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BRITISH COLUMBIA MINING RECORD

Devoted to the Mining Interests of the Pacific Northwest.

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THE MANAGING EDITOR, B. C. RECORD, LTD.,

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THE MONTH.

The second annual Convention of the Provincial Mining Association is convened for the week commencing Monday, February 22nd, in Victoria. The Association since it was organized a year ago, has accomplished a great deal of useful work, and is capable of doing much more. Enthusiasm, therefore, should not be allowed to flag, and it is to be hoped that the district organizations will realize the importance of being well represented at the forthcoming Convention.

We are glad to note that the immigration of coal miners to British Columbia from the North of England continues, and the men find ready employment in the East Kootenay collieries. It will be an excellent thing for the Province if we can man our collieries with intelligent British miners, instead of being obliged to employ ignorant, non-English speaking Huns, Poles and Dagos, representing the sweepings of Europe in work where intelligence is a *sine qua non*, having regard to the safety of human life.

It will doubtless be some little time before the significance of the new discoveries of ore in the 1350-foot level of the Le Roi is fully determined. But the potential importance of recent developments may be to some extent gauged by the published statements of the manager, who is not given to overmuch optimism of

view. Whatever the future of the Le Roi may be, and whether it will again come to be regarded as the premier mine of British Columbia, it is at any rate certain that its management is now in very safe hands, and if the ore is there Mr. Parrish may be depended upon to find and develop it to the best possible advantage.

The future of British Columbia depends on the growth and development of the mining industry. Mining is already conceded to be our premier industry, while agriculture takes and must continue to take a very secondary place. Yet year after year the Provincial Government appropriates a considerable sum in the aggregate in support of a Fruit Growers' Association, a Dairymen's Association, a Flockmasters' Association, Agricultural Societies and the British Columbia Agricultural Association. No grant has ever been made to promote or aid a Mining Association of any description. The Provincial Mining Association has already proved its efficiency and usefulness. It is, however, handicapped and hampered for want of funds. It has therefore a strong claim on the Government for financial assistance and encouragement.

The shareholders of the Velvet and Portland Companies have acted very wisely in approving of the proposed scheme of amalgamation. From every point of view the plan is a sensible one. The two properties adjoin and can consequently be worked together to advantage; management expenses will be correspondingly reduced; and the plan contemplates a considerable reduction in the issued capital of the Velvet and Portland Companies. Although in the past the development of the Velvet was not always wisely directed, the result of work more recently done was most gratifying. The Portland, too, is a most promising property. Mines in this section have been heretofore badly handicapped by heavy transportation costs, but the drawback in this respect should be largely overcome by the erection, as proposed, of reduction works on the spot. There is therefore every prospect under the new regime of the Velvet becoming like one or two other British-administered mining companies operating in the Province whose positions have lately been strengthened or improved, a profitable enterprise.

In a letter to the MINING RECORD, Mr. Rowland Machin points out the hardships imposed on prospectors and others by the regulations now in force prohibiting carriage of blasting powder, caps and explosives in general on the steamers plying between the Coast cities and northern mining camps, as well as on vessels navigating Kootenay inland waters. Thus a mine operator (say) at Whitehorse sending an order

for powder or caps to Victoria is often in consequence put to much serious inconvenience by the delay occasioned while arrangements are being made for shipment of his order by special vessel from Seattle. It appears that the C. P. N. Company has applied to the Dominion Government for licenses to carry explosives but that permission has been refused unless the company agree to assume all risks. These risks need not, however be great if proper precautions are taken as Mr. Machin suggests, and it seems rather absurd that explosives can be carried with impunity first across the Atlantic and then by rail across the continent, while they may not be taken in the same way a few additional miles by steamer upon their arrival at a Pacific Coast terminus.

A number of the residents of the Similkameen have signed a petition addressed to the Minister of the Interior, at Ottawa, asking that the Daly Reduction Company be granted a portion of the Indian Reserve near Hedley for smelter purposes in exchange for other and more desirable pasture land, to which arrangement the Indians themselves are most favourably disposed. In the petition the facts of the case are very clearly set out, and are briefly these: Mr. M. K. Rogers, acting on behalf of the Yale Mining Company and Daly Reduction Company, has spent a very large sum of money in this locality in the development of the Nickel Plate and other mines. Among other works which have directly benefited the public he has built over thirty miles of waggon road through the mountains, he has been a large employer of labour, and by his operations has done much to attract the attention of investors and others to a very promising section of country. On this showing it is submitted, he is entitled to every consideration. The company Mr. Roger represents, is now desirous of establishing smelting works in the neighbourhood, but the only available site in British territory is on Indian Reserve land, which is not and never has been utilized by the Indians, and it is pointed out, if the Department refuses the concession asked, the country will then lose an important industry. Application was first made for this land so long ago as 1899, but to unravel a tangle of red-tape nothing is equal to a strong "pull." In Canada we always place politics before business.

The export number of the *Engineering and Mining Journal* issued on January 7th is truly a monumental production, and surely marks a period in mining journalism, as it also indicates the remarkable development and growth in recent years of the mining industry of North America. This noteworthy weekly issue of a noteworthy publication contains no less than a hundred and forty-two pages of advertisements and sixty-six pages of letter-press matter printed in small type. The issue is given up almost exclusively to reviewing industrial and commercial conditions affecting the mining industry of this continent in 1903, and as such serves a far more useful purpose than the average governmental blue-book, because it is just as reliable, compiled by recognized experts, and strictly

"on time." We venture to say, for example, that Mr. S. S. Fowler's excellent summary of last year's mining developments in British Columbia, is a better advertisement for the Province than the Annual Report of the Minister of Mines which may be published any time between next March and next July. Of course, the Minister of Mines' Report may prove more useful for statistical purposes, and be valued accordingly by statisticians and archaeologists; but we need hardly discuss that point. We take the opportunity meanwhile of congratulating Mr. T. A. Rickard and his very able editorial staff not only on this wonderful special issue, but also on the high standard maintained in the ordinary weekly editions of the *Engineering and Mining Journal*, by which it so easily substantiates its claim to be considered the "world's leading mining and metallurgical periodical."

The sensational death of Mr. Whitaker Wright, the mining promoter who took poison immediately after having been sentenced to seven years' penal servitude has special interest for those engaged in mining in this province. Certain of our most important mines were involved in his financial operations, and many of our mines have been subjected to methods almost equally disastrous by promoters who have either transgressed the law and evaded punishment or have kept their operations within statutory and penal limitations. Mr. Wright was not brought to justice for the main counts in which his promotions transgressed the rules of sound finance and ordinary business morality, but because he failed to keep in view the nice distinction existing between operations technically legal but morally outrageous, and operations in contravention of the criminal law. Had he been indicted for the former he would hardly have stood alone in the dock. That he should be punished for the latter when demand for his punishment was aroused by the effects of the former leads to the reflection that the interests of society would be better protected by measures against a very general financial corruption, than by the occasional punishment of some one of those who plunder society with impunity, who has happened to cross the line of statutory criminality. It may make successors more careful not to cross the line, but it will hardly make them less greedy to participate in the spoils of unwarrantable promotions. We have little to add to what we said in February, 1901, on the subject of the London & Globe and Mr. Whitaker Wright: "He gives the impression more of a daring actor in a saturnalia of corruption than of a mover and instigator of financial debauchery. . . . It becomes a difficult matter to apportion personal responsibility and one from which the severest critic may shrink. Under the veil of charity the features of Mr. Whitaker Wright may well be hid." If there was reason then for such language, there is greater reason now. He no longer flaunts great wealth in the eyes of the world but is dead at his own hand and lies in a dishonored grave.

A deputation representing the Executive Committee of the Provincial Mining Association recently inter-

viewed the Premier in order to ascertain what action, if any, the Government proposed taking in respect to the several important recommendations — suggesting the introduction of legislation of a remedial character — made by this organization during the past year. The deputation was received with courtesy, but beyond obtaining an assurance that it was the Government's intention to provide an alternative for the two per cent. tax, the interview was otherwise apparently resultless. On the subject of the crown-granting of placer claims, however, Mr. J. B. Hobson, one of the chief advocates of this measure who happened to be present, replying to an enquiry put by the Minister as to whether he would object to the imposition of a condition when title was issue requiring work equivalent to the expenditure of at least a hundred dollars to be prosecuted annually on each placer or hydraulic claim so granted, urged the desirability of providing some safeguard on these lines which would prevent large alluvial areas being acquired and held for purely

from the present leasing system. As is well known, we have yet in British Columbia a large extent of country to which access is difficult, but where the opportunities for mining appear sufficiently encouraging to warrant exploitation and possibly preliminary working. It might well happen in such a case that after a hydraulic mine had been opened up and equipped, that it was found to yield a very small, if indeed any, margin of profit under the disadvantageous conditions imposed by distance and inaccessibility, while with these disabilities removed, as they would be by, for example, the building of a railway, the mine could be made to pay a very fair return on the energy and capital expended. Under the present leasehold system the owner of such a mine is either obliged to continue working year after year at possibly a loss or else be penalised by the forfeiture of his property, others subsequently, when conditions are no longer arduous or hazardous, grasping the fruit of his toil. Surely then it should be only just and fair that so long as the



The LeRoi No. 2 Company's new Concentrator utilizing the Elmore Oil Process.

speculative purposes. But to our mind the suggestion made by the Premier is absurd to a degree, for a conditional crown grant would not be a crown grant, while the expenditure of so small a sum as a hundred dollars per annum in the development of an hydraulic mine would certainly be of no advantage to anyone. Rather it would be a source of continual irritation and render title to placer ground less secure than at present. If we rigidly understand the contention raised by Mr. Hobson and other hydraulic mine operators, the chief objection to the leasing system now in force is that the Act limits the life of a lease to twenty years, and does not specifically state that upon the expiration of that period renewal shall be obtainable. Consequently title is not regarded as sufficiently stable to encourage outside capital to invest in this class of property. But there is also, we think, a still stronger reason in favour of crown grants or at least a change

principle of crown grants is admitted, and absolute titles are granted in the case of farm and mineral lands, that the rights of the hydraulic miner, he having afforded satisfactory proof of his *bona fides* by developing his property, should be also considered and respected. If crown grants to hydraulic ground are issued only after a sufficiently large expenditure has been made to prove their value, there need be no fear of advantage being taken of the change of system by speculators for their own purposes.

THE ZINC PROBLEM.

The establishment of a successful industry in zinc mining is of great importance to British Columbia. Zinc mining would, and to a certain extent already does, form a useful auxiliary to silver-lead mining, but its development presents serious, though not in-

superable, difficulties. There are three possible outlets for British Columbia zinc ores. One is the British or Continental market, the second is the United States market, and the third lies in the formation of a home market, in which the ore would be sold, and from which its contents would be marketed separately. The British market possesses the obvious advantage over the United States market that it allows to some extent for the silver content of the ore. But this advantage is not altogether decisive. The recovery of by-products in European smelters is far more an economy forced upon them by the fact that when foreign ores reach them they have become costly through freight and other charges than a result of superior practice or superior money making ability. It does not pay to transport ore from one end of the world to the other, and then throw away anything of any value it contains, even if complex and expensive processes are necessary to save its by-products. Shippers of zinc ore to Europe have had this impressed upon them by actual returns of a not particularly encouraging character. The smelters of the United States are eager to buy high-grade zinc ores. But they purchase them for the zinc and not for any silver they may contain. So far, the United States smelters have not shown any anxiety to establish works which would treat argentiferous zinc ores with the view of saving the silver. Argentiferous zinc ore is uncommon. If sufficient of it were procurable in British Columbia to form the base of a successful smelting industry in the United States, the zinc produced from this source would unquestionably be subjected to the penalties of an import duty. There is already an attempt being made in the United States to regulate the output of zinc ore. If high-grade argentiferous zinc ore from British Columbia came into competition with lower grade non-argentiferous zinc ore in the United States, who can doubt that, however inconsiderable the competition, the tariff would be adjusted so as to put an end to it. At present the European and United States markets seem to establish an equilibrium so far as our producers are concerned, which leaves them in doubt to which to ship, or whether to ship to either. The third choice, the establishment of a local industry, remains. This would naturally be from all points of view the best solution of the matter if it is at all practicable. Is there enough argentiferous zinc ore available in British Columbia to justify anyone in attacking the problem of treating it locally and saving both the silver and the zinc. It is undeniable that in British Columbia smelting facilities have tended to outstrip the supply of ore except in the Boundary district, where the problem has been reduction in the cost of smelting rather than an adequate supply of ore. Nor has the smelting practice in this province shown any lack of adaptation to new conditions. It is therefore reasonable to suppose that if, or we should say, when the problem of treating our argentiferous zinc ores locally presents itself in a form which demands and admits of successful solution, it will be attacked and solved as other problems not less difficult have been successfully met. To our mind the full and profitable

utilization of our resources in zinc ores lies still to some extent in the laboratory of the chemist. But we have no doubt at all that British Columbia will yet achieve another metallurgical triumph in this direction, and that another well-founded and stable industry will eventually enrich the mining industry of the province.

Mr. A. C. Garde, the president of the Silver-Lead Miners' Association, has meanwhile written a letter to the press, in support of the resolution recently passed by that organization, urging the Dominion Government to engage the services of a duly qualified expert to report on the whole zinc question so far as British Columbian interests are concerned. Although, of course, the Association did not actually suggest the name of any zinc metallurgist in particular to whom this work should be entrusted, Mr. Garde now mentions the fact that mine-operators in the Slocan had in view the appointment of Professor Ingalls, and he points out that not only would the report of such an undoubted authority be of inestimable value to those now engaged in the mining of zinc ores in the country, but also prove of advantage in securing capital for the further development of the industry.

THE MINING ASSOCIATION AND THE DUTIES OF THE EXECUTIVE.

The *Inland Sentinel*, commenting on Mr. Leslie Hill's open letter published in our issue last month, addressed to the Vice-President of the Provincial Mining Association and our reference thereto, remarks: "Both Mr. Mortimer Lamb and Mr. Hill know perfectly well that in referring to the discussion on taxation by the executive in that strain, they are neither fair nor honest. It is pretty generally known that the Government, when asked to repeal the two per cent. tax, had asked the Association to suggest some alternative method of taxation, and in considering the subject, the executive did neither more nor less than their duty. It is all arrant humbug for Mr. Hill to prate about "socialism," etc. The trouble is that men of set ideas, like Mr. Hill, are not big enough to concede to others greater perspicacity than they themselves possess."

This is an important matter and should be fully dealt with. It is not what Mr. Leslie Hill or Mr. Mortimer Lamb think that's important; nobody probably cares. What is important is the point raised by Mr. Hill involving the policy to be pursued in future by the Provincial Mining Association if it, as an institution, is to have any weight or influence with the Government of the country. To have such weight and influence it must have the endorsement of practical mining men. A Mining Association of farmers would have no weight. Practical men wish to consider practical questions immediately and directly affecting the mining industry. They do not consider, for example, that they are called upon to advise the Government to adopt an entirely new system of taxation which would admittedly bear more heavily on other interests than upon themselves. In the case of the resolution introduced by Mr. Kirby at Kamloops, while we may personally be in sympathy with that gentleman's ideas on

economic questions, the *MINING RECORD* is not published to represent the personal views of its editor or the views of Mr. Kirby. It is published in the interest, and endeavours to recognize the requirements of, the mining industry of British Columbia, and to that extent it supports the Provincial Mining Association. But all this is beside the point. In the matter now under discussion, the whole question hinges on the powers vested in the Executive Committee. Whatever those powers may now be we do not think it either expedient or right, nor was it intended, that seven committeemen, representing a quorum, should be permitted to commit three thousand persons—that or thereabouts being presumably the membership of the Association—to the endorsement of so radical a measure as that recommended, for example, by Mr. Kirby—a measure, concerning which there had been no general discussion, and of which very probably the Association as a whole might not approve. In the case in point the Government were fully apprised of the circumstances under which the resolution was passed, and consequently felt disposed to take as much notice of it as was taken of the famous petition said to have been presented on an historic occasion by the three celebrated tailors, who claimed to represent the people of England. That is the principle of the thing; to reply directly to the *Inland Sentinel's* contention, we submit that Mr. Kirby did not offer an alternative for the two per cent. tax. He proposed an entirely new system of taxation by which other interests would be more seriously affected than mining, and this without their consent or approval. Furthermore, while it is true the Government did ask for alternative proposals, the Convention which appointed the Executive Committee decided almost unanimously that the Association had no wish or intention to assume the prerogatives or duties of the Legislature in these respects. Again if the Executive is allowed to make attacks on civil servants, it will be easily recognized how dangerous a weapon is placed in the hands of individuals for venting personal spites or for avenging personal wrongs, real or imaginary. It seems to us therefore that if the Provincial Mining Association is to continue to occupy an influential position and accomplish the purposes for which it was organized, a better system or working, or rather the system originally conceived, must be followed out, and somewhat on these lines: A Convention is held once a year at which are present delegates representing not only localities but interests directly and indirectly dependent upon the mining industry. Thus we recognize officially in the Association five distinct classes, namely miners and prospectors, mine-managers, mine-owners, smelter, business and professional men, and farmers and others. At this Convention, which is a thoroughly representative gathering, matters affecting the interests of the mining industry of B. C. at large are brought up for discussion, resolutions are passed and an Executive Committee is appointed for the express purpose of bringing to the attention of the proper authorities the requirements and wishes of the mining communities and take the necessary steps to see that they are carried into effect; these wishes and requirements having been very clearly

set out by resolution passed in Convention. When the Executive Committee has attended to this duty, it is expected to meet periodically to receive, consider and deal with suggestions and recommendations from branch organizations on matters affecting the interests of individual localities, and not, presumably, those of the whole Province. Should the occasion arise, however, when some question of general interest and importance arises with which it is advisable that the Mining Association should deal, then before taking any decisive action the Executive Committee should certainly take the precaution to ascertain the views and wishes thereon of every branch organization. Of course, under the new system proposed of giving each district better representation on the Executive, and also providing for a larger representation of practical mining men, theoretically, at least, most of the objections to the present system will be removed, but this notwithstanding we still think that most of the important business of the Association should be done in Convention, leaving to the Executive the task merely of endeavouring to render effective the wishes of the Convention. We therefore agree with many of the conclusions arrived at by Mr. Leslie Hill, and expressed by him in his open letter to Mr. Hobson, although possibly we may not argue from precisely the same premises.

JUDGES AND EXTRA JUDICIAL WORK.

IN last month's *Canadian Law Times* appears an interesting letter from the pen of Mr. Justice Martin, on the subject of "Judges and Extra-Judicial Employment," wherein the learned writer argues with much clearness and force against the practice of appointing judges to sit on commissions, while for the same reasons he would have removed "all temptations in the nature of" railway passes and directorships, the acceptance of which might even unconsciously affect judicial independence of thought and action. There can be no doubt at all that the view of the matter Mr. Justice Martin takes is a high and, in the main, a right one. So far, at any rate, as directorships of public companies are concerned, any judge accepting an invitation of the kind would be taking not only a greater personal risk and assuming a heavier responsibility than a private individual would be called upon to carry, but he would also take the more serious risk of bringing a high and dignified office into possible disrepute. That, of course, is the extreme view, for no Canadian judge in his right mind would dream of joining the directorate board of a company engaged in anything resembling a speculative business. Even the most legitimate and conservative of business enterprises, however, may come to grief, possibly under circumstances necessitating legal investigation or action, and consequently if on no other than politic ground, it is certainly inadvisable that judges should allow their names to be associated with any commercial or industrial undertaking of whatever nature. It is a common practice in Canada for judges to be tendered passes by railway and steamship companies.

The transportation companies in this country are, in fact, most liberal in this respect, and not only judges, but members of Parliament, clergymen, not to mention, journalists (who, however, generally render a *quid pro quo*) are as a rule afforded the opportunity of travelling without charge. We do not suppose for a moment that passes are offered to judges or members of Parliament with the object of influencing their opinions or as inducement to them to extend special favours in return at the expense of strict morality. At the same time to accept a gift and fail to experience a friendly and cordial feeling towards the donor and a desire to benefit him would be unnatural, and in view of this, judges and parliamentary representatives being but human, the pass system is not a good system. But we are more concerned with the question: Should judges act as commissioners? Mr. Justice Martin replies in the negative, as "it has directly or indirectly, publicly or domestically, an undesirable effect on the administration of justice and is contrary to the welfare of the State," and his reason for arriving at this emphatic conclusion is that the absence of one judge on extra-judicial work throws an unfair burden on his colleagues of the Bench, and is apt to delay litigation. If in practice this argument is found to work out, it is unanswerable. On the other hand there is much to be said in favour of the principle of the appointment of Supreme Court judges on commissions. We were in communication the other day with a number of mine-operators and others who are desirous of bringing about certain changes, which in their opinion would be highly advantageous to the industry, in the mining law of the Province. The suggestion was made there that what was required to convince the Legislature and the people of the justice of their contentions was a commission to enquire thoroughly into the working of the mining laws and secure evidence bearing specially on the points raised. The reply to this was: "No, commissions are worse than useless. The Government will appoint commissioners to suit themselves, and if they do not desire a change in the law, the commission would so manoeuvre as to bring in a report adverse to us." Ignoring, we think, advisedly, the debatable point here raised, we can nevertheless safely say that the judiciary in Canada is accorded a measure of respect and confidence that is not extended generally to professional politicians, and consequently the inclusion of a judge on a commission, over which he would probably preside, would lend weight to the findings of that body and be an additional assurance that the matters enquired into would be, at any rate, honestly and impartially considered. Apart from the fact that a judge is peculiarly fitted to act as a commissioner from training and experience in the weighing and sifting of evidence, he has often the further advantage of having made a special study of the subject anent which enquiry may be made. To particularize, no one is so well informed on the mining law and its operation in British Columbia as the author of "Martin's Mining Cases and Statutes of British Columbia," and no one would be better qualified to act on a commission to enquire into the working of our mining law than he. That such a commission,

properly constituted, could render most effective service we have no doubt at all, for whether reform is needed or not in the direction indicated by mine-operators or by the Executive of the Provincial Mining Association, it is an acknowledged fact that the numerous ambiguities and conflicting clauses in the Mineral Act at least, are, and until amended or reconciled, will be, a fruitful source of litigation. So long as commissions can be made to serve a useful purpose, and this means for investigating alleged abuses or grievances continues, so it is absolutely essential that the men sitting as commissioners should be like our judges, independent, impartial, disinterested, beyond the reach of political influence or taint. If the services of Supreme Court judges are unobtainable for the performance of extra-judicial duties, then surely it would not be altogether impracticable to make permanent appointments, in the same manner as judges are appointed, of men specially trained and fitted to act on all occasions as presiding officers of commissioners, Boards of Conciliation or Arbitration. The adoption of such a measure would go far towards popularizing and increasing the usefulness of this system of enquiry and redress.

THE PROVINCIAL MINING ASSOCIATION OF BRITISH COLUMBIA.

THE SECOND ANNUAL CONVENTION—THE PRESIDENT'S
LETTER OF INVITATION TO DELEGATES.

THE campaign of Remedial Legislation which was commenced by our Association at its General Convention in February last has been prosecuted with zeal by the Executive Committee ever since.

The Legislature was, at the time, in a state of internal dissension, and unable to give its attention to the many pressing needs of the Province. Nevertheless, we did succeed in obtaining two of the reforms recommended by the Association, viz.:

- (1) The right of redemption of mineral lands sold for taxes;
- (2) A provision enabling the owner of a group of crown-granted mineral claims to perform all requisite work upon any one of his claims.

The Association, as you are aware, is composed of men representing all classes of industry and politics in the Province; but the Association itself is absolutely non-partizan.

Our object is to secure relief from numerous artificial burdens which have, from time to time, been imposed upon the mining industry. The welfare of the Province demands reform, and our Association, guided by the wisest counsels it can enlist, is determined to secure it.

Owing to the shameful mismanagement of our public affairs by successive legislatures during the last few years, the Province has been brought to the verge of bankruptcy. Is it not time for the people to insist that henceforth wisdom rather than folly, and carefulness rather than recklessness, shall guide the destinies of our country?

The Association is not yet a year old, yet it has already accomplished much by its constant devotion to the interests of the mining industry. At its first convention it adopted means to successfully settle the Fernie strike, which threatened to close up all the mines in the Kootenays and stop the circulation of upwards of \$400,000 disbursed monthly by the affected coal mines and dependent industries.

In order to inform you more fully of our labours during 1903, I enclose a brief statement of the remedial measures recommended, after careful deliberation, by the Convention and its Executive Committee.

If these measures receive, at the hands of the Legislature, the prompt and favourable consideration which they deserve, we shall soon witness a great and permanent improvement in our mining conditions.

Our second convention will be held in Victoria during the week commencing Monday 22nd February, 1904. We occupy a far stronger position to-day than we did at the first convention. We now have the results of nearly a year's deliberations, by those most competent to advise on matters affecting the mining industry; and it is impossible to believe that any government will persist in turning a deaf ear to suggestions so framed.

Mining is the paramount industry of our Province. The metalliferous, mineral, and coal mining industries stand by themselves as those which, in their extension, increase individual rewards, not alone of their followers, but the followers of all other industries. They are not competing producers, but, on the contrary, are competing consumers for all the others.

The development of the vast mineral resources of our Province is of vital, never-ending importance, and should be encouraged by every patriotic resident. Every additional ton of gold, silver, copper, lead or other metal or mineral having a commercial value produced by our mines adds new wealth to the Province and sends new money circulating through the channels of trade and commerce.

For election of delegates the procedure will be the same as last year, viz.: Meetings to be called and one delegate appointed thereat for each twenty members or fraction of twenty members.

Delegates' credentials shall consist of a letter signed by the local president (or chairman) and secretary certifying the number of members in their branch and setting out the full names of those who have been duly elected as delegates.

Where branches have not been formed, the procedure is to call a public meeting for the purpose of organizing such a body; elect a president, vice-president, secretary, treasurer, executive and other necessary committees for a period of one year.

Arrangements have been made with the C. P. R. for special transportation rates to delegates attending this Convention, and you are requested to see that delegates from your branch are fully informed thereon. In order to profit by these special rates, delegates must purchase within three days of date of Convention, first-class, full rate, one way tickets to Victoria, and obtain certificates to that effect on Standard

Certificate forms, which will be supplied by ticket agents upon application.

Upon arrival at Victoria, delegates must hand in their certificates to the secretary for indorsement.

If fifty delegates hold Standard Certificates, duly indorsed, they will receive free transportation upon presentation of same at ticket office; if fifteen or more, the return fare will be one-third the full one way rate; if fourteen or less, the return fare will be two-thirds the full one way rate.

Delegates must *not* purchase return tickets, as their doing so will interfere with other delegates obtaining the reduction.

Do not omit to notify the secretary of the number of delegates appointed from your locality, that this office may be fully posted. Delegates may have their mail addressed care of the Association, P.O. drawer 656, Victoria, B.C.

All communications are to be addressed to "The Secretary," at the above address.

By order of the Executive.

JOHN KEEN, *President.*

Please Note:—No city, town, or village will be entitled to more than twenty delegates.

THE CANADIAN MINING INSTITUTE.

THE Secretary announces that the Annual General Meeting of the Institute will be held in the King Edward Hotel, City of Toronto, on Wednesday, Thursday and Friday, 2nd, 3rd and 4th March next.

Appended is a preliminary announcement of the syllabus of papers so far arranged at this date: (1) Presidential Address, by Mr. Eugene Coste, E.M., Toronto; (2) Hydraulic Mining in the Yukon: Its Present and Future, by Mr. Lucien J. Robe, C. & M. E., Dawson, Y.T.; (3) The Evolution of Mining Practice in the Yukon, by Mr. A. J. Beaudette, M.E., Dawson, Y.T.; (4) Exhibition of Lantern Slides illustrating Mining Practice in the Yukon and Cariboo Gold Fields, by Mr. B. T. A. Bell, Ottawa; (5) On the Construction of Mine Bulkheads, by Mr. W. Thompson, Rossland, B.C.; (6) On Gold Dredging, by Mr. John E. Hardman, S.B.E.M., Montreal; (7) On Certain Conditions of Coal Mining in the Crow's Nest Pass, British Columbia, by Mr. James McEvoy, M.E., Fernie, B.C.; (8) On the Bornite Ores of British Columbia and the Yukon, by W. M. Brewer, M.E., Victoria, B.C.; (9) On the Nickel Deposits of Norway, by Major R. G. Leckie, M.E., Sudbury, Ont.; (10) On the Electric Smelting of Iron Ores, by Dr. Eugene Haanel, Ottawa; (11) The Geological Survey of Canada as an Educational Institution, by Prof. T. L. Walker, Toronto, Ont.; (12) On the Opening up and Development of Mines, by D. G. Kerr, C. & M.E., Cordova, Ont.; (13) The Undeveloped Mineral Sources of Ontario, by W. G. Miller, Provincial Mineralogist, Toronto; (14) On the Manufacture of Sulphuric Acid, by C. A. Messieur, Sydney, C.B.; (15) On the Mines of Ontario (Illustrated by Lantern), by W. E. H. Carter, M.E., Toronto; (16) On the Genesis of the Animikie, Iron Range, by F. Hille,

Port Arthur, Ont.; (17) The Year's Progress of Mining in Ontario, by T. W. Gibson, Director of Mines, Toronto; (18) On Magnetic Separation, by F. G. Snyder, Chicago Ill.; (19) On a Water Supply for Hawaiian Sugar Plantations, by I. N. S. Williams, Puunene, H.I.; (20) Subject not yet announced, by Frederic Keffer, M.E., Anaconda, B.C.; (21) The Early History of Mining in the Sudbury District, by J. W. Evans, C.E., Descronto, Ont.; (22) Subject not announced, by A. C. Garde, M.E., Sandon, B.C.; (23) On the Carboniferous of New Brunswick, by Dr. H. M. Ami, Ottawa; (24) Subject not yet announced, by E. B. Kirby, E.M., Rossland, B.C.

The above programme will be kept open for additional papers until 15th February next.

HYDRAULIC MINING IN CASSIAR.

MINING operations in the Cassiar district during 1903 were confined entirely to the work done by the Thibert Creek Company, working hydraulic ground on Thibert Creek, a brief report of whose operations follows:—

Number of days (of 24 hours) worked.....	98
Water used per day, miners' inches	475
Total water used for season.....	46,550
Total gravel moved, cu. yds.	162,925
Amount of gold recovered	\$21,000
Total cost of operating for season, including Government fees and licenses, pipe-laying, tools, etc	\$17,400
Profit for season	\$ 3,600
Cost of recovering gold per \$1.00.....	83c.
Value of gravel per cubic yard	13c.
Cubic yards of gravel washed per miners' inch	3.5

The shortness of the season's run was due to the pipe line not being completed, which delayed the commencement of washing until the 13th of June. Also to the fact that the manager did not wish to incur expense by doing late work from which profits would not be derived until next season. Operations were therefore discontinued earlier than was necessary.

With pipe lines and plant in readiness for a start, operations could be commenced about the 30th of May and continued until near the end of October; though, in ordinary seasons, the last clean-up should take place not later than the 1st of that month, on account of cold weather setting in and preventing the picking and cleaning of bedrock and cuts. The washing of gravel, however, may be continued until about the 20th of October.

Last season's water supply was the smallest ever known in the district and when it was most abundant the company's pipe line and monitors were not in order to be worked.

A great deal of water is wasted which could be secured and made available by building dams and diverting some of the smaller creeks into Berry Creek. By using means to secure this water the company would have much more than they could use. The present supply is not adequate for washing banks 150

feet in height; 1,000 inches or more should be available.

There are three propositions for securing for the mine an increased supply of water at a reasonable cost and with a larger supply the cost of washing would, of course, be much less per cubic yard. The wages of high-priced men are as great a tax on a small production as on a large output. The rate of wages paid for pipe men was: Pipe men \$6.00; machinists, \$6.00; carpenters, \$5.00 and sluice men \$4.50 per day, would be no more if using a larger supply of water, while the quantity of gravel washed and gold recovered would, of course, be much greater. It may be mentioned that nothing has so far been done to improve the water supply in Berry Creek. A heavier flow of water would also force larger stones through the sluices and save cost of moving on cars.

The preliminary prospecting of the mine was not sufficient to establish the lowest portion of the bedrock in the old channel, so that two of the sluices were started too high up to allow of a good grade in the rock cuts. This to some extent increased the cost of working for the season. Next year (1904) the lowest portion of the channel now being established, sluices will be started low enough to give sufficient grade. The cost of removing boulders last season was one half of the working expenditure. This expense will be proportionately reduced when conditions are improved in future seasons. Fully one-third of the stones now handled by cars might be moved by a larger supply of water.

Bringing in and taking out the men cost \$800. This item remains fixed whether the season be long or short. The cost of laying pipe and setting machines also is as great for small as for large installations and increases the cost of working a yard of gravel proportionately.

The cost of working per \$1 gold produced in the past season was, as above shown, 83 cents, divided as follows: Manager's and foremen's salaries, Government fees and part of travelling expenses, 27 2-3c., high priced labor, 13 5-6c., ordinary labor, 41 1-2c.; total, 83 cents.

With a season of 150 days and a water supply of 1,500 inches, the total cost of producing \$1 worth of gold would be 52 1-2 cents. The amount produced calculating upon the results of last season's operations would be \$100,000, leaving a profit of \$47,500.

From calculations made the carrying capacity of the miners' inch can be put down at 3.5 cubic yards. According to this the company washed during the season 162,925 yards, with a value of 13 cents per yard. With the larger supply of water above indicated 787,500 cubic yards could be washed in one season of 150 days.

The Thibert Company's property consists of seven claims, each 1,500 feet, following the old channel, or 10,500 feet in all, 500 feet of which has been worked. These claims measure on an average 400 feet in width by 100 feet in height, or 14,000,000 yards of gravel in all.

MINING IN ONTARIO.

(By J. C. Gwillim.)

THE total production of minerals in Canada for the year 1902 was \$64,970,732. A little less than half of this belongs to the non-metallic class, and \$35,000,000 of metallic product. Ten years ago, in 1893, the total was \$21,100,000, of which \$16,169,345 was non-metallic and \$4,634,381 metallic. The great proportionate increase in the metals is due principally to British Columbia and the Yukon. The lesser but still substantial growth of non-metallics is due principally to the Western coal and the many products of Eastern Canadian mines.

The natural growth of the mineral industry in newly developed districts is along the lines of precious or semi-precious metals. As facilities, population and industries increase a host of lesser, often neglected, minerals become commercial quantities. This is very apparent in the older civilized countries and to a considerable extent in the Eastern Provinces and states of this continent.

The Report of the Bureau of Mines of Ontario has a list of twenty non-metallic minerals, a product valued at \$7,134,135 in the rough. Some of these have hardly begun to be produced in British Columbia and some possibly never will be produced, since so great a variety is rarely found in any one province. Take the following instances:

Pyrites—Worth about \$3.50 per ton for sulphur.

Feldspar—About \$1.50 per ton for china clay.

Talc—About \$1.30 per ton, used chiefly in paper industry.

Molybdenite—Six cents per pound as ore, used in steel.

Corundum—\$74 per ton, used for abrasives (emery).

Mica—Five cents (and upwards) per pound, for electrical work.

Graphite—About \$90 per ton.

Iron, nickel, mica, asbestos, oil and salt, are all produced in Eastern Canada, principally in Ontario, excepting asbestos, which amounts to \$1,174,708 in the Province of Quebec. Ontario produced of these six minerals \$6,296,781 in 1902.

This variety of commercial minerals is found principally in the archaen rocks which lie a little way north of the Great Lakes. They are not produced as museum specimens but in hundreds or thousands of tons, as: Mica, 999 tons; feldspar, 8,766 tons; corundum, 1,140 tons; graphite, 1,923 tons; nickel, 5,950 tons (metallic nickel). Most of these industries appear to be on a paying basis. Some are thoroughly equipped with modern plants, others evidently paying their way, work with buckets, derricks and horse whims.

The cement, mica and corundum industries have come forward greatly of late years. The General Electric Company works its own mica mines, and in this connection it may be said that smaller sizes are now satisfactory, so increasing the outputs.

British Columbia has a large belt of mica-bearing country, north and west of the Big Bend of the Columbia, and to a less extent in a few other places. These at present are expensive districts. However, the time will come when this and many other unconsidered minerals will be produced and add to the somewhat slim list now given in the statistics.

Impressions of the varied, and sometimes unique minerals of Ontario, have been gathered in trips made in connection with the School of Mining at Queen's University. To illustrate this, a three-days' trip out and back to Kingston with the senior class in mining included the following: Cement works, Marlbank, capacity 1,200 bbls. per day; Belmont gold mine, 30 stamps; Deloro, gold and arsenic, 20 stamps; Atlas, gold and arsenic, 10 stamps; Hellandia lead mine; Jarman pyrites mine; Coe iron mine (haemitite); Henderson's talc mine. The gold, silver, copper and lead production altogether amounts to a little less than one million dollars.

Recent discoveries of extremely rich native silver, nickel and cobalt arsenides have been made along the line of the new railway in the Temiscamingue district. This opens up a promising field and suggests the spread of the mineral industry along the line of the Grand Trunk Pacific, which will run a little further north.

 THE WORK OF THE LONDON AGENCY.

AN INTERESTING INTERVIEW WITH THE HON. J. H. TURNER.

(From Our Special Correspondent.)

RECOGNIZING that some details with regard to the useful work which is being done by the London Agency of the British Columbian Government would probably be of interest to your readers especially at this season of the year, I recently called at Salisbury House to have a few minutes' chat with Mr. Turner upon the subject. Upon learning the object of my visit Mr. Turner, although as usual, busily occupied with the affairs of the Province, expressed his willingness to tell me anything he could with regard to his department and its operations which might be of interest to your readers.

"It is now nearly two years, Mr. Turner, since you took charge of the London Agency, and it seems to me an opportune moment to ascertain your views as to the results achieved by the Agency since its control passed into your hands."

Mr. Turner reflected a moment before replying. "You see," he explained, "I have recently made my second report, and I hardly know how to deal with your question, because, of course, much of what I can tell you now will be embodied in that official document."

I hastened to point out that what would be of interest in the Province would be any data as to the work of the office generally during the past year.

Mr. Turner continued: "The report I mentioned covers the ten months up to October 31st. Yes, I think the results have been fairly satisfactory, particularly taking into consideration the depressed condition of matters relating to our principal industry. Let me give you to begin with some particulars relating to our work. From the beginning of the year to the end of October we received 2,750 letters, and despatched 3,000 letters, and approximately 12,000 pamphlets and reports have been distributed. About 1,500 visitors have called at the Agency for information about the Province. In April last I gave a lecture at Leigh, in Lancashire, and spoke at some length, also the next evening at a dinner which was attended by a large number of employers of labour, and I am glad to find from recent letters received from various quarters, that several settlers have gone out from that district, and that a good many more are thinking of emigrating next year. I have also spoken at many dinners and other public gatherings, and have invariably made use of the opportunities thus afforded of representing the importance of our country, not only on account of its wonderful resources, but also as an admirable field for tourists and on account of its big game and splendid fishing facilities for the British sportsman. I am now endeavouring to get up a representative exhibit of British Columbia trophies of game, fish, furs, etc., for the permanent Canadian exhibit at the Crystal Palace on the occasion of the Motor Car Exhibition in February next, which is expected to be the largest of its kind ever held in England or abroad. Those who take an interest in motoring are necessarily of the wealthy classes, are great travellers, and a large number of them prominent sportsmen, and I think the fact that we shall be able to exhibit there should be productive of excellent results. A great number of photographs and lantern slides have been lent to different towns in various parts of the kingdom for lecture purposes, and half-tone blocks have been supplied to various newspapers. In many cases these latter have been made more interesting by descriptive matter, which has also frequently been inspired from this office. The Agency has been kept well before the public by means of advertisements inserted in a large number of the leading papers, and I think it is of the utmost importance that these advertisements should be continued, and if possible considerably extended. This advertising has proved very effective in attracting enquiries from people not only in Great Britain and Europe generally, but as far away as the Cape, South America, India and many parts of the Empire. The Australasian colonies are well aware of the value of advertising and spend very large sums in keeping their countries well before the public. I am convinced it is money well spent, and valuable in attracting applications for the literature we distribute."

"Have you any idea, Mr. Turner, as to how many people have left England for British Columbia since you took over the position of Agent-General?"

"Well, we know that at least 250 people have left this country during the past ten months with the intention of settling in British Columbia, but owing to

the fact that there is no means of checking the stream of emigration as regards the various provinces, when it has once left this country—there being no official report on the subject—it is impossible to give any exact figures."

"And the class of emigrants?"

"Largely professional men and their families, men having in most cases fixed annual incomes, and a considerable amount of free capital besides; farmers and their families, also with capital; many young men desirous of learning farming or taking up land for fruit growing, dairying, etc., and practically all with some means. We have also, I believe obtained a good number of engineers, miners, farm hands and mechanics, all having money enough to keep them going for some time after their arrival. In all cases those who seek employment have been advised that it is necessary for them to have some means, as competition is keen and work not always to be obtained immediately on reaching the country."

"I take it for granted," I said, "that the majority of these emigrants are British?"

"Undoubtedly," replied the Agent-General. "The English and Scotch form the greater majority, but we receive many enquiries from countries as far distant as Brazil, Chili, Argentine, West Indies, Africa, Australia, India, Japan and even Canada and the United States, principally from those desirous of taking up farms. We know that a number of people have gone to British Columbia from several of these countries, and we also know of other instances where emigrants are said to be now on the way to the Province from India, or contemplate starting early next year."

"Generally speaking, what do you think would be their average capital?"

"I think about £500 per head, or in the aggregate approximately £175,000. This is probably under the mark. Of course in addition to this there is the capitalized value to the Province of each settler, and this has been placed in the United States at as high as \$2,500 per head."

"I am pleased to see that you have recently installed some interesting products of the Province here. Do you find that this assists you in your propaganda?"

"Undoubtedly," said Mr. Turner, laying emphasis on the word. "Much interest has been taken in these exhibits, as they afford direct evidence that the Province is not as many people have hitherto supposed, a land solely for miners. I might add in connection with the fruits exhibits which arrived from British Columbia in September, that these were at once forwarded to the great Royal Horticultural Society's show, and that they attracted the keenest attention of the many thousands of people who visited Chiswick, in view of the fact that they were the first exhibit of British Columbia fruit in this country. You will no doubt have heard that we secured a silver medal for this exhibit," and as he spoke, Mr. Turner, with conscious pride, produced the award, and handed it to me for my inspection. "I am strongly impressed with the necessity," he went on, "of following this up next year with a first class exhibit of fresh fruit, and hope to arrange this for the 1904 show. As for the specimens we have

here, I certainly think that we shall require larger offices for their effective display, and also owing to the growth of the business of the Agency."

"And now," said Mr. Turner, "there is a little matter which I should like to enlarge upon. A great many enquirers are disappointed at not being able to obtain full information as to blocks of land and their character in British Columbia as they can be supplied with in respect to, say, Ontario or Manitoba. It is very important, I consider, that the plan that was proposed some years ago to legislate in the direction of the small holdings for settlers should be carried out. This measure, from conversations I have had with many agriculturists, would, I am sure, prove very attractive."

"You will no doubt have noticed in the advertisements of the Dominion Government that free grants of land are offered to settlers. Is not this a little misleading, Mr. Turner?"

"Yes, it is very misleading, as people come here and expect to find that I can offer them farms free of cost. I have, of course, to reply that the nearest thing we can do for them in British Columbia in that direction is to allow them to take up land under the pre-emption clause. I am frequently met with the question 'Can you point out to me on the map any district where land is open to pre-emption?' This, of course, I am unable to do at present."

"Apart from agriculture and mining, can you tell me anything about the other great industries of British Columbia?"

"Of course there is the important fishing industry; this, however, is firmly established and simply fluctuates with the condition of the fishing season. But a great industry, and probably one of the largest on the West Coast of America is that of lumbering. This is advancing, as I understand here, rapidly at the present time, and no doubt this expansion will be materially augmented by the commencement of the manufacture of paper pulp in the Province, for which product there is undoubtedly a world's market."

"And now, Mr. Turner," I said, "I want to call your attention to an important matter connected with the mining industry. As you are aware, practically all the colonies who can be in any way regarded as mining countries issue periodical reports giving the results achieved by the colonies they represent. But British Columbia is now, as it always has been, a laggard in this respect. A cable comes through, I believe monthly, from a news agency giving the Rossland and Boundary outputs, and no doubt this is in a way useful, but it is not like an official report issued from your office. Look at the splendid returns issued monthly by the Rand authorities for many years past. I believe that the completeness of these figures was chiefly responsible for educating this country and the continent as to the vast possibilities of the Transvaal mining industry. People knew there was a Rand—they saw the tables every month for themselves, and were able to follow up developments as closely as their broker in town. As for British Columbia, even now many people think it is identified with the South American republic, and many have not heard much about it beyond the fact that it is somewhere in the region

of "Our Lady of the Snows." The short cable I have mentioned does not help very much—it is useful, but not sufficient. It's all a very great pity; surely something could be sent you every month to circulate to the Press. Can you tell me what is causing the delay in such a valuable development?"

"What I have to reply to you upon this point," said Mr. Turner, "is this. The Australian Colonies issued periodical reports through their Agents-General in London giving in a few words the actual output of the particular colony. Unfortunately there is not at present any official report issued by British Columbia beyond the yearly document which, excellent in its way, and most valuable for fuller reference to the various districts, mines, and metals and minerals dealt with, is not sufficient for requirements here. What we want is regular information supplied to this office from Government sources, not perhaps so much of the actual values as the total tonnage monthly of each district—if the values, actual or approximate, could be incorporated, all the better, of course. These would be gladly received and published by all the leading papers—free of charge naturally, coming from this office—who in any way identify themselves with mining or financial matters."

Knowing well the silent character of the majority of the London-formed B. C. mining companies, and the difficulty experienced in ascertaining their progress or otherwise, and the criticism which has so frequently been launched at the Government of the Province, I only put the following question to Mr. Turner as a matter of form: "And we may assume that you have been repeatedly approached on this matter by both the general public and the newspapers?"

Mr. Turner's reply should convince the British Columbia authorities of the imperative necessity of removing from the London Agency the reproach of being least informed as to the periodical progress of the mining districts, it was apparently largely created to assist and foster by giving information that would attract foreign capital. He said: "For the first six months after my arrival many of the leading newspapers sent their representatives to me each month for my report or any statistics I could supply and they were greatly surprised to find that neither the one nor the other could be supplied."

"I can well understand that," I ventured to interject.

"Yes," continued the Agent-General with a twinkle in his eye, "in some cases these newspaper men even seemed to think that I was purposely withholding this information, as they simply could not understand the opening of such an office unless it were primarily for the dissemination of such reports and statistics."

"And the Stock Exchange, and financiers and others interested in the progress of the Province were of course—"

"Oh, I need not say that they are always most anxious to get such information. At the time the last loan was issued this question was raised by Stock Exchange people, and I am constantly approached by mining firms anxious to know if there is any periodical return giving the details in question."

"And now, Mr. Turner, I am ashamed at having taken up so much of your valuable time, but should much like to have your views as to the present position of the mining industry."

"Well, after carefully going through all the information that I can obtain from the different districts, I fully believe that the mining industry in British Columbia is on the eve of very great advancement and prosperity. Owing to conditions which I need not recapitulate there have been very great difficulties in connection with mining generally in the Province, but I feel that they are now getting on to a more stable foundation. It is recognized that much of the past trouble is due to the fact that numbers of companies were over-capitalized at the outset. Several mines, would, I fully believe, be paying dividends now if they had been capitalized at their real value."

"One final question. I presume that you will agree with me that the period of depression through which the country has been passing has been materially responsible in checking the development of the Province?"

"Oh yes; there is no doubt that financial affairs in London have a most important bearing upon colonial developments. Look at the British Columbia threes which were issued last November at £92. These have only recently been sold at as low as £87 or £88. And when you come to remember the enormous sums, amounting in the aggregate to probably over £100,000,000, which have been and are being requisitioned by the Government, British municipalities, railway companies and colonial governments, etc., it is not very surprising to find that similar securities have suffered from the dead weight of these new creations. It is owing to this glut of high class investments, and the general depression which has been such a painful characteristic of the stock markets during the past few years, that there has been little or no real attention paid to industrial or mining investments outside Great Britain. As in the cases of South Africans, West Africans, West Australians, etc., British Columbian mines have suffered from a conjunction of adverse circumstances. These circumstances, I need not tell you, are in no way connected with the mining industry itself, which is not affected by these purely market considerations. The great confidence that I have always felt in the ultimate prosperity of our splendid Province is in no way shaken by recent events. I hold that its intrinsic merits will enable it to finally emerge triumphant from the various hindrances which have checked its more rapid advancement."

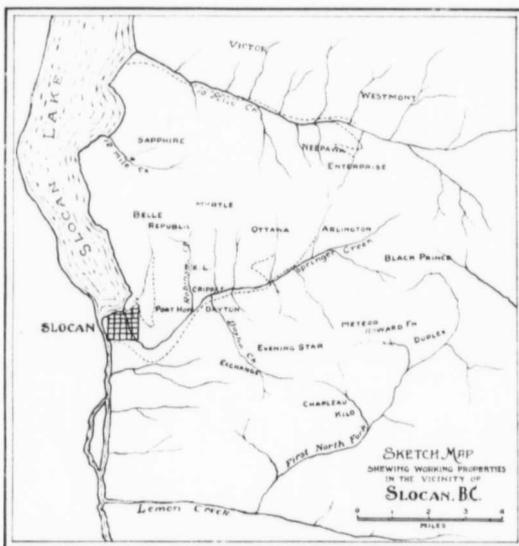
1903 IN THE "DRY ORE BELT" OF SLOCAN.

(By W. D. McGregor.)

THE first months of the year were marked by general discouragement. Silver was dropping steadily; the Enterprise mine was shut down as "a losing proposition"; the Arlington force was reduced to "development only" conditions; the festive promoter had disappeared entirely from the scene. Under such circumstances, distant fields are sure to brighten and Alaska, Cassiar, East Kootenay and

other districts have profited by the little exodus from Slocan in the early spring.

However, the successes of leaseholders in one or two cases—the announcement on the part of the Arlington management, that they had solved the treatment problem, as to their low-grade ores and the steady improvement, under development, of most of the working properties, have assisted in improving the general outlook. Now at the close of the year, we find, that more properties are working under lease than ever before, that the existence of comparatively large bodies of low-grade ore, along with the rich shoots, has been proved in several of the big north and south deposits and that many of the smaller lodes are paying by being worked in a modest way, hand-sorting the richest of the ore and shipping the product to the smelter. Of course this is an extravagant and



generally unsatisfactory system, but it is better than letting the properties lie idle and much better than having them in incompetent hands.

To appreciate the situation, one must understand the main peculiarities of the camp. Physically a country of granites, often broken and twisted, seamed with ledges and cut by frequent dykes. Bunches of rich ore are to be found in most of the veins and assays of the most spectacular variety are common. In the early days of the camp, the Sandon slate country adjoining was booming and the finding of deposit after deposit of high-grade silver and gold ore, on Ten-Mile and Springer Creek creeks drove prospectors and amateur miners wild and prices soared skyward. Conservative miners would not meddle with an unproven district on the terms asked, while the speculators bought freely, on rich assays and the general assurance that all beneath was ore. Unfortunately for the camp, most of the properties were expected to pay from the start. (Yes, and to pay dividends on the

stock of a big mine, too.) So they were saddled with all the useless paraphernalia of the big stock company and as a rule, with a treasury fund just about big enough to break by the time they had found out that there was something besides ore in the mountain side. To make matters worse, most of the veins are subject to shallow horizontal faulting, and a very welcome excuse it must have been. The vein, ore and all, had gone and it was all the fault of the country. In some cases considerable development was done. The ore was found to be in irregular shoots, very rich as a rule, but mined with gangue or low-grade ore. What had been looked upon as a bonanza required care to make it a profit earner.

at once makes the question of mechanical concentration a serious one. More than this, most of the ores carry a large percentage of their value in a silver sulphide scattered almost as a dust through the quartz or the ore. This is practically all lost in any water concentration. Suffice to say that development has shown the ledges go down and values are as good as the surface but that present methods are wasteful.

The Arlington and Speculator management, after a prolonged series of experiments, have announced that they will put in a plant including concentration and electro-cyanide treatment. They estimate 40,000 tons of ore too low grade to stand shipping, in the Arlington workings alone were left—after taking out the



General View of Arlington Mine from Lillie B. Cabin, Slocan.

Hundred dollar ore, should, it would seem, pay well, but if produced by sorting one ton out of twenty, all the expenses of mining and handling the twenty are charged against the solid ore remaining. The sacking, packing, freight and treatment may then easily bring profits to the vanishing point. Nevertheless \$100 ore is too good a thing to let pass, and in spite of failures mining development continued. It was soon found that the veins were of two classes: big north and south fissure zones, and a series striking generally northeast marked by the smaller size, cleaner fissure and a persistent quartz paystreak, more or less regularly charged with metallic sulphides, copper, iron, zinc, lead, etc. These again carrying value in gold or silver or both in great variety of combinations, which

richer shoots on which they have been working to a depth of some 500 feet.

I have followed more closely the Black Prince one and a-half miles east of the Arlington, opened to the 210-foot level and with something over 1,000 feet of exploratory work done on the vein, which is from 8 to 30 feet wide. This shows a succession of shoots or lenses of ore of varying quality in compositions, from argentiferous galena to quartz carrying native and sulphide silver. In its earlier stages one body of ore was encountered which sampled 47.07 silver; as this would not stand shipment, some 2,340 cubic feet (180 tons) were stoped. From this, 15 tons were sorted, giving smelter returns of about 1,600 ozs. and a profit, but the balance, containing, say, 6,800 ozs., is still on the

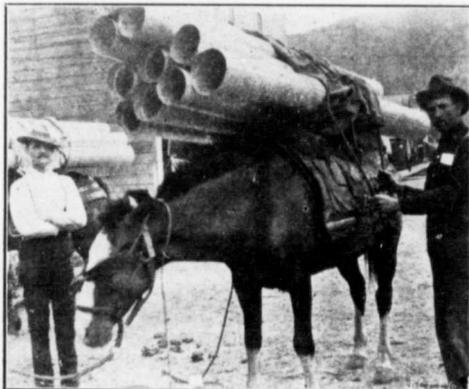
dump. This is an extreme case, but will serve as an illustration of the unavoidable waste under present conditions. This property is working under lease and the lessees are well satisfied. They are shipping two carloads now that they expect to average over 200 ozs. to the ton. (Smelter reports first car 211 ozs. per ton.)



Tunnel at Black Prince Mines, Slocan City Division.

The Ottawa, a mile west of the Arlington, is developing into a big property of the same class, with first class ore, realizing in the neighbourhood of 500 ozs. They have high-grade ore enough to make a mine and low-grade to make it a big one.

The Myrtle, still further east, at the head of Robinson Creek, shows 30 feet of ledge 50 feet deep. Actual shipments of the sorted ore ran 200 ozs. They are now cross-cutting about the 100-foot level in order to control the flow of surface water.



Packing Supplies to the Mines in Slocan.

Among the leasehold properties the Enterprise of course comes first. This mis-managed mine is in practical hands and under a five-years' lease. The buildings carried away last spring by a slide have been re-built to accommodate 75 or more men. When the

snow came last week there were six cars of ore waiting for sleighing. The ore in this vein is naturally concentrated and requires but little sorting. This mine is paying its way, royalty and all, and never looked better. The principal properties now working under lease are the Black Prince, Sapphire, the Belle of the Republic Group, Port Hope, Dayton, Argentite Fir and Alberta. A number of the owners of prospects are also taking out ore to provide for further development. Among these are the owners of the Happy Medium, the Neepawa and the Cripple Stick.

The shipping list for the year shows eighteen properties shipping and a product of 1,300 tons. Of course this is high grade, worth from \$40 up to about \$250, averaging \$100.

The gold producing mines also afford several points of interest. Gold values can be found in most of the smaller series of ledges, from the mouth of Ten-Mile southwest to the headwaters of Lemon Creek, accompanied by silver, various sulphides of which form the



View Looking Down Springer Creek, Slocan City Division.

main value till we get near the head of the First North Fork of Lemon, where we find the Chapleau, Kilo, Legal, etc., with their value practically all in gold. Probably in treating the ore from this group of mines the difficulties are less great than elsewhere in the district. Development to the depth of 100 feet and over has been done on several of these mines. They all show surface breaks and all the veins go down. Most of them have made shipments to the smelter and returns run from \$16, \$21 and \$22 gold from the Sapphire, and \$39 gold from the Cripple Stick and from the Dayton.

Just across Springer Creek shipments having an average value of over two ounces were made from the Howard Fraction, Alberta, Kilo, Star and Exchange with the record taken by the Chapleau, for gold contents. Practically all of them carry more value in silver than in gold—from 40 ozs. to 512 ozs., this last being the Meteor's record.

What of the treatment? This review covers far too wide a range now, but I must add another word or

two. The configuration of the country and variety and the quality of metallic products points to local smelting as the final stage. The similarity of the ores in the different groups of veins, say in the separate valleys of the mountain creek, could probably be best served by carefully designed plants permitting of concentration in various forms for roasting any part and for the amalgamation or electro-chemical treatment of the residue. It is not half as bad as it sounds, as water powers and satisfactory mill sites are scattered almost as freely as ore throughout the district.

Some day we are bound to succeed. In the meantime we are doing fairly well, thank you.

KAMLOOPS DISTRICT IN 1903.

(By C. Outhett, A.R.C.S.)

THE Kamloops District, which since 1896 has undergone steady development, is within measurable distance of becoming steadily productive. The foremost property in the district is the Iron Mask. This has been developed under the superintendence of Captain Argall with a crew of about 20 men, and is owned by the B. C. Exploring Syndicate. Above the 500-foot level, 4,000 feet of development work has been done; below this level exploration has been carried on by a diamond drill. The vein near the foot wall has a body of solid chalcopryite, the balance of it being a concentrating ore. The property was recently examined by Mr. William Jones, consulting engineer for the Ashanti Lands, Ltd., and as a result of this examination the property will at once be equipped for raising and treating 200 tons a day. The shaft will be continued to a depth of 700 feet and the mine provided with new head-frame 60 feet high constructed of 14-inch timbers, a ten-drill two stage air compressor, a sawmill and timber framing machinery. The concentrator, manufactured by Fraser & Chalmers, is of the most modern type, with jigs for coarse concentrating and Wilfley tables for the finer products. Magnetite will be separated from the concentrates by a magnetic separator.

The main power house to be built adjoining the concentrator, will contain two 125-h.p. return tubular boilers to carry a pressure of 150 lbs. (to be supplied by the Vancouver Engineering Works); a Corliss tandem condensing engine, with reheater between high and low pressure cylinders, capable of developing 250-h.p. and a 300-light electric plant. The present power plant will be retained as an auxiliary mine plant.

Contracts for the new plant have been let and grading for the foundations is well under way. The whole of the equipment is expected to be in working order by early spring.

The Copper King has throughout the year been under development by Mr. A. N. Gray, of Woodstock, Ontario. The ore body has been proved to a depth of over 300 feet. Connection has been made between the upper workings and the tunnel, through which the ore is taken out. The mine has been equipped with three-rail gravity tramway from tunnel mouth to ore bins situated near the wagon road to Cherry Creek. At

Cherry Creek station ore bins have been built in which ore is dumped from waggons for loading on railway cars. Shipments of ore to Crofton commenced early in November. During the last two months of 1903 400 tons were shipped.

The bucket dredge on Tranquille Creek has worked steadily throughout the season of 1903, under the direction of the dredgemaster, Mr. Toole, the dredge handling up to 1,800 cubic yards of gravel a day. The dredge is worked by six men, in two twelve-hour shifts. The dredging ground on the creek has an average width of 600 feet and at present is dredged to a depth of 18 feet. The best pay gravel is found above a streak of clay at a depth of 15 feet. The material washed on the tables passed through a revolving screen, the sections of which are one-quarter, three-eighths, seven-sixteenths and one-half inch respectively; the coarser gravel and boulders passing to the tailings elevator. The mats on the tables are removed and washed once a day. Richer gravel is met as the dredge works up the creek. The dredge is apparently successful, as it will be thoroughly overhauled and repaired during the winter months. An additional half-mile dredging lease on the creek has been secured by the dredging company, making one mile of dredging ground above the dredge.

On the Truth prospecting has been carried on during the last half year, an exploratory tunnel is being driven on the vein to drain and enable further exploration of the old workings. A contract has been let to drive a tunnel on the Lost Chord on which there is a promising surface showing. Mr. J. H. Morrison has by driving a cross-cut tunnel and other workings, shown up a very promising property on the Evening Star.

The Kamloops Coal Company, a recently organized syndicate, is to begin at once explorations for a workable seam of coal, near the outcrop of coal measures some two miles south of Kamloops.

RECENT MINING DEVELOPMENTS IN THE VERNON DISTRICT.

(By A. A. Watson, B. Sc.)

THE mining situation during 1902 showed remarkable improvement. In the fall of 1902 the Morgan claim, containing a rich vein of gold quartz, was bonded by Mr. Jim Wardner, whose name has for so long been associated with successful mining promotions. The claim is situated at Monashee, fifty miles east of Vernon, by wagon, road, and the vein is supposed to be an extension of the old Monashee vein. A company called the Cherry Creek Gold Mining Company, was promoted in Nelson, eastern capital was enlisted and work was energetically prosecuted on the property. The McPhail group nearby was also bonded by the company. Much of the stock in this undertaking was sold locally at ten cents per share, but the vein on the McPhail claim proving exceptionally rich the promoters decided to buy back the shares for which they paid twenty-five cents. A stamp mill has now been installed on the claims.

The British Empire claim, four miles from Vernon and situated on Okanagan Lake, was bonded last month to an American syndicate. This claim is under exceptionally capable and energetic management. A development shaft has been sunk two hundred feet, and several cross-cuts made and drifts run. A working tunnel for getting out ore is also nearing completion. A five-stamp mill was installed in November and all the ore that had been taken out in the way of development, about 150 tons, was crushed. As the syndicate is a private one, not depending on the public for support, no information in respect to the value of the returns obtained is available, though these are believed to have been satisfactory. A compressing plant, with drills, has been installed and since the clean-up mine development has been steadily carried on. This little camp is proving even richer than anticipated. The Sarah claim, above the British Empire, is known to be rich, while two other claims of equal promise were located only the other day.

Last June the old Monashee mine was bonded and a great deal of work was done thereon by Messrs. Peck and Young, Mr. A. A. McPhail being in charge of operations. The vein, which had faulted was relocated and a rich shoot of ore encountered, said to average two feet and a half in width. Samples supposed to represent average ore assayed about an ounce per ton in gold. This claim was considerably developed many years ago and a stamp mill was installed, but owing to bad milling, the results of crushing were very unsatisfactory and a sample of the tailings which have lain so long there as to be bedded and to have the appearance of a schist, assayed over ninety dollars per ton in gold and silver. The whole vein is said to average about seven dollars per ton. Work has been prosecuted very steadily on this claim under the auspices of a local company, the Monashee Gold Mines, Limited.

THE HORSEFLY DISTRICT OF CARIBOO.

WE published in the October and November issues of the *MINING RECORD*, articles specially contributed by Miss Rosalind Watson, M.A., on the subject of mining in the Barkerville and Quesnel sections of the Cariboo district. Miss Watson unfortunately had not sufficient time at her disposal to visit the third important mining area—that of Horsefly—but Mr. W. M. Brewer, who recently visited this section, has prepared a most interesting account of it for the *Mining and Scientific Press*, of San Francisco. This article we reproduce, thus completing the description to date of conditions in the most important of the Province's alluvial gold areas. Mr. Brewer writes:

The Horsefly River, in the south-eastern portion of the Cariboo mining district, B.C., flows for some distance from its source in a westerly direction, thence northerly, and empties into the great Quesnel Lake. The section of country drained by it is a vast plateau, its elevation ranging from 2,000 to 3,000 feet above sea level.

To the east, about 50 miles distant, is situated the Selkirk range of mountains, and to the west, about

the same distance, is the Fraser River. To the south lie the agricultural lands of the Lac la Hache valley, and the stock ranges contiguous to it, and to the north the Cariboo mountains and the placer mining section.

The history of the Horsefly country is particularly interesting, from the fact that the same party of prospectors who discovered Hill's Bar, the first important discovery of gold on the Fraser River, in 1858, also discovered placer gold on the Horsefly River during the same year and blazed the trail into the Cariboo mining country proper.

During the late fall of 1901 important discoveries of placer gold were reported to have been made in the mountains to the eastward and near the head of the Horsefly River. These reports caused a small stampede; but as no phenomenally rich diggings were found, and the country proved a difficult one to get into, the excitement died out, and that section still remains unexplored.

The geology of the Horsefly territory is particularly interesting. To the south lies an extensive area of basaltic rocks. The rock formations in the area containing the auriferous gravel deposits belong to the Tertiary period, and within that area occur the channels of ancient Miocene rivers of stupendous proportions. Underlying the basalt, in places, occur beds of white quartz, water-worn gravel. At one point on an ancient channel a shaft has been sunk to a depth of 480 feet without reaching bedrock. The rimrock was cut into at the bottom of this shaft, and the shaft continued down 50 feet into the shale which formed the rimrock. From that point a tunnel was run under the channel and an upraise made into the gravel. There apparently occurred the bedrock, and it was reported that the gravel prospected and showed good pay; but the influx of water drove out the miners and afterwards operations were abandoned. This shaft was sunk through white quartz (water-worn gravel) nearly its entire depth, but as it is reported that the gravel carried very little values above the bedrock, it would have been necessary to have found phenomenally rich pay on bedrock to have warranted the continuation of mining operations by the drifting system. One peculiar feature about this very deep channel, at the particular point where it was attacked, was the fact that, while the gravel carried such low values, yet the work was done because it was supposed that that portion of the channel was an extension of a channel immediately to the north, where is located the Ward claim, which has yielded very rich pay, over a surface area covering about forty acres. Although the character of the material forming the bedrock at both places is almost identical, yet it is doubtful if the rimrock can be traced from one to the other, and there is considerable difference in the character of the auriferous material; therefore, it appears to be quite possible that the deep workings to the south are located on a separate and distinct channel from that on which the Ward claim is located. Another reason for this conclusion is that in following up the course of the present river for a distance of five miles above the Ward claim, there occurs apparently the same

ancient channel paralleling the present course of the river as is being worked at the Ward claim; the bedrock at both places is of the same character of shale and is encountered at about 150 feet—the same depth below the present surface—and the auriferous material, which carries values from the surface down, appears similar and is reported to carry about the same values at bedrock.

The course of this ancient channel appears to conform closely to the course of the present river, which in many places has apparently intersected the ancient channel. This condition is shown at the Ward claim, where the owner, in working on the ancient channel, has more than once completely changed the present course of the stream in order to work the channel on the opposite side.

The Horsefly portion of the Cariboo district presents a marked difference with regard to the available water supply for carrying on extensive hydraulic workings to the Quesnel Forks portion. Mussel Creek, a tributary of the Horsefly, which has its confluence with that river a short distance south from the Ward claim, will furnish from 4,000 to 6,000 miner's inches of water during the entire season of seven months, and that taken out from the creek within five miles of its mouth. There are two systems of canals constructed from this creek, one having a length of about six miles, the other about twelve miles. The first one carries the water supply for hydraulic operations at Ward's claim, while the second carries the water for hydraulic operations at the Horsefly hydraulic mines, five miles northerly from Ward's.

The last-mentioned canal is interrupted in two places by 8,000 feet of 30-inch pipe laid in the form of inverted syphons, to carry the water across two depressions 180 feet in depth.

So far as one can judge from the results of operations in both placer and hydraulic mining, it would appear that the area containing auriferous gravel in paying quantities is comparatively limited in extent in this particular portion of the Cariboo district. But there are extensive areas of the ancient river channels which have not been exploited. One of the principal reasons for this is the great depth to the bedrock and another is the lack of dumpage facilities. In consequence of this latter reason the alluvial deposits would have to be attacked, either by drift mining, as has been done at the Horsefly hydraulic mine, or by a method of elevating the tailings, as is practised at Ward's claim, or by dredge mining, which latter has not yet been introduced into this portion of the Province.

The Horsefly hydraulic mine affords an excellent opportunity for studying systematic drift mining.

Until the early 90's this property was worked by the hydraulic method and about \$150,000 produced.

In working by the hydraulic process, as the bedrock was followed towards the south, it was found that the gravel immediately overlying the bedrock had become cemented so hard that it was impossible to successfully attack it with water under pressure; consequently a 10-stamp mill was erected and a system of drift mining introduced. A main tunnel was run from the hydraulic cut towards the south, the

mouth of this tunnel being connected with the mill, which was built near the bank of the river, by a covered track. From the main tunnel drifts were run towards the east and west and the body of cement blocked off into squares.

It was found that, in driving the main working tunnel to the south, the bedrock continued at variable angles, and sometimes at almost 45 degrees, indicating that the workings have not reached the bed of the channel, but are probably on the northern rim of what may be an extensive alluvial deposit belonging to an ancient channel. During the progress of opening up the mine for operations by drifting and milling process, 9901 tons of cemented gravel, bedrock, etc., mined from the various drifts, were run through the company's stamp mill and produced \$14,564.21—an average of about \$1.46 per ton. The extent of the development is 1,200 feet main tunnel and 3,165 feet of working crosscuts and drifts, which have been driven at right angles to the main tunnel.

During the drifting operations on this property it seems, from the manager's report, that about 25 per cent. of the material mined was free gravel, which it was not necessary to run through the mill in order to save its values.

At the time of the writer's visit to this property active operations had been suspended and during the past season a sample mill run only had been made. It would appear that the owners of the property would be justified in prosecuting development in order to determine whether the extent of the deposit of cement in this ancient channel is sufficiently large to warrant the erection of a stamp mill of much greater capacity than the present one; because it does not seem as though a 10-stamp mill, being operated on material of such low average grade as this is shown to be, could result in commercial success, even though the duty of each stamp was to crush five and a half tons of this cement per day, which, according to the manager's reports, has been about the average.

In accordance with this view, the writer finds that in the last report of Manager Hobson to the shareholders he recommends the expenditure of \$200,000 as the total cost of the necessary development work and installation of an 80-stamp mill, which he estimates will place the mine on a dividend-paying basis.

The cost for mining and milling he estimates at \$1.12 per ton, and the lowest average tests which had been obtained at any time from drifting and milling were \$1.12 per ton, and seven tests of selected gravels, the first four of which were made in 1897 and the others in 1898, are reported to have resulted as follows:—

	Quantity Milled.	Product Per Ton.
1897.....	No. 1..... 100 tons.	\$3.42
".....	No. 2..... 100 "	4.13
".....	No. 3..... 100 "	2.18
".....	No. 4..... 100 "	4.13
1898.....	No. 5..... 50 "	5.02
".....	No. 6..... 100 "	3.07
".....	No. 7..... 100 "	4.31

Some idea of the gravel deposited in this ancient channel can be formed when the extent already exploited is considered. In addition to the area which has been washed over by the hydraulic process, where the bedrock is exposed over an area of four or five acres, the main tunnel, which is really run to cross-cut the channel, has been driven 1,200 feet from the northerly rim and has apparently not yet reached the opposite rimrock, as well as the distance from rimrock to rimrock, is as yet undetermined, as is also the length of the channel.

The thickness of the high-grade cement varies from 2 to 6 feet, while the thickness of the entire deposit from the present surface to bedrock averages about 150 feet; this is made up of about 20 feet of boulder clay from the surface down, the remainder being free and cemented gravel, of which the highest grade is the stratum already referred to, which immediately overlies the bedrock.

On the Ward claim, five miles farther up the river, all the work which has been done has been by hydraulic process and elevating the tailings. The material washed is piped from the face of the bank to the foot of the elevator, which is of the suction pattern, elevated 50 feet, discharged on a grizzly and dumped into sluice boxes, the discharge end of which reaches to the tailings dump.

Mr. Ward, the manager, informed the writer that about 80 per cent. of the values contained in the gravel were saved before the material was elevated; but of this amount it appears to the writer that a considerable proportion was lost between the face of the cut and the bottom of the elevator, because the material is washed over the gravel floor of the cut, instead of being piped into a flume furnished with riffles.

The material in that portion of the channel on which Ward's claim is located, although showing that some cementing process had been at work, has not become as compact and hard as at the Horsefly mine; consequently, drift mining has not been resorted to, the material still being sufficiently free for piping.

The writer during his visit witnessed a somewhat unusual condition which characterized a stratum of boulder clay, almost black in colour, which Mr. Ward had previously considered as being barren of values. From motives of curiosity, more than the hope of finding value in this material, he panned some, with the result that it yielded nearly 50 cents to the pan; he then started to prospect the material with sluice boxes, and as a result of two days' work by five men, shovelling into sluice boxes, cleaned up \$90, and demonstrated that the pay stratum averaged between 3 and 4 feet in thickness.

The depth from the present surface to bedrock varies in this portion of the channel, the maximum being 150 feet; but, owing to the lifting capacity of the elevator, 60 feet is the greatest depth to which work can be carried.

This property has been worked since 1876, and, when conditions are favourable, often yields as high as \$1,000 per day, the quantity of water used being about 2,000 miner's inches. This supply is furnished from Mussel Creek, being taken out just above the falls,

and about two miles nearer the mouth than the location of the dam constructed by the Horsefly Hydraulic Mining Co.

On Mussel Creek, which is a tributary of the Horsefly River, the rock formation changes from shale to basalt, and it is near the falls that the stratum of white quartz gravel underlies the basalt. On the same creek, and about four miles above its mouth, the eruptive rocks contain impregnations of native copper. Particles from the size of the head of a pin to a coffee bean are found disseminated through the basalt with greater or less regularity, probably averaging 1 per cent. or 2 per cent. The extent of the mineralized zone has never been determined, principally for the reason that lack of transportation prohibits the attempt to work any but placer, hydraulic or free-milling gold-bearing rock in this portion of the Province.

MINERAL OCCURRENCES ON THE NORTH FORK OF KETTLE RIVER.

(By E. Jacobs.)

North from Grand Forks lack of a railway also militates against the progress of the mining camps. Three properties tributary to that town had more work done on them last year than for several years.

SEATTLE.—The Seattle, some ten miles up the North Fork, was worked for several months by the Canadian Smelting Works, of Trail, but although a lot of ore was uncovered none was shipped, and operations were suspended before the winter set in.

BETTS AND HESPERUS.—The Betts and Hesperus group, situate on Hardy Mountain, within three or four miles of Grand Forks, was acquired by the Hesperus Gold & Copper Mines, of Chicago, which company has been developing these claims since last July, under the management of Mr. T. H. Rea. Surface prospecting consisting of about 200 feet of cross-cutting. Besides this a tunnel was driven in ore on the footwall side of the vein and then for 25 feet across it, when a winze was sunk 75 feet on the dip of the ore shoot which at that depth carried higher values and widened out to between 30 and 40 feet. The ore is iron and calcite with chalcopyrite and a little gold and silver. A smelter test of 2,000 lbs. gave rather better than \$15 in all values, copper predominating. The winze is being sunk to 100 feet, at which depth the ore body will be cross-cut to ascertain its width. A parallel vein carrying iron and copper pyrite occurs about 200 feet away from the lead already opened. It is proposed to shortly install a 10-drill air compressor and to drive a 700-foot tunnel to cut the ore at about 300 feet depth.

VOLCANIC.—This property, now named the Volcano but best known in the district for many years as the Volcanic, has with a group of surrounding claims been bonded by several mining men of Marquette, in the iron belt of Michigan, U.S.A. They have organized a development company, known as the Volcanic Mining and Smelting Development Company, and have put in a diamond drill plant with which they are prospecting the Volcanic. This work was commenced

about the middle of December and it was expected that about 40 feet would be drilled daily. Ore was struck before the drill was in 50 feet. The ore of the Volcanic is an iron sulphide with a little pyrrhotite, but values at the surface are so low that if they do not increase with depth the bonding company make no secret of their intention to stop work and let their bond lapse. The ore has desirable smelting constituents, running about 20 per cent, iron and 21 per cent, silica. Mr. Alex. Meads, an experienced mining engineer who recently arrived from Marquette, is direct-

COAL LANDS.—The lands situate some 50 or 60 miles above Grand Forks, taken up two or three years ago for coal prospecting purposes, are now to all intents and purposes abandoned. Last spring a Nelson company sent up a party of men and Mr. W. Blakemore, the well-known coal expert, visited the lands of this company, but little was done beyond cutting a trail and doing some surface prospecting. It seems unlikely that a coal field of any considerable commercial value will be found in this part of the country, and those who acquired the lands appear to



The Emma Mine Boundary District

in operation the property, and Mr. W. A. Harkin, the well-known journalist of Grand Forks, is the company's business manager.

FRANKLIN CAMP.—This is another mining section progress in which is almost entirely prevented by lack of transportation facilities. A waggon road from Grand Forks is completed well up towards the camp, but the unmade stretch of twenty miles or more must be made before it will be practicable to haul supplies in and ore out. There are some fine showings in the camp, but very little development work has been done during the last two years, claim owners not being encouraged to do more work than they are compelled to while there is no immediate prospect of transportation facilities being provided.

have realized this before they spent much money in profitless examination.

RECENT MINE DEVELOPMENT AT CAMP MCKINNEY.

(By Henry Nicholson.)

MINING activity in Camp McKinney during the past year has been below the average, due in a measure to the general depression which has prevailed, more or less, in mining circles throughout the Province, though perhaps more to the need of cheaper transportation than at present exists and on which the future prosperity of the camp so much depends—remote from railway facilities, the bodies of

sulphide ore in the camp and its vicinity are of little value to their present owners, mining investors hesitating to furnish the necessary amount of capital required in the development of this class of properties, under such unfavourable conditions.

Though no new properties have been opened up and some of the old ones have been idle, the payrolls of the Cariboo and Waterloo have enabled the merchants to do about the average amount of business for the year.

I regret, owing to the temporary absence of the superintendent of the Cariboo, I am unable to send you the particulars of the work done in the old mine, but hope to do so in time for your next issue.

The Waterloo, owned by the Waterloo Con. Mining and Milling Co., of Spokane, Denis Clark, managing director, and John Harvey, Superintendent, has made a splendid record during the past year. In the earlier part of the year the mine was in the assessment stage, but since July, when the five stamp mill commenced running, the bullion has been rolling off the plates at the rate of \$5,000 a month, and it is already rumored that a dividend is in sight. When it is considered that so much has been accomplished in such a short time and with such limited milling power, it speaks volumes for the value of the property and the ability of the management.

I am indebted to the courtesy of the superintendent for the following particulars of work done, etc.: The first development commenced in January, with the deepening of the 150-foot working shaft to 250 feet, when from the bottom a drift (117 feet) was run and an upraise made to connect with the 150-foot level, while on the 150-foot level a cross-cut (70 feet) was run, west of the shaft, where a winze in the ore was sunk to connect with the upraise from the 250-foot level, the vein averaging three feet and the ore carrying high values. From the bottom of this winze stoping has been carried on for 100 feet in length and 50 feet in height, for supplying the mill, the richer crude ore being shipped. On the east of the shaft at the 150-foot level a drift about 75 feet was run on the vein, rich ore being obtained. What is known as the free gold stope on the 100-foot level has been opened up some 40 feet in length, the vein averaging three feet. This stope extends up to the 60-foot level, where the vein widens considerably.

The recent addition of five stamps and another concentrating table will necessitate extra men in the stopes west of the shaft, where there is a large body of ore, the company's ground extending in that direction some thousand feet. At the same time development work is being carried on east of the shaft, in the direction of the Fontenoy claim, both on the 150-foot and 250-foot levels.

The general value of the ore milled gives about \$20 on the plates, the concentrates averaging \$100 to the ton and the crude sorted ore which has been shipped giving a return of \$20 to the ton.

On the Dayton claim, some four miles east of the Cariboo, the owners, Messrs. Hamilton and Younkin, are engaged in sacking a carload of sorted ore, some

samples of which have given assay values of several hundred dollars to the ton. The Dayton is one of several similarly characteristic claims on the mineral belt between the North and South Forks of Rock Creek and which are but awaiting the advent of the Coast-Kootenay Railway to become paying properties. The result of this shipment is naturally being watched in the camp with great interest, its success meaning increased attention to a section in which rich deposits of ore undoubtedly exist.

MINING IN NELSON DIVISION.

(By E. Jacobs.)

SILVER KING.—The only recent information obtained relative to this mine, which is owned by the Hall Mining & Smelting Company, Limited, is that during eleven months ending November 30 it shipped 4,600 tons of ore to the company's smelter at Nelson, and that the lessee had estimated the output for December at 300 tons.

JUNO.—The Juno, situate on Morning Mountain, about three miles from Nelson, has been steadily worked for some time past. Since the property was acquired, rather more than three years ago, by the Juno Mines, Ltd., the plan of operations then mapped out has been carried forward with little deviation, the regularity of the lead under development having proved remarkable, both as regards size and quality. The managing director, Mr. M. S. Logan, who has been in charge of operations, has developed the property until, after connection shall have been made between the shaft and the lower tunnel, it will be capable of becoming a regular shipper. The Juno group consists of three full-sized crown-ganted mineral claims, situate immediately above the Athabasca-Venus, and at the summit of Morning Mountain. The lead averages about four feet in width and the value of the ore is stated to be from \$13 to \$15 in free gold. Besides these ordinary values, pockets of ore of considerable richness have been encountered from time to time. From eight to fifteen men are employed on the mine, which during last year was worked without interruption. Between 1,500 and 2,000 feet of development work have been done, this consisting of cross-cut tunnels, drifts and shafts. The long tunnel is now in 800 feet and its face is at a depth of about 700 feet below the surface workings. A few months ago arrangements were made with the company owning the neighbouring Venus mine, situate below the Juno, under which the Juno company is extending the upper tunnel of the Venus into the Juno ground. This tunnel is now in more than 200 feet beyond the Venus boundary line. A shaft is being sunk from the upper workings of the Juno to this tunnel, and when completed the ore already mined above will be taken out through these workings to the upper terminal of the tramway connecting with the Athabasca-Venus stamp mill, where it will be treated. This lower tunnel passes below the place where last summer a strike of rich ore was made on the Juno. The development of

the Juno has been carried out in a business-like manner, and had the stock in the company been held by a large number of local shareholders instead of by a few large holders resident in Montreal, much more would have been heard of the property during the comparatively long period over which its systematic development has extended.

ATHABASCA-VENUS.—A full description of this property appeared in the December number of the *MINING RECORD*. The work done last year consisted of about 2,500 feet on the Venus and 325 on the Athabasca. Some 7,700 tons of ore were put through the company's stamp mill, about 860 tons of this coming from the Athabasca and the remainder from the Venus. There were no additions to plant or machinery during the year except that the air pipe line from the compressor to the Athabasca was extended to the Venus, a distance of between 5,500 and 6,000 feet. Both mines are in good condition for maintaining an ore output. The company's mill consists of two batteries each of five stamps, and a cyanide plant is also in regular operation.

DUNCAN UNITED MINES.—This company operated the Poorman mine continuously from the beginning of the year until the middle of October, during which time about 10,000 tons of ore were mined. The mine is developed by seven tunnels driven from 75 to 150 ft. apart on the vein. Two deeper levels are respectively 150 and 300 feet below the lowest adit or main working tunnel of the mine, and these are worked from a shaft sunk on the vein. Some 600 feet of development was done during the year on three levels, the vein opened up by this work having varied in width from six inches to three feet. The machines employed in drilling were ten Rand No. 0 baby drills; these were supplied with air conveyed in a pipe line from a compressor installed at the stamp mill lower down the hill. The quartz was treated at this mill, which is a 20-stamp mill, run by water power obtained from Sandy and Eagle creeks under a head of 700 feet. It is owned by the company and is situate near Granite Siding, on the C. P. R., Nelson-Robson Railway. The metal production from the 10,000 tons of ore was approximately 2,500 ozs. bullion and 270 tons concentrates, which latter was shipped to the Hall Mining Company's smelter. Whilst operating the company gave steady employment to about 40 men. The neighbouring Granite mine, owned by the same company, was not worked during the year.

SHARPLESS MINING & MILLING Co.—Late last summer this Philadelphia company acquired the Star group of four claims situate at the head of Eagle Creek, between Nelson and several properties working on Forty-Nine Creek, and commenced work on them in the latter part of September. There is now a 6 foot by 7 foot shaft down more than 110 feet on a vein fully six feet in width where being sunk on. The ore is quartz, mineralized with gold and copper. At the 60-foot level the north drift is in about 35 feet and the south drift about 40 feet. Drifting is now in progress at the 110-foot level. The company has leased for a term of years the Duncan United Mines Company's Poorman-Granite mill and aerial tramway. A

commencement was made early in the winter to haul ore to the upper terminal of the tram, but after about 60 tons had been put through the mill and some 70 tons more sent down for a second run, the snow went off and no more hauling could be done until sufficient snow should fall to make the hauling good. The yield from the 60 tons treated was 27 $\frac{3}{4}$ ozs. bullion and some concentrates. It was estimated that by the end of the year there would be between 400 and 500 tons of ore ready to be sent to the mill, which has a daily capacity of about 60 tons. The intention is to put through between 40 and 50 tons per day. Next spring a tram one mile long will be constructed from the mine to the upper end of the existing tram.

MAY AND JENNIE.—The May and Jennie group is situate on Forty-Nine Creek, at a distance by waggon road of about nine miles from Nelson. There are six claims in the group and the principal development work has been done on the May and Jennie. Altogether 2,987 lineal feet of work has been done in underground development, this including three adits of 120, 375 and 80 feet, respectively, one drift of 575 feet and another of 650 feet, a raise 70 feet from No. 1 level to a 40-foot cross-cut tunnel and another 112 feet from No. 2 to No. 1 level. The remaining 965 feet embrace numerous cross-cuts from the long drifts, and a lot of prospecting work by means of short tunnels, shallow shafts, etc. In so thoroughly developing the property before putting on it a reduction plant that might have afterwards proved unsuitable Mr. A. H. Kelly—who owns a three-fourths interest, the other one-fourth being held by Mr. R. S. Lennie—has been enabled to determine the method of treatment that promises to give best results. Accordingly it is intended to install in the spring a quartz mill of 100 tons daily capacity and a cyanide plant.

The main lead on the property consists of a band of schist and quartz about 150 feet in width and having the larger portion of the pay ore on the hanging wall side. The ore is heavily mineralized with iron, in places much oxidized and in others being sulphides in either schist or quartz. The shoots of pay ore near the hanging wall range from seven to thirty feet in width. The greatest depth reached in any of the working is about 240 feet below the surface and the oxidization is found to occur down to this depth. At a depth of 225 feet the ore shoot shows in a cross-cut a width of 27 feet of which 21 feet is merchantable ore. The numerous assays made of ore from different parts of the mine have shown a value varying from \$3 to \$9. An average return from milling of about \$6 is expected. The values are almost entirely in gold, there being no silver of any importance. The ore is favourable for cyaniding; tests made in Spokane by the Hendryx electro-cyanide process gave very satisfactory results, from both oxides and sulphides. The lead has been opened either in underground workings or by open cuts on the surface along a distance north and south of about 2,700 feet, crossing in this known continuous length from the Red Top through the May and Jennie and on to the Gold Bell. It is estimated that there are above No. 2 level fully 60,000 tons of ore that it will pay to put through

the mill. There are some 1,800 tons now on the dump, this having been taken out in the course of development. No stoping has yet been done, but there is already sufficient ore available to keep regularly supplied for nearly two years a mill of the capacity intended to be put in. It is claimed that there is not another property in the country without a plant on it that has so much ore in sight.

A parallel lead, about 350 feet east of the main lead has been opened on the Red Top. The only work done on this is a shaft down 35 feet and from the bottom a 40-foot cross-cut, practically all in ore.

The mine buildings, including cook-house, bunk-house, dining room and other buildings, are of dressed logs. The timber for the mill building has been sawn on the property and it is mostly framed. A 24-inch by 24-inch flume line three-quarters of a mile in length conveys water from Forty-Nine Creek to a penstock, whence it passes through 800 feet of steel pipe, graded from 14 inches to 10 inches, and gives a pressure head at the mill site of 480 feet. The saw-mill is run by a Pelton wheel fed by a branch pipe line. It is proposed to construct a tram line, the surveyed route of which covers a distance of 1,605 feet from the mouth of No. 2 tunnel down to the mill site, the difference in elevation being about 700 feet.

The outlook for the property appears to warrant the confidence that it will prove productive and profitable. Mining costs will be low, the work being nearly all tunnel work. In places two men have been able to run four feet a day and do their own mucking, the ground being favourable to quick driving.

MCDONALD'S AND REFERENDUM.—McDonald and Olson, of Nelson, have a tunnel in about 700 feet on their property on the southeast fork of Forty-Nine Creek. They own two claims, the Gold Hill and Silver Crown. They shipped some 20 tons of ore, four to five tons of which was sorted and ran about \$80 per ton, the remainder yielding about \$25 per ton. There is a five-stamp mill on the Referendum, also on Forty-Nine Creek, and this property is worked intermittently.

ERIE.

ARLINGTON.—This mine, owned by The Hastings (British Columbia) Exploration Syndicate, Ltd., shipped to the smelter during eleven months ended November 30 a total of 1,287 tons (dry weight) of ore, the gross contents of which were 3,042.3 ozs. gold and 8,041.6 ozs. silver. Of this quantity 730 tons were shipped to the Canadian Smelting Works, Trail, and 557 tons to the Hall Mines smelter, Nelson. In addition to the foregoing, four carloads of ore were sent out in December. No development work outside of that attending the mining of this ore was done during the year. There is sufficient ore in sight to admit of shipments being continued for several months of this year.

SECOND RELIEF.—The ten-stamp mill on this property was run for three or four months until the suspension of operations, which took place last August.

CANADIAN KING.—This property was leased and

early in the year it shipped two or three cars of ore. It has more on hand for shipment.

KEYSTONE.—The output of this property was not large. Shipments were made both early in the year and towards its close.

PLACERING.—On the North Fork of the Salmo placering was continued, but the results were not of any considerable importance.

LARDEAU DISTRICT IN 1903.

(Continued from Last Month.)

CAMBORNE.

OYSTER-CRITERION.—The Ophir-Lade Mining Syndicate owns a group of seven claims also situate on Lexington Mountain, above Camborne. Development work was in progress on this property from June, 1902, until April, 1903. During the greater part of last year the construction and equipment of a stamp mill at Camborne had the attention of the company, and work was not resumed at the mine until the mill was about completed, which was late in the year. Since then the opening up of the veins has proceeded and ore has been sent down to the mill. No details of the work done or output of ore have been received. It is expected that the clean-up at the mill will show an excellent recovery of gold.

During about ten months, to April, 1903, about 1,500 feet of cross-cutting and drifting were done and several veins were cut. In a description of the property, published in the *MINING RECORD* last summer, it was stated that a 187-foot tunnel on the Criterion claim cut one galena and three quartz veins, and a 145-foot cross-cut on the Rossland encountered a continuation of the vein known as the Criterion vein. The galena vein had been followed 192 feet to its intersection with the Criterion vein. It was stated to vary in width up to five feet and to carry about \$10 in gold besides its silver values. The Criterion vein had been drifted upon about 190 feet and three cross-cuts made, showed its width to range from 16 feet at one end of the drift to 22 feet at the other. On the footwall there is a payshoot about four feet in width assaying up to \$90 in gold. Another vein opened up, believed to be the No. 2 vein of the adjoining Eva mine, shows a width of nearly four feet and gives an average assay value of about \$20. It was also stated that development work on the Criterion vein alone had proved the occurrence of a pay shoot between 500 and 600 feet in length and about 100 feet in depth down to the tunnel workings.

The stamp mill is a Fraser & Chalmers 10-stamp mill with stamps of 1,000 lbs. each. Room has been provided for a second section of ten stamps. The present capacity of the mill is between 30 and 40 tons per diem. The main building is 40 feet by 68 feet and 70 feet high from lowest floor to peak of roof. The compressor and motor room is 24 feet by 52 feet. The building is constructed of lumber covered with corrugated galvanized iron, and it is lighted by electricity. Besides the stamp batteries the plant here in-

cludes a 7 x 10 Blake rock crusher, three automatic sizers, three Frue vanners (one having a corrugated belt), a 48-inch Pelton wheel, which runs the entire mill—crusher, stamps and tables—and a 60-inch Pelton, which supplies power to the first half of a 10-drill duplex Rand air compressor from which an air pipe line runs up to the mine. A 250-light dynamo is direct-connected to its own Pelton wheel. The hydraulic plant is driven by water conveyed in a 3-foot flume from a dam on Pool Creek to a penstock above the mill and thence in 18 and 16-inch steel pipe to the Pelton wheels, giving a pressure head of 270 feet. A Riblet aerial tramway has been constructed between the mine and mill, the distance between terminals being about 3,500 feet, with one span of 1,260 feet. The difference in the elevation is about 1,500 feet. There are ten buckets on the tram and these are loaded and unloaded automatically. The tramway was completed last September and since then has been in use.

CHOLLA GROUP.—The Cholla group consists of ten claims situate in the vicinity of the Eva and Oyster-Criterion properties. It is owned by the Imperial Development Syndicate, Ltd., of Nelson. No work was done on these claims in the latter part of the year, but earlier half a dozen men were employed on them. Three tunnels have been driven and other development work done, with the result that several shoots of ore of good grade have been opened up.

CAMBORNE-GOLDFINCH GROUP.—These claims were held for some time by the Northwestern Development Syndicate, Ltd., of Hancock, Michigan, U.S.A., which after a comparatively long period of gross mismanagement came to grief last fall. A large sum of money was spent and there was no check on the extravagance and foolish expenditures at the mine end until too late to prevent the financial wreck of the company. Recently the Goldfinch Mining Company was organized to take over the property, which is now under western management, Mr. J. F. Musselman, of Nelson, having the oversight of its affairs. It is not proposed to do much work on the claims this winter. Some drifting and cross-cutting is in hand. No attempt will be made to resume running the company's 10-stamp mill until after an ample supply of ore shall have been blocked out to ensure continuous operation. Meanwhile a deal of development will have to be done to attain this end.

BEATRICE GROUP.—The Beatrice Mines, Ltd., owns a group of three claims situate at the head of Mohawk Creek, a tributary of Pool Creek. This property has had a lot of development work done on it notwithstanding that all supplies have to be packed over a long trail up a steep mountain side. During the four years 1898-1901 development work was done whenever practicable and a quantity of high-grade ore was raw-hided down the mountain and shipped to a smelter. In October of 1902 a commencement was made to run a long adit to tap at a depth of about 630 feet a four-foot lead of galena that earlier workings from the surface had yielded ore containing about \$8 in gold, 150 to 280 ozs. silver and 22 per cent. lead. This adit has been driven about 900 feet. A new trail has been

made from Camborne to the mine. It is intended to do 500 feet more tunneling and to put in an aerial tram. The property has been worked under considerable disadvantage, but the owners have every confidence that their persistence will be well rewarded, the showing and quality of the ore appearing to warrant their faith.

OTHER CLAIMS.—This part of the Lardeau, known as Fish River Camp, runs north 25 to 30 miles from the head of the Northeast Arm of Arrow Lake to Beaton (Thompson's Landing) and it has an approximate width of 20 miles. Fish River in its southward course to Arrow Lake divides the camp equally, the eastern half being drained by Johnson, Pool, Lexington, Ruby Silver, Boyd, Kellie, Glacier and Battle creeks, and the western portion by Henhinick, Scott, Sable, McRae, Bullard and McDougall creeks. There are numerous mineral claims scattered over this comparatively large area, many of them promising and having had more or less prospecting work done on them, but space limitations will not permit of their being noticed here. The camp is one of great possibilities, both silver-lead and gold ores occurring in many places in it. The rather heavy snowfall in winter makes it a difficult country to get about in during several months of the year, but in this respect it is no worse than other mining camps. There is no doubt that it will eventually become one of the most important mining sections of the Province.

ATLIN IN 1903.

(From a Correspondent.)

THE output in Atlin for the season of 1903 is not as great as for 1902, altogether owing to the lack of water. This affected the companies operating on Boulder, McKee, Birch and Pine creeks. The output, on proportion to the number of yards moved, however, was larger than in the previous year. Considered in relation to efficiency of equipment and effective development the district is now in a much more advantageous position than ever it was, and the outlook is decidedly encouraging. With a sufficient supply of water the McKee Creek, Sunrise, Birch, Boulder, and Deeks Hydraulic companies should all pay large dividends this year. They have practically been installing plants since 1900 and are now in a position to work their claims to the very best advantage.

The miners themselves are working in the deep workings and drifting. On Spruce Creek, although drifting as well, they are still working the creek claims. On Boulder and Spruce creeks they have struck the old channels and are in very good pay gravel.

The British American Dredging Company has installed an electric plant capable of operating five dredges. One dredge is already completed and ready for operations. Power is obtained from Pine Creek Falls. Surprise Lake, which has an almost unlimited horsepower in reserve, is being dammed at the head of

Pine Creek for power purposes. It will require a lot of money to develop the limit that may be required, but it is available.

From a dredging point of view the outlook in that country is very promising. It is expressed in local mining parlance as essentially a dredging "proposition." The values are evenly distributed, and, by the modern devices employed for saving gold gravel assaying 20 cents a yard can be made to pay. The country is more or less auriferous over an area, taking Atlin as a centre, having a radius of at least 25 miles.

The output of the district as obtained through the banks and express companies for the past season is estimated at \$430,000, to which may be fairly added \$75,000.

Labour conditions are now stable. A strike occurred in the spring, which was, however, of short duration. Labour is fairly plentiful, with prospects of a fair demand for good men in the spring. Miners now receive \$3.00 a day of eight hours and board; or \$3.50 a day of 10 hours and board.

Quartz mining is being developed with good prospects of success. A ten-stamp mill has been installed on the Yellow Jacket, on Pine Creek. The Beavis property near Atlin is also a free milling prospect; also the Imperial group, owned by Seattle men, on Monroe Mountain. All these properties are well spoken of. The White Moose on Taku Arm has afforded rich assays in silver and copper. The Lavadere group, a gold-copper property, is situated at the south end of Atlin Lake. It has been bonded for a considerable sum, but on the expiry of the bond the owner refused to extend it. There are many other claims recorded, and there is every reason to believe that the district will be a large quartz, as well as placer producer.

GOLD MINING IN WESTERN AUSTRALIA.

IN the course of a speech made about three months ago before the Legislative Assembly of Western

Australia the Minister for Mines, in moving the second reading of a Bill for the Amendment and Consolidation of the Law of Mining in that State, made the following remarks relative to gold mining in Western Australia: "I want to point out what the great mining industry does for a State such as Western Australia. In 1890 the population of Western Australia was 44,000 people; now it is about 225,000 people. In 1890 the reported gold value was £86,000; in 1902 it was nearly £8,000,000. In 1893 the shipping, in and out, was less than 1,000,000 tons; to-day it is more than 3,500,000 tons. In 1891 dividends were declared to the amount of £1,875; in 1902 the declared dividends amounted to \$1,424,272. Our output of gold up to July of 1903 was 11,408,723 ounces, of the value of more than £42,000,000, and the estimated gold production for 1903 is something like 2,500,000 ounces, of the value of about £9,000,000. We have paid in dividends to date \$8,588,977, and for the first seven months of this year we have paid £1,112,115. Taking

the nominal capital of all the companies at present working in Western Australia, which is supposed to be a fraction over £30,000,000, the dividends we are paying this year on all the mining—I refer to the nominal capital of gold mining companies—is 6½ per cent. interest. I think that a wonderful record, and it shows that the industry in Western Australia predominates over the same industry in any other part of the world. In 1902 for every man employed above and underground there was produced 117 ounces of gold, of the value of £427 per man, and this year it is estimated that each man will produce 136 ounces, of the value, for every man employed above or underground in the mines of this State, of £490 per man. That is a really wonderful record, and I do not think it can be spoken of too often; because the more we impress outsiders with the enormous resources of the gold-mining industry, the more likely we are to induce foreign investors to expend money in exploiting the industry. Last year, from every acre held under gold-mining lease from the Crown in this State, gold to the value of £234 was taken. I know that in the rich belt of Kalgoorlie the average was larger; but the general average return from the State speaks well for the industry."

ELECTRIC FIRING IN SHAFT SINKING.

FROM an account of the use of electricity for various purposes at the Sherwood colliery, Nottingham, England, the following is taken: The whole of the shot firing required during the sinking operations at this colliery was done by electricity. A shaft-sinking frame was employed, suspended from the surface, on which the compressed air rock drills that were employed were carried. Twenty-two holes were drilled at the same time in the bottom of the shaft, vertically downward, six in a circle of four feet radius, and sixteen outside of these, in a circle of nine feet radius, all the holes being six feet deep and two inches in diameter. All the twenty-two shots were fired together, and twenty-four horizontal holes in the side of the shaft were then drilled, in a circle of eleven feet radius. These were all fired together, and it is stated that the blasting left the shaft quite clean, no dressing having to be done afterwards by the pick. The total sinking to 1,400 yards only occupied fifty-four weeks, a very creditable performance indeed, and a great advance upon the previous records, due evidently to the intelligent use of the electric shot firing. The shaft bottom was lighted, during the sinking, by six incandescent lamps of thirty-two candle-power each, held in a special fitting, and suspended in the shaft by an armoured cable.

LILLOOET AND BRIDGE RIVER.

During the season of 1903, placer mining was carried on at the South Fork of Bridge River in a small way. On the North Fork the Bridge River Development Company made a large expenditure last year in the installation of machinery. Quartz mining has

been confined to development work on a number of claims at Cadwallader Creek and the North Fork of Bridge River. In the latter locality the Maid of England is regarded as exceptionally promising. The Lorne Mines have been further developed, and the ore crushed by means of an arrastra, the value of the gold recovered being \$3,200. Both the Ben D'or and the Anderson Lake Company's properties have been worked under bond. On Tyanchton Creek an outcropping of cinnabar was located and several claims staked in the locality.

UNRESTRICTED COMMERCE.

TO THE EDITOR:—When some of our friends from abroad come here in quest of large game, it is not an uncommon occurrence to find them heading for any one of our large steamers lying at the different wharves of British Columbia, with anywhere from two to half a dozen guns, some of them good enough and large enough to kill even an elephant. Accompanied with these guns will be found any amount of ammunition, caps, powder, etc.

Now, it does seem to me, Mr. Editor, that while we have no objection to our friends at home and abroad hunting wild game, that some protection at least might be given to a poor prospector who starts out in quest of mineral in the various points in British Columbia, and that he might at least be allowed equal privileges to equip himself with such material as he requires, but as a matter of fact, according to the present laws he is not permitted to carry even a stick of powder or a box of caps, but may take all the steel he wants or any other equipment, and provision enough to last him a lifetime, but the one essential thing necessary to his progress in prospecting, is by the Dominion Statutes absolutely barred. The consequence is, that we find a man who takes his life in his own hands one hundred times, who is really the jackal of all mining enterprises, resorting to all manner of subterfuges, not allowed to carry the one essential, namely, powder and caps. Now in the name of all that is fair and businesslike, why may not some provision be made on any boat on which these prospectors travel, by having constructed a small magazine visible by all the passengers and marked as such, the key of which might be kept in the hands of the purser whose duty in the case of an alarm or accident it should be to open such magazine and throw the contents into the water, thereby removing any extra hazardous risk in carrying these supplies. When we remember that so much of our own progress is affected by so vital a matter, it is surprising that it should not have received serious attention long ago. It would seem that instead of encouraging the poor prospector, every hindrance is put in his way. The most frequent notice on any one of the boats, is the caution against carrying explosives by any passenger. If it were not so serious a matter, one would be inclined to laugh at the farce of the thing. If we cut the mineral resources out of our consideration in dealing with the other resources of this Province, what have we left? Surely, Mr. Editor,

it is high time that our provincial authorities should appeal strongly to the Dominion Government for relief in this matter in the interest of untrammelled and progressive commerce.

ROWLAND MACHIN.

COMPANY MEETINGS.

VELVET (ROSSLAND.)

THE annual general meeting of shareholders was held in London last month. It was stated that Mr. Gray, the manager, upon getting to work, soon opened up some rich ground in the fifth level. Similar discoveries of rich ore were also made in the first and second levels, and work was restricted to them. The object of this was to save the expense of pumping, which is necessary to enable ore to be raised from the 5th level, and consequently, as soon as the ore in the upper levels became available, pumping was stopped, and the mine was allowed to fill with water up to the 3rd level, where it is automatically drained by the tunnel. The rich ore, therefore, in the 5th level remains for the future.

The operations at the mine between September, 1902, and July, 1903, were carried on without any material financial aid from London, and were only stopped when, to ensure a continuance of the supply of rich ore, further exploratory work became necessary.

The recent developments have for some time past shown the ore shoots trending towards the Portland. The opening up of the 1st level in the Portland gave excellent results, as did the driving south of the second level in the Velvet, which was extended into the Portland boundary, and Mr. Gray is of opinion that there are great possibilities of the discovery of fresh shoots of ore to the south on that property. Mr. Sorensen advised that the Velvet and Portland mines should be worked together, and now it has become a necessity for this company to acquire the Portland ground. Mr. Thompson in his report recommends this, and his view of the matter is confirmed by Mr. Maclean, who has recently studied the question on the spot; the key to a successful future for the Velvet, therefore, appears to lie largely in its becoming owner of the Portland. With the object of bringing this about, terms which are regarded as reasonable, and the best this company could arrange, were made with the Portland Company, subject to ratification by the shareholders, who doubtless will confirm what has been done on their behalf.

The proposed arrangement ensures a considerable reduction in the amount of capital issued by the Velvet and Portland companies, so that the new company proposed to be formed to take over the Velvet and Portland properties (in which it is hoped that all present, shareholders in both companies, will become interested), may not be handicapped by over capitalization.

Under the scheme of amalgamation Portland shareholders will receive fully paid shares in the new company while Velvet shareholders receive shares subject to a liability of 2s. 6d. The reason of this is simple; that the Portland directors (acting with the approval of a shareholder representing three-fourths of the capital of that company, refused to part with their property unless paid for it either in cash or fully paid shares. The Portland claims, being considered essential for the success of the new company, had to be acquired, and hence the agreement made, which is very reasonable.

As to the future method of dealing with the ores, it is proposed to erect a comparatively inexpensive smelting plant on the mine, with a view to saving expenses, which upon the 5,500 tons of ore treated amounted to \$40,000, or £8,000, or about 29s. per ton. By the process in question the sulphur contents of the ore will be made to act mainly as the fuel, and the ore values will be separated at a cost estimated at not more than \$2.50 or 10s. per ton, or a saving of 19s. per ton, instead of, as at present, at a cost of nearly three times as much.

ROSSLAND-KOOTENAY.

The annual report of the London directors of the Rossland-Kootenay Mining Company, Ltd. shows a loss during the

year of £6,572, mainly owing to the fact that the directors have decided to charge the profit and loss account with the following items: Proportion of mine development account; depreciation of buildings, plant, machinery, etc.; reserve for contingent expenses and legal charges in re Centre Star Mining Company suit.

Owing to the irregular manner in which the values occur in the ore it has been found very difficult to determine the tonnage and value of the ore in reserve, and eventually it was decided that the only efficient way of settling the matter was by shipment of substantial tonnage of ore. Accordingly some 5,000 tons have been shipped and realized at rates showing a profit over the cost of production. Now that the directors possess accurate knowledge as to the positions and values of the various bodies of ore available, the shipment and realization of the latter can be effected with the maximum of benefit to the Company. During the period covered by the accounts shipments have been necessarily limited to three and a-half months, but these will now be pressed forward, and the directors have every hope that vigorous diamond drill prospecting in the lower levels will materially add to the high-grade ore.

On August 15th last it was estimated that the Company possessed ore reserves amounting in all to 35,000 tons, but of this 16,000 only could possibly be handled at a profit under existing circumstances. The gross assay value was \$10.75. The management has turned its attention to some method of concentration, and favours a modification of the cyanide process. In the manager's report he refers to the great difficulty he experienced in making satisfactory contracts with the local smelters. The balance sheet shows that the company has practically used up the working capital which was brought into the amalgamation from the coffers of the Kootenay Company.

GREAT NORTHERN MINES, LTD.

Meetings of the Ophir-Lade and Great Northern Mining companies were held at Camborne during January. A resolution was passed by the shareholders of the former authorizing the sale of the Oyster-Criterion mine and mill to the Great Northern Mines for 500,000 fully paid up shares in the latter company.

At the meeting of the Great Northern Mines, Mr. W. B. Pool was elected president; Mr. F. W. Godsall, vice-president; Mr. Hodge, secretary, and Messrs. F. W. Godsall, W. B. Pool, J. J. Young, W. F. Cochrane, T. Kilpatrick, B. Crilly, and E. M. Morgan, directors.

At a meeting of the Ophir-Lade company the returns of the month's run of the Oyster-Criterion mill were presented, and showed \$2,344, or about \$6 per ton on the ore milled.

COMPANY NOTE AND CABLES.

B. C. (ROSSLAND AND SLOCAN) SYNDICATE.—The report of the British Columbia (Rossland and Slocan) Syndicate for 1903, presented at the meeting on the 23rd ult., states that the Snowshoe mine at Phoenix, owned by the Snowshoe Gold and Copper Mines, Ltd., in which this syndicate is the largest shareholder, has during the year been further extensively developed. Its development has shown up large bodies of ore, and during the year under consideration about 20,000 tons of ore have been shipped to the local smelters. Additional machinery has been installed, and shipments upon an increased scale have since been steadily maintained. The directors have been considering how best to develop some of the other properties owned by the syndicate, or to acquire interests capable of development in such a manner as to yield substantial profit, and in this connection considerable work has been done in various directions, which it is hoped it may be possible to turn to profitable account, as was done in the case of the Snowshoe. Many business proposals, some industrial and some for railway construction under Government charters, have been put before the directors and investigated and one or two of these are being further looked into on the spot. The profit and loss account shows a balance of £63, after writing off depreciation on furniture, office expenses,

directors' and auditors' fees, etc. The reserve fund consists of 79,000 shares in the Snowshoe Gold and Copper Mines, Ltd., valued at £79,000. The nominal capital of the company is £100,000, and of this amount at 31st December last 90,000 shares were issued. Of these 76,648 shares were fully paid, and 13,352 were 12s. 6d. paid, leaving a balance of 100,000 shares unissued.

SNOWSHOE GOLD AND COPPER MINES.—The following circular has been issued by the Company: During the greater part of the current year the directors have been considering certain proposals that have been brought before them by an American company, owning a large mine, together with extensive smelting works and a converter, within a short distance of the Snowshoe Mine, with a view to the amalgamation of the American company with the Snowshoe Company. After preliminary consultation in London with some of the directors of the American company, it was found necessary, in order to bring the negotiations to a satisfactory conclusion, for the deputy-chairman, Mr. G. S. Waterlow, and the managing director, Mr. A. J. McMillan, to make a journey to New York and British Columbia. They have recently returned from this trip, having visited and examined, in company with some of the directors of the American company, both the mines and the smelting works. The negotiations in connection with the proposal have been somewhat prolonged on account of the technical difficulties in arriving at a common basis of settlement. These difficulties have now been overcome, however, and I am pleased to be able to inform you that the boards of both companies have at length mutually agreed upon terms which they are prepared to recommend for adoption by the shareholders of their respective companies. The American company has undertaken to notify us early in the new year as to whether or not the terms provisionally agreed upon have been approved by their shareholders, and upon receipt of this notification, we shall proceed to submit the scheme in fuller detail for your consideration. It is estimated that the amount of ore shown up by development work upon the two mines amounts to considerably over 3,000,000 tons, which ore can be mined and smelted much more profitably if worked on the large scale proposed under the amalgamation. The advantages to be gained by the shareholders of this company by consolidating with the American company referred to, would be the immediate ownership of a smelting and converting plant in successful operation, capable of handling the maximum output from the mines at a minimum of expense. As the scheme provides for our joint ownership of a smelter at an early date the directors consider it unwise, pending the completion of the proposed amalgamation, to continue shipping ore to a smelter in which we have no interest, and which, naturally, makes a considerable profit on the transaction. The Board have, therefore, for the present, discontinued active operations at the mine. The scheme of amalgamation provides for the formation of a company in London to take over the smelter and mines of the existing companies, and for the proper representation of the Snowshoe shareholders upon the Board thereof.

LE ROI No. 2 (Rossland).—From the mine manager's report on the operations at the mine for November: Output—80 cars have been despatched from mine during the month, of an average weight of 26 tons. A copy of the returns will be forwarded as each lot is paid for. Josie Mine—On the 300 foot level, 10 feet driven in a northwest direction to pick up ore found in diamond drill hole No. 41. Ore seems fairly solid, and is of shipping grade. It is probably a cross lead. On the 500-foot level, 40 feet driven. The porphyrite dyke having now been left behind to the east, we are in a position to explore, either by crosscut or diamond drill, for the westerly extension of main ledge. Stringers of ore met with from time to time of exceptionally high grade, but too narrow to attempt to mine for shipping purposes. Diamond drill work done during the month: 300-foot level—A little ore met with at 158 feet, but not of sufficient importance to warrant following same; 500-foot level—Hole No. 43 driven 49 feet in the west end of the mine, to thoroughly explore the country round about porphyrite dyke. The object of this explora-

tion is to ascertain the direction of westerly extension of the ore body, if possible. Fines dump—Shipment of ore from this dump will now have to be discontinued till snow is gone.

ARLINGTON (Erie).—The manager sends us the following report for December, 1903: Expenses amounted to \$4,134.62. Shipments were resumed commencing on December 19th and 90 tons of ore shipped up to the 31st. The returns for these 90 tons will pay the month's expenses, but the payments were not received until January, so will appear in the statement for that month.

EVA (Camborne).—The manager in a letter to the MINING RECORD, dated January 5th, writes: The Eva clean-up just to hand resulted in production of a gold brick valued at \$10,400. The concentrates are valued at approximately \$600.

YMER (Ymir).—The mine manager reports the following return for November: Fifty stamps ran 30 days and crushed 3,950 tons (2,000 lbs.) of ore, producing 987 ozs. bullion. The estimated realizable value (gross) of the product is \$10,250; 287 tons of concentrates shipped gross estimated value \$8,500; cyanide plant treated, 2,850 tons (2,000 lbs.) of tailings, producing bullion having estimated gross value at \$2,250; sundry revenue, \$850—\$21,850. Working expenses, \$22,000. Loss, \$150. There has been expended during the month on development \$3,500.

LE ROI (Rossland).—The following report was cabled to London reporting on conditions at the mine in December: "Shipped from the mine to the Northport smelter during the past month 17,256 tons of ore, containing 5,428 ozs. of gold, 6,665 ozs of silver and 407,800 lbs. of copper. Has resulted in an (estimated) loss of \$15,500, according to the usual calculations. Development work, 1,350 level—In reference to my cable, dated the 17th, have commenced a stope 30 feet by 20 feet with ore in top, bottom and sides; the grade of the ore varies between \$10 and \$20—not possible to estimate closely owing to presence of small dyke. Other work 1,350 level encouraging, although have not yet met masses of ore I consider we are justified expenditure involved." (Office note—The above includes not only the costs of mining, smelting and realization of the smelter products, but also \$1.48 per ton of ore mined for depreciation and development. Mr. Parish has already been requested in future cables to state separately the cost of development.)

NOTES FROM THE MINING CAMPS—A SUMMARY.

THE COAST.

A PROMISING new ore body is reported to have been encountered on the Lenora mine, at Mount Sicker, at a distance of about a hundred feet north of the diorite belt. The ore body is said to be nine feet wide and shipments therefrom have already been made to the Crofton smelter.

The C. P. R. has granted an exceptionally low freight rate on ores shipped in earload lots from White Horse to the Ladysmith smelter.

The directors of the Princess Royal Gold & Copper Mining Company have decided to resume development operations at the company's copper mine on Princess Royal Island immediately.

SKEENA RIVER.

The Mining Recorder at Port Simpson, in a report to the Dominion Exhibition Commissioner, states that 148 tons of ore recently shipped from Portland Canal gave an average net return of \$130 per ton, while another shipment yielded \$90 gold, \$60 copper and \$23 silver per ton. The name of the mine is not given.

WHITE HORSE.

The new Alesk diggings still continue to be considerably "boomed," and it is said that from one claim on Boulder Creek, the gravel yields from twenty to twenty-five cents to the pan at a depth of six feet. In anticipation of a big rush to this field, block houses have been built at intervals over the entire distance from White Horse, and a large supply of provisions are now being taken in. This month 150 tons of ore from the Copper King mine at White Horse was received

at the Ladysmith smelter, for test purposes. On a previous test of sampled ore gave a gross return of \$90 to the ton.

LYTTON.

At a recent general annual meeting of the Fraser River Gold Dredging Co. the chairman stated that the cost of the dredge and leases at Lytton had been about \$60,000 and the gold produced, in round figures, \$4,450. A new powerful specially designed dredge is now being erected having an actual capacity of 60 cubic yards per hour, and it is hoped with this appliance that operations this season will be most profitably conducted. Working with the old dredge the last return was 443 ozs. of gold in 168 hours.

KAMLOOPS.

Another property, the Lost Chord, is being opened up in this section, a tunnel being now driven 20 feet into the hill in the expectation of striking the vein at a vertical depth of a hundred feet. The surface showing on the property is promising.

The British Columbia Mica Co., Ltd., has been incorporated to operate mines in New Brunswick, and the mica deposits at Tete Jaune Cache near Kamloops.

REVELSTOKE.

The Prince Mining & Development Co., engaged in developing a promising group of claims in this vicinity, contemplates installing an electric plant for working drills and lighting purposes in the spring. There is an excellent water power nearby. Two new companies, the Imperial Mines, Ltd., and the Keystone Mines, Ltd., have recently been incorporated to acquire and develop mines in, respectively Albert Canyon and Keystone Mountain. Work in both cases, it is stated, is to commence in the course of the next month or so.

The Lanark group of mines has, it is reported, been sold to a local syndicate for a relatively small sum by the Lillooet, Fraser River & Cariboo Gold Fields, Ltd.

LARDEAU.

The two principal productive mines, the Silver Cup and Nettie L., shipped in 1903, 2,018,857 tons, valued at \$139,891.41. The superintendent of the Eva mine at Camborne writes that the December clean-up realized \$10,400 in gold, and about \$600 in concentrates.

Several "deals" have been made in the Lardeau recently, including the sale of the Golden West and Crown King for \$25,000 and the Spyglass at Poplar Creek for, it is reported, \$50,000.

A few tons of ore from the Lucky Jack and Swede group, Poplar Creek claims, were crushed for test purposes at the Oyster-Criterion mill last week, the return being \$250 per ton for ten hours in respect to the former and \$37 per ton from the latter ore.

At an extraordinary general meeting of the shareholders of the Ophir-Lade Mining Syndicate, Ltd., held in January, resolutions were passed authorizing and confirming the sale of the Oyster-Criterion group in this camp and the Ophir-Lade group on Galner Creek to the Great Northern Mines, Limited.

It is announced that the Beatrix Company has concluded arrangements for the sale of 48 per cent. of its stock, in order to provide for an adequate working capital. On the Goldfinch a contract has been let for tunnelling.

SLOCAN.

Activity in this district is becoming more noticeable. At Sandon, the Alamo Concentrator is again in use; the Slocan Star concentrator is being re-modelled, the Ivanhoe mill is being equipped to treat zinc-bearing ores, and the Payne has installed a new electric hoist. Two or three mines have been recently leased, including the Lucky Jim, which at one time produced heavily. On the Ioho eighteen inches of high-grade galena have been encountered in the cross-cut tunnel; work has been resumed on the Whitewater Deep, and arrangements have been made to drive a long tunnel, for it is estimated, not less than 4,000 feet, on the Rambler-Cariboo, near Kaslo, the Providence Mines, on the South Fork have commenced shipments.

Under the Lead Bounty Act, regulations have been approved governing the payment of the bounty on lead contained in lead-bearing ores mined in Canada. The regulations provide, that all producers of lead-bearing ore who desire to avail themselves of the bounty must notify the minister of their intention to make a claim under the act declaring the name of the mine producing the ore, its situation, and the names of the president, secretary and manager, as well as the name of the official authorized to make the claim. All claims must be substantiated on the oath of the manager of the mine. The smelting of all lead-bearing ores, on which a claim for bounty is to be made, shall be at all times under the supervision of an officer of the Department of Trade and Commerce, and this officer may at any time demand a floor sample of any ore delivered at the smelter, for smelting purposes. The books of any mining company coming under the act are to be open at all times to the inspection of a supervising officer. The cost of such supervision is to be paid by the claimants and will be deducted *pro rata* from the bounty according to the quantity smelted during the fiscal year.

Shipments of zinc are beginning to assume larger proportions, the Payne having sold 500 tons last week to the Lanyon Company, while arrangements are also being made by this mine to ship 1,000 tons to Antwerp. The Lanyon Company has also purchased 300 tons of zinc ore from the Ivanhoe.

The C. P. R. has recently made a reduction of \$3 per ton in freight rates on zinc and crude ores shipped from Kootenay to Antwerp, the charge for which was formerly \$16, and it is understood in consequence that the Payne and other mines propose shipping part of their product to Europe. The ore will be shipped *via* St. John, N.B., during the winter season and *via* Montreal when navigation opens.

The important announcement is made officially that specially designed reduction works utilizing a new process of ore-treatment are to be erected in the immediate future at the Arlington in the Slocan City Mining Division. There are not only at the Arlington but at other properties in the vicinity, large reserves of ore which cannot be profitably extracted under existing conditions. By improved local concentrative treatment, however, there is no doubt that the low-grade ores of the camp may be handled to advantage.

NELSON AND YMIR.

Development work is to be at once commenced on the Monarch, a property owned by the Monarch Gold & Copper Mines, Limited, a recent Oregon flotation. At Ymir, development on the Foghorn continues to give satisfactory results, the east drift from the 900-foot level has now been driven about 50 feet in ore. A policy of retrenchment has evidently been decided upon at the Ymir, a number of employees having been discharged and expenses reduced in other directions. Only 20 stamps are in use at the mill.

Work on the Dundee, which was recently sold, has commenced, three shifts being now employed pumping out the mine. The second payment of \$3,500 was recently made on the Gold Cup, the third and final installment of \$10,000 being due early in April.

At the Arlington mine (Erie) the expenses for the month of December were \$4,134.62. Shipments were resumed commencing on December 19th, and 90 tons of ore shipped up to the 31st. The returns for these 90 tons will pay the month's expenses, but the payments were not received until January, so will appear in the statement for that month.

ROSSLAND.

Mr. Parrish, manager of the Le Roi, has been induced to make some important admissions in respect to the recent new discoveries of ore in the 1,350-foot level of that mine. Three hundred feet west of the main shaft at this level a cross-cut has been driven 100 feet along the course of the diamond drilling and since the ore body was encountered drifts have been run fifty feet in one direction and thirty feet in the other in ore, which is of first class grade, averaging from \$12 to \$30 per ton. Further west in the same level ore of similar grade has been encountered in another cross-cut near the shaft, and it is thought that this may possibly be a continuation of the same ore body, in which case it would

prove the largest ore shoot found in the Le Roi. To determine meanwhile, the extent of the ore, work is now being prosecuted.

Good progress is being made in the building of the Rossland Power Company's new works near Trail, for which a part of the machinery has already arrived. The initial capacity of the plant will be 200 tons daily, and it is expected operations will commence in April. At the White Bear a new hoist and 150-h.p. motor, and a 20-drill compressor is being installed. Shipments from Rossland are being maintained at the rate of about 10,000 tons a week. Late important news is that the No. 1 mine has re-entered the producing list.

Production from Rossland is now being maintained at a rate of nearly 10,000 tons of ore per week, and it seems probable that this output will be largely increased in the near future. In January the No. 1 was put again in active operation. The ore from this mine carries high percentages of iron and hence is acceptable to the smelters for fluxing purposes.

At the Spitzee, recent development operations have proved most encouraging, and if these results continue satisfactory, it is likely that an Elmore mill will be erected next summer at the mine. Some important machinery installations are being made at the White Bear, which will soon be very completely equipped. While excellent progress is being attained in the erection of the Rossland Power Company's new 200-ton concentrator near Trail. These works will, when completed, be the largest of their kind in Canada, the main building being 360 feet long by 120 feet wide. The proposed method of treatment is something as follows: The ore will first be crushed and values extracted automatically; this will be followed by water-concentration; the tailings will then be treated with cyanide, the slimes going to an Elmore oil-concentration mill.

BOUNDARY DISTRICT.

The amount of ore treated by Boundary smelters in 1903 is officially placed at 697,404 tons, of which 401,921 tons were treated at the Granby works, 162,913 tons at the B. C. Copper Company's smelter, and the balance at Boundary Falls. The Granby Company produced in 1903, 16,932,356 pounds of copper, 356,900 ounces of silver, and 47,000 ozs. of gold. Intelligence has been received from New York that the shareholders of the B. C. Copper Company have signified their approval of the proposed plan of amalgamation with the Snowshoe. During the month the judge of the County Court at Phoenix has made an order for the sale of the Winnipeg mine to satisfy Bank and other judgments. The final payment of \$2,000 was made last week on the Jack Pot in Wellington Camp. The Granby Company, it is announced, has secured control of the output of the Oro Denoro in Summit Camp, and shipments are to be maintained at the rate of 150 tons daily. The company has also bonded two other claims, the Shamrock III, and Reliance in Summit Camp. Recently very rich ore was struck both on the Elkhorn and Don Pedro two high-grade properties in the granite near Greenwood. An important strike is also reported to have been made on the Roderick Dhu, in Long Lake Camp.

The work has begun of stringing wire for the five-mile electric transmission line from Phoenix to Greenwood.

CAMP M'KINNEY.

It is expected that the meeting of the Cariboo-McKinney Company to be held in Toronto early in February will be an interesting one, as one section of shareholders are anxious to wind up the company's affairs, while another favors a continuation of operations until the funds still remaining in the treasury are exhausted. During 1903 about 15,000 tons of ore were milled, values being considerably less than \$10. From 68 to 70 per cent. of the values were saved on the plates, with the concentrates the total recovery being 83 to 85 per cent. A small profit is reported on the year's operations, and the company is said to have a cash balance of about \$50,000 or sufficient to pay a dividend of 4 per cent. on the issued capital.

It is now believed that the Waterloo Company, Camp McKinney will not make a dividend distribution in February as

was anticipated, profits being set aside instead for the purchase of the adjoining Fontenoy claim, for which the company is negotiating.

EAST KOOTENAY.

It is proposed to install a plant at the St. Eugene, Moyie, to treat the slimes and tailings from the mill, and a new appliance has been devised for that purpose. It is considered that in the past a loss of values of about one and a half per cent, has been made in the tailings. To overcome this, a building 250 x 25 feet has been erected at the lake shore, there being placed in the upper storey a large settling tank, through which will pass all the slimes and tailings from the mill, on to specially designed concentrating tables placed in the lower storey. It is announced that shipments at the rate of two carloads a day are to be resumed at once from the North Star mine to the Nelson smelter.

The manager of the Ptarmigan mine, at Wilmer, has received instructions to suspend operations. The Dominion group of claims near Marysville on the St. Mary's River, have been acquired by a Spokane syndicate. The property has been partially developed and contains two veins, one of galena and the other carrying gold and copper values.

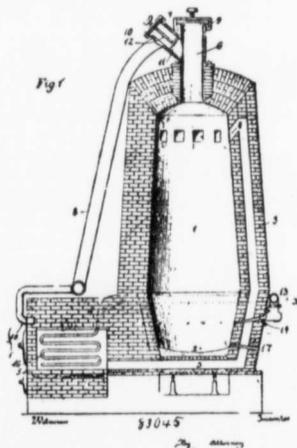
Leases have been secured on the old placer ground at Rider Bar, above the falls on Moyie River, it being proposed to thoroughly prospect the property this winter by sinking shafts, etc., with a view to installing a suitable hydraulic plant next season.

MINING AND METALLURGICAL PATENTS.

We are indebted to Mr. Rowland Brittain, patent attorney, of Vancouver, for the following report: Canadian patent No. 83,045. Ore Treatment, issued September 22nd, 1903, to Oscar Daube, Manhattan, New York.

Claim 2. In a furnace for treating ore, a coking chamber having tuyeres at the bottom thereof, and two separate openings at the top, each opening having a separate cover, substantially as described.

3. In a furnace for treating ore, a coking chamber having tuyeres at the bottom thereof, and two separate openings at the top, a fire space and means for leading gas from one of said openings to said fire space, substantially as described.



5. A vertical coking chamber, a fire box and flues leading from said box up around said coking chamber and side changing into said chamber below the level of the top of a normal charge, substantially as described.

7. In a furnace for treating ore, a vertical coking chamber and means for introducing air near the bottom thereof, in combination with a gas opening at the top of the chamber, a

gas pipe connected therewith, means for opening and closing communication through said opening, with said pipe, a waste opening also at the top of the chamber, and a separate cover for said opening, substantially as described.

9. In a furnace for treating ore, a vertical chamber, tuyeres entering near the bottom of said chamber, a fire box and a lining for said box containing an air passage communicating with said tuyeres, substantially as described.

10. The method of treating finely divided ore, which consists in mixing the same with finely divided bituminous fuel, heating this mixture in a single mass away from the air, and finely subjecting the mass so produced to the combined action of high temperature and an air blast, substantially as described.

11. The method of treating finely divided ore, which consists in mixing the same with finely divided bituminous fuel, heating the mixture in a single mass away from the air leading the gases from said mass, burning said gases and finally subjecting the mass to the combined action of heat from said gases and an air blast, substantially as described.

13. The method of treating finely divided ore, which consists in mixing it with finely divided fuel, coking the mixture in one mass, then adding a suitable flux, and finally subjecting the mass and flux to the combined action of high temperature, and an air blast, substantially as described.

THE DEKEYSER ELECTRIC-CYANIDE AMALGAMATING PROCESS.

A COMPANY, the Pacific Mineral Extraction Co., Ltd., is being promoted in Vancouver, with a capital of \$100,000, to acquire the Canadian rights and interests in an amalgamate process of amalgamation, utilizing electricity in conjunction with cyanide, invented by Mr. M. De Keyser. The general principle of this method of ore-treatment appears to be somewhat the same as that applied recently by Dr. Hendryx, but it is to be noted that Mr. De Keyser claims to have patented his process so long ago as November, 1900. We extract the following from a statement accompanying the prospectus:

The process is devised for the recovery of gold and silver by dredging, hydraulic and milling.

Before describing the mechanical and chemical details of this process, it may be stated that gold and silver are found in many states of combination with other elements, such as sulphur, tellurium, arsenic, antimony, etc., and in the metallic state, in nugget form of various sizes down to the impalpable form or condition found in veins or lodes and in alluvial deposits, clean-coated or in a rusty condition; hence it is that the extraction and recovery of these precious metals is attended with many difficulties, arising partly from its many forms of combination, and partly from its variable size and rusty condition.

The ordinary cyanide process may be eminently adapted to the treatment of an ore in which the gold and silver exists in a fine state of division, while entirely unsuited to the treatment of an ore in which the gold and silver exists in a coarse state, owing to the great length of time required for its solution in cyanide.

Turning to the other—that combination of gold and silver with the base metals, such as sulphur, arsenic, antimony, etc.—they are mostly insoluble in a solution of an alkaline cyanide; nor can they be amalgamated with mercury; hence the heavy losses in gold and silver extraction when either of those processes are used separately.

In order, therefore, to treat these ores successfully they must be split up or decomposed, either by physical or chemical means, so that the gold and silver will be rendered soluble and fit for the cyanide electric amalgamation process, each class of ore requiring a somewhat different mode of preliminary treatment.

TREATMENT OF QUARTZ, SULPHIDES AND ARSENICAL ORES.

In the treatment of these gold and silver ores the ore is first roasted (if found necessary), then crushed to half-inch mesh or finer and fed into a suitable pulverizer and agitator.

A diluted solution of cyanide of potassium (the strength of which has to be determined in each case) is continually fed from a storage tank through iron pipes, regulated by iron valves.

The pulp is reduced to 100 mesh or finer and is discharged with the solution and conducted into a revolving copper silver-plated drum, properly insulated from the other parts of the machine.

This electric amalgamator makes ten revolutions per minute, is six feet long and three feet in diameter, and is so constructed that the pulp and solution passes over one hundred square feet of plates before finding a way out, making a perfect deposition of gold and silver on the plates and quicksilver.

By this operation practically no values are lost, as the slimes are successfully treated by classifiers and improved electric amalgamating tables, which are six feet wide and twelve feet long, divided into four compartments provided with copper silver-plated plates placed in the form of steps.

From the tables the material passes through two or more traps, collecting all amalgam which escapes during the operation.

Finally, the tailings are discharged into filter bags and the solution extracted by pressure, which is pumped back to the solution tank and used over again.

The pulp (or tailings) is then dried and pulverized by rolls and conveyed to an electric magnetic separator, when the oxide of iron is extracted, this being marketable for use in paint, etc.

The dynamos used in connection with this process are of special construction to suit the peculiarities of the case. Ameters, voltmeters, etc., are of the latest design, and insure perfect control of the current.

The expenses in connection with the running of a mill treating one hundred tons from the bins per diem of twenty-four hours, exclusive of power, will not exceed fifty cents per ton of two thousand pounds, and the highest known percentage in gold and silver is extracted.

The operation is continuous and requires no extra labour or expert help, and very little attention, while the clean-up can be made at any time without interfering with the operation of the mill.

In order to install the DeKeyser process in any mill using the amalgamating process, very little change is necessary, the crushing and grinding of the ore being the same in either case, viz.: 50 to 60-mesh (or finer preferred), as may be determined by experiment.

The process is adjustable to the treatment of auriferous gravel and sands by dredging, hydraulic and placer mining in general, but the electric deposition is eliminated.

MACHINERY NOTES.

A new electric hoist has been installed at the Payne mine, Sandon.

The Slocan Star concentrator is being entirely remodelled, and additional machinery, including six Wilfley tables, installed. The company have also in view the installation of a zinc magnetic separator plant.

A 20-h.p. Westinghouse electric motor has been installed at the Granby Company's mines machine shop. The company has also received another small locomotive for mine haulage work, manufactured by the Davenport Machine Works.

An additional motor has been installed at the Le Roi No. 2 Elmore Mill, by which its capacity will be increased to 60 ton per diem.

Work is progressing rapidly on the improvements at the Tacoma smelter. These comprise additions to the lead refining plant, a three-storey brick bag house and a large steel blast furnace. The bag house building, which is 110x60 feet, is practically completed and the apparatus is being installed in it. It includes 1,000 bags, each 25 feet in length by two in diameter. The bags are placed suspended with the open end downward. The smoke is passed into the bag house

and forced through the bags, which catch all the valuable mineral otherwise carried off in smoke. It is expected that the bag house will be in use in two months. The new steel blast will make the fourth lead furnace in operation at the plant. Its capacity will be about 200 tons daily. The cost of the furnace is estimated at \$10,000, while the bag house will cost about \$50,000. These improvements when completed will materially increase the capacity of the smelter. The new blast furnace will nearly double the capacity of the lead plant. The total capacity of the smelter will be about 300 tons of copper ore and 500 tons of lead ore daily.

It is reported that the Cherry Creek Mining Co., operating in the Vernon district, propose installing a ten-stamp mill on its property in the spring. The Fraser & Chalmers two-stamp experimental mill has been in successful operation a month, crushing from eight to ten tons a day.

The 1,000-foot gravity tramway at the E. P. U. and Goldfinch mines near Greenwood, has been completed, and will greatly facilitate shipments from these properties.

At the Mountain Lion in Republic Camp, Wash., the property of a Canadian company, a Hendryx electro-cyanide plant is now being installed. It is intended to crush the ore to 80 mesh, first reducing it with 20 stamps and then crushing to the required fineness with four Huntington mills. From the latter the pulp will be automatically conveyed to a series of five storage tanks and thence to the agitator, which will be charged four times every 24 hours, requiring six hours' agitation for an extraction of 80 per cent. of the gold and silver contents of the ore. Each charge will consist of 40 tons of ore, 60 tons of water and 1 pound of cyanide of potassium.

The machinery to be installed at the Iron Mask mine, Kamloops, will consist of a large double-drum hoist, capable of lifting a four-ton skip 600 feet per minute. A tandem Corliss condensing engine capable of developing about 250 horsepower with all modern improvements, such as the super-heating of steam between high and low pressure cylinders. A ten-drill two-stage air compressor. A 300-light electric light plant. A sawmill and timber framing machinery. Two 125-h.p. steam boilers of 150 lbs. working pressure have also been ordered from the Vancouver Engineering Works. The concentrating plant will be capable of treating 200 tons per day.

It is reported that it is the intention of the Granby Company to increase the capacity of the smelter at Grand Forks by the addition of six additional furnaces, this coming summer.

A 20-drill compressor and a 150-h.p. hoist have been installed at the White Bear mine, Rossland.

BOOKS RECEIVED.

Annual Report of the Board of Regents of the Smithsonian Institution, 1903.

Summary Report of the Geological Survey Department of Canada for the year 1902.

This report contains much matter of interest to the West. Mr. R. G. McConnell, assisted by Mr. Joseph Keele, contributes a lengthy and comprehensive description of conditions in a section of country tributary to the MacMillan River, in the Yukon, where both an instrumental topographical survey and a geological reconnaissance was made. Mr. Arthur Webster, a former member of the staff, and Professor Ernest Haycock of Acadia College, Wolfville, Nova Scotia, report on the rocks and possible economic minerals of the outer or southwestern coast of Vancouver Island; Dr. R. A. Daly writes of his work commenced in 1901 in connection with the survey along the International Boundary between British Columbia and the State of Washington; Mr. R. W. Brock and Mr. W. H. Boyd report on a fifteen-mile area around the town of Greenwood, and Mr. W. W. Lesh describes at length geological conditions in the vicinity of Blairmore.

Modern Workshop Hints, by Robert Grimshaw, M.E., London; Sampson Low, Marston & Company, Limited.

This work should be of inestimable use to mechanical engineers and machinists, containing as it does a fund of useful data, describing unusual and rapid ways of doing work

in accordance with the latest and best American and European machine shop practice. The volume contains over four hundred pages and five hundred illustrations.

Across the San Juan Mountains, by T. A. Rickard: New York and London: The *Engineering and Mining Journal* 1903, qto. cloth; price \$1.

Had Mr. Rickard, the talented editor of the *Engineering and Mining Journal*, chosen he might have attained literary eminence as easily by any other path than that which he has gained it. He has a very wonderful knack of descriptive writing, and the gift, too, of expressing ideas with perfect lucidity and directness—a characteristic, we should imagine, of scientific men who have studied nature from the practical side. "Across the San Juan Mountains" is a delightful account of a journey through what is evidently a most picturesque country, that of Southwestern Colorado; and although, of course, the book deals largely with mining in that territory, it is by no means a technical treatise, being, in fact, devoid of technical terms and phrases and it should therefore appeal equally to both the technical and non-technical public.

Papers and Report relating to Minerals and Mining in New Zealand in 1903. Government Printer, Wellington.

This report, which is handsomely bound in cloth, comprises the annual statement by the Minister of Mines; Report on the Goldfields; Report on the Coal Mines and Report on State Coal Mines.

COAL MINING NOTES.

The development of the new anthracite discovery at Comox is proceeding with great energy, three shifts being now employed at the work. A branch line of railway has also been built to the mine, and while as yet the output is necessarily small, it is expected that by the end of February a daily production of between three and four hundred tons will be maintained.

The Crow's Nest Coal Co. produced in 1903, 661,118 tons of coal and 167,739 tons of coke, an increase of 50 and 39 per cent. respectively over the 1902 returns. The Company has now 913 coke ovens in use, and 215 under construction. In 1903, 1,450 men were employed as against 984 in 1902.

	1900.	1901.	1902.	1903.
	Tons.	Tons.	Tons.	Tons.
British Columbia				
Australia	766,917	710,330	591,732	289,890
English and Welsh	178,563	175,959	197,328	276,186
Scotch	54,099	52,270	95,621	61,580
Eastern (Cumberland and Anthracite)	none	none	3,600	3,495
Seattle (Washington)	17,319	27,370	24,133	13,262
Tacoma (Washington)	250,590	240,574	165,237	127,819
Mount Diablo, Coos Bay and Tesla	418,052	433,817	209,358	256,826
Japan, and Rocky Mountains by rail.	160,915	143,318	111,209	84,277
	42,673	51,147	47,380	108,219
Total	1,889,128	1,834,785	1,445,598	1,215,554

Important coal mining developments are taking place in the vicinity of Blairmore. During the past year a number of properties have been developed from mere prospects into producing mines, and where last year there were in the Pass but two mines, there are today eight. In this section French capital in very large amounts has been invested in colliery development, with the most promising results, and already a commencement in production activity is being made. Ere long the International Coal Company expect to begin supplying the Granby smelter with an adequate supply of coke, while the Solvey ovens at Little have just been fired. This company has now two engines employed in hauling and delivering coal to the C. P. R., the railway company taking the entire output for locomotive fuel purposes. The Grassy Mountain mines, owned by the same colliery company, are also now becoming productive.

COAL EXPORTATIONS AND TRADE.

THE following report has been issued by Mr. J. W. Harrison, of San Francisco: "The quantity of coal imported during the year is 230,044 tons less than 1902, as can be ascertained by referring to the figures below. This cannot be accepted as the amount of fuel to fill our requirements, as the quantity of fuel oil which has been produced this year has been 60 per cent. in excess of the product of 1902, hence the showing made for the coal consumption cannot be accepted as being a discouraging one for manufacturing interests locally. The early portion of this year labour disturbances developed themselves in the British Columbia collieries; these were not amicably compromised for some considerable time, as the manager of the Wellington Collieries displayed a disposition to maintain his rights rather than make concessions, although at a serious loss to himself; the laborers finally acceded to his demands.

The abrogation of the duty of 67 cents per ton on Australian and British Columbia coals, has proved for the year a marked advantage for their products, and has aided in giving large consumers here a pronounced benefit.

The present position is a complicated one, the outlook for low-priced Australian coal is discouraging, partially because the inducements for carriers to come here are anything but profitable, and partially because outward freights on grain from here are exceedingly low, and grain freights from Australia are fully 50 per cent. higher than from here. The quantity of coal of all grades on hand here at present is small. There are uncertain factors now existing which may create a very generous demand for fuel in the near future; principally the requirements of our government for Panama, and adjacent ports, hence the market is in a very uncertain condition. If the present outward rates of freight on grain from here should show no improvement in the near future, which will minimize colonial imports, thus leaving the control of the local coal market in very few hands, which will assure high figures for 1904. The marked difference between the prices of domestic grades, and ordinary steam coals is likely to be sustained, as the output of the former is concentrated in very few hands.

The various sources from which we have derived our coal supplies are as follows:—

To secure a complete statement of the entire coal consumption of California, I have been obliged to include deliveries at Port Los Angeles and San Diego by water, which have been added to the above sources of supply. The total amount received by water at those ports foot up to 69,248 tons.

Fuel Oil.—It can be safely computed that the Californian products of oil for 1903 will foot up to between 20 and 21 millions of barrels, as against 13,000,000 for 1902. Deducting the quantity which will be refined, and the amount which will be exported, there will yet remain enough for steam uses to be a disturbing factor in the consumption of coal. During the year there has been a marked advance for a further improvement in the price of oil. The railroad companies have absorbed most of the promising properties, the output of which will not seek buyers, hence the market price will not be affected.

Coke.—The total deliveries here by water foot up 68,000 tons, as compared with 64,916 tons last year. Fully 57 per cent. of this amount was shipped from England and Germany, the balance principally from Germany and Australia.

Pig Iron.—The total importations by water aggregate 29,845 tons, about half of this being shipped from Great Britain. This would demonstrate an increased manufacturing interests during the year, as the total amount received in 1901 was 8,478 tons.

The general review for the year for the consumption of fuel and pig iron, will clearly indicate that the year has proved a profitable one in the manufacturing line, and we have reason to believe that there will be no diminution the coming year, in fact, the car marks indicate that we have promises before us for marked increase over the present year.

PERSONALS.

Mr. Carlson, a former resident of Oregon, has assumed the management of the Gold Cup mine, at Ymir.

Mr. George Clothier has been promoted to the assistant surveyorship at the Le Roi mine, Rossland.

Mr. Percy J. Glezier has been appointed Deputy Mining Recorder at Ymir, vice A. B. Buckworth, Jr., resigned.

Mr. W. Yolen Williams, superintendent of the Granby Mines, is enjoying a vacation in Los Angeles, California.

Mr. Neil Cochrane, formerly of Rossland, is now superintendent of the Mountain Lion mine, Republic, Washington.

Mr. R. R. Bruce, manager of the Paradise Mine, Wilmer, has returned to British Columbia after spending a few weeks in Scotland.

Mr. R. W. Brock, of the Dominion Geological Survey, is again Professor of Geology at the Kingston, Ont., School of Mining for the winter term.

Mr. G. F. Robbins, recently resigned the position of assayer at the Payte mine, Sandon, and is now employed in the same capacity at the Le Roi.

Mr. Donald G. Forbes, manager of the Silver Cup Mines, Ltd., and the Great Western Mining Co., Ltd., at Ferguson, B.C., has resigned that position.

Mr. E. B. Kirby, general manager of the Centre Star and War Eagle mines, has returned to Rossland after an absence of some weeks in Eastern America.

Mr. Swaney, the new manager of the Great Western and Silver Cup Mining Companies, recently arrived from England and entered upon his duties.

Mr. R. M. Atwater has resigned the general managership of the Ymir mine, and is succeeded by Mr. G. H. Barnhardt, who previously occupied this position.

Mr. Edward Mills, manager of the Morpha Smelting Works, Swansea, Wales, visited the Granby Company's mines at Phoenix, Boundary district, last month.

Mr. John C. Scrafford, formerly superintendent of the B. C. Mine, Boundary district, is now in charge of the work recently commenced at the Rathmullen group.

Mr. James Rutherford, M.E., manager of the Lardeau Valley Mines, Ltd., has gone to England to endeavour to interest capital in some Poplar Creek mineral claims.

Mr. T. R. Stockett, who has for some time past been in the employ of the Crow's Nest Pass Coal Co. at Fernie, B.C., has been recently appointed acting general manager to that company.

Mr. W. H. Yawkey, one of the largest shareholders in the Minnesota Silver Company, owning the Ivanhoe mine, near Sandon, and other Slovan mining properties, died last month at Detroit, Mich.

A press despatch from Grand Forks states that Mr. A. B. W. Hodges, superintendent of the Granby smelter, has been summoned to Montreal on business connected with the proposed enlargement of those works.

Mr. E. A. Ashcroft, a well-known English metallurgist, and general manager and a director of the Metallurgical

Trust Company, England, is visiting his brother, Mr. A. E. Ashcroft, P.L.S., at Greenwood.

Mr. Ernest Levy has been appointed assistant manager at the Le Roi No. 2. Mr. Levy was a student at the Royal School of Mines and has gained a practical mining experience in Colorado and elsewhere.

Mr. J. L. Stamford, vice-president of the Northwest Coal & Coke Company, with coal lands in the eastern part of the Crow's Nest Pass coal district, left for England last month. He expected to return before the end of January.

Mr. C. Ferland, of Newcastle-on-Tyne, England (consulting engineer for the Monitor Company, Sandon, B.C., is expected to arrive at the mine shortly to determine the advisability of erecting a concentrator and possibly a zinc separating plant.

Mr. G. W. Cornish, an Australian mining engineer, for some time in the employ of the Queensland Government, is familiarizing himself with some of the Boundary mining properties especially several of the high-grade quartz mines in the vicinity of Greenwood.

Mr. Dudley C. Blackwood, of Nelson, has been gazetted Mining Recorder for the Nelson Mining Division. The duties of this office had been performed by the Gold Commissioner, Mr. Robt. A. Renwick, since the resignation of Mr. Harry Wright, now M.P.P. for Ymir.

Mr. G. O. Buchanan, of Kaslo, has been appointed to disburse the lead bounty authorized last fall by the Federal Legislature. He recently made a tour of the mining districts affected by it, in company with Mr. J. G. Parmalee, of the Dominion Department of Trade and Commerce.

Mr. Henry B. Smith, P.L.S., of Rossland, last month made a survey of the Lucky Jack mineral claim and the overlapping Shamrock placer claim at Poplar Creek, under an order of the Supreme Court sitting at Rossland and taking evidence in support of conflicting claims to the property in question.

Mr. W. E. Segsworth, assayer, has disposed of his assay business at Greenwood to Mr. J. Gourlay Lang, late of Vancouver Island, and has gone east with the intention of taking a course in mining engineering and metallurgy either at McGill University or at the Michigan College of Mines, Houghton, Michigan.

Mr. Ernest Hooper, of London, has lately been spending some time at the Ymir mine, near Ymir, of which Mr. G. H. Barnhardt has been appointed manager in succession to Mr. R. M. Atwater, Jr., who resigned. Mr. Barnhardt was superintendent of the mine through its successful years, and now assumes charge of it with wider powers of administration to endeavour to restore it to a profit-earning basis.

Mr. Alex. Meads, M.E., of Marquette, Michigan, is now resident engineer at the Volcanic, on the North Fork of Kettle River, where he is directing the diamond drill operations in progress with the object of prospecting that property at depth. He is a graduate of the Michigan State School of Mines, and has had charge of various copper mines in Ontonogon County, Michigan.

Mr. J. W. Astley, superintendent of the Snowshoe mine, at Phoenix; Mr. C. Bannatyne, the engineer, and Mr. W. Tomlinson, the company's chief clerk, have taken advantage of the suspension of operations at this property pending the arrangements now in progress for amalgamation with the B.C. Copper Co. by spending a holiday in England. Mr. Astley will probably arrive in London in time to attend the annual meeting of the Snowshoe Company.

THE PINDER CONCENTRATOR.

THE Pinder Concentrator differs widely from any other class or type of machine yet devised for this purpose.

It is distinctly a pan or batea in the form of an involute (practical round), with its outer edge curving inward from the widest part, where is located the feed box, around to the same point, having a jog or offset of fourteen inches directly at right angles from the general circumference or

rim. The pan is eight feet nine inches across at the narrowest part.

There is a spiral gradient of one inch in the bottom surface of the pan which extends all around, beginning at the widest part under the feed box. The bottom, or floor, also inclines to the centre, forming a concave surface.

This pan is constructed in such a manner as to render it flexible, the bottom being made of the best seasoned redwood staves three-quarters of an inch thick, and laid lengthwise from the centre. The inner or small end of each stave is bolted to the rim of the centre casting, and the outer or wide end is bolted to a steel rim or band, one-quarter inch by five inches, which forms the base in the construction of the pan. The outer ends of these staves are strengthened and held in position by a reinforce of redwood battens underneath and a substantial rim or edge all round the pan.

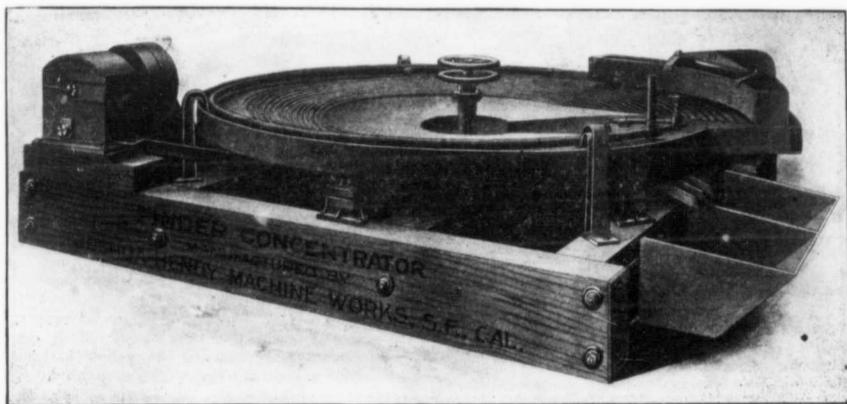
The staves are laid so that there is one-eighth of an inch interval between each, admitting flexibility, and they are made in such a manner as to prevent warping from moisture. In fact the whole structure is built with a view to great strength and stability. It will not get out of shape in course of time as is the case with some of the most approved types of riffled tables.

The bottom surface is covered with a special grade of

A steel post or shaft two and a quarter inches in diameter is securely fastened to the under or foundation frame of the machine, and this post acts both as the pivot as well as the centre support of the pan. This post passes through a sleeve in the centre casting of the pan, and the adjusting gear is screwed to the top end. This adjusting device consists of a ball-headed steel-threaded pin, the head of which rests on the end of the post, the threaded block passing through the cap of the sleeve which holds up the pan, and the two hand wheels geared on the upper end. The top wheel, turning from right to left, raises the centre of the pan, causing the incline of the bottom to become flatter; and by turning the opposite way the reverse result is obtained. The lower wheel is practically a jam nut which holds the pan to any adjustment once set.

The foundation timber frame is composed of four pieces, six by twelve inches square, and one piece, eight by twelve inches. There is also a short block, eight by twelve inches square, which is attached to the side of the timber on which the driving gear is bolted in order to support that mechanism. This frame is very solidly bolted together with three-quarter inch tie rods, which run from side to side in both directions.

There are six standard supports which act as bearings on which the outer edge of the pan rests. These bearings are



brown linoleum, which experience has proven to be the best substance that can be used for the purpose, and on this surface is laid brass or copper tapering riffles, fifty-six in number, and three-quarters of an inch apart, so arranged as to radiate spirally from the direction of the centre outwardly and around toward the rim, the feather ends terminating in regular sequence nearly in a circle so as to leave a clear smooth space between the terminals and the rim of the pan.

The feed box, which distributes the pulp upon the surface of the pan, is bolted securely to the widest point of the pan, the feed being received at the jog end of the box, and passing on to the pan through the feed holes in the bottom of the box. This box is curved so as to conform to the rounded rim of the pan.

The wash or clear water is conducted by a pipe three-quarters of an inch in diameter around the outer edge of the pan, and is delivered on the pan through various small holes therein, making jets, which fall behind a rubber water strip tacked and cemented to the bottom and running around the pan, having many small holes through which the water is spread very evenly to all desired parts.

The pipe is supported by three standards, which are securely bolted to the timber frame upon which the pan rests.

There are two discharges for concentrates, one at the end of the forty-second riffle and the other at the end of the entire system of riffles.

so arranged as to evenly distribute the strain between them, and each and every wearing part is of the best chilled iron. Attached to each side bearing is a spiral spring which takes up any lost motion and prevents vibration.

The driving mechanism is strong, compact, and light. It is of the simplest construction, of the common toggle type, the toggle links being of the best tool steel one-half inch thick rounded at the ends and working in chilled grooves cast in the parts to hold them. All other parts of this gear are also of the best workmanship, and both durable and smooth.

A large spiral spring made of five-eighths steel is attached to the steel rim under the edge of the pan on the side holding the feed box, and which is also fastened to spring seats bolted to the frame timbers. This spring is adjusted so as to pull the pan one way while the toggle pulls it the opposite. This spring also takes up any lost motion and prevents pounding or knocking of the bearing parts. A suitable threaded bolt is attached for regulating.

The tailings discharge through the centre of the pan where is located a suitable spout which directs the flow to the tailings launder.

A small V-shaped trough three inches deep should be placed in the notch of the frame under the table so as to catch the sulphurets from the second discharge hole and conduct them to the box in front. A suitable trough should also be placed to catch the sulphurets from the first discharge.

The box for retaining the concentrates is usually made at the mill; and this should be about six feet long, fourteen to sixteen inches deep and eighteen inches wide. Should it be desired to separate the first concentrates from the second, a partition should be placed in the centre. This box should be made of thick lumber, and very strong and tight.

The machine is 9 feet, by 11 feet 6 inches.

ALLIS-CHALMERS COMPANY'S NEW STANDARD REYNOLDS CORLISS ENGINE.

We illustrate herewith a new Corliss engine which is being brought out by the Allis-Chalmers Company from the designs of Mr. Irving H. Reynolds. The field of Corliss engine design has been so fully worked over in the past, and the accepted designs have become so simple, that no strikingly novel designs are to be expected. The present machine,

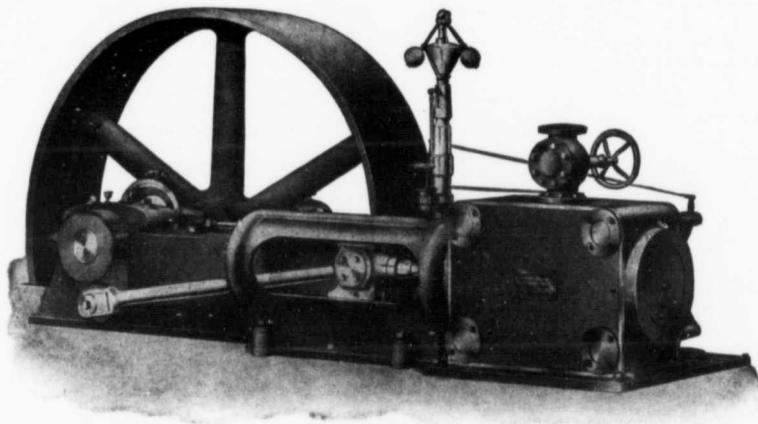
The regulator is of the high speed weighted type, designed to control the engine within narrow limits of speed variation.

The connecting rod is steel with solid forged ends, fitted with bronze boxes, babbitt lined on the crank pin ends, the boxes being adjustable by means of screw actuated wedges.

The crank is of plain type, polished on the face and is protected by a planished steel oil guard (not shown in cut).

The engines are fitted either with belt fly-wheels, as shown, or with square rim wheels where used with direct-connected electric generators. The crank and crosshead pins and main journals are of a size ordinarily used with heavy duty engines.

In brief, the engine is strong, simple and compact, and while nothing has been added for ornamentation, nothing contributing to economy or durability has been omitted, and the machine should find a large sale among power users who appreciate quality.



The Reynolds-Corliss Engine—New Standard.

however, represents the experience of twenty-six years in building of Corliss engines, and combines all of the desirable elements of the best designs.

Engines of the type illustrated are being built in seven sizes, ranging from 50 to 500 horsepower, and are designed for steam pressures up to 150 lbs. They are built of somewhat shorter strokes than have heretofore been customary in Corliss engines, with the idea of economizing in space and making the construction more rigid. The speeds are also somewhat higher than usual, ranging from 110 to 150 revolutions per minute, although these speeds are not higher than those at which the Reynolds-Corliss engines of older design are frequently operated.

The frame is cast in one piece with the slide, the construction being of the box type, resting on the foundation for its entire length. The main bearing shells are bored into the frame, thus insuring a solid bearing and also permitting the easy removal of the shells by rolling them out around the shaft.

The slide is of the barrel type with bored guides. The crosshead is fitted with babbitt faced shoes with wedge adjustment. The piston rod is screwed into the crosshead and held firmly with a steel lock nut. The cylinder is of the round cornered type, is fitted with double ported steam and exhaust valves, lagged with planished steel. The cylinder is set on a cast iron base plate, which extends under the valve gear, serving as a drip pan.

The valve gear is of the usual Reynolds Corliss type, the wrist plate being of skeleton pattern and fitted with a new type of disconnecting device which, while clamping the hook rod firmly, is very easily detached by hand.

The dash pots are of differential plunger type without leathers or packing of any kind.

TRADE NOTES.

The Trump Manufacturing Company, Springfield, Ohio, have issued a new descriptive catalogue of the "Celebrated Trump 'Model' Turbine." The catalogue is profusely illustrated and contains much useful information.

The Jeffrey Manufacturing Company, Columbus, Ohio, in Circular No. 77, describe the Jeffrey Grab Buckets which, it is asserted, are the most powerful buckets made. They will work in ore, mine-run coal, broken limestone, gravel and sand. They are absolutely self-filling, and will also excavate in clay, gravel and soft earth of any nature.

Queen & Co., of Philadelphia, Pa., established in 1853, send us an interesting account, published in pamphlet form, of their works where are manufactured all kinds of mathematical and engineering instruments, etc.

The Allis-Chalmers Co., Chicago, Ill., send us Catalogue No. 100, 5th edition, descriptive of several of their specialties in mining machinery, including the Overstrom concentrator, the Bradley Classifier mill and other appliances. The catalogue before us is printed in Spanish. Another pamphlet issued by this great manufacturing company giving a partial list of foreign users of Corliss and other engines built by Allis-Chalmers demonstrates the world-wide extent of the business done. Thus there is not a mining company on the face of the globe in which the Allis-Chalmers' machinery has not been introduced.

The firm of Charles Cammell & Co., Ltd., of Sheffield, is now known as "Cammell, Laird & Co., Ltd." This is in con-

sequence of the acquisition of the Birkenhead Iron Works, lately the property of Messrs. Laird & Co., ship builders and engineers. Last year also the works at Coventry and Birmingham of the Mulliner-Wigley Co., Ltd., were purchased. In these works gun mountings, etc., are produced, and the manufacture of field artillery and naval guns is contemplated. The new firm of "Cammell, Laird & Co., Ltd.," is now one of the largest and strongest in the world, controlling as it does, in addition to these lately acquired, the Cyclops Steel & Iron Works, Sheffield; Derwent Iron & Steel Works, Workington; Yorkshire Steel & Iron Works, Peniston; Grimesthorpe Ordnance Steel Tyre & Spring Works; Old and New Oaks Collieries, near Barnsley.

"We Pull for Leschens" is what you read on the large leather collars of the horses attached to the waggons of A. Leschen & Sons Rope Co., in St. Louis, New York, Chicago and Denver. These are the waggons in which they deliver their reels and coils of Hercules and Patent Flattened Strand and all other kinds of Wire Rope.

A. Leschen & Sons Rope Co. also manufacture and erect Aerial Wire Rope Tramways of every description; likewise underground and surface wire rope haulage plants. Their engineers in charge of the different departments have had years' experience and are thoroughly competent.

920 to 932 North First St., St. Louis, Mo., is the home address of A. Leschen & Sons Rope Co.

MINING RETURNS AND STATISTICS.

Returns of British Columbia's mineral and coal production during 1903 are now available, or at least sufficiently so to enable a fair idea of progress to be gathered therefrom. From the figures, it is reasonably clear that both in respect to tonnage and values an advance has been made, considerable as touching to the former, and satisfactory enough in the latter case. This increase, is however, almost entirely attributable to the development of the copper-gold mines on the Coast and in the Boundary and Rossland districts, while excellent showing made by the Crow's Nest Pass Coal Company, in East Kootenay, compensates for the decrease in output from the Vancouver Island collieries occasioned by the prolonged labour troubles in the spring of the year. On the other hand, a large falling off is noticeable in silver and lead production and the placer gold yield is also less than that of last year. In 1903, zinc ore was mined and marketed successfully for the first time on anything like a considerable scale.

VANCOUVER ISLAND.

Coal production was divided among the three collieries as follows: Western Fuel Co., 289,136 tons, of which 178,960 tons were exported and 110,176 tons sold in local markets; Wellington, 271,305 tons; Comox, 309,708 tons. In 1902, the Vancouver Island mines produced 1,173,293 tons of coal. Mineral output returns are not yet fully available, but it is computed that an increase has been made in the year of between 50 and 75 per cent., a consular report estimating the value of the copper mined at half a million dollars.

ATLIN, CASSIAR AND Omineca.

From returns made by the banks and express companies, the value of the gold recovered during the past season is given as between \$100,000 and \$430,000, to which \$50,000 may well be added to include gold taken out by individual miners of which no record was made. In Cassiar but one company was operative, its clean-up realizing about \$25,000. Placer gold production from Omineca was most insignificant, and will probably not exceed the valuation of \$10,000.

CARIBOO.

The yield will be in the neighbourhood of \$375,000 as against \$500,000 in 1902.

FORT STEELE DISTRICT.

Official returns from the Mining Recorder's office show that 169 claims are held in this district under crown grants or certificates of improvements, 103 claims were recorded in 1903, 87 transfers of mineral claims were made and 400 free miners' certificates were issued.

REVELSTOCK.

Probably placer gold to the value of \$5,000 was taken out during the season.

LARDEAU.

Shipments of ore from the Lardeau show an advance in 1903, but not commensurate with the considerable mine development and improvement instituted during this period, of which the effect has not yet become manifest. The value of the product, chiefly represented in lead and silver shipments, is placed at \$250,000.

SLOCAN, NELSON AND YMIR.

The tonnage of galena shipped was in round figures, 14,000 tons, and 2,000 tons of zinc, of a roughly approximate value of \$1,000,000.

Ore receipts at the Hall Mines' smelter, Nelson, for the eleven months to November 30th, 1903, were as follows: From Nelson and Kootenay Lake, 3,418 tons; Rossland, 180 tons; Slocan, 4,720 tons; Boundary 93 tons; East Kootenay, 894 tons; Ymir, 2,619 tons; Lardeau, 173 tons, and Republic (Washington), 5,399 tons; total, 17,406 tons. Of these ores 2,155 tons were dry, and 9,251 tons were lead ores. The metal contents were 762,494 ozs. silver, 7,572 ozs. gold, 2,925 lbs. copper, and 8,629,432 lbs. lead. The foregoing tonnage and metal contents do not include Silver King or Emma (Boundary) ores. Probable total receipts for December from all sources excepting the two mines just mentioned were 1,820 tons.

The company shipped to the Selby Smelting and Lead Co., San Francisco, 3,433 tons lead bullion, containing 655,270 ozs. silver, 6,324 ozs. gold, and 6,697,940 lbs. lead, total value \$574,327; and to the Granby Consolidated Mining, Smelting and Power Co., Grand Forks, 383 tons copper matte, containing 119,804 ozs. silver, 144 ozs. gold, and 372,003 lbs. copper, total value \$102,054. Probable shipments of bullion during December, 400 tons. The company purchased 4,600 tons Silver King ore, containing 119,525 ozs. silver and 347,333 lbs. copper, and the lessee of the mine, Mr. Davys, estimates that the tonnage for December will be 300 tons. Receipts of ore from the Emma mine totalled 182,621 tons. Lead ores shipped to United States smelters by the Company during the year amounted to 2,946 tons.

ROSSLAND.

Rossland is credited with a tonnage output of from 350,000 to 377,000 tons—a considerable advance over the 1902 production of 330,000 tons. The ore receipts at the Canadian Smelting Works, Trail, during 11 months ended November 30 last were 157,736 tons, as follows: From Rossland, 135,516 tons; Boundary, 6,000; Slocan, 5,178; Lardeau, 2,047; Republic (Washington), 4,638 tons; Windemere, 806 tons; East Kootenay, 366 tons, and miscellaneous, 770 tons. The approximate tonnage from Rossland for December was placed at 12,000 tons, and from all other parts, possibly 1,000 tons. This would give a total of 170,736 tons as the year's receipts. The total tonnage smelted in 1903 was about 175,000 tons, producing 8,500,000 lbs. lead, 2,900,000 lbs. copper, 82,500 ozs. gold, and 1,850,000 ozs. silver.

During the year the daily capacity of the lead refinery was increased from six and a half tons to twenty tons, and a plant was erected for handling the slimes. The refinery turned out some 150,000 ozs. silver of the fineness of 999, several thousand ounces of mint gold, and a quantity of copper sulphide. The antimony will be recovered later and will be used in making babbit metal.

The copper matte from these works was refined at Tacoma, and the lead bullion, other than that refined at Trail, was shipped to San Francisco, California. The lead produced was sold chiefly in Eastern Canada, China and Japan. The silver refined was sold for coinage for the Philippines. The gold went to the United States Government assay office, Seattle, Washington. It is stated that the gold and silver shipped, as above stated, were the first shipments ever made of these precious metals, the product of smelting and refining in Canada.

Meanwhile the Associated Boards of Trade of the Interior estimate the value of the mineral produced from the mines of South Kootenay and Yale as follows: Gold, 204,147 ozs., value \$4,219,718.49; silver, 3,471,421 ozs., value \$1,830,953.13; copper, 241,266,977 pounds, value \$3,382,174.93; lead, 10,168 tons, value \$489,792.53; or a total value of \$9,221,630.10. Tonnage is given as 1,034,830 tons.

BOUNDARY.

Shipments during the year aggregate approximately 625,000 tons, as against 520,000 tons in 1902.

ROSSLAND.

Shipments for the month of January were divided as follows: Le Roi, 20,060 tons; Centre Star, 5,480; War Eagle, 4,630; Le Roi No. 2, 2,000; Kootenay, 1,025; Le Roi No. 2 milled, 1,050; Jumbo, 915; Spitzee, 30. Total tons 35,190.

BOUNDARY DISTRICT.

Boundary district mines produced the following ore tonnage in January: Granby, 44,520 tons; Mother Lode, 12,

tramway and other plant installed there, while in addition three high pressure Humsford boilers are now being put in place. At Michel two new mines became productive in 1903, and a third has been prospected. A ventilating fan of a capacity of 200,000 cubic feet per minute was installed at Nos 8 and 9 mines and 252 coke ovens have been added, there being now 464 ovens at this colliery. At Morrissey four mines have been productive and two are in course of development. Here now slack storage bins having a combined holding capacity of 6,000 tons were built, a waterworks system and an endless rope haulage system established, 140 coke ovens built and 100 others under construction comprise some of the improvements effected. The outlook for a further increase in the East Kootenay coal trade in 1904 is most promising, and that the output will reach a million tons before the close of this year is a far from unlikely contingency in view of the settled and stable conditions now prevailing.

Mineral output was inconsiderable, only one of the big silver-lead mines having been productive in 1903.

RANGE OF B. C. MINING PRICES, JANUARY TO DECEMBER, 1903.

Prepared by Messrs. Straker, London.

The following table was referred to by our London correspondent in his article published in our issue of last month reviewing the movement of British Columbia Mining Stocks on the London market in 1903.

MINES.	Jan. 15	Feb. 12	Mar. 12	April 17	May 14	June 11	July 10	Aug. 13	Sept. 11	Oct. 15	Nov. 12	Dec. 10	Highest & Lowest Prices recorded Jan. to Dec. 1903
	LeRoi (£5)	28 9d	28 9d	35 8d	30 8d	27 6d	22 6d	23 9d	17 6d	13 9d	11 3d	13 9d	15 8d
Le Roi No. 2 (£5)	18 9d	17 6d	20 8d	18 9d	20 3d	23 9d	20 3d	22 6d	18 9d	15 8d	18 9d	20 8d	31 3d 128 6d
Rossland Kootenay	7 6d	8 9d	6 8d	6 8d	6 8d	8 9d	8 9d	6 8d	6 8d	5 8d	5 8d	5 8d	12 6d 28 6d
B. C. Develop. Association	5 8d	5 8d	5 8d	5 8d	5 8d	7 6d	7 6d	7 6d	7 6d	7 6d	7 6d	7 6d	11 3d 18 3d
Enterprise	5 8d	5 8d	5 8d	5 8d	5 8d	5 8d	5 8d	5 8d	5 8d	5 8d	5 8d	5 8d	28 6d 78 6d 18 3d
Hall Mining	18 9d	18 9d	18 6d	18 6d	28 6d	28 6d	18 9d	18 6d	18 6d	18 6d	18 6d	18 6d	38 6d 18 3d
Alaska Gold Fields	38 9d	38 9d	38 9d	38 9d	28 6d	28 6d	28 6d	28 6d	28 6d	18 3d	18 3d	28 6d	58 6d 18 3d
Klondyke Bonanza	5 8d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	18 3d	18 3d	18 3d	28 6d	78 6d 18 3d
Klondyke Consols	5 8d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	78 6d 18 3d
L. and B. C. Goldfields	5 8d	8 9d	5 8d	5 8d	5 8d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	108 18 3d
Whitewater	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	28 6d	38 9d 18 3d
Ymir	138 9d	128 6d	118 3d	108 128 6d	88 9d	78 6d	28 6d	68 3d	68 3d	68 3d	68 3d	68 3d	168 3d 18 3d
New Goldfields of B. C.	108 108	118 3d	108 108	108 108	68 3d	58 68 3d	28 9d	38 9d	28 6d	28 6d	28 6d	28 6d	158 18 3d
Velvet	88 9d	118 3d	78 6d	78 6d	88 9d	78 6d	68 3d	38 9d	28 6d	28 6d	28 6d	28 6d	158 18 3d
Snowshoe	*158	1218 3d	218 3d	218 3d	218 3d	218 3d	218 3d	218 3d	218 3d	218 3d	218 3d	108 228 6d	108 108 3d
Tyee Copper	168 3d	158 208 3d	278 6d	278 6d	418 3d	428 6d	408 418 3d	428 6d	408 428 6d	428 6d	418 3d	418 3d	568 3d 128 6d
Giant	208	208	178 6d	158	158	108 108	108 108	78 6d	78 6d	78 6d	78 6d	78 6d	228 6d 38 9d

* This was for the 158. paid up.

† This was for the fully paid up share.

Except in the case of the two Le Roi's all the shares quoted in the above list are of the nominal value of £1 (\$5.00)

The prices quoted are, of course, given in British currency.

114; Emma, 4,014; Oro Denoro, 3,736; Athelstan, 957; Senator, 318. Total tons, 65,659.

SLOCAN.

The Sandon Mining Standard states that ore shipments from mines in the vicinity of Sandon aggregated over 1,200 tons during the month of January, divided as follows: Silver-lead—Ruth, 101 tons; Blue Bird 20; Slocan Star, 187; Ivanhoe, 17½; Reco, 161; Last Chance, 81; Payne, 121; Sunset, 83; Mountain Con., 27; Sovereign, 41; Idaho, 60, Monitor, 20. Total tons 914½. Zinc—Ivanhoe, 99; Payne, 210. Total tons, 309.

Production from the Slocan City division was: Enterprise, 80 tons; Ottawa, 21; Neepawa, 16; Port Hope, 7; Republic, 20. Total tons, 114.

EAST KOOTENAY.

Despite the miners' strike early in the year, the Crow's Nest Pass Coal Company has been able to increase its output from 442,049 tons of coal and 121,000 tons of coke in 1902 to 650,000 tons of coal and 166,000 tons of coke in 1903, the collieries responsible for this grand total were the Coal Creek, whose contribution was 240,000 tons; Michel, 262,000 tons, and Morrissey, 150,000 tons, while at Fernie 96,000 tons of coke were manufactured and 70,000 tons at the coke ovens at Michel. During the year a sum of approximately two million dollars has been paid out in wages and for supplies, and about one million dollars in improvements and development. At Coal Creek three new mines have been opened this year, and a

LOCAL STOCK MARKET.

Quotations on the Rossland Mining Exchange at the end of January were as follows:—

	Asked.	Bid.
American Boy	2¼	
Ben Hur	4	2¼
Black Tail	3	2
Canadian Gold Fields	3¾	3
Cariboo (Camp McKinney) ex. div	3½	2
Centre Star	2½	22
Crows Nest Pass Coal	\$ 8	
Fairview	4	3
Fisher Maiden	2	1
Giant	2¼	
Granby Consolidated	\$5.00	4.00
Morning Glory	1½	1
Mountain Lion	16	14
North Star (East Kootenay)	7	
Payne	11¼	9¾
Quilp	17	
Rambler-Cariboo	26	24½
San Poil	2½	2¼
Sullivan	5¼	4
Tom Thumb	3	2
War Eagle Consolidated	13½	12
Waterloo (Assess. paid)	5	
White Bear (Assess. paid)	5	4