small footage of drifting and cross-cutting. It is stated on what is believed to be good authority that one shoot of ore in the Brooklyn mine has been proved to be at least 1,000 feet in length and 20 feet in width at the 250-foot level. This mine has a considerable quantity of ore on the dump but has made only one shipment of about 150 tons, sent to the smelter in 1900 for a bulk test. The average value of the ore is understood to be about \$5.00 in all values, but this statement has not been confirmed by anyone connected with the company. The Stenwinder has ore somewhat similar in character to that occurring on the Brooklyn, but as yet it has not been found in such great quantity on the former. The Idaho, which adjoins the Brooklyn on the south, has had a shaft sunk on it and a cross-cut has been run from this towards the Brooklyn workings, but development here is not yet extensive. The Rawhide shaft connects at 184 feet depth with a cross-cut tunnel run about 450 feet into a high hill. This shaft passed through a shoot of nice-looking ore which has not yet been opened out.

THE GOLD DROP.—The Gold Drop adjoins the Snowshoe on the west of the latter. No work has been done on this property since the summer of 1900. Up to then some 1,905 lineal feet of work had been done in underground development, 1,510 feet being cross-cutting and drifting and 395 winzes and raises. These workings disclosed the presence in the mine of large bodies of ore, but so far as known, only a single test carload was shipped to the smelter. It is understood that the owners are not disposed to work the mine at present, waiting rather for lower freight and treatment rates before resuming operations. The small power plant installed here includes a 4-drill air compressor, air receiver, 40-h.p. locomotive boiler, steam pump, machine drills, etc.

ORO DENORO.—In Summit camp, near Eholt, the Oro Denoro, R. Bell and Blue Bell each had attention at one time or another between 1897 and 1901. The Oro Denoro was owned until recently by the King Mining Company, Ltd., of Rossland, B.C. Last December the Denoro Mines, Ltd., was incorporated to acquire from the King Mining Company this and other mineral claims. More than 1,100 lineal feet of work have been done on the Oro Denoro, including a shaft 185 feet in depth and three cross-cut tunnels. The

showings of ore on the property are promising, whether outcroppings at the surface or encountered in the tunnels, and it is confidently believed that when work shall be resumed, which it is intended shall be at an early date, the output of ore will, at the lower freight and treatment rates now obtainable, bring in returns more than sufficient to pay operating expenses. There is on the property a small plant consisting of a 40-h.p. locomotive boiler, a 10x12 air compressor, air receiver, hoisting engine, steam pump, machine drills, etc. The R. Bell shipped 480 tons of ore in 1901, but no work has since been done on this claim. More than 1,000 feet of work have been done, including a vertical shaft 215 feet in depth with levels at 80 and 200 feet, respectively.

R BELL.—The grade of the ore obtained was satisfactory but no permanent shoot of pay ore was met with, only bunches here and there, so that there was not sufficient encouragement to continue prospecting under the conditions then existing. The claim will likely receive renewed attention later. A 25-h.p. boiler, 6x8 Bacon hoist, and a 3 1-4 Little Giant machine drill operated by steam, were in use whilst work was being done underground.

THE BLUE BELL.—The Blue Bell, situate in the neighbourhood of the B. C. mine, was for some months under bond to a company formed in Illinois, U.S., but the option to purchase was not availed of. Whilst the agreement was in force a shaft was sunk 133 feet, but at that depth it was in a sheet of porphyry which cut off the ore. As similar conditions were found to exist in the B. C. it is probable the ore occurs below the porphyry, as it does in that mine. However, the owners declined to extend the time for a substantial payment under the bond, so the Eastern men threw it up. Short drifts were run in ore at 50 and 100 feet depth, respectively, whilst work was in progress. The Mountain View, situate between the R. Bell and the Blue Bell; Maple Leaf, one of the Rathmullen group; and the Rambler, prospected by shaft, cross-cuts, and diamond drilling, by the Everett and Spokane Mining Company, are other mineral claims within a couple of miles of Eholt that have been prospected considerably.

THE MORRISON.—The Morrison, in Deadwood camp, is a property that will probably ere long be placed on the list of regular shippers, but for some months this mine has been closed down. For several years the Morrison was operated by the Morrison Gold Mining Company, of Spokane, Washington, until, in January of 1900, the Morrison Mines, Ltd., was organized to take over all the assets of the old company. There are three veins of ore opened on the property, but only one has been explored to any extent. The ore bodies in the main vein upon which work has been done are from 10 to 40 feet in width. Altogether about 3,000 lineal feet of work have been done underground, some 450 feet being sinking and raising and 2,550 feet cross-cutting and drifting. The diamond drill bored 1,011 feet of holes (all on the 300-foot level, and this cross-cut several large ore bodies, which have not yet been opened up though trial shipments of ore, 433 tons

in all, were made to the Greenwood, Grand Forks and Trail smelters for test purposes, but the mineral content was not published. An announcement was made recently that a contract had been arranged with the Montreal & Boston Copper Company's smelter to take ore and that consequently operations would be resumed at the mine at an early date. The mine is equipped with two boilers together 110-h.p., a 16x24 straight line Rand air compressor, rated at 5 drills, machine drills, air receiver, No. 7 Cameron sinking pump, and, at the 200-foot level station, a 7x9 Lidgerwood hoisting engine. With the plant and equipment now at the mine a daily output of 100 tons of ore is stated to be practicable. There are about 5,000 tons of ore on the dump. The mine buildings include boiler and engine house, boarding and bunk houses, and all other requisite accommodation. The mine is on Copper Creek, about three miles northwest of Greenwood, with which it has waggon road connection. The Deadwood camp branch of the Columbia & Western Railway, from Greenwood to the Mother Lode and Sunset mines, passes within a mile of the Morrison, to which a survey has been made for a spur, giving about a three per cent. grade on a direct route.

KING SOLOMON AND COPPER MINE.—In Copper camp oxidized copper-bearing veins are met with on the King Solomon and Copper Mine (the later known locally as the Big Copper) mineral claims. It is not unlikely that these also occur on other claims in this camp, but the two properties named are the only ones opened up in that locality. Some interesting observations by Mr. R. W. Brock, geologist, of the Dominion Geological Survey, on these veins were quoted in the first of this series of papers (See MINING RECORD for January, 1903, page 455). On the King Solomon the oxide zone is found, and on the Copper Mine the richest sulphide zone. A prospect shaft was sunk on the King Solomon several years ago, but the work done last year was the making of a deep open cut into the side of the hill, taking out rich iron and copper oxide. Some 850 tons of this ore were sent to district smelters, but as it had to be hauled by horse teams about four miles to the railway at Deadwood for shipment thence to the reduction works, freight costs took too large a proportion of the returns to induce the owner of the claim to continue shipping. Work done last year on the Copper Mine claim exposed an ore body 174 feet in length and 82 feet in width. An open cut, averaging 15 feet in width and 26 feet 6 inches in height, was run 93 feet in the ore, of which there is a considerable quantity on the dump ready for shipment whenever market conditions shall be deemed favourable enough. The opening up of this property directed attention anew to Copper camp, and it is likely that it will lead to the claim being sold ere long to a strong company. The Copper Mine is owned by Mr. Geo. B. McAulay, of Spokane, Washington, managing director of the Cariboo McKinney Mining & Milling Co., Ltd., and Mr. John Morand, of Greenwood, Mr. D. C. Corbin, the well-known builder of the Spokane Northern Railway, also of Spokane, owns the King Solomon.

RUBY AND GOLCONDA.—There are several promising copper claims in Smith's camp, near Boundary Falls, among them the Ruby and the Golconda. In 1901 the Ruby was under bond to men resident in Detroit, Michigan, who did a lot of surface work, uncovering several shoots of copper-gold ore of good grade, of which they sent to the smelter 85 tons. They installed a 45-h.p. boiler and worked two machine drills by steam, these facilitating the driving of two tunnels, one about 165 feet and the other of shorter length. Financial difficulties eventually necessitated a cessation of operations and the bond lapsed. The Ruby, which is owned by Messrs. W. G. McMynn and Geo. Cook, is situated within a quarter of a mile of the Boundary Falls smelter, but the Golconda group is in the hills to the west of Boundary Creek and about a couple of miles away. No work was done on the Golconda last year, but men are now doing some further prospecting on the property. A shaft was sunk four or five years ago, and later a cross-cut tunnel was driven 280 feet, the calculation being that the ledge would be encountered at 450 feet in, and would there give a vertical depth of 275 feet, but there remains 175 feet tunnel to be driven before this expectation can be realized. The group comprises the Golconda, Cleveland, Laccoon, York, Wild Rose and Gold Bed. Hon. Geo. E. Foster is one of the owners, and another, C. Haas, now of Spokane, has directed the prospecting work done on the claims. There are numerous other promising copper claims in the several camps of the Boundary.

1902 IN THE SLOCAN DRY BELT.

(By W. D. McGregor, M. E.)

BEFORE giving an outline of the more important developments of the year, it may be as well to notice one or two general matters that have affected our mines.

The district has always suffered on account of the extreme richness of the ore—or rather of the rich lenses of ore in many of the ledges. This may seem an unreasonable statement, but it is easily understood that a prospect owner finding a bunch of ore that assays from \$50 to \$150 per ton, and knowing that \$15 per ton will pay shipping and smelting charges, may very likely decide that there is a good thing in it for him, and he consequently starts in to make his mine open itself. Everything is done in the most expensive way, and after driving his little development tunnel through the rich shoot he finds that the ore sorted from the rock broken in the tunnel is not a very large percentage of the whole, that the little stoping ground available will hardly pay expenses and that he has no funds for further development. The chances are that he not only breaks down the ore from above, but “underhands” everything in sight and most fatal of all, sorts rather loosely. Then when his returns come in and he finds that his shipment ran about \$50 per ton and it cost him \$60 and he has gouged out all the rich ore in sight; the face of his tunnel is in low-grade and

the once promising prospect is a “frost,” though he may have cut through the top of an extensive ore shoot and others may, and probably do, exist on the same level ahead of his work, making the proportion of ore in the whole vein large enough to pay handsomely if properly and economically developed.

If, on the other hand, such a prospect cut into ore in one, two or more places, falls into the hands of a promoter, together with an optimistic report on ore *not* in sight, he (more or less self deceived) is likely to sell at a vastly increased price to some syndicate which probably unloads, at another killing profit, onto a company. The problem presented the directors is probably only the extracting of \$100 ore at a profit. This being the case a small fund in the treasury is looked on as ample, and this is probably expended on trails, buildings, etc., as development and ore extraction are expected to be synonymous, with dividends after the first month's operation. Of course the end of this is worse than the first case. The district is discredited and what might have been a good mine is an eyesore and a stumbling block to the whole camp.

Now, I do not wish to pose as a “calamity howler” or “knocker,” though we have suffered severely from this kind of thing in the past, and I must say I do not know of a good surface prospect in a good locality that has proved worthless under proper development. Also, the past year's development has been quite as satisfactory as that of any previous twelve-month, though of course the drop in silver hits us all hard.

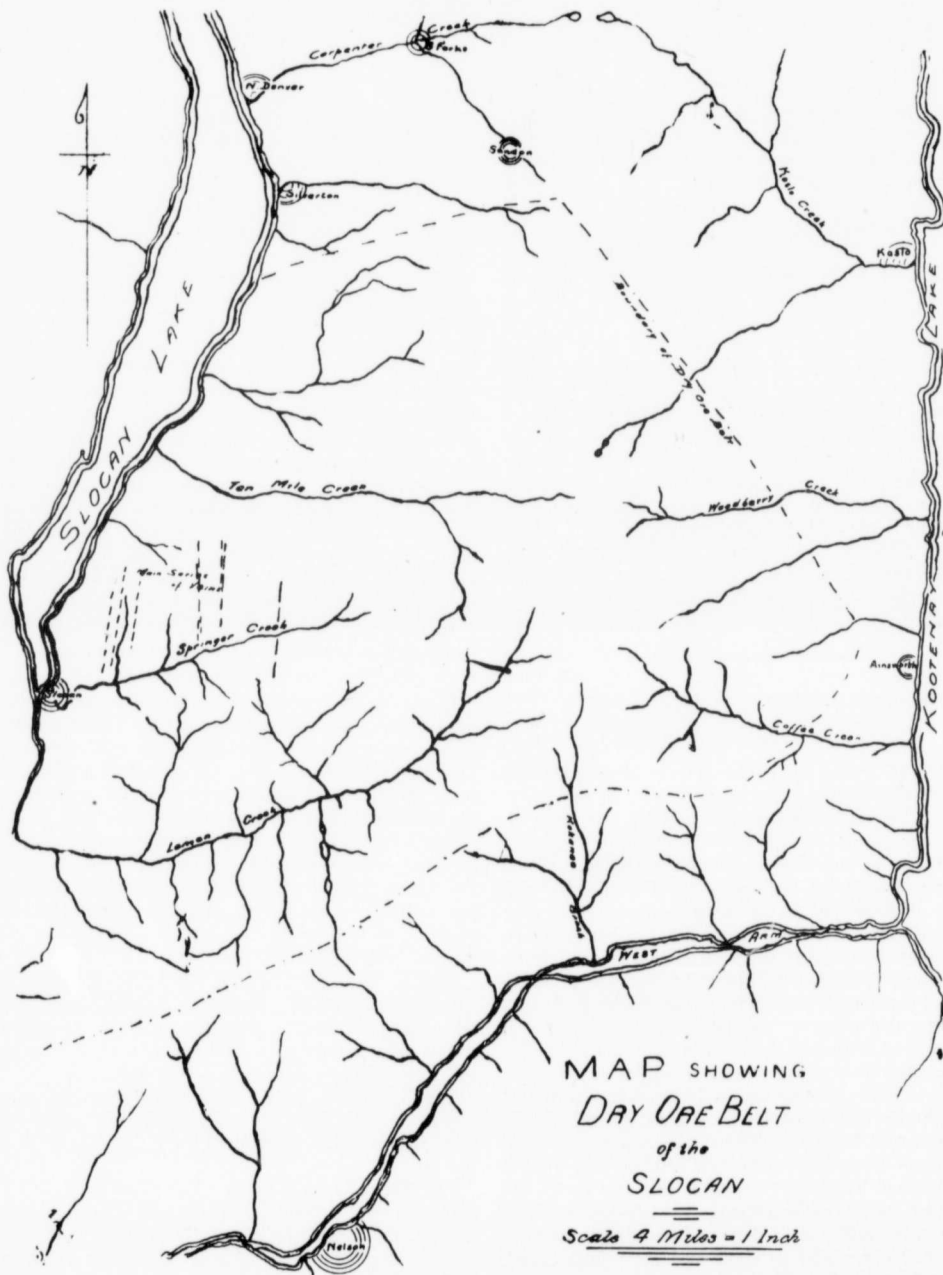
In outlining the year's work I cannot pretend to touch all the working properties, so confine myself to types and those I am best acquainted with.

Beginning at the extreme north, the most important work of the year has been done on the Fisher Maiden, which produced, several years ago, some very rich ore from a shoot near the centre of the property and was then practically abandoned. Surface prospecting in the fall of 1901 showed rich ore near the south boundary. Two adit tunnels have proved a more important ore body than the original discovery. No. 1 tunnel shows ore from 4 inches to 6 feet wide and about 75 feet long. The ore is rich, sorting to about 150 ozs., complex, various sulphides in quartz gangue and easily mined. Now shipping steadily.

Coming south to Ten-Mile Creek, we find the Enterprise mine with an output of 2,200 tons, chiefly concentrates, just about paying expenses for the season, and at present shut down, owing to the drop in silver and unsatisfactory results from the mill.

The Iron Horse, half a mile west of the Enterprise, operated by the Burlington Company, has been doing steady development work since the resumption of work last fall.

The Recowilabi Company owning the northern extension of the Arlington mine, under the same management and consisting of largely the same shareholders, has decided on the erection of a large reduction plant as soon as the snow goes. Satisfactory tests are reported from the experimental plant set up in Spokane and it is expected they will handle the low-grade ores, not only from their own vein, but from others



in the vicinity. As the manager of the Arlington estimates 40,000 tons of low-grade, most of which is on the dump, encountered in mining some 7,000 tons of shipping grade, all of which can be treated at a profit and representing the comparatively small vein area worked as yet, it will be seen that the value of successful treatment on the lines laid down will be very great, not to the Arlington, etc., alone, but to other mines of the same class. It is understood that the method includes table concentration and an electro-cyanide treatment of the tailings, giving a very close saving of values. Of course I believe that the final step in the treatment question will be the smelting at Slocan of the dry ores *en masse*, giving the necessary flux for the galena from the Upper Slocan. There is not ore enough cut as yet, to warrant the necessary outlay, but we are distinctly nearer the point than a year ago. One of the marked steps toward a big tonnage is the development on the Black Prince, situated about one and a half miles southeast of the Arlington and near the divide between Springer and Lemon Creeks. This has been developed under option by Mr. Hy. Norman, of Spokane, during the season. The work under the bond includes a cross-cut tunnel between 400 and 500 feet in length and some 150 feet drifting and cross-cutting, exploring the vein at this depth. As the vein is opened at the 80-foot level by a cross-cut and some 300 feet of drift a fairly good idea of its value is now available. It is shown to be from 8 to 16 feet wide; gangue, quartzose, banded highly mineralized in shoots. Ore dry, largely sulphides; large quantities second grade, has yielded five carloads sorted ore showing over 100 ozs. Altogether a most satisfactory showing.

On the same ridge one and a half miles west the Meteor claim is being re-opened under lease. The leaseholders have shown the old ore shoot to extend down 60 feet below where it was thought to be worked out. They have driven a cross-cut at this level and are now stoping ore which is concentrated into a quartz "pay streak" a large proportion of which is charged with grey copper, argentite and pyrites, the sorted ore showing in the neighbourhood of 1 oz. gold and 300 ozs. silver.

West of the Arlington one and a half miles on the same range and at about the same elevation lies the Ottawa. This is one of the marked successes of the year. It is owned by a Pittsburgh syndicate, having been purchased by them in the latter part of the summer, after developing for some six months under bond. The mine is in charge of Mr. McPhee, who opened the property for the owners and is working a full force on development while shipping about 15 tons of sorted ore weekly.

Coming west down Springs Creek, the next point of interest is the Dayton at the mouth of the creek of the same name. This also is being operated under lease and the leaseholders have been working in ore almost from the beginning. The gold values in this would seem to mark a belt a mile or more wide extending from Ten-Mile to Lemon Creek.

The Republic group, two and a half miles northeast of Slocan, has been under development all summer. A wagon road has been built and two long cross-cut

tunnels run from a gulch to tap the two main veins. This has not yet been accomplished, but since November they have been working a small force taking ore from the old workings where the showing has greatly improved. They are shipping steadily ore that returns somewhere in the neighbourhood of \$1,000 per car.

The owners of the Myrtle group, about one mile northeast of the Republic are putting in their second winter developing this, which they have already shown to be one of the big deposits of the camp. They count on defining the walls and getting a working estimate of its value this season.

On Lemon Creek probably the most important work is that done on the First North Fork, showing the continuity of the gold content with depth. There is no doubt that a considerable area here is well worthy investigation, as good gold values are shown in many places, and the deepest work on the creek shows satisfactory ore at the bottom, say 200 feet depth.

It might be well to note here that exploration so far seems to show that all of the ore-bearing deposits or veins in this vicinity belong to one of three main classes: First—The big veins or shear zones, running across the axis of upheaval, in the granite, sometimes over 100 feet wide, characterized by quartz deposits on each side or wall, which appear two distinct parallel veins and are often so described.

On examination, however, the belt between these "veins" is found to be fissured, twisted and more or less altered and mineralized by the passage of hot liquids and vapors. Lenses of ore are common and may occur in any band, though all the more important deposits of high-grade ore seem to be, in or connected with, one of the wall deposits. It would appear, however, that the ore will cross, sometimes in a series of steps, from one wall to the other, sometimes folding back on itself. The mineralizing action, of course, varied constantly; in some parts converting the whole mass into low-grade ore and again concentrated into a single band of varying width, of high-grade sulphides. These form a field for mining on a large scale and development should be provided for, with this end always in view.

The second is a simple fissure vein in the granite, running generally at a wide angle with series No. 1, marked by very distinct ore shoots, and with, as a rule, the values so concentrated that outside of the shoots the vein is worthless, and the ore in the shoots very rich and calling for the tenderest handling to prevent loss. A careless shot among dusty sulphides that assays \$1,000 to the ton is apt to not only lose a week's wages or more but to so plaster with mineral the barren rock adjoining, that another week's pay is lost by sending worthless granite to the smelter.

The third vein is probably the simplest proposition, as it is the gold-bearing, comparatively flat seam, enriched on the surface for the undoing of prospectors and the two optimistic operator, but proved to carry good values to depth and offering no special obstacle to treatment.

The Arlington might be cited as an example of No. 1, the Enterprise of No. 2, and the Violet of No. 3.

To summarize: The products of 1902—6,400 tons, from 13 properties with values ranging from \$40 to \$250 and averaging as near \$90 per ton or \$576,000 as need be. Results of season's development, satisfactory. The gold belt calls for more investigation and offers a promising field for experience backed by capital. The existence of low grade ore in large quantities proved by the Arlington, etc., and their determination to put in a plant for the treatment of these ores. Altogether the outlook in spite of low silver and some gross mismanagement is good, or even very good.

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AN "ALL-FIRE" METHOD FOR THE ASSAY OF GOLD AND SILVER IN BLISTER COPPER.*

(By Walter G. Perkins, Grand Forks, P. C.)

AS this particular product holds a place by itself, it seems desirable to give a paper dealing especially with it as a corollary to my paper entitled "The Litharge Process of Assaying Copper-Bearing Ores and Products and the Method of Calculating Charges."*

The process is first to convert the metallic copper into matte by the addition of sulphur, allowing the two elements to combine at the bottom of the crucible when heat is applied. The flux then acts on the sulphides, oxidizing some of the copper which goes into the slag, while the gold and silver are collected in the lead-button reduced by the sulphur. These buttons are combined and scorified twice, for the purpose of concentrating the values and eliminating the remaining copper, thus reducing cupal absorption-loss to a minimum.

Charge for a 20-gm. Crucible.

Sulphur	800.0	mg.
Cu (approx.)	0.083	A.T.
Na ₂ CO ₃ plus K ₂ CO ₃ (1-2 & 1-2)	0.5	A.T.
PbO (free from Ag)	8.0	A.T.
SiO ₂	0.5	A.T.
Salt Cover.		

Method of Operation.

Weigh out 0.25 A.T. of copper borings, divide it approximately into 3 equal parts, and place in 20-gm. crucibles; repeat the operation until four sets have been weighed out, thus having twelve crucibles in all for one assay. Weigh 800 mg. of pulverized sulphur into each of these, and mix with the copper; then add one charge of flux, but do not mix the copper and sulphur with the flux, as these two elements should remain at the bottom of the crucible, to form matte when heat is applied. Shake down; fill the remaining portion of the crucible with salt (NaCl), and place in a dull-red muffle. Raise the temperature very gradually for thirty or thirty-five minutes, at the end of which time some salt should remain, not quite molten,

in the centre of the top of the charge; this will melt and become quite fluid in a few minutes. The temperature should then be raised, so that, in forty-five minutes from charging, the muffle will be of a bright red colour, the charge quiet, and perfectly fused.

The success of failure of this method, especially the silver result, depends upon the proper regulation of the furnace. Therefore, a detailed description of the manipulation, as practiced by the writer, is necessary at this point.

The muffle used is 17x19x8 1-2 inches, outside dimensions, in which twenty-five crucibles can be placed at a time. Twelve crucibles containing the blister-copper charges should be placed in the front part of the muffle, so that the action can be watched carefully. In the back part of the muffle may be placed ore-assays, etc., the result of which are not so easily affected by temperature.

The atmosphere in the muffle must be reducing; otherwise, as the charge fuses, the silver seems to come to the surface, and a portion of it is apparently oxidized (or volatilized) and lost in the slag, making the result from 0.4 to 1.0 oz. per ton too low. A muffle that has a good draught through it always has an oxidizing atmosphere when fired with coal; therefore, some artificial means must be resorted to in order to bring about the desired result. The practice here is to plug the holes in the back of the muffle with bone-ash. Then distribute five crucibles (which are about three-fourths full of fine coal and covered with 3-in. scori-fiers) amongst the charge, thus: Two in the back row, one in the centre and two in the front row of crucibles, closing the front with a tight-fitting door. This will reduce 1 to 2 gm. of Pb from PbO, if a blank charge is run. In case a gas or gasoline furnace is used, the atmospheric conditions would probably be correct without resorting to artificial means.

Pouring, Slags and Buttons.—All conditions being perfect, the charge will pour very fluid. But care must be taken to rotate the crucible quickly, and tap sharply several times, in order to settle any fine shots of lead that may otherwise be held in suspension or adhere to small recesses in the walls or bottom of the crucible.

The slag, on cooling, should be a yellow silicate of lead at the outside of the cone, becoming finely crystalline and deep-green immediately inside the outer skin. If more than merely the skin of the slag shows as a silicate, the heat has been too great; and if the entire slag is crystalline, with large coarse crystals pointing towards the centre, the temperature has been too low, and has most probably left some shots of lead in the crucible. The salt on the top of the cone will be of a deep brownish-red, the depth of color lessening when overheated or when the atmosphere of the muffle had an oxidizing effect.

The button from each crucible should weigh about 18 gm., and break clean and bright from the slag. Care must be taken that a film of lead is not left on the slag where the button breaks from it, as a gas-bubble that has a thin covering of lead appears to form at the top button, which adheres to the slag.

*Trans. American Institute of M. E.

Scorification.—Each set is now represented by three buttons weighing 18 gm. each. These are now scorified, to eliminate more copper and concentrate the value. The four sets, each representing 0.25 A.T., are manipulated as follows:

Place four 3-in. scorifiers in a hot muffle for ten or fifteen minutes; then, having reduced the temperature in the muffle to about the right heat to open cupellations quickly, place the sets of three each in four scorifiers; close the door, and the scorifications should open as quickly as cupellations. When properly opened, lower the temperature to a heat that will just permit the operation to be carried on successfully until covered. Raise the temperature until the slag is hot enough to pour freely; decant as much slag as possible without losing any lead; return the scorifiers to the muffle and allow scorification to go on until covered again; close the door to heat up the slag, and then remove the scorifiers and pour. Each resulting button will weigh about 5 or 6 gm., if the temperature has been kept low from the start.

Second Scorification.—Four 2-inch scorifiers are now heated as before. The buttons from the first scorification are broken down and the slags scraped free of any lead-films on to a filter-paper. Each 5-gm. button is made up of 25 gm. with CP. test-lead. The filter-paper containing the button and test-lead is folded and put into the already hot scorifier. Conduct the operations at as low a temperature as possible, as these buttons will open easier than the first scorification. Raise the temperature when the buttons are nearly covered with slag, pour, cool, and break down again, watching for small amounts of lead on the slag.

These buttons are now ready for cupellation, and represent four assays of 0.25 A.T. each. Carry on this operation to get "feather" PbO on the cupels. This needs careful watching, as the buttons only weigh 5 or 6 gm. Weigh the beads for silver plus gold in 0.25 A.T. Combine two and two, part, and weigh for gold in 0.5 A.T.

SUMMARY.

1. The litharge must be absolutely free from silver, or, at the most, contain only small traces of silver, in order to avoid the necessity of correcting by difference. The kind used is of Pueblo manufacture.
2. The temperature must be carefully regulated in all operations. Also, have a slightly reducing atmosphere in the crucible operation, otherwise the silver result will be too low.
3. Great care must be exercised in watching for shots and films of lead, especially after the concentration of sets.
4. The cupels should be nicely "feathered," and when cold should be of a very pale greenish-yellow, denoting the almost entire absence of copper. It is possible to get a good result by leaving more copper in the lead-button, thus doing away with the second scorification. It is best, however, to do as directed, placing beyond doubt the question of the absence of copper in the silver-beads.

5. The flux can be mixed in large batches and measured by having a cup made that equals one charge, the formula being:

Na₂CO₃ plus K₂CO₃ (1-2 & 1-2 5 lbs.
PbO 80 lbs.
SiO₂ 5 lbs.

6. The advantages of this method are:

That it gives results in gold equal to the "all-scorification" method, and in silver equal to the combined wet and fire method.

That it does away with the necessity of making separate estimations for gold and silver, thus saving the time and expense of working the combination method for silver.

That the time taken is less for each estimation than in the all-fire scorification. In practice it takes from five to six hours to do three determinations of gold and silver.

APPLIED MECHANICS

(By Geo. Williams, Mech. Eng., Ladysmith.)

THE subject of this article is most especially the application of the science of mechanical engineering to the different methods of turning ore in the ground to as many dollars as possible in the pocket of the mine owner and operator.

It is an unfortunate fact that more often than not, the persons who in the first place discover a certain property, have not the necessary money to develop it, so the "prospector" looks for a capitalist.

We may suppose that all goes well, a company perhaps formed, with a president or general manager at the head, who as is often the case, knows nothing of mining or mining machinery. The mine is then developed in a more or less economical way, depending on the ability of the man in charge on the spot. Then machinery is needed, manufacturers consulted, whose interest is not the welfare of the mine, but to sell and get as large a price as possible. The more ignorant of such things the executive force is, the bigger the bill, as no intelligent check is put upon them.

All then going well, the cry is, "We must have a smelter." The manufacturers are again consulted, and advise the installation of whatever they see fit.

As the day of "secret processes" is practically at an end, the economy and proper working of the plant depends very considerably on the mechanical arrangement of it, and the steady and economical running of the machinery in it. A good engine well set with a good ordinary boiler furnishes power at a reasonable figure. For instance about 100 pounds of coal will furnish one horse-power per 24 hours, a non-condensing Corliss engine being used, or about 60 pounds through the medium of a compound condensing one. On the other hand the amount of fuel may reach as high as 300 pounds of coal per horse-power per day, a poor class of engine and boiler being used.

Moreover, good and suitable machinery properly arranged, will run without frequent shut-downs for repairs. What is more annoying or expensive than having frequently to shut down a furnace, on account of shafting being out of line, or a boiler not large enough? The hoist at a mine being disabled, shuts down the mine, time and money being lost in both cases.

To a mine or smelter which is being run on a narrow margin of profit, this means ruin, which might perhaps have been averted, had the machinery been selected and arranged by a competent engineer, or in other words, the principles of mechanics applied as they should be.

Another large item of expense, the handling of material, may be reduced to a minimum by the best arrangement of the integral parts of the works in question.

BRITISH COLUMBIA IN LONDON.

(From our own Correspondent.)

ALTHOUGH the tone of the B. C. market has been somewhat firmer recently, it cannot be said that there has been any material expansion in the amount of business transacted in this section. To a very large extent the prices quoted for British Columbian mining shares on the London Stock Exchange are still nominal, and it is only in Le Roi group, Ymir, Velvets and a few others that there is anything like a free market. As a matter of fact the changes during the month of January were few and far between, but it is satisfactory to record that they were mostly in favour of holders. Le Rois fluctuated between 11-4 and 11-16, the best mentioned price being 1-16 only above the final quotation. As a result of the cheerful and straightforward remarks made by Mr. MacMillan Le Roi market was decidedly firmer, whilst Le Roi No. 2 were steady notwithstanding the remarks made at the meeting as to the improbability of any immediate amalgamation of the two concerns. Rossland and Kootenay remain at about 3-8, and although a proportionately large gain is shown by L. & B. C. Goldfields as a result of better news about the Ymir, the shares of the parent company have never recovered from the blow sustained in connection with the collapse of the Ymir. The shares of the latter have been as good as 3-4, for the reason above given, but are of course still only about a third of the price to which they at one time advanced. This company is a striking instance of the folly of precipitancy in the matter of dividend payments, and it is to be hoped that if ever the concern is again able to enter the dividend list it will have a longer sojourn there than it had before. At present, however, there seems little possibility of the Ymir re-entering the charmed circle. The better news to hand for the mine, was, of course, welcome; good news is welcomed in a market not too plentifully supplied with cheering statements. One of the most notable features was the sharp advance in New Goldfields of B. C. in sympathy with the sharp advance in

Velvets based on the reported new discoveries on this property. Velvets are about 6s. higher on the month. It will give you some idea, however, of the way in which the London market exaggerates the relative importance of a cable from a property when I point out to you that the advance in New Goldfields of B. C. which followed the publication of the news in question amounted to no less than *four hundred per cent.* In other words the shares which had been knocking about the market at about 60 cents, were suddenly inflated to \$3. Of course the mining department has little or no sense of proportion at the best of times, and here is one of those examples which will prove this very clearly to your readers. Snowshoes are one of the best markets in this section, and are wonderfully well held. Your description of this property in the January RECORD has attracted quite a lot of attention, and it is hoped that the property has a good future before it. You will, of course have heard that two of its board, Mr. G. S. Waterloo, and Mr. MacMillan, have been elected directors of the Le Roi, and it is to be hoped that their accession will prove helpful to the board of what is—through good and evil repute—still regarded as the premier British Columbia mine, despite Mr. Curle, and his pessimistic utterances regarding B. C. mines in recent issues of the *Economist* (London).

I have made a little comparison of the prices of what may be regarded as the representative B. C. mines dealt in on the London Stock Exchange, at the 31st December, and at the end of January, and the following is the result:

ADVANCE.	DECLINE.	UNCHANGED.
Consolid Mines selection 1-16. Le Roi 1/2. L. & B. C. Goldfields 1/2. New Goldfields 1/2. Velvet 5-16.	Hall Mining 3d. Le Roi No. 2, 1-16. Nimrod 1/2.	B. C. Develop Ass'n. Duncan. Enterprise. Queen Bess. Rossland-Kootenay. Snowshoe. Whitewater. Ymir. Giant.

The above will show pretty clearly the drift of the market in London, viz., steady to firm with a better tendency for certain shares, due to exceptional causes. With anything like a continuance of favourable advices from British Columbia there would probably be an expansion of business in this section; but the British investor has had such a bad time as a result of his connection with B. C. mines that he naturally wants to see some definite prospect of a return on his capital before increasing his interest in the Province.

It is satisfactory to be able to note that Mr. Turner's efforts to enlighten the public here as to the attractiveness of the Province as a home for the British emigrant are being ably seconded by the Canadian Pacific Railway. I do not, of course, mean that the C. P. R. have ever been backward in this respect, but rather that they have lately hit upon a happy method of introducing people in this country to the Dominion of Canada by means of the bioscope. A few days ago the company gave an exhibition of animated pictures at the Palace Theatre representing Canadian life and scenery. The pictures thrown on the screen illustrated

a journey across the Canadian Continent, and represented in the most realistic manner town, farming and ranching life, lumbering, sport and mountain scenery. The views, which were witnessed by an enthusiastic audience, were a splendid advertisement for the Dominion, and I can only hope that the C. P. R. people will endeavour to give residents in the provinces an opportunity of obtaining such an excellent acquaintance with its industries and beauties. One could have wished perhaps that an effort had been made to give a little more attention to the mining side of Canadian life, but no doubt the C. P. R. officials recognized the necessity of dealing more with the phases of everyday life which attract the man in the street, rather than with a subject which is necessarily extremely technical and not of general public interest. The exhibition was under the patronage of Lord Strathcona and Mount Royal, and amongst the crowd of people present I noticed the Duke of Argyle, Lord Mount Stephen, Sir Spencer Walpole, the Hon. J. H. Turner, your hard working Agent General, Messrs. A. Lang, Cameron Alexander, J. G. Colmer, W. T. Preston, and many others. This useful work of education reflects much credit on Mr. Archer Baker, whilst the Warwick Trading Company of this city are to be congratulated upon their excellent photographs, which in their aggregate represented approximately 100,000 pictures. The run through the Rockies, Selkirks, Gold Range and Coast Range of mountains was the largest and one of the most realistic series of animated photographs that has ever been shown in this country.

It is to be hoped that when the complete—or approximately complete—returns of mining in 1902 are to hand, the same will at once be cabled over to Mr. Turner, so that he may have them circulated officially from the Agency. It is neither dignified nor in the best interests of the Province that these should be allowed to leak out in an incomplete form, and be so forwarded to London by news agencies. The Minister of Mines will no doubt see to this in future. The output of our mines is too important to be transmitted in a mutilated or inaccurate shape, and we trust that the methods of other Colonies will be adopted, and the information forwarded so soon as it is available without an instant's delay to London. British Columbia needs all the support that can be afforded it in the capital of the Empire at the present juncture, and such a piece of information as the yearly mining output should not be divulged to any one here until it has first been flashed over the cable to the Agent-General. He can be left to arrange for its immediate circulation both on 'Change, and in the press. Private enterprise is all very well, but when it is not always able to ensure accuracy it is liable to be harmful to the state's best interest.

THE CANADIAN MINING INSTITUTE.

NAMES OF THE OFFICERS AND COUNCIL NOMINATED FOR
1903.

THE Nominating Committee of the Canadian Mining Institute has reported the names of the officers and council to be elected at the Annual General Meetings on 4th, 5th and 6th March next. Mr. Charles Fergie, of the Intercolonial Coal Co., Westville, N.S., who has held the position of president for two years, retires, his place being taken by an Ontario man, Mr. Eugene Coste. Mr. Coste is one of the oldest mining engineers in Canada, having been the first chief of the Division of Mines and Mining Statistics in connection with the Geological Survey. On leaving the Survey, Mr. Coste was successful in locating, opening up and equipping the Welland Natural Gas field. He has contributed several valuable papers to the Geology of Canada, and particularly on the characteristics of the oil and gas fields of Ontario. The complete list is as follows:—

President—Mr. Eugene Coste, mining engineer, Provincial Natural Gas and Fuel Co., Toronto.

Vice-Presidents—John B. Hobson, mining engineer, Consolidated Cariboo Hydraulic Co., Bullion, B.C.; Dr. F. D. Adams, McGill University, Montreal; Robert E. Chambers, mining engineer, Nova Scotia Steel & Coal Co., Bell Island, Newfoundland; George R. Smith, M.L.A., mining engineer, Bell's Asbestos Co., Thetford Mines, Que.

Council—Edmund B. Kirby, mining engineer, Centre Star Mining Co., Rossland, B.C.; S. F. Parrish, mining engineer, B. C. Chartered Co., Eholt, B.C.; J. H. Tonkin, mining engineer, Crow's Nest Pass Coal Co., Fernie, B.C.; Frederick Keffer, mining engineer, B. C. Copper Co., Anaconda, B.C.; A. P. Turner, Canadian Copper Co., Sudbury, Ont.; E. A. Sjoostedt, metallurgist, Consolidated Lake Superior Co., Sault Ste. Marie, Ont.; D. G. Kerr, mining engineer, Cordova Exploration Ltd., Cordova Ont.; Dr. W. L. Goodwin, School of Mining, Kingston, Ont.; Harry J. Williams, mining engineer, New England Canadian Asbestos Co., Thetford Mines, Que.; Dr. J. Bonsall Porter, mining engineer, McGill University, Montreal, Que.; B. Bennett, mine manager, King Bros., Asbestos Co., Thetford Mines, Que.; F. Cirkel, mining engineer, Montreal, Que.; C. Shields, Dominion Coal Co., Glace Bay, C.B.; Dr. E. Gilpin, Jr., mining engineer, Halifax, N.S.; Thomas Cantley, Nova Scotia Steel & Coal Co., New Glasgow, N.S.

Treasurer—J. Stevenson Brown, Montreal Que.

Secretary—B. T. A. Bell, editor *Canadian Mining Review*, Ottawa, Ont.

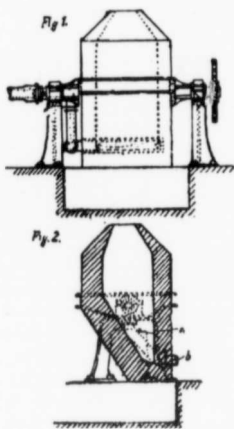
RECENT PATENTS OF INTEREST

TO MINING MEN.

WE are indebted to Mr. Rowland Brittain, Patent Attorney, of Vancouver, for the following report:

Sulphide Ore Smelting and Concentrating Process.

Canadian patent No. 78,857, granted December 30th, 1902, to Emil Knudsen, of Sulitjelma, Norway.



Claims: 1. The method of treating ores, which consist in first imparting to the lining of the furnace a high degree of temperature then charging the furnace with ore, then admitting a cold air blast to the charge at a low pressure thereby initiating the smelting of the charge and subsequently increasing the pressure of the blast causing thus the smelting and concentration of the charge without the addition of carboniferous fuel.

2. The method of smelting ores which consists in charging the ores into a furnace having a highly heated lining, introducing a cold air blast at the bottom of the furnace and below the surface of the ore, thus utilizing the sulphur in the melted ore as fuel, emptying the furnace and re-charging the same while the lining retains the heat imparted thereto by a previous smelting operation.

3. The process of smelting pyrites or sulphide ores which consists in charging the same into a furnace having its interior lining previously heated to a sufficiently high degree to fuse the ore, injecting into and through the melted ore a blast of cold air whereby the sulphur in the ore will be oxidized and the resulting heat utilized to smelt the charge without other fuel, then emptying the furnace and re-charging while the lining retains the heat imparted thereto by the previous smelting operation.

THE CANADIAN SMELTING CO.'S ASSAY OFFICE AT TRAIL.

TO replace the assay office which was destroyed by fire in July last, the Canadian Smelting Works has completed at Trail, B.C., a new structure, which, in point of modern equipment, equals, if not surpasses, any assay office on the American Continent. The purpose of the management is to keep pace with the progress and needs of the rapidly increasing resources of a new country, and to that end the assay office has been constructed and equipped to permit of

the running of all classes of work that might be presented, such as coal and coke, iron and nickel ores, gold, silver, copper and lead ores and other mineral deposits, in addition to any experimental work which might be necessary in connection with the smelter and the new electrolytic lead refinery.

In the case of the Canadian Smelting Works, where the ores are so varied, coming as they do from all parts of the province, containing anything from 200 oz. down in gold, and 5,000 ounces down in silver, from 30 per cent. down in copper and 82 per cent. down in lead, in practically every combination—and such impurities as molybdenite, arsenic, zinc and antimony—the assay office holds even a more important relation to the smelting industry than is generally the case, the great variety of ores making it necessary to analyze nearly every shipment. Such large quantities of zinc and other impurities demand the closest tab on the furnaces, roasters and every part of the works, necessarily increasing the demands on the assay office.

The new structure consists of two large brick buildings, the smaller or furnace building being built into and at right angles with the main structure, yet being entirely separated by brick walls. The main building which is 70x35, contains the office, two balance rooms, an electrolytic and parting room, the chemical laboratory, bucking room, store room and basement. In the basement is the motor, which furnishes power for the mills and crushers.

Two samples of every shipment of ore are sent to the assay office, where they are placed in electrical dryers. On one the moisture is calculated and the other is pulped. The mills and crushers are all on separate foundations to prevent vibration in the building. The sample is divided into four parts, one of which goes to the mine, one is sealed and put aside for use of an umpire, the third being stored for reference and the fourth is assayed. In case of dispute, the umpire sample is sent to some assayer agreed upon by both mine and smelter, and his assay is final. All samples are taken to the pulp room, where there is a cabinet capable of holding 10,000 pulps. All the weighing of pulps for chemical, furnace and electrolytic work is done in this pulp room, which is equipped with glass top tables, built from the ground, and carrying four chemical balances.

On one side of the pulp room is the chemical laboratory, fitted with every new labour-saving device. The chemical and draft chambers, for the purpose of carrying off all acid fumes, are brick the full height of the building. The chemical hood has four electric hot plates, each 12x18 inches, for chemical work, with separate adjusting apparatus, so that the chemist may have any degree of heat, from 50 degrees centigrade to the melting point of tin, without the slightest inconvenience. The hood has two similar electrical plates, three sulphuretted hydrogen and one dionide generator. In the laboratory there are two hot water tanks, one of which is connected with a still for distilled water, heated by electric coils and provided with syphons and rubber tubes for washing precipitates. Amongst other useful equipment are the

vacuum and pressure pumps and the hot and cold water throughout.

On another side of the pulp room is the entrance to the furnace building, the walls of which are surmounted by large ventilators and skylights. The furnaces, four in number, have 23x17 1-2 inch muffles, and are constructed to burn Crow's Nest coal. They have a common 40-foot stack. The fire room is also open to the roof, and is divided from the furnace room by a brick wall. The floors are concrete, covered with quarter-inch sheet iron.

Two electrolytic plates and a hood for fumes, similar to those in the laboratory, are contained in the electrolytic parting room. The electrical equipment in this compartment also comprises a set of storage batteries, connected with a dynamo in the basement, which are capable of delivering a continuous current of 20 amperes at 6 volts, the distribution of which is governed by rheostats, capable of cutting the whole down to one-tenth ampere. Larger currents, up to 500 amperes, may be had direct from the dynamo, when required for experimental work.

Not the least interesting, however, is the balance room, which contains three gold balances and one analytical balance. To insure greater accuracy, they are mounted on tables and are so delicate as to weigh the ten-millionth part of an ounce.

The building and its arrangement and equipment was planned by S. G. Blaylock, assayer for the Canadian Smelting Works.

THE STRIKE AT FERNIE.

IT is to be hoped that the Board of Conciliation appointed by the Provincial Mining Association to proceed to Fernie and endeavour to bring about a satisfactory settlement of the present deplorable strike situation at these collieries will be successful in their efforts. Meanwhile it will interest many of our readers to learn something of the issues at stake, and we therefore extract the following information published by a local contemporary, the *Fernie Free Press*. To show that the miners are exceptionally well paid as a class, Mr. Tonkin, the General Manager, has made a sworn statement of miners' earnings at the respective mines. These are:

MORRISSEY MINE.

Miners' Averages for Three Months—November, 1902, to January, 1903.

No. 1 Mine—	
Highest average net earnings per shift	\$6 54
Lowest average net earnings per shift	3 14
Average net earnings per shift	4 66
No. 3 Mine—	
Highest average net earnings per shift	8 38
Lowest average net earnings per shift	2 77
Average net earnings per shift	4 31
No. 4 Mine—	
Highest average net earnings per shift	6 96

Lowest average net earnings per shift (this party worked only four days)	1 81
Average net earnings per shift	4 72

ALL MINES.

Average net earnings per shift	4 64
Miners' average earnings—	Per Cent.
Exceeding \$6 per shift	20
From \$5 to \$6 per shift	18
From \$4 to \$5 per shift	28
From \$3 to \$4 per shift	21
Under \$3 per shift	13
Miners whose net earnings exceed \$100 per month—	
November	16
December	20
January	32

NOTE: During the months of November, December and January, the Morrissey mines were operated under a schedule of wages proposed by the Coal Company. During these months, and while the schedule was under advisement it was current information that the local union had instructed the men not to over-exert themselves; that is, to hold themselves down to a certain amount of work daily until the schedule was finally approved.

The schedule as approved, with several minor amendments, was finally approved of by a committee of eight men from the several mines, who met with General Manager Tonkin and General Superintendent Stockett at Morrissey in January. The schedule was then printed and posted at the mines.

COAL CREEK MINES.

Miners' Average for Five Months—September, 1902, to January, 1903.

Highest average net earnings per shift	\$7 29
Lowest average net earnings per shift	3 19
Average net earnings per shift	4 63
Miners average earnings:—	Per cent.
Exceeding \$7 per shift	1
From \$6 to \$7 per shift	12
From \$5 to \$6 per shift	16
From \$4 to \$5 per shift	41
From \$3 to \$4 per shift	30

Miners whose net earnings exceed \$100 per month—	
September	68
October	66
November	32
December	27
January	31

MICHEL MINES.

Miners' Averages for Five Months—September, 1902, to January, 1903.

Highest average net earnings per shift	\$6 93
Lowest average net earnings per shift	3 42
Average net earnings per shift	4 87

Miners average net earnings—	Per cent.
Exceeding \$6 per shift	14
From \$5 to \$6 per shift	26
From \$4 to \$5 per shift	50
From \$3 to \$4 per shift	10
Miners whose average net earnings exceed \$100 per month—	
September	50
October	50
November—only two months account local strike.	
December	18
January	46

In an interview Mr. Tonkin is reported to have made the following statement:

- (1) That only 18 per cent. of his employees had voted for a strike.
- (2) No notice of a strike had been served on the company.
- (3) He did not ask for 8 1-2 hours' work, but that it was agreed that a majority of the men employed must vote for the old system in order to re-introduce it.
- (4) The statement was incorrect that he was present at the vote.
- (5) Contract men were not affected by the 8 1-2 hour regulation and probably not more than 10 per cent. of his employees were directly interested in it.
- (6) A reduction of wages of 15 and 20 per cent. had not been made at Coal Creek. Five cents a ton was taken off when the new closed lights were introduced, and this affected only one mine.
- (7) The timber question was settled as soon as the landing room could be prepared and the men are having no more trouble with lack of timber. No miners were dismissed on this account, but because it was known that the four men in question were trying to incite a strike.
- (8) He had never refused to meet a committee from any one mine, or from any local union, and if necessary was willing that the local union should refer their grievances to a higher tribunal, the District Union of the Western Federation of Miners.
- (9) The objection to the company stores was certainly late in making its appearance. It was well known to every miner that the company was disposing of their stores at the three camps and he felt reasonably assured that the transfer would be made i.v March 1st.
He was at a loss to understand what was meant by the "buttying" system at Michel, unless it referred to the back-hand system by which the contractor generally earned a "rake off" from his helper. This system was employed by all mines and without it no one could become a practical miner as the laws of the province require a contractor to hold a miner's certificate and such a certificate cannot be obtained by any who has not worked in a mine for at least 12 months.
- (10) As to the question of the net average earnings of the men employed in all the mines, Mr. Tonkin offered the books of the company for inspection, in order to prove that the figures represented the net earnings after back-hand, powder and smithing had

been deducted. The case of Mr. P. Christopher was given as an example. In December he earned \$133.25; 50 cents were deducted for smithing and \$46.25 for back-hand; no powder was used. This left a balance of \$86.50, which, divided by twenty shifts worked in the month, leaves a daily average of \$4.32 1-2. All the others are worked out on this basis, and are sworn to as being correct.

THE MINERS' SIDE.

Referring to Mr. Tonkin's table of miners' earnings, the union offer the following criticisms:

After an investigation of numerous statements we find that the Coal Company method of book keeping is not infallible, as a copy of some of the statements will prove. Now we do not make statements we are not prepared to prove and to do this let us look at the following lists of wages:—

J. Ballusky worked 18 shifts, earning \$173.20. He had the following back-hands:—	
M. Kovalik, 27 days at \$2.50	\$67 50
H. Smith, 5 days at \$2.50	12 00
G. Erison, 1 day at \$2.50	2 50
J. Terman, 7 days at \$2.50	17 50

Total for back-hand labour \$100 00

Now this man had nothing stopped out of his earnings to pay these men. Had their earnings been deducted from his net earnings there would have been a remainder of \$73.20 for his 18 shifts instead of \$173.20 as given by the company due bill.

Wm. Murray worked 20 shifts, earning \$143.65. Now \$51.30 of this amount is given as consideration for which nothing is shown. He employed three back-hands for 20 days each at \$2.50 per day, making a total for back-hand labour of \$150. Take \$150 from \$143.65 and poor Murray is in debt to the back-hands to the amount of \$6.35 after working 20 days for nothing. But this would not do to put before the public, so the company generously deduct \$33.20 to pay for 60 days' work instead of \$150. For what purpose this is done we cannot tell.

Phil Christopher worked 16 shifts:

To mining 113 tons at 40c. per ton	\$45 20
To 13 1-2 yards entry at \$2 per yard	26 65
To 3 days' company work at \$3	9 00

Total earning \$80 85

The company give a total of \$102.85. What is that \$22 given to Christopher for? Again the company deducts \$39.00 for back-hand labour instead of \$60. Why was not full back-hand earnings stopped from Christopher? \$60 from \$80.85 leaves \$20.85, pay 50 cents for smithing leaves \$20.35 for 16 shifts, or an average of \$1.27 per shift—a magnificent sum for the dangerous occupation of coal miner.

John Spok worked 9 days in No. 3 mine, earning \$20.40; \$22.50 the company deducted for back-hand labour so for the privilege of working for the C. N. P. Coal Company nine days he paid them \$2.10. In fact

to pay these back-hands their proper days' compensation he started on company work in preference to digging coal.

Question: Have the contract men room for kicking?

The men whom the company call pushers are actually engaged in loading coal for miners. They are paid by the company right along and have been paid by them ever since the miners have been working under the protested wage list. We know by experience that as soon as the men would accept this scale of 40 cents per ton that they would be required to pay all the back-hands themselves according to the usual custom. There are several reasons why the company have given these miners so much help. It may have been that they wanted to make a big average wage for the miners to get them to accept the wage offered or it may have been to bribe them to work away contented and not to trouble about their less favoured fellows, for they undoubtedly would not leave these men to work as pushers and loaders as soon as the price of 40 cents per ton was established. It has come as a revelation to the miners of this valley that the company are in the business as philanthropists; if not why are these men's wages (loaders and pushers) not deducted from the miner's due bill?

Why did they not deduct \$100 from Ballusky's pay and give it to the back-hands? Why did they not deduct \$150 from Murray's \$143.65 and leave him \$6.35 in the hole? Why did they pay Christopher \$22 more than he had earned and why did they deduct \$39 for back-hand labour instead of \$60 and pay the difference themselves, for Christopher's back-hand statement showed that he received \$60. Again, why was the back-hand's wages deducted from J. Spok? In nine days he earned \$20.40 and \$22.50 was deducted for back-hands. How was it that he was not to enjoy the same privilege as others? Was it because he was not able to put his trouble into good hands or was it because he was not occupying any prominent position in the local union and therefore they did not consider that it was worth the expense to bribe him into quietness? This question we leave to the public decision.

The statements prove conclusively that the net earnings do not show all reasonable deductions since in many cases no back-hand labour is deducted at all. On the point of wages we believe the contract men have just room for "kicking," and we cannot see how we materially weaken our cause by raising this question. The miners at Morrissey were always likely to earn high wages under the objectionable rate for the reason shown. No greedy coal miner expects a larger average than \$4.50 for eight hours' work. As long as the management ignore the union and refuse their officers audience misunderstandings will never be cleared up. The secretary of Gladstone Union and also of the District Board has asked time after time for an audience and were invariably refused.

The union officials, however, have not been idle for the past week. With much labour the January statements have been collected in the three camps and in order to save space the results have been boiled down.

The officials of the union will take an affidavit as to their accuracy before Mr. Tonkin himself. Again you seem to believe that only contract miners are kicking about the wages. This is not the case, but all company men, all outside men and all coke oven men as well. The accompanying list of wages show how these men are paid. In many instances the wage would not be sufficient for a man to live in an Eastern town, much less in the West.

Taking 73 of the Fernie miners' due bills for January after smithing and blasting expenses are deducted we find that 11 men earn \$100 and over, 22 men under \$100 and over \$75, 14 earn under \$75 and over \$60, 25 earn under \$60.

The following is the list of 130 men employed in the Fernie mines at company work, such as shiftmen, trackmen, rope riders, drivers, brattice men, couplers, switch boys, etc.

1	man	earns	\$3.50	per	day.
1	"	"	3.25	"	"
27	men	"	3.00	"	"
6	"	"	2.75	"	"
45	"	"	2.50	"	"
30	"	"	2.00	"	"
13	"	"	1.75	"	"
4	"	"	1.50	"	"
3	"	"	1.00	"	"

The following is a list of coke drawers for January and number of ovens drawn and shifts worked:

Ovens drawn.	Per Oven.	Shifts	Consideration.	Total per month.
57	75c	19		\$42 75
57	75	19		42 75
40	75	19	25c	30 25
57	75	19	50	43 25
57	75	19	75	43 50
57	75	19	\$1 25	44 00
57	75	19		42 75
54	75	18		40 50
50	75	17	1 00	38 50
53	75	17		39 75
6	75	2		4 50
79	75		75	60 00
57	75		25	43 00

The following are coke loaders with number of shifts worked in January, tons loaded and price per ton.

Tons Loaded.	Price Per Ton.	Days Worked.	Total for Month.
319	17c	30	\$54 25
281	17	26	47 75
289	17		49 15
226	17	26	38 40
211	17	25	36 05
226	17	25	38 40
211	17	25	36 05
241	17	24	40 95
274	17		46 55
261	17		44 35
319	17	30	54 20
389	17		49 10

These are only Fernie prices and at Morrissey and Michel they are even lower. We regret that we have not been able to get the due bills from these places in time for the *Press* as it would have shown just how much lower they are than here. However, we are safe in saying that they are below a fair living wage, and that they should be raised to Fernie rates is only just. In the interview with the *Press* representative Mr. Tonkin states that the timber trouble was settled as soon as landings were made and that the men are having no trouble about lack of timber. We say the timber trouble was not settled and the men did have trouble for lack of timber right up to the time they came out. Those four men spoken of last week were dismissed for trying to get some redress to the timber trouble and for coming out of the mines for want of it. Indeed several other men on different occasions were told by the overman, that if they went out for the want of timber they would be dismissed. Further, Mr. Tonkin states that he was always willing to meet the committee of the local union. Well, the local committee did meet him often, and stated their grievances but could get no redress. So at last to stop further encroachments they had to place the whole of their troubles before the District Board. The trouble with the buttying system is that under that system the company do not pay enough to give the miner a good wage and allow him to pay a helper as he should be paid. It forces the helper to work for a lower wage than the general rate of the country. In all the West the Government price for outside labour is \$2.50 and in quartz mines the muckers get \$3 per day, yet these men are expected to work in the hazardous calling of coal mining for \$2.50 when they are working for a miner, and \$2.25 when they are working as helpers for the company at Michel. These are the complete facts of the case as taken by the *Press* Committee after going through all the due bills that could be got, and we think it answers the question "Are the men of the Crow's Nest Valley well paid?"

REASONS OF THE STRIKE.

The men and boys working in and around the mines and coke ovens of the Crow's Nest Pass Coal Company at Morrissey, Michel and Fernie came out on strike on the morning of February 11th. In Fernie the men and boys have been working under protest since August 4, 1902. The public at large are more or less acquainted with their grievances. Just one month and four days after the big explosion of May 22, 1902, in which 130 men and boys were killed because coal is mined for profit instead of being mined for use, Mr. John H. Tonkin, who by the way, came direct from Pennsylvania after the explosion to fill the position of manager of the Crow's Nest Pass Coal Company, without consulting his employees, imposed upon them an extra half hour underground, or in other words, made it nine hours from bank to bank instead of eight hours, as it had been previous to his coming here, and as it is in every other coal mine in British Columbia. The men were forced to strike or submit to the imposition.

After a six weeks' strike, and on August 4, the Gladstone Miners' Union, No. 76, of the W. F. M., entered into an agreement with Mr. Tonkin on behalf of the Crow's Nest Pass Coal Company and clause 5 of that agreement in part reads as follows: "If at the expiration of two months from date of this agreement the union shall signify in writing to the company after a vote by ballot among the employees employed by the company underground, that they are dissatisfied with the extra time underground, the company hereby agree that this agreement shall be at an end; and thereafter a day's work shall consist of one eight (8) hour shift."

The day they signed this agreement Mr. Tonkin told the committee that he intended in the near future to draw up a scale of prices which he wanted the committee to sign on behalf of the union. He assured the committee that he would not cut prices, or in other words, that the prices would remain as they were when he came. The day following the signing of this agreement he submitted his scale of prices to the union, and to the surprise of all concerned there was a general cut of from five to twenty per cent. Of course the union refused to sign it. But what could they do? They had pledged their word and honour to try the new system for two months. They went to work under protest of prices. At the expiration of two months the union took the vote by ballot, which resulted as follows: Thirty-three for the new system—who, by the way, were largely petty bosses of the company—and 129 votes to return to the old system. The union notified Mr. Tonkin in writing that they wished to return to the old system. He wholly ignored their notice.

Section 6 of the agreement reads in part as follows: "There shall be no discrimination by the company against any of the miners or working men employed by the company previous to the inauguration of the strike." This the company almost wholly ignored and many a good man left the camp rather than allow the union to get into trouble fighting his case.

At Morrissey they have been working under a protested wage scale since the middle of last October, 40 cents per ton for digging coal, and the company's stores to deal in. If I am correctly informed this is the lowest price ever paid for digging coal on this continent. At Michel where everything is owned by the company except the C. P. R. tracks, the union men in order to hold their meetings have to walk about three miles into the woods to an old logging camp with neither doors or windows. The company have positively refused to rent them a place to hold their meetings. The company stores are at the mines in all the three camps and none others are allowed.

Men and boys are killed or crippled almost daily in these mines. It would take a whole column to enumerate all the grievances in the three camps; I merely mention a few. So it will be seen that the employees of the Crow's Nest Pass Coal Company have not been waiting for an opportunity to strike, but all these months they have been working under protest with the hope that they could adjust their grievances without a strike, and knowing that to win a strike all three camps must strike together, in that way shutting off all the

coal supply and thereby closing down the smelters of West Kootenay and shutting down all the quartz mines, which will throw thousands of our fellow workmen out of employment and practically stop the wheels of industry. Realizing all this, the employees of the Crow's Nest Pass Coal Company have done everything in their power during these months that they have been working under protest to get the company to adjust their grievances without a strike.

The foregoing represents as near as possible the questions in dispute and we think any fair-minded person will conclude that the grievances of the miners are by no means all imaginary. It is, for example, an abominable system where a man may obtain a favoured position in a mine and so earn a very large wage, while another equally competent can only make a pittance by being obliged to work in a less favoured spot. Meanwhile, the strike at Fernie has demoralized the metal mining industry in the whole of Southern British Columbia, and unless steps are taken to prevent the recurrence of these continual labour troubles, we can never look forward to a period of permanent prosperity. The public should be informed at once who is really responsible for the present calamitous state of affairs.

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CANADIAN LEAD AND LEAD TARIFF.

THE Canadian Smelting Works at Trail have installed an electrolytic lead refining plant, which is now in successful operation, and as the process has proved to be more economical than the old zinc desilverisation process universally used in the United States, and to a large extent in Europe, this electrolytic refinery will immediately be enlarged to handle the bullion (lead, silver and gold) output of Canada. Unfortunately the present output of bullion in British Columbia is not sufficient to enable any refinery to earn the full amount of the Government bounty, namely, \$5.00 per ton on 20,000 tons of refined lead per year. This bounty cannot strictly be considered in the same light as a protection upon lead, as it was mainly for the purpose of offsetting an indirect bounty upon refining in the United States amounting to something over \$3.00 per ton of lead produced. The lead smelting and refining industries now having been established, furnishing competition in the purchase of lead ores, it now remains with the Government to secure for the lead miner the home market for the sale of his lead at prices which will enable him to make a profit upon the large amounts of money expended in lead mining in British Columbia and elsewhere, and also to secure for Canada an industry which may develop into an extremely large and important one, namely the corroding of lead, producing white lead, red lead, litharge orange, etc.

The present injustice of the Canadian tariff, so far as the lead miner is concerned, is due to the fact that he pays for practically everything which he purchases on the basis of 25 per cent. to 35 per cent. duty, whereas in the sale of his product, which from his standpoint is a manufactured or finished product, there is but 15 per cent. protection less the differential of one-third,

making a net of 10 per cent. or approximately \$5.00 per ton of lead. On white lead, which represents the main consumption of pig lead, the protection is but 5 per cent. less a third, making 3 1-3 per cent. net, or approximately \$2.00 per ton, in other words, not only has he far less protection in the sale of his product than he has upon the articles which he must purchase, but in the case of his purchases the differential duty is not effective, the prices being made practically by the United States, whereas in the sale of his product the differential of one-third is effective and fixes his selling price.

It is interesting to compare the protection accorded Idaho miners working under similar conditions and on practically the same general mineral deposits as in British Columbia, and it will be noticed that the British Columbia miner has a protection upon his pig lead of \$5.00 per ton, while the United States miner has a protection of 2 1-8 cents per pound, or \$42.50 per ton, a net protection in favour of the United States miner of \$37.50. In the case of white lead, which takes the greatest amount of the lead production, the comparison is worse, the United States protection being 2 7-8 cents per pound, or \$57.50, while the Canadian protection is only about \$2.00 per ton, making a net difference in favour of the United States miner of about \$55.50 per ton of white lead. The relative duties, therefore, on pig lead between the United States and Canada, are:—

United States	\$42 50
Canada	5 00

In favour of the United States miner. \$37 50

which amounts to \$18.00 or \$20.00 per ton of lead ore containing from 50 per cent. to 60 per cent. in lead.

To be entirely fair to the B. C. producer of lead, as well as others who have invested large amounts in that country in its development, it would be no more than fair to start upon a basis of charging 2 cents per pound duty upon pig lead and 3 cents per pound duty upon white lead, the other lead industries consuming lead or white lead to receive a protection over and above these figures an amount equal to their present protection. Duties of this kind would immediately have the effect of stimulating mining in British Columbia, increasing its smelting and refining industries to a great extent, being the means of establishing an entirely new industry, that of the corroding of lead in Canada, and would otherwise directly and indirectly give employment to a large number of men and the employment of a greatly increased amount of capital. This would be a marked contrast to the present state of affairs, when British Columbia producers of lead have now large quantities of pig lead on hand which they are unable to dispose of at several dollars per ton less than a London price, which is only about \$48.00 per short ton, while Mexican bullion, the product of Mexican smelters and Mexican mines, is being refined and corroded in bond in New York and vicinity, being shipped into Canada in the form of white lead.

The Canadian producer of pig lead can now dispose of but 3,000 to 4,000 tons of pig lead in Canada, due

to the fact that corroding works cannot be established under the present tariff regulations, while from 7,000 to 10,000 tons of lead is being annually imported from the United States, Germany and England in tonnages approximately proportional to order named. The British Columbia producer of lead is marketing the balance of his production (over and above the 3,000 or 4,000 tons, which he is enabled to market in Canada) in China, Japan and England. This can only be remedied by making such duties as will encourage and stimulate the mining industry in British Columbia, will give sufficient protection to those caring to invest in the corroding business. There can be no question but this can be accomplished by duties starting with 2 cents per pound on lead and 3 cents per pound on white lead, or if this is inconsistent with the present general tariff, to make these duties in this proportion not under any circumstances, however, making the duty upon pig lead less than 1 1-2 cents per pound and 2 cents per pound upon white lead.

There is, meanwhile, absolute stagnation in all the silver-lead camps; and such properties as the St. Eugene, which are capable of producing large tonnages, are completely closed down. This is due primarily to the very low price of London lead and silver. In spite of the cheap labour in Mexico, a number of their properties are also closed down. The Broken Hills Company, of Australia, seems to be making absolutely nothing; and the chances are the only people who make anything at present prices of lead and silver are the Spaniards.

It has been suggested by a few that a bounty paid direct to the lead miners would relieve the Canadian situation, but the Government intimated last year that they would not consider the granting of any additional bounties—but they did admit that where it was shown that the tariff needed revision they would be glad to correct it. A further objection to a bounty is the fact that it is unsatisfactory to the producer, as the Government must of necessity make it for a limited period only, and usually at a rapidly decreasing rate per ton of material produced. A still further objection to the bounty in the case of lead ore is that the Government would not under any circumstances be willing to grant an amount of bounty which would to any degree or material extent improve the conditions in British Columbia.

The reason for a revision of the lead tariff are many. First, the product of this country—pig lead—which is the result of mining British Columbia lead ores, at a high cost, smelting them, which is also an expensive operation, and refining the resulting bullion, is only protected to the extent of 10 p. c. net, or about \$4.50 per ton, whereas mines, smelters and refineries must purchase articles at prices which are regulated by a duty averaging something over 30 per cent. Second—White lead is only protected to the extent of 5 per cent., less one-third, or 3 1-3 per cent., and consequently is all imported from England, the United States and Germany; England securing but a very small amount of this business. The white lead and other lead coming from the United States is not of

United States origin, but is the result of refining and corroding Mexican bullion in bond. At the time the present tariff was framed, white lead was considered as crude material, Canada not being in a position then to produce either pig lead or white lead. There is every reason, therefore, for a revision of this portion of the tariff, making sufficient increase between pig lead and white lead to insure the construction of corroding works in Canada which will have the effect of giving the Canadian miner the benefit of the Canadian market.

A third reason for a revision of the tariff is the fact that the United States, through its duties on lead and lead products, has always discriminated against Canadian lead, and as their mines, particularly those of Idaho, are operated under similar conditions to those in British Columbia, it is very difficult for people owning mines just north of the line to understand why the Canadian Government should not give them the same benefits as are granted by the United States Government to the Idaho mines.

It is not a pleasing contrast to find properties like the St. Eugene closed down in Canada while those a few miles to the south are operating on a large scale, employing many men, and paying splendid dividends to their owners.

British Columbia mines are open to the smelters of the world; and United States smelters are treating about one-half of the tonnage produced, yet Canadian smelters are limited to their own market, being unable, on account of the United States tariff, to purchase a single pound of lead ore in the United States. Is there any reason why Canadian institutions should be placed at the absolute mercy of the large trusts of the United States, while Canadian institutions are prohibited from competing in the United States with those trusts?

In spite of the fact that Canadian institutions are in a position to smelt and refine as cheaply as in the United States, Canada seems perfectly satisfied to allow the smelting, refining and manufacturing of the various metal products to go to the United States.

Reciprocity with the United States on lead and its products would be most advantageous to Canada, but this can never be brought about until Canada makes her duties just as prohibitive as has the United States, and so long as that country is securing the cream of the Canadian business, as is the case to-day, there will be no inclination upon the part of the United States to grant reciprocity excepting on such items as coal and lumber, which they actually require for the protection of their immense industrial resources.

COMPANY MEETINGS AND REPORTS.

WAR EAGLE.

AT the annual meeting held in Toronto on February 24th, the following statement was presented to shareholders showing gross receipts from sale of ore during the year of \$207,393.44. The amount charged to mining in 1902 was \$172,096.32, to diamond drill prospecting \$24,896.49, to provincial taxes on

gross output of ore \$4,144.42, to interest and exchange, legal expenses, municipal taxes, insurance and sundry \$77,714.55, and to depreciation of plant and equipment \$30,577.41.

The statement demonstrates that mining was carried on only during the last four months of the year, while the expenses for development exploration, etc., were continuous during the entire year. These costs could only be met out of the proceeds of the ore sold in September, October, November and December, with the result that the current indebtedness has been increased by something less than \$20,000.

During the months when shipments were under way the mine shipped 21,455 tons of ore to the Trail smelter. This tonnage had a full assay value of \$403,193.33. The indirect smelting charges, which means the difference between New York and Trail metal quotations, were \$90,386.95 and the direct charges, including freight from the mine, \$105,412.94. The net value of the ore, f. o. b. cars at the mine, was therefore, \$207,393.44. In the same shipment it is shown that the output at the mine has increased from 48 tons in 1894, valued at \$2,053.56, to 21,455 tons in 1902, with a value of over \$400,000. The total tonnage shipped since the inception of the mine has been 180,372 tons, having a gross assay value of \$4,371,436.91, and a net value on cars at the mine of \$2,192,995.63.

In the table of mining costs it is shown that the expense of operating in the camp is being steadily reduced. The cost per foot of sinking the 116 feet of main shaft in 1902 was \$91.55 per ton; for sinking small shafts the cost was \$27.41; for raising \$31.98, and for 4,183 feet of drifting \$20.86 per foot. The cost of ore extraction was \$3.20 per ton.

An important statement was made anent per ton values. Average values per ton during 1902 were as follows: Gross \$18.79 f. o. b. cars at mine \$9.67. The statement of costs since 1897 shows a steady and consistent reduction has been made from year to year.

GENERAL MANAGER'S REPORT.

The following is an excerpt from the report of the General Manager, Mr. Kirby:

Explanatory Note: The values given are based upon the price of 12 cents for copper instead of 16.25 cents as in previous reports.

It is the usual practice of mines in pricing and recording ore to use the "Full Assay Value" instead of the "Smelter's Gross Assay Value," which is less. While this plan is often preferable, it has so far been more convenient at the War Eagle mine to use the latter value which, as shown by the table opposite, has on shipping grades ranged from \$4.68 to \$5.07 less than the full assay value.

"During the past year development work has been steadily pushed and the ore reserves increased. The heavy decline in the price of copper has been offset by the reduction in smelting rates, while the satisfactory solution of the problem of treating the low grades by milling now makes it certain that the large bodies of this ore exposed throughout the mine will soon be available.

"The third level has developed on the cross vein an ore body 100 feet in length, 12 feet wide and extending to the second level above with an average grade of \$12.00 smelter's gross assay value.

"The fourth level has developed on the cross vein three bodies of pay ore. One is 30 feet long, 9 feet wide, averaging \$7.80 smelter's gross assay value. The second is 45 feet long and 6 feet wide, averaging \$9.64 smelter's gross assay value. The third is 20 feet long and 5 feet wide, averaging \$7.63 smelter's gross assay value.

"The sixth level has reached the cross vein and drifting has begun upon it. The heading has so far cut a small body of milling grade. A third branch or vein, 120 feet north, has been located by the diamond drill. It is strong and well mineralized, carrying milling ore and a cross-cut to explore it is now in progress.

"The seventh level has now developed four branches or veins. The eastward extension of the third vein (which passes north of the shaft) is being explored. The fourth vein, still further north, has been located by diamond drill work and is known to be strong and well mineralized. It will soon be reached and exposed by the workings.

"Upon the eighth level the work has developed four branches or veins, the most northern of which has been located at several points by the diamond drill. It is a strong vein, heavily mineralized and is now being explored by the heading. Generally speaking, the work done upon this level has cut several ore bodies, two of which were especially promising. One of these, on the second vein west, was found to have an upward extension. Its downward extension is still untested. The other pay body on the first or south vein west has so far continued and the stope upon it, 45 feet long and 6 feet wide, is at present averaging ore of \$10.50 smelter's gross assay value.

"The ninth level has exposed but one of the vein branches, finding this of no value. Cross-cutting has not yet shown the other veins.

"On the tenth and eleventh levels, the shaft cross-cuts fail to disclose any of the veins owing to the broken nature of the ground and the presence of a belt of dikes. The development of these levels was therefore suspended to await further exploration by the diamond drill and the developments in progress on the eighth level.

"The ore sales during the year were 21,455 tons, averaging \$14.58 smelter's gross assay value. The average contents were: Gold .66 oz., silver 1.2 oz., and copper 2 per cent. The present reserves of ore payable under the new smelter rates are estimated at about 42,000 tons, averaging \$10.95 smelter's gross assay value, (pricing copper at 12 cents instead of 16.25 as in previous reports).

"The development of the mine has from the beginning continued to expose large quantities of ore too low in grade for smelting, but rich enough to promise a handsome profit to successful milling. Now that the difficulties of such treatment have been overcome, these low-grade masses will soon be available. It is impossible to present any reliable estimate of their quantity

or precise value, because their limits have not been clearly defined, and, until milling begins, they cannot be accurately sampled without excessive expense. The process of stoping them for the mill will undoubtedly develop much ore of a higher grade which is not now disclosed by the workings.

GENERAL REMARKS.

"Work after the strike was resumed early in December, 1901. The smelting works were not just then able to receive ore owing to unexpected delays in the completion of their new sampling works. Before shipments could be begun the large and sudden decline in the price of copper seriously reduced the net profit of the estimated ore reserves. In view of the heavy loss this entailed and of the expectation which then prevailed that there would soon be a partial recovery in price, it was decided to postpone shipments temporarily. After it became apparent that relief of this kind would at least be long deferred, the difficulties of the situation which affected both the mining companies and the Canadian Smelting Works led to conferences which resulted on August 4th in a voluntary reduction of smelter rates. This was in view of the fact that the fall in copper reduced the tonnage of pay ores which the War Eagle and Centre Star mines were able to furnish to the smelting works. In order to prevent this reduction and also further increase the tonnage to the amount desired for economical smelting the smelter works reduced the treatment charge from \$6 to \$5 and made an experimental rate of \$4 to reach ore which could not be stoped under the \$5 rate. This lower grade is to be shipped in such quantities as the smelter works find it possible to treat with profit. Under the new arrangement ore shipments were commenced August 21st. They are now progressing at the rate of about 200 tons daily.

"Much work has been done upon the milling problem and a successful method of treating these ores has been devised. It is expected that a preliminary or trial mill for perfecting the details of the process will be constructed this winter, and that by spring a regular tonnage of War Eagle low-grade ore will be under milling treatment."

LE ROI.

The third ordinary general meeting was held in London on Jan 30th. The chairman stated that although the accounts showed a debt to profit and loss of £46,551, the late manager, Mr. Mackenzie, claimed to have made a profit, and gave reasons for saying so. After referring to these in detail, the chairman pointed out the desirability of a local audit to prevent mistakes in the figures in future and said that since the 30th June, they had published month by month the profits made. These had amounted to £90,000, thus entirely changing the position with regard to the Bank of Montreal. They had converted a deficiency of net assets amounting to £40,000 into a surplus of £80,000, and they proposed to ask the Bank for a reduction of interest. Mr. Mackenzie had found more high-grade ore than was anticipated, whilst rates had been further

reduced between the mine and the smelter, and the coke had been more freely obtainable. With good, honest, careful management, reduced charges, and improved processes, he looked for a satisfactory change in their prospects. They had a great mine, with large reserves of ore, valued at from \$10 to \$12. It was expensively equipped, and they intended to devote themselves to its development.

The Managing Director, Mr. A. J. McMillan, also spoke in a hopeful strain.

CARIBOO (CAMP M'KINNEY).

The annual meeting of this company was held in Toronto on February 4th. The mine earned during the year 1902 the sum of \$136,000, which represents the net profit on the ore shipped. Of this sum some \$60,000 was expended in new development work; \$50,000 has been distributed as dividends and the balance, \$50,000, deposited to the credit of the company.

THE ELMORE PROCESS AT ROSSLAND.

TO THE EDITOR:—You will be no doubt interested to hear that the Le Roi No. 2, Ltd., have ordered a two-unit Elmore oil plant, capacity 50 tons per day, the erection of which will be commenced as soon as the weather permits. Being satisfied with the experiments made on their ore, they now intend further proving the process by continuous working on the spot with the above installation, and if the result is what is anticipated they propose erecting a plant of large capacity.

Referring to my article which you were good enough to insert in your February number, I beg to draw your attention to a slight error on page 478, second column, viz., Freight and smelting charges should be \$0.675 not \$6.75.

Yours faithfully,

H. H. CLAUDET.

Rossland, B.C., February 24th, 1903.

COSTS OF SHAFT SINKING AT MT. SICKER.

TO THE EDITOR: The Richard III shaft on Mt. Sicker was down 250 feet on January 31st, 95 feet of sinking having been done during that month. The shaft is in crystalline schists and diorite, two compartment and 4x8 feet in "the clear." The work was well timbered throughout with 5-foot sets of squared timber, which with lagging and blocking, was all taken from "the stump." Ladders and iron shod guides were installed. The total cost was well under \$15 per foot. This includes expenses of office salaries and all expense incurred. Engineers, miners and one carpenter were paid \$3.50 per day, foreman \$5, outside men \$2.50 and two Chinese wood cutters \$1 each per day. W. C. Rannels, late of the Nahmint mine, was in charge of the work, and we consider a record for shaft sinking, with hand steel, in British Columbia has been established. If we are in error will some reader of your estimable journal undeceive us.

DIRECTOR.

MINING RETURNS AND STATISTICS.

ROSSLAND.

SHIPMENTS from this district for the two months ending Feb. 28 are as follows:—

	Tons.
Le Roi.....	32,739
Centre Star.....	13,430
War Eagle.....	9,035
Giant.....	335
Velvet.....	1,391
Kootenay.....	225
Le Roi No. 2.....	2,709
Homestake.....	90
Total.....	60,044

SLOCAN.

From January 1st to February 21st.

	Tons
American Boy.....	245
Antoine.....	16
Arlington.....	40
Black Prince.....	35
Bondholder.....	1
Bosun.....	140
Blue Bird.....	20
Enterprise.....	160
Dayton.....	2
Fisher Maiden.....	290
Idaho.....	21
Ivanhoe.....	240
Monitor (Jan.).....	144
Ottawa.....	80
Payne.....	566
Queen Bess.....	20
Rambler.....	120
Reco.....	70
Republic.....	20
Ruth.....	21
Slocan Star.....	146
	2,276

THE LARDEAU.

In the last two months the Silver Cup and Nettie L. mines have shipped 597 tons of high-grade ore. The Lardeau *Eagle* publishes the following interesting returns of shipments from these mines:—

Silver Cup.—Total for 1902, 555,900 lbs., containing gold 192,496 oz., silver 54798.63 oz., lead 144,770 lbs. Value \$31,434.59.

Total for 1903 to date, 650,293 lbs., containing gold 212,615 oz., silver 59977.42 oz., lead 156,175 lbs. Value \$34,393.89.

Nettie L.—Total for 1901, 1,755,507 lbs. Value \$63,460.95.

Total for 1902, 1,057,120 lbs. Value \$43,236.83.

Total for 1903 to date, 927,033 lbs. Value \$36,237.71.

COMPANY NOTES.

CARIBOO (CAMP MCKINNEY).—Work is proceeding satisfactorily, with a force of between 40 and 50 men employed. At the Waterloo a force of 17 men is at present employed.

BOSUN.—Cablegram from the manager reports 60 tons galena shipped during the month of January and 50 tons zinc produced.

THE YMIR.—The following are the returns for January: Battery—Number of tons crushed: 4,200 tons crushed—60 heads of stamps running 29 days, yielded 1,711 ounces of bullion. Gross estimated value, \$19,750 (£4,072)—have shipped 265 tons of concentrates—gross estimated value, \$8,750 (£1,804)—estimated net proceeds, \$5,750 (£1,186). Cyanide—Tons treated, 2,550 (20,000 pounds English)—gross estimated value, \$4,000 (£825). Total working expenses, \$16,250 (£3,350). Expenditure on capital account—Cost of development, \$2,500

(£515). Sundry receipts, \$800 (£165). Net profit, \$11,550 (£2,380).

MORRISON (BOUNDARY).—It is reported that arrangements are being made for the amalgamation of the Morrison Mines, Limited, owning the Morrison mine in Deadwood camp, and the Athelstan Gold and Copper Mining Co., owning the Athelstan mine, in Wellington camp. A joint meeting of the shareholders of both companies for the purpose of ratifying the terms will be held in Grand Forks on March 28th next. The Athelstan Company will go out of existence, its property passing into the possession of the Morrison company. The latter is incorporated for \$150,000, in shares of a par value of 10 cents each, and the Athelstan has a capital stock of \$50,000, or 1,000,000 shares of the par value of 5 cents each. According to the terms proposed the shareholders of the Athelstan will receive shares on a certain basis in the consolidated company. The capital stock will remain at \$150,000, or one and one half million shares of the par value of 10 cents each.

LE ROI.—Shipped to Northport during January 16,377 tons of ore, containing 5,673 ounces of gold, 10,695 ounces silver, 479,183 pounds copper. Estimated profit on this ore, \$15,000.

DOMINION POWER AND IRRIGATION CO.—A new company, the Dominion Power and Irrigation Company, Limited, is being formed, with a capital of \$250,000, to buy the water rights held by the Dominion Consolidated Mines Co., Limited, and to develop the water power. The necessary capital is subscribed partly in Montreal and partly locally. The company intend to develop the water power of Okanagan Falls to the extent of 1,000 or 1,500-h.p., and the company is asking for tenders for the supply of the necessary turbines, dynamos and motors. R. H. Parkinson, C.E., of Fairview, B.C., is in charge of the construction works.

VICTORY-TRIUMPH.—A new milling plant is being installed at the Victory-Triumph mine, Rossland, of the high-speed gravitation type, the first of its kind on the continent. The mill is a new design evolved after years of investigation and experimenting by a practical mechanical engineer. A description of the apparatus states that in ordinary practice the best results obtained from the usual cam stamp with a drop of 7-1-2 inches effective height is about 95 drops per minute, while the weight of each stamp rarely exceeds 1,250 pounds, in the high-speed mill, the mean velocity at which the stamp is raised by the cylinder so far exceeds the limit velocity imposed by the essential features of the cam mechanism that from 132 to 135 drops per minute each of 7-1-2 inches effective height, can be obtained. It is therefore, much more effective and economical.

RECENT PUBLICATIONS.

PRODUCTION and Properties of Zinc, by Walter Renton Ingalls. The *Engineering and Mining Journal*, New York and London. 1902. First edition.

This is probably the most complete and comprehensive treatise yet published dealing exclusively with the mining and metallurgy and marketing of zinc. In British Columbia at the present time the subject is one of exceptional interest, and Mr. Ingalls' book should have a wide circulation in this field. The work, which is well illustrated, is divided into twelve chapters dealing with the following matters: The History of the Zinc Industry; Present Economic Conditions; Uses of Zinc and Zinc Products; Statistics of Production and Prices; Analysis of Zinc Ores and Products; Properties of Zinc and its Alloys; Chemistry of the Compounds of Zinc; the Ores of Zinc; Occurrences of Zinc Ore in North America; Occurrences of Zinc Ores in Europe, Africa and Australia; Mechanical Concentration of Zinc Ores; and Sampling and Valuation of Ores.

We notice that under the heading of the occurrence of Zinc ores in Canada, no reference is made to the British Columbia mines in which zinc in considerable percentages is found. The omission is, however, excusable enough in that it is only

LOCAL STOCK MARKET FOR THE MONTH OF FEBRUARY, 1903.

Prepared by the Stuart Robertson Co., Ltd., Stock Brokers, Victoria, B.C.

COMPANIES.	Week Ending Saturday, 7th February.				Week Ending Saturday, 14th February.				Week Ending Saturday, 21st February.				Part Week Ending 28th February.				REMARKS.
	Highest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		Highest.		Lowest.		
	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	Asked.	Bid.	
Cariboo McKin'y.	\$0 19	\$ 17	\$0 18	17	\$ 19	\$...	\$ 19	\$...	\$ 19	\$...	\$ 19	\$...	\$ 19	\$...	\$ 19	\$...	
Cariboo Hydraulic																	
Centre Star.....	33½	33	33	32½	33	32½	32½	32	31½	30½	30½	29	31½	30½	30½	29	
Crow's Nest P. C.																	
Dardanelles.....																	
Fairview Corp'n.	4½	4	4½	4	5	4½	4	4½	4½	4½	4½	4½	5½	4½	5½	4½	
Iron Mask.....																	
North Star.....	11	10½	11	9	13	11	10½	9	10½	9½	10½	9½	12	10	11	9½	
Payne.....	19	16½	9½	8½	22	20½	20	17½	22	20	21	18	22	19½	21	28	
Rambler.....	33	30	32	28	32	28	31	28	30	28	30	26	30	26	28	24	
Stocan Star.....																	
Sullivan.....	4½	3½	4½	3	4	2½	4	2	4	2½	4	2½	4	3½	3	2½	
War Eagle.....	18½	17½	18	17	18	17	18	17	19	18	18	17	18½	17	16	14	
Waterloo.....	5½	5	5½	5	5½	5	5½	5	5½	5	5½	5	5½	5	5½	5	
Winnipeg.....																	
St. Eugene.....																	
Granby.....	4 50	4 50	4 50	3 90	4 50	4 00	4 50	4 00	5 50	4 75	5 50	4 50	5 50	4 50	5 50	4 50	

quite recently that any real attempt has been made to turn the zinc contents of the Slocan ores to commercial account.

"The Investor's Blue Book (1903)" is, as its title indicates, a Blue Book for the Investor. A Blue Book is a publication containing a full summary of evidence collated regarding a specific subject, with opinions based upon such evidence. This principle has been applied to the compilation of this new reference work treating with joint stock undertakings. For many years the investor, and particularly the investor with small capital situated in the provinces, has felt the need of a book which would furnish him immediately with salient facts regarding the chief companies whose shares are actively dealt in on the Stock Exchange. "The Investor's Blue Book" endeavours to furnish not only the chief facts regarding companies, but also with an indication of their financial position. It also does what no other publication has yet ventured upon, namely, expresses opinions regarding the value of the shares, and whether, at a price stated, they are a good, bad, or indifferent speculative purchase. "The Investor's Blue Book" is edited and compiled by Herbert H. Bassett, joint editor of "Fenn on the Funds," and editor of "Men of Note in Finance and Commerce," etc. There is a special section on mining companies. Some leading financial writers in London and New York contribute special practical signed articles upon markets of which they are known to possess intimate knowledge. Other contents include tables showing the highest and lowest prices of stocks and shares over a period of four years; particulars regarding transfer fees, stamps, etc.; an article on trustee stocks; a complete dictionary of technical terms in use upon the Exchange; and much other miscellaneous information of great value to the investor. "The Blue Book" is published by the *Investor's Chronicle* (Tower Chambers, London Wall, E.C.) at 2s. 6d. net, cloth boards (2s. 8d. post free); and 1s. 6d. linen covers (1s. 8d. post free).

THE METAL MARKET.

A GENERAL improvement appears to have taken place during the month. Copper is strong and has advanced considerably, on the New York market, and in Europe lead is commanding a somewhat higher figure. Silver is also for the time being stronger, but whether the higher prices ruling recently will be maintained is strongly open to doubt. The latest quotations for copper are: Lake, 12 3-4 to 13; electrolytic in ingots, cakes and wirebars, 12 3-4 to 12 7-8; cath-

odes, 12 1-2 to 12 5-8; casting copper, 12 1-2 to 12 5-8. Statistics for February show a considerable decrease in visible supplies. Lead is quoted at 3.95 to 4. St. Louis; 4.05 to 4.10 New York, while the London market is more active, Spanish lead being quoted at £11 17s. 6d. to £12; English lead, £12 to £12 2s. 6d. Spelter is firm at 4.85 to 4.87 1-2 St. Louis; 5.05 New York. Ingot platinum is quoted at \$19 in large lots, and quicksilver at \$47 per flask, New York; \$45.50 to \$46.50, San Francisco.

COAL EXPORTATIONS AND TRADE.

BUSINESS during February was much demoralized by the strike of coal miners at Nanaimo and at Fernie. In the case of the former the matter at issue was happily adjusted, and it is also hoped that by the intervention of Mr. Mackenzie King, Deputy Minister of Labour, and of a Board of Conciliation appointed by the Provincial Mining Association, the dispute at the latter collieries will be ere long settled.

It is announced that R. Dunsmuir & Sons will re-open the Alexandra mines at South Wellington, near Ladysmith. New bunkers will be built. The old bunkers were torn down a year ago when the mine was closed after the labour troubles with the miners arising out of the project to make a federal union of all the Vancouver Island miners. The Wellington Colliery Company has also started boring for coal four and a half miles north of Ladysmith. At E: tension the output may be increased by the addition of a third shift, employing 200 extra men.

Shipments by the Western Fuel Co. during February aggregated 6,406 tons.

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