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### THE MINING OUTLOOK.

**S**EVEN months of the present year have passed, but it can hardly be said that the period has been marked by any very notable progress of or developments in the mining industry of the Province. In Boundary District the rate of output has hardly exceeded the average maintained last year; Rossland, however, has done somewhat better; but for the operation of the Tyee mine, the Coast's showing would have been most unsatisfactory; production from the Slocan has fallen to about the level of the 1895 yield; metalliferous mining in East Kootenay has practically ceased; the season in Barkerville has been a dry one; in Atlin floods have caused much damage; and last but not least, coal mining activity has been seriously restricted by disastrous strikes both at the East Kootenay and Vancouver Island collieries. But British Columbians are nothing if not hopeful, and it really seems that with the coming of summer sunshine the clouds that have overhung the industrial horizon should be suddenly dispersed, and that there is again foundation for the belief that the dawning of more prosperous times has already awakened. It has not been the fault of the Boundary, for example, that

the showing of the district has not, during the past few months, realized expectations. On the contrary, development has proceeded so far that it would now be no difficult matter for production at twice the present rate to be maintained, provided an adequate supply of fuel for the smelters could be depended upon. In an interview Mr. Tonkin, manager of the Crow's Nest Collieries, stated very definitely the other day, that any cause the local smelters may have had in the past for complaint in respect to the deficiency in the fuel supply, this would henceforward be removed; that the company had now made ample provision to supply the local market with coke; that the output from the collieries was being steadily increased and that since the settlement of the strike in February last amicable relations between the company and the men had been established, and all danger of further labour troubles or complications—at least during the life of the agreement entered into at that time—was entirely remote. Already coke is being delivered much more freely in the Boundary, with the result that all four furnaces at the Granby smelter are for the first time this year in commission, and a second furnace has been blown-in at the Boundary Falls works. The Granby Company meanwhile is installing two additional furnaces, and a third is to be added at Boundary Falls, while several hitherto unproductive mines are about to commence the shipment of ore. Altogether, therefore, it may be fairly assumed that prospects in this section are brighter than they have been for some time past and the effect of generally improved conditions should be shortly apparent.

Rossland has, as has been already suggested, made this year a relatively more favourable showing than any other of the mining districts; but this has been due almost entirely to the satisfactory performance of four large mines. Apart from the fact that but recently operations have been resumed at a number of the lesser developed properties, and that several other mines have entered the productive class, the most sanguine anticipations for the future are entertained concerning the potentialities of the economic treatment of the low-grade ores of the district by the employment of suitable concentration methods. It is expected that the new Elmore plant now being installed at the Le Roi No. 2 will be in commission

early in October, and should this process under practical test give the results promised, or only approximately equal to the results obtained from laboratory experiment, its general application to the treatment of the very large and numerous deposits of ores not only at Rossland, but in many other sections of the Province, where values are not sufficiently high to admit of profitable extraction by present utilized methods, will follow in natural course, and mean very nearly as much to British Columbia, as the demonstration of the uses of cyanide of potassium as a means of recovering values from tailings, had in the case of South African mining. The liberal bounty offered by the Dominion Government on lead ore production has already stimulated industry in the Slocan and East Kootenay, and in the course of the next few months a general revival of mining in the several sections of those districts may be confidently anticipated. The provisions governing, meanwhile, the distribution of the bounty are eminently wise and practical, the Government having clearly recognized the importance of safeguarding the interests of the home smelting industries, by stipulating that the mine-operator in order to earn the bounty on the lead he produces, must, unless receiving special permission or authority to make a departure from this rule, send his ores to Canadian works for smelter treatment. While at the present time relatively few shipments of lead ores are being made to outside smelters, for the reason that local smelting rates are at least no heavier, yet the safeguard is, for obvious reasons, a judicious one, and ensures to two important Kootenay industries a long term of uninterrupted prosperity.

Reports from the Nelson, Ymir and Erie districts have of late been altogether favourable. Several additions have quite recently been made to the number of the productive mines and some of the returns therefrom have been exceptionally high. The very promising new finds on Poplar and other creeks in the Duncan-Lardo country are likely to cause further exploration and a considerable investment of capital in a district the richness of which has been long suspected; although by reason of the inaccessibility of the region—a drawback no longer experienced—no very determined effort has been put forward ere this to prove the value of the discoveries. Again, in the Fish Creek and Camborne area the development of free-milling quartz veins carrying good values is most satisfactorily proceeding, and if this progress is maintained, the designation, the "Cripple Creek of B. C.," recently given to the camp by one enthusiastic mine-operator there, may soon be shown to be far from inappropriate. Several important installations of

machinery are also being made at Trout Lake mines, production from which is steadily increasing; important hydraulic mining developments are taking place in the Big Bend; in Kamloops arrangements have been completed for the operation of the two principal properties on a large scale; and there is decidedly greater evidence of activity in Nicola and the Similkameen. On the Coast, the outlook is now better than it has been for years. The Tyee mine at Mount Sicker is at length in a position to earn substantial dividends; operations have been resumed at the Lenora; the Texada mines are making regular shipments; the Britannia mine at Howe Sound is shortly to be extensively operated and other promising claims in the vicinity developed, and the adjustment of the labour troubles at Ladysmith has greatly stimulated coal mining activity on Vancouver Island. While it is true that conditions in Cariboo this year have not been altogether favourable and the season is likely to be a short one, the yields so far have not been unsatisfactory, and the aggregate returns should not at any rate fall below those of last year. In other placer fields fair progress is being made, reports from Atlin in particular being on the whole encouraging. In brief, conditions throughout the country have in a most extraordinary manner suddenly and spontaneously improved, so much so that instead of the outlook being, if not lowering, at least, far from assuring, the entire situation has changed to one of bright promise.

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The custom followed by some mining companies of periodically publishing detailed reports of operations, while doubtless commendable from one point of view, may not be always in the interests of shareholders. The shareholder naturally desire to be kept properly and regularly informed concerning the operation of the property in which his money is invested; but it is obviously preferable that the necessary information should be general in character, rather than rendered so comprehensive as to be incomprehensible to the non-technical public, but extraordinarily useful and valuable to business rivals or competitors. Hence, we think, no objection can be taken to the determination arrived at by the directors of the Le Roi Company, to discontinue in future the publication of the customary detailed reports supplementing the monthly cablegrams of the general manager. Notification of this decision is conveyed in a circular letter issued to shareholders, with the explanation that the publication of the detailed reports has resulted in the "company's business of purchasing customs ores being already badly handicapped by permitting its

rivals to have full information concerning its affairs, though itself quite in the dark as regards similar information concerning other companies." Moreover, in respect to mining costs and the profits realized from month to month, the information heretofore given places the transportation companies in the position of "knowing the utmost that they are able to charge, and the company able to bear, in the shape of freight rates." So impressed, in fact, have the directors become with the idea that "silence is golden," that they have further decided to discontinue the practice of handing to the financial press the monthly cables for publication, and propose instead to communicate the information so received to individual shareholders by post-card. This latter course, however, appears to us to be carrying the matter rather far, and its advisability even may be called into question. By the publication of the reports in the financial press important information would be made known to (say) a shareholder in Glasgow, almost as soon as it would be conveyed to a shareholder in London, and both would have an equal opportunity should occasion arise to take advantage of their common knowledge. But by the post-card system the Londoner would manifestly be at an advantage. A London contemporary, the *B. C. Review*, by the way, objects to this proposed innovation on the grounds that "in view of the present state of the British Columbian market \* \* \* it is hardly calculated to restore the confidence of investors," and proceeds to remark that "shareholders and the market generally are already asking themselves the question, are these *bona fide* pleas, or merely plausible excuses for withholding information, which, if divulged, would show that the payable ore in the mine is rapidly being exhausted." In other words, according to this authority, the Le Roi shareholders suspect their Board of Directors and the General Manager to be scoundrels. The mining community in British Columbia has every confidence in the integrity and ability of Mr. McMillan, the managing director, and of Mr. Parrish, the general manager, of the Le Roi. Both are men of affairs, and their concern is to put the mine in a position to earn dividends, without regard to the effect the adoption of any present policy with that ultimate object in view may have on the buying or selling price of shares on the London market. If the shareholders of the Le Roi are not a parcel of fools they will leave the affairs of the mine in the hands of men who know what they are about, and to whom their business has been entrusted.

It was reported early last month that nearly fifty prospectors had met in Nelson for the purpose of

forming a Prospectors' Union with the object of doing away "with the frauds now being perpetrated in connection with assessment work, and to arrange an equitable scale of recompense for developing claims." It is charged that in Nelson and other Kootenay towns there are men who for the sum of \$25 will agree to do what they will afterwards swear represents an assessment of \$100 worth of work. Whether this movement at Nelson will end in anything practical being achieved in that district in the direction indicated, or whether it be eventually concluded that the practice of making an affidavit that the work required under the provisions of the Mineral Act has been done when as a matter of fact it has not been done, at least not to the value required, is so common that one association can do little or nothing to remedy a state of affairs that is notoriously prevalent, remains to be seen. It is doubtful, though, whether anything effective will be accomplished so long as the Provincial Government, or the department of it suppose to take cognizance of mining matters, persists in ignoring what is well known in most mining districts, viz., that it is by no means infrequent for false affidavits to be made by those upon whose sworn statements certificates of work or certificates of improvements are granted. At times a claim owner makes an affidavit in good faith knowing that he has paid the requisite amount of money to have the work done, but sometimes it happens that he has not seen for himself that it has been done—only accepted the assurance of the man he paid that he had faithfully carried out his undertaking to do a fair assessment. Time and again one owner faithfully living up to the law sees that the owner of a neighbouring mineral claim scamping his assessments is able to get his certificate of improvements without any question as to his *bona fides*. The honest owner should not be expected to turn informer against his dishonest neighbouring owner, nor should he be encouraged to similarly scamp his assessment. No doubt there are difficulties in detecting the frauds referred to since it is not the particular duty of any official to keep a check on assessment work done, but at least it should be insisted upon that no general statement of work will suffice, but a fully detailed statement of work done giving measurement, days and dates worked, and rate per day worked. This at least would in some measure give a basis for a prosecution for perjury if it could be shown that work was not so done. Men are generally more afraid of swearing to particulars that can be checked than to general statements that admit of equivocation. The present system certainly admits of fraud, so it as certainly should be altered.

The Tyee is now the only British Company operating in this country whose shares are quoted on the London Stock Exchange at a substantial premium, and yet so far it has not distributed a penny in dividends. The company's affairs, however, have—except during a relatively brief space when some rather costly mistakes were committed—been most ably and honestly administered from the first, and the high estimation in which the undertaking is now held is entirely justified. Had the same methods been employed and the same wise policy followed in the case of the many British-owned mines in the Kootenays whose prospects were more brilliant at the start than those of the Tyee, and which were brought out under much more favourable auspices, but which to-day occupy either doubtful positions or no position at all, British Columbia as a mining country would be now held in very different esteem in London. But it is proverbially useless to lament over milk once spilt, and much more to the point to congratulate ourselves on the fact that a better state of affairs now prevails and that without so far as we are aware an exception, the British-administered companies *still* remaining in the field are being managed with a show of some degree of capacity and judgment. The Tyee company may, nevertheless, be taken as a model in several important respects, some of which may be enumerated as follows. The superintendent—a graduate by-the-way, of a Canadian university—in charge of the mine is a local man and thoroughly conversant with local conditions and requirements; consequently, not having the disadvantage of (say) a South African experience, he has known at once what to do, and has done it; the smelter was built and is operated by a metallurgist of the highest professional standing, having also special knowledge of local conditions and as a result the plant is one of the best arranged and most economical in the West; the company's business in Canada is looked after by a resident managing director, likewise a local man, this again being a departure from the usual mode of procedure in referring all matters big or little to a board of generally ignorant wisecracks in London; appointments to responsible positions have, so far, been made upon considerations of capacity and competence only, and not on account of the applicant being second cousin to a director's or large shareholder's wife's sister; the company has ignored the stock market and run the mine as a "business proposition"; there has been no disposition to declare dividends before the mine was sufficiently equipped or developed to be placed on a regularly profit-earning footing; and a dozen other instances of the capable manner in which the undertaking has been

managed might be cited. Two more recent examples should indeed be mentioned; one in respect to the complete system of insurance, policies having been taken out against loss not only by fire, but covering accident to machinery or the stoppage of work from other causes; and the other, the wise provision of the directors in dealing with the development and commission accounts, together amounting to £55,311, which it is proposed to write off in five years, by setting aside every year during that period before dividends are paid a sum equal to a fifth of the whole. Which is a distinctly business-like and sensible arrangement.

The B. C. Exploring Syndicate, operating the Iron Mask mine at Kamloops, should be congratulated on the tentative agreement that has been made with the Ashanti Lands, Ltd., to supply the working capital required to adequately equip the property and place it upon a profitably productive footing. The completion of the arrangement depends on the report of an engineer, who is to make an examination shortly in behalf of the Ashanti Company. But from our knowledge of the property, and from the reports made by Capt. Argall—to whose care and skilful management, by-the-way, the Syndicate owes a very great deal—there can be no question but that the Ashante Lands will be quite content to find the money on the present showing, and the Iron Mask should soon in consequence commence a most respectable profit-earning career. It is thought, meanwhile, that a suitable method of treating the ores locally may be found in the Elmore process, but in any case the establishment of reduction works on the spot is contemplated. In this connection a correspondent of the *B. C. Review* calls attention to rather a bad "break" made by the charman of the Syndicate at the recent London meeting. This gentleman is reported to have remarked: "Whereas six months ago we were anxious to find out whether we had enough stuff in sight to warrant our putting up a smelter, we are now anxious to erect only a reducing or concentrating plant to produce concentrates, which will become a marketable commodity. Fortunately for us, our ore is a perfect self-fluxing ore; that is, it possesses all the ingredients, such as lime and other quantities (*sic*) that smelters require; and we therefore know that if we could get a large quantity of concentrates on hand we should find a ready market for it at remunerative rates."

Here, points out our contemporary's correspondent, the chairman seems to be entirely unaware of the fact that although they may have a self-fluxing ore as it comes from the mine, yet the very act of

concentration robs it of this quality, and may make it not a whit more desirable to a smelter than any other ore. His remarks about smelters and concentrators show an equal lack of accurate knowledge. The relative value of smelting *per se*, and of smelting preceded by mechanical concentration, cannot be determined in the off-hand way adopted by him. It requires careful experiment and calculation." All of which is very true, only as even an exact and lucid statement of the case would doubtless have conveyed no more meaning to the other gentlemen present on this occasion, who were probably quite content so long as nothing disagreeable was told them, no great harm was done. The Syndicate is very wise in leaving technical matters largely in the hands of its technical representative.

Satisfactory reports continue to be received of the new discoveries at Poplar Creek, but so far none of these reports, that we are aware, have emanated from sources that could be regarded as official or authoritative. The field may and doubtless does embrace a large area of exceptional richness and promise, and on those grounds an early official corroboration of the news spread by prospectors and less responsible persons is very much to be desired. Probably none of the Departments of the Provincial Government require re-organization to the degree of the Mines' Department, which at present we feel impelled to say, is exceedingly inefficiently and unsystematically administered. The Annual Report of the Department is largely valueless by reason of the tardiness of its appearance, while absolutely no attempt is made to supply the public with information beyond this. If no better state of affairs had previously prevailed, possibly existing deficiencies would not be so glaringly apparent; but if it were possible to organize an efficient system of work such as was in force half a dozen years ago, why not now, or why should that system have not been continued? The Provincial Mineralogist passed through Nelson the other day on his way to East Kootenay. East Kootenay is a very important field, but at the moment there is nothing there requiring the immediate presence of this official. On the other hand, Poplar Creek is no great distance from Nelson, and it is in the interest of the public that early official information on Poplar Creek should be procurable. If Poplar Creek and the adjacent territory is as rich as is supposed, a confirmatory report by the Provincial Mineralogist published in the form of a Bulletin and largely circulated would have a considerable affect in interesting outside capital in the new discoveries; if the reports were

found to have been exaggerated, it is very nearly as important that this also should be shown.

Bulletin No. 11, issued by the Bureau of Provincial Information and embracing a general review of Mining in British Columbia, should prove a very useful publication. The demand for Bulletin No. 7, published last January, and containing similar information, was such that the whole issue of 2,500 copies was exhausted in thirty days. The Secretary of the Bureau, Mr. R. E. Gosnell, points out that "these bulletins are not intended to, and do not, cover common ground with the Minister of Mines' Annual Report. They are intended to give a more or less popular description of mining conditions in the Province as a whole, at the same time dealing with each district separately; whereas the Minister of Mines' Report is technical, describes individual properties, and deals more particularly with the current year's developments. One is for general and the other for particular information." In the bulletin now under notice Mr. Gosnell has assembled much information, including important additions to that given in the earlier bulletin. He has gathered the matter from the Minister of Mines' Report, from articles specially contributed to this journal, from valuable papers on topics connected with mining written by men well-informed on their respective subjects, and from whatever other sources yielded suitable material. Tables of statistics showing mineral production and admitting of interesting comparisons being made also appear, and, too, a synopsis of the mining laws of the Province has been added. The whole of the varied information given is contained in a handy-sized pamphlet of 208 pages, which should in a very effective manner serve the useful purpose for which it has been compiled.

The June issue of the *Dominion Labour Gazette*, published by the Department of Labour, Ottawa, contains a fifth and final article on "Labour Organization in Canada—Its Growth and Present Position," this number dealing with labour organization in British Columbia. The statistics were collected several months ago, and, with the stated object of basing the several articles of the series (which began last September) on a common investigation and with reference to a common point of time, admittedly have not been amplified by the addition of unions reported as having since been formed. The descriptive tables show a total number of 161 labour organizations in British Columbia, the most prominent from the point of view of activity in organization being the transport

trades with 37, the building trades with 35, the mining industry with 22, the metal trades with 19, and the fishing industry with 6 unions. It is noteworthy that one half of the unions in connection with the mining industry were organized in the year 1899. Of the other 11 the years 1880, 1890, 1895 and 1898 each saw the organization of one, while 1900 is credited with two, and 1901 with four, the remaining one not being accounted for. The localities in which these unions have been organized are as follows: West Kootenay, 9 (Kaslo, Nelson, New Denver, Rossland, Sandon, Silverton, Slocan City, Whitewater and Ymir); East Kootenay, 4 (Fernie, Kimberley, Michel, and Moyie); Boundary, 3 (Camp McKinney, Greenwood and Phoenix); Kamloops, 1; Vancouver Island 4 (Extension, Ladysmith, Nanaimo and South Wellington); and Texada Island, 1. The intention is to publish in the next issue of the *Gazette* a table showing the total number of unions reported to the department to June 30 of the current year. These particulars are reproduced here as of some interest to those connected with the mining industry of this Province.

#### CASSIAR.

(By Clive Phillips-Wolley.)

**I**N the *Badminton Magazine* for November, 1897, (an English magazine published by Longmans & Green) there occurs an article by the present writer to which the editors have added this note: "This article, the publication of which has been unavoidably postponed, was written early in the year 1895. It will be found of special interest at the present time. Not only does the writer foretell the great rush of gold seekers which has since taken place, but he describes the new route to the Klondyke."

The editor had bottled up my prophecy until it had been fulfilled, but I ask some little credence for future prophecies concerning the North, for the sake of this proved accuracy in the past.

Unfortunately my editor was not altogether right in speaking of the new route to the Klondyke, but he was only an Englishman and could not be expected to understand the politics of British Columbia or Canada generally: could not be expected, for instance, to understand that a country would commit suicide for the benefit of its rival and at the suggestion of the party most interested. But that is another story which we may consider later on.

At the very outset I find myself in serious difficulty. In speaking of Cassiar, I think that we all meant ten years ago, that district which lies between the Alaskan boundary line and the western edge of Athabasca, between the Skeena and the western limits of British Columbia: that is to say the great northern block of our province of which Dease Lake is the centre, the Stikine River the natural entrance, and the Dease, Stikine, Liard and perhaps the Taku, the natural lines of travel, although, of course, once started from Dease Lake down the Dease and the Liard, an enormous hinterland is open to you which is not Cassiar, but only *the unprospected area of which Cassiar keeps the key.*

Cassiar proper as defined by the authorities, is, I believe, a district lying between the limits to the east and west which I have already assigned to it but extending north and south from the edge of the Comox District in 51 degrees north latitude to 60 degrees north latitude, and containing over a hundred and five millions of acres, and possibly in 1895, one hundred and five white inhabitants.

To-day that is all changed.

The Klondyke rush took men through the northern districts of our province and though "gold by the bucket" was the bait, the country they passed through was such that the eyes of some of the pilgrims, blind though they were to almost all but their goal, were caught here and there, and as a result Atlin and other camps grey up and Cassiar was re-divided into the mining districts of Bennett, Atlin, Teslin, Stikine and Liard.

The whole Cassiar country has been compared by Dr. George Dawson to the Russian province of Vologda, and will, according to him, do as much to sustain a population as that province, but whereas Vologda in 1890 sustained a population of a million, I doubt whether Cassiar contained a hundred white men all told.

In 1804 Cassiar was slumbering after her great excitement of 1872. There were perhaps a dozen miners who "holed" up in Wrangel for the winter and went up to their old haunts to wash a little gold in the summer: there were a few traders on the rivers like Callbreath & Hyland at Telegraph Creek: a very few fur traders like Johnny le Montague travelling down the Liard, and of course the one or two officials at the scattered and unimportant ports of the H. B. Co., but these and a small residue of Chinamen on the creeks of 1872, still washing what the whites had abandoned, and a few thousand Indians, (Sticks trapping on the Stikine or Cascas hunting all over the Arctic slope) made up the whole population of this vast territory.

In those days, we hunters, who talked of moose whose heads would measure over six feet, and bears whose hides would go over ten, were laughed at as those are to-day who venture to believe that there may be some truth in the oft-repeated story of an ibex somewhere up in the Mt. St. Elias country, but since then Mr. A. S. Reed has brought back to Victoria not one but half a dozen specimens of moose heads of the required dimensions and bear skins exceeding our maximum in dimensions and all the hunting world believes in the giants of Cook's Inlet. As it was with the hunters so it was with their comrades, the prospectors. Their stories of a north land richer than Cariboo were laughed at and the suggestions that the matter be looked into and a road built into the new country made by myself and others were disregarded as the foolishness of unreasonable men, but as it was with the game so it was with the gold.

At first there was a story afloat that those good fellows Reed and Rufus Sylvester, pioneers and friends of pioneers who keep (or kept, for Sylvester is dead) a store at Wrangel, had grub-staked two prospectors to go North and that these men had come back

and paid, having their pockets full of dust, the result of their season's work.

In 1896, "Bonanza" and other creeks were discovered on the Canadian side of the Yukon basin and coarse gold exposed equal to the richest finds of Cariboo."

After that the rush came and everyone now knows how many millions have been taken out and are still being taken out of the country, which in 1894 no one would pay any attention to.

Meanwhile a gentleman who had won his spurs as an explorer in the farthest Northwest, had realized with the true instinct of a born traveller, that if the great hinterland of Cassiar which adjoins the Yukon basin was ever to be effectively prospected, it must be prospected from Dease Lake.

From Dease Lake the rivers run down towards the Arctic and men who have but a short season in which to prospect, can do more by coming in up the Stickine in May, portaging to Dease Lake, and *dropping down stream* to the new fields than they could by coming up the Yukon and fighting their way up stream to those same fields.

Therefore, to make such a course easy a railway would be necessary to connect the head of the navigable waters of the Stickine with Dease Lake and therefore Mr. Warburton Pike and his associates applied for and obtained a charter to build from Glenora to Dease Lake, a distance of about eighty miles through a country which is fairly easy in most places.

The charter was a very liberal one *on the face of it*. The company had a right to select 68 blocks of 10,240 acres each of the unoccupied lands of Cassiar, as an aid to or a reward for building this railway, *but it had to find them first* in an area of ten million acres covered for the most part with forest and willow brush.

The company and its charter were, of course, properly reviled by a certain class which expects foreign companies to spend their money in philanthropic works, and objects to any one else making a good thing out of an enterprise, even if that enterprise benefits the country, but the company has not so far made a good thing out of this charter although it has spent a very large sum of money in its endeavours to do so and has done more to bring men into the country and afford means of transportation and facilities for prospecting than has been done by anything else since the rush of 1872.

The fact is the company, in the language of the country, bit off more than it could chew. The time allowed for selection was not long enough and probably it would take a good deal of persuasion to induce the shareholders to make any further effort even if they had time in which to do so.

But this charter, and still more, the Mann & Mackenzie charter to build a railway via Teslin Lake to the Klondyke gave Cassiar its second chance of development.

For a time the country was full of men: the Stickine alive with steamers: grub obtainable and not much too dear in the country, and pack trains were running in more than one direction.

But the old policy prevailed. Mann & Mackenzie were grudging their miles of snow and ice, which may be all gold but have not yet been shown to be so, and the Cassiar Central Railway Company, handicapped financially by the outbreak of the South African war, which almost broke so many English investors, could not build within its time limit, so Mann & Mackenzie and their stores and men and horses trooped out of the country again and the Cassiar Central, having done some grading and a very great deal of exploring and prospecting, ceased to take any very active interest in the district.

But some things were proved in the meanwhile.

In addition to its railway grading and work of that nature the Cassiar Central Railway Company had done a great deal in the way of opening up trails, exploring for mineral belts, and testing and developing certain mining leases on Thibert Creek, but perhaps the finding and partial opening up of certain copper properties in the MacDame District were of most importance to the public.

From one of these, the MacDame Creek ledge, assays were taken, eighteen of which are quoted in the Mining Report for 1900 running in silver, copper and lead.

It is not fair to fill this article with quotations, especially as any one interested can refer to the report (pp. 784, 785, etc.) but it may be useful to say that the highest assay in silver was 84 ozs., in copper 11.90 per cent. and in lead 35 per cent. On another ledge assays were obtained as high as 132.16 ozs. of silver and 19.90 per cent. copper; 158.2 silver and 26.65 per cent. copper and 168 ozs. silver and 33.02 per cent. copper. Of these assays it is stated that the samples were taken very carefully across the whole body of the veins, in order to ascertain the average value of the ledge, and it must be remembered that these were not vendors' assays, but assays which were taken for the company and have only seen light in the Government report.

These facts and such as these go a long way towards establishing the fact that Cassiar is a rich mineral country and well worthy of further prospecting, but it is a difficult country and one which will never be properly developed until a railway line has been built through it.

Mines which would create a furore in Kootenay would not be worth Crown granting in Cassiar today because the cost of transportation would eat up all the profits of the richest ore body which required treatment.

Of the hydraulic mines I am not at liberty to say much. Thibert Creek is the only one, to the best of my knowledge, upon which any serious development work has been done.

What Mr. Robertson, our Provincial Mineralogist, has been pleased to call "the manager's admirable report" has been submitted to the public in the Mining Report of 1901. Since then the mine has been further equipped and Mr. Pike and his associates have worked unceasingly, but as their object is to take gold out of the gravel and not out of other men's pockets, all that

the public knows or can know is that last year a nasty accident occurred in the shape of a slide which somewhat postponed their harvest, and that year after year they take in the same gang of men and offer no shares for sale.

They left again for their mine on May 22nd, and those who wish Cassiar well, will wish them good luck. They are at any rate fortunate in retaining the services of Mr. Alexander Hamfield, a practical mine manager whose reports are not the only "admirable" things about him in his business.

The earliest days of Cassiar are, of course, connected with the operations of the H. B. Co., when in 1834 that company tried to make use of the Stickine as a road to the Cassiar fur district.

As usual it was fur seekers first and then the gold seekers, just as it was in Siberia and indeed in South Africa, except that in Africa the pioneers were hunters and wing seekers rather than fur trappers.

But in 1861 a man named Choquette came wandering through the country with pick and pan and found gold upon the river bars. This brought the first small rush of miners to the country. I believe that some of Choquette's sons are to-day mining in the Klondyke.

In 1873 a little Frenchman named Tribert and McCullough found gold upon the streams which run into Dease Lake, having wandered thither from Red River by way of the Liard, trusting for food principally to the fish in the lakes *en route*.

In two years nearly four thousand miners had joined Thibert and McCullough and in all, I believe, that some four and a half million dollars in gold dust has been sent down from Cassiar, but McCullough died of cold and hunger on "the Desert" at the mouth of the Stickine River, almost in sight of Wrangel, and the last time I saw Thibert he was making dog collars for a living. I believe that the hardy old man is still alive and taking his share in the prospecting of the Klondyke.

To my mind, the Cassiar country is again upon the eve of a fresh attempt at development. The movement may not come this year, but a successful season on Thibert Creek would go far towards causing an excitement the year following.

If it is possible to teach people anything in this world, the people who would be benefited by the creation of a great mining industry in Cassiar, I mean those of the Coast cities who deal in supplies, must have learned that up North, although we have a treasure chest, it costs much to open it, and that those who, like Mann & Mackenzie, are ready to risk the opening must be tempted to do so by terms more generous than those offered to men embarking upon a business certainty. Therefore, perhaps the next people, whoever they may be, who want to gamble upon a railway in the North, will get a shade better offer than their predecessors, and in order to tempt them to try I would call attention in closing this article to the following facts:

Contending with very great obstacles and hampered by the lack of all facilities for transportation, the men of the pick and pan took out four and a half million of coarse gold from the creeks of a small portion of

Cassiar in the seventies, and any man with eyes in his head can see that the country to-day is littered with quartz float and seamed with great veins of quartz. True, few of these quartz reefs have so far been found rich in gold, but few have been prospected. A sample here and there has been chipped off for assaying by the passing prospector, but I believe that it is unusual for a quartz ledge to carry gold through its entire length.

But on the other hand, if we turn to the miner's guide and friend, Dr. G. M. Dawson, in his "Mineral Wealth of British Columbia," pp. 137 R., we will find that "heavy gold and pellets of silver" were found on the Tahltan; that Dease Creek in 1873 "yielded from \$8 to \$50 a day to the hand in coarse gold; Thibert Creek yielded coarse gold; Defoe Creek yielded "gold coarse, rough and often full of quartz, large nuggets including one of fourteen ounces," and the Doctor assumes that this gold is "evidently derived from massive deposits of quartz, which occur at the head of the creek." MacDame Creek in 1874 yielded from \$6 to \$100 a day of "coarse gold worth \$17.75 to \$18.00 an ounce. The high and varying value of her gold is characteristic of Cassiar, the highest in value, I think, being worth \$18.25 an ounce. On Snow Creek "the richest single claim in Cassiar—paid for a week 300 ounces for six or eight men. Seventy-two ounces were washed from one pan of dirt in 1876 and "decomposed rusty quartz containing gold" was found on this creek.

Now turn to the same author pp. 50 R. of the same book and you will read:—

"Save in a few exceptional cases the occurrence of coarse gold in the old channels may safely be accepted as proving that the original source of the gold is not far off. The distance to which coarse gold travels is, as a rule, very inconsiderable, even in the beds of rapid streams. Additional evidence to the same effect is generally offered by the varying assay value of the gold found on different creeks, or even on different parts of the same creek, and this is often emphasized by the rough uneven character of the gold and the circumstance that it not infrequently still holds imbedded fragments of quartz."

The gold in the different creeks in Cassiar runs in assay values from \$15.50 on Dease to \$18.25 on Rosella. We have, then, every indication not only that our creeks and their old channels would pay the hydraulic miner as handsomely in proportion as they paid the "cream skimmers" of 1872, but that the gold in our gravels is a proof that the quartz from which it came is not far off, and I am convinced, though my conviction as a mere amateur is worth noting unless my reasoning is sound, that when Cassiar has had its fair share of prospecting by men who are experts at the business and when facilities of transportation have made it worth a man's while to find anything but pure gold, a quartz mining industry will spring up in that country which will do something to compensate the business men of our Coast cities for the wealth they sent to Seattle when Mann & Mackenzie lost their charter.



### THE NEW COMPRESSORS OF THE GRANBY COMPANY AT PHOENIX.

(By Geo. E. Cole.)

**A**MONG the recent installations of power plants in British Columbia, the new air compressors of the Granby Consolidated M., S. & P. Co., at Phoenix are noteworthy, and the fact that this is one of the largest plants of its kind in the province, and most modern in respect to both its mechanical and electrical features, are reasons sufficient, perhaps, to justify a somewhat detailed description thereof.

Some five years ago a 10-drill Canadian Rand air compressor was installed at the Old Ironsides No. 1

works appeared in a recent issue of the RECORD) so that, at the present time, electric motors drive the air compressors, which, in turn, supply the motive power for mine pumps and hoisting engines.

The new compressors were designed and constructed by the Canadian Rand Drill Co., of Sherbrooke, Que., and the motors were built by the Westinghouse Electric and Mfg. Co., of Pittsburg, Pa.

The site of the plant is somewhat east of the present workings, but so located as to be within easy reach of all. Fig. 1 is a view of Phoenix looking towards the works of the Granby Company. The compressor house is seen to the left of the photo, while the Old

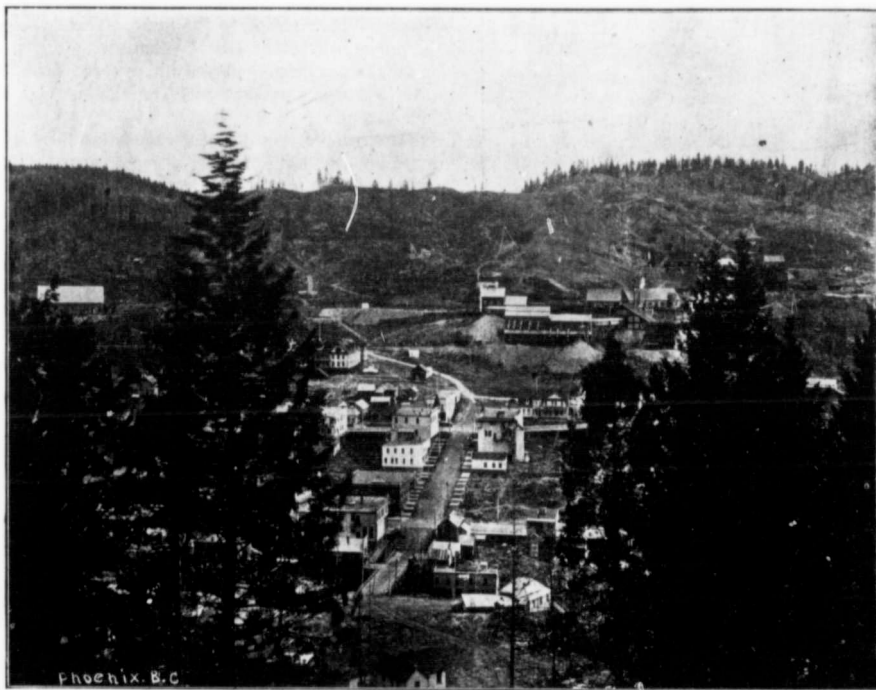


Photo by J. McRae

FIG. 1.  
Knob Hill. O. I. Shaft House. Compressor Shaft.

shafthouse. In 1900 another 10-drill compressor was placed in position at the Knob Hill. Before the installation of the new plant these two older compressors, hoisting engines and mine pumps were driven by steam. But the supply in the vicinity of timber for fuel purposes was rapidly becoming exhausted, with the result that steam generated power was no longer economical. This fact, together with the large extension of operations at the mines necessitated recently a larger plant and a change in motive power, and electricity was substituted for steam.

Power is now supplied to the Granby Company by the Cascade W., L. & P. Co. (an account of whose

Ironsides shafthouses Nos. 1 and 2 and the surface workings of the Knob Hill appear on the right. The Knob Hill spur of the C. P. R. passes within a few feet of the building, so that facilities for unloading machinery and supplies are the best.

The superstructure of the building is of wood frame and wood construction. The timbers used are 12x14 and the foundations of the building rest on solid rock. In appearance the exterior of the building is plain. The interior is finished in the same style, but the general arrangement of the machinery and fittings make its appearance attractive.

The general dimensions of the buildings are 120x60

and the height under roof truss is 20 feet. The floors are of oiled wood, except where foundations of the compressors project about five inches above the floor level.

Both compressor and motor foundations are of concrete and rest on solid rock. In the foundations of

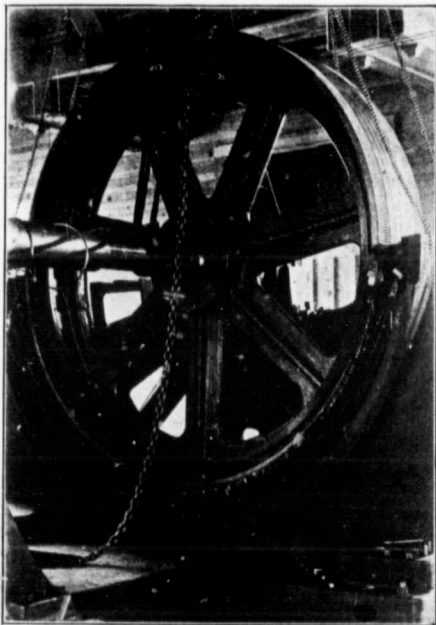


Photo by J. McRae

FIG. 2.

compressors, the concrete is 11 feet deep and motors rest on foundations of 7 foot depth. The wheel pits and rope driveways are also firmly lined with concrete.

A travelling crane, capacity 20,000 pounds, operated by hand chains, spans one side of the room and travels the whole length of same. The crane runways are supported from the cross beams by heavy iron bolts. A view of the crane may be had from Fig. 5. The crane can be transferred from one side of the room to the other and this, in a short space of time, by means of a small car which travels between the runways of the crane.

The motors, two in number, rest on 13 foot square iron bases, which are bolted to the concrete. The height of the motors above the floor is 13 feet 6 inches. Fig. 2, a photo taken when motor was being erected, gives an idea of the size of the revolving part, which is 10 feet in diameter and 24 inches wide. Fig. 3, is a view of the primary winding before the revolving part was mounted.

Both motors are of the induction, 3-phase, Westinghouse type C. Each is wound for 2,000 volts and 7,200 alternations per minute. The speed is constant at 200 revolutions per minute, and each motor has a capacity of 700-h.p. The drive wheels are 7 feet 8

inches in diameter and 48 inches wide. They are grooved for twenty-one 1½ inch ropes. Fig. 4 shows the motors in position. That on the left is in operation as is seen from the appearance of the rope drive and tightener.

Fig. 5, a view taken from the centre and opposite end of the room, shows the two motors, autostarters and switchboards. The well-known device of the Westinghouse Company is used in starting the motors. In connection with the controllers are two auto-transformers which tend to take up any excess of current in the line, until the motor has reached its full speed. When the motor has started, the controller is then thrown on the line.

There are two switchboards, each motor having a separate panel. The third board seen in Fig. 5 is that used for the lighting in the town. There are five instruments on each board—voltage, three ammeters and a wattmeter. Directly above the switchboards the lightning arresters, the Westinghouse indoor type are arranged.

The compressors are of the tandem duplex air type. The low-pressure cylinders are 28x36 inches and the high-pressure are 16x36 inches. The low-pressure cylinders are fitted with Corliss inlet valves and poppet discharge valves; the high-pressure cylinders have

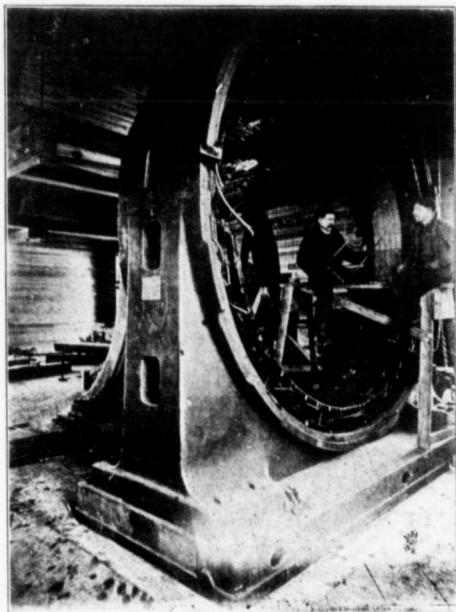


Photo by J. McRae

FIG. 3.

bringing inlet valves and poppet discharge valves. Between the low and high pressure cylinders an inter-cooler is placed. Air is taken in to the low-pressure cylinder at atmospheric and compressed to 25 pounds pressure, at which it enters the high pressure cylinder when it is compressed to 100 pounds. This air

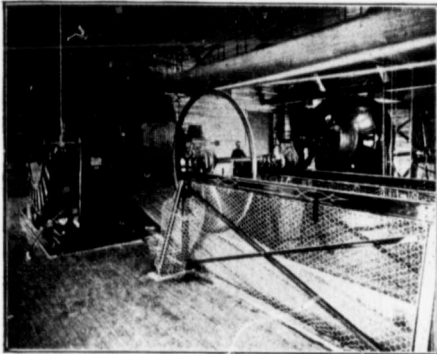


Photo by J. McKae

FIG. 4.

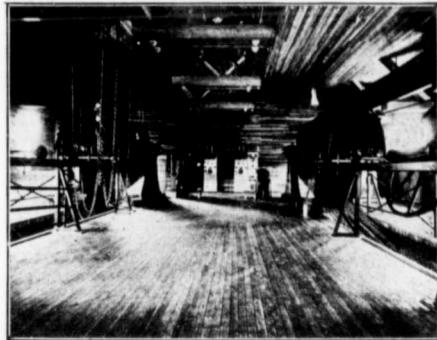


Photo by J. McKae

FIG. 5.

is in turn discharged into an aftercooler where any heat is removed. From the aftercooler the air passes to a large receiver 16 feet long and 72 inches in diameter. Compressed air is distributed from this receiver by a main air line, which is 10 inches in diameter.

sight-feed oilers. The crank pins have centrifugal oilers and the cross heads a set of wipers.

Both compressors are equipped with a system of indicators whereby readings can be taken at any time

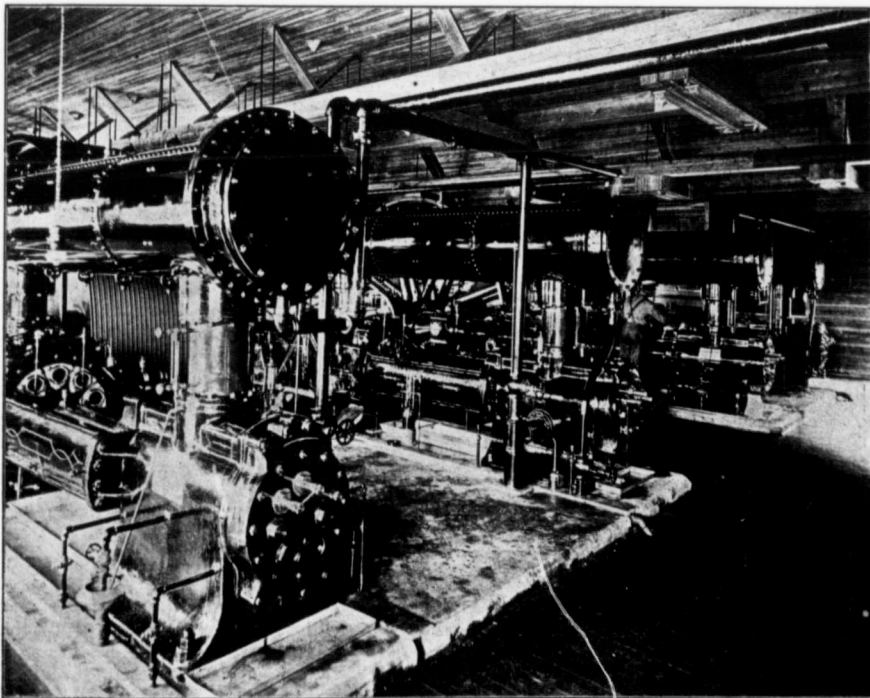


Photo by J. McKae

FIG. 6.

The low-pressure cylinders are lubricated from one reservoir, so arranged as to distribute the oil to both ends and also to the centre of the cylinders. Separate lubricators are used for the high-pressure cylinders. Pillow blocks and all moving parts are fitted with

showing the condition of the valves and pistons. A gauge board at one end of the room has a high pressure gauge, one high-grade clock, four low-pressure gauges, two revolution counters and one recording end test gauge. A set of thermometers is arranged

on the low and high-pressure cylinders to indicate the effect of the cooling water in the intercoolers.

The low-pressure cylinders are water jacketed around both the cylinders and heads, but the high-pressure has jacketing around the cylinder only. The cooling water passes first through one intercooler, then through a second and finally through the cylinder jackets, which it leaves at 70 degrees Fah. A general view of the compressing engines is given in Fig. 6, in which the eight cylinders appear with the intercooler on top. The valve movements of the unloading device may be seen on the second half of the

fly-wheel. The distance from centre of motor drive to centre of fly-wheel is 60 feet. This rope drive is arranged with an automatic take-up whereby the tension of the rope is kept constant. The track, some 40 feet in length, for this tightener, rests on an iron frame which is fastened to the floor. Views of this tightening device may be had from Figs. 6 or 7. The tension weight is taken up through the ceiling and cannot be seen from the engine room.

In trial tests, the motors were started independently and run for twelve hours. The drive ropes were then put on to connect fly-wheels and motor drives. Each

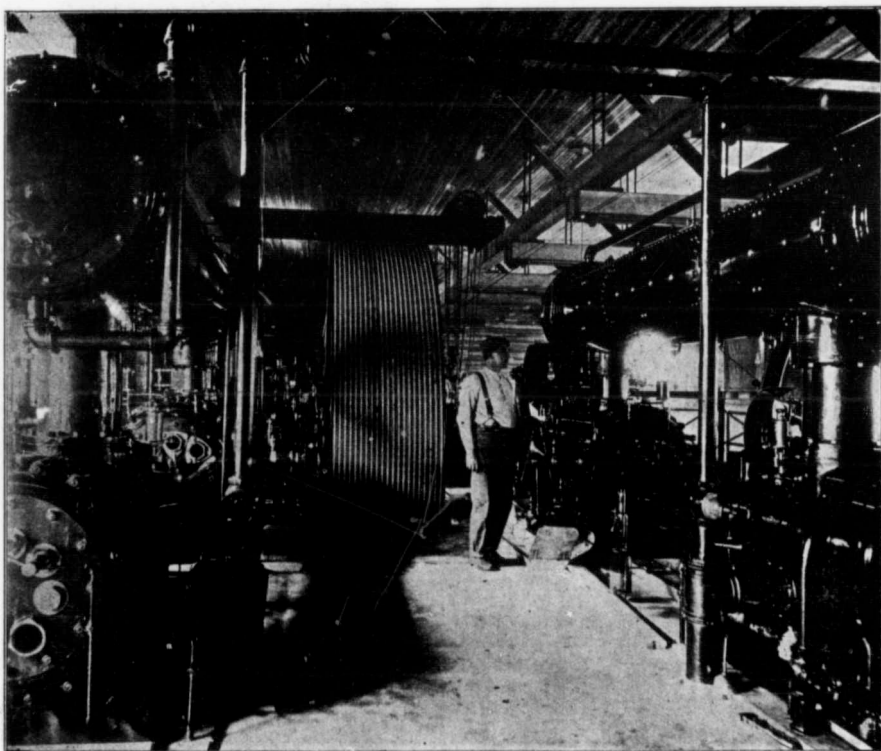


Photo by J. McRae

FIG. 7.

nearer compressor. Fig. 7 is a view of the engines looking towards the motors.

The fly-wheels, one of which is noticed in Fig. 7, are 18 feet 2 inches in diameter and 48 inches wide. Each wheel is grooved for twenty-one ropes of  $1\frac{1}{2}$  inch diameter. The wheels make 80 revolutions per minute and the capacity of each motor is 4,220 cubic feet of free air per minute.

Each fly-wheel is driven from the motor by an endless rope which runs from the motor drive wheel to

compressor was then run light for twelve hours. The load was thrown on the machines and they have been running almost continuously ever since. Indicator cards have been taken from time to time showing the machinery to be in first class condition. The readings prove the compressors to be doing all the work the makers claim for them. The motors are doing their work in the same highly efficient style.

This new compressor plant is now one of the sights of Phoenix and any one visiting the camp will not have seen all should the compressor house be missed.

## DREDGE MINING IN BRITISH COLUMBIA.

(By Wm. M. Brewer, A.M.A.I.M.E., Etc.)

**L**EASES for dredge mining on the Fraser, North Thompson and several of the creeks in British Columbia have been a popular acquisition by many syndicates and individuals during recent years. Prospecting work has determined that, especially in the Fraser and North Thompson Rivers, the bedrock carries pay in placer gold in variable quantities. Besides the bedrock, there are also a number of bars on both rivers which cannot be reached by a placer miner, and consequently in order to win the gold which these bars contain dredge mining must be resorted to.

At first it was thought that this method of mining would be a very popular one in the province, because it appeared as though there would be practically no difficulties to contend with, except, the rapid current. But practical experience has demonstrated that in dredge mining as well as every other character of mining, it is not all "beer and skittles." In the first place the operators found that a type of dredge machinery such as a suction dredge was useless for the work, because although it could be operated on the sand bars, yet whenever the bedrock was attacked the results obtained were entirely unsatisfactory. The next character of machinery used was the single dipper as built by the Beattie Dredge Company, of Ontario. One of these was built and operated at Boston Bar about three miles from North Bend on the Fraser River. During 1898 and a portion of '99 this dredge was worked successfully though since that time it has been laid up, but for what reason has never been made public. During the time this dredge was operated, it is reported that the clean-ups were very satisfactory.

The next season's attempt at dredge mining was on the Fraser River near Lytton, where an English company, installed a bucket dredge designed after the same pattern as is used in New Zealand with about 30 buckets working on an endless chain. All the machinery for this plant was brought from England and when set up ready for operating is said to have reached a cost of nearly \$100,000.00. Operations have been carried on with it at intervals since its installation in 1900, until last autumn, but during the past winter a serious accident happened, the entire plant sinking to the bottom of the river. During the operations various reports were circulated as to the results obtained and various reasons given why the plant was not kept in continuous operation.

The latest attempt at dredge mining was on the North Thompson River some distance from the town of Komloops. The results from these operations have never been made public so far as I know.

In addition to the operations already referred to, there have been two or three attempts made to dredge the Fraser River in the vicinity of Lillooet, but up to the present time these have resulted in failure, owing chiefly either to the type of machinery installed or such accidents as losing the plant in consequence of its breaking away from its moorings and being carried down the stream by the strong current.

During the present season, another attempt is to be made in the same locality and Mr. Robert Hamilton, of the Hamilton Manufacturing Company, is now on the ground constructing the plant and installing the machinery.

When the product of placer gold yielded by the Fraser River in days gone by is taken into consideration, together with the further fact that prospecting has demonstrated that the bedrock of the river carries values in paying quantities, it would seem as though operations by dredging should certainly result satisfactorily, and that a considerable quantity of placer gold ought to be won every year by this method of mining, but up to the present time the records show more loss than profit.

At frequent intervals one hears of new men coming in who represent themselves as being thoroughly experienced dredge miners, a majority of whom claim to have gained that experience in New Zealand, and several of these were employed in operating the dredge near Lytton. Although the results of these operations were not satisfactory, yet when we take the extracts from the report made by the directors of the company at the meeting held in London in December, 1902, which was reproduced in the recently published Minister of Mines' Report for that year we find much food for thought and reasons for the conclusion that either the machinery or the operators of this dredge were at fault for the poor recovery of gold, which practical tests showed was hoisted from the river and dumped into the revolving screen arranged for the purpose, which in its turn discharged the material on to the tables arranged for saving the precious metal.

The following paragraphs are taken from the report of the directors: "We have an average of the tests from September 29th to the first week in December. The average comes out at 49.50 grains per cubic yard (a grain of gold is worth about 5 cents.) Of course these tests vary very greatly; I find on this sheet that one comes out 21.3, the next 12.63 and another 8.91, but we never had one barren test." "This gives an idea as to the value of the ground being dredged, and there is no reason for thinking that this is an unusually rich bar or portion of the river. Mr. Turner dug a hole in the bar with the dredge and found below nine feet of water that the first two feet below gave 23.62 grains (of gold) per yard; the next two feet, 10.12 grains; and the next six feet is hardly worth working." As to working costs, the chairman said: "At present everything over an average of 20 ounces of gold per week is profit. The gold recovered amounted to £939 (\$4,695). We know positively, instead of that representing all the gold we should have recovered, 'we have 'chucked' 99 per cent. of the gold we had on board overboard."

After looking over the field for dredge mining and taking into consideration the fact that the problem of hoisting the material from the river beds has been solved because both the single dipper dredge installed near North Bend and the buckets on an endless chain which was the type installed near Lytton have both been thoroughly proven in that respect, one is forced to look further for the cause of the unsatisfactory

results which have so far been obtained from this method of mining in British Columbia.

From the remarks quoted above from the Chairman's report of the English company operating near Lytton, it is quite evident that at least portions of the river beds carry sufficient values to give very satisfactory results provided these values are saved.

Dredging machinery is to be installed in the Atlin District as well as in Lilloet during the present year. The operations will be watched with a good deal of interest, and there is no doubt that if the management have used good judgment in first prospecting the ground as thoroughly as possible before buying the machinery, and next in having purchased that type of machinery which has already proven its ability to raise the material from the river bed, the operations should result satisfactorily, provided the operators do not make the same mistake as was made by those in charge of the Cobble-dick dredge when according to the chairman's testimony only about 10 per cent. of the gold taken from the river was saved.

British Columbia ought to afford great opportunities for the dredge miner, because of the number of rivers and the aggregate mileage along those rivers from which placer gold has been taken in the past by mining with the rocker or sluice-box. There are the Similkameen, the Tulameen and Granite Creek in the extreme southern portion of the province; the Fraser, North and South Thompson and tributaries of those rivers; the streams in the Omineca and the Cassiar and Atlin Districts. Reference to a map will show that the belt of country which forms the water-sheds of these various streams extends from the extreme south of the province to the extreme north of it, and covers a width which in places is not less than fifty miles.

Successful operations by even one company operating anywhere through this belt would undoubtedly be followed by the installation of plants in other portions, but when the past record of dredge mining in this province is considered, it is not at all strange that the industry does not assume greater proportions.

#### THE IRON ORES OF THE COAST.

**I**N a recent issue of the MINING RECORD this subject was discussed by Mr. W. M. Brewer. The conclusions he arrived at differed in one or two material respects from those of the officials of the Mines Department, a brief summary of whose report is now given:

The chief importance which attaches to the British Columbia iron deposits is that they are practically the only known occurrences of iron ore in quantity on the northern part, at least, of the Pacific Coast and, consequently, iron manufactured therefrom would have the whole of such territory as a market.

In regard to this it might be appropriate to quote from the Annual Report (1901) of the Geological Survey of the neighbouring State of Washington (page 256), in which State the general conditions in regard to fuel, fluxes, labour and geographical position are

very similar to those of British Columbia, excepting that the B. C. coal is undoubtedly higher grade and possesses better coking qualities. The report says:—

"Washington has plenty of material suitable for fluxes and no fear be felt in this particular. Labour is perhaps a little higher in Washington than it is in the East, but the difference would have little effect on the price (cost of production) of iron. The whole Pacific Coast would furnish the market, as very little pig iron, if any, is being produced in any of the States west of the Rockies, except Washington, at the present time (March, 1902), and the steel and iron being used on the coast is shipped from the East. The results shown here are rather against the probability of Washington ever becoming a very large producer of pig iron from ores occurring within her own borders, at least unless other deposits than those known at present are found. There is, however, one factor that has not been taken into consideration as yet, and that is the British ore occurring on Texada Island and perhaps some of the other islands of the Straits of Georgia."

There is, therefore, a large and growing market for the products of the iron ores of the Pacific Coast, a market in which the coast producer would have an advantage over the producer of the East to the extent of the lower rate of freight, which is, however, to a certain extent offset by higher Western labour cost, and the less advantageous smelting mixture of ores at present obtainable. As to the best location for an iron plant to treat these ores, the market of the Pacific Slope is divided into that of the United States and of Canada, the former of which is much the greater, being protected by a tariff of \$4 per ton on pig iron smelted in Canada.

This larger market at present offers an inducement for the establishment of a furnace south of the international boundary line, but it is handicapped by an import duty of 40 cents per ton on all iron ores imported (at least 75 per cent. of the total supply) and an inferior quality of local coke as fuel. On the other hand, if iron works were erected in British Columbia, they would have the advantage of better and cheaper fuel and the product would earn the bounty offered by the Canadian Government.

The only iron smelting as yet attempted on this Coast has been with the use of charcoal as the principal fuel, a little coke from Carbondale having been used, however. On this Coast there are no hardwoods and charcoal has to be made from spruce or fir, producing a fuel which is very much inferior in quality to hardwood charcoal. Under these conditions it is a question whether charcoal iron can be produced here to compete with the Eastern product; certainly the Irondale furnace never paid running expenses, according to the report of the Geological Survey of Washington. Whenever, then, iron ore is smelted in British Columbia on an important scale, it will have to be with coke as a fuel.

The East Coast of Vancouver Island has, at Nanaimo and Comox, a plentiful supply of coal, much of which is suitable for coke-making. The collieries referred to mined during 1902 over 1,247,000 tons of

coal, while there were manufactured at Comox some 20,000 tons of coke.

The coke at present made contains, it is true, from 15 to 16 per cent. ash, which results largely from the ineffective separation of shale from the coal. There is no doubt, however, that the coal is capable of producing a coke which would run not to exceed 12 per cent. ash, and with very low phosphorus contents.

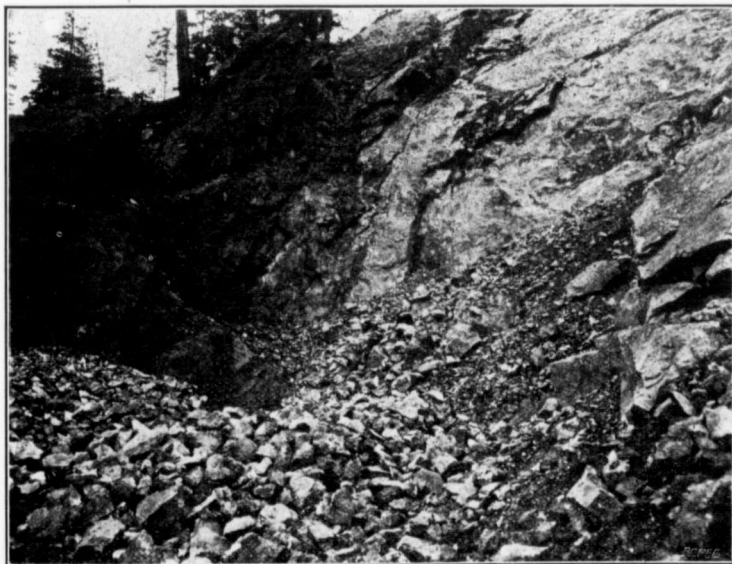
The limestone associated with the iron is exceptionally pure and free from injurious elements. Analyses made at the Government Laboratory show 99½ per cent. calcium carbonate and ½ per cent. carbon.

In the mining of iron ore the necessity of cheap transportation cannot be over-rated, and in this respect at least, the known deposits of iron on the Coast of British Columbia are singularly fortunate, inasmuch as nearly every one is within reach, by a short and cheaply constructed tramway, of the navigable waters of the inlets which indent the coast line.

In attempting to give any description or idea of the iron ore deposits of the Coast of British Columbia, one is immediately confronted with the fact that, almost without exception, none of the known deposits have been worked other than superficially and few have received any further developments than very shallow open cuts, tunnels or



Open cut through magnetite—Iron mine, Copper Island.



Open Quarry Face, Texada Iron Mine.

shafts, and, consequently such facts as are known relative to these deposits are also superficial and far from conclusive.

Up to the present time there has been no market for such ores, except for a comparatively small tonnage which has been shipped to Irondale, Washington, for treatment there in a small charcoal blast furnace, and on a scale which must be regarded as purely experimental.

That such experiments have been satisfactory is a fact. They have demonstrated that a good merchantable pig iron can and has been pro-

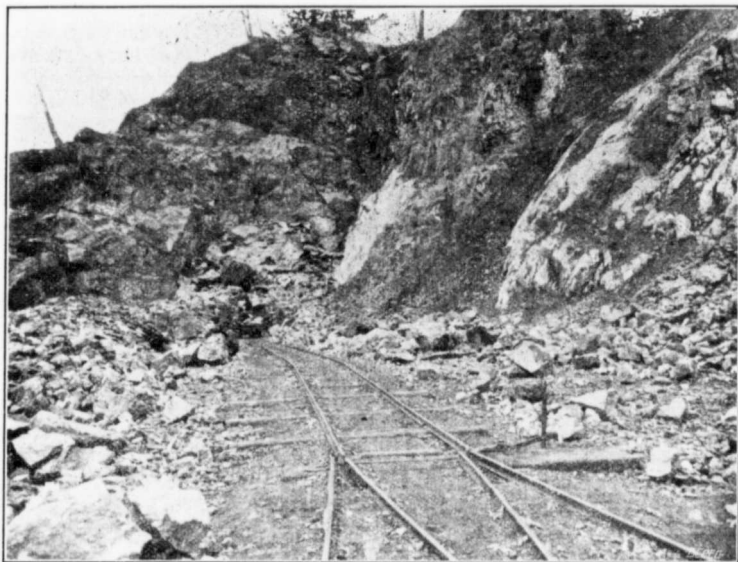
duced from these ores, Texada Island magnetite having been mixed with ore from Hamilton, Skagit County, Wash., in the proportion of 93 and 7 per cent, respectively. The growing demand of the country west of the Rockies for iron in all its forms, and on which the freight charges from eastern points of manufacture or from England (at present the only sources of supply), from such a serious percentage of the ultimate cost, has led to a serious investigation of such known deposits of iron ore as occur in British Columbia, and has also stimulated an equally serious prospecting for new deposits.

The only ore of iron that has been discovered on the coast, and proven by actual development to be of commercial importance, is magnetite. Hematite ( $\text{Fe}_2\text{O}_3$ ) has been reported as found at several localities, but careful inquiry has failed to show any instance where such discovery has received any development, and where the mineral has been found in commercial quantity.

Clay iron stone, although associated to a limited extent with certain of the coal deposits of Vancouver Island, has not yet been reported in sufficient quantity to make it a probable source of iron, although it is possible that this may be partially caused by the fact that, so far, it has been regarded as undesirable mat-



Magnetite Exposed by Bugaboo Creek to Depth of 40 Feet.



Showing Contact of Magnetite with Lime—Texada Mine.

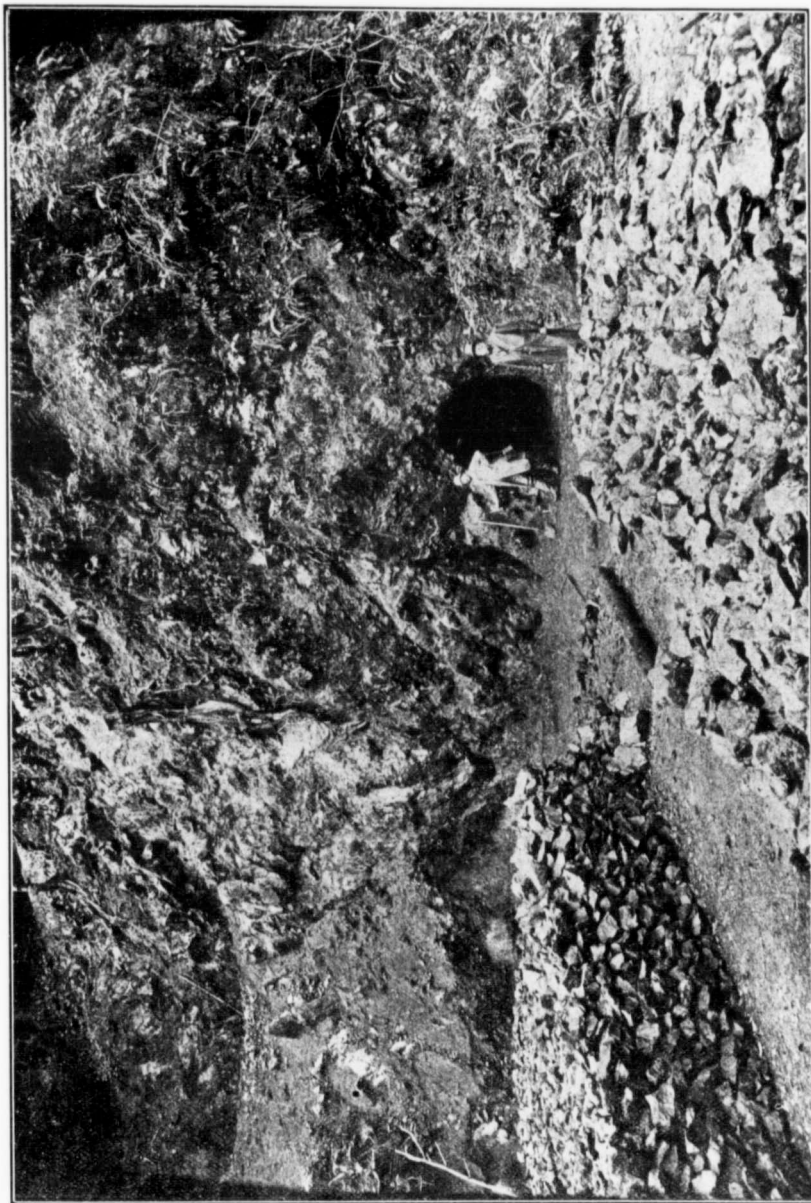
ter and a market for it may bring forth a limited quantity for fluxing purposes, at least.

There appears to be a remarkable similarity between all the known exposures of magnetite on the coast of British Columbia, as far as geological conditions and surroundings are concerned, and it is probably more than a coincidence that all the notable deposits, if not in contact with crystalline limestone, are at least in the immediate vicinity of it, and occur where it is in close proximity to the granite of the coast islands.



There is also a remarkable similarity, topographically, in these occurrences, as they are usually found on the end or flank of a ridge on a steep shoulder, a fact which may possibly be accounted for by the greater

out in exposed knobs, on and near the older granitic rocks, and the ore bodies being more or less free from underbrush or soil, have in this way been located with very little preliminary work.



Exposure of Magnetite on Bluff—Sarita Iron Mine—Barkley Sound.

hardness and durability of the mineral offering a better resistance to the forces of denudation. This resistance to denudation has caused the magnetite to stand

As will be noted, most of the iron discoveries have been made on Vancouver Island or the islands of the Straits of Georgia. The Mainland is densely wooded

and little explored, and it is quite probable that future prospecting may discover iron there, as the geological formation is similar though more covered with later deposits. While the similarity of occurrence of the

deposition, and that subsequent work will prove them to be of variable origin.

Of the magnetite iron deposits of the West Coast of Vancouver Island, one point is very noticeable when



Surface Exposure of Magnetite—Eugaboo Creek.

various iron exposures is remarkable, it is just possible that this similarity has led to too great generalization in classifying these deposits as to origin or cause of

the known locations are platted on the map, *i.e.*, that these iron discoveries lie on a straight line parallel with and from 10 to 15 miles back from the general

west coast line of the Island, and the impression is at once strong that the cause of such deposits must be very closely connected with the general granitic upheaval which uplifted the central portion of the Island and which sent up spurs or dykes, penetrating the originally stratified rocks.

Such line of mineralization would conform to the line of outcrop of certain beds of the Vancouver Island series, and would also conform with the probable lines of fracturing caused by the uplifting of such beds by the granite. In a general way, the copper deposits have also a trend lengthwise of the Island.

In the case of almost every one of the magnetite deposits, there are in some part of it quantities of iron

points in connection with the matter, which have hardly received sufficient attention.

*Motive Power.*—The first important point to be considered is that of the power to be adopted for driving the machines. It will no doubt be conceded that, where the mine conditions are suitable, electricity possesses great advantages over compressed air. A few of these advantages may be enumerated as follows—(1) Less initial outlay for generating plant. (2) Cables, compared with pipes, are cheaper, cost less to lay, take up less room, and are easier to maintain. (3) Efficiency as between the prime-mover and the motor. With regard to this point, which is all important, electricity from the very start is the most economical

ANALYSES OF IRON ORES ON THE COAST OF BRITISH COLUMBIA.

Locality.	Kind of ore									Analyst.	
		Iron	Silica.	Sulphur.	Phosphorus	Titanium.	Copper.	Lime.	Mang. Oxid.		Alumina.
Quatsino Sound.....	Bog iron	52.0			0.5						Provincial Gov't Laboratory
"Glengarry," Nootka, hand sample.....	Magnetite	69.0									
"Violet," Hesquiot, average sample.....	"	59.8	11	0.55			0				
Lowest outcrop Agnes 2, Hesquiot.....	"	44.7					0				
" " 75 feet above first outcrop.....	"	56.7	13.1				0				
Crown Prince, Seshart, average sample.....	"	48.4		0.7	trace	trace					E. H. Cook, Middleboro, Eng. Dr. O. Wuth, Pittsburg, Pa. Provincial Gov't Laboratory
" " " hand sample.....	"	66.0	2	0.2	.01		4	.44			
" " " glassy ore.....	"	65.00		0.9	.008						
Bald Eagle, Seshart, average.....	"	37.4									" " "
"Mou tain," Copper Island, average sample.....	"	62.2									
Sarita dump, average.....	"	50.4	18.6	0.3	0.053	trace	0				" " "
Smith's Landing (139) rough average sample.....	"	63.7	3.85	0.3	trace	none	0				
Brown's claim, Anderson Lake, average sample.....	"	55.9	16.0	1.0			0				" " "
"Bently & McG," Bugaboo Creek, Port Renfrew.....	"	55.7	20.3	0.3			0				
Baden Powell and Little Bobs, Bugaboo Creek, Renfrew, best looking surface ore.....	"	69.2	2.7	0.5			0				" " "
"Rose," Newton, hand sample.....	"	63.6		1.5							
"Ogenau," Tyee Co.....	"	61.9		0.34		trace					" " "
Sooke Iron Mine, 8 samples, mixed with a considerable amount of pyrites.....	"	69.7									
Texada Iron Mine, hand sample.....	"	28 to					1				E. R. Kendrick, Geol. Surv. Canada. Fulmer, Geol. Sur., Wash.
" " " representing a lot of 600 tons smelted at the Puget Sound Iron Co.'s furnace.....	"	64%									
Redonda Island Iron Mine.....	"	69.85	2.75	6	trace			1.05			
	"	67.91	2.96		trace						Tenth Census, U.S. F. T. Wait.
	"	65.71			.013						
	"	65.9	4.3	.015	none		2.3	.11	22		

and copper sulphides, which render that portion unfit for iron making, and these sulphides seem much more than merely accidental, for, with most of the copper properties on the West Coast we have associated magnetite, as, for example, at both the Nahmint and Monitor mines on Alberni Canal, and also at the copper properties at Sidney Inlet. That part of Vancouver Island lying to the east of the central ridge presents geological conditions similar to the western slope and would be expected to contain similar mineralization.

#### COAL-CUTTING BY MACHINERY.\*

(By R. W. Clarke.)

THE subject of coal-cutting by machinery, which has become of increasing importance during the last few years, has been exhaustively dealt with and discussed, but there are undoubtedly still many

agent, and as the working-faces advance farther away from the shaft, the percentage of efficiency becomes more marked as compared with compressed air.

*Type of Machine.*—The next point to be considered is the type of machine that should be employed. In recent papers dealing with this subject, an attempt has been made to suggest a perfect type of machine to deal with the varying conditions of the coal-face. The writer, however, is of opinion that it is impossible to design a so-called perfect machine, and that type must be multiplied and modified to suit different collieries. For instance, in a thin seam, it will perhaps be necessary to employ a machine to develop say 20 horsepower, weighing not more than 30 cwts., with a maximum height above the floor of 20 inches. This machine will probably give excellent results in a seam 2 feet

\*A paper read before the North Staffordshire Institute of Mining and Mechanical Engineers.

thick, where the coal need not be undercut to a greater depth than three and a half feet.

It would, however, be scarcely the type of machine for use in a seam six feet thick, where the coal must be holed to a depth of five and a half feet. In order to provide for the additional horse-power required, the machine must necessarily be bulkier and stronger, but in a thick seam, the additional weight will not be so serious a drawback.

It is a moot point whether the disc or bar is the best tool for undercutting. The writer does not propose to discuss the advantages of either method, but as the former has been the most successful, and has been more generally adopted in this country, it will be understood that this paper treats of coal-cutting with a disc machine.

*Working-face.*—Perhaps the most important point, in connection with coal-cutting, is the face of coal, in which the machine will have to work; and there is no doubt that many machines have failed to give satisfactory results, not so much from the faulty design of the machines, but from the fact that it would have been next to impossible for any machine to do satisfactory work under conditions such as obtain in some mines. Many colliery officials are intensely conservative, and refuse to believe that any modification of their methods is either possible or necessary. It should always be remembered that a coal-cutter is unlike any other mechanical tool; and that it is not fixed *in situ* like a lathe, coal-crusher or a drill, but has to travel along what must necessarily be a bad road, and is liable at any moment to be derailed or buried.

A little care and attention to such matters as straightening the working-face, setting the timber evenly, and providing good roads, laid with permanent rails, along which the machine has to be flitted, will often reduce the price of cutting in the most surprising manner.

There are two methods of laying out faces for coal-cutting. One may be called the long face, and the other the short face:—

*Long-faced Method.*—The most perfect face consists of four sides of a square, the machine cutting continuously round and round without requiring to be fitted. This method is only practicable, however, in a seam nearly level, and free from water. Unfortunately these conditions seldom exist, and it is rarely possible to lay out a face in this manner.

It is, however, often practicable to adopt a modification of this plan by cutting two sides of a square. The machine starts from a wheel-hole at the bottom corner of the end-face, and after cutting the first side, is twisted at right angles and then proceeds to cut along the bord-face. It will be found a great convenience to keep a heading, nine feet wide, in the corner, about nine feet in advance. This will enable the machine to cut right through the end-face, leaving no coal to be holed off, while the heading always provides a wheel-hole for starting the machine along the bord-face. It must be remembered that when cutting towards the fast-end of a face, no machine can cut absolutely up to the post, and there always remains five or six feet of coal to be holed by hand. The heading driven at an angle

of 45 degrees to the end-face, however, will overcome this difficulty.

Where it is found impossible to lay out two faces at right angles to each other, good results may be obtained by laying out faces in a straight line and flitting the machine back to the starting end along the main road, after it has cut through the face.

It is difficult to lay down hard and fast rules for determining the length of the face, but it may be taken that this length need only be limited by the difficulty of maintaining a proper haulage road, along the level, parallel to the face; while it has been found by experience that 300 feet is the least economical length of face which can be worked on the long-face method.

At the Lidgett colliery, in South Yorkshire, one machine-face is 4,500 feet long in a straight line. The seam is 24 inches thick, 10 inches of inferior coal being taken up in the face to provide height and material for packing the waste. Two machines follow each other at regular intervals, each working 15 shifts per week, and the pack-walls are moved forward, on an average, twice in ten days. The gate roads are spaced at intervals of 66 feet, and are cut off at intervals of 600 feet by cross gateways branching right and left from main gateways, 750 feet apart, which are ripped to make height for horses. When a new cross gateway is started from the main gateway, the pass-bye is moved to the new cross gateway, and the horse or any other method of traction receives the coal at the new pass-bye.

*Short-face Method.*—This method, which has been largely adopted in Scotland, consists of laying-out faces of such a length that the cutting and filling can be performed in a certain length of time, say 24 hours. The machine, on finishing its cut, is not flitted back to the starting end, but, when the face has been cleared of coal, cuts back again along the face to the right-hand corner.

The length of the face and the distance of the gateways from each other is determined by the thickness of the seam; but it may be stated that lengths of 300 feet with gateways 45 feet apart have given good results, the face being moved in some cases five times per week.

It is possible by this method to obtain good results, but only by the most unremitting attention on the part of the management. Any loss of time on the part of the workmen, or breakdown of the machine, will entail the dislocation of the system, and the loss of the output from that particular face for the day on which the breakdown occurs. With regard to labour, the difficulty can be met by adopting the butty system as practised in North Staffordshire; and breakdowns of the machine can be guarded against by stocking spare parts, which are accessible to the machine men at any hour of day or night.

*Reversing the Machine.*—With regard to the question of cutting backwards and forwards, a great deal of skill has been displayed in attempts to design a machine which will cut equally well in either direction. In the writer's opinion this is misdirected energy, as it is practically impossible for any machine to cut equally well in either direction. The hauling gear and the

starting switch must necessarily be respectively at the front and rear end of the machine, if the machine is to be operated by two men, and if the machine is reversed, they will occupy positions which will make the work very inconvenient. The driver of the machine, who operates the switch at the rear, is in the best possible position for controlling the machine. His duties are to stop and start the machine, shovel away the holings, replace any road-packing which may have been misplaced by vibration or thrust, pull forward the face-cables from time to time, and pull up the last length of rails, when the machine has crossed them. If from any cause the wheel is rising or falling in the cut, or the machine is not making its full cut, he can, from his position at the rear, detect it at once and inform his road-layer.

If, in order to make the return journey, the motor is simply reversed, he will be able to do nothing but stop and start the machine, and will require two assistants to do the work that one should do, namely:—Lay and pull up the road; while it will be difficult to clear away effectually the holings from the wheel, and the machine, if cutting near the floor, will either be completely choked or will absorb a great deal more current than is necessary. The haulage rope also will pass under the machine, and with an undulating face will add to the danger of derailment.

The best method of overcoming these difficulties is to turn the machine completely round, and make the return journey with the wheel on the opposite side of the frame. The machine can easily be arranged for this by boring the frame on either side to receive the wheel bracket and the carriages for the haulage gear, while the shafts with their pinions need only be turned over, the whole operation taking about two hours. With regard to the twisting of the machine, many colliery officials will say that they cannot afford sufficient room in the face to do this.

It must be remembered that when the machine has cut through it will be impossible, in any case, for it to remain there. It must be moved somewhere to enable the last six feet of coal to be holed off and filled out. In such a face as we are considering, there is sure to be a gateway within a few feet of the cutting-out end; and the machine must be removed into this till the coal is cleared away. When it is taken back into the face, it must be twisted with the drum end to the right hand and then shunted back into the corner, and it will then have been reversed without any large space being necessary, just as a locomotive is reversed on a triangle, in the absence of a turn-table.

*Difficulties.*—The writer has observed that, at some collieries, the management are willing to entrust the driving of their machines to men with the very slightest previous experience of such work, on the ground that they are cheap. It need scarcely be remarked that this practice rarely results in successful coal-cutting.

When a machine is cutting well in a favourable seam the operation seems simplicity itself, and after the machine has been working for a short time, many have been heard to express the opinion that there is no difficulty in coal-cutting.

In order to correct this idea, the writer will en-

deavour to enumerate a few of the difficulties which may arise, and how to overcome them. In the first place, it is essential that the machine should run on a firm stable road. The rails should be strong enough to bear the weight and thrust of the machine without bending; they should be of sufficient length to avoid too frequent joints, and yet be sufficiently portable to be handled by one man, and short enough to follow the undulations of the face in order to keep the machine up to the cut. A flat-bottomed rail, 12 feet long, with a section of 26 pounds to the yard, has been found to answer these requirements. The sleepers should be spaced about four and a half feet apart, and should be capable of being easily fixed and detached from the rails. The joint-sleepers should be of such a design as to prevent the rail ends from moving in any direction, after they are adjusted; and it should be possible to adjust them to the rails when either rail is several inches in advance, which must inevitably occur in a face which is not quite straight or which is laid out on a curve. If, owing to the latter cause, either rail leads too far to allow the joint-sleeper to be fixed, the difficulty may be got over by spragging the last joint-sleeper against the machine, while the latter is in motion, and making it shove forward either rail; or by cutting off a few inches from the end of one rail, and using it to correct the lead at either side, when that becomes necessary.

As the thrust of the disc machine operates away from the face at the rear end, and towards the face at the front end of the machine, packing must be inserted at either end of the sleepers, care being taken that the packing on the face side is not high enough to catch the cutters in the wheel. If the face is not very straight, it may be advisable to dispense with packing on the face side so that the machine may draw itself into the face and make a full cut. The goaf side packing may then be put in, after the machine has drawn itself into the face. With regard to the latter its efficiency will depend on the amount of timber available in the face, and the ingenuity and resource of the road-layers; but it is important to remember that the packing should be of such a nature as not to become displaced or drop down when the tension is relieved by the thrust of the front end of the machine.

The rails may be either laid horizontally or inclined in any direction, but it is important that they should be solidly bedded on the floor. If this is not attended to they will tilt or sink, when the weight of the machine comes on to them, with the result that the cutter wheel will either climb up or down. This is a very disconcerting incident to the amateur coal-cutter, but can be corrected in a very short time by putting cutters into the wheel, either slightly turned down or up. When the wheel has resumed its normal position, the original cutters should be at once replaced. When climbing, the machine will of course ride above the rails carrying all its weight on the cutter wheel, but the rails must not be raised up to the machine, as the turned-down cutters will inevitably bring it down within a few feet.

When approaching a crooked joint, the road-layer must attend at the front end of the machine, and keep

the front bridle or thrust arm quite slack till the joint is passed. He must then keep screwing it tight, till the rear rolling wheel and bridle of the machine have crossed it. Neglect of these precautions will inevitably cause derailment at the front or both ends of the machine, which may mean a loss of between one and three hours.

*Workmen.*—From the above remarks, it will be seen that the driver of the machine should be a person of considerable intelligence and resource. He should first of all be a thoroughly competent miner, to enable him to take care of himself when the machine is running under bad roof. He should also have a rough working knowledge of elementary electricity and mechanics, to enable him to replace broken parts, to make ordinary electrical connections on the machine, and to adjust the brush gear.

As a good driver can under favourable circumstances hole from 200 to 300 feet per shift of eight hours with the assistance of a competent road-layer, turning out from 50 to 300 tons according to the thickness of the seam, it will be apparent that a colliery manager having secured an individual of this description should treat him liberally in the matter of wages.

The Lidgett colliery management, mentioned above, employ upwards of ten machines to cut their weekly output of 3,500 tons from a seam two feet thick. About fifty men are required to man the machines, but a large reserve of men is maintained at the colliery. These men, it is needless to say, have all been trained at Lidgett colliery.

The President remarked that the subject of coal-cutting was attracting attention at the present time, and was one to which mining engineers would have to devote more attention in the near future. There seemed to be very little doubt that coal-cutting was a subject that would have to be taken up in this country to a greater extent than it had been up to the present time. America seemed to be the country where mining engineers had gone into this question most extensively. Whether it was due to the machines or other circumstances, there was no doubt that the output of coal in the United States had increased so rapidly within the last few years as to make those States the leading coal-producing country of the world. In 1899 the number and kind of machines in use in America\* were as follows: Total number of machines in use, 3,125, divided into chain, percussion and long-wall. Of the chain machines, 564 were of the Jeffrey type, 95 link-belt, 401 Morgan-Gardners, and 46 others; of percussive machines, 590 were Ingersoll-Sargeant, 317 Sullivan, 992 Harrison, and 98 other systems; and longwall machines, 22, making 3,125. The proportion of coal cut by machinery in America was about 25 per cent. of the total output, while in this country it was only about two per cent., so that there was evidently a great margin for the further use of coal-cutting machinery in Great Britain. Seeing that coal-getting was of so expensive and laborious a nature, it appeared rather extraordinary that the use of machin-

ery had not been brought to a greater state of perfection before now. No doubt the difficulties were great, but if mechanical engineers received encouragement from colliery owners they would make machines, and bring them to a greater state of perfection than they had at the present time.

#### SOME FIGURES FROM THE MINES' REPORT

(By E. Jacobs.)

TABLES IX and X included in the report of the Minister of Mines for 1902, showing comparative mineral production for the years 1901-1902 of British Columbia and other Provinces of the Dominion, respectively, supply some interesting data exhibiting the prominent position this Province occupies in connection with the important industry of mining as compared with the rest of the Dominion east of the Rocky Mountains. It will be noted that the production of the Yukon Territory, which like British Columbia, lies west of the Rockies, is left out, the comparison being made between this Province and all the other Provinces of the Dominion. Were the comparison to be made as between the relatively small area west of the Rocky Mountains and the immensely larger territory of the Dominion lying to the eastward, it would show the mineral production of the former to be much larger than that of the latter notwithstanding the enormous disproportion of the respective areas under notice. Leaving out of consideration, though, the yield of the Yukon and taking into account that of British Columbia only, it must be conceded that in comparison with the other Provinces this Province makes a very creditable showing. The comparison of the total value of the minerals produced in 1901 was even more in favour of this Province than that of the production of 1902. In 1901 the total value of British Columbia's minerals was \$19,686,780 as against \$19,861,287 for the remaining Provinces. In 1902, however, this Province lost ground, its production having totalled only \$17,036,550 as compared with \$20,186,691 for the remaining Provinces. This retrogression is more seeming than real, for, as mentioned in last month's review of the Report, it was chiefly owing to the lower average market prices for silver, copper, and lead, prevailing last year, and to accidents and strikes at the coal mines of the interior which, as well as lower prices, kept down the output of minerals, that the reduced total value is attributable for the total tonnage of ore mined showed an increase of 8.6 per cent. An analysis of the accompanying statistics will show that in production of gold, silver, copper, and lead British Columbia is far and away ahead of all the other Provinces combined, the totals for 1902 being \$12,174,242 and \$1,837,525, or between six and seven times as much for the Pacific Province as for the combined output of these metals of the Provinces east of the Rockies during the same period. But the Eastern Provinces have a set-off in their output of nickel of \$5,025,903 as against *nil* for British Columbia, and again their coal output was \$11,346,429 as against British Columbia's \$4,192,182. It is not unlikely,

\*Mines and Quarries: General Report and Statistics for 1900, page 452.

though that from now on, at least for several years the coal output of this Province will increase in greater proportion than that of the other Provinces. There is another metal that at present adds but the merest trifle to the total production of this Province, viz., iron, which last year contributed only \$30,051 whilst the total of the other Provinces for this metal was \$1,077,979. But here, too, a very considerable change may be looked for in the course of a few years, since the extensive iron deposits of British Columbia are at length attracting attention and may be expected to be utilized to a considerable extent ere long. On the whole the prominent position this comparatively small area of the Dominion occupies in relation to the total mineral production of the Dominion is one that it may well be proud of, especially since under ordinarily favourable conditions it may be expected to show to increasing advantage year by year until it will be a long way in the lead in regard to the product of the mining industry. The following figures have been taken from the two tables above mentioned:—

mines, that last year's results indicate a falling off in this particular branch of mining, except in the case of gold. But it is necessary to look farther than at the figures showing the values, to obtain a fair idea of the actual position. For instance, whilst gold exhibits an increase in both quantity and value, copper shows an increased production and a decreased value. The latter is, of course, attributable to the lower average market price for the year 1902 as compared with that of 1901. In silver and lead both quantities and values show a very considerable decrease, but this is easily accounted for by the demoralized market conditions and the consequent enforced reduction of output of the silver-lead mines, most of which suspended work until the prices obtainable for these two metals should make it practicable to work the mines at a profit. Passing from this reduced value phase of this subject, it is interesting to compare the progress made in lode mining during the sixteen years for which the output of the mines and the total value of their products are given. During six years, 1887-1892 the only metals

	British Columbia.		All other provinces combined.		Dominion Total.	
	1901.	1902.	1901.	1902.	1901.	1902.
Gold .. . . . . .	\$5,318,703	\$5,061,409	\$1,143,519	\$ 279,836	\$6,462,222	\$6,241,245
Silver .. . . . . .	2,884,745	1,941,328	108,923	339,629	2,993,668	2,280,957
Copper .. . . . . .	4,446,963	3,446,673	2,153,141	1,107,022	6,600,104	4,553,695
Lead .. . . . . .	2,002,733	824,832	197,051	111,038	2,109,784	935,870
Iron .. . . . . .	17,238	30,051	745,046	1,077,979	762,284	1,108,030
Nickel .. . . . . .	.....	.....	4,594,521	5,025,903	4,594,523	5,025,903
Coal .. . . . . .	4,380,993	4,192,182	10,290,122	11,346,429	14,671,122	15,538,611
Coke .. . . . . .	635,405	640,072	628,955	898,855	1,265,360	1,538,930
	\$19,686,780	\$17,036,550	19,861,287	20,186,691	39,154,067	37,223,241
		Add Yukon Territory, value of gold. . . . .		18,000,000		14,500,000
		Grand total for Dominion (including Yukon) ..		\$57,154,067		\$51,723,241

The tables of statistics published yearly with the Report of the Minister of Mines for British Columbia supply information of much value for comparative purposes. Among those contained in the recently issued report for 1902 is the accompanying "Table VI.—Production of Lode Mines."

won from lode mines were silver and lead, and the aggregate value for that period was but \$363,678. In 1893 lode gold appeared in the statistics for the first time, and the following year copper was added. For the period 1893-1897, the total value of the product of the lode mines, then yielding all four metals above

Year.	Gold.		Silver.		Lead.		Copper.		Total Values.
	Oz.	Value.	Oz.	Value.	Pounds.	Value.	Pounds.	Value.	
1887 .. . . . . .	.....	.....	17,600	\$ 17,331	204,800	\$ 9,216	.....	.....	\$ 26,547
1888 .. . . . . .	.....	.....	79,780	75,000	674,500	29,813	.....	.....	104,813
1889 .. . . . . .	.....	.....	53,192	47,873	165,100	6,498	.....	.....	54,371
1890 .. . . . . .	.....	.....	70,427	73,948	Nil.	Nil.	.....	.....	73,948
1891 .. . . . . .	.....	.....	4,500	4,000	Nil.	Nil.	.....	.....	4,000
1892 .. . . . . .	.....	.....	77,160	66,935	808,420	33,064	.....	.....	99,999
1893 .. . . . . .	1,170	23,404	227,000	195,000	2,135,023	78,996	.....	.....	297,400
1894 .. . . . . .	6,252	125,014	746,379	470,219	5,662,523	169,875	324,680	16,234	781,342
1895 .. . . . . .	39,264	785,271	1,496,522	977,229	16,475,404	532,255	952,840	47,642	2,342,397
1896 .. . . . . .	62,259	1,244,180	3,135,343	2,100,689	24,199,977	721,384	3,818,556	190,926	4,257,179
1897 .. . . . . .	106,141	2,122,820	5,472,971	3,272,836	38,841,135	1,390,517	5,325,180	266,258	7,052,431
1898 .. . . . . .	110,061	2,201,217	4,292,401	2,375,841	31,693,559	1,077,531	7,271,678	874,781	6,529,420
1899 .. . . . . .	138,315	2,857,573	2,939,413	1,663,708	21,862,436	878,870	7,722,591	1,351,453	6,751,604
1900 .. . . . . .	167,153	3,453,381	3,958,175	2,309,200	63,358,621	2,691,887	9,997,080	1,615,289	10,669,757
1901 .. . . . . .	210,384	4,348,603	5,151,333	2,884,745	51,582,906	2,002,733	27,603,746	4,446,963	13,683,044
1902 .. . . . . .	236,491	4,888,269	3,917,917	1,941,328	22,536,381	824,832	29,636,057	3,446,673	11,101,102
Total .. . . . . .	1,077,490	\$22,049,732	31,640,203	\$18,475,882	280,200,845	10,447,521	92,652,480	12,333,200	\$63,229,102

At first glance it might appear, looking only at the respective values of the several metals won from lode

mentioned, was \$14,730,749, these five years showing a very considerable increase over the total of the pre-

vious six-year period. But the rate of progress was still greater during the five years, 1898-1902, the total value for that period having been \$48,134,927. The most striking comparison, though, is that of the last three years, 1900-1902, during which the production totalled \$34,853,903, which is more than half the aggregate production of the whole sixteen years under notice. This means progress, and that too in very marked degree, so that there is no need for discouragement at last year's setback, which was temporary and the result of unusually unfavourable market conditions. Prices will assuredly continue to fluctuate from year to year, but this notwithstanding, the outlook is that whatever may happen to influence the production of silver and lead, gold and copper may be expected to show a steady increase in both quantity and value, whilst it is not unreasonable to look for iron ore long adding its quota to the total value of the lode mining industry.

#### NOTES ON THE DRY ORE BELT.

(By W. D. McGregor.)

THE summer of 1903 has been abnormally late in arriving and the damage caused by the melting snows has been so severe in this district—sections of Springer and Lemon Creek waggon roads having been completely washed out—that ore shipments have been very much retarded.

I note that the local branch of the Provincial Mining Association are discussing the whole question of the present method of dealing with trails and roads. That as long as we consider the roads and trails in a riding as so much "patronage" to be dispensed by political influence, so long we must expect the Government appropriations to be looked upon as "easy money" and for it to be dispensed where "it may do the most good," in a political sense is a truism. How to take the whole question of location, construction and maintenance of trunk roads and trails out of politics and into practical business is perhaps, as important a question as any the Provincial Mining Association may be called upon to solve.

To return to our local doings. The winter and spring development has been marked by several discoveries of very rich ore—by the very general success of lessons on the smaller series of veins in the district and by the success of further development in the big veins showing large bodies of low-grade ore.

On Ten-Mile Creek, the Enterprise mine has been working steadily under lease and, as the lessors are satisfied with a limited tonnage carefully taken out, they are doing well for themselves and the company. The owners of the Highland Light have opened a bunch of 1000-ounce ore and are going to make a bid for the record shipment. The Westmount and the Victor are both yielding pay. The latest strike reported is on the Black Hawk owned by one of the Mansfield Companies, which now shows the typical ruby silver of that part of this district. On Springer Creek development has been fairly steady, showing the continuance in depth of large deposits of low-grade ore in the Black Prince and the Volvette, the

latter showing 30 feet on the cross-cut. The last carload from the Republic was the highest grade of the season. The Meteor and the Dayton, both under lease, have shipments of \$250-ore to their credit. The Ottawa shipments among others are of course held back by the condition of the road. They are, however, pushing development and experimenting for the treatment of their second-class ore. The Hampton is at work again with more of a force than previously. Lemon Creek shows more activity than for years, several properties near the headwaters showing marked improvement. The Ocean group is now sacking ore. The Legal on the First North Fork having very much improved will probably be worked continuously. Work on the Hoodoo in its immediate vicinity by a Virginia company has just been begun under favourable auspices. This gold belt is exceedingly well worth the investigation of practical men as the development is well in advance of the initial stage and there is money to be made in it.

To sum up. The district as a whole is busy. Some mistakes are being rectified. The narrow rich ore shoots are being handled more tenderly, while the large veins are being exploited to show the size and value of their ore bodies and indeed we are very nearly in condition to show the ore reserves required to warrant the erection of a smelter drawing its lead from the Upper Slocan and making up its charge from the dry ore deposits on Springer Creek.

#### MINING AND SMELTING COSTS AT MOUNT SICKER.

IN his annual report to the directors of the Tye Copper Company, Mr. E. C. Musgrave, superintendent of the mine, gives the following interesting information concerning mining costs at the Tye, where, he remarks, conditions for doing cheap work are exceptionally favourable:

The current rate of wages is as follows: Machine minders \$3.50 per day; miners \$3 per day; timbermen \$3.25 per day; and muckers and trammers \$2.50 per day. All above work eight hours a day.

On the surface the wages are: Carpenters and timber framers, loggers, mechanics, hoisting engineers and blacksmiths, \$3.50 per day of nine hours, and surface hands \$2.50 per day of ten hours. A lot of the surface work is done by Chinamen, who can be obtained for \$1.00 per day of ten hours.

The total amount of development work done during the year has been: drifting, 1,095 feet; cross-cutting, 511 feet; sinking, 193 feet; and upraising 319 feet; and the average costs per lineal foot have been: drifting, \$9.15; cross-cutting, \$6.77; sinking, \$18.31, and upraising, \$11.59.

The costs of stoping are also very small, being only an average of \$1.359 per ton, for stoping and raising to the surface, which of course includes timbering, supplies, etc.

The following table gives the costs which can be charged against the ore, and their total amounts to the small sum of \$2.173 per ton of ore, shipped.



	<i>Per Ton.</i>
Stopping . . . . .	\$1.359
Proportion for exploration . . . . .	.499
Surface work . . . . .	.124
Ore sorting . . . . .	.041
Transporting to railway . . . . .	.15
Total . . . . .	\$2.173

*Tonnage Delivered to Smelter.*—The total tonnage delivered to the smelter during the year has been 21,565½ tons, of which 20,688½ tons was first class ore, and 877 tons copper-bearing schists. Of the ore 2,930 tons was sent from the dump, and 17,758½ tons from the mine.

The only tests of values, besides the actual smelter test has been a number of assays taken from the roast piles during the last three months, and the average of these has been: Copper, 5 per cent.; silver, 3.2 oz.; and gold, .15 oz.

This grade of ore has been secured by mixing all grades from the highest to the lowest, and thus instead of following up the rich ore and taking it out, and being then left with a very large proportion of low-grade ore, it is possible, by mixing the ore, to work the mine more economically, and thus to get a greater profit on the low-grade ore than could be done if it were taken out and shipped separately. By this method the ore is broken out from wall to wall, and while the absolute waste is eliminated on the sorting belt, all the ore is shipped.

The smelter manager, Mr. T. Kiddie, states in a similar report that the total cost of roasting and delivering the burnt ore to the smelter bins is now 37 cents per ton of burnt ore.

The ore receipts from September 22nd, 1902, to April 30th, 1903, have been as follows: Rough copper ore, 15,060,725 tons; fine, 5,173,785 tons, a total of 20,234,510 tons of ore, the average assay of which was as follows: Copper (wet), 4.43 per cent.; silver, 2.76 oz.; gold, 0.12 oz.

The average assay for the three months ending January, 1903 was: Copper (wet), 4.32 per cent.; silver, 2.71 oz.; gold, 0.129 oz., and for the three months ending April 30th, 1903: Copper (wet), 5.28 per cent.; silver, 3.21 oz.; gold, 0.142 oz., an increase of copper .96 per cent., silver .5 oz., and gold .013 oz.

The other receipts were as follows: Schistose flux ore, 1,340.90 tons; sandstone, 396 tons; iron, 550.97 tons; coke, 2,346 tons.

*Burnt Ore.*—The average analysis of the burnt ore delivered to the smelter is as follows: Iron, 10.44 p.c.; zinc, 8.14 p.c.; alumina, 3.61 p.c.; barium sulphate, 34.08 p.c.; magnesia, trace; lime, 3.46 p.c.; silica, 22.51 p.c.; combined sulphur, 7.42 p.c.; total sulphur, 13.86 p.c.

During the past three months, the burnt ore has shown an increase of: Iron, 1.86 p.c.; zinc, .93 p.c.; barium sulphate, 7.66 p.c.; lime, .50 p.c.; sulphur combined, .54 p.c., and a decrease of 11.49 p.c. silica.

*Smelting Operations.*—Since the furnace blew in on December 16th, 1902, it has run 107 days of 24 hours

each, and smelted as follows: Burnt ore, 13,853.841 tons; green ore, 2,237.624 tons; schist, 539.636 tons; silica flux, 774.687 tons; slag, 338.108 tons; iron ore, 301.653 tons; matte, 963,818 tons. Total mixture, 19,009,367 tons. Coke used, 3,166,313 long tons, showing an average per day of 150,387 tons of ore, and 177,657 tons of mixture. The ratio of coke to ore was 1 ton of coke to 7.428 tons of ore, and 1 ton of coke to 8,775 tons of total mixture.

*Slags.*—The following is an average assay of the slags produced: Copper, 0.65 p.c.; iron, 15.71 p.c.; silica, 28.79 p.c.; alumina, 11.51 p.c.; zinc oxide, 10.43 p.c.; barium oxide, 30.55 p.c.; calcium oxide, 3.38 p.c.

*Product.*—The product for the 107 days ending April 30th, 1903, was as follows: Matte produced, 1,394,3195 tons containing: Copper, 1,169,896 lbs.; silver, 41,372.78 ozs.; gold, 2,068,398 ozs. Total value, less refining charges only: Settlements received, \$74,879.60; balance not settled for (estimated) 717,060 lbs. copper at \$11.5; 24,878.35 ozs. silver at 95 per cent. of 53.5 equals 50.82 cents; 1,293,416 ozs. gold at \$20, \$120,974.42. Total \$195,854.02. Showing an average matte of copper, 41.95 per cent. (dry); silver, 29.67 ozs.; gold, 1.483 ozs.; and a yield per ton of ore of copper (dry) 3.63 per cent. at 11.5 cents, \$8.349; silver, 2.57 ozs. at 50.82 cents, \$1,306; gold, 0.128 ozs. at \$20.00, \$2,560. Value per ton of ore, \$12.215.

#### TYEE COPPER COMPANY.

THE fourth ordinary general meeting of the shareholders of the Tye Copper Company, Limited, was held on Friday, July 3rd, at the Cannon-Street Hotel, London, E.C., Mr. T. H. Wilson (chairman of the company) presiding.

The Chairman said: Before moving the adoption of the report and balance sheet I should like to make some few remarks, and they shall be as brief as possible, as our general manager (Mr. Clermont Livingstone) is present, and I feel sure that you are more anxious to hear the statements direct from him as to the value of your property, and the improvements made during the past year, than anything that I can tell you. I will now draw your attention to the balance sheet. Sundry creditors, £2,893 os. 6d.—This amount is the charge for goods, etc., purchased during the month of April, since paid. Profit account, £9,021 18s. 1d.—This, I think, you will agree with me, is highly satisfactory, especially when I draw your attention to the fact that the whole of the working expenses, including mining and development for the year from May 1, 1902, to April 30, 1903, have been charged, and the smelter has been in operation only during the short period of one hundred and seven days. As to the appropriation of this profit, I will address you later. I will now direct your attention to the credit side, the properties, concessions, etc. You will observe that from the £97,169 14s. 4d. we have deducted £9,493 4s. 1d., the amount expended on mine development up to the end of April, 1901, and placed to capital account by resolution of the shareholders

August 20, 1901. You will doubtless remember that at the general meeting held July 23, 1902, it was proposed to transfer to the same account the sum of £13,818 8s., the amount expended on mine development from May 1, 1901, to April 30, 1902; but objections were raised, and a poll demanded, which was duly held at the office in Leadenhall Street. The result was, the proxies of the objectors were entered; but those differing allowed the affair to pass, knowing that before any dividend could be paid the present meeting would be held. The board regretted the apparent opposition, and, if any hint had been received that the treatment of these amounts would be preferred in another form, they would have been only too glad to have considered the question, feeling sure that all concerned have but one object, and that the welfare of the company. The ultimate results in either way will be the same. To be consistent, the board have therefore placed the two amounts, £9,493 4s. 1d. and £13,818 8s., to the same account—in all, £23,311 12s. 1d., of which I will speak later. The remaining items down to sundry debtors explain themselves, except that you may wish to know the amount of depreciation written off on all the machinery, etc., buildings, live stock, wagons, and furniture; 10 per cent. up to April, 1902, has been deducted, and amounts to £819 17s. 3d. Now, as to sundry debtors, the greater portion of this amount is the ten per cent. balance due on the matte sales, and ere this, has been received. To those who do not understand this, I may explain that the rule in disposing of the matte is that 90 per cent. is paid down, and the other 10 per cent. is paid in fifty days. It is this 10 per cent. portion that is represented by this item, sundry debtors, and it is, of course, just the same as cash. The commission account and mines development account I will refer to later.

#### PROFIT AND LOSS ACCOUNT.

I will now ask you to turn to the profit and loss account. On the debtor side full details are given at the mine, the smelter, and also in London; but if any shareholder wishes for any information upon either of the items, I shall, before asking for the vote, be pleased to give it. On the creditor side, seeing the amount received for matte, £40,114 14s. 1d., some of the shareholders may wonder why the balance at our bankers' was so small. The explanation is that the completion of our smelter by the contractor was two months behind time, owing to strikes, etc. We, of course, continued development work to the full, and consequently, had to overdraw our account by arrangement. At the end of January, 1903, it was overdrawn £15,500. I am pleased to be able to say that by the end of April this overdraft was wiped out. The other items speak for themselves. I will now explain your directors' views as to the treatment of the mines development account, and also the commission account. The mines development account is £23,311 12s. 1d., and the commission account £32,000, making a total of £55,311 12s. 1d. It is proposed to write this off in five years; that is, £11,062 6s. 5d. per annum, this amount to be reserved each year before

paying any dividend. We are in this position—for the past year a profit of £9,021 18s. 1d. has been made. We are thus £2,040 8s. 4d. short of the required amount. We have therefore to find this current year £2,040 8s. 4d., plus £11,062 6s. 5d.—in all £13,102 14s. 9d. This we expect to be able to provide for in May and June. We have, consequently, the profits of the remaining ten months left, from which we hope to pay substantial dividends. I fancy I hear some of you say that you would like me to give some idea of what you may expect. Well, I am not good at prophesying, but knowing what we have done in the past four months, I am justified in hoping to be able to pay an interim dividend in November. I would here mention that we have no fear of stoppage of our works at the mine on account of drought. Mr. Livingston, in his report, will explain how this has been provided against for the future. I cannot close without congratulating all concerned, and feeling thankful that all our hopes and promises have been more than fulfilled, and can refer you to the original reports on which we went to the public for capital, from which you will see that the results have exceeded the prospects held out. I now move: "That the report and balance sheet be approved and adopted." Before asking for your vote, I shall be glad to hear if you have any questions for me to answer.

Mr. A. Straube seconded the motion.

No question being asked, the resolution was put to the meeting, and carried unanimously.

The Chairman said he had now the pleasure of calling upon Mr. Clermont Livingston (their local director and general manager) to make some remarks.

#### MR. C. LIVINGSTON'S STATEMENT.

Mr. C. Livingston said: It is a pleasant duty I have to perform to-day. I do not, however, propose to give you a detailed account of all the work done on your property during the past year, as this has already been supplied in the reports of your mine superintendent and smelter manager; but rather to give you a general account, so that you can more easily grasp its great value. Although many of you present here to-day may have heard about the early history of this mine, I should like to trespass on your time for a few minutes to go briefly over the work that has been done on it since its first discovery. Six years ago last April my attention was drawn to the discovery of copper ore in large quantities on Mount Sicker. Six months later I saw the first prospecting shaft started, and witnessed the first shot put into the hill. From that time to the present I have practically devoted my whole time to this work, and, with the exception of a few months in London during the spring of 1900, I have never been further away than a day's journey from the mine. These six years have shown great changes, as I have watched the gradual building up of commercial enterprise, and the change from a good-looking and rich prospect to a fully developed and well-equipped mine, with its own smelter and communications to the railway, and last, but certainly not least, large and ever-increasing ore reserves; for every month's work has shown improv-

ing values, and the Tyee Mine bids fair to develop into one of the big producers of the world. The property of the Tyee Copper Company consists as follows: The Tyee, Herbert, X.L., Tony, and Donald mineral claims, and the Magic Friction, N.T., Phil, and Muriel fractional claims. These are all Crown-granted (also the T.H.W. fraction, not yet Crown-granted), and the surface rights purchased from the railway company. The titles are therefore freehold, and no country in the world gives better titles to mining property than we possess in Vancouver Island. The Tyee Company also owns 600 acres of very fine timber lands. These rights have also been purchased from the Esquimalt and Nanaimo Railway Company, and give not only the timber, but the surface rights to the land. This timber was selected for us as being most suitable for mining purposes, and, what is most important, being a level haul to the mine. These timber lands, being on a level with the sawmill at the mine—about one and a half miles distant—I may some day ask my colleagues to allow us to connect these timber lands with the mine by a light steam or electrical tramway. The cost of these 600 acres was £937 10s., of which the sum of £658 6s. 8d. appears in the accounts before you, and the balance, being paid since April 30, will be included in those for the current year.

#### DEVELOPMENT WORK.

The aerial tram connecting the mine with the Esquimalt and Nanaimo Railway has been properly gazetted under the Railway Act of the Province, and at the lower terminal we have secured 65 acres of free-hold land, upon which stand the ore bins of the company. At Ladysmith, some 13 miles distant, we have an ideal smelting site of 44 acres, with water rights for smelting purposes. This is a long strip of land, giving a sea frontage of nearly a mile, and was given to the Tyee Company by the railway company for a nominal sum, for the express purpose of building a smelter and erecting the necessary works. In describing the work done I shall first take the mine. The mining claims, which I have already enumerated, contain 235 acres or thereabouts; but the entire work so far has been done on the Tyee only. The work up to April 30 from the commencement is as follows: Sinking, 862 feet.; drifting, 2,326 feet.; cross-cutting, 1,618 feet.; raising, 510 feet.; or a total of 5,316 feet, being over one mile of underground workings. For the past two years the entire opening up of the mine has been planned and laid out by Mr. Musgrave (your mine superintendent), and carried out under his personal supervision; and it is due to the manner in which this work has been performed that the mine stands as it does to-day. Several engineers of the highest standing from Butte and elsewhere have visited your property, and they have all said that they have never seen better work put into a mine. The chief developments have been between the surface and the 200-foot level. On April 30 the 100-foot level had been driven about 960 feet from our western boundary line, and at that point has gained an additional depth, arising from the slope of

the mountains of about 175 feet, making the depth from the surface at that point about 275 feet. Along this entire distance the ore has been practically continuous. I mean by this that we have followed the ore, and, where the ore has run out in the drift, either a little further driving has put us again into ore, or we have found large bodies by short cross-cuts; in fact, in some portions of the mine the ore bodies appear to overlap. These bodies of ore are very large, and a stope seven sets wide, or 35 feet, is no uncommon thing. An intermediate level at 165 feet has been driven about 800 feet from our western boundary line, and was in ore for the greater part of this distance. At a point below the No. 2 stope of the 100-foot level a raise was put up on the footwall, and the ore located by a short cross-cut half way between the two levels, where we found 18 feet of solid ore.

#### THE ORE RESERVES.

After the ore was located at this point, a cross-cut from the 165-foot level to the north passed through 27 feet of ore, thus proving that the ore went down to this level, and as the ore was solid underfoot, there is no reason why it should not live down to a great depth. This east drift at the 165-foot level is in about 150 feet east of the cross-cut just mentioned, and there is continuous ore to the north, with a very heavy drip of water. A heavy seepage of water in this mine is a sure precursor of large ore bodies, and we have never yet met water without finding big bodies of ore. This brings me to two subjects which are of great interest to us all—namely, the amount of ore now developed in the mine, and the question of its continuity in depth. When we started shipping last autumn, our mine superintendent made a most careful and conservative estimate of the ore available at that time, and gave it as 62,500 tons. Since then, up to the end of our financial year, we have shipped over 20,000 tons of ore, and on April 30 he made another careful estimate of our reserves, and found that, although we had shipped this tonnage, the ore in the mine and on the dumps, instead of being lessened by the ore stoped out, has risen from 62,500 tons to over 96,000 tons. This, at our present rate of smelting, gives a two year's supply ahead, and one thing I would like to impress upon you is that, as the development work never stops, these reserves are being added to daily. As a mining engineer, and the superintendent of your mine, Mr. Musgrave naturally has to be on the safe side in estimating ore reserves, but I can tell you that the gross figures, when first worked out, touched over 150,000 tons, and I believe that by the actual test, which in our property means stopping, the gross figures will be nearer the mark than the net, and certainly up to the present time, the stopes have always beaten the estimates, and I hope they will always continue to do so. The estimate of ore reserves does not include the copper-bearing schists, of which there are large bodies in the mine, and which some day may be utilized by concentration or for fluxing purposes, nor does it include the new and valuable strike at the 165-foot level. The Tyee is a mine that

requires long and careful study, and an intimate local knowledge; also considerable cross-cutting, or indications might be passed over and ore bodies containing many thousands of tons be missed. I will give you one illustration of several that have occurred during the development of the mine. At a certain point in the 100-foot level, to be exact, about 560 feet from our eastern boundary, which is the Richard III. claim, we struck about three feet of ore. There was a heavy drip of water following this ore, and, on a raise being put up, a powerful body of rich ore was disclosed, from which we have broken out and shipped several hundred tons while developing it. From indications, your mine superintendent considers there should be more ore to the north, and so, to prospect the ground in that direction, had a cross-cut driven just west of where the ore was found in the raise. At 45 feet, to the north a fine body of absolutely solid ore was encountered, which proved to be 20 feet wide, the first 7 feet of which assayed 9.25 per cent. copper, 5.13 oz. silver, and 0.26 oz. gold, while the whole 20 feet. went copper 4.93 per cent., silver 3.9 oz., and gold 0.13 oz.

#### THE MINE OPENING UP WELL.

In this instance a heavy seepage of water was coming up from the floor, and just before I left for England this ore body was struck again in the level below, or 165-foot level (namely, about 340 feet from the surface), where it was found to be 30 feet wide, assaying for the first 10 feet 12.07 per cent. copper, silver 4.88 oz., and gold 0.08 oz.; while the whole 30 feet gives an average of 7.8 per cent. copper, 3.66 oz. silver, and 0.153 oz. gold, equal, at the present price of copper, and after allowing for refining charges and all mining and smelting costs, to \$15, or, say, £3, per ton of ore net, which is highly satisfactory. The body encountered in the drift was running, approximately, north-west and southeast, and looks as if it would intersect the one met with in the cross-cut; in fact, the more the mine is explored, the more are the ore bodies that are opened up. It is no narrow vein, with two walls so closely defined that a cross-cut of a few feet would put you out of the ore-bearing formation, but a fissured—or, rather, shattered—zone of unknown dimensions. Starting from one well defined or foot-wall would probably mean a cross-cut of 1,000 feet to take us out of the ore-bearing country, and some day that cross-cut must be driven. Up to the present, however, we have found such stores of good ore within a short distance of the south or footwall, that we have had no need, nor the time, to go further afield. In speaking about ore, I am pleased to tell you that some good ore has been found on the Richard III. claim—that is to say, the claim immediately to the east driving west from their shaft; and as the ore in the west drive in the Richard has been worked on at a depth of about 170 feet from their surface in that claim, and as our east drift at our 100-foot level, at the end of April, was within about 480 feet from the Richard III line, it is now practically certain that our ore lives right through the Tye, and from the position of the ore in the Richard III. shaft, it will give

us handsome backs, and thus we can count with safety on ore reserves greatly in excess of those I have figured on to-day. 200-foot level—It was in this level that the rich north vein was discovered. This vein was met with in a cross-cut 165 feet north of the No. 2 Shaft. It is about 3 feet wide, and, in places, although not solid ore, the mineral was very rich, selected samples running very high in gold and silver, and showing visible gold. This ore body may become a valuable asset, and is entirely different in structure to the large deposits to the south. Up to the present we have had no time to explore this small vein, but as the ground is opened up from the lower levels, it will most certainly be prospected. It has not been taken into account in the ore reserves.

#### THE DEEPER WORKINGS.

Ore in Depth.—I will now touch upon this question. Some of you may be surprised that so little development work has been done below the 200-foot level; but there were two reasons why our work has so far been restricted to the upper levels. The first was the extra demand for ore by the smelter being greater than was anticipated and which required the rapid opening up of the ground most available. The second was the installation of more drill power and the addition of a second cage in the main shaft, so as to maintain the increased ore shipments to the smelter, together with the simultaneous opening up of the lower levels. Now that the installation of this additional plant has been completed the development of the lower levels will be pushed ahead, and I have no doubt as to the outcome of that development. At our comparatively shallow depth we have ore bodies of such magnitude and extent that they have taken some years to open up to the development of to-day, and even now not one-half of the ground between the surface and the 200-foot level has been explored. The main shaft has been sunk to a depth of 425 feet from the surface, the datum level of 400 feet being taken from an old shaft near our western boundary line. At the 300-foot level stations have been cut, and a cross-cut of 95 feet has been driven south, so as to locate the footwall. That being done, a cross-cut was run north for 120 feet, and solid ore was struck in close connection with the graphitic schists which have always been found with the ore in the levels above. At the 400-foot level, cross-cuts have been run 47 feet south and 90 feet north, which will be continued. The first development work to be put in on these lower levels will be drifts to the east, to connect with the large and rich ore bodies in the upper levels of the eastern portion of your mine, together with cross-cuts at regular intervals, as in the levels above. You must remember that in the upper level developments the ore bodies have been practically proved to extend right through the Tye, a distance of some 1,500 feet in length. In our soft ground this is work that can be quickly and economically done, and when the 300-foot level has been thoroughly explored we shall turn our attention to the 400, and after that recommence sinking.

## PROPOSED EXPLORATION WORK.

I think I have given you as good a description of the Tyee Mine as time will admit. As to the other claims belonging to the company, these are Crown-granted; but no work, excepting that required by the Government for Crown-granting, has been as yet done on them, our energies having so far been concentrated on the Tyee. These lower claims will most probably prove of great value as the strike of the lode, in conjunction with a fault or break that occurs west of the Tyee, carries the ore-bearing zone through them. This is the reason why I recommended the purchase of these claims, and I hope that at no distant date I shall get the permission of my colleagues to start the opening up of this portion of your property. The graphitic schists, that I have already mentioned as occurring in connection with our ore bodies, cross the Chemainus River at the Muriel Fraction, which is over 1,200 feet below the level of the Tyee main shaft, and 8,000 feet distant on the strike of the lode. This is a large tract of ground to explore, as it is over five times the length of the Tyee claim. We are now installing a pumping station at the river on the Muriel claim. This will not only give us abundance of water at the mine, but it will be additional protection to the mine buildings in case of fire. I may add here that we are covered by insurance against loss by fire both to the mining plant and to the smelter; and also, at my suggestion (as I believe in protecting ourselves as fully as possible against the chance of stoppage of our works), we are further covered by special policies to the amount of £3,000 per month for stoppage of work for a period not exceeding six months—namely, at the mine and aerial tram against such stoppage arising from damage by fire, and at the smelter if arising from fire or accident to machinery. I will now deal with the connecting links between the mine and smelter. The ore is taken from the bins at the mine by a Riblet aerial tram three and a third miles in length. This tram is the longest in the province, if not in Canada. The automatic loading device is most ingenious and a great saving of labour, and the entire plant is running well and satisfactorily. This aerial tram takes the ore to the Esquimalt and Nanaimo Railway, and discharges into an ore-bin at a new station called Tyee, after the mine. From the Tyee station the ore is taken to Ladysmith, in cars containing 30 tons each, and we have an arrangement with the railway company to haul our ore for a term of years at a moderate freight rate. Mr. James Dunsmuir (the president) and Mr. Joseph Hunter (the general superintendent of the Esquimalt and Nanaimo Railway Company) have done everything in their power to facilitate our work, and, in fact, have gone many times out of their way to do so. At Tyee station and the smelter at Ladysmith they have put in about a mile of sidings, connecting the various portions of our works, and have assisted us in many other ways.

## THE SMELTER WORKING WELL.

This now brings us to the smelter, which is under the able management of Mr. Thomas Kiddie, and it is

due to his untiring energy and thorough practical knowledge that such good results have been obtained. When the ore arrives at Ladysmith the cars are weighed, and then taken to the bunkers at the burning grounds at Rock Creek. The siding from the main line of the Esquimalt and Nanaimo Railway passes over the top of these bins, and so the ore is dumped into them by gravity. It is then drawn from the bins in cars, containing about a ton each, and distributed to the various piles for roasting by means of a most ingenious travelling bridge. This device is an original idea of Mr. Kiddie's, and has been designed by him. It entirely does away with handling the ore, and is a great saving of expense. After the ore is roasted it is shovelled into cars, which enter the ground by cuttings below the surface, and so the ore falls, by gravity, into the cars. The cars are then drawn by a horse-tramway a distance of 1,500 feet to the burnt ore-bins at the smelter. These ore-bins have a capacity of 1,000 tons, and the ore is taken from them in cars, which run on a level with the top floor of the furnace. Thus, in its journey from the mine to the furnace, the ore is only once touched by hand—namely, when it is shovelled down from the burnt ore piles into the cars. Every detail that goes to the economy of labour has been most carefully thought out. I will mention one point out of several whereby a great saving of expense in handling has been secured. The slag, when it leaves the furnace, falls through a hole in the floor and is shotted. "Shotting" is a process of reducing the slag, while still in a state of fusion, into "shot," or small particles, by bringing it into contact with a jet of cold water, and thus carrying it, by a launder, down to the sea. This means a saving of about £1,500 a year in the item of labour alone. Room has been left in the buildings so that at any time the plant can be doubled and a converter added. At the present time the plant consists of one blast furnace, capable of handling nearly 200 tons per day, with engine, blower, boilers, sampling mill, electric light plant, and all the equipment of a first class smelter, and within a few months I hope to see it running to its maximum capacity. I may inform you that from February to the end of May the net profits have ranged from £5,000 to £9,000 per month. It is, however, impossible to expect any furnace can be kept in full blast from January 1 to December 31 of any year without stoppages. I have therefore advised my colleagues not to base their calculations at the present time on the highest results attained, but rather on a medium. Knowing the conditions as thoroughly as I do, I consider we are justified in expecting a net profit of not less than £6,000 per month for the current financial year. (Hear, hear.)

Before concluding my remarks I should like to impress upon you what the value of the precious metals in our ore means to us. The gold and silver contents are always constant, running in value from 15s. to over 20s. per ton of ore. There has never been a blank in these metals, and the latest developments prove that these values are steadily increasing. To take the last month of our financial year, namely, April, the net gold and silver obtained very nearly paid for all our

mining, developing and smelting costs, so that, after allowing for the refining charges, the net cost of producing and selling in New York a ton of electrolytic copper only amounted to about \$66, or, say, rather less than £14, per ton, which means that if copper should even fall to the record lowest price in past years—namely, £35 per ton, we should still be able to make large profits, which, at our present estimated copper production, say, 2,000 tons per annum, would equal over £40,000 for the year. There are few copper mines in the world that can do this. (Hear, hear.) You will be glad to hear that the latest news regarding our developments fully confirms my statement that the ore bodies live right through the Tyee and Magic Fraction claims. Another new ore body has just been struck in the east drift at the 100-foot level, at a point about 300 feet from the eastern boundary of your property, and we are waiting particulars as to its width and value. The depth from the surface at this point will be, approximately, 300 feet. (Applause.)

Mr. W. Pellew Harvey asked permission, as a shareholder who had recently visited the property, to make a few remarks. He paid a very high compliment to the way in which the mine was being developed and worked by Mr. Livingston, Mr. Musgrave and Mr. Kiddie; but he expressed the opinion that the estimates of these gentlemen as to the value of the ore-body that was in sight were almost too conservative. He examined the figures in detail, and compared them with the figures which he had himself prepared from what he had seen, the result being that in his opinion they might expect a yield, at the current prices of the metals, of \$15.08 per ton, instead of \$12.21, while the total value of the ore in sight he estimated at £366,000. If they worked 4,000 tons of ore per month, which they could easily do, the life of the mine would be three years and a half with the ore at present in sight.

Mr. A. J. Johnston wished to offer the directors his congratulations upon the very satisfactory result which had attended the year's working, and to propose a vote of thanks to Mr. Livingston for his untiring and successful management of the Tyee Copper Mine. (Applause.)

Mr. Jackson (a shareholder) said he paid a visit to the mine some time ago and was shown over it by Mr. Livingston. He did not profess to be a mining expert; but he had seen a good deal of mines and mining, and was glad to be able to say, in regard to the Tyee, that he had never seen work better done. The aerial tramway and the whole of the buildings were very substantially constructed, and, as a result of his inspection, he could speak in the highest terms of the management. In conclusion, he proposed a cordial vote of thanks to Mr. Musgrave (mine superintendent), Mr. Kiddie (the smelter manager), and the other employees of the company for their faithful services.

The motion was seconded and agreed to, and the proceedings terminated.

## COMPANY MEETINGS AND REPORTS.

### THE NORTH STAR.

THE following is an abstract of the report of Manager J. L. Parker, as presented at the recent annual general meeting of shareholders:—

Whilst not finding any large deposits, the work done during the year in conjunction with the previous work has fully demonstrated the fact that the porphyry contracts possess a most important bearing on the ore deposits, and judging from the length of the principal ore shoots, and the smaller ones, which in each case were lying in contact with the porphyry dyke, some very close relation between the two must exist. Drill holes were therefore placed in such a position as to prove that these dykes probably extended to the deep, and a stringer of ore was also followed down, at the north end of the No. 1 ore body, by a shaft.

The shaft, which is known as the east incline shaft, is 200 feet deep, and drifts and crosscuts have been driven with the result that stringers of ore have been encountered in the contact, which, whilst low grade, averaging 8 to 10 ounces silver and 23 to 38 per cent. lead, show that there is a possibility of striking something better later on. This shaft will be sunk deeper as soon as the necessary buckets, which have been ordered, have arrived.

The north incline has been driven 250 feet and has followed the ore channel all this distance and good stringers of ore have been met intermittently all the way down, which have assayed as high as 90 ounces silver, and 70 per cent. lead.

The total amount of development work done during the year amounts to 12,166 feet of drifting, cross-cutting, sinking, raising and diamond drilling.

During the year 3,426 tons of ore have been shipped the assay value of which averages 29.5 ounces silver and 36.2 per cent. lead.

In conclusion the manager states that the conditions are now more encouraging than at this time last year and that he has certainly not lost hope of more ore being found as the development work continues.

### WORKING ACCOUNT.

To cost of mining and shipping	\$10,372 44
To freight and treatment . . . . .	49,832 59
To ore tax . . . . .	639 97
To general expenses . . . . .	2,061 64
To written off permanent equipment . . . . .	7,264 16
	<hr/>
	\$70,170 80
To balance transferred to profit and loss . . . . .	21,960 00
	<hr/>
	\$92,130 80
By proceeds of ore sales . . . . .	\$85,449 20
By miscellaneous receipts . . . . .	6,681 60
	<hr/>
	\$92,130 80

## PROFIT AND LOSS.

To dividend No. 10. . . . .	\$19,500 00
To balance . . . . .	79,457 55
	\$89,957 55
By balance at credit of profit and loss . . . . .	\$67,997 55
By balance from working account . . . . .	21,960 00
	\$89,957 55

## DUMAS GOLD MINES, LIMITED.

The annual general meeting of this company was held in Rossland during the month. The following were elected as directors for the ensuing year: Thomas E. Atkins, Vancouver; Alfred J. Bultimer, Vancouver; J. Stillwell Clute, Rossland; G. W. McBride, Rossland; Wm. B. Townsend, Rossland; J. Stephen Deschamps, Rossland; E. Croteau, Rossland.

The manager reported favourably on the condition of the mine, a considerable amount of ore having been encountered when work was in progress last winter. It is proposed to resume operations immediately. The company has had a road surveyed a distance of one mile to connect with the Ymir mine wagon road, and as the road was partly cut last fall only a small expenditure will be necessary to finish it, when the company intends commencing shipping operations.

## B. C. EXPLORING SYNDICATE.

At an extraordinary general meeting held in London for the purpose of sanctioning and confirming an agreement entered with the Ashanti Lands Co., providing for the inspection of the Iron Mask mine at Kamloops with a view to the formation of a new company having sufficient working capital to continue operations on a more extensive scale, and install a smelter, the chairman in moving the adoption of the agreement gave particulars of the development work, and stated: "Last year, on the 18th September, at the 500-foot level, 344 feet had been driven along the line of reef, and 202 feet by cross-cuts in other directions. Since then the footage has been extended at this level by 339 feet, with 150 feet of cross-cuts, making in all a total footage of 693 feet. Also at the 300-foot level since September the footage has been increased by 100 feet, and we are still in an ore body running in an easterly direction in both these levels, and it still maintains the value that it had in the earlier stages. We have also made a test with a diamond drill at the 500-foot level, getting it down 82 feet below this level into a good body of ore, and the ore was getting richer at depth: in fact, so rich did it become that the drill was unable to work, and had to be withdrawn, owing to the fact that the high grade ore, in a very fine state, ran into the drill and filled it up. Captain Argall is now working the drill at the same level, 200 feet, in a more easterly direction, and we hope to get the same encouraging results. We have discovered various bodies of ore, all of good, payable quality, which we did not know were in existence, and which add to the value of the property. These bodies of ore are in addition to those which were discovered near the shaft some two years ago."

## COSTS OF LEAD SMELTING IN KOOTENAY

*To the Editor.*—In your July issue your article on "Costs of Lead Smelting in Kootenay" surely fails to prove the actual cost of smelting, but only quotes the charges made by the railway-smelting combination for freight and treatment, and also a comparison between the Canadian and American combinations. The contention is not made that the Canadian smelters mulct our ores more severely than do the American ones, but that freight and treatment charges are excessive.

The public know by now that to smelt a lead ore, a mixture of lime ore, iron ore, silicious ore must be added to the galena (lead sulphide) ore (after this has undergone a preliminary treatment of roasting) in order to collect the lead, silver and gold as metals, and discard the gangue or worthless ingredients as slag.

The art of cheap smelting is to assemble together a lime ore carrying values in lead and precious metals, an iron ore with values in gold and silver, and a silicious or dry ore with high values to enrich the lead for subsequent refining. By perfecting the above methodical system, every ore used as a flux more than pays its own way and so throws no onerous charge on the wet and dry ores.

Do the smelters positively claim that British Columbia contains no iron ores carrying ample values to pay their way as fluxes; that no lime ores exist with the requisite lime as well as values? If they are not satisfied with the present developed ores, should they exploit the districts near them, they can find all they want, though they may have to acquire and work deposits of their own to command a steady supply, and so gain larger profits for themselves.

Of course they cannot contend that these fluxing ores do not exist with values to pay amply a legitimate profit on smelting and transport. This fact being granted, does the railway-smelter combination then mean to tell the mine-owners in Slocan and Lardeau that fifteen dollars a ton on a wet ore, and nine dollars a ton on a dry ore, is not an excessive rate for freight and treatment, and that the extra one dollar for each hundred pounds of lead contents for a fictitious journey to London is not an outrageous swindle by the railway companies?

What is happening at present? The high-grade wet ores of Slocan and Lardeau are paying the exorbitant rates for freight and treatment quoted above, and the lower grade wet ores of East Kootenay and Ainsworth are paying somewhere about nine dollars a ton. The high grade in silver and the low grade, being both wet ores cost an equal amount to smelt. Why, then, should nature's bounty be offset by a railway-smelter combination?

The dry ores of the Republic camp in the State of Washington, U.S.A., and British Columbia dry ores cost on an average the same to smelt. Why do our railways then build up an American camp and transport their ores broadcast to the smelters in the Province, rather than bring down the freight and treatment on the dry ores of British Columbia?

The writer distinctly claims that discriminating rates (though high enough in themselves) are being given to the North Star mine because Messrs. McKenzie & Mann are shareholders, and to the Highland mine at Ainsworth on the lake shore, and that the Slocan and Lardeau ores are taxed outrageously. That the dry ores of Republic, Washington, are supplying ores at the expense of our Province to keep up our freight and treatment charges. That unsuitable magnesian, so-called iron, ores in some cases are being used as flux at the expense of valuable ferrie ore deposits that can be opened and so increase our wealth.

Sir Thomas Shaughnessy and his fellow conspirators (directors) complain that their mining railways here do not pay. Whose fault is that but their own? The mineral is here, but the railways prevent our metals by high freight rates from competing in the world's market. If they can afford to haul Republic ore through the Province and transfer it across the sea to the Crofton smelter for \$2.50 a ton, and so build up foreign camps at our expense, they can give us better freight rates throughout. It is galling to a Briton to know that he has to fight a bonused railway to be allowed to make a living, and that nature's bounty is autocratically set at naught.

The Government at Ottawa though practising false political economy have given the lead industry a bonus and it is not good part for the miner to cavil, if the Canadian taxpayer does not. The gaining of this bounty by the real producer has to be safeguarded more than ever, for where the carcass is, there will be gathered the vultures.

RONALD C. CAMPBELL-JOHNSON.

Slocan, July 18th, 1903.

#### HOME SMELTERS AND RATES.

*To the Editor.*—Referring to your letter of June 8th (or 9th) as well as my brief answer under date June 17th, I wish to make a correction inasmuch as your publication of my letter in the last B. C. MINING RECORD would have a tendency to convey the incorrect impression that our dealings with Canadian smelters has been unsatisfactory. I will readily admit that by answering your communication so briefly I was probably at fault; the reason for this being that at the time of the receipt of your letter I was unusually busy with some important matters that absolutely prevented me from going into the matter fully. What I had particularly in view by referring to Mr. Cavanaugh's publication in the *Daily News*, was that the freight rates quoted by him corresponded with those paid by the Payne Mining Company in the early days; it was, however, not my intention thereby to discriminate against our home smelters, and the fact that since I have had charge of the Payne Mines for more than two years, all our shipments have been sent to Trail, would be sufficient proof that our dealings with the Canadian Smelting Works have been satisfactory.

Our company has found it to their interest to ship to the home smelters, not so much because we wish to further home industry, but that we found it convenient and to our advantage to do so.

My dealings with Mr. Aldridge have always been very satisfactory, and in justice to him and his company I would ask of you the courtesy to withdraw my statement from your last issue of the B. C. MINING RECORD. My approval and reference to Mr. Cavanaugh's correspondence only pertained to smelting rates paid during the early period of lead smelting in British Columbia; his other views and later correspondence referring to the general advantages of foreign smelters above our home smelters, I do not share, and prefer not to discuss; this being a matter of private opinion subject to individual experience.

ALFRED C. GARDE.

#### THE BOUNTY ON LEAD.

*To the Editor.*—The British Columbia Silver Lead Miners' delegation desire to publicly express their appreciation not only of the action of the Government in acceding to their request for a bounty on lead, but also of the unvarying sympathy and consideration which they have received from the members of the Cabinet during the necessary investigation of this important question.

Too great credit cannot be given to Senator Templeman and our British Columbia members, especially the member for Yale-Cariboo, for their unwavering support of a cause which we are confident will work as much to the interest of the Province as a whole, as to the mining districts in particular.

JOHN L. RETALLACK,

*Chairman, Silver-Lead Delegation.*

Ottawa, Ont., July 8th, 1903.

#### THE BOUNTY ON LEAD ORES.

THE terms under which the Dominion Government offer a bounty on lead ores mined in Canada are as follows:

1. The Governor-in-council may authorize the payment of a bounty of 75 cents per 100 pounds of lead contained in lead-bearing ores mined in Canada, provided the sum to be paid as such bounty shall not exceed \$500,000 in any fiscal year. Provided also that when it appears to the satisfaction of the minister charged with the administration of this act that the standard price of pig lead in London, England, exceeds £12 10s per ton of 2,240 lbs., such bounty shall be reduced proportionately by amount of such excess.

2. Payment of said bounty may be made from time to time to the extent of 60 per cent. of the full bounty authorized, subject to adjustment at the close of each fiscal year. If at the close of any year it shall appear that during the year the quantity of lead produced on which the bounty is authorized, exceeds 33,330 tons of 2,000 lbs. each, the rate of bounty shall be reduced to such a sum as will bring the payments for the year within the limit mentioned in section 1.

3. If at any time it shall appear to the satisfaction of the Governor-in-council that the charges for transportation and treatment of lead ores in Canada are excessive, or that there is any discrimination which prevents the smelting of such ores in Canada on fair and reasonable terms, the Governor-in-council may authorize the payment of bounty at such re-



duced rate, as may be deemed just, on lead contained in such ores mined in Canada and exported for treatment abroad.

4. Said bounty shall cease and determine on the 30th day of June, 1908.

#### COMPANY NOTES AND CABLES

**PROVIDENCE (Boundary).**—Smelter returns on the last car-load of ore shipped gave a valuation of \$225 per ton. The net weight of ore was 37,832 lbs., the gross value of which was \$4,256.27. The mineral contents per ton were: Gold 1.82 ozs., silver 37.38 ozs., and lead 6.8 per cent.

**SLOCAN STAR (Sandon).**—This mine last month declared a dividend of \$25,000.

**LENORA (Mt. Sicker).**—Operations at this mine have been resumed under arrangement with Mr. James Breen, one of the owners of the Crofton smelter. At a meeting of creditors held in July Mr. Breen consented to the following amendments to the original agreement: That a representative of the unsecured creditors should be allowed to visit the mine at any time, examine the books and inspect the new work; that plans of new work would be submitted to the representative of the creditors; and that no ore of less value than \$5 a ton would be shipped to the smelter.

**VELVET (Rosslund).**—The manager cables: "Have received the following returns from smelters, namely: 187 tons first class ore yielded 107 ozs. gold, 8,706 lbs. copper; net returns from smelters, \$3,750, or an average of £4 2s. 10d. per ton. 46 tons 'fines' yielded 17 ozs. gold, 2,250 lbs. copper; net returns from smelters, \$292, or an average of £1 6s. 3d. per ton."

**NIMROD SYNDICATE (Atlin).**—Result of second clean-up by Atlin Mining Company for eight days' run is 125 ozs. of gold.

**CARBON CONSOLIDATED (Lightning Creek).**—The following report has been received by the secretary of the company dated 25th May, from the resident manager: "I am very glad to be able to give you most encouraging information in regard to the Lightning Creek work. In sinking borehole No. 4 we encountered highly auriferous gravel having a thickness of about three feet immediately above the bedrock. The total depth of this hole to bedrock was 129 feet. In this strata of gravel we recovered between four and five hundred small colours or fine particles of gold, the largest being a flake about one-sixteenth of an inch square. As this gold is forced from the bottom of the surface through a three-inch pipe by a small stream of water, it is, of course, impossible to secure heavier colours, the velocity of the water not being sufficient to do this. It is a most remarkable showing under the circumstances, and proves that the ground we propose drifting is very rich. We are now preparing to sink borehole No. 5, distant 100 feet from borehole No. 4, towards the south rim. In this hole we will endeavour to secure heavier gold by means of a pipe fitted with a valve in end of same, acting as a sandpump. This borehole No. 4 was the first hole in which we have struck gravel on the bedrock, showing that we must now be into the channel. By next mail I will send you the cross section developed to date, of this Lightning Creek Channel."

**LE ROI No. 2 (Rosslund).**—The following report has been received from the mine manager for the month of May: "Josie Mine; 500-foot level.—Instead of drifting we widened out towards the footwall, following the streak of ore hitherto left behind on account of its low values. It has proved much better than anticipated. 300-foot level.—13 feet were driven, and we again broke through, for the second time, into the main drift, nothing but stringers being encountered. In an eastward direction 18 feet were driven; but the ore there pinched out, and we abandoned the drift. We raised on a good showing of ore about 9 feet west of our cross-cut. Here we got occasionally very good assays; but the ore was broken up, and we had to abandon this also. (Height of rise, 22 feet. above sill floor.) 700-foot level.—96 feet were driven on route of diamond drill hole No. 27, with a view to undercut Annie No. 3 ore body. 500-foot level.—Hanging-wall

drift driven 18 feet. Some good values were encountered; but average grade of ore is second-class. Diamond drill work.—Hole No. 27 advanced from 243 feet to 393.5 feet, but nothing met with. 900-foot level.—Hole No. 28 run 270 feet. Nothing met with so far. No. 1 mine, 200-foot level, west drift—20 feet were driven. There were occasional good showings of ore, but they were hardly so good as anticipated. East drift.—17 feet were driven to meet west drift. About 5 feet of this were in ore of milling grade. This is now spoken of as stope II. We widened out on footwall side about 3 feet, where a streak of mixed ore occurred. 300-foot level.—The cross-cut shown on plan was driven 11 feet in very good ore. Ore production.—Ore has been taken from the stopes in the following proportions: Josie Mine: Stope 19, 300-foot level, 558 tons; stope 20, 500-foot level, 1,845 tons; stope 5, 400-foot level, 354 tons; stope 6, 600-foot level, 203 tons; stope 11, 700-foot level, 175 tons; total, 3,135 tons. No. 1: Stope 10, 200-foot level, 26 tons; stope 11, 200-foot level, 137 tons; stope 2a, 200-foot level, 66 tons; stope 4, 300-foot level, 487 tons; stope 5, 300-foot level, 12 tons; total, 728 tons; total, Josie Mine and No. 1 Mine, 3,863 tons. General remarks on above stopes: Josie: Stope 19.—Back of this stope has again become badly broken up; ore penetrating into dyke on third floor. Stope 20.—This is very good, and has improved greatly during last month. Stope 5.—We stopped shipping from here early in the month; there is a large tonnage of ore broken, which we can draw from at any time. Stope 11.—we have also stopped shipments from here, as value became very low grade. No. 1 Mine: Stope 4 is giving very good ore; another streak has been found in footwall giving very high values, and we are not following this up. Cross-cut previously mentioned is very good-looking stuff, and promises to be an important find."

**CANADIAN KING (Eric).**—The Canadian King mine, near Eric, has shipped a car of ore to the Trail smelter, the returns of which were \$57 per ton—the value is gold with a little silver. The mine is under lease.

**SULLIVAN (E. Kootenay).**—The manager has received instructions to prepare for the shipment of 1,000 tons of ore. The mine has, it is said, 11,000 tons of ore on the dump, about half of which is of shipping grade.

**STANDARD DEVELOPMENT SYNDICATE (Ymir).**—The Standard Development Syndicate, Limited, of Nelson, has issued a circular to shareholders, which contains a statement showing that the final settlements on ore shipped netted, after payment of railway freight and smelter charges, an average of \$13.10½ per ton on shipments from Double Standard, \$17.80 per ton on quartz from Double Standard, \$12.47 per ton on ore shipped from Hunter V., \$7.20 per ton on ore shipped from Hunter V., and \$9.54 and \$9.54 per ton on ore shipped from Hunter V. and Double Standard. The average for all shipments was \$10 per ton. The ore was smelted at the Hall Mines smelter at Nelson and the freight and treatment charges range from \$3.15 to \$5.80 a ton. The force at the mine of the Syndicate has been increased. The mines are situated on the divide between Hidden and Porcupine Creeks, about seven miles from Ymir.

**YMR GOLD MINES (Ymir).**—The following circular has been issued to the shareholders: Recent reports received from the manager concerning the developments of the mine show that satisfactory progress is being made, and that good payable ore is being met in the lower levels. At the present time, however, the returns are being obtained from low-grade ore, but when the lower workings are further opened up, judging from the assay values of the ore found in the Nos. 5 and 6 levels, the returns should improve, but the benefit of these developments will not be felt until some two or three months hence. In the last report received from the manager he states:—

No. 4 level, east drive, advanced 19 feet, total 138 feet. In this drive a 4-foot band of ore has been showing for the last 6 or 7 feet, which assays \$9 in gold and silver per ton. This is probably a part of the same make of ore that has been followed on the No. 5 east level for a considerable distance further out.

No. 6 level, west drive, advanced 19 feet, total 39 feet. The assays for this distance have varied from \$3.50 to \$11 per ton in gold and silver and average \$9.25 for the hanging-wall 5 feet, and \$7.50 for the footwall 5 feet.

No. 6 level, east drive, advanced 11 feet, total 37 feet. The assays for the distance varied from \$2 to \$34 per ton in gold and silver, and average \$19 for the hanging-wall 7 feet, and \$13 for the footwall 7 feet. The developments at the No. 6 level are characterized by unusually heavy mineral contents and high silver values, the average of the latter metal being about 5 ozs. per ton, and runs as high as 12 ozs. per ton. The best streak of ore has not been, as is usual in other parts of the mine, along the footwall, but is carried in the middle streak, the actual hanging-wall band being of barren white quartz carrying a good deal of calcite.

No. 7 level.—The fact of the east drive, 20 feet from shaft, was sampled prior to commencing driving; the results show \$3 in gold and silver per ton for a width of 8 feet. Driving will be commenced here immediately, and will be carried very narrow, following the best streak of ore if possible, as there is practically no way available for the moment to economically dispose of waste.

The driving of the No. 10 tunnel has been suspended, and the payable ore is being followed down from the upper workings. Considerable economies in the working expenses will, however, be effected from working the mine through this tunnel, the benefits of which is already being felt.

The favourable developments which are now taking place all point to the hope that the mine should shortly regain its former prosperity and give satisfactory returns to the shareholders.

The returns for May were as follows: Battery—Number of tons crushed, 5,300; 60 heads of stamps running 31 days yielded 1,150 ounces bullion. Gross estimated value, \$12,900. Have shipped 220 tons of concentrates; gross estimated value, \$6,000. Cyanide—3,400 tons tailings treated; gross estimated value \$1,650. Total working expenses, \$20,000. Sundry receipts, \$1,040. Profit, \$1,500. Expenditure on capital account, including development not deducted from receipts, \$5,500.

FISHER MAIDEN (Slocan).—In order to provide funds for opening up a road to the property and driving a still deeper tunnel, the Fisher Maiden-Troy Company, operating in Slocan, has decided to reorganize on an assessable basis, and a meeting for that purpose has been called at Rossland for August 11th. It is probable that the present incorporation will be preserved, and that advantage will be taken of Section 163 in the British Columbia Companies Act, which provides a way of putting non-assessable companies on an assessable basis. The object the directors have in proposing the foregoing is to provide funds for building a road and doing some 400 feet of development work, which, it is believed will result in placing the company on a dividend-paying basis. The costs will not require anything like the amount of 3 cents per share to be assessed, but is simply taken as a maximum at which the power to assess shall absolutely cease.

VENUS (Nelson).—A body of high-grade ore has been struck on the No. 4 level, at a depth of approximately 600 feet. There are thirty men now at work on the property, including those at the stamp mill. Work has been resumed at the Athabasca and ore is again being shipped to the mill, although in small quantities as yet. Both properties are looking very well.

JUNO (Nelson).—A very rich strike is reported to have been made on the Juno, on Morning Mountain, the ore being of exceptional grade. Development work will be continued on the lead. At present the ore is being sacked and shipped to the mill as rapidly as possible, and the company in any case will realize handsomely out of the present find, even if it proves to be only a pocket, as its extreme richness leads some to believe.

MOLLY GIBSON (Nelson).—The directors of the company owning the Molly Gibson mine, at the head of Kokane

Creek, Nelson district, have decided to resume operations. A concentrator will be built near the mine, as the lead and zinc values in the low-grade ore are worth saving. Instructions to begin work are looked for daily at Nelson.

QUEEN BESS PROPRIETARY.—The following Crown-granted mineral claims, namely, Queen Bess, Young Dominion, Concord, First Extension and American Girl, situated near the own of Three Forks and formerly owned by the Queen Bess Proprietary, Ltd., were sold at a sheriff's sale in Nelson last month. The property realized \$6,500.

SLOCAN LAKE GOLD AND SILVER MINES, LLD. (Slocan).—This company's properties, including the Tiger, Tiger Fraction, Bland No. 2 and Howard Fraction, were sold in July by the sheriff to satisfy a judgment of the Bank of Montreal.

OTTAWA (Slocan).—An important discovery has been made at this mine, the existence of two veins having been demonstrated paralleling one another at a distance of 80 feet. On the surface near the mouth of No. 4 tunnel ore assaying 1,000 ozs. of silver was encountered.

WATERLOO (Camp McKinney).—The last car of ore from this mine netted 3,500 dollars. It is estimated that the clean-up for the month ending July 15th will be from \$8,000 to \$10,000.

GREAT WESTERN MINES.—The sixth annual meeting was held at Ferguson on July 8th, the report stating that since November last 3,391 feet of development work had been done, and for the year ending June 30th, 1,420,343 tons of ore shipped yielding a net profit of \$40,224.85. Reduction works and an aerial tramway are to be shortly installed.

OPHIR LODE.—The seventh general meeting of shareholders was held during the month. The report presented states that the right-of-way has been cleared for the aerial tramway and the derricks erected to receive the cable. The air compressor is on the ground and ten concrete beds ready to put in place. The frame of the mill is erected and the bed cut for a water pipe, over 2,000 feet of which will be laid. The mine is in good condition. The syndicate has decided to float a new company to operate Imperial, Balfour and part of the Rossland claims on Lexington Mountain.

VAN ANDA (Texada).—Mining operations at the Van Andra properties, Texada Island, are proceeding satisfactorily. Three shipments of ore are being made to Crofton smelter. One hundred and twenty-five tons were shipped from the Copper Queen, and 300 tons from Cornell. There are 7,000 tons of ore on the Cornell dump, left there by former operators, which will be shipped to Crofton shortly. These could not be handled previously on account of the cost of haulage. Completion of the tramway and bunkers, however, has now made this large quantity of ore available.

TYEE COPPER (Mt. Sicker).—Results of smelting for 14 days in June: Ore smelted, 2,246 tons; matte produced, 293 tons; gross value of contents (copper, silver and gold), less costs of refining, \$31,870. The national holidays, smelter repairs, and allowing time for roast piles of ore to cool, account for the month's short run. Mine.—During the month of June 3,974 tons of ore were shipped to smelter.

BOSUN MINE (Slocan).—Telegram from the manager reports 40 tons galena and 60 tons zinc shipped during the month of June.

NORTHWESTERN DEVELOPMENT CO. (Fish River).—A clean-up at the Gold Finch during July, after eighteen 12-hour shifts, resulted in the production of a gold brick weighing 135 ounces.

LE ROI.—The manager cables: "Shipped from the mine to the Northport smelter during month of June, 11,289 tons of ore, containing 4,500 ozs. of gold, 4,480 ozs. of silver and 227,700 lbs. of copper. Shipped from the dump to Northport smelter during the past month, 5 tons of ore, containing 26 ozs. of gold, 36 ozs. silver and 927 lbs. of copper. Estimated profit on this ore \$8,000."

## MACHINERY NOTES.

## THE WAKEFIELD CONCENTRATOR.

THE concentrator at the Wakefield is being remodelled and when completed will have a capacity of from 100 to 150 tons per day. Sufficient ore is already blocked out to keep the mill running the entire season.

## HOIST AT THE MARBLE BAY.

A 75-h.p. hoist, having a capacity of 700 feet, is being installed at the Marble Bay, Texada Island. The mine will be idle for probably two weeks, until the machinery is in place, when sinking which has been delayed on account of inadequate hoisting arrangements, will be resumed.

## COKE OVENS AT BLAIRMORE.

A contract has been let by the International Coal and Coke Company, operating coal properties at Blairmore, Alberta, for the erection of 100 coke ovens, and the work is now under way. It is expected that the ovens will be ready for use early in the fall, and coke shipments will be made therefrom to the Granby and other Boundary smelters.

## EQUIPMENT FOR A BOUNDARY MINE.

A large 150-h.p. boiler was received this month at the Snowshoe mine near Phoenix from the manufacturers, the Jencks Machine Co., of Sherbrooke, Que.

## PROPOSED WHITE BEAR CONCENTRATOR.

The White Bear mine, Rossland, has applied for 100 miners' inches of water from the Trail smelter dam, to be returned to the smelter flume. This is regarded as final evidence that the mine will build its concentrator at or near Trail, as no such application would be practical without the previous consent of the smelter.

## COMPRESSOR AT THE RAMBLER.

It is stated that a compressor is to be installed at the Rambler, about two miles from the mine. Here by fluming two creeks a continuous water supply may be depended upon.

## SMELTER FOR GREBBLE ISLAND.

It is reported that a smelter of 100 tons daily capacity is shortly to be built at Grebble Island, about 350 miles up the coast, to treat the ores of the Canadian-American mines.

## CHLORIDISATION IN THE LARDEAU.

The installation of a concentrating and chloridising plant for treatment of the ores of the Silver Cup and Nettie L. mines is considered as an indication that mining in this section is about to enter a new stage. Hitherto only those properties which had bodies of clean, high-grade, shipping ore, or ore which could be cheaply assorted for shipment, could be profitably operated, and the large quantities of ore mixed with gangue had to be thrown on the dumps as second-class to wait a time when means of profitable treatment should come. That time has arrived, and with it the Lardeau will enter on a new phase of mining, where large capital, large plants, and the best technical skill will be employed in the development of the industry.

## THE FISH CREEK FREE-MILLING ORES.

The erection of the Northwestern Company's mill at Camborne has been completed, and the building is well in progress of the ten-stamp mills at both the Oyster-Criterion and Eva. The Vancouver Engineering Works is establishing a pipe plant for the Calumet B. C. Mine Co., of Camborne, and also a power plant for the Ophir-Lode Gold Mining Company.

## ELECTRICAL POWER IN BOUNDARY.

It is understood that the British Columbia Copper Company, owning and operating the Mother Lode mine and smelter, have recently concluded arrangements for utilizing electrical power generated at Cascade at the company's reduction works near Greenwood, making the second of the Boundary smelters to take advantage of this cheap power.

While nothing official has yet been given out on the subject, it is understood that a contract has been awarded for the building of a branch pole line from Phoenix to Anaconda, near Greenwood, where the Mother Lode smelter is

situated, a distance of about five miles. It is said that L. A. Campbell of Rossland has secured this contract and will shortly begin the work of construction. The necessary surveys have already been made between the two places, and it is probable that construction will not require more than a month, if there are no unforeseen delays. As the Greenwood smelter is now operating two furnaces, and is intending to put in others at no distant date, the cheaper power thus to be obtained will become an important factor in the economical operation of those reduction works. The Sunset smelter, located three miles further down Boundary Creek, with two furnaces now in operation and a third under construction, will also, it is believed, be glad to avail itself of this economical power, in place of the steam power which both of these plants now use. Electric power is also now being utilized by the Snowshoe mine.

## THE SUNSET SMELTER AT BOUNDARY FALLS.

A third Connersville Company's blower, with direct-connected Erie City engine, was received at the Montreal & Boston Copper company's smelter at Boundary Falls early this month and later a third blast furnace arrived at the same works. The two blowers already in use are also Connersville machines, one a No. 7 and the other a No. 7½, each driven by its separate 75-h.p. Erie City engine, and each supplying blast for one furnace. The blower just received is a No. 8 and its engine is of 125-h.p., its capacity being equal to the blast requirements of two furnaces.

The new furnace, like No. 2 now in operation, was manufactured by the Union Iron Works, Spokane, Wash. The new furnace is of similar dimensions to the two running at Boundary Falls, viz., 40 inches by 176 inches at the tuyere line. It will be placed in line with and immediately south of No. 2, the removal of the power house having given room for more furnaces.

Other plant lately received at this smelter includes seven large cars or trucks to be used for the purpose of dumping the slag hot as soon as the present method of granulating it shall be abandoned. The limited space available for a slag dump makes it necessary at these works, as well as at the other two district smelters, that hot-dumping of the slag shall be substituted for granulation. The cars, which were made by the Union Iron Works, have a capacity of between four and five tons each. A locomotive for hauling these cars was ordered seven months ago, but there has been an unexpected delay in delivery on the part of the manufacturers who contracted to supply it. However, preparations are being made at the smelter to have everything in readiness to utilize it as soon as it shall reach the works, the blacksmiths being busy making switches, frogs and other parts of the railway between furnaces and dump for the slag tram.

## AERIAL TRAMWAY FOR THE BRITANNIA.

Arrangements have been made for the installation of an aerial tramway system at the Britannia mines, Howe Sound.

## GRANBY'S NEW FURNACES.

The two new furnaces now being installed at the Granby smelter, making a total battery of six, are practically set up. The connections with flue dust chambers and blowers will be made early in August, when the plant will be closed down for a week. It is expected that the entire six furnaces will be in blast a fortnight later if a sufficient supply of coke can be secured. The smelter will then have a capacity of 2,100 tons daily.

## NICKEL PLATE STAMP MILL AT HEDLEY.

Construction is proceeding steadily on the flume and stamp mill at Hedley, twenty miles down river from Princeton. It is stated that upon the completion of the mill the erection of a smelter on the Indian Reserve land will be commenced. The smelter and stamp mill will be the property of the Yale Reduction Works, and it will treat custom ores, especially yellow copper ores when the plant is in operation, which is expected to be in about eighteen months. Copper ores will be needed in smelting the arsenical iron of the Nickel Plate mine. Up to the present time it is estimated

that there has been expended on the whole works a million and a half dollars.—*Similkameen Star*.

#### AERIAL TRAMWAYS IN THE LARDEAU.

The contract has been let to B. C. Riblet for the construction of a tramway from the Nettie L. mine in the Lardeau to the new mill at the Silver Cup. The tramway will be one and one half miles in length, and will have a capacity of one hundred tons per ten hours. Work will be commenced on the construction of the tramway, the machinery for it being manufactured in Nelson. This makes five mine tramways in course of construction in the Lardeau.

#### PROPOSED TRAM FOR THE HUNTER V.

The installation of an aerial tram at the Hunter V. mine, in the Ymir district, is projected.

### MINING RETURNS AND STATISTICS.

#### REPUBLIC (WASHINGTON) TO B. C. SMELTERS.

THE ore shipments from Republic to the Granby, Hall, Tacoma and Crofton smelters for the six months ending June 30, 1903, aggregated 371 cars. The average per car was 30 tons. This brings the tonnage up to 11,730 or 1,950 tons per month. Of the total tonnage 4,380 tons were shipped in June.

#### YUKON.

It is probable that the Yukon gold yield for the year will approximate that of 1902. Some estimate it in advance at eleven millions and others place it at an amount in the neighbourhood of \$13,000,000. Some reduction has been made in the cost of production, as a result of cheaper machinery, labour and commodities, and on the whole the results of the present season should show some slight improvement on those of last year.

The following is a statement of gold received at the Seattle assay office for a period covering five years, from July 15th, 1898 to July 15th, 1903:

Nome, Alaska .....	\$11,285,071 08
Balance of Alaska .....	2,654,037 79
Total for Alaska .....	\$13,940,008 87
British Columbia and Canada .....	3,428,780 47
British Columbia and Canada .....	3,428,780 47
Washington, Oregon, Idaho and Montana .....	1,153,856 47
Total .....	\$73,364,700 18

#### ROSSLAND.

Ore shipments from Rossland for the year to the week ending July 25th, were divided as follows:—

	Tons.
Le Roi .....	106,341
Centre Star .....	44,692
War Eagle .....	32,829
Le Roi No. 2 .....	15,095
Velvet .....	4,951
Kootenay .....	4,180
Giant .....	614
Jumbo .....	300
White Bear .....	250
Cilica concentrates .....	85
Homestake .....	80
I. X. L. ....	40
O. K. ....	20
Total .....	208,577

#### BOUNDARY.

Returns of Boundary district ore shipments from January 1st to July 25th are:—

	Tons.
Granby .....	187,715
Mother Lode .....	58,830
Snowshoe .....	31,212
B. C. ....	18,565

Emma .....	10,046
Sunset .....	8,225
Oro Denoro .....	600
Providence .....	634
Athalstan .....	435
Elkhörn .....	129
Total .....	316,421

#### SLOCAN.

From January 1st to July 18th shipments from the Slocan and Slocan City mining divisions have been as follows:—

	Tons.
American Boy .....	502
Antoine .....	101
Arlington .....	40
Black Prince .....	17
Bondholder .....	2
Bosun .....	690
Bluebird .....	20
Dayton .....	4
Enterprise .....	375
Fisher Maiden .....	280
Hartney .....	21
Hamilton .....	4
Idaho .....	21
Ivanhoe .....	466
Lucky Jim .....	105
Monitor .....	436
Meteor .....	12
Ottawa .....	106
Payne .....	1336
Queen Bess .....	144
Rambler .....	800
Reco .....	153
Republic .....	50
Ruth .....	203
Rio .....	9
Red Fox .....	24
Slocan Star .....	995
Slocan Boy .....	16
Silver Glance .....	55
Surprise .....	5
Vancouver .....	20
Total .....	7154

### COAL EXPORTATIONS AND TRADE.

THE settlement, after a suspension of operations extending over a period of four months, of the differences between Mr. Dunsmuir and his mine-employees at Ladysmith, has been hailed with great satisfaction, and during July work at the collieries have been actively prosecuted. The men at Cumberland are yet idle, but an early adjustment of the trouble there is also expected. On the 10th inst. an explosion occurred in No. 6 mine, Cumberland, resulting in thirteen fatalities of Chinese.

At Nanaimo the Western Fuel Company is making preparations to pump out the old Harewood mine, which has been closed now for a year. The old company ran into faults, but it is proposed to drill through these, and if the results are satisfactory to again work the mine thoroughly. It is thought, meanwhile, that the limits of the usefulness of oil for fuel have been reached; and the price having stiffened has improved the condition of the San Francisco coal market. Shipments last month aggregated 18,706 tons.

At Coal Creek the mines are again in perfect working order, all the damage done during the disaster in May of last year, and in the strike early this season, having been entirely repaired. The coal output for the month of June was as follows: Coal Creek, 24,586; Morrissey, 18,124; Michel, 28,543—a total of 71,253 tons. The coke shipped during the month was 6,568 tons from Fernie and 6,657 from Michel, total 13,223 tons. The disposition of the coke was: Canadian Smelting Works, Trail, 3,146 tons; B. C. Copper Co.,

Greenwood, 1,902 tons; Granby Company, Grand Forks, 4,799 tons; Hall Mines, Nelson, 363 tons; Montreal & Boston Company, Boundary Falls, 1,771 tons; Northport smelter, 1,244 tons. It is estimated that the total coal shipments for July will be in the neighbourhood of 85,000 tons, and the coke tonnage will also be increased. At Morrissey 48 of the new coke ovens are now in brick, while all the stone work on the full number building has been completed. It will be the first of September before all will be ready for work, but it is intended to start the ovens up as fast as completed. The same will be done with the new ovens at Michel, where already sixty are in brick, and the balance have the stone work done. At Fernie, for the first time, all the ovens in the place were worked during the latter part of the month, a total of 422 and these will be run steadily now.

The first shipment of coal from the mines of the International Coal & Coke Co., Blairmore, N.W.T., was made last week, when one carload of coal was shipped to Phoenix. The coal will be used for operating the steam shovel in the surface quarries of the Granby mines. Another carload of coal is *en route* to the Granby smelter. Although work at the coal mines is only in its initial stages, about 25 miners are employed, and two carloads of coal are being taken out daily in course of regular development.

LOCAL STOCK MARKET FOR THE MONTH OF JULY, 1903.

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

Companies.	Highest.		Lowest.	
	Asked.	Bid.	Asked.	Bid.
	\$ c.	\$ c.	\$ c.	\$ c.
Cariboo McKinney . . . . .	12½	11¼	12	11¼
Cariboo Hydraulic . . . . .	75	..	75	..
Centre Star . . . . .	28	26½	26½	24½
Crow's Nest P. Co. . . . .	100 00	75 00	87 50	68 75
Fairview Corporation . . . . .	6½	4½	5½	4
Iron Mask . . . . .	6	..	6	..
North Star . . . . .	13½	12	12	10½
Payne . . . . .	21	18	14½	13
Rambler . . . . .	65	40	42½	40
Sullivan . . . . .	6	5¼	5	4
War Eagle . . . . .	13	10½	12	10
Waterloo . . . . .	7	6	6½	5½
Winnipeg . . . . .	4	..	4	..
St. Eugene . . . . .	48	40	48	40
Granby . . . . .	5 50	4 50	4 50	4 00

THE METAL MARKET.

The markets this month have been somewhat inactive, and there is nothing of particular interest to record. The price of copper shows a slight further decline, notwithstanding that enquiry from Europe has been good. It is thought, meanwhile, that manufacturers are holding back in the hope of still lower prices. The latest quotations are Lake, 13¾ to 13¾; Electrolytic, 13¾ to 13¾; Cathodes, 12¾ to 13¾; Casting Copper, 12¾ to 12¾. The average price in June for electrolytic was 13.942. Lead has been in good demand, at, however, practically unchanged prices, 4 to 4.02½, St. Louis; 4.05 to 4.10, New York. The London quotations have ranged from £11 8s. 9d. to £11 13s. 9d. Spelter has been active, and a scarcity of spot metal is reported, the St. Louis quotations being 5.50 to 5.55; and 5.65 to 5.70, New York. The price of silver after advancing slightly in consequence of buying from India, again relapsed and has since remained unchanged at a small fraction over 53.

IMPORTS OF MINING MACHINERY.

The imports of mining machinery into Canada during 1902 were valued at \$850,339; of which \$789,921 was for machinery

from the United States; 58,133 from Great Britain and \$2,285 from other countries. The total imports of wire rope, which \$73,986, came from Great Britain and 563,519 pounds, valued at \$135,573. Of this quantity, 1,033,307 pounds, valued at \$73,986, came from Great Britain and 563,519 pounds, valued at \$58,902, from the United States. The balance, 80,724 pounds, valued at \$2,685, were from other countries.

THE WHITE HORSE GOLD EXCITEMENT.

In consequence of the reported discovery of a very rich new gold area on a tributary of the Alsek River, in the Yukon, a stampede has taken place from White Horse, from which place the new finds are distant from between 120 to 150 miles in a north-westerly direction. In one day over two hundred and fifty licenses were taken out and excitement ran high. Two creeks in the locality, Fourth of July and Ruby, have been already tolerably well prospected for a distance of about ten miles, and it is said the gold is very evenly distributed, yielding from three to fifteen cents to the pan, and that miners are making from \$10 to \$12 a day.

THE VANCOUVER POWER CO.

The contract for the construction of the power-house of the Vancouver Power Company, which is to be built on the beach below the Trout Lake dam on the North Arm of the Inlet, has been awarded. The power-house will be built entirely of stone to be furnished by the Vancouver Power Company. The building will be 40 feet by 156 feet, and the walls 30 feet in height and two and a half feet in thickness. The company intends to have its generators and Pelton wheels installed and in operation before Christmas, by which time it is expected that 6,000 horsepower will be available for use in Vancouver.

One of the unique features in the station will be the twelve submerged oil switch brakes, the oil baths being ranged along one side of the structure. Besides these twelve oil tanks provision is made for thirteen more in case they should be needed later on. The oil tanks represent the latest idea in the breaking of electrical contact on high voltage lines. By breaking the contact of switches in oil there is no danger of the current arcing as is the case when switches are broken in the ordinary manner.

RECENT REGISTRATIONS AND NEW ISSUES.

The following companies have been registered as extra-provincial companies during the month.

Black Diamond Tunnel Co., \$1,000,000, office Ainsworth; (mining).

Gordon Mining & Milling Co., \$100,000; office Erie; (mining and development).

The following certificates of incorporation have been issued:—

Aztec Mining Co., Limited, capital \$15,000.

Hunting-Lea Lumber Co., Limited, capital \$20,000.

Park Ranching Co., Limited, capital \$10,000, to acquire lands in Osoyoos division.

Barclay Sound Pulp Company, Limited, capital \$100,000.

Ship Lord Templeton Company, Limited, capital \$70,000.

B. C. Box & Lumber Company, Limited, capital \$25,000, to take over the business of the British Columbia Box Factory of Vancouver.

Northern Brewing Co., Ltd., capital \$20,000, to take over the business of the Northern Brewing Company of Atlin.

THE STARR LAKE WATER POWER.

It is reported that arrangements are being made for the utilization of the large water power at Starr Lake, an American capitalist having undertaken to finance the undertaking.

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SEATTLE, 218 Second Ave., So.  
BAKER CITY, Oregon.

LOS ANGELES, 321 Trust Building.  
SALT LAKE CITY, Utah.

#### THE WOOD PULP INDUSTRY.

It is reported that the manufacture of pulp is shortly to be commenced by the erection of a mill, to employ in the neighbourhood of 300 men, on the Gulf shore, at the mouth of Powell River. The syndicate having this undertaking in view have in the aggregate an area of two hundred and fifty square miles of spruce timber lands at various points on the Mainland coast.

#### FIRE CLAY IN THE SIMILKAMEEN.

A shipment of a hundred and twenty tons of fire-clay and brick recently arrived at Vancouver from the United Kingdom consigned to the British Columbia Goldfields Company, of Frank, Alberta, to be used in the construction of coke ovens. In this connection the Similkameen *Star* remarks that few British Columbians are aware that the Similkameen "contains good seams of fire-clay almost identical with the best Scotch and English fire-clays, and equal, if not superior, to any found on this Continent," and adds that "once transportation facilities are afforded there will be no necessity to import fire-brick from England, as this district can furnish, not only this Province, but the whole Pacific Slope.

#### THE LUMBERING INDUSTRY AT REVELSTOKE.

Few of our readers, remarks the Revelstoke *Herald*, realize the importance that the lumbering industry is assuming in the districts tributary to Revelstoke. The enormous stretches of timber land up the Big Bend and in the Arrowhead and Fish River districts must be seen to be realized, and our citizens should certainly consider the possibilities of the rapidly growing industry. It is a well known fact that manufactured lumber has increased largely in price within the past year or two and every indication points to present values being

maintained even if no further rise takes place. The many applications from all over the Dominion and Western States for good timber belts have resulted in a better figure than ever before being paid to those having title to timber.

Many representations have been made that the present tenure is somewhat unsatisfactory and the market would be much brisker and an influx of outside capital would follow if the system of annual licenses now in force were changed. Probably the most feasible suggestion so far made is that licenses should run for five years at a reasonable annual rental with privilege of extension if required. The matter is now engaging the attention of the authorities and it is probable that a change of some kind will be made at the next session of the House.

The timber cruisers are much pleased at the recent action of the Government in cancelling the regulation requiring the survey of limits applied for before granting applications. This, in the first place, was most unnecessary, and worked hardship on the real discoverers of valuable timber belts. The license fee is hard enough to meet, in many instances, without the additional cost of survey which, in districts far removed from centres of civilization, would amount to several hundred dollars.

Recent unfortunate labour troubles have caused an oversupply of logs to the mills on Burrard Inlet, but with the return of amicable relations between the mill owners and their employees this congestion will be removed and lumbering at the Coast resume its wonted activity. In Revelstoke, and districts tributary to it, this has not been felt, as every class of labour engaged in the industry receives the highest current rate of pay. It does not appear that the present course will be departed from and Revelstoke, therefore, need not fear any danger of the diminution of pay-rolls in this city.