

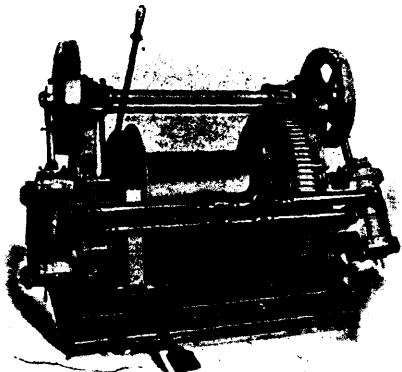
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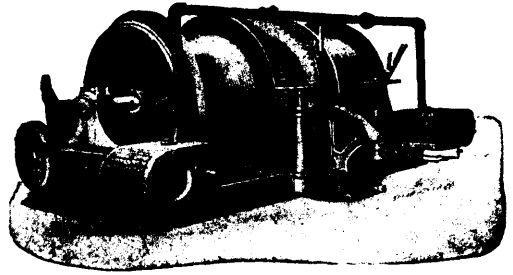
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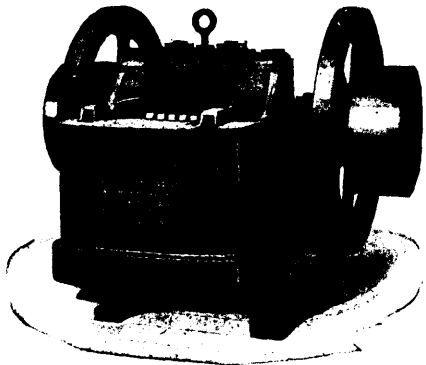
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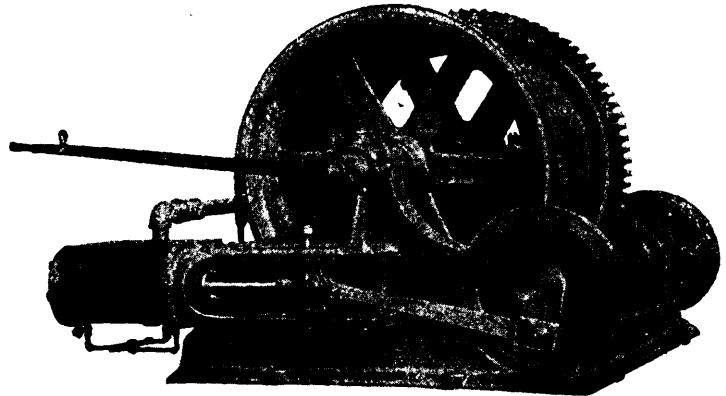
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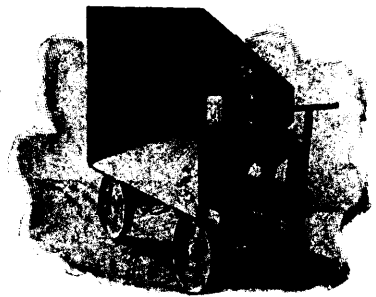
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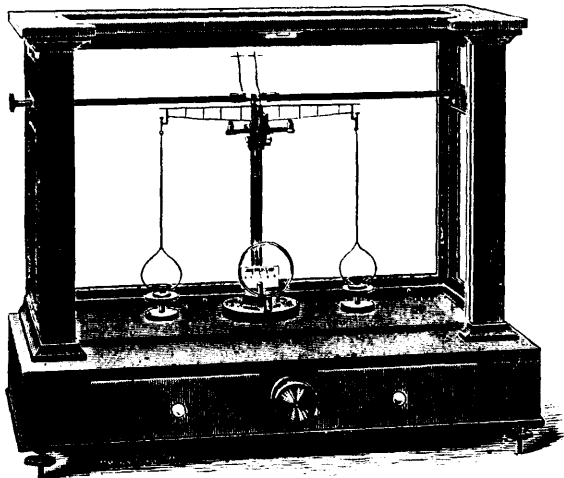
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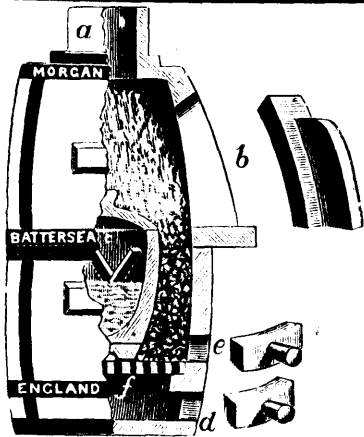


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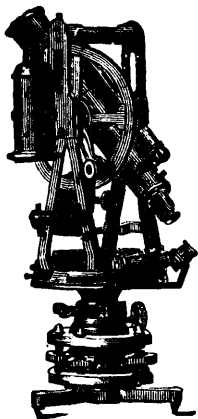
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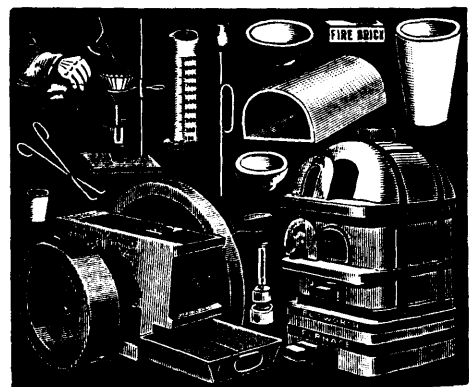
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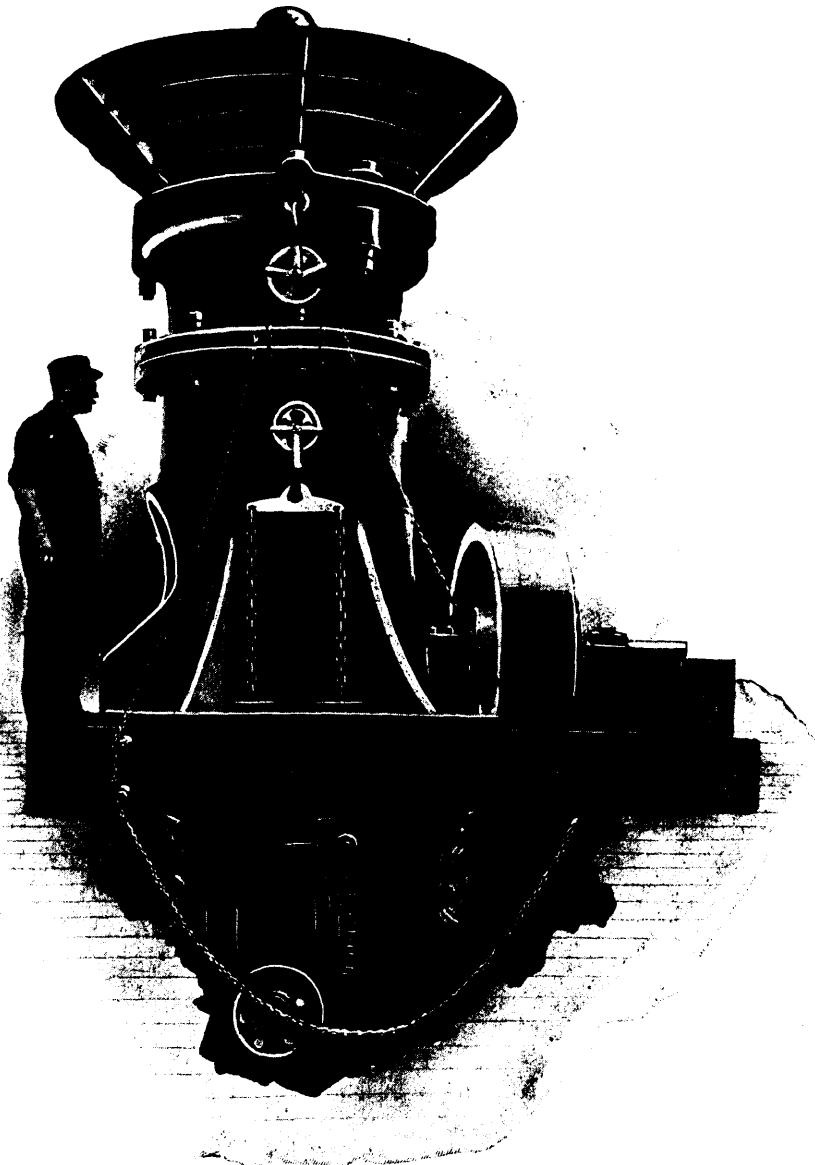
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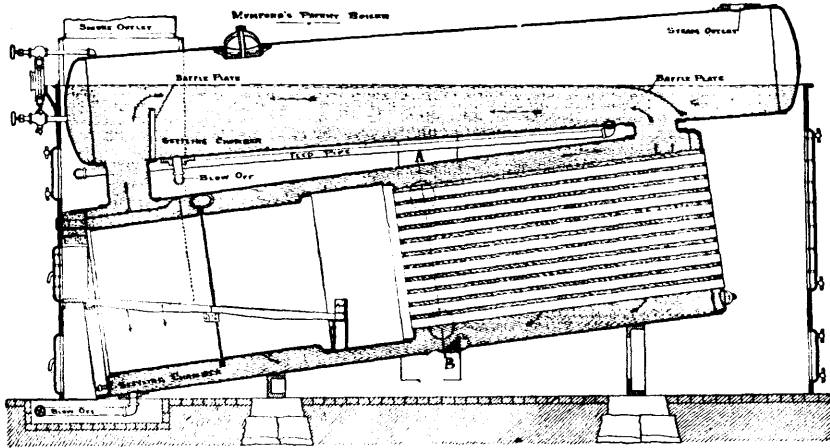
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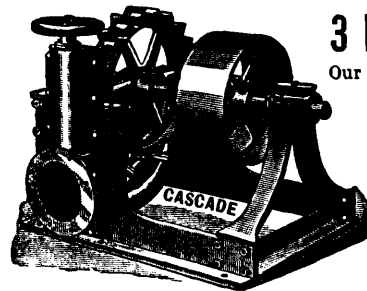
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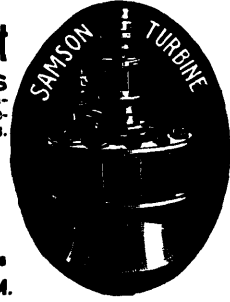
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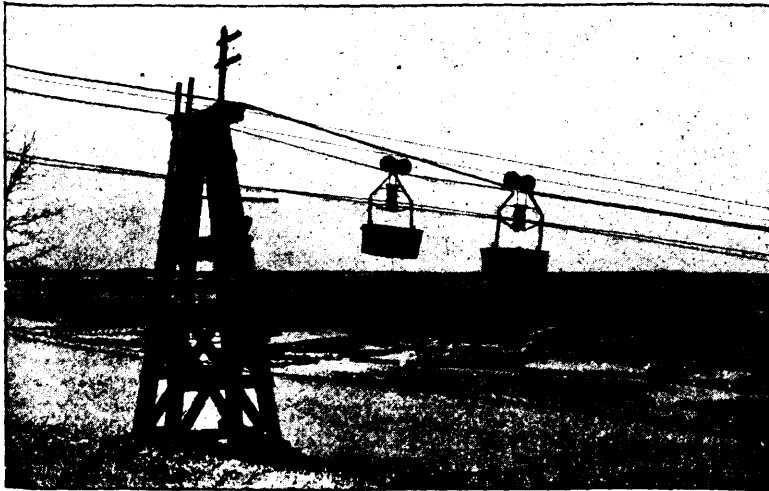
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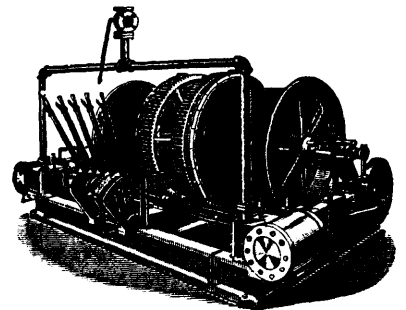
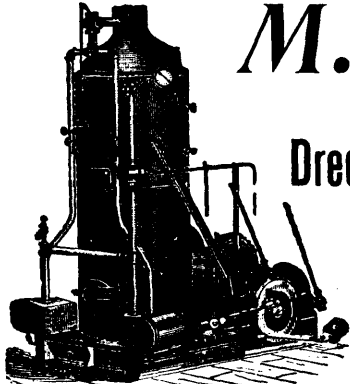
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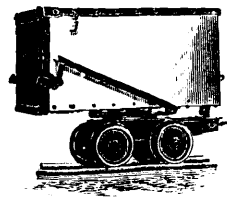
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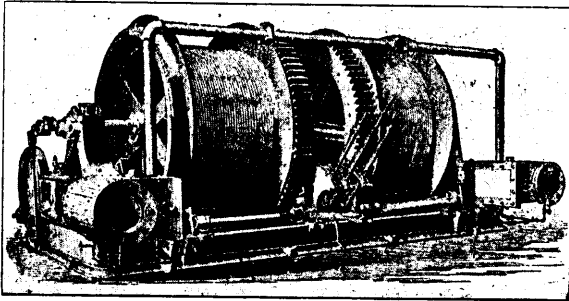
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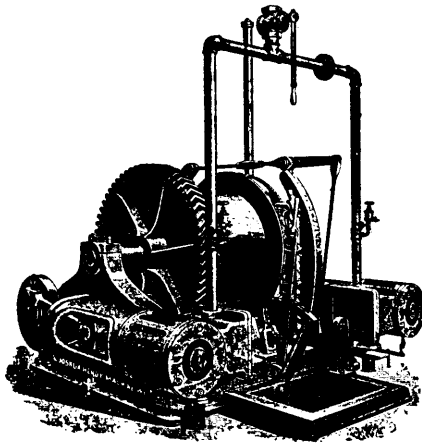
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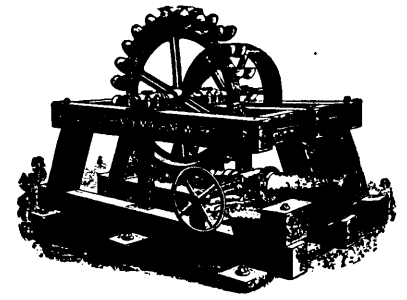
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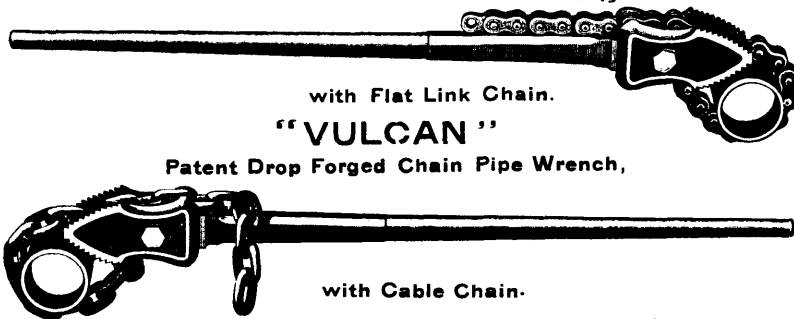
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All communications relating to the editorial department of the British Columbia MINING RECORD to be addressed to THE EDITOR, B.C. MINING RECORD, P.O. Drawer 645, Victoria, B.C.

All communications relating to the business department of the British Columbia MINING RECORD to be addressed to the BUSINESS MANAGER, B.C. MINING RECORD, P.O. Drawer 645, Victoria, B.C.

WITH this issue the MINING RECORD enters its sixth year of publication—a fact which, if it does not excuse, at least excuses at the present time an indulgence herein that (to other people) intolerable practice known technically as “blowing one’s own trumpet.” Our readers, however, will, we think, concede, that this is a vulgarity to which the MINING RECORD is not commonly addicted. With this preface then, we may turn with some degree of pardonable pride to a steady growth of circulation and a rapidly increasing advertising patronage, sufficient indeed to justify the addition this month, and to be continued in future issues, of eight pages to our space. With these greater facilities at our command, we hope to introduce into our periodical some new and, we trust, interesting features, beginning this month by publishing for the first time a summary of recent legal decisions as affecting the mining industry of British Columbia. We shall continue in the future, as in the past, to use every endeavour to fearlessly expose in these columns schemes of a doubtful or “wild-cat” character; and that already our efforts in this regard have been well appreciated by the best class of mining men in this Province, is, to a gratifying degree, attested by the numerous commendatory letters we have of late received from the most prominent and the most respected mining engineers and mining operators of Western Canada. Of these letters there are none we value more highly than

the following from Mr. J. D. Kendall, until recently the resident partner in Vancouver, of the well-known engineering firm of Bewick, Moreing & Co. :

H. Mortimer Lamb, Esq., *The B. C. Mining Record,*  
Victoria, B.C.

DEAR SIR:—Before leaving for England I would like to express to you my appreciation of the manner in which you have endeavoured to conduct the MINING RECORD.

I know how almost impossible it is to prevent inaccuracies sometimes creeping into a paper of this kind, but so far as I have been able to judge you have succeeded in producing by far the most reliable mining paper in the Province. The stand you have taken against wildcatting and booming must be of great value to the mining industry of the Province, although your efforts will certainly not have the appreciation of those who profit by these reprehensible practices. As I have said elsewhere, the mines of British Columbia do not need booming, they will boom themselves if capably conducted, and after three years’ residence in the Province I am satisfied that the greatest enemies to the complete development of its mineral resources are the wildcaters and boomers.

Yours faithfully,

J. D. KENDALL,

Resident Partner, Bewick, Moreing & Co., Vancouver.  
Vancouver, B.C., Aug. 11th, 1899.

A LONDON weekly journal of very considerable standing and influence recently published in its financial columns an article commenting on the very unsatisfactory showing as yet made by the majority of British companies operating mines or mining properties both in the Klondike and in this Province, and arrives at the following conclusion, that: “If British Columbia and the Yukon ever became material contributors to the world’s production of gold it will be only after much patient effort and struggle upon a limited capital, for it is certain that the investing public will not lightly dole out further cash. The goldfields of the region have had their opportunity, and it has been lost. It has taken five years for West Australia to live down the evil reputation won for it by a number of unscrupulous company promoters, and it will take British Columbia and Klondike as many, if not more.” It is now nearly two years since we expressed the fear that the Klondike “boom,” which was then at its height and resulted in the flotation in London of numberless highly speculative or decidedly dubious Yukon company promotions would have a blighting effect on the then promising prospects of the British Columbia market in Great Britain. Events have justified only too truly our predictions of that time, but while the bursting of the Klondike “bubble,” so far as promoting enterprise is concerned, is principally responsible for the disfavour with which British Columbia mines are now regarded by the ordinary British investor, it has only become so by the poor showing made in the meantime by the majority of

English companies which have confined their operations to strictly within the Province itself. Had the golden promises held out by such men as Mr. Grant Govan, Mr. Horne Payne and others, materialized, there is every reason to believe that the British investor could have been induced to disassociate mining under the disadvantageous conditions of this class of enterprise in the frozen fields of the Yukon, with the industry in British Columbia where the opportunities for profitable and economic mining are both numerous and favourable.

On the other hand, had there been no Yukon excitement the more pronounced disasters which have befallen British promoted companies in this country might have been the sooner forgotten or ascribed to the real reason, the extravagances, the incapacities, and in some cases, the dishonesties of the management. The heavy losses, however, that investors in Klondike concerns have sustained has created a bad impression, not to be easily removed against the Canadian Northwest in general, including, of course, the Kootenays and other districts of British Columbia. As an evidence of the present demoralized state of the British Columbia market in London, it is disheartening to note that of twenty-six companies listed as presumably alone representing those whose shares are marketable, in only two cases are the prices of the shares higher than last year's quotations, in every other instance a notable depreciation having taken place. At least half of the companies in the list quoted, however, are in far stronger positions than a year ago, and it is therefore logical to ascribe the depreciation in share values solely to the influence of a prejudiced market. The Athabasca, the Porto Reco, owned by the Canadian Pacific Exploration; the Dorotha Morton, operated by the Fairfield Syndicate; the Hall Mines, Le Roi, Bosun, the Queen Bess, the Ruth, the Whitewater and the Ymir, all promise in the early future to return to their shareholders fair and even handsome profits. To particularize, the Athabasca with an output at present of nearly \$10,000 per month, and giving the promise of better performances in the near future, should ere long be in a position to pay regular dividends; the Porto Reco is being developed and equipped in a systematic and practical manner, and its shareholders can well afford to wait the result; the value of the Dorotha Morton production in December last was only \$3,363, but since, the output from the mine has steadily increased and last month the value of the mill run was \$12,979—this mine, however, is owned by a syndicate and can hardly be classed among the London company promotions; the Hall Mines, according to Mr. Hardman, the well-known mining engineer, should yet give a very good account of itself; Le Roi, though unfortunately overburdened with a heavy capitalization, promises when Mr. Carlyle's programme is carried out to be one of the big mines of America, but even as things are it is capable of paying a dividend of at least 6 per cent.; the Bosun, Queen Bess and Ruth are all excellent, the Ruth, however, having the advantage of being in a more advanced stage of development, but the Queen Bess, if systematically developed before any attempt is made to distribute dividends, can be regarded as particularly promising; both the Whitewater and Ymir are in excellent hands—in the Whitewater a large quantity of high-grade ore has been blocked out, and it is stated on good authority that the profits from the mine for the first four

months of the present year ranged from £800 to £1,000 per month; the profits from the Ymir mill for the short time it was in operation this year was approximately £5,000, and the company's engineer, Mr. Fowler, we are informed, does not hesitate to promise a profit of £2,500 monthly from the mine directly the mill is in regular running order. But as we have stated, notwithstanding the encouraging results of the present year's development in these properties the market price of the shares in every case show a considerable depreciation. The price of Hall Mines, for instance, in 1898-9 was 1 13-16, the present price is 9-16; Le Roi in 1898-9 was 8 $\frac{1}{2}$ , it is now 7; Whitewater last year was 1 $\frac{1}{2}$ , this year it is  $\frac{3}{4}$ , and Ymir was 1 $\frac{1}{2}$  last year as compared with the latest quotation of 1 $\frac{1}{4}$ . In itself this circumstance need not create much apprehension, for if, as we believe, these dozen or so companies are in possession of meritorious properties, the shares will necessarily rise in the natural order of things, until they represent an actual market value; but as an indication of the attitude of the London stock market towards British Columbia investments, the general decline in the price of our best British controlled mining securities is anything but auspicious. While the development and progress of the mining industry in this Province is not by any means entirely dependent upon British capital, the history of mining in other countries, excepting perhaps that of the United States, affords clear proof of the fact that all phenomenal growth or expansion has been the result of enterprise and investment promoted from London. Until British capital begins to flow freely in our direction, we cannot expect, unaided, to take that place among the great metal producing countries of the world which the undoubted potentialities of our mineral resources should entitle us to occupy. But metalliferous mining in this country is still in the very first stage of development, dating as it does back barely ten years. Some of our best mines in the older established districts, such as Rossland and the Slocan, are in the hands of wealthy Canadians, and some of these will upon the first favourable occasion, be listed on the London market. When this is accomplished and the Canadian companies begin to pay, as they are able to do, regular dividends, not from capital account, but from actual mine earnings; when to this list of profitably-operated mines others from the exceedingly promising newly-opened districts of Lardeau and Boundary Creek are added, we may hope to see, long before the predicted five years expires, the revival and on a much larger scale, in the world's metropolis of that interest and confidence in the wealth of British Columbia's mineral resources from which both the Mother Country and her most western colony are yet to derive mutual profit and benefit.

A MAN named Frank Richards, who, in the autumn of last year, made himself well-known in Vancouver, though hailing originally from Liverpool, England, is endeavouring to promote in London a Yukon and Atlin company, which cannot be described as other (to put it mildly) than a most delusive undertaking, and certain to involve any who are foolish enough to take stock in it in the loss of what they invest.

The concern is pretentiously styled "The Vancouver, Dawson and Atlin Cities Trading and Ship-

ping Corporation," behind which is prominently displayed the name of "Frank Richards, of Atlin City and Vancouver, B.C." Mr. Richards has an agent in Leith, Scotland, in one Edward G. Buchanan, who circulates the "gull-trap" prospectus of the company widely. In that prospectus the company asks the co-operation of British investors in "taking out some of the millions of gold dust and nuggets which are in British Columbia," and adds the extraordinary and outrageously false assurance that "if you co-operate with this company you may make a quarter of a million in less than one year." The "quarter of a million," be it noted, refers to British currency, the prospectus being English and means pounds, not dollars! Mr. Richards is then described as a most expert financier, capable of carrying out gigantic undertakings, and as one who has "solved the socialistic problem, apart from the usual revolutionary ethics." It is amusingly added that "in the goldfields socialism is crowded out by true socialists." Among many other misleading assertions of the prospectus that are, however, quite other than comic, it is stated that the members of a successful party organized by Mr. Richards were landed last year in Dawson City on August 22nd, and that the steamship "Manauense" brought down under the direct management of Frank Richards over three millions of gold dust and drafts, arriving in Victoria, B.C., on August 8, 1898. Of course the members of the expedition could not have arrived in Dawson on August 22nd and returned to Victoria—a month's journey distant by the then available water communication before the same date in the same month; but as a matter of fact the "Manauense" was too large to get to Dawson at all, the Yukon being a great but very shallow waterway; and the vessel reached Victoria from St. Michael's, on the Yukon, on August 3rd, not on the 8th. As for the \$3,000,000 said to have been brought down by the ship, this assertion was made by the usual boom methods to the Provincial press on the authority of Mr. Richards himself, who was the purser of the "Manauense." There is every reason to believe that there was not a third of the alleged \$3,000,000 aboard, while so far from the gold being, as inferentially suggested in the prospectus, the property of a "Manauense" party under the tutelage of Mr. Richards, whatever came down by that vessel belonged to a miscellaneous crowd of Yukon miners, prospectors, traders and gamblers, mostly Americans, hardly one of whom probably knew Richards from Adam, when he stepped aboard the vessel. Indeed, Mr. Richards himself gave to the Victoria correspondent of the Vancouver *News-Advertiser*, among other Provincial journalists, the following statements as to the alleged gold-winners aboard, crediting F. Neaves, of Victoria, with \$800,000; Michael Traynor, of Victoria, with \$30,000; H. Doser, of Seattle, with \$117,000; Louis Paulus, of Seattle, with \$400,000; T. Rogers, of Seattle, with \$650,000, etc.—sums afterwards learnt to be vastly exaggerated. Clearly none of these men were of a body chiefly English, suggested as having been brought into and out of the Yukon under the direct management of Mr. Richards. And even as regards the "Manauense's" southern voyage, it has to be noted that Mr. Richards only acted in the subordinate capacity of purser.

However, the false suggestions and inferences to which we have alluded, are all meant by the prospectus to prelude a suggestion that small investors

in Great Britain should be fools enough to pay to Mr. Richard's agent, Buchanan, £30, one-third of the amount to be paid through the Merchants' Bank of Halifax in Atlin, to Mr. Richards or his order, on production of the title of the claim or claims purchased in the name of the subscriber. Here again is clearly fraudulent deception, it being absolutely impossible to secure and register an Atlin gold claim for £10, for, as everybody knows, payment of so small a sum for a claim alone, without allowing for the securing of a miner's license and registration would mean at the best vacant ground, miles away from nowhere, with ten thousand chances to one against the probability that an ounce of gold could be obtained from it. There is further fallacious twaddle in this precious prospectus about gold adhering to the grass roots in Atlin, and a statement is added, on the alleged authority of the General Traffic Manager of the White Pass and Yukon Railway, that the gold output could not fail to be between \$40,000,000 and \$50,000,000 this season. As it happens, in a sensational despatch sent to England early this year, the Manager of the White Pass Railway was credited with a statement that \$40,000,000 of gold would this year be got from the northern goldfields, but he distinctly referred, when making that optimistic prophesy to the Yukon, and not to Atlin at all.

In respect to the "Manauense" it may be added that Captain Edwards and the others concerned in chartering that vessel induced a small number of Englishmen to come by that vessel via Vancouver on agreement to deliver them at Dawson for £160 by means of a long and expensive voyage from England. The contracts were, however, broken, as of course it was impossible for the proprietors of the vessel to carry out the agreement for the sum named, and expensive litigation consequently resulted. This and other troubles long tied up the "Manauense" at Vancouver. Meanwhile, Mr. Richards did his level best, but failed, though he made long speeches to influential men and organizations, and wrote windy letters to the press, in an endeavour to float a Northern steamship company with headquarters in Vancouver. Indeed, a small volume might be written regarding this gentleman's exploits in British Columbia, but further comment is needless. The utter untrustworthiness of his concern and the outrageous falsifications of the prospectus in relation to it, showing clearly enough, that an endeavour has been made by the ex-purser of the "Manauense" and his associates to float one of the worst bubble mining concerns on record, with a view to trap the gullible small investor in the United Kingdom. Fortunately the *London Critic* has been active in exposing Mr. Richards' methods, and indeed to it we are indebted for much of the information which we have given concerning this concern and its manager in Scotland. These, however, we have supplemented by the addition of a few (among many) facts available in British Columbia in further discredit of one of the most disgraceful attempted impostures which we have ever encountered in connection with mining and trading in Western Canada.

The appointment of Mr. Carlyle to the Superintendency of the Rio Tinto may be his gain, but it is undoubtedly British Columbia's and Rossland's loss. He carries with him the best wishes of everyone who has ever casually or otherwise come in contact with him. Mr. Carlyle is a very suave and tactful man,

and possesses those qualities in a high degree which render a man in a position of great responsibility at once popular and successful.

Meanwhile, it must not be imagined that Mr. Carlyle severed his connection with the B. A. C. to accept the flattering Rio Tinto appointment without a qualm. The interesting work at Le Roi, Nickel Plate, No. 1, and Columbia & Kootenay, which for the past eighteen months or so has been conducted under his supervision, he is now obliged to leave others to complete, and to any man in love with his profession, such an abandonment, even though voluntarily made, must come as a severe wrench. However, from chief engineer of the B. A. C. to superintendent of the Rio Tinto is a very considerable promotion, and Mr. Carlyle evidently so regarded the matter. His position in Rossland certainly gave him an important place among the mining engineers of Canada, though not particularly pre-eminent rank with his confreres of North America. But as the technical head of one of the oldest and greatest mines of the world, the general as it were commanding an army of men ten times more numerous than the combined mine labour of the Slocan, he at once steps into a position of world-wide prominence. This is an honour indeed, and as Canadians we have reason to be proud of the distinction which has been befallen a graduate of old McGill and to British Columbia's first Provincial Mineralogist. So

"Last toast—and your foot on the table!—

A health to the native born!"

The visit of the members of the Canadian Mining Institute to Kootenay may not in any material sense alter the destiny of Kootenay, but it was undoubtedly of very great advantage to the visitors themselves. In Rossland particularly they were brought face to face with mining on a scale to which many of them have been little accustomed and they were duly impressed by it. The reports of their meetings were mostly confined to remarks of the after-dinner order, in which the courtesy of guests was expressed according to the various ability of the speakers. Several excellent papers were read, but the most interesting was perhaps Mr. Ferrier's masterly exposition of the rationale of Rossland ore deposits.

It has, meanwhile, been questioned whether the Institute acted wisely or well in expressing an opinion on the question responsible for the local labour trouble in the Nelson and Slocan districts. But if we accept the Canadian Mining Institute as a representative body—and certainly there is no other association that can lay claim to the distinction with as good a right—it must also be conceded that its members are just as well entitled to pass resolutions dealing with matters affecting the welfare of mining in this Province as with those relating to mining in Ontario. No one quarrelled with the Institute on the score of its "unwarrantable interference," when some time ago its members passed a resolution condemning the imposition of an export duty on nickel ore from Sudbury; and if the passage of the latter resolution was deemed—as was indeed the case—a righteous, wise and permissible proceeding, why not the former. We venture to assert that of the two evils, the imposition of an export duty on ore and the restriction placed on the liberty of the subject

which limits his wage-earning capacity to less than its full power, the last is, from an economic standpoint, the most vicious. It is true the Canadian Mining Institute did not regard the matter from this point of view, but even on the grounds that the eight-hour legislation is intrinsically unfair to the men, who, by the employment of capital and brains, are building up our mining industry in the Kootenays, we submit, that the resolution in question was both timely and weightful.

Our Rossland correspondent writes: "There is considerable activity in the demand for mining machinery in this camp at present. This demand has arisen from the determination of the management of the large producers to increase the development as well as the output facilities. The Le Roi has just closed a contract with the Rand Manufacturing Company for a 40-drill compressor, and the British America Corporation has just given an order for 18 additional drills. The War Eagle is about to order a 40-drill compressor, by which it is intended to place the present work independent of electrical machinery. With ninety drills at work in the Le Roi and a similar number in the War Eagle, underground work in the Le Roi will make phenomenal headway. So far Red Mountain has proved by depth and otherwise that it contains large deposits of gold-copper ores, and this is further confirmed by the fact that dividends amounting to, at least, \$1,240,000 have been paid from the two great producers, which represent but a comparatively small portion of the mountain, so far as territory is concerned."

Shipments from Rossland are being maintained at a satisfactory level. The gross shipments for 1899 have already exceeded the tonnage of 1898, and about 20,000 tons a month, more or less, may be counted on for the balance of the year. It is satisfactory also to note that according to the statements made by the mine managers shipments have been made so far wholly secondary to development work, and that this policy will be continued for some time.

Mr. Collins, who is consulting engineer for the groups of mines controlled by the London and Globe, British America and Standard Exploration, has been in Rossland for some time and has been examining the various properties of the B. A. C. It is stated that his verdict on the Le Roi is extremely favourable. He has apparently outlined a new scheme of development work and some of the work already undertaken is suspended in consequence. His visit has also been accompanied by sweeping changes in the B. A. C. staff and it is said that still more changes are contemplated in the near future. The indications are that there has been dissatisfaction in the central office with the manner in which the business of the corporation has been conducted. If it is so, the alterations are being made very judiciously; there is nothing except the fact of the changes occurring to mark any such reason for them.

The Government has at length started to do something towards solving the question of transportation to and from Sophie Mountain, in the Rossland district. A road has been surveyed and is being graded. At the same time a company comes forward with a proposition to run an electric railway from Rossland to the mines on Sophie Mountain. The possibilities

of electric traction for the moving of ore in a rough and mountainous country are immense, and will yet be made use of to a much larger extent than they have been, especially in a country where the opportunities to develop electricity from water power are so numerous as they are in Kootenay. The company proposing this enterprise is a responsible one and the experiment will doubtless be tried.

The Le Roi report for August is interesting, chiefly from the fact of the extremely low grade of the ore shipped; \$13.55 per ton is not certainly a high average, and yet a very good profit can be made on this ore. The amount of ore reported on covered the output of 24 days. The pay-roll of the mine is roughly \$1,000 a day, say \$24,000 monthly. Freight and treatment on the amount of ore shipped would amount to about \$22,500. Expenses of management cannot well be estimated very closely, but suppose they are put at \$10,000 a month, four-fifths of that would be \$8,000, making a total of \$54,500, leaving a net profit of \$30,000, or \$4.75 per ton, on the lowest grade ore yet shipped. The total cost of mining and treating ore from the Le Roi is not over \$8.80 per ton, and with an increased tonnage should be less. And it must be remembered that this figure includes all the expensive development at present in progress. That is the advantage of estimating cost from payroll. It brings everything at once into current account. The foregoing estimate is based on a freight and treatment rate of \$3.50, which may be considered too low, but, nevertheless, the treatment cost is only \$3.00 per ton. This wonderful result has been attained by putting good men in charge. The combination of Messrs. Bellinger and Brun has enabled the Northport smelter to achieve results in the economy of treatment unsurpassed in America. They own one-quarter of the smelter between them and are both accumulating great fortunes out of it. How long will it be before they are bought out and replaced by an expensive, inexperienced, and therefore incompetent English management, such as has frequently wrought havoc in otherwise good mining and milling propositions?

There is a decided improvement in the prospects of the Rossland South Belt. The very satisfactory appearance of the Homestake has been followed by a discovery of copper ore on the Deer Park, which has greatly encouraged shareholders in that property, and other prospects are undergoing reorganization and are likely to be worked. Those who have had long experience of the Rossland camp are coming more and more to the conclusion that mining is still in its infancy and that gradually but surely the area of production and profit will extend until some of the earlier dreams of enthusiasts are realized.

There is a well-defined rumour in mining circles that Mr. Whitaker Wright is meditating a general coup in the Rossland camp. It is not necessary to explain or criticize that gentleman's business methods. But people who malign often do so because they have not the brains to emulate. Be that as it may, Mr. Whitaker Wright knows his business and makes it amply successful. There may be a good deal of financial jugglery about it but it is not all financial jugglery. There is sound judgment and rapid intuition, amounting to genius, about it. Nobody seems to know just what he is up to at present,

but he is up to something. He wants to float West Le Roi and Columbia-Kootenay and make a good market for these shares. Before he can do that the British Columbia market must be galvanized into activity. It is stagnant at present. There are two ways of doing it, one to rush the Le Roi output and declare a dividend, the other to take away the market's breath by declaring a big dividend on the B. A. C. It is unlikely that he will move until the Transvaal war cloud has cleared away, because while that looms over the market the dynamic force of his action would be wasted. But it is significant that while the Le Roi is shipping low-grade ore, and not so very much of it, the Northport smelter is steadily increasing its capacity.

How haphazard mining is after all and with what extraordinary persistence bodies of ore are sometimes overlooked. A case in point is the recent discovery on the surface of the Black Bear, at Rossland. The Black Bear shows the outcrop of a ledge on which pits have been sunk from the flat on which the Le Roi compressor stands up to the crest of the hill. A tunnel was also started by the original locator, supposed to drift in on the vein. In all of this work no indications of value were discovered and the Le Roi Company bought the claim, so it is reported, for \$500. The company continued the tunnel, but desiring to use it as a means of exit to the mine bore away to the north. This summer, to carry out the proposed development scheme of the Le Roi this tunnel is being enlarged and improved and extensive grading was undertaken at the mouth where a shop for framing timbers was contemplated. This involved blasting the top off the ledge capping, which had been lying stripped for years. The result was over ten feet of beautiful ore, carrying fair values in gold and a high percentage of copper. The portal of the tunnel is within six feet of this ore. Four sticks of giant powder and four hours' work would have made a difference to the original locator of between \$500 and \$50,000, or if he had held his property till now between \$500 and \$500,000. But the tunnel started above the ore and bearing north remained above and to one side of it all the way. The only thing the occurrence reminds one of is practising at a window pane with a pistol to see how near one can come without breaking the glass. The obvious moral is never run a drift tunnel to show up a property without cross-cutting, and do not be afraid of surface work.

The Northport smelter has given a \$4.50 freight and treatment rate to the Evening Star and presumably to other mines that care to ask for it. The margin of profit to the smelter must be very small if indeed there is any. But in the interest of Rossland mining the effect of such a rate cannot be overestimated. It bears out what we stated last month that the lower grade of the ores mined would be compensated by the higher percentage of profit on each ton mined arising from improved facilities for handling and treatment.

The estimation of the Le Roi mine in London is being seriously affected by a persistent impression that the ore from that property is growing baser. This impression is apparently borne out by the statistics of treatment, but is entirely at variance with the facts. Under the old management only parts of the ore-body were mined. There was a continual hunt going on for portions of the ore which were the richest. In

early days this was from necessity, later from policy. It is overlooked by critics that under the old management the ore shipments while large were irregular. As soon as a new level was opened the richest positions were stoped and shipped with all possible speed. It is very probable that present results are lower, not merely than previous ones, but than the average of the mine through the systematic working of levels which have been partially robbed.

An extraordinary explanation of the reduction in the treatment rate offered by the Northport smelter was given in the local press, to the effect that it was a reprisal against Trail for bidding on and securing contracts on Republic ore, Republic being claimed to be in the peculiar territory of Northport. The author of this explanation omitted to state how it was proposed to transport ore from Republic to Northport.

A very curious phenomenon in mining is the seasonal revival of interest in mining shares. Somewhere between the beginning of August and October there is always a revival of prices, not of individual stocks as contrasted with one another, but of all stocks, it matters not what. Such a revival is in progress now. Most mining shares have a purely speculative value; this value is not based on any immediate expectation of returns. It is not easy to say what it is based on. A number of factors, such as the strength of the company, prudence in management, as well as the appearance of the ground enter, and quite rightly so, into the formation of the public opinion that gives values to mining shares. These things give an added value to a company working good property, but by a remarkable want of logic they also give value to shares representing absolutely worthless property. Most people admit that ten times nothing is nothing; but it does not occur to them that nothing times ten is also nothing. But that is digressing. The rise in general prices must be governed by some law liberating more money for speculative investments at one season of the year than at another. Lucky are the promoters who catch such times right. They get all the money they want from the public. Of course these natural changes in the level of prices are often stimulated by a boom, merited or otherwise, in some particular stock. It was so last year. This year nothing of this kind has occurred in Rossland as yet, but still there is better inquiry, there are more sales, and a much healthier tone prevails generally.

Some of the Miners' Unions leaders in the Slocan take up and urge on their followers the adoption of the impossible position that no labor contract is to be made, unless a minimum wage of \$3.50 is to be guaranteed by the mine owner. Mr. Ralph Smith, M.P.P., one of the most representative labor leaders in the Dominion, however, holds and suggests the taking of the more sensible view, that no union miner should ask such guarantee, so long as he is offered a contract which he deems sufficiently profitable for his own acceptance. So much, of course, depends on the skill and energy of the contracting worker that a mine owner could not possibly guarantee him a minimum wage of \$3.50 a day as a condition of a piece-work agreement.

An important decision, affecting the sale of foreign lead, which, of course, includes British Columbia, in

the United States, has just been given by a Judge of the Federal Court of the State of Washington, in the case of the Puget Sound Reduction Works, operating the Everett Smelters, on appeal from a decision of the United States Board of Customs Appraisers in New York City. The *Mining and Scientific Press* of San Francisco thus summarises this interesting decision:

"The Court—Judge Hanford holds that, under the United States laws, what is known as the 'fire' assay shall be used to determine the amount of dutiable lead in imported ores, and gives the smelter company judgment against the United States for the amount of excess duties paid on ores shipped to it under the ruling of the Washington officials that the 'wet' method should be used in assaying such ores.

"Under the new ruling, the government will be compelled to change its system of assaying imported ores for the purpose of obtaining values on which to figure duties. In the past the official system has been the 'wet' or chemical process. It is contended and generally acknowledged that this process yields about 2% more lead than the fire system. The smelter people fought the case and won on the theory that the commercial method is the fire assay. The decision settles the question as to whether the wet or the fire assay is the commercial method by declaring that the evidence is satisfactory and convincing in favour of the latter.

"Judge Hanford had the case under advisement, and handed down a written opinion. Reviewing the evidence, he says, in part:

"It would require a very strained construction of the law to find that congress, after having in 1894, and again in 1895, enacted statutes requiring the sampling and assaying of ores, for the purpose of collecting duties thereon, to be according to commercial methods, and without having expressly repealed the law of 1896, could have intended in the law of 1897 to continue the same policy as regards the methods of sampling and yet departed from that method for the purpose of assaying.

"It is my opinion that the Secretary of the Treasury is required, by the positive provision of the acts of Congress above referred to, to prescribe regulations for the assaying of lead ores by the commercial method, is a question of fact, for the decision of which resort must be had to evidence.

"In this case the evidence is all one way, and it is in all respects satisfactory and convincing. From it I find that the commercial method of ascertaining the quantity of lead contained in imported ores is the fire process, and any other method of assaying does not meet the requirements of the law."

The movement to induce the Federal Government to re-admit, duty free, from the United States refined lead originating from Canadian bullion, is not, as many imagine, of but recent date. For two years past the Canadian Pacific Railway and others interested in fostering our local lead smelting industry have been endeavouring to obtain this concession from the Ottawa Government, but as we have previously stated, the plea has not been heretofore favourably entertained, for the reason that the Government held the view that by the bonus of fifty cents per ton offered for lead smelted in Canada the local smelters had been accorded every reasonable encouragement. Now that the term has expired during which the bonus could be drawn there is reason to anticipate that at the request of British Columbia lead smelters some new place will be adopted to enable them to compete on a more equal footing with the American combine. The remission of the 15 per cent. on Canadian lead refined in the United States is not in itself sufficient for the attainment of the object in view, and if this desired change is made it must, to be effectual, be contemporaneous with a radical amendment of the tariff with regard to the duties on manufactured lead. These are present are very markedly inconsistent. Thus the duty on pig lead is 15 per cent. on lead pipe, shot, etc., 35 per



cent., but on white lead, a manufactured article, a duty of but 5 per cent. is imposed. There are very few similar instances, if any, where the duty on articles manufactured, or which could be manufactured in Canada, is less than that placed on the crude material, such as in this case.

The Provincial Government has not, it seems, been able to enforce its recently formulated colliery labour regulation under the Coal Mines Act, without meeting a legal impediment which will at least postpone and may prevent the operation of the regulation, which declares that no person shall be employed underground in British Columbia collieries unless able to read and understand the special rules printed in English. The declared object of the new rule is of course to prevent colliery accidents, by providing that every man engaged underground shall be able to understand English rules providing against accidents in coal mines. Its secondary, but certainly more important object, is, however, principally to preclude Mongolians from obtaining work in the collieries, and in this regard the regulation is very popular with the labour unions. However, under section 90 of the Coal Mines' Regulation Act the new rule has, before taking binding effect—having been declared unnecessary by petitioning colliery owners represented by the Union and Wellington Colliery Companies—to be declared legal after the hearing of arbitration proceedings, which will take place early next month. Mr. W. J. McAllan has been appointed the Provincial Government's arbitrator and Mr. T. T. Wynne, the colliery owners' representative, while the Attorney-General and other counsel will argue the case for the regulation against other opposing advocates. The forensic struggle will be keen, for the consequences of the decision will from a social and racial standpoint be most important. To secure ratification of the rule the Government will need to prove that knowledge of English is a desirable requisite of colliery labour in view of the issue of mining regulations in our language, in which also mine managers and overseers also, of course, give their orders.

There are reports of rich finds of copper-gold ore from the Agassiz district of the Fraser, and an attempt is consequently being made to "boom" that district in Vancouver as a miniature Klondike near at home. The finds, however, need greater verification and much development work must be done on the various claims located to reasonably justify the very sanguine anticipations held out by those immediately interested.

It is stated by the *Atlin Globe*, the first issue of which, published at Atlin "City," made its appearance on the 20th of August, that the daily output of the placer mines of this district exceeds twenty-eight thousand dollars, and that on this basis, allowing sixty days as the length of the present season, the total placer yield of the goldfields this year will be rather more than a million and a half dollars. This estimate is said to be approximately correct by some recent arrivals from Atlin, though others again place the production at a very considerably lower value. Even at a million and a half dollars the showing is nothing very remarkable, though, of course, the season just closed has been sadly curtailed as a result of much unnecessary litigation and official blunder-

ing. Atlin is now being boomed as a coming quartz camp, but no responsible opinion has yet confirmed the highly coloured reports of the daily press.

The late Gold Commissioner at Dawson, Mr. Thomas Fawcett, is now publishing a newspaper at Niagara Falls, in which periodical, the *Record*, he recently discussed the Edmonton route to the Yukon, thus summing up: "We venture to say that no greater crime was ever perpetrated in Canada than the party or parties who were responsible for sending the innocent citizens of Canada, Britain and other countries into that unbroken wilderness to perish through starvation, disease and hardships, were guilty of. There is no such route as the Edmonton route to Dawson. Experienced explorers take from twelve to eighteen months to make the trip from Edmonton to Dawson via either the Pelly or Mackenzie River routes, and these have always been furnished with guides at the different H. B. Co.'s posts, to show them all the short cuts and prevent months of needless travel." In this connection it is worth noting that many of the unfortunates who began the journey via the Edmonton route to Dawson nearly two years ago, have only just reached Victoria, having been obliged to obtain employment from the "Cassiar Central" as labourers on this company's railway construction works to provide themselves with sufficient funds to return to civilization.

Rather more than a year ago the *British Columbia Review*, of London, published a somewhat scathing article, supposed to have been inspired by Mr. E. P. Rathbone, a mining engineer whose name is frequently before the public, commenting on the unjustifiable attempt made by local men to interest a London syndicate in a number of hydraulic mining claims in the Omenica district. These properties were condemned by Mr. Rathbone, who was sent to examine them, and they were, moreover, described in the *Review* as "rotten eggs." Shortly after Mr. Rathbone's examination and report the ground was acquired by a Californian syndicate—a close corporation—known as the St. Anthony's Company. The manager of this company is now on his way home, and while visiting Victoria *en route*, he gave to the press some information, regarding these condemned hydraulic claims in Omenica, which will probably surprise Mr. Rathbone, who, by the way, is now in the Province, very considerably. Of course, Mr. More may have some ulterior object in view in reporting so favourably on the gold claims in question. He may have some intention of offering the St. Anthony stock to the public, but he emphatically states that this is not the case; that he is a member of a private syndicate and that far from giving others an opportunity to share in the profits he expects to obtain from the operation of the Omenica properties, his associates and himself intend to acquire more ground and work it strictly for their own benefit. As Mr. More is quite a well-known man in his native State, where he is highly respected, we are bound to accept his statement on these points without question. Mr. More has offered to wager that from one of the claims alone his syndicate will next year take out gold to the value of \$160,000. In prospecting this ground during the past season \$7,000 in gold was saved and the values in the gravel run as high as twenty cents to the pan. The St. Anthony Company are, meanwhile, certainly giving proof of



their faith in the richness of their Omenica properties by the installation on the ground of a very complete equipment plant for extensive hydraulic operations.

Commenting on the subject of waggon roads and trails in East Kootenay, the Fort Steele *Prospector* remarks: "East Kootenay is sadly deficient in a matter so vitally necessary to the development of the district. The complaint is not alone from East Kootenay, but from every section of the Province. The amounts appropriated are insufficient, and the appropriation is spread all over, with the natural result that the money expended might just as well have remained in the public treasury. There is hardly a road or trail in this section about which there is not some complaint." While on the whole a very fair proportion of the Provincial revenue is devoted to the building of roads and trails in the mining districts, in view of the developments that are taking place in such promising sections of the country as the districts of East Kootenay, the district of Lillooett and the Similkameen, a greater display of liberality on the part of the Government with regard to expenditures in this direction would certainly meet with the approval of the tax-payers. In Lillooett, in the Bridge River district, the main trail is in a very wretched and even in places a dangerous condition, but no heed, we understand, has been taken of the many requisitions made for its improvement. In not a few instances when the appropriations for road construction in various parts of the Province have been quite adequate, the money has been extravagantly spent or otherwise frittered away. A case in point was brought to our notice but recently. Here five thousand dollars had been granted by the Government for the building of a road up the West Fork of Kettle River, between Rock Creek and Beaverton, in the Boundary Creek district. Along this waterway was a natural road, extending for a considerable distance, to a spot known as James Creek, and the early work needed to make this natural thoroughfare entirely passable was the removal in one or two places of projecting rocky bluffs. However, the overseer of road building was not content with merely making these inexpensive improvements, but must needs spend a very considerable share of the appropriation at his disposal in converting this, for all practical purposes, excellent natural roadway, into what might well pass for a scientifically graded race-course; with the result, we are informed, that long before he came to the really impassable portion of the route he was obliged to discontinue work for the very natural reason that he had run out of money. No doubt in many other districts the same sort of thing goes on. Wherefore the moral would appear to be, that if we want roads in the mining district, it will certainly pay to get men who know their business to build them.

Apropos, as we have on several occasions pointed out, there is no part of the Province so badly in need of the ordinary transportation facilities as afforded by waggon roads as the Similkameen. The Similkameen is in much the same position as was Boundary Creek some five or six years ago. It has some very remarkable mineral showings which have been sufficiently developed to promise very big things in the future, but the miners and prospectors of the district are entirely cut off, so far as artificial communication is concerned, from the commercial en-

ties and railways. At Princeton, Wolf's Camp, Summit Camp, and in the water shed of the Tulameen many of the discoveries of galena and bornite are remarkable as regards values and extent of outcroppings. In one of the groups of claims in Summit Camp upwards of five thousand dollars has been expended in development work, and the ore, which is a coarse-grained galena, assays from 48 to 68 ozs. in silver and 53 to 65 per cent. lead. Undoubtedly the most feasible route for a waggon road tapping this district to follow would be, starting from Hope to follow the old Nicola trail to Summit City, thence crossing the Coquihalla, sixteen miles from Hope, and travelling the easy grade, which is possible to obtain over the Summit Mountains, pass down to the valley of the Tulameen River and along its left bank to its junction with Slate Creek. From this point a fair road has already been built to Princeton. An alternate route has been suggested in that known as the Similkameen trail, but not only would the construction of a road in this direction be more difficult and decidedly more costly, but the distance would be some twenty miles greater and less valuable mineral territory would be tapped.

Mr. Richard Popkiss, a Director of the Ymir Gold Mines, Limited, who recently visited British Columbia, has prepared a very interesting report of the Ymir mine from data he obtained during his stay in the country. In this report, Mr. Popkiss quotes the company's engineer, Mr. Fowler, as his authority for placing the value of the milling ore at from ten to fourteen dollars to the ton, and the shipping ore at from sixty to seventy dollars to the ton. The cost of mining and milling it is expected will be reduced to four dollars per ton, thus leaving a very handsome margin of profit on the milling ore, and a still larger gain is made on the shipping ore on which the cost of freight and smelting treatment reduces the profit to about half the value of the shipments. We hope next month to reproduce Mr. Popkiss' report in full.

The Coast district should this year for the first time figure in the Provincial mine returns for a fairly substantial output of gold and copper ore, mainly as a result of the Dorothea Morton workings, which already account in 1899 for an output of over \$80,000 in value. The Mount Sicker developments are also most promising, recent smelter returns on 600 tons of ore shipped being about \$36 per ton. The copper yield of the Van Anda mine on Texada Island is also adding substantially to the Coast output, and taking the district as a whole it would seem fairly certain that it will at least be credited with an output of over \$150,000 ere the end of the year—a not very large aggregate production perhaps, but sufficiently encouraging as a vertical beginning, when, moreover, it is considered that it will in the main represent the output of two properties, most of the Coast undertakings being still in the early stage of development.

If it be found correct as the result of further and fuller special investigation and development work that the Dunsmuir capitalists have secured the control of really extensive coal deposits near Sandon, this means a very great deal for the smelting and general mining industry of the Slocan, obviating, as the working of local coal measures would, the cost of a fairly long haul from the Fernie mines of East Kootenay. All indications point to the fact that at

any rate the next generation amongst us will witness British Columbia's development to the stage of one of the great coal producers of the world, when it will be found that the happy juxtaposition of coal, iron and copper will eventually mean quite as much—indeed probably more for British Columbia than even our stores of the more precious metals.

The prospectus has been issued of the British Columbia Mining and Exploration Company, Limited (non-personal liability). Capital \$150,000, divided into 600,000 shares of 25 cents. The company, which is locally promoted, has as its directorate Colonel E. G. Prior, M.P., of Victoria; Mr. John Thomas, a financial agent, of Seattle, Wash., and Mr. Henry Croft, a mining engineer, of Victoria. With regard to the concern itself, there does not at present appear to be much to promise that the invitation to the public to subscribe for shares will meet with any very extraordinarily enthusiastic response. We are told in the prospectus that the objects for which the Company is established are to acquire for the purpose of developing, working and selling sixteen and three-quarter mineral claims and "mines" in various parts of the Province. Of these mineral claims and "mines," there is absolutely no information of a definite character afforded, except in one instance, when in referring to a claim called the Giant, situated on the Spillamachene Mountain, in East Kootenay, it is stated that "about \$10,000 has already been expended on this property, which contains a wide vein of argentiferous galena." Such a statement as this is, of course, utterly valueless, until evidence is brought forward that the expenditure has proved resultful. Meanwhile the chief inducements held out to investors seem to be embodied in the two following paragraphs contained in the Company's prospectus: (1st) that the properties "are situated in some of the best mining districts of the Province of British Columbia, and. . . . shareholders will have the benefit of being interested in different mining camps, *thereby availing themselves of the development work that is being done on a number of the adjoining mines;*" and (2nd) that "the owners of the various properties have received 350,000 fully paid up shares for their interests, and the present sale of shares to the public will be *mainly* devoted to the development of the properties." The italics in both cases are ours.

It will be interesting to watch the results of new endeavours to work with profit two greatly discredited Mainland mine ventures. New syndicates are working on the Galena and Golden Cache groups of claims, those interested in the former asserting that they can dispose of the zinc trouble and also satisfactorily deal with the intermingled zinc after such disposition by metallurgic process. Toronto mining men interested in the Golden Cache, also express themselves as hopeful—they having foreclosed on the mine mortgage—of yet making returns on the property under new conditions of ownership and management. It will, of course, be well for the Province if either or both of the efforts succeed, even in part, for the ill-repute of the Galena mines and the Golden Cache undertakings has done British Columbia very great harm with large possible investors in England. Meanwhile, reports from Lillooet are of a most favourable character. The Ben D'Or mine is now crushing, the recent clean-up returning in the neighbourhood of an ounce to the ton, being rightly considered as eminently satisfactory.

The report here—soon contradicted as false—of the insolvency of Alexander Macdonald of Dawson, the so-called "Klondike King," lately reached London and appeared in the columns of leading issues of the metropolitan press with the equally absurd addition that Mr. Macdonald was likely worth £28,000,000 as a Klondike mine and real estate owner. Although Mr. Macdonald is in all probability a very rich man, a sum much nearer \$5,000,000 or £1,000,000 sterling will fairly represent the worth of his Yukon interests. The notion that the latter run to £28,000,000 in value or the equivalent of more than five years of the present gold output of the whole of the Yukon is absurd, but not too absurd to be accepted by some leading London news editors.

The Transvaal continued up to the end of August—despite all the trouble and unsettlement of the crisis—to enlarge its gold output. This amounted for the month to no less than 478,493 ounces, as against 382,006 ounces for the like period of last year—a very large increase. It is, of course, possible that the Transvaal gold returns for August may be falling off as a result of the increased intensity of the crisis and the reported exodus of Uitlanders, but as yet the Transvaal gold yield of the year is far in excess of that of the like period of 1898. The returns of the gold yield from the chief Australian colonies all tell the same tale of greatly increasing output, and it is already abundantly clear that expert predictions that 1899 will be an absolutely "record" year in respect of the world's gold production will be more than justified.

The London correspondent of the *Engineering & Mining Journal*, of New York, is some times inclined to go beyond his depth. Thus he recently wrote as follows to the journal in question: "The fact is that abundant proofs are coming to hand that British-Columbia is a land of low-grade propositions." That there is much low-grade ore in British Columbia is quite true, but low-grade mines certainly do not preponderate. Three or four years ago, if we mistake not, the same correspondent belittled Western Australia, but since that time he, as well as the able journal he represents, have been compelled to materially change their opinions as to the gold fields of that colony.

There are quite a number of graduates from the Cambourne School of Mines in Nelson and its vicinity looking out for work. Gradually they drop into billets, and they all seem ready and willing to take anything that turns up. One does not know what they expected to find, but it would be well that others who may be following them should learn that there are not any mines here lying agape for managers.

The high price which copper now commands has had the rather curious effect of tending to send copper coinage, which has consequently a greater value as metal, out of circulation in several countries where it is a principal medium of exchange. Thus both China and India are exporting copper coins to America, the latter country only recently having consigned some two hundred and fifty tons of small copper change to the Orford Copper Company, there to be paid for as scrap copper, and remelted in bars

It is interesting to note, as illustrating the relative proportions of value in which the British mint is utilizing gold, silver and bronze for coinage, that in 1898, the year of largest coinage on record at the Royal Mint, gold coin struck represented a value of \$28,952,230, silver a value of \$6,561,530, and bronze, used for pence and halfpence, a value of \$422,775.

Well considered advance estimates of the world's probable gold output for the year value it at \$340,000,000. Allowing for the expected somewhat considerable advance of British Columbia's gold output of 1899 over that of last year, and estimating the probable return as in the neighbourhood of \$4,000,000, our contributions of the world's gold yield will amount approximately to 1 2-5 per cent. Our day of greater things in gold output is, however, yet to come, while our advance is steady, and things considered eminently satisfactory. A considerable gold yield, however, from Atlin or further successful development of the hydraulic gravels of Cariboo would of course raise the Province's gold output for the year to a sum of far beyond four million dollars.

The report of the British Royal Commission on the Indian currency is in favour of the adoption of a gold standard of coinage for British India, with gold purchasable by the mints in rupees at the rate of fifteen rupees to the sovereign or pound sterling. This means a further relegation of silver in India to a subsidiary position and a big demand for gold coin in that empire. As, however, the Indian mints have for years been closed to the coinage of silver the change in its effect in the value of the metal may be regarded as considerably discounted. If, as expected, the Indian Government adopts the suggestions of the Royal Commission, the effect will be a further and, perhaps, a considerable stimulus to gold and copper-gold production here and elsewhere in the world, and some slight further discouragement of low-grade silver mining development. But the effect should hardly be appreciably felt in this Province, as by far the larger properties of our silver producers are high-grade propositions, the working of which will not, to any great degree, be influenced by a possible fall of a point or two in silver.

It speaks well for the advantage of the possession of good copper mine properties under present circumstances, when the Rio Tinto and one or two other noted mines in Spain, capitalized with British and American money—chiefly the former—and English directed, maintain their stocks at high prices, despite recent largely increased levies of the Spanish Government upon them. These last are made in order to meet the enormous cost of the war with the United States and help Spain to avoid, if it be possible, national insolvency. An additional royalty is now, it seems, imposed on the mine concessions held, a duty of 3 per cent. on the gross value of the ore output and a tax of 5 per cent. on the coupons and dividends paid to share and debenture holders, plus other minor exactions. After these Spanish levies on copper mines and their owners—which, however, don't in all quite equal the exactions of the Yukon—our provincial tax of 1 per cent. on net output of our metal mines appears to be, as undoubtedly it is, very reasonable. Causes there are for discontent with British Columbia's administration of her mining interests, but the charge that an excessive state royalty is imposed is certainly not to be reckoned among these.

The reports of the Nova Scotia Department of Mines show that up to date this year the largest gold-producing mine in that Province is at Sherbrooke and belongs to the Bluenose Gold Mining Company, Limited. Its gold output to the end of June was in all worth rather over \$32,000, which places the yields of the best present gold mine in Nova Scotia considerably below that just developing and wonderfully promising Coast mine, the Dorothea Morton

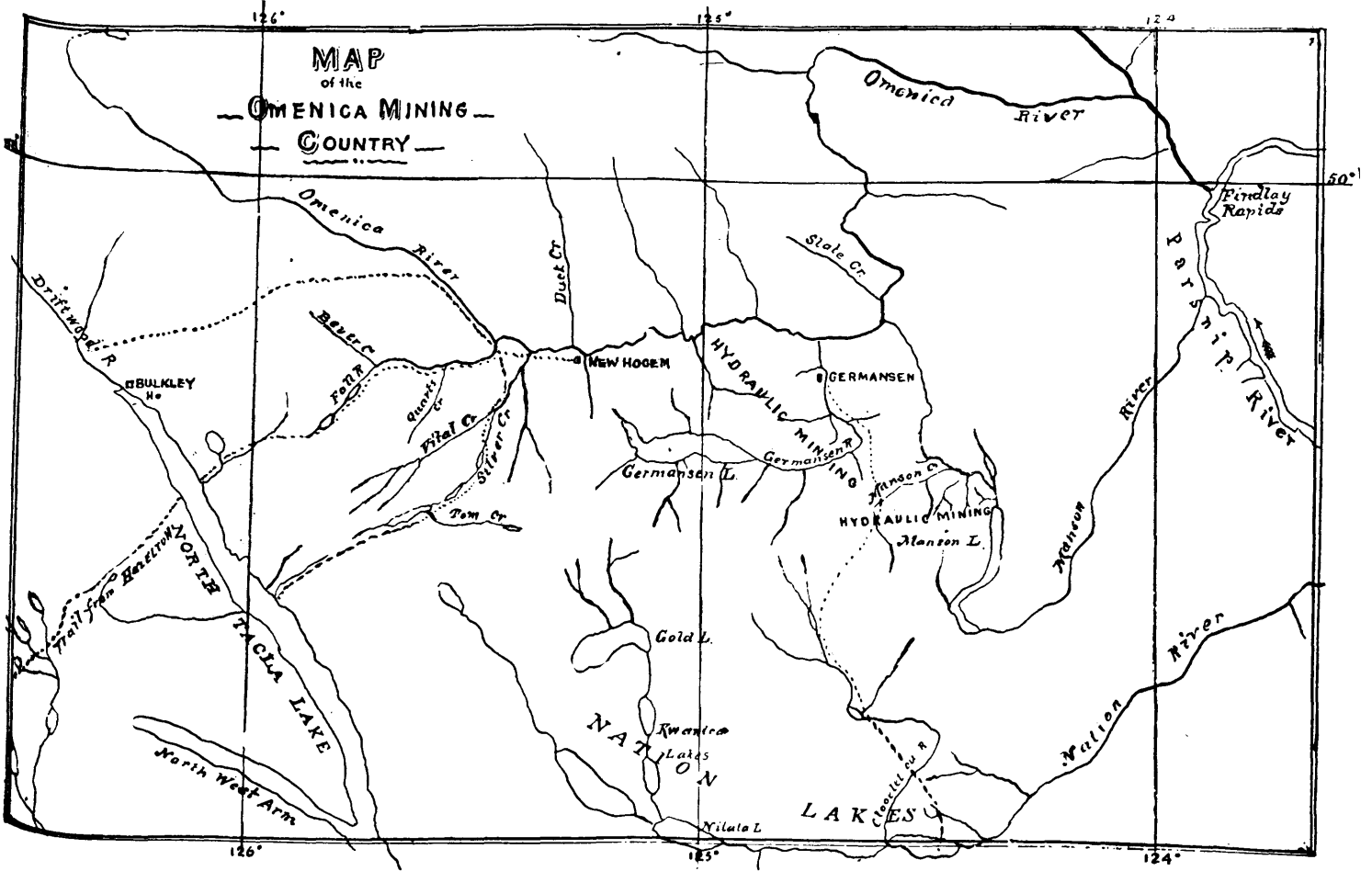
The chances of bimetallism and the reinstatement of silver as part of a dual standard of currency in the great nations of the civilized world are receiving further sets-back as a result of the still steadily increasing output of gold in the great producing regions, and as a result—in part due to the former cause—the resolve just announced, of the Legislative Council of British India to adopt a gold coinage and standard. This step means a considerable lessening of the use of silver coin in the British Orient, although some slight compensation is afforded by the fixture by the India Government of a definite rate of one shilling and four pence, at which the formerly much fluctuating silver rupee will be exchangeable for gold in that country. Everything now points to the fact that silver miners in this and other parts of the world must, for an indefinite period, continue to rely chiefly for their profit-earning on the world's demand for silver in the arts, rather than for coinage purposes. What has now happened in India has, however, been so long anticipated that it can have but little effect on the silver market.

#### OMINECA FIELD NOTES.

Written for the MINING RECORD by J. H. McGregor,  
C.E., P.L.S.

THERE are two main routes to the Omineca—one by way of the Cariboo waggon road from Ashcroft to Quesnelle and then by trail to Stuart Lake and north to the diggings. The other—by Coast steamer to Port Simpson or Port Essington, thence by river steamer to Hazelton, and then by trail around the north end of Babine Lake and eastward, crossing Tacla Lake by ferry.

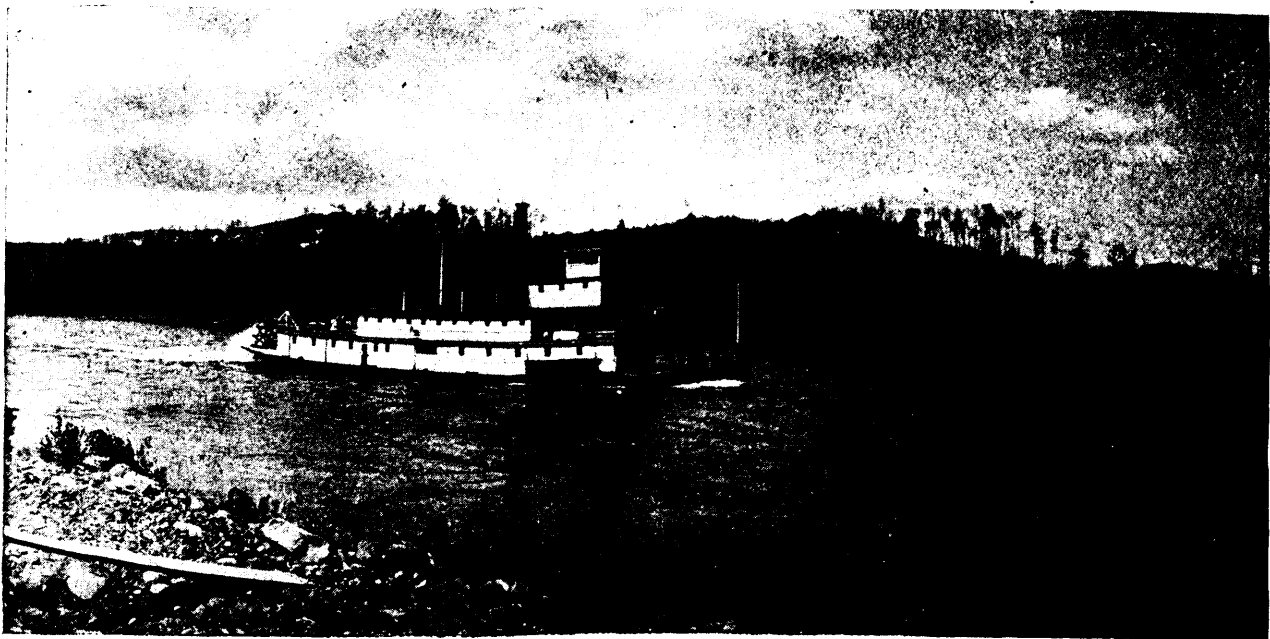
As to which is the best road opinions differ. Those of us who went in from the Coast this year are all for the interior route, while those who travelled the latter are unanimously in favour of the Hazelton trail. It was a bad, backward season for travel. We left Port Simpson in a snowstorm, on the 26th of April, on board the Hudson's Bay Company's steamer *Calcutonia*, a handsome and comfortable river boat, with accommodation for about forty passengers; and after visiting old Metlakahtla, Inverness and Port Essington in the wide tidal mouth of the Skeena, we started up stream on the 28th. We were three weeks on the river. Fairly good time was made for the first seventy miles, the channel being deep and the current not too strong. This stretch, from Essington to Kitsumgalum, carries one through the coast barrier of mountains, and from here on, although mountains are still plentiful, the topographical features of either bank show more variety, a considerable amount of good land being evident in the many valleys, beginning with that of the wide spread pass to Kitamat Arm, which, for a distance of forty miles, attains only about 200 feet elevation above sea level. The alternating



stretches of flat soil, sloping hills and snow-topped peaks, given full effect by the many and sudden bends in the stream, combine to make the Skeena the finest river in the Province for scenic display. They also combine to produce a most startling number and variety of gravel bars, which, in low water, turn the proud river steamer into a crawling amphibian.

Twenty years ago Kitsumgalum was the head of steamer navigation, but in these days of wire cables and steam winzes, a very shallow covering of water is sufficient to transform a gravel bar into a river channel.

We toiled and tugged and warped ourselves slowly forward, being compelled to tie up for several days at



THE HUDSON BAY COMPANY'S STEAMER "CALEDONIA" STEAMING UP THE SKEENA.

a narrow channel known as Little Canyon, and again a few miles further at Kitsalas, or the Big Canyon, where development work is being done on several good-looking copper properties.

Kitsalas Canyon differs materially from the canyon

the dark mouth of the canyon. Later in the day fourteen canoes passed by with 180 natives, bound for the salmon canneries. Some miles above the canyon Lorne Creek enters the left bank, where placer ground has been worked for years with varying results. This



ABOVE LITTLE CANON, SKEENA.

of the Stikine. While the latter is a long, straight drive between high-rising mountains the former is more of a Z-shaped passage cut through huge beds of porphyry and tapped at several points by smaller channels of rushing water, causing a confusion of currents that would embarrass any but the most skilful of pilots. The run down the canyon when the river is fairly high is exhilarating in the extreme—almost more so. As we puffed our way out at the upper end of this narrow passage there came toward us at flying speed a south-bound canoe. Her crew of fourteen men and

summer was, I believe, a successful one for a few men. Above Lorne Creek we touched at Ninskanish, a pretty village under the paternal government of a missionary with business instincts, who runs a saw mill, raises cattle and generally transmits energy to his dusky flock. Back of Ninskanish rises the beautiful range of mountain peaks known as the Seven Sisters, a magnificent sight.

Up river again, with a long stretch of good land on our right of some 5,000 acres. Then Kitwongah on our left, with a fertile Indian Reservation, including



THE VILLAGE OF METLAKAHTLA.

women were paddling with great strength, and in perfect time, while at the stern the captain stood, well braced, and watchful, holding with both hands the heavy thirty-foot sweep that constitutes a steering paddle in these waters. For one minute we viewed a striking picture—the dark and graceful boat—the flashing red and blue paddles—the swaying bodies and swarthy faces, surmounted by gay-coloured silken head-gear; and then they were gone—swallowed by

a huge gravel bar, said to contain good pay gold, but exclusively pre-empted by a siwash cemetery. The totem poles of Kitwongah are particularly striking and well worth the study of the archæologist. Above Kitwongah, on the left bank, is seen the old Grease trail, travelled since olden days by siwashes bound for the oolachan run in the Naas River.

On past Kitseguekla, through a narrowing channel between rocky hills, and then at the Forks, where

the Bulkley River enters from the southeast we tie up at Hazelton. Hazelton is built on a series of broad and fertile terraces, beginning with the flat on which stands the stockaded Hudson's Bay Fort, Cunningham's store, the church, and other creditable buildings and culminating in the cemetery, some 200 feet

bridges are needed at Nine-Mile and Twenty-Mile Creeks (from Hazelton), and again at Salmon Creek, nine miles beyond Babine Lake. The spring was very backward this year, and as late as the 25th of June there was heavy snow wading for our horses on the Babine summit, 3,600 feet above the Forks. At



HAZELTON.

above the river. A good deal of land is cultivated by the Indians, who raise potatoes, rhubarb, turnips, onions, hay and many small fruits.

From Hazelton run three trails of some importance. One, up the main river to Kispiox and Kiskagass, is travelled chiefly by Indians, and last year by Ashcroft pilgrims. A second follows the valley of the

Babine we were most kindly entertained by Mr. French, the chief of the Hudson's Bay Fort at this point. Here again we found vegetables and fruit growing in rich profusion, though the staple industry of the Lake is fishing. The salmon catch is so rich that the company are able to ship dried salmon to the coast and compete with the Fraser River for the



THE INDIAN CEMETERY AT HAZELTON.

Bulkley to its head, and so on to Quesnelle. The third, which we followed, is the route over which the Hudson's Bay Company pass their supplies to Babine, Stuart's Lake and interior points. As trails go, it is a good one, but at the high-water season there is much mud and several hard streams to cross. Good

dog-food trade. The dried fish retail here at 5 cents, making a cheap food for man and beast.

From Babine we drove our horses through a desolate series of hills, some forty miles, to Tacla Lake, where a ferry (run by "Bear Lake Tom") is always ready, weather permitting, to transport horses and

packs to the trail on the other side, about one and a half miles. Our desires not lying in that direction we

canoe, but fairly well-shaped and decidedly serviceable. Our Indian cook, Jimmy, came with us to cap-



AN INDIAN BRIDGE NEAR BEAR LAKE.

paid off our pack train and hired canoes—cottonwood dug-outs—not to be compared with the coast cedar

tain one canoe, and twelve miles up the lake we hired two more guides, Teegu and Hansen. Hansen was a



THE GUIDES TEEGU AND HANSEN, AT DRIFTWOOD RIVER.

big black, heavy stage-villain, with a chronic scowl, whose voice and general appearance reminded one of

tized Daniel, was slighter in build and in moral fibre, of an insinuating manner and a calculating habit of



BEAR LAKE.

an angry bear. We called him Adam Zad for short. but before he left us we voted him a diamond of the first water and good stuff all through. Teegu, bap-

mind; he will probably acquire wealth and many blankets before his end comes, which will not be by drowning.



SEVEN SISTERS, SKEENA.



As a canoe-man, however, he was perfect, and I have no doubt that when he reaches the Styx he will make himself so useful to Charon that he will obtain



Government Offices at Manson Creek.—Mr. Valteau, Gold Commissioner, in foreground.

a permanent billet on the ferry instead of going to his proper *illahee*.

We paddled across the end of the placid lake, passing the ruins of Buckley House, where one of the old Telegraph parties wintered their stock 30 years ago, and turned into the swollen Driftwood, 100 yards wide at the mouth, and so wound our way northward, following the loops and curls of the river as it turned and corkscrewed between dense hedges of willow and wild grasses. Our paddling changed from the easy stroke of the lake traveller to a hard and harder struggle with the current. At night we camped, tired and wet, on a pleasant park-like flat, an old Hudson's Bay camping ground, and here we cut and prepared poles, "and bitterly thought of the morrow." From this



Hydraulic mining on Manson Creek, Omineca.

time on our voyage up the river was a long series of heart-breaking efforts with pole and paddle, to which we were relentlessly spurred by our pitiless hired men. Up the river lay our course, north and west in a general way, though the winding river directed us

to every point of the compass many times a day. Up and up till the current was only less steep than the Falls of Niagara. Then we ran into a little creek with no current and no hard work. The creek turned to a small stream, the stream to a ditch, and the ditch to a portage. Then through ponds covered with water-lilies, and more streams and ditches, till we made the big portage, 300 yards long, and found ourselves on Bear Lake and once more on water, bound for the sea by way of Hazelton and Essington. From Tacla to Bear Lake, by canoe, is about sixty miles—the direct distance is not more than twenty-five. The Driftwood Valley is wide and flat and suitable for agriculture, the timber being light and scattered.

Through this pass lies the trail to the little-known Sestoot and Thutage Lakes, draining into the Omineca and Findlay and a wide expanse of territory, as yet untouched by explorer or prospector.

A small settlement of Indians at the north end of the lake hunt and trap for fifty miles in all directions.



Tatla Lake—Notice the phenomenal reflection.

and from Chief Hywass we gathered the following:

This district was once a portion of the territory of the Siccanies, who hunted it for many generations, until in the course of time some of the more thoughtless members of the tribe wandered westward, and coming upon a few Kiskagass hunters slew them with deadly slaughter. The surviving men of Kiskagass were very salix and prepared for war in big style. The Siccanies, repenting of their hasty action proposed arbitration, which being acceded to resulted in a protocol, afterwards confirmed by a treaty conveying Bear Lake and its water sheds to the descendants of the slain and injured Kiskagass. Of which descendants the greatest was Hywass, who was pleased to throw open his land to the *Chicamen* stone-hunters on condition that we meddled not with beaver, moose or marten, and cut not firewood near his village—and a small *cultus petlatch* of tobacco would greatly oblige.

SOME AUSTRALASIAN MINING FIELDS

Written for the MINING RECORD by W. M. Mackinnon, C. E.

THE writer having lately spent some months wandering about Australasia had the opportunity of seeing various mining fields which have peculiar features of their own. The following notes on some of the places he visited may be of interest to mining men:

VICTORIA.

For some years a system of dredging—so-called—has been carried on in certain districts of Victoria by Mr. J. A. Wallace, M.L.C., presumably with great success, as he has some eight or ten plants at work. The system would in this country be known as hydraulic elevating by steam power.

The plant consists of a boiler and engine and two centrifugal pumps, the whole being carried on a barge or scow. The scow is built in an excavation in the gravel bed which it is proposed to work. One of the pumps supplies water to a nozzle, from which a jet is thrown against the bank of gravel to break it down and carry the material into the lowest part of the pit, from which the other pump raises it into an elevated line of sluices, carried on trestling. As the excavation advances the water is allowed to rise in the pit and the scow is floated further on. The water discharged from the sluices can be impounded and used over again—a very necessary consideration where water is so scarce as in Victoria.

At Castlemaine, where the writer saw the plant of the Campbell's Creek Dredging Company in opera-

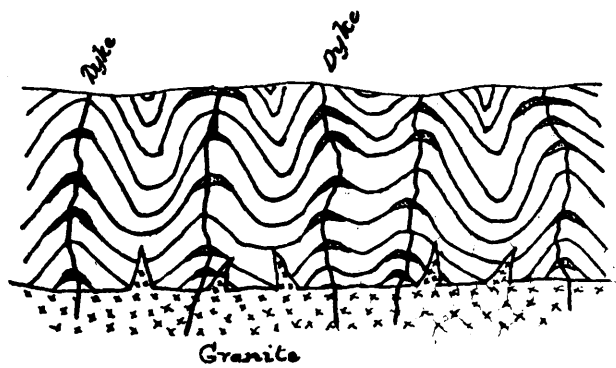


Fig. 1. Ideal Section of saddle reefs

tion, the gravel is fine and has a large amount of fine alluvium mixed with it. This appears to form an important factor in gold saving; as, the thicker the water, the more easily will it carry the gold along with it to within the influence of the pump. By using a wide sluice and spreading the discharge from the pump over it the velocity of the water can be so checked that its thickness need not prevent the deposit of the gold on the riffles.

One and a half grains of gold (6 cents) per cubic yard is reported to be sufficient to pay expenses of working. Mr. Wallace's success has brought others into the field, and a large number of leases have lately been taken up for working on his system. Where a supply of water can be obtained, and there is sufficient gold in the gravel, operations should be carried on with success.

The most interesting quartz mining field in Vic-

toria is at Bendigo, where the unique "saddle reef" formation is worked to a depth of over 3,200 feet. A most interesting report on the field has been made by Mr. E. J. Dunn, F.G.S., of the Victorian Department of Mines, and to it may be referred those in search of more information than can be given here.

The country rock is composed of slates and sandstones of Lower Silurian age. Since their deposition, the beds have become contorted to a remarkable degree and compressed into a series of synclinal and anticlinal folds. The cavities opened along the anticlines have become filled with quartz, which forms the "saddle reef." (See Fig. 1.)

The axes of the anticlines are known as "lines of reef." The Department of Mines have mapped twelve distinct lines approximately parallel, striking N 16° W, eight miles long, and extending over a width of

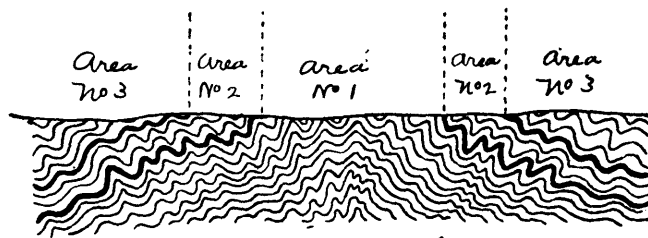


Fig. 2. Cross section

about two miles. Some of the reefs are known to extend for much greater distances, but the survey has been limited to the distance mentioned.

These "saddle reefs" often measure from 20 feet to 50 feet over the saddle, and from 20 feet to 30 feet in height, while their downward extensions, or "legs," on each side of the saddle, thin out to a wedge, and seldom exceed 100 feet in depth below the top of the anticline. They can be followed continuously along the axes of the anticlines, varying in thickness, and dipping or "pitching" in both directions along the strike. They recur in depth one below the other.

In the Lazarus Mine 24 "saddle reefs" were met with down to the 2,200-foot level, 13 of them proving payable.

Mr. Dunn states that "the richness of the quartz bodies depends primarily on the country rock," and he has mapped out three areas, shown diagrammatically in Figs. 2 and 3, which appear to support his view

Area No. 1 has proved very productive.

Area No. 2 has proved much less so.

Area No. 3 is barren.

It will be noted that No. 1 area is composed of the

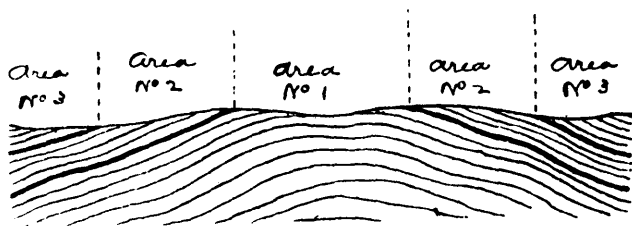


Fig. 3. Longitudinal section

older rocks, which are overlain in succession by the beds composing areas Nos. 2 and 3.

\*" Although there is a general uniformity in the silurian beds, even a cursory examination discloses certain broad distinctions that are intimately related to the presence or absence of gold in these beds."

" Taking the Mall, Bendigo, which is the heart of the auriferous area, as a starting point, and radiating from it, it will be noticed that at first rocks are passed over that are much decomposed at the surface, highly coloured, yellow, green, purple, red, etc., in stripes and mottled. In places these rocks look damp, even in summer, on the exposed edges, the result of hygroscopic salts (sulphate of magnesia) being present. From these rocks the derived soil is commonly of dark red colour, clayey, and very fertile, especially adapted for the growth of the vine and of fruit trees . . . many of the beds of slate and sandstone in this area are massive, reaching to as much as 30 feet in thickness. . . . Proceeding further from the Mall, a far more extensive area is found to completely surround No. 1 area. The rocks are similar to those above described, but as a rule the beds appear to be thinner, there is an absence of the massive sandstones and slates, and the colouring of the rocks is less pronounced, there are more beds interstratified, and the beds generally appear to decompose less readily. The soil in this area is usually more clayey, and of a pale yellow colour, and less fertile."

Outside No. 2 area the rocks " consist of hard sandstones and some slaty beds, that at the outcrop are firm and sharp angled, they are seldom stained of decided colours, and they weather very slowly. As disintegration is not rapid there is little soil, and what there is mostly arenaceous, or of pale yellow or grey colour and of poor quality."

A peculiar feature of the Bendigo field is the existence of dykes of doleritic material along all the anticlinal axes, while none are found along the synclines. They are not continuous but recur at intervals.

That they have been formed at a later date than the "saddle reefs" is shown by their cutting through them. It is not proved that they have had any influence in enriching the quartz, as in some rich mines the dykes

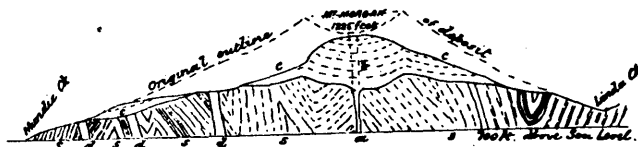


Fig. 4. Section across Mt Morgan.  
a. Pipe of geyser (horizontal) c. Overlying deposit of geyser  
b. Cup deposit of geyser d. Rhyolite dykes.  
e. Metamorphic Rocks.

do not occur.

The ore is treated by milling and amalgamating and concentration of the sulphurets. Concentrates are sold to pyrites works, of which there are several at Bendigo, where the gold is extracted by roasting and chlorination and by cyanide.

A noticeable feature about the Bendigo mills is the absence of rock breakers and automatic feeders. Most of the companies are Victorian and are controlled by local directors. Mine managers are not highly paid, and by keeping down expenses, \$7 stone is made to pay well, even at a depth of over 3,000 feet.

The New Chum, the Garden Gully, and the Hustlers are the lines of reef which have been most extensively mined. Now that the geological structure of the field is so well understood there is scope for scientific mining, and as the area of ground worked bears a very small proportion to the extent of country known to be auriferous it is certain that Bendigo will continue to be a rich mining field for many generations to come.

\*From Mr. Dunn's Report.

#### WEST AUSTRALIA.

The gold fields of Coolgardie and Kalgoorlie are situated on an undulating plateau, about 1,400 feet above sea level, of palæozoic rocks, consisting of granite and hornblende schists, with intrusive diorite and acid eruptive rocks; and similar geological conditions prevail over a large area in the southern and western part of the colony. The inequalities in the contour of the surface have become filled up by sand, carried by the wind, and the absence of creeks and water courses is abundant proof of the scarcity of rain. What rain falls soaks into the sand to re-appear at lower levels, where salt lakes are formed.

Though the country is covered with gum trees and sheoak scrub, not a blade of grass grows upon it, and it speaks volumes for the pluck and endurance of prospectors and explorers that they should ever have penetrated such a desert. The railway from Perth now extends beyond Kalgoorlie, which is nearly 400 miles from the coast. Water for railway purposes is obtained from tanks constructed at intervals along the line, where bare granite ridges occur. These ridges have been utilized as catchment areas by constructing masonry channels round them, so as to lead the water running off them during rain into the tanks, which are simply excavations having the excavated material formed into an embankment round about.

During the "rush" to Coolgardie condensers were established at salt lakes along the route to supply travellers with water. Wrought iron ship-tanks of 400 gallons capacity built into masonry fire-places were used for boilers, and the steam was condensed by being led through long lines of pipe exposed to the air, and protected from the heat of the sun by bough shades.

On the gold fields fresh water is obtained in most cases by distillation from the water drawn from shafts and salt lakes, but some mines have tanks in which rain water is caught and stored. Air condensers, into which the waste steam from engines is discharged are universally used. They consist of groups of galvanized corrugated iron drains, several feet in diameter and 12 feet or 15 feet long connected in series, through which the steam passes, and, becoming condensed, is led by drain pipes into the boiler feed tank.

A marked characteristic of the Coolgardie field appears to have been the extraordinary richness of lenticular masses of quartz at their outcrop.

Many failures in mining ventures were due to the working out of these masses, while in other cases success has become assured by systematic following up of the fissure, which has opened out, and disclosed many more of these lenticular masses rich in gold. The gold occurs in rich patches, and in the Bayley's United Mine, they do not appear to follow any particular lines, but occur irregularly. In the London-derry mine, shoots of gold have been found to follow lines dipping at a high angle along the strike of the reef.

The alluvial deposits about Coolgardie, particularly in the neighbourhood of reefs, have proved very rich, and a large number of nuggets weighing from 10 ozs. to 60 ozs. have been found.

The dryblower may still be seen eking out an existence shovelling dirt into his "shaker." The fine gold cannot be saved by the process of dryblowing, and most of the surface would pay to sluice were sufficient water available for the purpose.

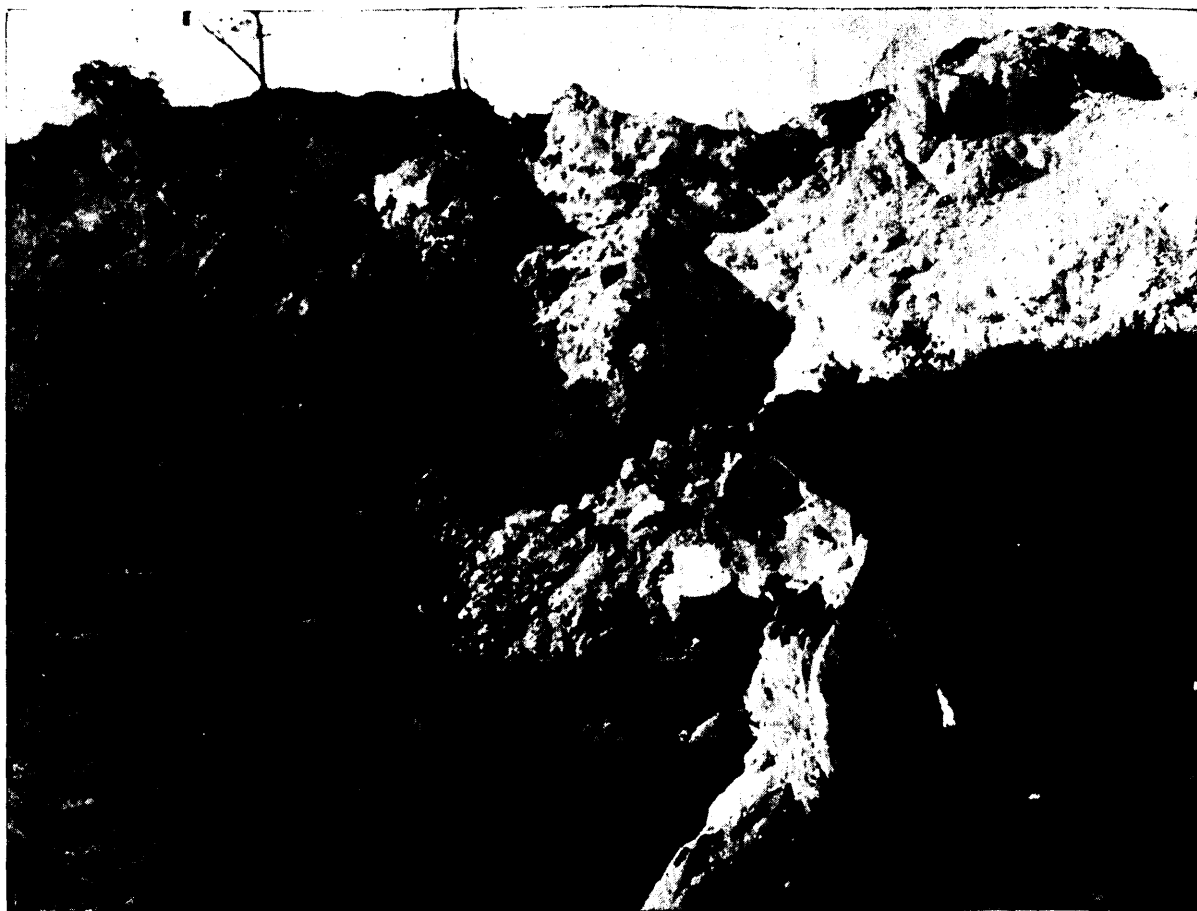
Kalgoorlie lies 25 miles further to the east than Coolgardie and has drawn away most of the population of the latter place. The nature of its complex lodes and their high gold bearing value makes Kalgoorlie a most interesting field.

The conflict of opinion as to the origin of the lodes is well illustrated by the following quotations:

Van Oldbrintenborgh in "Technical Observations Upon the Coolgardie Goldfields," after giving many reasons for the conclusions to which he comes, says: "Therefore the above statements altogether appear to me to establish that most of the complex lodes discovered in West Australia must not be considered as

In appearance the lodes are highly schistose. Wall appears after wall and the only guide as to the limit of the pay ore is constant drilling into the walls and assaying the drillings. The ore is oxidised to a depth of from 100 feet to 200 feet from the surface, and in going along a level the horizon of oxidisation rises and falls in an irregular manner. This is no doubt due, as in other places, to the varying permeability of the material, so that the surface water penetrated some parts more easily than others. The oxidised ore is treated by milling and amalgamating and cyaniding the tailings and sluices.

There is a large proportion of sluices which makes



MT. MORGAN—OPEN CUT SHOWING STOPED FLOORS BENEATH.

being fissure nor impregnation veins resulting from hydrothermal action, but that on the contrary they constitute lodes of true eruptive origin."

\*"The auriferous lodes in all the mines at the south end of the camp (Boulder) are in reality dykes of highly foliated felsite impregnated with carbonates of lime, etc., and also with auriferous pyrites and tellurides of the noble metals."

†"The veins are mineralized bands in a schistose country. The ore is very slightly altered country rock, containing iron pyrites and tellurides of gold."

||"Impregnations of the country rock along fissure planes or crushed zones with but little deposition of gauge minerals. . . . Zones of crushing and fissuring in diabase and highly altered slates, from which channels, impregnation and some replacement of the country rock has taken place."

the use of agitators in the cyanide vats, and filter presses for extracting the solution, a necessity. Large plants, consisting of various forms of crushing appliances, roasting furnaces and cyanide apparatus, are in course of construction for the treatment of the sulphide ores. Much of the rich telluride ore has been sent to Adelaide to be smelted, and a large smelting plant has lately been erected at Fremantle to treat Kalgoorlie ores.

Those mines which have enough oxidised ore to keep their mills employed for a year or two are in an enviable position, as they can afford to await the results of experiments by their neighbours before going to the expense of erecting plants for the treatment of the sulphides. Much money has already been wasted in the construction of plants which have proved unsuitable.

\*E. S. Simpson, Transactions Am. Inst. Mining Engineers.

†Geo. J. Bancroft, " " " " " "

||H. C. Hoover, " " " " " "

The following figures show the rich nature of the Kalgoorlie lodes:

Mine.	Total production 31st Dec., '98.	Yield per ton (3,240 lbs.)		
Associated .. . . .	73,715 ozs.	1 oz.	15 dwt.	12 grs.
Great Boulder . . . .	250,308 "	2 "	14 "	16 "
Lake View Consols. . .	193,755 "	1 "	17 "	11 "
Hanna's Brownhill. . .	81,104 "	2 "	15 "	1 "
Ivanhoe . . . . .	93,787 "	1 "	19 "	16 "
Total production of field to Dec. 31, '98, 858,163 ozs.				
Yield per ton (2,240 lbs), 2 oz. 0 dwt. 15 grs.				

As similar geological conditions exist over such a large area, the probabilities are that other fields of a like nature to Kalgoorlie will be found, and it is not improbable that West Australia will, before many years have passed, rival the Transvaal in its production of gold.

ment Geologist, is of the opinion that it has been formed by deposition from a hot spring or geyser; while others look upon it as the gossau of the pyritous rock by which it is surrounded and on which it lies.

The country rock in the neighbourhood of the mine consists of highly metamorphised sedimentary rocks of carbonifero-permian age, intersected in all directions by dykes and intrusive masses of igneous rock. Mr. Jack has made three reports on the mine at intervals of four or five years. In his first report he gives a cross-section of Mt. Morgan (see Fig. 4), showing the cup-shaped nature of the deposit common to geysers, and the evidence afforded by subsequent workings shows that that is the form the deposit actually takes, and goes to prove that his theory is correct.

To quote from Mr. Jack's second report: "The evidence now to hand, in my opinion, goes to confirm my original view that the auriferous material was



MT. MORGAN—VIEW OF MINE AND WORKS.

#### QUEENSLAND.

The Mt. Morgan gold mine is about thirty miles distant from Rockhampton, the coast terminus of the Central Queensland Railway. A branch from the main line of the railway has lately been completed, which gives communication between the mine and Rockhampton. On this line a steep gradient about three-quarters of a mile in length is ascended by a rack on the Abt system, which is of interest as being the only one in Australia.

The nature of the formation in which the gold occurs in Mt. Morgan, and the richness of the deposit, make the mine one of the most remarkable mines in the world.

Geologists differ as to the mode of formation of the deposit. Mr. R. L. Jack, the Queensland Govern-

deposited by a thermal spring. The deposit is freely intersected by felsite dykes, and lies on and is surrounded by the pyritous quartzite country-rock. Numerous dolerite and rhyolite dykes intersect the country-rock, but not one has been met with in the auriferous deposit. Had the auriferous deposit been merely the siliceous skeleton remaining after the removal of the pyrites from the pyritous quartzite, the dolerite dykes would still have remained to attest the original identity of the two masses. But there is at least one clear instance of a dolerite dyke intersecting the quartzite country-rock, and not intersecting the overlying sinter. This shows that the sinter and ironstone were deposited on and were not altered portions of the pyritous quartzite country rock. . . . . Again, the fact that the sinter is mainly a hydrous

silica is an argument against its being the skeleton produced by the solution of masses of pyrites from an anhydrous quartzite."

The top of the mount consisted chiefly of siliceous hæmatite, with a stalactitic structure, containing gold in a very fine state; but the bulk of the ore mined is a siliceous cellular sinter, which is sometimes so light that it will float in water. Auriferous pyritous ore is found at lower levels. Mining has been carried on in open cut to a depth of about 160 feet, and numerous floors are stoped out below ground. The ore was at first treated by milling and amalgamating, but as only about half the gold was saved owing to its extreme fineness, recourse was had to chlorination. The Newberry-Vantin system was in use for some time, but, as it is unsuited for the treatment of ore on a large scale, it has given place to a process in which the ore is leached in open tanks instead of closed barrels. After being dried, in revolving cylinders, crushed and roasted, the ore is deposited in the tanks, in which are gravel and sand filters, and the chlorine solution is run in. The effluent, containing chloride of gold, is passed through charcoal filters, when the metallic gold deposits on the charcoal. The charcoal is then burned off and the gold smelted in a small furnace (not in crucibles) and run off into bricks.

Krom rolls and ball mills are used for pulverizing the ore, and revolving cylinder and reverberatory furnaces for roasting pyritous ores. The first section of a series of shaft furnaces has just been brought into use. These furnaces are built of brick, and consist of tiers of arches inside the shaft, over which the ore passes continuously from top to bottom while being roasted. Means are provided to check or accelerate the rate at which the ore is passing through.

From 1886 up to 31st May, 1895, 1,331,015 ozs. of gold were taken out of the mine, which gave an average yield per ton of ore of 2 ozs. 13 dwt. 5 grs., and \$18,500,000.00 were paid in dividends.

During 1896 the yield amounted to 153,097 ozs., giving an average of 1 oz. 8 dwt. 18 grs. per ton; while, during 1897, although 173,274 ozs. were obtained the average per ton only amounts to 1 oz. 6 dwt., 16 grs. So that while the amount of ore treated is increasing the yield of gold per ton is falling.

REPORT ON TRIALS AT BAGOG, QUEBEC.  
TO TEST THE ECONOMY EFFECTED  
BY PRE-HEATING COM-  
PRESSED AIR.

By Prof. J. T. Nicolson, D. Sc. (Edinburgh and McGill), M. Inst., C. E.

THESE trials were made during the month of April, 1899, at the Dominion Cotton Mill, Magog, Canada, where there is installed a 150 horse power hydraulic air compressing plant on the system devised by C. H. Taylor, of Montreal.

They were made at the instance of Mr. John A. Inslee, of St. Louis, and conducted under the auspices of Mr. Inslee, the Taylor Hydraulic Air Compressing Company, and the Dominion Cotton Mill Company, jointly.

The trials were conducted by the undersigned, assisted by Professor R. J. Burley, B. Sc., Etc., of McGill University, but a number of prominent engineers from the United States were invited to be present and took part in the experiments. Amongst others, I may mention Mr. A. Langstaff Johnson, of

Richmond, Va., Mr. Wm. O. Webber, of Boston, Mass., and Mr. John Birkinbine, of Philadelphia, Pa.

Experiments were made on five different methods of using compressed air in an ordinary steam engine of the Corliss type.

- 1st. The air was supplied to the engine cold.
- 2nd. Steam was injected into the air in the main pipe before supplying it to the engine.
- 3rd. The air was injected amongst the water in a steam boiler and heated by mixing with the water and steam of the boiler before being supplied to the engine.

4th. The air was blown upon the surface of the water in a steam boiler and heated, by mixing with steam in the same before being made to drive the engine.

5th. The air was passed through a tubular heating vessel and heated by a coke fire afterwards being used to work the engine.

For all the experiments the air was drawn at a pressure of 53 pounds from the five-inch air pipe of the Taylor air compressor, which supplies power to the mill and was piped to a 12" diameter by 30" stroke Corliss engine supplied for the purpose of the trials by the Laurie Engine Company, of Montreal.

A friction brake was fitted on the fly-wheel of this engine, and the engine in this way was worked up to its full power at about 75 revolutions per minute.

Connection was made to a Lancashire boiler 7 feet diameter by 30 feet long, when it was desired to mix steam with the air for purposes of pre-heating.

When dry heating was resorted to the air pipe was led through a heater of the construction shown in the annexed drawing, on its way to the engine, having been previously blanked off from the steam boiler. This heater was designed by the writer and built by Messrs. The Laurie Engine Company, for these experiments; but, as it was designed of such size as to heat the whole of the compressed air used in the mill, it was considerably larger than was required to heat the greatest quantity of air which could be used by the Corliss engine employed on the test. It was, therefore, a matter of some difficulty to prevent the heater and the small quantity of air passed through the same from becoming hotter than was desired.

1. For the experiments made without pre-heating the observations made were as follows:

The temperature of the air before entering the engine.

The same on leaving the engine.

The pressure of the entering air, indicator cards from each end of the cylinder, readings of the revolution counter and of the rope brake weights.

A trial was conducted with cold air on April 27th in the presence of Mr. Birkinbine, which gave the following results:

The air entered at 66.5 F. and was exhausted at -41 F., the revolutions being 74.6, and the cut-off about one-third of the stroke. The indicated horse power was 27 and the weight of air used per hour was 1,671 lbs. This gives about 841 cubic feet of free air at 60 F. per 1 H.P. hour.

On another trial made under same conditions 850 cubic feet of free air were used per 1 H.P. hour.

2. In the case of experiments made with the dry heating, the following observations were made:

The temperature of the air before entering the heater; after passing up the first row of tubes; upon leaving the heater; before entering the engine.

The temperature of the furnace and flue-glasses of the heater were also taken, the former with a Callendar's patent electrical promoter.

The amount of coke (Sherbrooke gas coke) used was carefully weighed and the trial only began when the conditions had become steady, i.e., about three hours from the time of beginning the run with heated air. Cards were taken; the brake horse power and the revolutions were also observed.

With air entering the heater at a pressure of 53½ lbs. gauge and at a temperature of 58.2 F., it was raised to 225 F. after passing the first row of tubes, and to 363 F. upon leaving the heater. Owing to undue length of air pipe and lack of proper covering, the air fell in temperature to 287 F. before entering the engine. It was exhausted at 88 F. and the pressure at the engine was 52½ lbs by gauge.

The temperature of the gases leaving the fire was only about 700 F., and was reduced to 100 F. in the flue of the heater. It was difficult to use a small enough quantity of coke in such a large heater without letting the fire out altogether. A closed ash-pit was used and the air for combustion supplied from the compressed air main, and could be regulated in its amount to a nicety.

Under these conditions and with exactly the same cut-off as in trial of cold air, the indicated horse power being 26.7 and the revolutions 70 per minute, there were used 1,310 lbs. of air per hour; this gives a consumption of 640 cubic feet of air per 1 H.P. per hour, a reduction of 850—640—610 cubic feet of free air per 1 H.P. per hour due to pre-heating. Thus 210—850, a saving of 24.7 per cent. is effected in the quantity of air used.

This saving was effected by the burning of 9.3 lbs. of coke per hour, or of 9.3—26.7 348 lbs. per H.P. per hour.

These results may be stated otherwise, as follows:

To produce 100 H.P. with cold air 85,000 cubic feet of air were required in this engine; when pre-heated to 287 F. the horse power yielded was 85,000—640—133 H.P., and as this heating was effected by the burning of  $9.3 \times 133$ .

27 47 lbs. of coke per hour ;  
the additional 33 H.P. were obtained by an expenditure of 47 lbs. of coke per hour, or at the rate of  $\frac{47}{33}$

1.42 lbs. of coke per hour additional.

If we assume that this gas coke had three-quarters of the calorific value of good coal, it is seen that we obtained an additional horse power for every (1.42 x  $\frac{3}{4}$ ) 1 lb. of coal burnt in the heater.

As an ordinary steam engine and boiler of this size would require from 4 to 8 lbs. of good coal per H.P. per hour, it is seen what a very economical mode of using the heat this is. Heat is used 4 to 8 times as efficiently in a compressed air pre-heater as it is in a steam engine and boiler.

With regard to the results of this trial it ought to be remarked that a large radiation loss per lb. of air used was taking place, both on account of the undue size of the heater and on account of its distance from the engine. Much more favourable results can be and in fact have been obtained, when the size of the engine and heater are properly proportioned.

Professors Riddler and Guttermuth have obtained an additional horse power in air motors for every  $\frac{3}{4}$  lb. of coal burnt to heat the air. This is an economy far surpassing that of any prime motor in existence.

In large plants with first class air motors, where double or triple pre-heating might be resorted to, a better result than even this can easily be obtained.

In a large transmission plant consisting of a Taylor air compressor, a five-mile pipe line, air engines and electric generators, with coke pre-heating stoves; the full or gross power of the water fall can be obtained at the terminals of the dynamo, at a comparatively insignificant cost for fuel.

No other system of energy transmission can compare with this for economy of first cost and maintenance.

3. Tests were made of the economy to be obtained by heating the air by mixing it with steam from a boiler before allowing it to do work in the engine.

The results are of the highest scientific interest; and show the adaptability of compressed air to almost any condition of employment. As regards economy, this method is, however, inferior to that of dry heating. By mixing from 10 to 13 lbs. of steam per H.P. with the air, the quantity of air required was reduced from 850 cubic feet to 300 to 500 cubic feet per 1 H.P. per hour. Thus the air required for a 100 H.P. engine running with cold air would be sufficient to operate an engine of 85,000—400—210 H.P., if mixed with 12½ x 100—1,250 lbs. of steam per hour. This can be supplied by about 140 lbs. of coal per hour; so that 100 H.P. additional were obtained by the burning of 140 lbs. of coal or 140—110—1.3 lbs. of coal per 1 H.P. per hour additional.

Such a method of heating, economical as it may appear, would, however, be unsuitable except for powers of over 50 H.P. unless waste steam is available from a boiler plant at times of low demand.

The full detailed results of these tests will be found in the Technical Appendix hereto attached.

#### THE SMALL ECONOMICS IN MINING.\*

By Howard West, A. R. S. M., New Denver, B. C.

IN presenting a paper of this character at an important meeting of the Institute, I do so with a full knowledge of the vastness of the undertaking—which may seem possibly on a review of the title a somewhat paradoxical statement to make—and the grave responsibility which I am incurring in venturing to discuss a subject which has been so ably and thoroughly gone into by the most eminent authorities in every quarter of the globe.

Granting that much of what has previously been written will apply equally to this section, my excuse is that there may be still some matters which have not been brought to the notice of mine operators, and also that local conditions have such an important bearing on the subject that only those who are thoroughly in touch can form a conception of the nature of the problems met with in each particular locality. It is unnecessary to add that almost all the world's great producers depend on the strictest economy for their successful operation, for we know that where the cost of extraction on a large scale approximates in any degree the average value of the ore, a very small saving indeed is sufficient to constitute an important item in dealing with the profits, which after all is the fundamental object of mining from a commercial point of view.

The term "small," as applied in this sense, is of

\*Read before the Canadian Mining Institute at Nelson, September 12, 1899.



course merely relative, as a small economy involves a great saving where quantity is concerned.

It would be digressing, I think, to refer in this paper to the tremendous strides which have been made in this direction of late years by other countries, notably perhaps the Transvaal, where the adoption of the cyanide process for the subsequent treatment of slimes and tailings has done so much to raise the standard of efficiency attained, because conditions here can scarcely be deemed analagous; nevertheless, we in British Columbia can boast of isolated examples of economical management which will bear favourable comparison with the best of undertakings elsewhere. No one will contend for a moment that we are as yet all that is possible or indeed that we might be in this direction; my object, however, is only partly to notice the more palpable and obvious shortcomings which may be seen at the majority of mines, but principally to throw light as far as I am able on a few apparently unimportant, because often unobserved, details. Before proceeding, let me say that I have no intention of ignoring the many disadvantages under which mine operators labour in this country as compared with other centres of the industry, nor do I wish to insinuate that we are in any way behind rival districts, which may have found themselves at one time or another similarly handicapped; my desire is merely to draw attention to the fact that through various causes, many of which it must be confessed are quite incomprehensible to an ordinary individual, real economies are not effected in the manner in which one is taught to look for them, and to explain some few of the reasons why these conditions are allowed to continue.

As this subject can only be conveniently dealt with by taking into consideration the different varieties of ores and the peculiar conditions encountered in each division, I shall confine my subsequent remarks to a very important section of the country, and one of which you have all heard, namely, the Slocan. Having been myself a resident of this district for nearly five years, no one can accuse me of prejudice in expressing the opinion that for a region where mining has assumed permanent proportions, the economies effected are still of the most elementary description. Admitting this then for the sake of argument, we will proceed to observe carefully the cause of this apparent neglect of one of the first principles underlying the success of any industry. Among the chief reasons, I am inclined to think, is the large element of chance which enters into mining in all localities, but which is perhaps a more noticeable factor in the Slocan than elsewhere. At Rossland, and in fact all camps where medium and low-grade ores can be handled to advantage the tendency is ever towards quantity rather than quality, within specified limits, which as a natural consequence brings matters down to a more or less mathematical basis so that comparisons of the cost of production and the value of the ore can easily be made, and the profits estimated with a certain degree of accuracy beforehand. This of course is the origin of all mining on a large scale, and it must be candidly acknowledged that so far as the Slocan is concerned some considerable time will elapse ere it attains to this desirable end. Not that quantity is despised by any means, but quality is the one essential requisite before a deposit can be considered of practical value. Seeing then that only ore of a fairly high grade will pay to ship—from the Reports of the Minister of Mines we find that the average silver and lead contents of Slocan ores for the last two years were 103 ozs. and 46 per cent. respectively—it becomes a question of de-

veloping small veins of relatively high-grade ore in preference to larger ones of somewhat lower value; and in working a deposit under ordinary conditions, one is forced to ignore the wide bodies of what is commonly referred to as concentrating ore and push on towards the richer chutes where the values have been already determined in nature's laboratory. By this I must not be understood as advocating the principle of gutting a mine of its richest ore and leaving behind stacks of material which, under fostering treatment, would become marketable; I simply wish to point out in extenuation the allurements which this district offers to the investor in the shape of quick returns, as has been repeatedly demonstrated in the past, in contrast to the system of uniform, though more modest gains which is a feature of lower grade camps. In short, the tendency of those responsible for the operation of our mines in the past, after exercising due judgment and discretion in the selection of properties to work upon, has been to regard mining as essentially a gamble and chance the main factor, because many of the deposits were sufficiently rich near the surface to render economy apparently superfluous; unmindful of the fact that for every mine so favoured there are probably a dozen which could be made successful from a business standpoint by the adoption of an economical system of working and development. Fortunately for the survival of the reputation of the district these early impressions are rapidly giving place to more healthy aims, and it is easy to see that simultaneously with the influx of capital more attention is being paid to the other primary factor, namely, that of quantity or tonnage than has been possible to those of small means. This of course is only to be expected, for the old saying that "money makes money" holds true in this department of life as in others. Mine managers in the Slocan are accustomed to pride themselves above all else on the richness of their deposits, which enables them to compete on equal terms with other districts offering considerably more advantages for cheap production; this, however, in no way relieves us of the responsibility which we feel as mining engineers of endeavouring to raise the industry to the position where it will give employment to the greatest number of men and return the maximum of profit to those who show their faith in the Province and its resources in the most practical method of all, by investing their surplus capital in our midst. As I have before showed, statistics amply prove the right of this district to the title of a high grade camp, but this is not saying but what there are thousands upon thousands of tons of second-class ore—much of which would doubtless not be so designated in more favoured regions—which would soon double and treble the production of the district could it only be worked at a profit. The accumulations which are a burden in their present condition are capable of being converted into a source of revenue under efficient management, so that when the necessary co-operation from money centres is forthcoming one of the most important elements of loss will be obviated.

Let us look for a moment at the true meaning of the word "economy." An economy can only be said to be effected when the saving resulting from an operation or a series of operations is greater than the expense connected therewith. We must be careful therefore to avoid in our handling of the subject too close a comparison with districts differently situated. In speaking of economy then it would be incorrect and misleading to apply the same hide-bound rules which govern mining in far away places to the conditions in



the Slocan, and to say that because ore carrying 10 per cent. lead and 6 ozs. silver per ton can be made to pay in Ontario or Quebec, therefore, we are not economical in British Columbia if we cannot do the same thing, our object should be rather to stimulate investigation into the causes which render mining in the provinces first named profitable, and afterward to seek as far as possible a solution of the difficulties here met with. Take as an example my casual mention of an ore carrying 10 per cent. lead and 6 ozs. silver; the reason this can be made to pay in Quebec is because under conditions which are favourable it can be converted into a marketable commodity by the simple process of concentration, whereas by no known method can it be turned to account in the Slocan. I merely instance this as one case in a great many where natural obstacles render it next to impossible to treat with ore which could be handled elsewhere to advantage. This of course does not apply alone to material which is susceptible of concentration, for there are values too vast almost to realize concealed in ore which has already attained its maximum limit through natural agencies, and which is too poor even in this condition to warrant further investigation. The utilization of these reserves should be a matter of paramount concern to the engineer, in the study of which he is called upon to exercise his utmost skill and ingenuity; and perhaps it might not be out of place right here for me to add my oft-repeated protest to that of others against the practice of placing unqualified engineers in charge of developed properties and leaving to them the details of management, when men of experience are to be obtained without difficulty. In the first stage of operations this can hardly be avoided to some extent, the expense of a trained technical adviser being often beyond the means of pioneers, and his presence, too, not always so necessary as when the finer matters of treatment are under consideration; but with all due respect to the practical man—and I have every reason to thoroughly appreciate his many excellent qualities—I submit that he is utterly incapable of supervising economic details, many of which require a man versed in geology and mineralogy to properly comprehend. This I argue is the first step that must be taken if the mines of any district are to be worked to advantage, and whatever the shortcomings in this direction in the past, it is gratifying to observe that the better class of mines in the Slocan are now almost without exception in charge of men who are equally practical and theoretical.

The main reasons why comparatively low-grade ore will not pay to mine in the Slocan are not far to seek, many of them being common to all mining camps in their early history. The necessarily high cost of transportation and treatment is one of the chief factors to be considered, and though little progress appears to have been made during the last few years, we may rest assured that as soon as developments warrant and capitalists see their way clear to erect reduction works nearer the source of supply, they will not hesitate to act upon their convictions. Of equal importance is a matter that I am somewhat chary of touching upon, namely, that of the removal of the duty on lead, so much having already appeared upon the subject from these better qualified to discuss the subject in all its different aspects. Looking at it, however, from an economic standpoint, one stares in amazement at the amount which is collected yearly by the United States officials in duty, and speculates idly on what effect it

would have on this district were lead added to the free list.

Then again, the question of cheap transport from the mines to the railway is by no means an easy one to solve, even when operations are assured on a large scale, but the advent of capital is bringing machinery of every description to our aid; matters being greatly simplified by the introduction of tramways of various types.

Economies in marketing the ore are admittedly hard to effect as the majority of smelters have a combined freight and treatment charge and a uniform method of estimating the values, which leaves little in favour of any particular establishment. There are, however, one or two points in this connection which are well worthy the study of the intelligent manager. In the first place it should be his aim where the quantity of reserves will permit to secure the very best rate possible by guaranteeing the entire output for a given period to one smelter, others things being equal; in this way it is sometimes possible to save many hundreds of dollars in a year. Then again, he should endeavour to suit his ore as far as convenient to the requirements of the smelter by eliminating, where the expense is nominal, objectionable material which would otherwise tend to increase the treatment charges and incidentally the cost of transportation as well. I have in mind a case where a manager succeeded in bargaining for a considerable reduction in smelter rates through being able to guarantee that no shipment would contain upwards of 5 per cent. of zinc, and similarly a company which found that its ore invariably overstepped the 10 per cent. limit allowed by most smelters was enabled to save a dollar a ton by shipping to a concern which inflicted no penalty until a maximum of over 12 per cent. was present. Moreover, by a judicious mixing it is often possible to avoid paying any penalty whatever, and in some instances I have known matters have been so manipulated that credit was obtained for one ingredient which would not otherwise attain the necessary standard, as in the case of an ore carrying a little less than two dollars per ton in gold; by shipping in conjunction with material giving higher returns of this nature the whole of the gold contents will receive recognition.

The idea of smelters being intentionally dishonest and not paying on the real assay value of the ore received, is one largely held by those who are either suspicious of everyone on principle or are in the habit of incorrectly sampling their ore before it leaves the mine. This view I need hardly say is not accepted by the more observant managers, but that smelters may occasionally make mistakes, possibly to the disadvantage of the miner, will be conceded even by their own employees, and therefore a preliminary sampling before the ore is shipped is important to serve as a check on the smelter returns.

When convenient it is more satisfactory perhaps for the shipper to go himself or send a representative to supervise the sampling done at the smelter, for I know of one case at any rate where the check pulp corroborated the actual returns as given by the smelter, and yet on a representation from the mine that it did not accord with their preliminary results the car was re-sampled and the returns materially increased.

The value of pulp as delivered for check purposes is, I suppose, questionable, unless the shipper has, as suggested, personally seen his ore weighed, crushed

and sampled, and further, assisted at the moisture determination, but the smelter company practically agreeing to pay on the assay value as shown by this sample, it is always advisable and sometimes profitable to carefully check their returns. It will detract in no way from the recognized efficiency of smelter assayers if I say that even they are occasionally caught napping, and in justice to their integrity I wish to record the fact that on several occasions I have discovered that the smelter has paid for more than other competent assayers were able to detect in the pulp which was furnished them.

One other matter to which I should like to draw your attention is that I have been taught by experience that owing possibly to a slight difference in practice, smelters' assays themselves vary to a degree, which is well worthy of consideration, and that whereas I invariably obtain a fraction of an ounce less than actual returns as given by some smelters, the reverse is the case in others, one instance coming to mind where there is always a deficiency of from one to three ounces. We are justified in assuming, therefore, that slightly better returns will be obtained on the same ore from an establishment belonging to the former class than from one of the latter, and in practice it is manifestly economy to take advantage of experience of this kind.

Then, too, in the case of ore which is characterized by containing part of its value in the form of metallic prills there is need for the most searching investigation, as owing to the unevenness of its distribution smelters are sometimes doubtful of their own assays, even representing the contents of the ore in bulk, it being much more convenient to entirely ignore the prills, a course of procedure which I have been assured is occasionally followed where the value represented is small in comparison to the whole.

These are all doubtless matters of little importance by themselves, but in the aggregate they mount up and may assist in determining the difference between the successful and unsuccessful management of a property. I do not, however, cite them as common experiences by any means, but simply to show that they may occur unless guarded against, and that therefore it pays to devote the most careful attention to detail in every direction alike.

It frequently happens that a variety of minerals of an essentially different nature are encountered in the same workings, but we find that very often, owing possibly to prejudice or the apathetic determination to follow custom in the matter, no effort is made to dispense of anything but the main product. This is a very serious error, and one which may be rectified by a careful study of the situation and the demand for any particular class of ore. It is safe to say that tin mining in Cornwall would not have survived to the present day but for the recovery of the associated copper, arsenic and tungsten minerals, and instances abound the world over where the comparatively unimportant element has furnished the margin of profit on the investment. Hitherto the Slocan has been regarded solely as a silver camp, no other metal, with the exception of lead, having found favour in the eyes of smelter men. It is by no means certain, however, that other descriptions of ore, some possibly unknown at the present time so far as this region is concerned, will not eventually constitute part of the output; indeed there is one mineral very intimately associated with the galena which ought to be turned to account, and this in spite of the fact that it has so far proven a

source of considerable loss, and been regarded generally as detrimental. I refer, of course, to zinc blende. It is no secret that the Bosun mine has disposed of several car loads of ore in London at a large profit for which it was absolutely impossible to find a market this side of the Atlantic, constituting, if I am not mistaken, the first record in the history of the Slocan where actual payment has been made for the zinc contents, although the penalty inflicted by American smelters of ore of this class may be avoided by shipping to certain works on the Manchester Ship Canal. I commend this to the attention of mining men generally and those of this district in particular, as there is a possibility that in many cases it may lead to encouraging results. The ore in question, I may say, was hand-picked until it averaged roughly 45 per cent. metallic zinc, 1.5 per cent. lead, and from 50 to 80 ounces of silver per ton.

The ever widening nature of the subject I have chosen is becoming so alarmingly apparent as I progress, that I find it expedient to make no effort to complete the undertaking in the manner originally contemplated; I beg leave, however, before concluding to refer to two other matters which fully merit our notice. The first is the absolute necessity of every mine being supplied with a proper system of accounts so that the manager can refer whenever he desires to the cost of any particular piece of work and make the necessary comparisons as he goes along. There is no need, however, for me to dwell upon this at length, even if I had not already trespassed too long upon your time, for I notice that Dr. Hardman, the worthy President of the Institute, intends to go into the subject more fully in his contribution to the proceedings.

The other matter which I had in mind would fill a volume if necessary, as it relates to the much vexed subject of concentration. While I have had some little personal experience in work of this kind, and am thoroughly conversant with the principles underlying the process, there are members present I know who have been making a special study of this branch for months past, so that I shall be very brief indeed, in order to give them an opportunity to speak for themselves. I would willingly have omitted all mention of this matter were it not self evident that the process is destined to be the chief factor, if I may be allowed to say so, in the future advancement of the district. In no other department perhaps is the strictest supervision so essential to success, for even a little carelessness may result in large values being persistently run to waste. It is economy of the first order to employ a thoroughly competent mill man as he will save in a month's hundreds of dollars worth of ore, which would doubtless be irrecoverably lost under less skilful treatment. So, too, the highest professional skill is the cheapest in the long run, and a mine owner makes a serious mistake when he employs an engineer or an assayer simply because his fee may be lower than that of others.

The type of concentrator generally adopted in this district was dealt with in a paper entitled "Mining Machinery in the Slocan," which I submitted some eighteen months ago. Since that time but little alteration or improvement has taken place, if we except the introduction of the Wilfley tables at the Alamo works, where it is used in place of the round bridles. In the newer types of concentrators now under consideration to be erected before long, it is probable that in view of the prospective importance of the zinc blende in the ore, four compartment jigs will replace those previously employed, so as to facilitate the recovery of this product.

## RECENT LEGAL DECISIONS.

(Specially Reported for the MINING RECORD.)

Callahan vs. Copen.

In May, 1892, the defendant located the Cube Lode Mineral Claim, which was duly recorded and certificates of work were issued in respect of it regularly since that date.

The plaintiff in 1896 located and recorded the Cody Fraction and the Joker Fraction Claims on the same ground as the Cube Lode Mineral Claim and attacked the defendant's location of the last mentioned claim on the ground that upon the initial post the "approximate compass bearing" of No. 2 post was not given as required by the Mineral Act.

At the trial Mr. Justice Martin dismissed the action, with costs, holding that the irregularity in locating was cured by the defendant's recording his last certificate of work.

Connell vs. Madden.

The initial post of the Sheep Creek Star Mineral Claim had been planted on the United States side of the international boundary line.

Mr. Justice Walkem held at the trial that the location was an invalid one, and on the matter coming on by way of appeal before the Full Court, the judgment of the trial Judge was confirmed.

Haney vs. Dunlop.

The plaintiff commenced an adverse action relating to the Pack Train and Legal Tender Mineral Claims on the 5th day of August, 1897. The writ of summons, which only remains twelve months in force, not having been served, the plaintiffs in the 2nd August, 1898, upon an *ex parte* application, obtained an order for the renewal of the writ. This order was on the application of the defendant set aside.

Upon an appeal being taken to the Full Court, the Court held that as no reasonable explanation of the delay in serving the writ had been given, the order for renewal was properly set aside. The Full Court's decision practically puts an end to the action.

Stamer vs. Hall Mines.

This was an action under the Employers' Liability Act for damages for injuries sustained by the plaintiff in falling down a winze on an intermediate level in defendant's mine, in which he was engaged as a miner. At the trial judgment was given for the plaintiff, but on an appeal being taken the Full Court reversed the decision, and held that rule 18, section 25, of the Metalliferous Mines Act does not require that a winze extending through several levels of a metalliferous mine should be protected at each level; the rule being sufficiently complied with if the winze is protected at the top level only.

## THE WORLD'S COPPER PRODUCTION.

The world's copper production grew from 412,088 metric tons in 1897 to 441,288 tons last year, the United States supplying 55.1 per cent., or more than half the total. Spain, thanks to British capital and mining skill, making good use of its rich ore deposits, put out last year 54,077 metric tons, or less than a fourth of the yield of the United States, to which, nevertheless it came second, with a percentage of a little over 12. No other country supplied as much as 6 per cent. of the world's copper output, Japan and Chili each furnishing rather over 5 per cent. Canada's output of 8,040 metric tons, to which British Columbia contributed most, meanwhile represented about one and four-fifths per cent. of the world's copper yield, a proportion destined, however, to grow

enormously in the early future. The copper yield of the Dominion last year showed a gain of no less than 109 per cent. on that of 1894, and is further increasing with each succeeding month.

## SILVER-LEAD DISCOVERIES IN ENGLAND.

It is stated that the Slocan may have a counterpart in miniature in most unexpected quarters, namely, the English counties of Cumberland and Westmoreland. According to report, specialists have there recently discovered ore very rich in lead and containing also  $13\frac{1}{2}$  ounces of silver to the ton of 2,240 pounds, while ores have also been located in the same English districts containing large percentages of ironstone and copper, other deposits, also found in the neighbourhood, being rich in tin, antimony, arsenic and wolfram. It is added that so convinced are the local railroad companies that there is much in the finds, that they are intending themselves to spend £10,000 in aiding necessary development and exploration work. Meanwhile the original discoverer, an elderly gentleman named Bird, and his associates, have, it is stated, leased on easy terms some five square miles of mining right in the Cumberland district, in which he first found the rich metal deposits, which have since been tested by the sinking of many adits with satisfactory results. Further developments in this case should, therefore, prove of very general interest, especially to English metal men.

## THE MONTH'S MINING.

FAIRVIEW.

(From Our Own Correspondent.)

THE last two months have brought about a very great change for the better in this camp and the prospects of a profitable, successful future never looked so bright in the history of mining operations in Fairview. The two large companies now working seem to have a very bright future before them, the cost of mining and milling their ore being the only side of the question yet unsolved. The Dominion Consolidated Mines Co., Ltd., with a partly paid-up capital of \$500,000, divided into 2,000,000 shares of 25 cents each, owns and is now working three claims, known as the Flora, Western Hill and Virginia, which lie about two miles northwest of the town of Fairview. For the entire length of these three claims the ledge has been traced by means of pits, open cuts and shafts, showing a width of from 8 to 14 feet and the ore of a uniform character throughout.

I went over this property the other day with a view to getting information for the RECORD, and was certainly astonished at the large amount of ore shown up by the present workings, and I am convinced that the company need have no fear as regards quantity of ore. The vein, which dips northerly at an angle of nearly 45°, follows the direction of the centre lines of the three claims, westerly, up a very steep hillside and thus affords the management means of tunnel development without a foot of lost work. By the time this tunnel (which is now being run along the ledge from the lower end of the property) has reached the western extremity of the claims, it will have attained a perpendicular depth of over 700 feet in the 4,000 feet of distance. Besides this tunnel others will be run at higher levels and will be ventilated with shafts raised to the surface. All this work will be done on the ledge, thus developing the claims

in the most economical manner possible. The consulting engineer, Mr. T. H. Trethewey, places the average values of the ore at from \$3.50 to \$5.25 per ton, while he estimates the cost of mining and milling at from \$1.50 to \$2 per ton. If these figures are accurate (which Mr. Trethewey's reputation leaves no cause to doubt) this company will evidently prove one of the most profitable mining concerns in the country, since there is such a vast body of ore that it seems impossible ever to exhaust it.

The management have secured 2,000 inches of water at Okanagan Falls (ten miles distant), which will be used to develop electric power for mining and milling operations. A six drill duplex air compressor plant is now on the way to the mine, and as soon as it is set up in working order the present force of men will be augmented and the development will proceed steadily until sufficient work is done to block out enough ore to keep a 100-stamp mill running for three years. Then, if the ore still carries its present values such a mill will be erected. In the meantime mill tests of a few hundred tons will be made in one of the existing stamp mills, thus giving a check on the sampling of the mine. The resident engineer, Mr. W. J. Trethewey, is in charge of the work, while Mr. L. W. Shatford superintends the finances of the company. The head office is in Fairview, and the annual meeting will take place here early in November.

The Stemwinder Mine (owned by the Fairview Corporation) has recently been subjected to a severe examination by Mr. Taylor, chief examiner of mines for the Gooderham-Blackstock Syndicate. Mr. Taylor's opinion is that there is undoubtedly a very large body of ore in the mine,

while his estimate of the values was slightly higher than that of the resident engineer, Mr. J. F. Bledsoe. The latter gentleman estimates the cost of mining and milling at \$2 per ton, and the lowest average value at \$3.85 per ton, and recommends the installation of a large milling plant.

For the present the company, having acquired possession of the Smuggler stamp-mill, will haul down a thousand or more tons of ore in order to thoroughly test the values and prove the cost. The shaft on the main ledge will also be sunk another 100 feet.

The Smuggler Company seems to be suffering from a lack of money to prosecute work on the Admiral Dewey claim. This claim, the engineer, Mr. John Campbell, reports as looking remarkably well, the ledge being strong and well defined and carrying good values.

In consideration of the low-grade nature of Fairview ore and the fact that great economy is necessary to produce paying mines, it is greatly to be regretted that the Government should have seen fit to create such an obstacle to the mining industry as the eight-hour law is now proving. Even if the law were now repealed the situation would not be relieved, as men would certainly demand extra pay for the extra time they would have to work.

A considerable amount of work is being done on McCaig Mountain, a few miles north of here on properties belonging to Mr. C. A. Gordon, of Vancouver.

The Oro Fino mine is also being steadily developed under the superintendence of Mr. Fleming Robinson.

On Kruger Mountain, Mr. George R. Naden, of Greenwood, is working the Gold Dust and other

claims, held under bond. Mr. Norden appears very well satisfied with his bargain and fully expects the properties he has acquired to develop into paying mines.

Near Keremeos, a new camp has come into being, and is known as Summit Camp. It lies at the head of Olalla and 15-Mile Creeks, and produces some exceedingly fine samples of ore. Of course the discovery is so recent that very little work has yet been done.

RICARDO.

#### CAMP M'KINNEY.

(From Our Own Correspondent).

Very satisfactory work has been accomplished during the last month and the prospects of the camp were never brighter, it being a general remark of those returning after a few months absence, of the wonderful changes in McKinney. Numerous rich brick business houses having been erected, while the more prominent mining properties are equipped or are being equipped with the latest and best machinery.

One consideration is a first-class hotel, and a small fortune awaits any one who will supply that need. Without reflecting on the present hotel accommodation, it goes

without saying that the travelling public of the present day, accustomed to the luxuries and comforts of the hotels of our larger towns, look with more or less contempt upon our so-called first-class hotels as relics of a past generation.

The famous old Cariboo with its additional compressor plant is now working a full force of men, and recently your correspondent was shown some most magnificent samples of ore taken from the lower level, the specimens fairly sparkling with gold—pretty good evidence that depth is not depreciating values in the old mine.

On the Wiarton claim, to the east of the Cariboo, the vein has just been struck. Some six months have been spent hunting for it, and it is most satisfactory to chronicle that at last success has crowned the efforts of the company.

The five stamp mill in the Waterloo is now being put up under the superintendence of Mr. Osnaburgh, who expects to have it in running order in about two weeks. The mill is a very complete plant, and though at present only five stamps will be used there is sufficient power for ten. Unless the managers are badly deceived this property will become one of the leading mines of the camp.

The Fontenoy people are running their steam drill, drifting towards the junction of their north and south ledge, with the east and west ledge coming from the Waterloo, where a big body of ore is expected to be struck. This property having two such defined ledges and the company ample capital for development, it can hardly fail of becoming an early producer.

Considerable work is being done on the Ecuador claim, belonging to the Ecuador Company, of Toronto, and also the Path-finder, Gold Cut and New York, belonging to the Silver Bet Company, of Toronto. These properties lie to the east of the Fontenoy.

A waggon road is being constructed to connect the Ecuador with the main Pentiction waggon road, to enable the company to haul in machinery. The Lemon Company's property, the Golden Standard, a little to the east of Ecuador, is

working well and preparations are being made to place a mill on it, the water ditch having already been completed.

The ten-stamp mill for the Minnie-ha-ha claim is now at Penticton, their large boiler and compressor having already been placed in position. This property is most efficiently equipped with first-class machinery. Everything in connection with the work being done in a most substantial manner. Professor Montgomery, who has just arrived in camp, will assist the management in planning out the work for the coming winter.

The contract on the Sailor shaft has been completed and operations are for the present suspended, awaiting the arrival of the steam hoist and pump, now on the way from Penticton. As soon as the hoist and pump are put in place the shaft will be sunk an additional 30 feet and a drift run to cut the ledge. Hoisting machinery has also been ordered for the Kamloops, the shaft on which is down about 50 feet.

It is gratifying to be able to report that the Granite and Banner claims, about which there has been so many contradictory rumours, are now showing up remarkably well, some good ore being taken from the tunnel. The five-stamp mill keeps pounding away, and the superintendent informed your correspondent that the clean up averages from \$50 to \$65 per day, four miners keeping the mill running. It is further reported here that the property has changed hands, Toronto people being the purchasers.

The Pandie is another claim which is making a remarkably good showing and will doubtless in the near future change hands for a good sum.

The foregoing remarks will show you that our camp is quite busy and the beautiful weather which we are now having, after the long spell of rain and cold, makes us bright and cheerful, even if we are not the fortunate possessors of one of the bonanzas.

#### BOUNDARY CREEK.

(From Our Own Correspondent.)

A company has been formed in London to acquire from the Jewel Development Syndicate, Limited, the Jewel and Gold Drop mineral claims and a half interest in the Denero Grande. The new company is called the Jewel Gold Mines, Limited. The directors are Sir Bartle C. A. Frere and Mr. W. H. Tyser, of London, and Mr. W. W. Slater, of Edinburgh. The

bankers are the London Joint Stock Bank, Limited; the solicitors, Messrs. Clarke, Rawlins & Co., and the secretary, Mr. J. A. Allen, and

offices at 15 Philpot Lane, London, E.C. The nominal capital of the company is £80,000 in 80,000 shares of £1 each, of which 60,000 are to be issued as fully paid up in payment for the above-mentioned properties, together with a mill site on Long Lake, a steam hoist, pumps and all other plant and appliances now on the mine. The Massachusetts and Imperial, fractional claims, quite recently acquired by the syndicate, are also to be taken over by the company. These claims lie between the Jewel and Denero Grande on the one side and the Gold Drop on the other, and the whole form one connected group. Most of the work done on the properties has been done on the Jewel. The following particulars of the Jewel mine have been obtained from Mr. Gilbert Mahon, who, for several months, has been in charge of the mine: The ores of the Jewel group and neighbouring claims are

unlike the majority of those found in other camps in the district, being gold quartz as opposed to copper ore. Very little has been heard of the Jewel for some time past, for the reason that it has been worked as a private speculation by a syndicate, most of the members of which reside in England and the management were anxious to make certain that operations would be successful before publishing any details. In June last the mine was exhaustively examined and sampled by Mr. D. J. MacDonald, a thoroughly practical and experienced mining man, at one time a Provincial Inspector of Mines and afterwards with the British America Corporation under its general superintendent, Mr. W. A. Carlyle. He has reported most favourably upon it and has advised the installation at once of a 30 to 50-ton reduction plant, to be enlarged to a capacity of 100 tons per diem when the mine shall have been more extensively developed. The ore is suitable for direct cyanide treatment, and the working cost is placed at \$5 per ton for extraction and reduction. The developments, consisting of a main incline shaft 7 feet by 3 feet 6 inches in the clear, 234 feet in depth, 600 feet of drifts and cross-cuts, and 160 feet of winzes and raises, have thoroughly exposed the vein and blocked out the ore to the depth mentioned and for a distance of more than 100 feet on each side of the shaft. The ore from the 120-foot level upwards runs about \$8 to \$10 per ton. At 234 feet the vein is strong and well defined and averages about six feet in width between good walls. This lower level has been driven in a fine chute of ore, which continued about 200 feet in length and carried a value of from \$15 to \$20 per ton. A considerable portion of this chute gave values by bucket samples from \$30 to \$50 per ton. The all-round average given of \$15 to \$20 per ton is, however, considered highly satisfactory. Mr. MacDonald took samples from 35 different parts of the mine, purposely avoiding, though, the more highly mineralized streaks. These samples returned values, chiefly in gold, but with some silver, ranging from \$1 to \$83 per ton of 2,000 lbs. He estimates that there are 500 tons of ore on the dump and about 11,000 tons blocked out in the mine, of an average value of \$13.36 per ton, giving a total estimated value of \$153,640. A 60-horse power boiler has been ordered for the mine to furnish additional hoisting power. It is intended to sink the shaft 100 feet deeper and afterwards to run 300 feet of drifts at the 334-foot level. This development would almost double the quantity of ore "in sight." A reduction plant will be put in later on the company's mill site at the edge of Long Lake, distant about 200 feet.

Present work on the Mother Lode includes the deepening of the main shaft, which is now being sunk from the 200-foot to the 300-foot level, the continuation of the north drift at the 20-foot level and the sinking of the winze in the old workings so as to connect with the drift at the 200-foot level. A station has been cut out in the old tunnel and a hoist installed.

Sinking will be in progress here before this appears in print. The north drift will have to be extended some 50 or 60 feet more to get under the old winze, and when this distance shall have been driven an upraise will be made to meet the winze. When this connection shall have been made good ventilation will have been provided for that part of the mine and a lot more ore exposed.

On the Sunset preparations are being made for the

large plant that will be sent in immediately after the completion of the Columbia and Western Railway to Boundary Creek. The incline shaft on the Buckhorn is now down between 60 and 70 feet, all in ore. This property is looking well and the management is satisfied with its prospects. The Morrison is stated to be opening up well. The tunnel has cross-cut three leads and exposed more than 60 feet of ore. The indications are favourable to the property fulfilling earlier sanguine expectations induced by the extensive surface showing it has. Gold Bug, one of the Boundary Creek Mining and Milling Co.'s big groups of claims, continues to show up satisfactorily and a very profitable return is expected from a trial shipment of 10 to 20 tons that is to be made to the Trail smelter.

There continues to be much activity here, particularly on the Old Ironsides, Knob Hill and Victoria group. A new hoist has been placed over the shaft on the boundary line between the Old Ironsides and Victoria, and mine buildings are being erected here also. The cross-cut tunnel from the Greenwood Old Ironsides into the Victoria has CAMP. opened up a lot of ore-carrying ground. The station, 350 feet in from the mouth of Knob Hill tunnel, has been cut out and sinking in the big lode is now in progress. Preparations for active work on the Brooklyn and Stemwinder, owned by the Dominion Copper Co., are being made in the direction of additions to the plant. Both the Snowshoe and Gold Drop are at work and interesting developments on both claims may be looked for.

The Winnipeg is putting out some good grade ore from a depth of more than 300 feet. This mine is developing satisfactorily, and it is expected that excellent returns will be received when its ore can be shipped for treatment. The main WELLINGTON shaft on the adjoining claim, the CAMP. Golden Crown, is now down 322 feet vertically, at which depth sinking was lately suspended. Stations are being cut out preliminary to cross-cutting in opposite directions from the shaft, with the object of intersecting in this 300-foot level the ledge already tapped and drifted on at the 100 and 150-foot levels, and several other leads met with in a cross-cut tunnel run some time ago. A cage is being put in so as to facilitate the raising of ore from the different levels. It is stated that the Golden Crown will be the first mine in the district to substitute a cage for the bucket for ore-raising purposes. There are two boilers on the mine, together giving 100 horse power and the hoist is equal to working about double the present depth. Only two machine drills are now in use, but it is proposed to add two more shortly, and, as well, to increase the number of men below ground.

The B.C. is making steady and gratifying progress. Its operations, carried out down to the 160-foot level, have proved the existence of three distinct big chutes of ore, a large quantity of which is blocked out. It is claimed that one of the SUMMIT dumps contains 3,000 tons of ore, CAMP. worth about \$60 per ton and returning about 22 per cent. copper, 11 ozs. silver and small gold values. Another dump is stated to contain about 8,000 tons of ore, worth \$20 to \$25 per ton. It is understood that a contract has been entered into to ship to Trail for one year the ordinary output of the mine. What that will likely be is not stated. The Oro Denero and the Emma have both

had some effective prospecting done on the surface in the course of the work of grading the spur line from the Columbia and Western main line towards Greenwood and Wellington camps. No particulars of these properties are at hand just now.

Work is in progress in other camps and on other claims in the Boundary Creek district, and of these the City of Paris group should have attention, but no reliable information has lately been received by the writer. Reports of some of the properties on the North Fork of Kettle River are good, the Golden Eagle, Earthquake and Pathfinder having specially favourable mention. The last mentioned has four large and distinct ledges, the ore being copper pyrites carrying high values. From several of the camps tributary to the upper main Kettle River, above Midway, also come good reports, these suggesting that later some good mines will be developed up there.

Track-laying on the Columbia and Western Railway is being pushed as expeditiously as possible. The rails should be laid to the summit of the divide between the North Fork and Boundary Creek by October 1st, and then it should not take long to run down to Greenwood and Midway, grading being practically completed, and there being no bridge of large size to occasion delay. Work on the Granty Company's smelter at Grand Forks is proceeding as speedily as possible, and a beginning is about to be made with the British Columbia Copper Company's smelter at Anaconda, near Greenwood. Recently there has been experienced marked improvement in business throughout the Boundary Creek district, which contrasts favourably with the comparative stagnation that prevailed during the summer months.

PERCY VERENS.

Midway, B.C.

ROSSLAND.

(From Our Own Correspondent).

The past three or four weeks has marked many important changes in the mineral industry here, an industry which is fast making history. The production point of ore shipments from Rossland mines has reached and even passed the record for the whole of 1898. The entire shipments then were 111,282 tons, valued at \$2,470,000. For the 8 months and 21 days ending September 21 there have been shipped 113,000 tons of ore from Rossland mines, valued at about \$2,000,000 gross. With decreasing gold values it will be seen that it will yet take about 25,000 tons of ore to equalize the value of last year's output. When this point is realized the net gain in value will begin. Although this record, so far as shipments are concerned, is a gratifying increase much more remains to be done, and I hope in my next report to be able to record a much greater advance than that already noted. With the present facilities the ore output should be much greater, even from the regular producers than it is; we are promised this next month and are requested to have a little additional patience.

As to the dividend account for this year, it stands thus: On September 15th the War Eagle, the only dividend payer this year, paid \$26,250, making its total dividends for this year \$226,250, or a grand total for the mine of \$414,000. Under the Clark ownership, the War Eagle paid \$187,000. The first dividend under the present owners was declared



June 15, 1898, when the sum of \$7,500 was distributed. This is very satisfactory. The last dividend paid by the Le Roi was in April, 1898, when it paid \$825,000. Some reports credit this company with having paid nearly \$200,000 more, but I can find no record of it amongst the cash distribution to shareholders, though it is not unlikely that some ore at the Northport smelter was on the transfer, credited to the new company, but I can find no record of its distribution amongst the shareholders.

The Iron Mask, which is a constant shipper, has, I understand, paid off many obligations, besides the cost of an expensive law suit, in which it is at present engaged with the Centre Star, but it has paid no surplus to its owners, but it undoubtedly will next year. The Centre Star is too young in the matter of shipments yet, but no doubt next year it will distribute profits.

As to the Le Roi, its dividend account is closed for the present. When it will be re-opened I cannot say.

The MINING RECORD is already in possession of some facts and figures showing that the pay-roll of Rossland mines and mining properties for the month ending September 15th, 1899, amounted to \$132,000. This amount cannot be accepted as the average for every month, which at that rate would be \$1,584,000. On an average for the past year it has, at least, been \$100,000 per month.

Returning to the item of shipments, I find that up to September 21st, of the present year, the Le Roi has shipped 64,500 tons of ore, the War Eagle 40,000, the Centre Star 6,100, the Iron Mask 3,125, and the remaining tonnage is accredited to miscellaneous mines. The weekly production has been about 4,500 lately, but we are promised record breakers soon, the War Eagle taking the lead.

The resignation of Mr. W. A. Carlyle as chief engineer of the Le Roi and manager of the B. A. C., was for some time anticipated, since Mr. Carlyle himself had previously intimated it to some of his immediate friends. Mr. Wilson, late of the Cripple Creek Consolidated, has already taken Mr. Tregear's place as underground foreman of the Le Roi, and as he comes with a reputation for energy he will probably make his experience felt.

That it will be some time yet before all the facts which are connected with these changes are really

known to the public, must be taken for granted. In the meantime the public are assured that Mr. Carlyle is going to take charge of the Rio Tinto, in Spain. This ought to prove itself with time. Mr. Mackintosh has gone east on private business, and I hear nothing substantial about his new syndicate.

Le Roi.—The station at the 900-foot level has been completed, and further sinking will not be resumed there for the present. Shipments are being made from all the levels from 500 to 900. Extensive improvements are to be made on the Black Bear ground, which is an extension of the Le Roi.

War Eagle.—Development and other work is in full progress on all the levels from the 250 to 750-foot levels. The shaft is down to the 875-foot level, where a station is being cut, and the 900-foot level will be reached in a few days. Both sides of the new hoist are working very well, but, notwithstanding this, the management is making arrangements for additional air compressor service independently of the electric plant. The management is determined to be on the safe side.

Centre Star.—Shipments have been temporarily discontinued, but development work is being vigorously prosecuted.

Iron Mask.—According to the statement of Mr. J. F. Herrick, manager of this company, arrangements are being made for an output of 50 tons of ore per day. The mine is in a good condition.

Virginia.—The attempt to cut the alleged vein from the bottom of the shaft has been abandoned, and work in the old shaft has been discontinued. The work is now confined to the new pits south of the main shaft and where there is a small showing of pyrrhotite and copper pyrites in a quartz streak. The force of men has been considerably reduced.

Evening Star.—The development is entirely confined to surface work. The ore which the management has been shipping comes from the upper drifts. The company has not sufficient available capital to work the property and a plan to re-organize is in contemplation. About 800 tons of ore have been shipped to the Northport smelter.

Mascot.—A recent find of rich ore, assaying 6 ozs. in gold, 201.76 ozs. in silver, copper 2.01 per cent, total value \$264.71 was made in tunnel No. 3 on this property. The assay was made by Richard Marsh, assayer, Rossland, and the information is confirmed by Mr. William Y. Williams, superintendent of the Mascot. The values are phenomenal and have excited considerable attention. The same vein cut 200 feet above did not give any appreciable values.

British American Corporation—Nickel Plate.—Sinking continues in the new shaft. Great Western—Sinking to 500-foot level continues. The shaft continues to make a good deal of water, but is being constantly pumped out. Depth of shaft 350 feet. California—Surface work on this property has been resumed under the direction of Superintendent W. Y. Williams. The management has ordered a complete compressor plant to be run by electricity. The Jenckes Machinery Company secured the contract.

New St. Elmo.—The main shaft is in 75 feet. A ten-drill compressor has been ordered. The property is on the southeast face of Red Cut proper.

Sunset, No. 2.—Drifting at the 100-foot level is in progress from the new shaft. About 20 men are at work.

Homestake.—The management is still cross-cutting No. 1. Sinking to the 500-foot level has been discontinued. The work now consists in drifting from the 400-foot level.

White Bear.—The shaft is nearing the 350-foot level, when cross-cutting will begin. About twelve men are at work.

Josie.—The 500-foot level has been reached, and the station complete. The new machinery is not yet installed.

Velvet.—The main tunnel is nearing the ledge. It is now in 385 feet. The ledge is believed to be 15 feet further. Drifting along the ledge is in progress at the 250-foot level. The ledge is to be cross-cut at this level.

Gertrude.—Development work continues to progress with fair indications.

The mining machine agents report considerable activity in their line.

#### ROSSLAND'S PAY ROLL.

The pay roll of Rossland mining properties according to the best statistics available amounts at present to about \$116,200, and to this amount must

be added \$16,000, the pay roll of mining properties tributary to Rossland, giving a grand total of \$132,200, but this cannot be accepted as an average monthly payment, as it varies considerably.

The figures in detail are as follows :

Le Roi .....	\$ 32,000
War Eagle .....	27,000
Centre Star.....	11,000
Columbia & Kootenay.....	6,000
E. Le Roi, including Nickel Plate and Great Western.....	4,000
West Le Roi, including Josie and No. 1.....	5,000
Iron Mask.....	7,500
Sunset No. 2.....	2,500
Virginia.....	2,500
Deer Park.....	2,000
White Bear.....	2,000
Gertrude.....	1,500
Evening Star.....	1,000
Homestake.....	2,700
Big Three.....	4,000
St. Elmo.....	900
Jumbo.....	900
I. X. L.....	900
Coxey.....	800
B. A. C. Shops.....	2,000
	<hr/>
	\$116,200

The following mining properties must also be included as the pay rolls embrace Rossland :

Total.....	\$116,200
Velvet.....	2,800
Bunker Hill.....	1,800
Green Cut.....	900
Wallingford.....	900
Royal George.....	400
Heath Bell.....	800
Miscellaneous.....	8,400
	<hr/>
Grand Total.....	\$132,200
Number of men employed.....	1,400
Total tonnage of ore shipments to Sept. 18 (tons)....	111,000
Valued at.....	\$1,850,000

SLOCAN.

(From Our Own Correspondent.)

Public attention in this district is still rivetted upon the unduly protracted labour difficulty, but notwithstanding that there are no new developments to announce, the outlook is a great deal more promising than it was a month ago. Putting the question of right or wrong to one side, it would appear to be a matter of expediency for the mine owners to accept the inevitable and resume on a basis of \$3.50 for eight hours, although they protest without exception that they have not the slightest intention of adopting this course.

The positive announcement from the Government that the law is here to stay, the seeming impossibility of bringing suitable men in, the fact that other camps, admittedly inferior in every respect, are employing men at standard wages, the necessity of commencing operations almost immediately or remaining closed for the winter, and lastly the determined attitude of the unions, must all be taken into consideration, and the knowledge that most of the mines are even now making preparations, though merely conjectured, is taken to indicate that a resumption of activity will shortly take place. The miners apparently made a bad move when they decided not to allow contract work except upon the most ridiculous terms, and owing to the radical difference of opinion which exists on this point even among the recognized leaders, they have now aban-

doned that position, leaving the impression that they are weakening in their demands and may be still further brought to time, an impression I am afraid essentially false in principle, which will doubtless have the undesirable effect of still further prolonging the difficulty. Local sympathy is about equally divided between the opposing forces, though a settlement in whatever direction would be gladly welcomed.

Shipments for the five weeks ending September 16th totalled 700 tons, supplied principally by the Idaho, Whitewater and Payne, bringing production for 1899 to date up to 17,600, a long way short of the 30,000 which will be required to equal last year's output, and less even than the 17,994 which represented the amount shipped in the latter half of '98.

Under normal conditions, however, we should have little to complain of, an era of extensive development and improvement having set in, which speaks well for the confidence displayed by investors.

A conspicuous feature is the number of long tunnels being projected, which goes to show that no alarm is felt as to the prospects of the ore deposits continuing in depth. The Ivanhoe and Last Chance are each engaged in driving cross-cuts which will be well on to 1500 feet before the ledge is reached, and the Queen Bess is contemplating extensive development by means of a 2,000-foot drift in order to prove the main ore chute at a lower level.

The officers of the Payne are still emphatic in their assertion that the mine will not be worked to anything like its limit until men can be obtained at \$3.00 a day, but meanwhile the most encouraging developments are in progress, increasingly important bodies of ore being encountered in the No. 5 tunnel.

A phenomenal strike has also to be recorded in connection with the Madison, where, it is stated, that four feet of shipping ore has been met with in the lower tunnel, a continuation presumably of that found higher up.

The relative advantages of shipping to English and American smelters has been carefully gone into by most of the managers in the Slocan, the verdict being almost unanimously in favour of the latter, owing, of course to the distance and the time which must elapse before returns can be obtained from the Old Country. On certain classes of ore, however, more especially those containing a high percentage of zinc, a considerable saving may be effected by shipping to works on the Manchester Ship Canal, and we note that one concern, namely, the Lucky Jim, is profiting to a large extent by this arrangement, having a consignment of 600 tons now on the road.

Work is being pushed on the Ruth concentrator and it will not be long before they will be in a position to commence milling operations, much of the machinery being on the ground at the moment of writing. At the Wakefield, on Four-Mile, the other property erecting works of this nature, the contract for the Finlayson

wire tramway, which is to be capable of handling 240 tons a day, has been let to B. C. Riblet, and that for the concentrator, which involves several novel ideas and will be different in many respects to those previously in use, has been awarded to the firm of White, Rogers & Co., of San Francisco. The flume, which is necessary to provide power and water for the mill, is at present under construction, and it is desired to have the plant in complete working order by the end of the year,

A GENERAL SUMMARY.



the capacity of the concentrator being estimated at a hundred tons a day.

Wilson Creek properties on account of the low grade of the ores have never been much in favour with investors, but the company operating the Jeanette are spending large sums in developing and proving their group, undeterred by prejudice. As pioneers in a field which is to all intents and purposes untried, it is to be hoped their efforts will be crowned with success.

Silver Mountain continues to come to the front; the Marion, the only property of note which is in operation exceeding expectations both with regard to the quantity and quality of the ore, and the Toronto company acquiring it are to be congratulated on securing a very promising mine. The California, adjoining, has recently been stocked for a million under the title of the California and Clipper Silver Lead Mines Limited, and work may be resumed at any moment.

Another deal lately concluded refers to the Hartney, also in the neighbourhood of the Marion, this has been bonded for \$30,000 by the same parties who are working the Jeanette, and from the known nature of the locality it will be a surprise to many if the group does not turn out well.

Most important of all, however, is the arrangement which has been come to whereby the Bosun and Fidelity are about to be amalgamated as one company. From an economic standpoint this consummation has been long and earnestly desired, and now that it has been satisfactorily accomplished we may expect to witness remarkable developments in the course of a few months which will place the company in the front rank of those operating in the Slocan.

It is said that misfortunes never come singly, and many who profess to be well informed are of opinion that in addition to home troubles we are likely to be confronted with a serious fall in the price of silver ere long, due to a variety of causes, the probable precipitation of hostilities in South Africa and the consequent reduction in the gold output exerting a most prejudicial effect on the market. However, we have long since ceased to be moved by rumours of this kind, even when supported by reason. The fact is, we have undergone so many reverses in the past that discretion is now thrown to the winds and in the reckless words of the British public we say "Let 'em all come."

LARDEAU.

(From Our Own Correspondent.)

I have just returned from a trip to some of the claims in this vicinity, and have been at once surprised and delighted with the showing in some of the latest discoveries. The great attraction was Tweedie's gold strike on the Lexington Mountain, and in spite of the remarkable reports which I had heard and only half believed, I was astonished at the real fact. The gold, which is principally contained in the cavities left by the decomposition of arsenical iron, fairly dazzled me and colours of all sizes showed themselves in every piece that I took from the dump. The lead is very wide and at a point some six-hundred feet away from the real work it has been opened up at four distinct points across the lead, each one of which displays gold plainly visible without a glass. From here we walked along the side of the mountain towards Pool Creek for about twenty-five minutes and took a look at, and several fine samples

from, the Lucky Jack, lately discovered by Messrs. Butlet, Rowland and Desrosiers. This property, which consists of three claims, is a silver-lead proposition and an eminently promising one at that. The galena has the appearance of being high grade,

PROMISING and the ore chute widens perceptibly towards the floor of the tunnel; it is PROSPECTS. a treat for a poor man to walk on

the silver street, and my experience of it, though short, still makes me feel rich. There are a couple of narrow streaks containing a nice showing of copper pyrites, and altogether the three lucky ones are to be congratulated. The next notable property which we visited was the Wild Flower Group, on the north side of Lexington Creek, also discovered only two months ago. Here there is perhaps more real ore on the surface than is shown by any silver-lead property that I have seen in this district. The owners have done a considerable amount of work, considering their circumstances, but unfortunately they have gone rather too far from their showing, and although their tunnel has cut through three minor stringers of ore which do not show on the surface, their real pay streak lies some fifteen feet ahead of them. A little further along the same lead we came upon a force of men who are engaged in developing the Lardeau King, under the direction of Mr. H. O. McClymond, of Rossland, who has stocked it, and intends to work it for all it is worth during the winter. They already have exposed a vein twelve inches wide of shipping ore, and prospects are very flattering. We had intended to make a much more comprehensive pilgrimage, but the weather drove us home. However, if I recover from the rheumatism I caught on this journey I will make another before your next issue. By the way, I cannot understand why so few of the investing element manage to find their way to what could not fail to prove a very profitable field for their operations.

REVELSTOKE.

(From Our Own Correspondent).

Development has been steadily carried on during the past month in nearly all the claims that have been opened in the various mining camps in this district, and it is very satisfactory to state that the value of the claims has in almost every case improved. This, however, is not surprising when it is remembered how few are the mines, and how many the prospects, upon which nothing but the necessary assessment work has been done; the surface indications, while usually amply good enough to warrant further expenditure, being naturally of much less value than the ledge that is indicated and prove to exist only after more work. In the Lardeau district this is especially notable, and among so many verified reports of new strikes it is difficult to pick out one that is better than another. The Nettie L. strike, referred to last month, however, is worth a word, being from 2 to 3 feet solid galena with grey copper and iron pyrites, which assays over 700 ozs. silver per ton, besides gold, copper and lead. This mine, which is close to the fast rising town of Ferguson, is hard at work stoping and sacking the ore, and a large shipment will be ready in a very few weeks, though, for economy's sake, it may be worth while to delay delivery till the snow makes transportation easier and cheaper. The Sunshine, also a neighbour of the famous Silver Cup, is very jubilant

TROUT  
LAKE.

over a valuable find in the tunnel, which will help materially to pay expenses for some time. It is the advent of the two railways that will help that district immensely, and the Great Northern is clearing part of the town of Ferguson for the purpose of building its shops there. The C.P.R., also, is coming in the same direction, and is said to have acquired a large portion of Selkirk City, at the foot of Trout Lake, for their purposes; but not for the terminus. Altogether, Lardeau is looking exceedingly well, but like other camps, needs more capital. At Albert Canyon, or rather some miles from there, the Tangier is working with about twenty men, and more are wanted, but nothing particular is being done with the Wonderful Waverley. There seems to be, however, no doubt at all that the Lanark is going to work again. In the Big Bend, very satisfactory results are still being obtained from the placer diggings on Smith Creek, which are now quite extensive, and are still being extended. The Carnes Creek Company are busy working and intend to keep busy all the winter, a sufficiency of supplies has been sent up, and the necessary cabins are being built. The ore here (Rosebery group) is highly arsenical pyrites, and carries very good value in gold; but just lately the ore seems to be changing and becoming much more copper bearing than hitherto with much increased silver values. It will be very interesting to see what a large vein of arsenical iron at the surface will become when greater depth is attained: if it becomes a copper vein (for which there seems no chemical reason, but we are in B.C.!), it will form a very nice precedent for future mining engineers to base their reports and probabilities upon.

The Boston and B.C. Company are now doing what they should have done before issuing that marvelous prospectus, preparing to develop their claims. An ample quantity of supplies for the winter is now being & B.C. CO. daily "pack-trained" up to the Standard basin, and all arrangements are being made to keep at least ten men working all through the winter. This much delayed, but right and proper work seems to be the outcome of an examination made lately by a New York expert, Mr. Von Rosenberg, who was up there very recently, and considers the surface showing very good indeed and well worth further outlay for development. After a winter's work we surely ought to know something more definite about this much-talked-of property; the property itself being possibly all right, but the description of it very much too romantic. Meanwhile, we may well suspend our judgment on the matter till further work has been done, as it should have been long since. It is very interesting to those who have ore to sell, to notice that zinc is no longer anything like the trouble it used to be at the smelters; no doubt many firms do still make an extra charge for each 1 per cent of zinc over a certain amount, but it seems very certain now that zinc may shortly even be paid for if in sufficient quantity, whether it be made into commercial spelter or not. From accounts recently published, a certain Dr. F. L. Bartlett has succeeded in saving the zinc in ores in the form of oxide (which is used very largely in paint as "zinc white"), and at the same time saving the silver and gold values. If this process is found to be practical, it will mean a great deal to those who have hitherto been "fined" for having too much zinc, and further details of results actually obtained will be looked for with much interest.

## CORRESPONDENCE.

*The Editor does not hold himself responsible for the opinions which may be expressed in this column. No notice will be taken of communications unless accompanied by the full name and address of the writer.*

## THE SLOCAN STAR AND MINERS' UNION.

TO THE EDITOR:—In reference to the communication of W. L. Hayles in your August number, I quoted in my former letter my authority, one which I consider unimpeachable. As some time had elapsed between the date at which the circumstances were related to me and that at which my letter was written, I may have got wrong in regard to some details, but the essential facts were told me as I wrote them. The expression that the Star Mine was on the "bad books" of the union, was a figure of speech, meaning no more than that its management had not complied with the demands of the union.

Slocan, Sept. 13, 1899.

Yours faithfully,

D. X. Y.

## PUBLICATIONS.

THE Mineral Industry, Its Statistics, Technology and Trade, in the United States and other countries, to the end of 1898. Edited by R. P. Rothwell. Vol. VII. The Scientific Publishing Co., New York. Price \$5.00.

The present volume of this well-known work fully sustains the enviable reputation earned by previous annuals for reliability, completeness and general excellence. Practically in all parts of the world the "Mineral Industry" has come to be regarded as the standard authority on mining and technical progress and industrial conditions relating thereto; and it is an accepted fact that the statistical information contained in these volumes not infrequently appears well in advance of Governmental Blue-books of official returns.

Among the specialists who have contributed articles to Volume VII. are included men of world-wide reputation as writers on technical subjects, and several of these monographs are entitled to rank as classics in their particular departments. Of the many important papers in this volume that on ammonia, and the manufacture of ammonian sulphate from gas liquor occupies a most prominent place. Here the important modern technical produce "calcium carbide" is described, and the latest methods of manufacture explained in detail. The most economical kinds of furnaces for this industry are indicated, and complete information is furnished with reference to preparation of the crude materials, as well as for the storage and transportation of the finished product.

A very interesting article is that on hydraulic cement, which, with the articles in Vols. V. and VI., form a complete text-book on this subject.

In the chapter on "Clay" there are numerous valuable hints to those engaged in the manufacture of brick, terra-cotta, sewer pipe, drain tiles, stoneware, etc. In this chapter, also, the manufacture of fire-brick is treated of, as well as the paving-brick industry and the uses of kadlin.

Over forty pages are devoted to coal and coke, and a monograph on coal mining methods and their economical bearing forms a most practical contribution to modern literature on this subject.

The coals of the Canadian Northwest and the Rocky Mountains, by W. G. M. Dawson, is of much importance and interest.

At the present time when the metal copper has be-

come so valuable, and of such economic importance, the chapter on this metal, which occupies fifty pages of the volume, will be found to repay careful study.

In this article the electrolysis and refining of copper is described in an essay which may be considered in many respects the best treatise on the subject that has yet been published.

A very interesting paper on the "Identification of Gems" is contributed by a specialist in that department, and many valuable hints not found in the ordinary text-books are embodied in the article.

The metals gold and silver occupy 100 pages of the book, and the latest improvements in the cyanide and Californian processes are duly considered.

An article which should prove of especial interest and value at the present time is that on "Lime Burning," illustrated by numerous diagrams of the various kilns employed.

To the people of British Columbia with limestone deposits conveniently situated for supplying unlimited lime to countries bordering on the Pacific Ocean, there is hardly any subject that would better repay consideration at the present time. One of the most elaborate articles in the volume is that on the manufacture of sulphuric acid, a subject that should receive much more attention in British Columbia than it has in the past.

It may safely be said that the information relating to the sulphuric acid industry in this volume is worth many times the price of the book. The writer of this article treats the subject in a way that leaves no detail of the process unexplained, and the working drawings which accompany the article are thoroughly modern in every particular.

There are many other features of the book which it would take too much space to enumerate, among these being articles on mica manganese, nickel and cobalt, petroleum, platinum, salt, talc and soapstone, tin, etc.

A very handsome and eminently creditable illustrated quarterly has just been issued by the publishers of a well-known Western newspaper, the *Spokesman-Review*, of Spokane, Washington. The publication before us is very profusely and artistically illustrated with mining and other views in British Columbia, Idaho, Montana and Washington, the attractive arrangement and presentation of these many charming photographs being particularly worthy of commendation. The letter-press is pleasing, but as one has learnt to expect in connection with American, or at least Western journalistic ventures of this nature, most of the accompanying descriptive articles are characterised by a somewhat offensive floridness of style, and by use of exaggerated, or, to coin a word, "boomistic" language.

"The Mineral Resources of the Province of New Brunswick, by L. W. Bailey, Ph.D., LL.D., F.R.S.C., the Geological Survey of Canada. Queen's Printer, Ottawa, 1899.

This report is based on data derived in part from the published reports of members of the Geological Survey staff and others; from information supplied by persons engaged or interested in mining operations, and finally from observations made by Dr. Bailey, from May, 1897, to the summer of 1898. Accompanying the report are several handsome engravings from photographs, and an excellent map, showing the principal mineral occurrences in New Brunswick.

## PRODUCING MINES.

### SLOCAN.

THE Slocan output for the month of August shows an advance of approximately three hundred and fifty tons over that of July, but compared with the production during the same period of last year a very considerable falling off of nearly one-third is to be noted. The ore shipments over the Kaslo & Slocan Railway amounted to 1,680,195 lbs. The total clearances of the Kaslo post for this month was:

Gross lbs. ore.....	492,000
Pounds lead .....	244,000
Ounces silver .....	31,775
Value .....	\$26,077

There was no ore reported from the sub-port of Nakusp.

#### Production for the four weeks ending September 22nd :

Mine.	Tons.
Payne.....	80
Coin.....	3
Jackson.....	99
Whitewater.....	186
<b>Total.....</b>	<b>368</b>

### NELSON.

The value of the clean-up of the Athabasca mill for thirty days ending Sept. 16 was \$9,800.

The following tables show the business transacted at the customs and inland revenue offices at Nelson for the month of August :

Exports—	Value.
53 tons ore.....	\$ 4,154 00
182 tons copper matte .....	51,561 00
Gold bullion.....	19,595 00
The forest.....	34 00
Animals and their produce.....	12 00
Agricultural products.....	23 00
Manufactures.....	990 00

**Total.....** \$76,373 00

Imports—	Value.
Dutiable goods.....	\$56,470 00
Free goods.....	14,414 00

**Total.....** \$70,884 00

Revenues—	Amount.
Duty collected.....	\$15,865 65
Other revenue.....	80 00

**Total.....** \$15,945 65

Inland revenue (sources)—	Amount.
Spirits.....	\$ 2,540 48
Malt.....	390 00
Tobacco.....	410 00
Raw leaf.....	31 20
Cigars.....	216 00
Licenses.....	25 00
Petroleum inspection.....	40 00

**Total.....** \$ 3,652 08

The results of the Hall Mines, Ltd., smelting operations for the four weeks ending September 1st, were as follows :

Ore smelted, tons.....	4,115
Copper, tons.....	79
Silver, oz.....	51,720

### ROSSLAND.

Our Rossland correspondent telegraphs on September the 20th : The ore production from Rossland mines for the nine months ending September the 30th is estimated at 120,000 tons, valued at two million dollars. The Okanagan Free Gold Mines have declared a dividend of one-quarter of a cent per

share, or a total distribution of four thousand dollars, equal to five per cent. on the capital of eighty thousand dollars. Mr. J. S. C. Fraser, manager of the Rossland branch of the Bank of Montreal, showed your correspondent to-day two gold bricks, the result of clean-up from plates only. The value of the concentrates is yet undetermined.

The customs returns for August from this port are as follows :

Exports—	Tons.	Value.
Ore.....	9,420	\$264,712
Matte.....	524,523 lbs.	165,193
All other exports.....		2,936
<b>Total.....</b>		<b>\$432,841</b>
Imports—		Value
Dutiable.....		\$ 51,577
Free.....		12,428
<b>Total.....</b>		<b>\$ 64,005</b>

Duty to the amount of \$13,690.72 was collected during the month.

COAST MINES.

The following table shows the monthly returns from the commencement of the running of the mill to the end of August :

December.....	\$ 3,363
January.....	6,232
February.....	8,120
March.....	7,864
April.....	9,536
May (assay value).....	13,130
June (assay value).....	9,632
July (assay value).....	9,950
August (assay value).....	12,979
<b>Total.....</b>	<b>\$80,806</b>

Dorotha Morton Mine.—We are indebted to the general manager of the Fairfield Exploration Syndicate, Ltd., for the following returns from the above named mine for August :

The mill ran 29 days, 19 hours and 24 minutes.	
Tons crushed.....	1,242.9
Tons crushed per stamp per day.....	4.16
Tons treated by cyanide.....	910.4
	Value.
Average assay value in gold.....	\$14.24
“ “ “ silver.....	1.37
Calculated extraction gold 87 per cent., and silver 76.3 per cent.	
Bullion recovered, 2,637 oz., containing :	
	Value.
581.43 oz. of gold.....	\$12,019.19
1,601 “ silver.....	960.60
<b>Total value.....</b>	<b>\$12,979.79</b>
	Pounds.
Consumption of cyanide per ton.....	2.88
“ “ “.....	53

COAL EXPORTATIONS.

The shipments of coal from the Island collieries during August were as follows :

	Tons.
The New Vancouver Coal Co.....	39,370
Wellington.....	12,970
Union.....	6,857
<b>Total.....</b>	<b>59,197</b>

FOREIGN SHIPMENTS.

The New Vancouver Coal Mining & Land Co., Limited, shipments are :

Date.	Vessel.	Destination.	Tons.
2—	SS. Titania.....	San Francisco.....	5,096
4—	SS. San Mateo.....	Port Los Angeles.....	4,450
7—	SS. Robt. Adamson.....	San Francisco.....	4,522
9—	SS. Mineola.....	Port Los Angeles.....	3,462
9—	SS. Wigwam.....	San Francisco.....	18
14—	SS. Titania.....	San Francisco.....	5,106
19—	SS. San Mateo.....	San Francisco.....	4,400
<b>Total.....</b>			<b>27,054</b>

THE METAL MARKET—SEPTEMBER.

[Compiled from special telegraphic quotations to the B.C. MINING RECORD from the *Engineering & Mining Journal*, New York.]

The metal market during the month has been somewhat affected by the general reaction in speculative stocks—largely due to the high rates for money general at this season of the year. On the other hand, the commercial outlook is very favourable, and progress and activity continues to characterize every line of industry.

SILVER.

Indian Exchange has been fairly steady, the Council bills offered in London of late having been taken up at an average of 15.97d per rupee. There has also been some buying of silver in London for Indian account. The New York price has fluctuated very little during the month, the lowest quotation being 58-15-16 and the highest 59½. This, however, shows a small decline from last month, when the average price was 60c.

COPPER.

This market continues very strong in tone and there is again a considerable enquiry on the part of consumers both here and abroad; but not many transactions are reported. Electrolytic is obtainable at 17.40 to 17.50c for cakes, wire bars or ingots, and 17.15 to 17.25c for cathodes; casting copper is nominal at 17½ and Lake copper is freely offered at 18½c. The European market has not shown much animation.

LEAD.

Manufacturers appear to be busy, but the market itself has not been remarkable for any special feature. The metal has been quoted in New York during the month at 4.55 to 4.60, and in St. Louis 4.50 to 4.52½c. The European market is in a very healthy condition, recent quotations being £15 2s 6d to £15 5s for Spanish lead, and £15 5s to £15 7s 6d for English.

SPELTER.

Spelter is still quiet but steady. The ruling quotations are 5.35 to 5.40c St. Louis, and 5.55 to 5.60c New York.

PLATINUM.

The demand for platinum is very active and prices continue high. For large lots \$15.50 per ounce is quoted in New York, for smaller orders \$16 to \$17.

THE STOCK MARKET—SEPTEMBER.

THE market is showing signs of improving and large sales are daily being made in Toronto, Montreal, Rossland and Spokane.

ROSSLAND

In Rossland stocks the best sellers have been I.X.L. at 13 as a result of an important strike in the mine; Evening Star at 11, owing to increased shipments; Deer Park at from 2 to 5, upon the report of

the discovery of a new vein on the property. Iron Mask is coming into favour, owing to a rumour that a settlement of the law suit with the Centre Star may be amicably effected. Virginia has declined from 25 to 10 and 11, the vein having been lost at the 300-foot level. War Eagle declined during the month from \$3.50 to 2.98, but has since recovered to 3.30. The principal reason given for the decline of this stock is that the shareholders expected to have the privilege of subscribing to Centre Star at a lower price than this stock would be offered to the general public, whereas it was reported that Centre Star would not be offered to War Eagle shareholders for less than 1.50; but this report has since been denied by the Centre Star Company.

**NELSON, SLOCAN AND AINSWORTH.**

Athabasca has been in demand at 38 to 39. Fern has declined from 31 to 24. Payne from 1.40 to 1.25, while Noble Five has advanced from 22 to 28. Rambler from 43 to 52, though it has since fallen back to 49.

**COAST MINES.**

Van Anda has been the best seller, but notwithstanding the price has receded from 11½ to 8. 8½ and 9.

**MOUNT SICKER AND B.C.**

Development has recently shipped 455 tons from the Lendra on Vancouver Island, the ore, it is said, averaging \$29.50 per ton. These shares are quoted at £1.

**CAMP M'KINNEY.**

Cariboo remains steady at 1.25 to 1.30. Waterloo at 11½, Minnie-ha-ha has declined from 19 to 17 and Fontenoy is held firm at 17. Silver Bell was very active for some time and advanced to 8½, but has receded to 7.

**BOUNDARY CREEK DISTRICT.**

Knob Hill remains firm at 98 and Old Ironsides at 1.15. Rathmullen has been very active and the price has advanced from 8 cents to 9¼. Winnipeg is held firm at 30. Brandon and Golden Crown at 29, King at 25, and Morrison at 18.

**H. W. TREAT,**  
Pres., Treas. and Gen. Manager.

**THOS. KIDDIE,**  
Smelter Manager.

# Van Anda

**COPPER & GOLD CO..**

## Purchasers and Smelters

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Only First-Class Properties Handled.

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# The Wilfley Ore Concentrator Syndicate, Limited.

**32 OLD JEWRY, E.C. LONDON.**

Beg to call the attention of Mining Engineers, Mine Superintendents and Managers, Machinery Dealers, and all connected with the Mining Industry to

**THE "WILFLEY" TABLE**

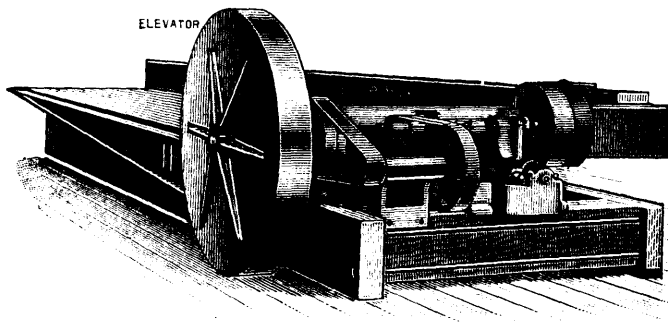
The following strong claims are put forward for the "WILFLEY," and will be found more than fully substantiated in actual working:

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2. Facility of adjustment to all ores treated. Once adjusted it needs but a minimum of attention.
3. Its wonderful capacity. Will handle three to five times as much material as any belt table made.
4. Reduction of maintenance charges. No skilled labour required. Reduction in initial outlay, as smaller number of tables are needed.
5. The ore particles being separated into distinct streaks a complete separation of the different minerals contained is effected.

The "WILFLEY" has only been on the market some eighteen months, yet in that time nearly 800 have been sold, and are in use in 200 mines, which speaks volumes for the rapid and favorable recognition it has been accorded.

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