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MINING RECORD

ESTABLISHED 1895

VOL. XI.

JULY, 1904.

No. 7

BRITISH COLUMBIA MINING RECORD

Devoted to the Mining Interests of the Pacific Northwest.

PUBLISHED BY

THE BRITISH COLUMBIA RECORD, LIMITED

H. MORTIMER LAMB, Managing Editor.

Victoria, B. C., Office, Province Building.
Vancouver, P. W. Charleson, Hastings St.
London Office: 24 Coleman Street, E. C.
Denver, Col.: National Advertising Co.
San Francisco: Dako's Agency.

SUBSCRIPTION TERMS:

Canada and the United States, one year - - \$2.00
Great Britain and Foreign, one year - - \$2.50

Advertising Rates on Application.

THE MONTH.

It is somewhat an event in the Lardeau, that the Silver Cup combination mill, near Ferguson, has commenced crushing operations, the first bar of bullion having been produced therefrom last month. Before the completion of construction work on this mill we were informed by more than one correspondent of the alleged inadequacy of the precautions taken to demonstrate by preliminary experiment, the suitability of the process to the treatment of the Silver Cup and Nettie L. ores. From what we have since been able to gather there does not appear to have been sufficient foundation for these statements, and the fact that the mill is now seemingly in successful operation substantiates the conclusions at which we had arrived.

Last month Atlin witnessed the inauguration of an important enterprise when dredging operations were started by the British America Dredging Company, on Gold Run. According to reports from the district the dredge is working most satisfactorily, handling even, contrary to pre-conceived opinion, boulders with great ease. It is early yet, of course, to speak with any degree of assurance of the possibilities of a successful future for dredging in the Atlin district; but if in actual practice the results approach those obtained from last season's prospecting, then the outlook for the industry is most promising.

Mr. J. H. Christie, a peripatetic prospector not unknown at Rossland, recently furnished a Vancouver news-gatherer with some optimistic information relative to the alleged coal and oil resources of the Wulffshon Bay district. The particulars published made interesting reading—"an immense carboniferous deposit, almost at the doors of Vancouver City"; "followed the formation fifteen miles"; "simply a continuation of the carboniferous beds of Vancouver Island"; "we have staked 12 square miles," etc., etc. Now for the "thorough exploration" promised, and then some big collieries at Vancouver's doors—perhaps.

The example set by the general manager and mine superintendent of the Tyece Copper Company in offering donations as the nucleus of a sum of \$400 for prizes for a miners' rock-drilling contest to take place during Fair week in Victoria at the end of September next, is one that should be followed by others interested in mining on Vancouver Island. If the executive committee succeed in getting together a good display of minerals, and the proposed rock-drilling contest be definitely arranged, they will have some little claim upon the mining districts within easy reach of Victoria to give the Fair the benefit of their recommendation and personal support.

In an interview published in a Rossland paper, Mr. Alexander Sharp, acting as consulting engineer for Messrs. P. Burns & Co., is reported to have said after visiting the Poplar Creek district, that no "free-gold camp" of equal importance and promise had in his opinion been discovered in British Columbia. The showings on the more developed properties were, he said, exceptionally fine, the leads in some instances being as much as fifty feet wide. The only and of course most vital matter yet to determine was whether or not values would continue at depth, but Mr. Sharp considers that geological conditions are not unfavourable to this supposition. There are at present in the district some six hundred prospectors either doing assessment work on their claims or prospecting in the hills.

The announcement a short time ago of the declaration by the Crow's Nest Pass Coal Company of its

customary quarterly dividend at the rate of ten per cent. per annum suggests the reminder that this is the fourth consecutive year in which this company has been a steady dividend-payer. Its total disbursements in dividends is now well on towards a million dollars, and this, too, over a period in which there has been continuously a large outlay in connection with the further development and equipment of the company's several collieries. Usually the name of the Crow's Nest Pass Company is omitted, inadvertently of course, by those who make up lists of the dividend-payers among the mining enterprises of British Columbia, yet the fact remains that the company's operations have for several successive years yielded a considerable profit, from which its shareholders have received regular returns at the rate of ten per cent. per annum on the par value of the stock.

The action of Mr. John Keen, president of the Provincial Mining Association, in making arrangements with Dr. Hendryx for the treatment at Spokane of mineral-bearing schists from the Poplar Creek camp is worthy of commendation, and it is gratifying to find that these arrangements have already been taken advantage of, several parcels of schist having been forwarded for test purposes by the Hendryx electro-cyanide process. It is stated by men who have some acquaintance with the Black Hills of Dakota that there is much similarity between the schists and quartz ores of that important mining country and those of the Poplar district. In our description of the Poplar Creek camp, published last October, we quoted one prospector as having informed our representative that on one claim "the gold occurs in a sort of laminated schist. This rock is a puzzle to most prospectors, but it carries gold all right." We await with much interest the result of the tests of this mineralized rock.

It is matter for satisfaction that one Rosland mine at least, Le Roi No. 2, has been able to declare a dividend this year, amounting to a shilling per share, or at the rate on the present market price of the shares, of about 7 per cent. We had hoped to have been able to announce that the profits had been helped by the institution this year of concentration at the mine, but it appears that so far the commercial success of the Elmore process at the Le Roi No. 2 has not been clearly demonstrated. However, for the nonce, according to a report attributed to the manager, this is of no great moment, as new ore bodies of high grade value have been discovered at the 600-ft. level, and the life of the mine thereby materially increased. It is not likely, however, that the directors will be so short-sighted as to discontinue the effort to find a suitable method of treating the lower grade mine products, for any such policy would be the height of folly.

The following extract from a paper read before the American Institute of Mining Engineers at its meeting held in New York in February, 1889, is instruct-

ive, even after a lapse of fifteen years, having in view the claims frequently advanced regarding low-cost mining and smelting in the Boundary district of British Columbia. The paper the excerpt is taken from was contributed by Dr. Franklin R. Carpenter, then Dean of the Dakota School of Mines: "It would seem that a hint might be taken from the large mines of the Lake Superior region, where, owing to the great quantity in which low-grade copper ores occur, as well as to the ease with which they can be concentrated, enormous dividends have been paid. The Atlantic copper-mine of that section made in 1885, 1886 and 1887, the following extraordinary showing. The rock yielded only 0.743 per cent. of refined copper, and was treated at the following cost:

	1885.	1886.	1887.
	Cents.	Cents.	Cents.
Mining, selecting, breaking and surface expenses.....	78.62	80.88	87.23
Transportation to mill....	4 80	3.43	3.80
Stamping and separating.....	30.36	26 53	27.31
Freight, smelting, marketing and New York expenses....	25.45	24.25	23.07
Total working expenses.....	139.23	135.14	141.41
Total expenditures.....	143.60	138.01	145.22
Net profit.....	22.05	15.29	30.53

The Trout Lake *Topic* commenting on the improvement in condition in the Lardeau districts, remarks: "Until recently the cost of handling the ore from the different producing mines ran from \$40 to \$60 per ton. With present facilities the same can now be handled at about half the figure. In addition to this the reduction works of the Great Western mines will allow of the production and treatment of large bodies of ore which heretofore could not be touched. The building of the C.P.R. to Trout Lake and the erection of aerial trams have effected this big saving and made the installation of reduction works possible. The proposed new placer works will no doubt add materially to the output of the year." It speaks well, meanwhile, for the high grade character of the ore-bodies in this district that despite the difficulties with which mine operators until recently have had to contend that in the last three years shipments of ore have aggregated in value something like half a million dollars, over rather than under. Lardeau's production last year was nearly double that of 1902, and it is evident that the district is about to become a most important contributor to the Province's annual output not only of silver-lead, but of gold also.

In a recent press dispatch from New York the statement was made that the scheme arranged at the instance of the Montreal & Boston Consolidated Mining & Smelting Company, of consolidating therewith the interests of the Morrison & Dominion Copper companies in the Boundary district, was likely to be

successfully consummated, the shares of the new undertaking having been already underwritten. As the new company is to be capitalized at the absurdly high figure of six and a half million dollars, and as neither the Sunset group, owned by the original Montreal & Boston Company, nor the Morrison have been profitably operated in the past, for the reason seemingly that the ore so far treated has not been of payable grade, the outlook for the new concern, excepting always for stock-mongering purposes, is not a particularly promising one. It is true the Dominion Copper Company's Brooklyn group is of value, though the ore-body is relatively small when compared with the deposits in this district, which are now being successfully worked. In any case the possibility of the new company earning profits on its inflated capital is remote to a degree, and this view is evidently shared by that exceptionally astute person, Mr. Jos. Breen, who insisted on payment in hard cash before relinquishing his interests in the Brooklyn.

At a meeting of the shareholders of the Slough Creek, Limited, a resolution was passed providing for the issue of 40,000 cumulative preference shares, carrying interest at the rate of £10 per centum per annum, and also entitling the holder to 40 per cent. of the profits of the Company available for distribution in dividends, after the preferential dividend shall have been paid. It is further stipulated that should the Company be liquidated before the holders' shall have received £3 per share in dividends, they shall be entitled to be repaid the amounts paid up on their shares in priority to the claims of the remaining shareholders. The object of this arrangement is seemingly to provide funds, should it be found necessary, for the continuation of the work now in progress at Slough Creek, of preparing the mine, by steady pumping, for actual mining work in the ancient river channel which has been tapped. The water once removed, it is believed, the venture will pay handsomely. The Company has meanwhile been twice reconstructed, and although funds are not as yet required the directors evidently believe in anticipating the need, and thus avoiding the possibility of delay in the future on that account. If ever an undertaking was deserving of success it is surely this one, for directors, manager, and shareholders have in the face of much difficulty and discouragement refused to be discouraged, but instead persevered as one man to carry the enterprise to a successful issue. As to the probabilities, if the water difficulty is once overcome, and recent indications have been most gratifying, the profits will be reckoned in hundreds rather than in ten per cents. Also it will be a very big thing for the Cariboo district.

Although the probabilities are not in favour of an amalgamation of the Le Roi and War Eagle-Centre Star companies, the suggestion itself, which by the way has now been raised for the third or fourth time, is by no means an impossible one. There are sound

reasons for the belief that the three large mines might be more advantageously, that is to say more economically worked under one general management, while doubtless the arrangement would in general facilitate milling and smelting operations, particularly if it were possible to include in the consolidation a developed mine in the Boundary district, from which a good supply of ore containing a fairly high percentage of iron might be regularly obtained. Again the Le Roi certainly, possibly the War Eagle and Centre Star, are over-capitalized, and the opportunity of consolidation necessitating of course general reconstruction, would afford an excellent excuse for the reduction of the capital of the consolidated companies to an amount upon which it should be practicable to earn a substantial percentage of profit. The chief difficulty, we have heard it suggested, in the way of rendering effectual any arrangement of the sort, would rest in the determination of the value of the properties and the basis on which consolidation would be carried out from the point of view of shareholders. But if matters reach that stage it will be possible, of course, to gain a very nearly accurate idea of the value of the properties from the reports thereon by independent engineers who would naturally base their opinions on the extent of the ore actually in sight at the time they made their examinations.

The outlook is decidedly promising for much activity in mining matters in East Kootenay this season. Last month we published information relative to lode mining at the Ptarmigan mines, placer mining on Perry Creek, and to the Sullivan Mining Company's smelter at Marysville, the completion of which works is now in hand, and this month we give some particulars of the Paradise mine. In May we described the St. Eugene mine, now employing about 300 men after having been idle for about three years. The Flathead country, in Southeast Kootenay, is attracting much attention, and prospecting for coal and oil will probably be prosecuted with vigor during the summer and return, numbers of men having already gone into that section with that intent. An enlarged market for Morrissey coal is reported, and the railway controlled by the Great Northern Railway Company is being extended from Morrissey Junction to Fernie, which will also give the Coal Creek colliery unbroken rail connection with Washington and Montana markets for coal and coke. The considerable water power available near Elko, so it has been announced, is to be utilised shortly. There are numerous other instances in which enterprise is being displayed—in the coal section surrounding the Crow's Nest Coal Company's holdings, in lode-mining in Northeast Kootenay, and in hydraulic and other placer mining on several of the creeks tributary to either the Columbia or the Kootenay River. Then there is an extensive lumbering industry besides, so that the prevailing optimistic tone noticeable in the district press appears to be fully justified.

Labour unionism, as represented by the Western Federation of Miners must necessarily suffer by the recent dastardly outrage committed, it is alleged, by members of that labour institution at Circle City, Colorado, by which a number of non-union workmen were killed by the explosion of dynamite. Although the Western Federation deny any complicity in this atrocious deed and have offered a large reward for the arrest and conviction of the perpetrators, until proof positive is brought forward the public in general will certainly refuse to believe in the innocence of the organization whose past record is marked with deeds of violence and bloodshed. Without going into the question of the rights and wrongs of the dispute now of long standing between mine-owners and the union miners in Colorado, it is very clear that the latter have not had the support of the Colorado public in the struggle that has been in progress. As a general rule the justice of a cause on the one side or the other may be learned by this criterium. In a sense, it is an added matter for regret that a large proportion of our British Columbian miners' unions are affiliated with a body whose motto seems to spell anarchy, although in justice it must be said that so far the influence of the Western Federation in this country has been for good, instead of otherwise, to the prevention and settlement of strikes rather than the encouragement or promotion thereof. The time perhaps is not too far distant when labour will not be required to organize for its own protection. The Western Federation of Miners is, it is said, governed by men who, as avowed socialists, disbelieve in unionism, holding to it merely as a temporary expedient. But moral force nowadays is more powerful than brute force, and socialism, or any other cause, however inherently righteous is not likely to be advanced by the advocacy of murderers and madmen.

A telegram despatched from Ottawa early in the month and given wide publicity, stated that the Federal Parliament had acceded to the wishes of the British Columbia lead producers, and extended the benefits conferred by the Lead Bounty Act to permit of the exportation of the lower grade ores. This now appears to have been misleading, the announcement having been, to say the least, premature. Both in the House of Commons and in the Senate there is strong opposition to the suggested change, on the grounds that it would largely defeat one of the principal objects of the Act itself which was to encourage and stimulate the smelting of lead ores at home. At the same time pressure is being brought to bear on Parliament by men who possess strong political influence and hence there is a fair chance that the amendments will be made. The suggested arrangement is after all merely in the nature of a compromise to cover a period only of one year and thus give the local smelters an opportunity of increasing the capacity or otherwise improving the efficiency of their plants to be able to adequately handle the entire British Columbian lead-ore output, while, too, it is merely desired that the

surplus of the bounty offered, after mine-owners who have complied with the present requirements of the Act, shall have been paid, be made available to producers of the lower-grade ores, who under the rather exceptional conditions now existing, are unable, without this encouragement, to carry on operations upon a reasonably profitable basis. As the British Columbian smelters have themselves endorsed the petition there would seem to be no economic reason why it should be refused. On the other hand, the extension of bounty privileges would undoubtedly result in a greatly increased silver-lead production this year, the working of a number of mines now idle; the consequent employment of labour, and the stimulation generally of trade and industrial conditions in the Kootenays.

The information relative to the Mineral Museum of the Provincial Department of Mines we publish elsewhere in this issue of the MINING RECORD will, we hope, be widely read and serve to so interest in that institution a large number of our readers as to induce them to make use of its advantages whenever practicable and, by contributing specimens of minerals, rocks, etc., to assist in extending its sphere of usefulness. It is not characteristic of the Department of Mines to blow its own horn, which it might justly do in regard to the practical benefits derived by many from the Mineral Museum as well as from the Provincial Assay Office, both supervised by Mr. Herbert Carmichael, Provincial Assayer. Comparatively few of the general public have any idea of the number of those who make use of the Museum by spending an occasional hour there making themselves familiar with the appearance and general character of rocks and minerals previously strange to them, and thus better fitting themselves for determining whether or not the specimens they find when traveling or prospecting are likely to be worth giving attention to. Further, as a means of advertising the varied mineral resources of the Province the Mineral Museum is effective. That this is so does not appear to be recognized in some of the mining sections of the Province. Many districts are well represented, among them some of those in which the Provincial Mineralogist has spent a week or two, or in which some resident has taken the trouble to collect and forward representative specimens. Among those that are either poorly represented, or not at all, are Omineca, Cariboo, Lillooet, Fish River and other parts of the Lardeau, Arrow Lake and Ymir. The absence of a good display from the last-named camp is surprising, since its exhibit at Nelson and Spokane fairs last year was one of unusual excellence. It is to be hoped that this reminder will have the effect of securing from the several sections mentioned a representative collection of their respective ores and typical rocks, so that the Museum of the Department of Mines may the better serve its purpose.

When the organization of the Bureau of Mines, in accordance with the "Bureau of Mines Act", Chap

3, 1895, was begun in January, 1896, by Mr. Wm. A. Carlyle, Ma. E., Provincial Mineralogist, and Mr. Herbert Carmichael, Assayer and Chemist, a proposed plan of operations was drawn up. The ground to be covered by that part of the Bureau more particularly in the charge of the latter official was included in the following:

"To maintain a laboratory for assay and chemical analysis, for which will be charged the customary fees, and to determine, free of cost, specimens of rock, mineral or ore that may be sent in, and give all possible information concerning the occurrence or probable commercial value of such, with hints concerning the best methods of treatment, etc., etc.

"To maintain student laboratories, for instruction in assaying, blow-piping, mineralogy, geology, etc.

"To assemble and systematically arrange in a public museum specimens of mineral, ore, country rock, building and other economical mineral materials from the mines; and also, for comparative study, specimens of the same from other mining countries, models, maps, etc.

"To establish and equip a plant for testing, metallurgically, the different kinds of ore, coal, coke, etc., etc."

This month we publish two contributions relating to the Assay Laboratories and Mineral Museum, respectively. It is interesting to note that the plan of operations, as stated above, has in the main been faithfully adhered to and successfully carried out, and we take pleasure in directing attention to this fact. It would appear, though, that there is room for more active co-operation on the part of the mining districts of the Province, and we have no doubt that the Department of Mines would cordially welcome such assistance in, and appreciation of, the work of practical usefulness it is endeavouring to carry out in the manner indicated.

From several quarters, perhaps not always unprejudiced or disinterested, dissatisfaction has been expressed at the not too favourable views set out by the Provincial Mineralogist in his recently published report on the oil fields of the Flathead Valley; and it is true that compared with the opinions held by the late Dr. Selwyn when head of the Geological Survey of Canada regarding the potentialities of the district in respect to its mineral oil resources, Mr. Robertson's statements appear to err somewhat on the side of over-cautiousness. Thus it is somewhat difficult to understand on what grounds the Provincial Mineralogist based his suggestion that "oil in quantity, if it does exist, must in all probability be at a very considerable depth, possibly over 3,000 feet." Of course if there is actual evidence of this fact it were well that the public should be so informed, as it is questionable whether undertakings could be profitably conducted in this field if boring must be carried on to so great a depth. But if on the other

hand a mere theory is advanced, the statement is likely to have a deterrent effect on enterprise, which it is the province of the Department of Mines to encourage. Even the most able of geologists, it must be remembered, are not always infallible, and one has only to instance their mistaken views some years back concerning the gold-occurrences on the Rand, while we have other examples much nearer home. Now that the Government has withdrawn the reserve from these East Kootenay lands, important developments in this new territory may be hopefully looked for. The successful establishment of an oil industry in British Columbia is certainly a desideratum, for it would undoubtedly attract much capital to the Province for investment not only in that but in other industries.

Apropos, a correspondent of the *Fort Steele Prospector*, a Mr. Michael Phillipps writes as follows: The report of the Provincial Mineralogist on the oil fields of the Flathead is in many ways misleading, and because Mr. Robertson, a stranger in a wild country, failed to find more than the oil seepages on the much staked off Kish-e-neh-na and Sage Creeks, he at once concludes that they are the only ones known. He reports too that he failed to find oil in a spot where Professor Selwyn found it. There is one place near this latter point where by hollowing out the shale a basin is formed that at once fills with a clear straw-colored crude oil. The boulders on many of the creeks are saturated with oil, showing how very large must be the entire seepage of oil in the vicinity of these two creeks, and in some other adjacent ridges in the section of the Flathead Valley north of the Boundary. I first visited the oil seepage in 1872. It had been known to the Indians for years before that time. The mistakes Mr. Robertson made in getting into the Flathead Valley show how necessary a guide is. Mr. Robertson describes the route he followed as the blazes of Mr. Ritchie, who knew less of the country than Mr. Robertson. Had Mr. Robertson gone a little to the south he would have reached the Flathead Valley without going over a mountain, in place of the 7,000-ft. ridge he went over. A low pass is also mentioned and shown on the map where no pass exists. Moose Creek, a large tributary of Wigwam River, about the spot shown, heads in a large basin with high precipitous and impassable mountains to the exit."

Some very interesting expert evidence has already been given in the course of the trial now in progress at Nelson arising from the claims for damages on the part of relatives and others of those killed or injured in the explosion at the Crow's Nest Pass Coal Company's Fernie colliery, some two years ago. Thus one of the witnesses for the defence, Mr. Ashworth, a well known English coal mining engineer, in refutation of the expert testimony offered by Mr. William Blakemore positively asserted the explosion resulted not from dust as perhaps generally surmised but from the ignition of gas. He stated that at the time of the

explosion, according to the evidence previously submitted, the coal was giving off ethane in considerable quantities and that the explosion was capable of being traced thereto. The burning and coking in the old workings, this witness pointed out, might have been caused by the secondary action of the explosion, while the dust in these workings would not be responsible for any extension of the explosion. Mr. Ashworth also testified that the practice of watering coal mines was no longer regarded from a scientific standpoint as effective, and in recent reports the British mine inspector, Mr. Henry Hall, has stated that attempts to deal systematically with dust in British collieries by watering has been abandoned. Mr. E. M. Atkinson, coal mine inspector for North and South Staffordshire, has also reported the discontinuance of the practice in his district, notwithstanding that the mines there are dry and dusty; and even Mr. Martin, the inventor of the combined water-air system of sprinkling, has now admitted that coal mines should be kept dry. Mr. Ashworth further implied that the watering of mines did more harm than good, as five per cent. of watery vapour, or a condition of dampness generally, is conducive rather than otherwise to a coal dust explosion.

In cross-examination the following conclusions arrived at by the British Royal Commission on coal mines' explosions were submitted to the witness, and his opinion thereon sought:

1. The danger of explosion in a mine in which gas exists, even in very small quantities, is greatly increased by the presence of coal dust.

2. A gas explosion in a fiery mine may be intensified, and carried on indefinitely by coal dust raised by the explosion itself.

3. Coal dust alone, without the presence of any gas at all, may raise a dangerous explosion if ignited by a blow-out shot or other violent inflammation. To produce such a result, however, the conditions must be exceptional, and are likely to be produced only on rare occasions.

4. Different dusts are inflammable, and consequently, dangerous in varying degrees; but it cannot be said with absolute certainty that any dust is entirely free from risk.

5. There appears to be no probability that a dangerous explosion of coal dust alone could ever be produced in a mine by a naked light or ordinary flame.

Mr. Ashworth replied that under certain conditions No. 2 was true and he concurred in Nos. 1, 3 4 and 5. He added, however, that without absolutely describing the recommendations made by the commission as "slipshod," he disapproved of the findings as made, on the ground that they were made on insufficient knowledge and evidence.

It is customary to include in the annual mineral production returns an estimated sum to represent the value of the building materials produced, these being classed as non-metallic minerals. It is somewhat surprising, though, that, apparently, no systematic and

sustained effort is made to direct public attention to the extent, variety and excellence of quality of such structural materials as marbles, granites, freestones, etc., which are among the mineral resources of the Province. Local official publications give but scant attention to them, and private enterprise, seemingly, follows suit. In the Report of the Minister of Mines for 1901 the following lines occur: "On Kootenay Lake a coarsely-crystalline marble quarry is being worked for building purposes. There are on the Coast several first-class granite and sandstone quarries opened and doing a local trade. These quarries are so admirably situated as regards water transportation that there is a fair prospect of their becoming an important export industry." In the 1902 Report these particular building materials are disposed of in less than two lines, while in the 1903 Report the single word "stone" is the only reference to them. We are not finding fault in this particular direction, but are pointing out how little prominence is given in official publications to one of the natural resources of the Province that might, with judicious fostering, become as suggested above, an important export industry. It may be that there are striking exhibits of marbles and building stones so prominently placed in our larger cities as to catch the eye and impress the visitor with the fact that these are samples of the materials used in the more substantial buildings that do credit to our Province, but we have not happened to see them. The Victoria Tourist Association gives wide publicity to the statement that the British Columbia Parliament Building "is acknowledged to be one of the handsomest and most imposing structures on the continent," but it is not in its province to advertise the fact that there is at Haddington Island plenty of the same kind of stone as that used in the erection of that palatial block, available for export or local use. Similarly the Tourist Association directs public attention to the churches and the "stately mansions" to be seen in Victoria, but it is not called upon to state that the stone for that fine pile of buildings, the Metropolitan Methodist Church, came from Saturna Island, or that Koksilah supplied the stone for Mrs. Dunsmuir's imposing residence. And so on all down the line, whether of other prominent stone buildings in our Coast cities or the substantial and comparatively pretentious structures the Dominion Government has erected at Nelson, Rossland, and other Provincial towns. Surely, though, it should be somebody's business to give much publicity to the fact that there is in the Province durable building stone in plenty and variety easily accessible, and it certainly should be the care of either the Provincial Government or, in the event of its continued neglect to do so, of enterprising private individuals, to make provision for an adequate public display of these materials, accompanied by information relative to their sources and good qualities, at any rate in our larger cities, and to direct attention to the fact that the stone used in the erection of the most costly buildings in the Province is a home product. And as the marble, which is well distributed and of several varieties and excellent

quality—it would be a striking object lesson to those directly concerned were they to attend such an Exposition as, say, that held annually in Spokane, where they would see the most made of so favourable an opportunity to advertise the products, both raw and manufactured, of the marble quarries of Northern Washington. At least let there be a good example set at the Mineral Museum of the Department of Mines where, through no fault of the official in charge, the present exhibit of marbles, granites and freestones is distinctly meagre and little calculated to impress visitors with the fact that the Province possesses a valuable asset in its structural materials.

LOCATION OF PLACER CLAIMS OVER LODE CLAIMS.

THE reply of the Minister of Mines to the representations of the executive committee of the Provincial Mining Association regarding the position developed by the location of a so-called placer claim over the Lucky Jack mineral claim at Poplar Creek is not, in our opinion, calculated to encourage the investment of capital in the opening up of mineral or lode claims on which occurs ore carrying high gold values. These two communications are printed on another page, with other information relating to Provincial Mining Association matters. As the position to which the attention of the Minister of Mines was thus drawn, and a remedy for which was asked, is a very serious one, we think it well to here review the facts. Briefly, these are, that at Poplar Creek a man named Tanghe located a placer claim over the Lucky Jack mineral claim on which had been discovered a quartz ledge containing much free gold. The Gold Commissioner for the district—we quote from the judgment of Mr. Justice Martin—"practically refused to grant a record for this claim on the ground that, as a result of an examination he had made that morning of the claim with the plaintiff, he, the plaintiff, had not proved it to be a *bona fide* placer location, and was therefore not entitled to a record." The matter was referred by the Gold Commissioner to the Attorney-General. Ultimately, five weeks later, a record was issued, but it was accompanied by an order to remove the posts marking one of the boundary lines of the claim. The effect of this order was to change the whole of the plaintiff's location. Litigation followed and, eventually, a Supreme Court judgment was rendered, placing Tanghe in legal possession of his so-called placer claim, and consequently also in possession of the ground crossed by the reef or ledge of the Lucky Jack mineral or lode claim. This judgment was the logical outcome of a literal interpretation of the law bearing thereon, but the following excerpts from the judgment will show what little protection is afforded the holder of a mineral claim upon which some unprincipled scoundrel or other may have covetous designs. The judgment proceeds: "But though the plaintiff was entitled to have his location recorded as aforesaid, yet the validity thereof is attacked on the ground that in

truth it is not a placer claim at all, though so styled, and that nothing was found on the claim to warrant the statement in the affidavit, par. 2: 'That from indications I have observed on the claim applied for I have reason to believe that there is therein a deposit of placer gold.' . . . It is urged that the defendant has established that this is not a placer claim at all, because there is no placer ground in it, and that any prospector or miner of the most elementary knowledge could in a very short time satisfy himself of this fact beyond peradventure. Assuming all this to be the case, we get very little further, for it does not touch the one necessary element, i.e., the belief. It is further argued that in the circumstances no sensible man could have thought that the claim was placer ground, and therefore it must be assumed that the act of the plaintiff was fraudulent, and that he had not the requisite belief, but simply aimed at appropriating some rich ground from a lode claim and blackmailing the owner thereof. But the difficulty is that the belief required is not that of a sensible or an honest man; the insane delusion of a criminal under the Placer Act is just as efficacious, and it would require very strong evidence, stronger than has been adduced here, to justify the Court in coming to the conclusion that the belief was entirely absent, even in the case of a locator who has acted in such a suspicious and dubious manner as has the plaintiff."

The seriousness of the position thus developed so impressed claim-owners and others interested at Poplar Creek that the local branch of the Provincial Mining Association appointed a special committee to take up the question. This committee recommended that resolutions be adopted as follows:

"That in cases where it is of vital importance to the litigants that the Court should personally examine the disputed claim, arrangements should be made for the Court to be held in the near vicinity of the ground, so that the Court, and jury if any, could go over the ground in question, see the points for themselves, and a larger number of witnesses could be more readily examined on special points, and the posts examined, which is impossible in the distant Court-houses.

"That the Placer Act should be amended in the interpretation clause so as to prohibit rectangular pieces of a quartz ledge, eroded by time or detached by work and lying alongside thereof, being styled 'placer' and included in the phrase 'natural stratum or bed of earth, gravel or cement.'

"That Form 'G' of the Placer Act be so altered in these cases as to read that the locator has actually found placer gold within the lines of his proposed claim; that it is situated on land already under record of a mineral claim or quartz claim, and that he has found placer gold other than the loose pieces of eroded, or detached pieces of angular rock, found lying around on the quartz claim and within its boundaries."

These resolutions were passed by the local branch and submitted to the executive committee of the Association, which, after careful consideration, passed the following resolution:

"Whereas the judgment recently rendered by the Hon. Mr. Justice Martin in the case of Tanghe vs. Morgan et al., decides that whenever a free miner makes the statutory affidavit (Form G) required by the Placer Mining Act and pays or tenders the requisite fee to the Gold Commissioner, such free miner becomes entitled to a record of his location notwithstanding the fact that the ground is already occupied as a lode location, and the Gold Commissioner, after personally inspecting the ground, is of the opinion that the application for a placer location is not *bona fide*, and

"Whereas the said judgment also affirms that in an action brought by the placer locator against the earlier lode locator, the placer locator is entitled to the judgment of the Court, notwithstanding the fact that the evidence establishes that the so-called placer claim was not a placer claim at all, because there was no placer ground in it, and

"Whereas in the case of an adverse action between rival claimants of a lode claim, where both parties have filed the statutory affidavit stating that they had, respectively, each discovered mineral in place, it has always been open to the Court to find that one, or both, of the locations is invalid by reason of the fact that no mineral had been in truth discovered; and it is difficult to say why the law should be administered differently in the case of placer claims; and

"Whereas, if the said judgment be correct, intolerable confusion will arise by the locating of imaginary or fictitious placer claims over valid existing mineral claims, and the said judgment demonstrates that the provisions of the Act, relating to the matters in question, are ambiguous and doubtful.

"Therefore be it resolved that the uncertainty and confusion which apparently exist in the Placer Mining Act ought to be promptly removed by order of the Lieutenant-Governor in Council, pursuant to the powers conferred by Section 150 of the Act, and that a copy of this resolution together with a copy of the letter and accompanying report received from the Poplar Creek Branch of this Association be sent to the Hon. the Minister of Mines."

The reply of the Minister of Mines appears to be particularly unsatisfactory. First, it gives the entirely unnecessary information that "it seems quite clear that a placer claim may be located over a mineral claim," which was not questioned by the executive committee of the Mining Association, since not only had such location been made, but the locator had been confirmed in his right to make it by the Supreme Court, notwithstanding that the Court recognized "he had acted in a suspicious and dubious manner"; and next, it practically refuses, "on the

ground of public policy," to make any attempt to afford the protection asked for, which is in effect to require sharks of the Tanghe ilk to make an affidavit in language admitting of no loop-hole for such a subterfuge as that which confirmed Tanghe in possession of mining ground he has neither a moral nor an equitable right to. Meanwhile, if the report be true that the Nickel Plate mineral claim at Twenty-Mile Creek, believed to be one of the most valuable properties in the Similkameen, has been similarly "jumped," the great risk incurred by those who spend money on high-grade lode claims is emphasized, which, however, seemingly will matter very little so long as the time-serving requirements of "public policy" are met.

RECOVERY ON THE LONDON STOCK MARKETS.

(From Our Special Correspondent.)

SINCE March the London Stock Market has displayed a much more cheerful tone and business has shown a broadening tendency. This is chiefly due to the beneficial influence of cheap money, but is also largely the result of the revival of public interest in stocks and shares generally, which has lately been such a welcome feature. The recovery of public confidence makes slow progress, it is true, but none the less those who are in a position to keep their finger on the pulse of the market give it as their opinion that we have seen the worst of the depression which has for so long overhung the country, and that better times are ahead. As already noted, the sharp decline in the value of money has materially assisted in the improvement, which in all the leading gilt-edge stocks has made considerable headway. Consols, which you will remember in the early days of the year, were at one time dealt in at as low as 84 $\frac{1}{2}$, are back to 90 again, and have taken other high class stocks with them. Home Railways, and a number of the better class industrial and commercial securities have also been in favour, whilst although the effect of the decision to sanction the use of Chinese labour in the Transvaal has not been so pronounced as had been expected, the Kaffir market has shown a much better tendency, and increasing activity is looked for in this section. Foreign Government securities are largely under the domination of Paris, and Paris does not appreciate the serious reverses to the Russian forces, but even Foreign stocks have been steady apart from Russian securities, which for obvious reasons are not a particularly cheerful market. This week we have had quite a spurt in low-priced West Australian mining shares, and the mining market generally is healthy, and inclined to anticipate better times. In the British Columbia department—which by the way has now assumed very moderate dimensions indeed—the Le Rois slumped heavily on the cable from Rossland reporting the big over-estimate of values and results, Le Rois at one time being offered at under \$4. There has been a recovery from the lowest points, but this has been another painful shock to the market, and especially after Sir Henry Tyler's rosy statements at the recent meeting. There is really nothing much to say about British Columbia mining shares: very few of them indeed command a free market.

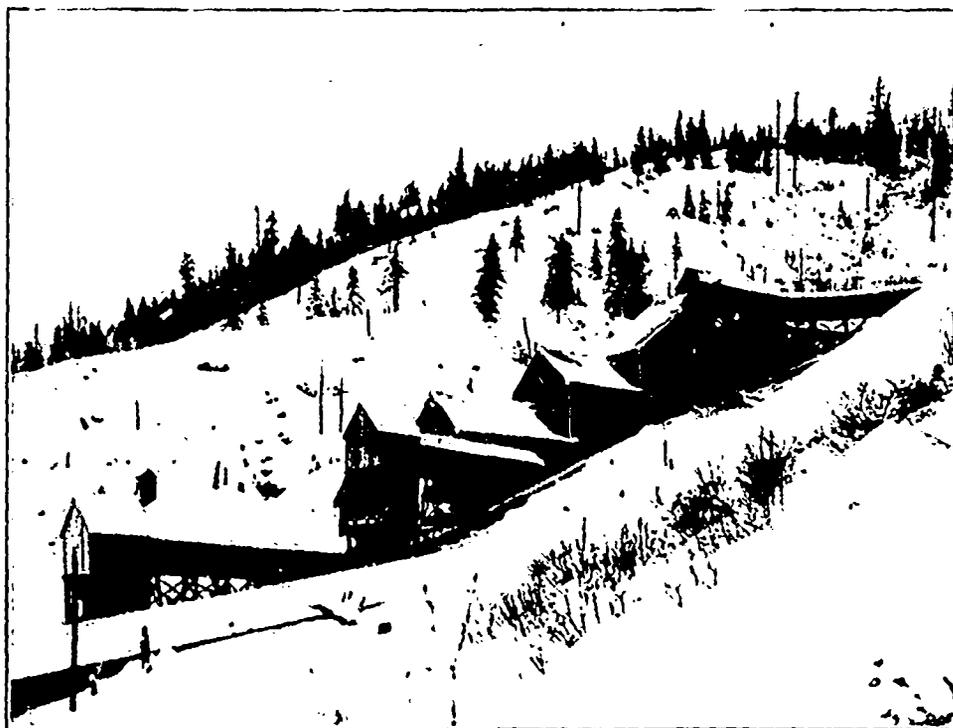
CONCENTRATION OF ORES IN ROSSLAND DISTRICT.*

DURING the year 1903 some experiments, which have been conducted for the better reduction of Rossland's ores, have been carried to what might be called a successful finish. In consequence of this, several plants, of varying nature, have been completed, or are under way, and the year to come will probably see a revolution in the treatment of the ores of this camp, the initial stages of which have been witnessed during 1903.

Of these experiments perhaps the most important, at all events the most advanced, is the "Elmore" process for the concentration of the values in the silicious ores, and while it would be well to refer to the

nical representative of the Canadian Oil Concentration, Ltd., the company holding the Canadian rights to the process.)

ELMORE OIL PROCESS.—The mill of the Elmore Oil Process plant as worked at the Le Roi No. 2, at Rosslund, is so situated that ore from either the Le Roi No. 2 mine or from the dump can be trammed direct into it. The ore is first fed into a Blake crusher, in which it is crushed to about four inches in size. From this it goes to a Gates crusher and is reduced to from one-half inch to three-quarters of an inch, in which size it goes into the ore bin, which holds a sufficient supply to last over night. From the ore bin the ore is fed by Challenge automatic feeders into two 6-foot Trent mills (Chilian), in which it is pulverised to the desired mesh. Up to the present time



Le Roi No. 2 Company's Mill—Elmore Oil Process—Rosslund.

whole of these various methods, yet, in a sense, the "Elmore" is a key to all. The Elmore Oil Process is applied chiefly to the reduction of silicious ores of low grade having a greater or smaller percentage of copper and low values in gold. It will also treat lead ores, and is more or less suitable to ores which are not base. The typical mill is that which has been erected upon the property of the Le Roi No. 2 in this camp. It is a combination of the water process and of oil.

(NOTE BY THE PROVINCIAL MINERALOGIST.—The description of the Elmore Oil Process furnished by the Gold Commissioner has been amplified by information kindly supplied by Mr. H. Hayman Claudet, the tech-

the mesh used has been No. 40, but to a certain extent this is a matter of experiment as yet, and naturally would vary with different ores. From the Trent mills the pulp passes through automatic samplers and thence on to two Willsley tables, by which the coarser and cleaner, and therefore the heavier, particles of mineral are separated out. The tailings from the Willsleys, which consist of the gangue matter, together with particles of mineral not entirely freed from gangue or in too fine a state to have been readily caught by the Willsleys, then pass on to be treated by the Elmore Process proper.

As will be seen, the process up to this point is the ordinary water concentration, and the oil process is employed simply as an adjunct to this, to treat the tailings from the former method and from them to make

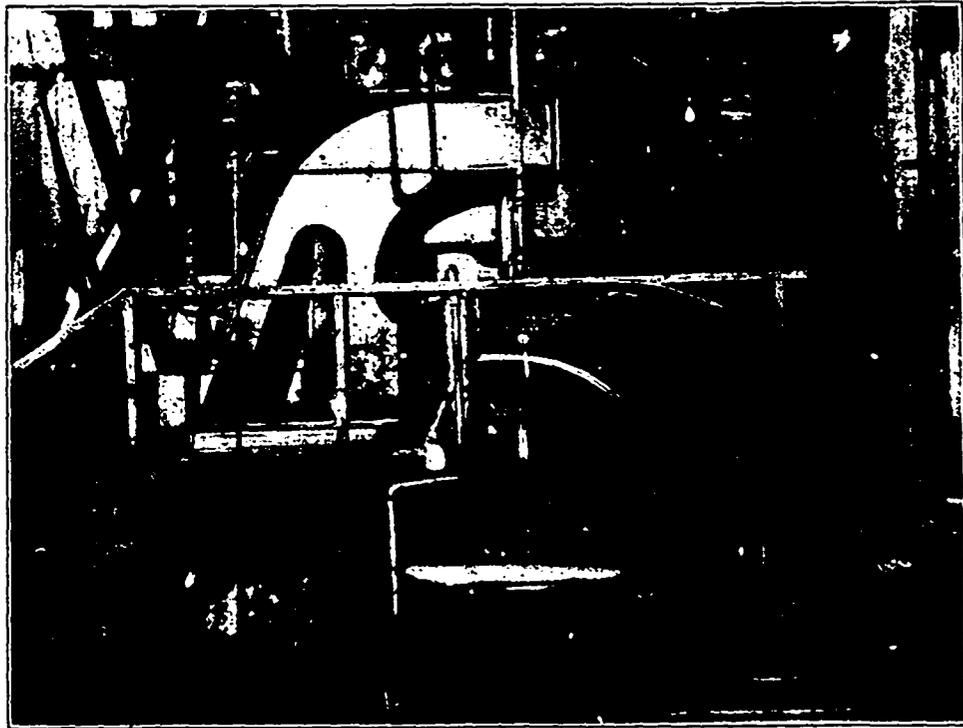
*Gold Commissioner for Trail Creek Mining Division in Annual Report of Minister of Mines for 1903.

a saving of what would otherwise be a waste product.

The tailings from the two Wilfleys, having already passed a 40-mesh screen, are run on to two units of an "Elmore Oil Plant." (One unit equals an estimated capacity of 25 tons per day.) These "tailings" are fed into "mixing cylinders" with water and oil from the storage tanks. These mixers, of which there are three, are long iron cylinders, placed horizontally and provided with inside baffle plates, which, as the cylinder is revolved at a low rate of speed by power, thoroughly mix the charge, bringing the oil into contact with every particle of mineral in the tailings. The oil, for some reason not explained, has the faculty of catching up and retaining fine particles of sulphides and of free gold. From the mixers the charge is flushed with water into settling tanks. Here the gangue matter settles to the bottom, while the oil, be-

"oil extractor," which is a centrifugal machine, 4 feet in diameter with solid walls, revolving at a speed of 1,000 revolutions a minute, in which any surplus oil is washed out by water and flows over into an oil-settling tank, from which it goes back eventually to the storage tanks on the higher level.

After all the surplus oil has been washed out, the water is run off and the "oil concentrates" are discharged and carried by a worm conveyor to a second extractor at a lower level. This second extractor is a centrifugal with perforated screen side, and here a steam jet is introduced, which renders the oil more fluid and at the same time assists in the removal of a further quantity of it, "drying" the concentrates somewhat. All oil not absorbed by the concentrates is returned to the process to be used over again. The concentrates, both from the Wilfley tables and the oil



Elmore Oil Process—Interior View, Showing Separators.

ing lighter than the water, floats on the surface, retaining with it the metallic sulphides, etc. The oil can only carry a limited amount of sulphides to an extent such as will not render the oil-mineral compound heavier than the water.

The first settler-tailings (gangue matter, with such sulphides as may have escaped the first mixer) are run with the water into a second mixer, with the addition of more oil, and a second separation is similarly made in a second settler. The second settler tailings are usually fairly clean, but are run through a third mixer and settler. From this last the tailings go to the dump through an outside settling tank, in which is collected any oil which may have escaped.

The mineral-charged oil and any surplus oil is run off from the surface of the various settlers into the first

process, are sent to the smelter.

Mr. Claudet says: "The cost of installing such a plant will, of course, depend on the location to a certain degree, as well as on the style of crushing machinery which is installed. The oil plant itself costs, approximately, \$6,000, to which must be added the cost of the building to contain it, and the erection. The power required to drive a 50-ton oil plant is about 10-h.p. The water required is from six to ten times the amount of ore treated: or, to take an average, for every ton of ore about eight tons of water would be required. The consumption of oil varies with the nature of the ore which is treated, but it may be taken as ranging from one to one and one-half gallons per ton of ore treated. In the Le Roi No. 2 mill, up to now, they have only treated low-grade

ore, viz. between \$4.50 and \$5 ore. The ratio of concentration has been on the average about 13 to 1. From ore of this value they are obtaining concentrates from the Willsley tables of about \$50 and oil concentrates of about \$40, and the tailings will run a little over \$1 per ton. By finer crushing, together with one or two modifications, we shall be able to reduce the value in the tailings even lower than this.

"The great feature of the oil process is that it saves the finest slimes without any trouble; while very good work is done by the Willsley tables on the comparatively coarse material, the finest particles of values which escape the tables are readily picked up by the oil.

"With regard to the applicability of the process, one might say that, with very few exceptions, all sulphides are amenable to the oil treatment; on the other hand, oxides are not. It is also essential for close work that the sulphides should have a fresh surface, as the oil seems to take up any brightened surface better than a tarnished one.

"The cost of treatment will depend of course on the size of the plant, as well as on the local conditions; but, for the guidance of anyone in this Province, I think it is near enough to say that for a plant on a large scale, say of 200 or 300 tons capacity per day, the total cost, including loss of oil and the royalty, would come to about \$1.25 per ton of ore treated; while for a small plant, say of 50 tons a day, the total cost would probably be in the neighbourhood of \$2 per ton. At present the cost of treatment in the Le Roi No 2 plant exceeds this latter figure; but then, it must be remembered that up to now there have been stoppages and delays, due to the large amount of snow we have had, as well as to unavoidable delays in starting up a new plant, which have interfered with the continuous running essential to any mill.

"I consider that eventually we shall have a very large field on copper ores, which slime considerably when crushing. There are plenty of these ore bodies in this Province too low grade to smelt and yet impossible to concentrate by water. Also, I believe we shall have a field anywhere where there are already existing water concentrators, which are losing a lot of values in the slime running away in the tailings."

These are the main conditions of the process, and it may be stated that the mill is run by electricity, of which there is a cheap supply in the camp.

Below the mill described is to be erected another of a larger size by the White Bear Company, and probably a third, below that of the White Bear but within a few hundred yards of the first, will be built by the Spitzec. It may be said that the details of this work have not as yet been thoroughly elaborated, and further orders of similar machinery are but awaiting this being accomplished.

In the mines of the Rossland camp, even including those mines which are generally classed as silicious, many kinds of ore are found. It will at once be apparent that heavy pyrrhotite requires different treatment to silicious quartz. Also, as is not gener-

ally known, there is a variable quantity, occurring irregularly, of free-milling gold in the base ledges.

As may have been gathered from these remarks, the Elmore process, however eminently suitable to the treatment of the silicious ores of the camp, cannot in the very nature of concentration touch the ferruginous. And yet the ferruginous ores of Rossland are considered to be quite as plentiful as the silicious, and some method of treating these cheaply must be found if the lower grades are to be treated successfully. For the heavy pyrrhotite ore smelting is sufficiently economical, but for the low-grade iron ore, running between four and eight dollars per ton, of which there is plenty in the camp, notably on the north-eastern side of the crater, as well as occurring plentifully in the south belt, smelting is far too expensive.

As these ores often run from 40 to 80 per cent. iron, it will be seen that concentration, which only gets rid of the silica in the form of mud, but saves all the metallic particles, is absolutely useless. Pyritic smelting has been suggested and the sublimation process, but according to recent experiments on the Rossland-Kootenay ores, the process which is popularly known as the "Hendryx," but which is really an adaptation of the electro-cyanide, will be adopted some time during the coming year.

HENDRYX PROCESS.—In detail the Hendryx mill commences its treatment process much as does the Elmore plant at the Le Roi No. 2. There are the ordinary crushers, through which the crushed ore is fed to Chilian mills. Here, instead of water, a weak solution of cyanide is introduced, coming from a storage tank above. The pulp flows into the storage tanks, where the surplus cyanide solution is drawn off and returned above. The pulp is then let into the only part of the plant which can possibly be called "Hendryx": this is the agitator, and in this the oxidation is set up. Before cyanide will act upon the precious metals oxygen must be taken up. This is supplied by the atmosphere, and usually is introduced by means of compressed air: it takes some considerable time to thoroughly permeate the pulp. Moreover, there is a thermal action set up which tends to separate nitrogen and oxygen in the air, causing the formation of nitrous compounds which give trouble. This agitator, which practically makes the electro-cyanide process available for Rossland ores, acts in a different manner. Inside the agitator is a cylinder, and inside the cylinder are a series of paddles which elevate the pulp in the path of a spiral to the top, where it falls in a thin stream over a flat surface back over the sides of the cylinder to the bottom of the agitator, whence it is again lifted up. The cyanide, during its exposure, absorbs oxygen from the atmosphere: hence the process takes a few hours instead of days, thus making a small mill do the work of a larger one. After the lapse of sufficient time the solution is decanted into a tank below, the pulp squeezed dry by hydraulic pressure, forming the tailings. The cyanide solution contains the whole of the gold and the small proportion of the copper present in the ores. The

iron and sulphur goes untouched into the tailings, and electrolysis then precipitates the metallic contents upon a silver plate. The cyanide solution is then regenerated by electric power, only 4 per cent. of cyanide being lost, which is added. The Hendryx process does not as yet recover copper, though Dr. Hendryx says he is hopeful of accomplishing this eventually.

A third method for reducing the low-grade ores of this camp, namely, pyritic smelting, has been the subject of much investigation during the year. To this investigation attention was recently called, in a general way, at the annual meeting of the Rossland-Kootenay Mines held in London in December. As a result of these experiments, it has been decided by the Chairman of the Velvet-Rossland Mines, Ltd., to erect a small pyritic stack on or near the Velvet property, probably on Big Sheep Creek, at the foot of Sophie mountain. This is to be run in conjunction with a concentrator which will be set up upon the property itself. The concentrator is planned to be of the water type, and is calculated to save about 80 per cent. of the values. The concentrate from the mill will be used in the pyritic smelter in order to bring up the value of the matte. The matte will be in the form of a concentrate of about 25 to 1.

ROSSLAND POWER CO.'S CONCENTRATOR.—The plant of this company is now in course of construction at a point about three-quarters of a mile north of Smelter Junction, near Trail, on the line of the Canadian Pacific Railway from Rossland to Nelson. It is being built primarily for treating the lower grades of ore from the War Eagle and Centre Star mines, but will probably handle more or less custom ore as well, when the capacity has been raised to allow of it without interfering with the output of the two mines mentioned. The initial capacity of the mill will be 200 tons per 24 hours, but it is being so arranged that, by duplicating certain machines, the capacity can be greatly increased—possibly doubled—without adding to the buildings now under construction.

The essential feature of the process used is a thorough water concentration, with gradual reduction to prevent the formation of rich slimes, a preliminary coarse crushing and concentration permitting of the removal of a considerable percentage of the sulphide contents as a product for smelting. The tailings will then be ground and separated into sands and slimes, each of which will be given a special treatment for the recovery of the remaining values.

The location of the works and the arrangement of the plant are such as to afford an almost automatic handling of the material from the time it enters from the railway cars as crude ore until it is discharged into the railway cars as concentrates, the tailings going to the waste dump. The plant is of the "level site" type, as distinguished from the usual side-hill type. It is believed that this is the first mill of this type of construction to be built in British Columbia. The water supply, which is necessarily a large one, is from Stony, Rock and Murphy creeks, whence it will be conveyed by flume to a point on the north side of the first-

named stream, and thence to the mill by a steel pipeline. The waste water and tailings will be discharged to the large sandy flat opposite the mill. The motive power will be electricity from the system of the West Kootenay Power and Light Company, Limited. The equipment of motors will be a little less than 500 h.p. It is expected that the plant will be ready for starting some time during the spring. When operations commence and the mill is running to its full capacity, from 40 to 60 men will probably be employed. The estimated cost of the plant is \$150,000.

NICOLA'S ADVANTAGES AS A COAL FIELD AND SMELTING CENTRE.

(By J. West Collis.)

I ENDEAVOURED in the May issue of the MINING RECORD to give some idea of a promising new section of country i.e., the Ten-Mile Creek Camp of the Nicola District. In that article I made the assertion that given adequate transportation facilities there it would be possible to treat as low grade copper ores at a profit as are handled at any other point in Western America. I shall now give my reasons for speaking so optimistically of the Nicola as a future smelting point of much promise; reasons which should prove that at no distant date an industry will be established there that will contribute largely to the commercial and industrial prosperity of a large section of the Province.

A cheap coke supply being the first desideratum of a profitable smelting industry, it is necessary to prove the existence of a large and easily workable coal field, the coal from which should also possess good coking qualities. From the results of bore-holes put down in the Nicola Valley some years ago and from surface exposures on Coal Gully and on the bank of the Coldwater River there is sufficient evidence to establish the fact that there is such a coal field at Nicola; and the following extract from the report of the late Dr. G. M. Dawson (Geological Survey Report, 1877-78, pp. 122B-126B), and the report on the Nicola-Coldwater coal fields by Mr. Archibald Dick, Government Inspector of Mines, bear out this contention. Dr. Dawson wrote:

"Since the above-mentioned report was made, borings in the vicinity show that the coal seams have an extent of at least several miles beneath the alluvial lands of the wide Nicola Valley.

"The best natural general section of the rocks is that found in Coal Valley, facing the Nicola Valley, and about a mile and a half from the bank of the Coldwater. As given in the report above mentioned it is as follows:

	Ft.	In.
1. Soft, yellowish sandstone in thin beds at the top of the hill	32.	0.
2. Coal, laminated, rather soft	15.	4.
3. Sandstone, rather soft, with some shale	89.	0.
4. Coal	5.	4.

5. Sandstone, with a considerable thickness of shaly beds at the base	141.	0.
6. Coal (about)	3.	0.
7. Sandstone, generally in thin beds	136.	0.
8. Coal (about)	2.	5.
9. Sandstones	—	—
	424.	1.

"Main seam: Small exposure on the bank of the Coldwater, which shews a thickness of at least 5 feet 3 inches of workable coal of good quality and yielding a coherent coke.

"Two test borings made in the Nicola Valley in this vicinity by the Nicola Valley Company in 1891 and 1893. Put down in the flat part of the valley, which is entirely covered by alluvial deposits:—

"The first (No. 5) was situated on Lot 125, Township 91; the second (No. 7), on the east side of the northwest quarter of Section 14, both being in the angle between the Nicola and Coldwater rivers. The level of the surface at both places may be considered identical.

"In No. 5 the part of the section supposed to represent the main seam is as follows:—

	Ft.	In.
Coal	3.	8.
Sandstone	0.	6.
Coal	1.	4.
Sandstone	0.	8.
Coal	0.	7.
Total cost	5	9.

"Depth of base of seam from surface: 196 feet 9 inches.

"In No. 7 the corresponding portion of the section is as follows:—

	Ft.	In.
Coal	0.	8.
Shale	1.	1.
Coal	0.	6.
Slate	0.	4.
Coal	4.	4.
Total coal	5.	6.

"Depth of base of seam from surface: 144 feet 5 inches.

"N. 5 was carried to a depth of 600 feet, and No. 7 to 563 feet, cutting in each case through several more thin seams not of workable dimensions.

"The coals obtained in these borings yield a good strong coke.

"The two borings are distant from each other about a mile and a half, and although the natural outcrops to the south of the line joining the borings show some stratigraphical complication, the result of these tests is to indicate that a considerable undisturbed and easily workable coal field exists beneath."

In his report Mr. Dick made the following statements:—

"The strike of this coal is about north 45 degrees west with dip of about 18 degrees to northeast. Upper tunnel in about ten (10) yards. Lower drive in a much greater distance almost level with the bed of the river. Total thickness of this seam between roof and floor is five feet nine inches (5 ft. 9 in.) and of this there are 4 feet 10 inches of what appears to be very good hard coal, and that at the outcrop, viz:—top coal 1 foot 6 inches, dark bone coal or shale 2 in.; coal 1 ft. 8 in., rock 1 in.; coal 4 in., shale 8 in., coal 1 ft. 4 in.—all this is on the west side of Coldwater. Bore hole to a depth of 600 ft. This hole is about half a mile to the dip of the tunnels and gives a very encouraging prospect. At the depth of 190 ft. they strike their first coal, 3 ft. 8 in.; rock, 6 in.; coal, 1 ft. 4 in.; rock, 8 in.; coal 7 in., making a good workable coal, 5 ft. 7 in., with 1 ft. 2 in. of rock, total thickness 6 ft. 9 in. At 212 ft. 5 in. coal is again struck, and this is very good coal 1 ft. 5 in. thick: again at 240 ft. from the surface there is 1 ft. 4 in. of good coal: there are four other thin seams of coal mentioned at lower depths, all of which go to show that, good as are the prospects now, they may prove better. Another bore hole depth 199 ft.—hole close to the crystalline rock, such rock struck at the depth of 195 ft. I have examined the cores out of the above mentioned bore-holes. They are 1 and 5-16 in. in diameter, and they are fine specimens of what the drill has gone through. They look so well that no person would wish to find better looking rock where it is expected to find coal. I am of opinion that this valley will yet prove to be a large coal basin extending up to Nicola Lake.

"Bore-hole almost in the centre of northwest quarter of Section 14, Township 91, property of Jesus Garcia, and about 30 chains southeast from G. Murray's southeast corner. First coal at the depth of 137 ft. 6 in. from the surface; coal 8 in., shale 1 ft. 1 in., coal 6 in., slate 4 in., coal 4 ft. 4 in., making a good workable vein of coal 5 ft. 6 in. thick, mixed with 1 ft. 5 in. of rock. This coal is somewhat soft, but appears to be very clean. The rock cores shew the pitch to be about 40 degrees; and it is quite probable that there may be some local disturbance in the formation, which has caused the coal to be soft here. In the other places the coal was hard. Further down in the measures at a depth of 166 ft. 6 in., coal of a thickness of 1 ft. 11 in. was found—this also soft. At 219 ft. from the surface 5 in. of coal is found, and again at the depth of 335 ft. they passed through 7 in. of coal, this being the last coal struck in the bore-hole, which was carried down to the depth of 562 ft. and then stopped with prospects of a promising character in this bore-hole, as in the bore-hole put down previously that coal would be found at a further and perhaps not much greater depth. All the measures (or strata) gone through look most favourable, and prove to be productive. The holes and drifts that have been already run into the coal prove that there is a large deposit of coal of a superior quality lying under the Nicola Valley and the work already done shews that the coal beds extend over

several miles. The prospects already obtained are sufficient to justify any parties in commencing to develop the coal fields there without putting down the additional bore that I suggested near the reserve.

"In conclusion, as the prospecting done by the explorers has reasonably established the fact of the existence of a large and practicably workable coal field in Nicola, it may from a coal miner's as well as a capitalist's point of view, be considered safe to start work without further delay."

The next point to be considered is water supply, which can also be utilized for generating power. In this respect Nature has given with a lavish hand. The Coldwater and Nicola rivers will give an unlimited supply for smelting purposes, whilst on the former immense power can be obtained. It would be hard to find a more ideal smelter site than the one situated on the Coldwater river a few miles above its junction with the Nicola.

The last important consideration, and upon which the future prosperity of the industry depends, is the chance of a permanent and extensive ore output within easy reach of the smelter. From present indications this prospect is most encouraging. The Nicola is so situated that, given the necessary transportation facilities, it is possible to treat the ores of the Ten-Mile Creek and Aspen Grove camps at comparatively low cost for haulage—the distance from any of the properties included within these limits not being more than twenty miles, and in most cases nearer ten. The ores from these camps will in all probability lend themselves admirably to mechanical concentration, plants for that purpose necessarily being erected near the mines will reduce transportation charges to a minimum. The cost of smelting will also be low, as the following assays will show in the case of Ten-Mile Creek ores:

Assay of Ten-Mile Creek Aberdeen ore by Trail Smelting Works: Gold, nil; silver, nil; copper, 39.4 per cent.; lead, nil; iron, 21.2 per cent.; silica, 15 per cent.; lime, trace; sulphur, 8.2 per cent.; zinc, nil. Same by Granby Smelter, Grand Forks: Gold, trace; silver, 0.8; copper, 40 per cent.; silica, 9.2; iron, 19.4; lime, 4.5; sulphur, 10.3.

In the event of these ores not proving self-fluxing, for at present it would seem that one supplies what the other lacks, the deposits of iron and lime in the vicinity should prove quite sufficient for fluxing purposes.

Turning from camps which are not developed up to that stage where a steady output can yet be depended on, to one which has a few properties ready to ship to a smelter were there such within a reasonable distance, and with the necessary railway connections. (I refer to the Kamloops camp, which since 1896 has undergone steady development.) The Iron Mask is at present busy erecting a concentrator to treat the large body of ore discovered in its workings: this mine is already in a position to afford a steady and in all likelihood a permanent output. The Copper King has been and is still making small shipments to Crofton, but considering the relative distances as be-

tween a smelter at Crofton, or for that matter any of the existing smelters, and one situated at Nicola, (which is only a little over sixty miles from Kamloops), there can be no comparison as to cost of transportation. There are a number of other properties in the Kamloops district which could soon be put in condition to supply a local smelter with ore, notably the Stump Lake camp, situated between Nicola and Kamloops, the mines of which are already partly developed with considerable ore on the dump.

In looking at the prospects of an ore supply from the Similkameen country to a smelter at Nicola, the fact must be conceded that for economic reasons there will be smelters erected there within the immediate vicinity of the mines. The Daly Reduction Company, owning and operating the Nickel Plate mine at Hedley are contemplating building a smelter near the mine, as also will any company operating on Copper Mountain, near Princeton, in order to make the very large but low grade ore bodies there yield a profit. But these smelters when in operation will have to draw their coke supply from the coal fields at Nicola, as being the most accessible and the only coal in the vicinity known to possess good coking qualities. It has already been pointed out to the public by the writer of this article the advantages that the Boundary smelters would derive by the opening up of the Nicola coal fields, seeing that this source of supply is nearer than the present one by about one hundred miles, to say nothing of the incalculable advantages of having an alternative source of supply.

This brings me to the conclusion and to the reason why the establishment of a smelting industry in the Nicola and Similkameen districts is not an actual fact—(the want of adequate transportation facilities.) Given these—the completion of a Coast-Kootenay road, or a connecting link from the C.P.R. at Spence's Bridge, following the Nicola Valley and on through the Similkameen to the Boundary—the clog on the wheels of industry in this important section of the Province would be removed, and in place of the stagnation existing at present there would be busy centres of activity from which the whole Province, and particularly the Coast cities would immediately feel the benefit.

DEEP GRAVEL MINING IN CARIBOO.

THE efforts being made to mine the ancient river channels at Lightning and Slough Creeks and at Willow River are attracting a great deal of attention and interest, for it is realised that the success of these undertakings will open up new mining possibilities not only in the Cariboo district, but perhaps in other sections of the Province where the same conditions may exist. Mr. Bowron, the Gold Commissioner for the district, reporting on the recent installation of a large plant at La Fontaine, on Lightning Creek, remarks that the equipment is apparently well calculated to meet requirements, and adds:

"The total cost of taking out, washing and disposing of the gravel of a 10-foot set of timbers under

ordinary conditions would be from one to two ounces of gold, while with the improved appliances and under the system proposed by this company, it is believed that \$10 to the set can be made to yield a profit, and should the company's expectations be verified upon a working test, it will be the means of rendering large areas of ground valuable which have hitherto been regarded as worthless."

The following account of the operations on the Cariboo Consolidated, Limited, at this mine prepared by the manager, Mr. M. Bailey, was published in the recently issued report of the Minister of Mines:

"This company is developing its Lightning Creek property by means of a bedrock shaft and tunnel to tap the deep gravels.

"Early last spring a complete system of bore-holes

timbers and excavate well into the rim rock in order to secure foundations for this shaft-house. The building is a frame structure, 40 by 80 feet, with three wings, two 24 by 40 feet, containing the boiler room, machine shop, store room, men's changing room and bath-room, and one wing, 18 by 24 feet, in which is placed the dump boxes and sluice flume approach.

"A working shaft, consisting of pumping compartments 6 by 8 feet, and two hoisting compartments 4 by 6 feet each, has been sunk to a depth of 175 feet from the shaft-house floor level. The main tunnel breaks out from the shaft at a depth of 165 feet, leaving 10 feet for a sump. The size of this tunnel is 8 feet in width by 8 feet in height. The tops of the sills in the tunnel are 18 inches above the floor level, in order to allow drainage under same. Upon these



La Fontaine Camp, Lightning Creek—Cariboo Mining Division.

was put down, in order to ascertain the cross-section of Lightning Creek valley at a point about the centre of the West of England claim, one and one-half miles below Stanley. An American Well Works jetting machine was used for this purpose. It was found that the greatest depth to bedrock from the present surface of the creek was 126 feet. Most encouraging prospects of gold were recovered from the bedrock gravels in putting down these bore-holes, and as soon as reliable data were obtained as to the location and depth of the channel, work was immediately started upon the necessary plant to open up and develop this property.

"The main shaft-house has been erected on the south side of the Lightning Creek valley, the floor of which building is about 35 feet above the creek level. It was necessary to construct a large cribwork of

sills are placed the rails for the double car track. The total length of this tunnel will be about 325 feet. Over 100 feet have now been run and good progress is being made.

"The machinery for operating the plant consists of the following: Two 80-H.P. return tubular boilers; one 30-H.P. locomotive boiler; 8 by 10-inch double-drum Hendrie & Bolthoff hoisting engine; 10 by 10½ by 12-inch Hendy air compressor; 36-inch by 12-ft. air receiver; two 3½-inch Giant air drills; 15-H.P. high-speed engine; Buffalo exhaust fan, 12-inch discharge; electric lighting plant; 100-H.P. feed water heater; two boiler-feed pumps; Ingles cross-compound Corliss engine; two Cornish pumps; two steel cages with safety clutches.

"The shaft house, tunnel and camp buildings will be lighted throughout by electricity. The dynamo

is at present furnishing light for the shaft-house, and the work of wiring the buildings is under way.

"All the machinery has been installed with the exception of the pumping plant, which is being put in place. The plant consists of two Cornish pumps of 18-inch diameter each, with an 8-foot stroke running at a maximum of 12 strokes per minute. The pumps are driven by an Ingles 12 by 22 by 30-inch cross compound Corliss engine. This pumping plant was furnished by the Vancouver Engineering Works, of Vancouver, B.C., and reflects great credit upon the makers, both as to design and workmanship. These pumps have a lift of about 140 feet, discharging into

"As soon as the first line of bore-holes was completed, the work was immediately commenced of taking another section of borings at a point on Lightning Creek two miles below the present shaft, with a view to putting in another plant to develop the property. Six bore-holes were put down to bedrock, when the work had to be closed down on account of the winter season. The greatest depth to bedrock from the surface so far ascertained in these borings was 205 feet. Good prospects in gold were recovered, and the continuation of the gold lead of Lightning Creek was proved beyond doubt. Active work will be resumed on these borings as soon as the weather



Cariboo Consolidated Co.'s Shaft House, La Fontaine—Cariboo M. D.

a drain tunnel that intersects the shaft 30 feet below the floor level of the shaft-house.

"A ditch, 3,600 feet in length, has been constructed from Lightning and Anderson Creeks, to bring water to the shaft-house for the purpose of washing the gravels when mined. The dump box and sluice flumes are placed immediately in front of the main shaft, so that minimum haulage from the shaft to the dump box is obtained.

"A reservoir 16 by 12 by 4 feet has been excavated in a small water-course on the side-hill at the back of the shaft-house, at an elevation of 140 feet above the shaft-house floor, and from this reservoir a 3-inch pipe-line has been laid to supply water to the boilers, bath-room, for fire protection, etc. All camp buildings are supplied with water brought in pipes from a small ditch constructed on the side-hill on the north side of the valley.

permits next spring, and additional cross-sections of the valley will be taken still further down Lightning Creek."

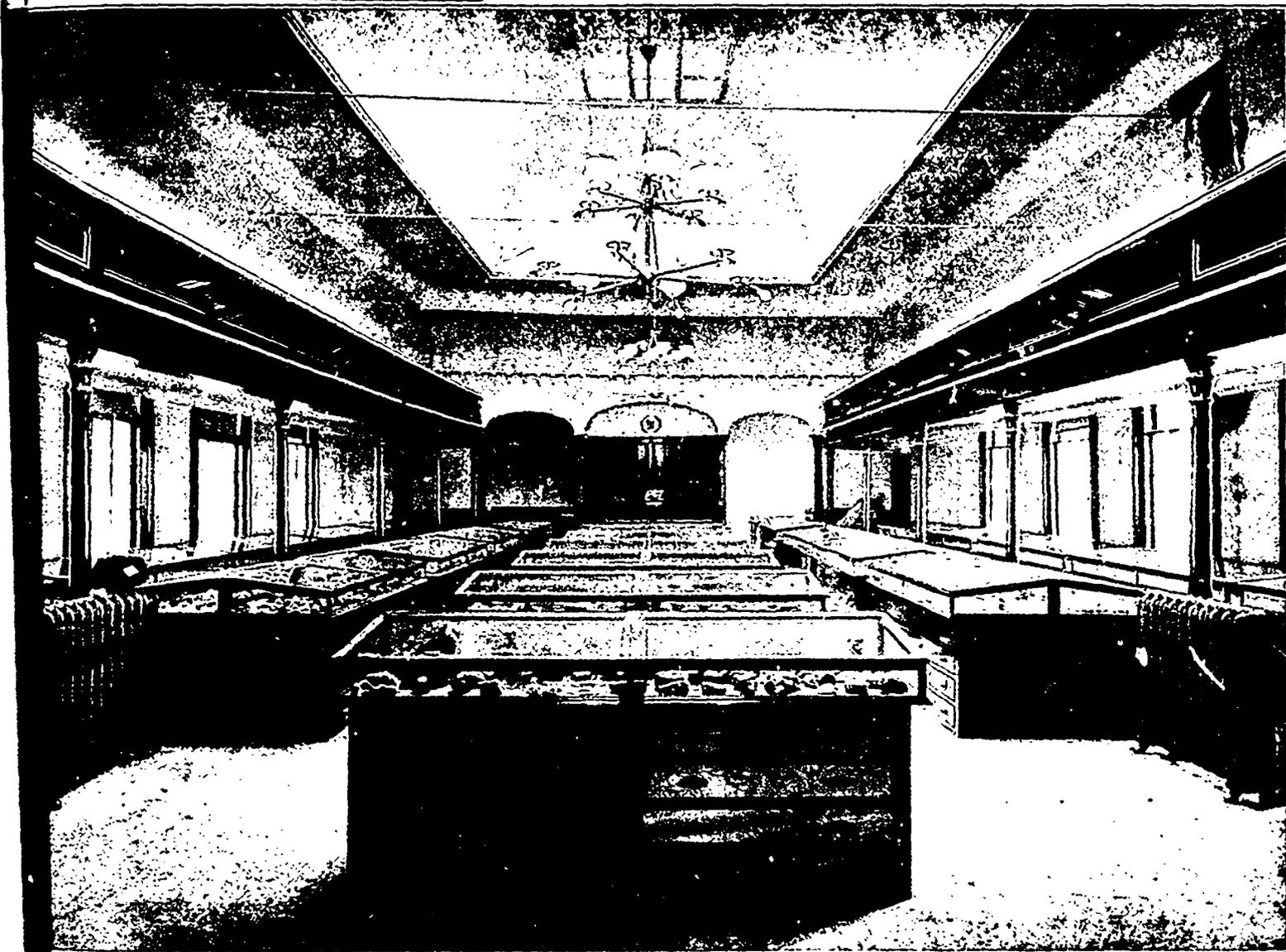
MUSEUM OF DEPARTMENT OF MINES.

(By E. Jacobs.)

THE Museum of the British Columbia Department of Mines is in the main hall of the old Legislative Buildings, Victoria, a room 32 feet by 76 feet, surrounded by a gallery and lighted from the sides and top. In it are 28 specially-constructed cases, made from the yellow cedar of the Province, with sloping glass tops and the interior coloured a dull black so as to display the mineral specimens to best advantage. Fifteen of these cases are fitted with drawers for duplicate specimens, these supplying material for ex-

changes or for collections sent away for placing on exhibit or for educational purposes. Access to the contents of these drawers is permitted to students and others examining minutely the ores of the Province. The accompanying block, kindly lent to the *MINING RECORD* by the Department of Mines, shows the general arrangement of the cases. The central row of cases and those flanking it on right and left, respectively, contain examples of the economic ores of Brit-

Kettle River), Grand Forks and Osoyoos divisions—while the fourth comprises New Westminster and the Coast, including Queen Charlotte Islands. The corresponding row on the opposite side consists of two cases of Vancouver and Texada Island specimens—Clayoquot, Quatsino, Alberni, Victoria and Nanaimo divisions—and two cases of Lillooet, Clinton, Cariboo, and Atlin and Bennett Lakes ores. On the whole the display of mineral specimens is comprehen-



Department of Mines Museum, Victoria, B. C.

ish Columbia so arranged as to show those of the various mining divisions each in a separate group. Five of the seven central cases contain West Kootenay ores, including specimens from Slocan, Ainsworth, Illecillewaet, Revelstoke, T out Lake, Nelson and Trail Creek Mining Divisions. The remaining two cases in this centre row represent East Kootenay—Fort Steele, Windermere and Golden. Of the four cases on the immediate right, three contain specimens from Yale District—Greenwood (late

sive, but while some divisions make an excellent showing, others are either only fairly or but poorly represented, and a few not at all.

Along the wall on the right-hand side of the hall there are six cases containing a general collection of minerals, irrespective of commercial value or whence obtained. This collection is of much practical use, especially in indicating the appearance and character of minerals not generally well-known and so assisting prospectors and others in identifying minerals

found in the mining districts and in giving an idea as to whether or not they are of commercial value. These minerals are arranged in classes and groups, allied minerals being placed together. First are Silica—quartz and varieties—and Silicates—hornblende group (bisilicates), feldspar, mica and scapolite groups (unisilicates), tourmaline group (subsilicates), and talc, serpentine and chlorite groups (hydrous silicates). These fill two cases; a third contains numerous allied minerals; a fourth includes zinc, cadmium, tin, lead, nickel, cobalt and iron; a fifth takes in copper, mercury, silver, platinum and gold, and in a sixth are hydro carbons—coals and bitumens.

The cases along the left-hand wall contain specimens of the typical rocks, in arrangement commencing with sedimentary, working up through metamorphic to straight igneous, and ending with lavas, tuffs, etc. A collection of British Columbia rocks is being got together. These rocks are being microscopically examined and properly classified, the department having its own petrographical microscope. This work is slow and tedious, so that the making of a thoroughly representative collection of rocks must necessarily take considerable time.

In a recess at the back of the hall is a case containing examples of metallurgical products—mattes of copper and nickel, slags, etc. The products of British Columbia smelters are, however, generally conspicuous by their absence, the collection including but few specimens from Provincial reduction works.

The building materials of the Province do not make a creditable showing, these being very insufficiently represented. A frame covered with roofing slates from Jervis Inlet, a column of polished light marble from Beaver Cove, a few small blocks of marble and building stone and a single brick, about comprise the surprisingly indifferent display of the Province's extensive and valuable resources in this direction.

Among the miscellaneous exhibits are the first pig of lead made in British Columbia (smelted at Revelstoke in 1890 or 1891); the first bucket used in the Le Roi mine, Rossland (an iron-bound, coal-oil barrel); a large block of coal from the Wellington Colliery, Vancouver Island; and a pyramid of gilded blocks, reaching almost to the ceiling, each block made to represent the gold yield of the Province for a separate year, ranging from a value of \$379,535 in 1893 to \$4,732,105 in 1900, and representing a total gold production in those eight years of \$18,380,706. There is not room to add more blocks, else larger ones could be made, the maximum value of a single year's gold product having since been increased to \$5,895,409.

It is intended to shortly add another interesting feature to those already possessed and which attract an increasingly large number of visitors to the museum. Mr. Carmichael, who has charge of this branch of the Mines Department, is preparing a number of large photographic views of mines, smelters, water-powers, and characteristic scenery of the Province. These will be arranged in the lobby or entrance hall.

and will serve as an object lesson, in some measure exhibiting the substantial advancement already made in the direction of utilizing the mineral resources of the Province and illustrating the topographical and scenic features of some of the mining and other districts.

*THE HENDRYX ELECTRO-CYANIDE PROCESS.

(By C. M. Fassett.)

IN Republic, Wash., are three idle cyanide mills, all built by men of large experience in this branch of metallurgy, and with an outlay in the neighbourhood of \$750,000. The mills are models in their design, and the character of the machinery and appliances for thorough and economical work, but they are idle. There are thousands of tons of good milling ore broken and blocked out in the mines along the main belt, yet the mills are idle. The district is paying no dividends. The mine which has shipped the best ore and upon which the most expensive mill has been built is about to be sold, with all its improvements, to satisfy a mortgage loan of less than \$100,000. Some of the mines are now shipping ore to the British Columbia smelters, and although they are getting a very low freight and treatment rate, considering the highly silicious character of their ores, it is hard to figure a profit on anything that assays less than \$10 per ton, and the value of the bulk of their ore is less than that figure.

No wonder times are dull in Republic.

Now comes W. A. Hendryx of Los Angeles, Cal., who says he has a process by which these ores can be worked up to 80 per cent. of their assay value in gold and silver, at a cost not exceeding \$1.50 per ton, and with machinery inexpensive to install and well adapted to be added to crushing mills now in existence. After considerable experimenting on charges of 100 to 200 pounds of ore in a small plant installed three months ago in my testing laboratory in Spokane the Mountain Lion G. M. Co. ordered the installation of a Hendryx agitator in their mill at Republic, to follow their crushing plant of heavy stamps and Huntington mills. This work is now being done and the plant should be in operation by the time this is published. The owners of Republic mines are watching this mill with almost breathless interest.

The agitator now going in is 16 feet in diameter, with straight sides 9 feet high and a conical bottom 8 feet deep. The central well is 2 feet internal diameter. Its capacity is about 100 tons per day, on the supposition that three charges can be worked in 24 hours.

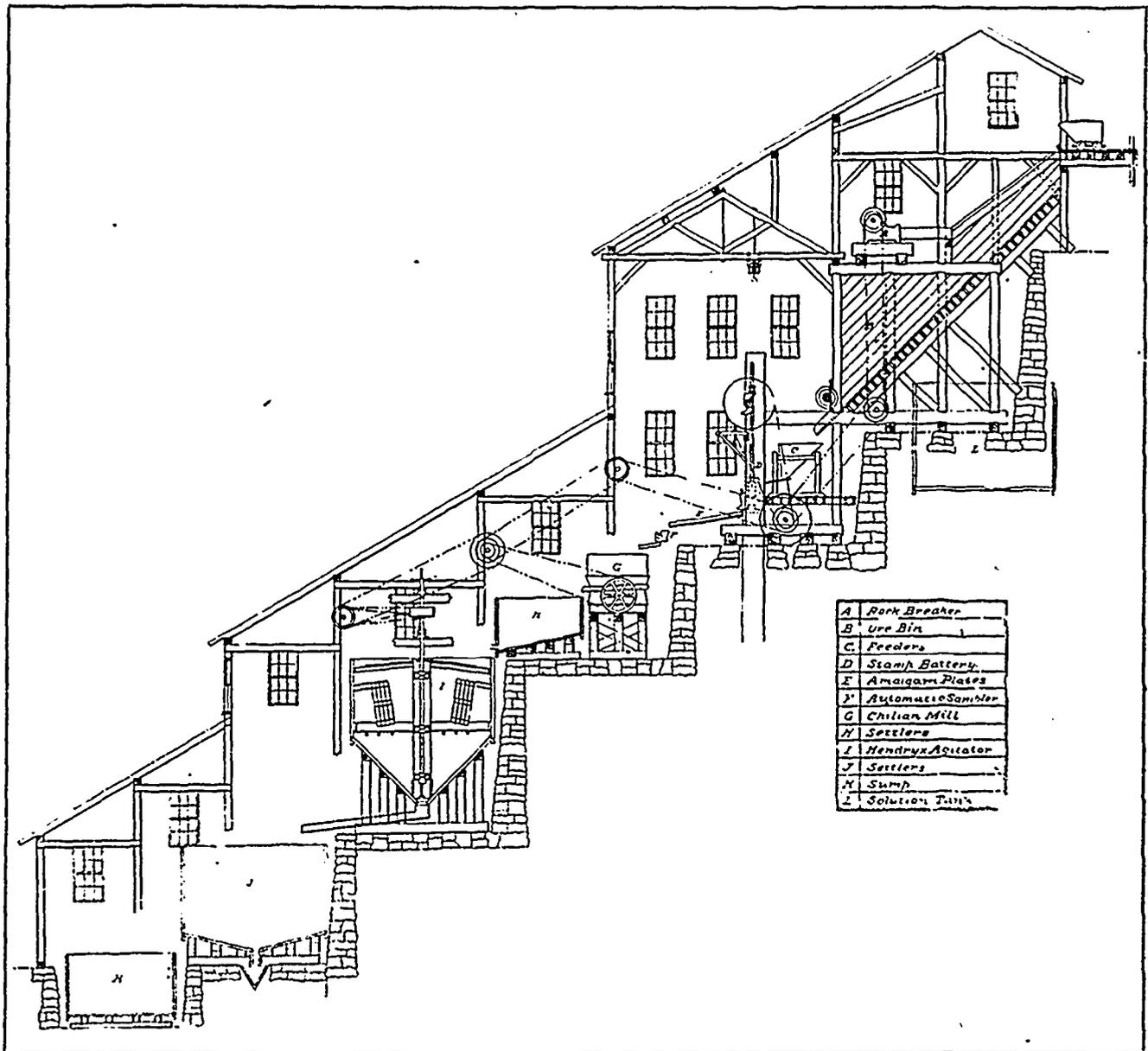
Whether or not a success is made by this process on the peculiar ores of Republic (and it is rather hard on the process that its first trial in this section should be on these difficult ores), the process is worthy the attention of any progressive mining man. It con-

*The Mining and Scientific Press, San Francisco.

sists of agitation of the crushed ore with a very dilute solution of potassium cyanide, and the deposition of the dissolved gold and silver upon plates by means of an electric current at one operation. The pulp of proper consistency is charged into the agitator, together with enough alkali to overcome its acidity and sufficient cyanide to bring the solution to .05 per cent. This agitator is the essential mechanical feature of the process. It consists of a cylindrical tank having a

slope outward. Underneath this apron and outside of the well are supported the anode and cathode plates, supplied with current by a small plating dynamo.

The revolution of the shaft carrying the propellers creates a strong upward current in the shaft, and the result is a rapid and uniform circulation of the whole charge upward through the well and downward among the electrically charged plates. When the assays show that the operation is completed the



Plan of Hendryx Mill.

conical bottom of 45° pitch. In the centre of the tank and extending nearly to the bottom and top, is a cylindrical well in which revolves a vertical shaft, supported and driven from above the tank. On the shaft are secured three screw propellers, and in the centre of the shaft, which is hollow, is the stem of the discharge plug at the bottom of the tank, operated by a hand wheel at the top of the shaft. A circular apron extends from the top of the well in all directions towards the side of the tank, having a slight

plug is drawn up and the pulp discharged into a settler, whence the separated solution is pumped back to the stock tank and the tailings sluiced out.

The claims made for the process by its inventor are: First—That it will extract all the values that any cyanide process can.

Second—That it will deposit the precious metals in the form of marketable bullion without the intervention of any troublesome precipitating and refining process.

Third—That it will make the extraction with less cyanide, on account of the perfect aeration and the regenerating action of the electric current.

Fourth—That it will do this work at a much less expense for plant and operating costs than the ordinary methods.

Fifth—That it is especially adapted to handling tailings and slimes from amalgamation and concentration plants already equipped and running.

Any metallurgist will recognize the fact that there is little novelty about the Hendryx process, but if he has had experience in trying to agitate fifty tons in a vat, or to pass a constant current through a charge of pulp which is not of regular and stable consistency, he will appreciate the utility of a machine which will agitate 100 tons as readily and as completely as one, which will keep the pulp in perfectly homogeneous condition, aerate it thoroughly, and which cannot be stalled by a momentary shut down of the power.

In the three months I have been experimenting with this process we have treated all classes of ores from many States. When the precious metals in an ore are not soluble in cyanide, the Hendryx agitator will not make them so; when they are soluble or can be liberated by fine grinding, I believe the machine will treat them quicker and cheaper than any other known method.

Three years ago I was employed to make a series of cyanide tests for a company operating in Montana. They had a very porous, thoroughly oxidized ore, on which a small cyanide mill was doing very good work. A new mill with a capacity of 200 tons per day was constructed and is now in successful operation on the property. The ore is treated in vats from six to eight days. With the Hendryx agitator we made an extraction of 97.4 per cent. of the gold in this ore, at twelve mesh, in four hours, with a cyanide consumption of less than one-fourth pound per ton of ore. One 16-foot agitator would have a daily capacity of over 200 tons, and the metal would be in the form of bullion instead of a troublesome zinc slime.

I know this sounds like the claims of an inventor, but I never invented anything and have no interest in the exploitation of this or any other process. I know the experiments have been carefully conducted under my immediate supervision, and that the results have been as stated. If there is any reason why our experiments will not yield like results on a larger scale I do not comprehend it. The Hendryx process will not work on every ore, but that it is a very valuable addition to the metallurgy of gold and silver I am fully convinced.

THE PROVINCIAL ASSAY OFFICE.

(By E. Jacobs.)

LAST month the MINING RECORD made brief mention of the work of the Provincial Assay Office, which is a Government institution rendering much useful service to the Province, more, indeed, than is generally recognized. The Provincial As-

sayer and Analyst—for Mr. Herbert Carmichael fills this dual position—has varied duties to perform and, in carrying these out, he is well seconded by his efficient assistant, Mr. D. E. Whittaker. Apart from ordinary custom assaying and gold-melting, the fees received from which in part provide for the current expenses of the establishment, numerous free qualitative determinations are made of minerals and rocks sent in for identification and classification. A two-fold benefit is derived from this free service: First, prospectors and others are encouraged in their search for new minerals or mineral districts, and, next, the department acquires additional information as to the minerals of the Province, their nature and places of occurrence. The latter advantage is greater than appears at first sight. For instance, an enquiry comes from either within or without the Province respecting some one or other mineral and many such communications reach the department, from near and far—and information can at once be given as to whether or not such mineral is known to occur in the Province, and if so under what conditions as to quantity, accessibility, and other important particulars. Or a prospector finds minerals or rocks that are strange to him and sends samples to the department, and, after careful examination, he is informed whether they contain anything of value, and all other available information is given that will assist him in deciding whether it will be worth his while spending time or money in following up his discovery. Further, data in this way obtained from widely-scattered sources that contributes to the knowledge already gathered and enables the department to continue a necessary work it has in hand, viz., the making of an up-to-date annotated list of the minerals known to occur in British Columbia.

Besides the required assaying and analysing for the Department of Mines there is much analytical work done here for the Department of Agriculture and that of the Attorney-General; in fact this is the chemical laboratory for all the Provincial Government departments. Then, the laboratory is specially fitted for making umpire assays of sample pulps, being well equipped with electrical apparatus for the determination of copper. Although this fact is well known in some of the mining sections of the Province there are other districts—the Boundary, for example—which, seemingly, are not aware of this, and so have many of their umpire assays made in the United States. Another direction in which useful work is done is in analysing the waters of hot and mineral springs, numbers of which occur in this Province. These are carefully analysed to ascertain whether or not they contain elements of medicinal or commercial value, and their nature, volume, situation, accessibility, etc., recorded. Some have been found to be simply hot water, whilst others possessing valuable properties have been properly classified. In one instance the presence of a new element was discovered and this is being further investigated.

There are, as well, ample facilities here for prospec-

tors and students to learn to do preliminary assay and simple blow-pipe work, and for advanced students to take finishing courses before presenting themselves to the Board of Examiners (of which the Provincial Assayer is a member and secretary-treasurer) for certificates of competency and licence to practise assaying in British Columbia. Pharmaceutical students also take a chemistry course here.

The Assay Office is situate in the former Legisla-

balance room. The accompanying illustration shows a part of the former. The furnace room, built of brick, is between the two laboratories. Included in its equipment are a Fletcher large-muffle gas furnace, a wind coke furnace, a coke assay furnace, two large gasoline melting furnaces, and a derrick and other necessary apparatus for lifting heavy melts of gold, there being appliances to melt and handle bars of gold up to 1,000 ounces in weight. The crushing



Government Laboratory—Department of Mines.

tive Buildings, which, on the completion and occupation of the new buildings in 1897, were handed over to the Department of Mines for utilization as Assay Laboratories, Mineral Museum, etc. During the first half of 1898 the old buildings were renovated and so altered as to make them suitable for these purposes. The work of fitting up the laboratories was completed in August of that year. In the students' laboratory there is room and equipment for up to twelve students at a time, doing ordinary assay and blow-pipe work. The Provincial Assayer has his own laboratory and

and sampling room, under the furnace room, is cement-floored.

A large amount of photographic work is also done, numbers of photographs taken by the Provincial Mineralogist and the Provincial Assayer, when in the field, being developed and printed here. Much care and skill is displayed in this work, as is evident from the excellence of those of the photographs printed here used to illustrate the Annual Reports of the Minister of Mines. Examples may be seen in the Report for 1903, in which are blocks made from

four, five, and, in one instance, seven negatives, respectively. The dark room is well furnished with requisities for doing good work, including apparatus for enlarging. Many large photographs for use at exhibitions have been sent out from this department.

For years the Provincial Assayer has spent a part of the field-work season in examining mining sections, afterwards reporting to the Government upon them. His first official work in this direction was done in 1893, in which year he reported on the gold-quartz ledges of China Creek, Alberni. The lengthy account of the Iron Ores of the Coast of British Columbia, published in the Mines Report for 1902, was largely his work.

Mr. Carmichael studied chemistry at the Royal Academical Institution, Belfast, Ireland, in 1883, winning the first prize that year in that subject. He next took the Arts course at Queen's College, Belfast. His finishing course in chemistry was taken at Owens College, Manchester, England, while Sir Henry Roscoe was professor of chemistry at that institution. Ever since then he has given his attention to chemistry, mineralogy and engineering. He came to British Columbia about fifteen years ago. After having been in business as an analyst in Victoria for a time he, in 1892, entered the Provincial Civil Service, so that he has now been a Government official for about twelve years, during which period he has visited nearly every part of the Province, particularly the Coast districts with which there are few as familiar, for he knows the Coast north to the Alaskan boundary, and as well Queen Charlotte Islands and Vancouver Island.

THE LATE CLARENCE KING AS A LOVER OF NATURE.

DR LEDOUX in his address on "The American Mining Engineer" to which we have made a somewhat lengthy reference elsewhere, after advising the student of science to "take in as much of the artistic side of life and education" as he can, that his whole career may be broadened and his life happier therefor, refers to the poetic record the late Clarence King made of his feelings upon discovering the rare silurian fossil for which as a geologist he first gained fame. We cannot refrain from quoting from the Transactions the beautiful passage* in full:

Ordinarily, solitude is with me only a happy synonym for content; but throughout that ride I was preyed upon by self-reproach, and in an aggravated manner. The paleontologist of our survey, my senior in rank and experience, had just said of me, rather in sorrow than in unkindness, 'I believe that fellow had rather sit on a peak all day and stare at those snow-mountains than find a fossil in the metamorphic Sierra;' and, in spite of me, all that weary ride his judgment rang in my ear. Can it be? I asked myself; has a student of geology so far forgotten his devotion

*Mountaineering in the Sierra Nevada.

to science? . . . Later, when evening approached, and our wheels began to rumble over upturned edges of Sierra slate, every jolt seemed aimed at me, every thin sharp outcrop appeared risen up to preach a sermon on my friend's text.

"I re-dedicated myself to geology, and was framing a resolution to delve for that greatly important but missing link of evidence, the fossil which should clear up an old unsolved riddle of upheaval age, when over to eastward a fervid crimson light smote the vapor-peaks. . . . Through this gateway of rolling gold-red cloud the summits seemed infinitely high and far, their stone and snow hung in the sky with lucent delicacy of hue, brilliant as gems, yet soft as air,—a mosaic of amethyst and opal transfigured with passionate light, as gloriously above words as beyond art. Obsolete shell-fishes in the metamorphic were promptly forgotten, and during those lingering moments, while peak after peak flushed and faded back into recesses of the heavens, I forgot what paleontological unworthiness was loading me down. . . . But for many days thereafter I did search and hope, leaving no stone upturned. . . .

"Picking up my hammer to turn homeward after a fruitless search, I noticed in the rock an object about the size and shape of a small cigar. It was the fossil, the object for which science had searched and yearned and despaired! There he reclined comfortably upon his side, half-bedded in luxuriously fine-grained argillaceous material,—a plump pampered *belemnites* (if it is *belemnites*), whom the terrible ordeal of metamorphism had spared. I knelt and observed the radiating structure, as well as the characteristic central cavity, and assured myself it was beyond doubt he. The age of the gold-belt was discovered.

"In ten or fifteen minutes I judged it full time for my joy to begin. Down the perspective of years I could see before me spectacled wise men of some scientific society, and one who pronounced my obituary, ending thus: 'In summing up the character and labors of this fallen follower of science, let it never be forgotten that he discovered the *belemnites*,' and perhaps, I mused, they will put over me a slab of fossil rain-drops, those eternally embalmed tears of nature.

"Once, in after years, I met an aged German paleontologist, fresh from his fatherland, where through three score years and ten his soud had fattened on Solenhofen limestone and effete shells from many and wide-spread strata. We were introduced. 'Ach!' he said, with a kindle of enthusiasm, 'I have pleasure you to meet, when it is you which the cephalopoda discovered has.'

"Then turning to one who played the role of Gany-mede he remarked, 'Zwei lager.'"

MINING AT QUATSINO SOUND.

THE accompanying illustration, showing an open cut on one of the claims of the June Group, Quatsino Sound, is from a photograph taken by Mr. Herbert Carmichael, Provincial Assayer, when he visited the property last summer. The block was

one of several used to illustrate Mr. Carmichael's report on Quatsino Sound, published in the last Annual Report of the Minister of Mines.

The June Group consists of five mineral claims, owned by the Copper Mountain Mining and Development Co., of Tacoma, Washington. In the centre of the June claim the ground rises in a rounded ridge, at the western end of which an open quarry exposes a face of 48 feet wide by 36 feet high. The mineral-bearing material is a porphyritic hornblende granite, mineralized with copper pyrites and bornite, and mixed with solid magnetic iron, while copper pyrites and bornite are also finally disseminated through the iron ore. The ore occurs irregularly on the face

exposures to be seen, but the mineralization appears to occur between lime on the north and granite to the south, a comparatively narrow band of felsite or felsitic dyke intervening between the granite and the ore body, the latter probably having been formed at the time of the granitic upheaval.

THE AMERICAN MINING ENGINEER.

IS the American mining engineer superior in point of efficiency to his European confrere? This is a question that has been raised on several occasions during recent years, while the other day it formed the subject of a presidential address at the Atlantic City meeting of the American Institute of



Open Cut on June Group—Quatsino Sound.

of the bluff, and in places has a brecciated structure, having streaks of crystalline quartz and calcite through it, in fact the vein matter is more silicious than has been noted in other deposits of a similar general character on Vancouver Island.

While not proven by continuous work, outcrops were seen some 250 feet to the north of the quarry, which would place the probable width of the mineralized zone at 300 feet, though it is likely the mineralization varies considerably in this distance. The mineralized ridge extends to the end of the June claim and through the adjoining Helen claim, a total distance of about 3,000 feet. Some twenty cuts and prospect holes show magnetite, generally impregnated with a little copper pyrites.

In this part of the country there are very few rock

Mining Engineers. The president, Dr. Ledoux, prefaced his remarks by saying that he had been asked by the chairman of a British Commission appointed to enquire into the educational systems of the United States, "whether the superior efficiency of the American mining engineer is due to superior technical education, and, if so, in what respect American schools of mining differ from those of Great Britain." To which he replied off-hand, that he did not think the alleged American superiority was primarily attributable to special educational advantages, but was the result rather of environment. Dr. Ledoux, however, stated that at the time he did not possess any special knowledge of the comparative merits of American and British schools, and that therefore he was not then in a position to discuss the point raised except

in a general way. But he had since given the subject considerable thought, the conclusions he had arrived at being embodied in the address at the meeting of the Institute to which we have referred. The fact that, speaking generally, American mining engineers are professionally superior to European engineers, seems to have been admitted by more than one British authority on mining. Thus Mr. Herman Jennings in an address before the Institution of Mining and Metallurgy in November last referred to the apparent advantages of American methods of education and inferentially conceded some degree of superiority to the average American mining engineer. Again, Mr. J. H. Curle, the author of "Gold Mines of the World" and other works, in an article contributed not long since to the *Engineering and Mining Journal*, wrote: "An Englishman as a rule has a less clearly defined idea of the net value of any given mine than an American. We do not seem to rush in and grasp the one great fact—the profit in sight—as do Americans. . . . We try to shift the responsibility of the decision to some one else, and write a report which has no back-bone or individuality. . . . The environment of the English engineer is against him. In America the capitalist who sends a man to value a mine probably intends to buy that mine himself and work it. But the London capitalist does not buy mines to work himself. He is essentially a middleman. . . . The English system of mining is seen at its worst in Australia. The Australian flatly refuses to sample any of his mines. The American miner goes at once to the vital point. He says: 'I want to know the net profit in sight in this mine. Do not bother with details. Just let us go to work to get the sampling through.'" In this connection Dr. Ledoux is impartial and generous enough to say that the faults discovered by Mr. Curle in the reports and work of some English engineers are by no means lacking in America. Still it can not be ignored that the most successful of mining engineers and metallurgists for many years, whether in the Americas, Africa or Australasia, have been whose *education or experience* or both were American. (The italics are ours.)

Dr. James Douglas, in an address before the School of Mines and Metallurgy of the University of Missouri in 1901, attributed the success of the American miner and metallurgist to the mechanical instinct of the race, the mining engineer, forced to employ machinery on account of the cost and scarcity of labour, was not content, he showed, with appliances of a former generation, but invented and improved at every step. But Dr. Ledoux asks what are the characteristics of the American mining engineer, and in so far as they are to his advantage, how much is due to education and how much to environment? And to this he replies: "The standing of the American mining engineer is due not exclusively to his initial education, but to the necessity for initiative born of environment: to the mechanical instincts of the race and to the natural buoyancy and self-reliance of our

people. In the great West this self-reliance and this buoyant temperament find full opportunity for growth and development." And it must be confessed that the evidence from which these conclusions are formed is unquestionable. In the Old World the engineer, however well and thoroughly grounded, is nevertheless trained to the idea of the injudiciousness of attempting to depart from established methods and practice. Thus originality instead of being regarded as a commendable trait, is nearly always looked upon with suspicion, and its employment invariably discouraged. Again, in America the interchange of ideas and professional co-operation are great assistances towards increasing the general average efficiency of mining engineers and metallurgists of this continent, and last but not least the American engineer as a rule takes his work more seriously. Thus Dr. Ledoux quotes the late Hamilton Smith, of London, who upon being asked what was the most characteristic difference which he had found between the American and the European engineer, replied: "Well, in South Africa the American never lets up. He works from daylight until dark and is thinking about his job in the evening. Our European engineers want to stop at four; the Englishman to play tennis, the Germans for their beer."

To give, in conclusion, Dr. Ledoux's remarks local application, the experience of the past ten years in British Columbia contribute most forcibly to the general soundness of his argument. There are unfortunately instances innumerable where men sent out direct from England to report on or direct operations at mines have displayed that lack of practicability, adaptability and originality, which by contrast with American methods has appeared all the more glaring and is one of the considerable causes of the non-success of British enterprise in this part of the world. On the other hand, the work of American (which description of course includes Canadian engineers and metallurgists and also British engineers and metallurgists who, by long residence on this continent, have instinctively adopted American methods and habits of mind) has been of a very high character, resulting in the successful solution of many of the abstruse engineering and metallurgical problems with which the industry has been beset, so that to-day our methods of treating low grade ores, of profitably mining ore bodies of large size; but containing extremely low values; our adoption of special concentration methods and the determined and hopeful effort that is being made to reduce costs in every direction and turn to profitable account mine-products which heretofore had been considered valueless, are regarded as eminently satisfactory by the very highest authorities. Notwithstanding the extraordinary disabilities which must necessarily beset almost any description of industrial effort in a new and unpopulated country, mining in British Columbia, thanks to the high standard of professional efficiency of the engineers and metallurgists connected with industry, is gradually but steadily year by year gaining an importance and character.

THE ESTIMATION OF OIL IN OIL CONCENTRATION PRODUCTS.*

(By L. C. Wynne.)

SINCE the Elmore Process may now be said to be established in British Columbia, and is likely to largely increase its scope here in the near future, a few notes on the estimation of oil in oil concentrate products may not at this time be out of place, and may prove of use to the members of this Institute.

The products in which an assayer is called on to estimate oil are concentrates and tailings resulting from a mill in which the oil process is used. When operating a concentrator it is an essential to good running that a careful estimation of loss of oil should be made from daily samples. Practically the whole loss of oil incurred in the Elmore Process is due to the oil which is carried away with the tailings and that which is retained in the concentrates. The loss of oil being one of the chief costs of the process, the importance of keeping a careful check on it is self-evident.

The products to be estimated for oil are usually of a fine mesh, seldom coarser than 30-mesh. As a rule the ore treated in an Elmore mill is either the slimes or tailings from a water concentrator and usually carries a high percentage of very fine material. In the Le Roi No. 2 concentrator when 40-mesh screens are used on the Trent mills 80 per cent. of the pulp will usually pass through a 100-mesh screen.

The percentage of oil to be estimated will vary from a trace in some samples of tailings up to 5 per cent. or 6 per cent. in concentrates. Extreme accuracy should be used in the estimation if the assayer wishes his results to tally up with loss found by actual estimation shown by depreciation of stock, and it has been found that with care the calculated loss and actual loss should check closely.

The method which has always been found most satisfactory by those connected with the Elmore Process is washing with benzine or gasoline. The method of burning off the oil is undoubtedly quicker, but is inaccurate. It is extremely difficult to drive off the last traces of oil without burning off some sulphur, especially when oil in concentrates has to be estimated. Then again the oil (being usually a petroleum residuum) will leave a solid hydro-carbon residue when distilled.

The process of washing with gasoline or benzine is slow. Considerable time must be allowed for the complete solution of the oil. This process, as used in the Canadian Ore Concentration's laboratory in Rossland, is as follows: 25 grammes of the product to be estimated (less may be taken with oily concentrates, say of 5 per cent. oil or over) are weighed in a beaker of known weight on the chemical balance. A beaker of 200-cc. capacity will be found a convenient size. The beaker is then filled about three-quarters full of filtered benzine or gasoline. Filtering the benzine is advisable in case any solid residue might be present. Commercial naphtha (when filtered) will be found quite good enough for this assay. Stir the contents

of the beaker thoroughly, settle and decant the liquid through a filter until the washings, after being in contact with the ore for some time, appear free from oil. The final washings should be hot. It is best to boil at the end at a water-bath temperature for at least half an hour. This is important as the gasoline will not dissolve all the oil in the cold. To estimate the amount of ore carried over on to the filter the paper should be prepared as follows: Take two good quality white filters, fold and cut off the point of one about one-half inch. Then counterpoise the two accurately on the balance, cutting from the top of the whole paper if necessary. The filter proper is then inserted through the hole in the first paper. It is necessary to filter in this manner as the gasoline dissolves part of the substance of the paper. The paper cannot, of course, be burnt without losing weight through volatilized sulphur, and it is not possible to brush the ore from the paper without a loss. But by this method the two filter papers are attacked to the same extent and the amount of ore carried over on to the filter can be weighed direct, one filter being placed on either pan of the balance. The increase in weight will of course be ore. After washing is finished the assay in the beaker is dried carefully at a low temperature to avoid spitting, and weighed; the loss in weight after adding the weight of ore on the filter to that in the beaker is reported (in per cent.) as loss of oil.

At a future time I hope to go fully into some possible sources of error, such as the solubility of different ore in gasoline, losses due to loss of very fine material in filtering, solid residues left by certain oils, and a few other points.

The following is an example of an assay for oil:

Weight of beaker	34.365	gms.
Weight of beaker and ore	59.365	"
<hr/>		
Weight of beaker and ore (washed)	58.783	"
Weight of ore on filter	0.097	"
<hr/>		
Total	58.880	"
Loss	0.485	"
(Equal to 1.94 per cent. of oil.)		

By conducting the whole assay, including weighing, in a beaker all losses through transferring the ore can be avoided. An assay for oil by this method will take several hours, depending, of course, on the number of washes necessary.

I had hoped to have included in this paper some notes of experiments on a few points which are of interest in connection with this assay, but as I have not as yet had time to complete my experiments I must hold them over until later.

BRITISH COLUMBIA INSTITUTE OF ASSAYERS.

THE British Columbia Institute of Assayers is an organization aiming to promote the interests of the assayers of the Province and to maintain a high standard of efficiency among those practising assaying. The movement was inaugurated in November, 1901, and in March, 1903, the Institute

*A paper to be incorporated in the proceedings of the British Columbia Institute of Assayers.

was incorporated under the Benevolent Societies' Act and Amending Acts. The officers and council for the current year are: President, Mr. Thos. Kiddie, Tyee Copper Company, Ladysmith, vice-presi-



Mr. Arthur A. Cole,
Secretary-Treasurer B. C. Institute of Assayers.

dent, Mr. S. G. Blaycock, Canadian Smelting Works, Trail; secretary-treasurer, Mr. Arthur A. Cole, Centre Star Mining Company, Rossland; council, Messrs. Herbert Carmichael, Department of Mines, Victoria; A. L. McKillop, Nelson; W. E. Segsworth, Greenwood, and Douglas Lay, McGuigan.

The last general meeting of members was arranged to be held at Victoria a few weeks ago. Several papers were prepared by members for presentation; at that meeting. One of these, by Mr. L. C. Wynne, is printed in this month's *MINING RECORD*, and another, by Mr. Douglas Lay, on "The Determination of Silver in the Sulphide Ores and Concentrates of the Slovan: A Comparison of Pot and Scorification Assays." will be published next month, it having been crowded out this month.

THE VOLCANIC ORIGIN OF OIL.

MR. EUGENE COSTE in a communication to the Secretary of the American Institute of Mining Engineers takes exception to the opening paragraph of a paper presented by Mr. Robert T. Hill at a joint session of the Mining and Metallurgical section of the Franklin Institute and the American Institute of Mining Engineers, which read as

follows: "In endeavouring to interpret the geological occurrence of oil, the geologist is confronted by the fact that science has not yet solved the problem of its origin which lies at the root of the subject. For the present we must consider oil as a material in the rocks, the origin of which is still unexplained." Mr. Hill's contention meanwhile is supported by Messrs. Hayes and Kennedy in Bulletin U. S. Geological Survey, No. 212, containing a report on the Beaumont oil-field. Mr. Coste, in differing from the opinion of these gentlemen, affirms that "geology can to-day most clearly prove the origin of oil to be inorganic and the result of solfataric volcanic emanations," and he describes as fallacious the assumption long held that oil or bitumen is due to "the decomposition of the organic remains of the sedimentary rocks" "whereby the words organic and bituminous have come to be used synonymously, and, accordingly "without attempt at explanation, the origin of oil is in every case ascribed to some bituminous-shale horizon, more or less full of organic matter." Mr. Coste proceeds to point out that



Mr. Thos. Kiddie,
President B. C. Institute of Assayers

the problem is pre-eminently a geological and not a chemical one. We quote from the paper:

"Chemists can extract hydrocarbons from organic remains and can also produce hydrocarbons from simple mineral reactions (as in the commercial manufacture of acetylene, for instance), but the question is

fore us is not, What are all the numerous chemical reactions capable of producing hydrocarbons or bitumens? but only, How does nature do it. What are the geological facts in this connection? If in chemistry hydrocarbons are generally grouped and classed among the organic compounds, that is not a proof that the natural hydrocarbons have geologically an organic origin, and that, geologically speaking, organic and bituminous are synonymous terms. On the contrary, the geological evidence is clear and strong, disproving the organic origin of bitumens, or hydrocarbons (excepting some marsh gas), found in the earth's strata, and showing plainly that the natural geological process of to-day, and of ages past, in the formation of these products, is a mineral or inorganic



Mr. Herbert Carmichael,
Government Assayer for British Columbia.

process. This geological evidence is so well known and so indisputable that a simple enumeration of it seems to me to be sufficient:—

"1. Animal organic remains or bodies are never entombed in the rock-formations, and, therefore, cannot there produce oil or anything else.

"2. Vegetable organic remains in the rock-formations always decompose into carbonaceous matter: that is, peat, lignite and coal, with a small production of marsh gas, which, however, either escapes in the atmosphere or remains in the coal, and has evidently nothing whatever to do with the natural gas and oil of the gas and oil-fields.

"3. Further distillation of carbonaceous matter has not taken place in nature, except locally, in very rare instances, as is proved by all the lignite and coal beds of the sedimentary strata.

"4. As reviewed elsewhere,* and as able observers have repeatedly recorded, in the volcanic districts of the earth, not only gaseous, liquid and solid hydrocarbons or bitumens are among the most important products of the solfataric volcanic emanations, but also carbonic acid, chlorides (mostly common salt), hydrogen sulphide, sulphur, gypsum, and hot calcareous and siliceous waters are always the remaining conspicuous products of these emanations, and all these associated products together stamp the solfataric volcanic phenomena with a unique and unmistakable seal.

"That this volcanic process is the normal and orderly mode of petroleum-production is to me a most clearly established geological fact for the following reasons, also, which I have discussed at length in the paper already quoted:**

"1. It is the only geological process of petroleum-production to be witnessed in active operation to-day, in nature.

"2. In all the oil- and gas-fields or petroleum deposits, the gaseous products are under a strong pressure which is not artesian or hydrostatic, which increases with depth, and which cannot be anything else but a volcanic pressure.

"3. In some of the oil- and gas-fields, heated waters, oils and gases are met with.

"4. All the oil- and gas-fields bear, imprinted largely through the products associated with the oil and gas, the seal referred to above as the distinct characteristic of solfataric emanations.

"5. The oil- and gas-fields are located along the faulted and fissured zones of the crust of the earth, parallel to the great orogenic and volcanic dislocations.

"6. Oil, gas and bitumens are never indigenous to the strata in which they are found—they are secondary products impregnating and cutting porous rocks of all ages, exactly as volcanic products alone could do.

"7. Oil and gas are stored products, in great abundance in certain localities, while neighbouring localities often are entirely barren: and many of the strata among which they are found are so impervious that the source of these hydrocarbons must be the volcanic source below, which alone is abundant enough, and alone possesses sufficient energy, to force and accumulate such large quantities of these and associated products in so many spots through such impervious strata.

"In support of the hypothesis of volcanic origin, the following facts are adduced:

"The oils, waters and gases under these mounds are not under hydrostatic pressure. This is amply demonstrated by the fact that the once famous gushers of Spindle-Top are already gushing no more, and have now to be pumped. If the pressure there was artesian or hydrostatic they would be gushing yet, the same as at first: and, if the oil had been exhausted

*Journal of the Canadian Mining Institute, vol. vi., p. 73.

**Op. cit., vol. vi., p. 72.

in some of them, these would be gushing water out of the supposed artesian water-column behind the oil. It is now admitted that, in all the oil- and gas-fields, the rock-pressure of the gas is a stored energy continually decreasing as the gas escapes. Gas itself has to be pumped to-day in many fields where its pressure was too strong at first. Surely, this phenomenon is not a result of artesian or hydrostatic water-pressure. Messrs. Hayes and Kennedy say in their recent report on these oil-fields:

"It appears highly probable that the pressure in the oil-reservoir is due largely to the expansive force of the associated gas.' But the question remains: To what is the expansive force of gas due? This cannot be answered except by reference to its real volcanic source. The one word 'volcanic' explains it all."

After discussing other points raised by Mr. Hill, Mr. Coste thus concludes:

"These simple geological considerations lead to the safe conclusion that the so-called sheet-oil is not an indigenous product of the decomposition of organic matter. That it is also, like the so-called pocket-oil, a secondary product of impregnation and replacement, becomes quite clear when we remember that these so-called sheet-oil deposits are found, not only in a few horizons, but in hundreds, from the oldest Paleozoic to the alluvial gravels and sands of to-day; and that nowhere do they spread like sheets, but that, on the contrary, they are always found in relatively very small pools in porous reservoir rocks which are barren of oil outside of the little pools (exactly as in the case of the mounds). These pools form only a very small percentage of the area of the numerous rock-strata in which they are only occasionally found. That these accidental pools are only receptacles or reservoirs is admitted to-day by all who have studied the question. That these reservoirs were filled also from the great volcanic tank below, in a manner exactly similar to the case of the Texas mounds, is plain when all the evidence enumerated above, which geology can bring forward to-day, is considered together.

"The above views on the origin of the oil-phenomena, not only of the mounds and salt islands of the Texas-Louisiana district, but of all other oil-deposits, suggest a simple interpretation of the geological occurrence of oil which should be a guide to important results in the practical development of new oil- and gas-fields in the United States, as they have already been such a valuable guide to me in the development of large new gas-fields in Canada*.* These views lead indeed to the following important conclusion:

"Oil and gas were only supplied along some of the lines of structural weakness or along some of the fractured zones of the crust of the earth, and, therefore, the new fields are to be found only along these zones or belts.

"The numerous oil- and gas fields known to-day indicate plainly a considerable number of these oil-

belts; but more remain to be discovered, and new ones are coming rapidly to the front, especially in the United States. That this is the solution of the problem of the geological occurrence of oil and of oil-developments and explorations the writer has long been convinced, on the considerations and for the reasons given above. It follows, therefore, that, as far as practical results are concerned, the important point is to accurately trace these fissured zones or belts on good maps and to drill in the localities thus indicated.

"I have been at work ever since 1888, on maps of this character, embracing North America, and hope to be able to publish them before very long, as soon as our present knowledge of these most important structural dislocations is a little more complete."

THE RECENT LENORÁ NEGOTIATIONS.

AT a meeting of those interested, held in Victoria on June 23, Mr. J. S. H. Matson, official liquidator of the Lenora Mining Co., made a statement regarding the negotiations lately conducted in London with the object of selling the Lenora mine and other properties intended to be included with it in the proposed sale. The following are excerpts from the lengthy report of the meeting published in the *Colonist*:—

"Briefly Mr. Matson's contention was that had the unsecured creditors given him the power which he asked for by cable at the opening of the negotiations, without resorting to securing an order of the Court, the negotiations would have been successful. As matters stood, however, there was still a possibility of the deal being consummated, providing the unsecured creditors would raise the sum of \$7,500—one-half of the necessary flotation expenses in London—and rescind the arrangement which made it necessary to pay \$10,000 into court."

"Mr. Matson also said the unsecured creditors, if they had no confidence in the men who were conducting the negotiations, had better say so. He could tell them that Sir Charles Hibbert Tupper and Mr. Bryden were of the opinion that the time was fast approaching when the mine should be sold to the highest bidder.

"Colonel Gregory remarked that if the unsecured creditors could be shown what was the value of the property they would be in a position to proceed understandingly. If the mine was worth nothing, it should not be sold but abandoned. Its sale otherwise could only serve to give a further black eye to British Columbia in London.

"The only definite action at the meeting was the appointment of a committee of five, consisting of Messrs. D. R. Ker, Joseph, Wilson, Lawrence Goodacre, James Floyd and Otto Weiler, to discuss the matter with Mr. Matson and approve or disapprove of his further proposals affecting the property."

(Note.—The report of the above-mentioned meeting came too late for us to make any comment in our editorial columns this month. We cannot, however, refrain from here expressing the opinion that the unsecured creditors will hardly be so foolish as to provide \$7,500 towards flotation expenses as suggested.—Editor B. C. MINING RECORD.)

SOME NOTES FROM THE MINING CAMPS.

YUKON.

TELEGRAPHIC advices from Dawson announce that sluicing commenced on May 8th and royalty has been paid on 55,753 ounces of gold. The water supply, it is furthermore stated, is holding out well.

ALBERNI.

Our Alberni correspondent writes: "Development work has been pushed ahead greatly the last month on the Hap-

*Journal of the Canadian Mining Institute, vol. iii., p. 68.

John, Cascade and Southern Cross mines, with splendid results. The Happy John and Southern Cross mines are both working day and night shifts. The latter is driving a tunnel from the beach to encounter the lead, which is considered to be distant about 200 feet. Although only about 80 feet has yet been driven, some good ore has been met with in the tunnel. The Happy John mine is driving a tunnel on the vein and many tons of high-grade chalcopryite ore is on the dump ready for shipment. At the Cascade mine the new boarding houses, etc., have been completed and, I understand, the plans are ready for the proposed wharf, ore bins and tram line. This property has also a quantity of high-grade ore ready for shipping and many tons of ore are being extracted daily. The owners expect to be ready for shipping in about three weeks.

"News of importance to this district has been received here, with great satisfaction, namely, the reopening of the Nahmint mine, perhaps better known as the Hayes mine, on Alberni Canal. It is understood that active operations will commence about July 1st. Messrs. A. D. McQueen from Portland, Ore., and W. S. Haskins from California, visited the mine last week, with the above result. It is hoped that this promising property will be opened up under careful and judicious management, as anyone, acquainted with the mine must admit that its profit-earning capabilities were not fairly tested by the late management.

"Mr. J. Drinkwater and party will leave in the early part of July for the Big Interior. This copper property is located near the headwaters of Bear River, but the easiest way to reach it is *via* Alberni and Great Central Lake. Mr. Drinkwater proposes to thoroughly open up the claim and as there is no underbrush nor surface work to interfere, he also proposes to work by quarrying methods.

"Captain Huff's new steamer *Brent* is making now regular trips on the Alberni Canal. This service is a great convenience for miners and prospectors, who until now, had to depend on the cannery tug *Albert Lea*, owned by the Alberni Packing Co., Ltd. We are all, however, grateful to Mr. C. Ternan and Captain D. H. McDonald, of the above company, for the kindness they have shown miners and prospectors in this district, for the tug has conveyed miner-passeengers and their supplies for over a year past from and to the mines free of charge."

THE COAST.

Work is now well under way at the Britannia mine, where shortly an aerial tramway will be installed to bring down the ore to the water's edge.

At Steveston, where boring for oil is still in steady progress, bed-rock has been reached at a depth of over 900 feet, the pressure here being twenty-five pounds to the square inch. It is reported, too, that the indications of shortly striking oil are most promising, as there has risen a great escape of gas.

It is reported that a fine seam of coal between two and a-half and three feet wide has been discovered near tide-water at Wulffsohn Bay, rather more than fifty miles north of Vancouver on the Mainland coast.

A rich strike of free-milling gold ore is reported to have been made by Indians on Fire Mountain, in the New Westminster mining division. There are said to be two leads, one of which is of some width, but the second, only six inches wide, affords the richer specimens. Meanwhile the importance of this discovery is discounted by the fact that the result of previous mining in this section proved altogether disappointing.

MOUNT SICKER. (V. I.)

The Richard III. Mining Co. has paid the final instalment of the purchase price of the Richard III. mine. It is stated that the company's has expended about \$40,000 in development work, and has placed the mine on a shipping basis.

ATLIN.

Prospects in Atlin district are said to be exceptionally

bright this season, and there is every likelihood that the output will again show an increase. Working by dredging methods is now fairly under way, and if they prove successful one may look for the beginning of a new mining era in the northern field.

The *Claim* reports that the dumps on Spruce Creek are nearly all cleaned up, the results obtained being most satisfactory.

The benches of auriferous gravel on the headwaters of the O'Donnel River are meanwhile being prospected by means of a small hydraulic plant by the Bull Creek Hydraulic and Dredging Syndicate.

The Gold Commissioner at Atlin has given notice that the bed of Pine Creek from Discovery to Gold Run being practically worked out, the Government has decided to issue no new records, it being deemed advisable to keep this portion of the creeks open for the benefit of those operating the benches on either side.

By a recent judgment the Societe Miniere obtained an injunction prohibiting miners working on Boulder Creek from depositing tailings in that stream, a practice that had formerly greatly hampered the operation of the company in question.

YALE.

The International Gold Company has been incorporated to mine a free-milling gold property on Siwash Creek. The mine is to be actively developed this summer. The company is installing six Marrell stamps with quadruple discharge. There is said to be "in sight" and ready for crushing 10,000 tons of rich ore.

CARIBOO.

At the Consolidated Cariboo Hydraulic mine at Bullion work is now in progress on a new 10 by 12-ft. rock tunnel that is to be driven 1,200 feet. The upraise through the bed-rock will be some 70 or 80 feet, and will enter the pit about midway between the veins and near the present face. The tunnel is designed to carry the sluice boxes, which will be paved with blocks. The prospects for a fairly successful season are said to be promising, and it is expected a first clean-up will be made in July.

At Wingdam a Keystone boring machine is to be shortly installed wherewith to test the ground formerly owned by the Lightning Creek Gold Gravels & Drainage Co. We suppose the proverb "better late than never," has its application, but it is cold comfort to quote the saying to former shareholders, who, had this method of proving the value of the property been earlier adopted, would have been saved many a dollar.

LYTTON.

The two gold dredges are for the present idle, additional machinery being awaited for the one, while the other is undergoing repairs.

OKANAGAN.

Work, it is announced, is to be shortly resumed on the Cherry Creek mines, in the Okanagan district. The managing-director states that ore to the value of \$60,000 has been blocked out and development has been so advanced as to permit of the establishment of additional ore-reserves at a comparatively low cost.

CAMP HEDLEY.

Another case of the location of placer claim over a rich quartz location is reported to have occurred, a man named Studd having staked an alleged placer claim within the boundaries of the Nickel Plate mine, owned by the Yale Mining Company at Hedley. The placer claim has been staked in fact over the glory hole, from which the 40-stamp mill commenced crushing a week or so ago, is supplied with ore. There is said to be much valuable float on the property.

LARDEAU.

Operations have been resumed at the Triune mine, and it is expected that work will be at once started on the con-

struction of the aerial tramway, the contract for which has been let.

The Kingston & McMinville groups of claims, in the Camborne district, have been sold for the large sum of, so it is reported, \$200,000, of which a ten per cent. payment has been made. The Kingston, which has a promising showing of free-milling quartz, has been developed by two tunnels driven in on the vein, the average values in which are about \$12.

SLOCAN.

At the Chapleau mine—a property by-the-way which never seems to be out of difficulties—recently acquired on leasing terms, the miners have ceased work and placed a lien on the property, they not having received their pay. This is attributed to differences between the leaseholders. Recently a satisfactory clean-up was made at the mill, and the mine is said to be looking well.

Rich ore has been encountered at a depth of 800 feet on the Rambler-Cariboo near McGuigan. The vein, which varies in width from six inches to over two feet, is found on assay to average 170 ounces silver and 74.6 per cent. lead, while from the north drift the values were 136.3 ounces silver and 63.8 per cent. lead. The mill has resumed operations. In the vicinity of Sandon there are now five concentrators working.

NELSON.

In the Nelson district the Juno is being satisfactorily developed, an upraise of which 200 feet has been run in ore; being now driven by which a fine body of milling ore will be opened up. A drift is also being put in from the 200-ft. level, exposing a fine body of ore. In the Ymir Camp the Star claim, adjoining the May and Jennie, has been bonded to the Canadian Smelting Works for \$25,000. The ore, which carries a considerable percentage of iron, is required, it is understood, for fluxing purposes.

The Cliff mine on Toad Mountain was bonded for \$20,000 on working terms recently to an American syndicate. The ore, which is free-milling, has yielded \$24 per ton, from smelter returns.

The Hunter V. mine is shipping from 50 to 60 tons per day. One car per day continues to go to the Northport smelter, and one to Nelson with an occasional car to Trail.

AINSWORTH.

An important strike of high-grade dry ore has been made at a depth of 400 feet on the Pontiac group on Woodbury Creek, in the Ainsworth district. Three assays have been made of the ore, which gave returns of 295, 682 and 1,415 ounces of silver and \$6 in gold to the ton. It is the most important dry ore strike, it is said, that has yet been made at depth in that section.

TRAIL.

The Canadian Smelting Works' electrolytic lead refinery is now being worked to its full capacity, the resulting lead product being marketed in Eastern Canada, while the fine gold bullion is sent to the U. S. assay office at Seattle and the silver to China. The works are also manufacturing copper sulphate, which is sent to the North-West Territories, where it is made use of for pickling grain. It is further proposed to make in future at the refinery extra pure lead for special manufacturing purposes.

ROSSLAND.

A ledge of free-milling ore, between three and four feet wide was reported last month to have been located on the I X L.

The Rossland Miner intimates "that within the next few weeks the Iron Mask, Cliff and Abe Lincoln may re-join the working list of Rossland mines. The extensive sampling of the Iron Mask dumps would seem to indicate a move in this direction, although no official statement can be secured on the point. The plans for the reopening of the Cliff mine are locked up in the bosoms of the men in control of the company, but it is more or less generally known that a move is contemplated in the course of the next week or two. Dr. Brinkerhoff, of the Abe Lincoln company, will be in

Rossland in August, and it is expected then to start work on the property. At the present time a strong appeal is being made to Abe Lincoln shareholders to replenish the company's treasury and it is intimated that a satisfactory response has been secured.

BOUNDARY DISTRICT.

On one of the high-grade ore bodies, the Helen, near Greenwood, at which work was recently resumed, a small 10-inch lead has been encountered by drifting, the ore assaying from 6 to 9 ounces in gold, and 54 ounces in silver.

At the Granby smelter new ore bins will be built this year, to accommodate the ore shipments that will be made over the V., V. & E. branch of the Great Northern, now in course of construction.

A shipment is shortly to be made to the Greenwood smelter from the Roderick Dhu, which is under bond to the B. C. Copper Company.

EAST KOOTENAY.

In East Kootenay at Bull River, the scene of former extensive placer mining in the old days, the Gold River Mining & Power Co. are about to make a rather unusual and interesting experiment in gravel mining with a moderate outlay of capital. For many years Bull River was noted for its rich gravel, but by inability to control the water, a large portion of the original rich gravel remained undisturbed. This however, is found to contain a workable percentage of gold. In view of the large preliminary outlay, the Gold River Co., decided to dam Bull River. To construct a big flume capable of carrying all the water of the river at its normal stage, thus leaving the original channel free of water, to be mined at small expense. It is the intention of the company to install a large power plant as soon as the dam and flume is built, with a view to furnishing electricity for conversion into power and light in connection with mining operations, and other industries in East Kootenay.

Operations have at length been resumed at the Sullivan mine, and it is thought the smelter, which will have an initial capacity of 150 tons a day, will be in readiness to "blow-in" about the first of October next. Under its present management the company may now look forward to the enjoyment of a successful and prosperous career.

MINES OF THE TRANSVAAL.

THE Statist (London) has just issued a new edition of this valuable publication, and although the information comprised within its covers concerns the Transvaal, it is such a model of what a book of this kind should be—writes our London correspondent—that many Canadian mine managers would probably find it of material assistance. South African mining companies, with few exceptions, have always kept their shareholders well posted with regard to development work, ore stoped, reserves, values and yields per ton, and no doubt Mr. R. R. Mabson, F.S.S., the editor, has derived much assistance from the mass of statistics periodically published by the leading Transvaal mining companies. But this very liberality on the part of managers frequently makes these reports well nigh valueless to the average investor, who reads some handy work of reference which will show him at a glance the salient points about some property he is interested in. And it is here that Mr. Mabson comes to his assistance with "Mines of the Transvaal." Ignoring superfluous detail the editor has taken each company, analysed its statistics, and presented them in an intelligible form, so that the reader can instantly gather from the particular record all that he wants to know. The life of the mine is estimated, either from official sources or by the author himself, whilst other information given comprises situation and area of property, character of reefs, number of stamps employed, profits earned, capital, etc., dividends paid thereon, extreme prices of shares over a long period, results from crushings, with yield, expenses and profits per ton. These and other details are set out fully, and yet in such a form that there is no redundant information. This—the third edition—has been very considerably enlarged, new co-

panies being added, and the information regarding those hitherto dealt with, materially augmented. One of the most valuable features is the series of maps, the fact that they are without fold increasing their usefulness. Mr. Mabson recently visited South Africa on behalf of the *Statist*, and whilst there he was able to glean much valuable information for the present edition,—information indeed which largely anticipated a number of official reports which have been issued since the book went to press. It is claimed on behalf of "Mines of the Transvaal" that it is absolutely indispensable to all interested in Transvaal gold mining, and this claim is well sustained. The book is absolutely up to date, and it deals comprehensively, completely and accurately with a subject of paramount importance to British and continental investors. Those only conversant with the enormous amount of labour involved in the compilation of a statistical work of this kind can fully appreciate its time-saving merits, and the editor is to be congratulated upon such a satisfactory termination to his labours. The book should be on the office desk of every mining man.

THE DEATH OF A PIONEER MINER.

FEW of the Cariboo pioneers anywhere in British Columbia, remarks the *Ashcroft Journal*, but will remember Sam Montgomery, who died in the Barkerville hospital on June 1st after quite a long illness. He was born at Inniskillen, Ireland, in 1814, and was thus in his 90th year. Coming to Cariboo in 1861, most of his life was spent at sea. In 1858 he joined the rush to the Fraser River, coming from California, where he had mined in the early '50's. He will be remembered long by his Cariboo friends for his honesty and ability to work at his advanced age. Montgomery was a successful miner, having made lots of money and spent it. His early mining in Cariboo was done on Nelson and Lightning Creeks. He never ceased prospecting and when 83 years of age sank a shaft 53 feet and ran a tunnel from the bottom 60 feet, entirely without assistance. Two years ago, when 88 years old, he sank the first 33 feet of the Montgomery shaft alone, and but for a large boulder, too big for him to handle, he would have completed the work without help. From this claim he had as his share several thousand dollars, some of which he had at his death.

Sam Montgomery was a prospector in all that the word implies. Like most men who spend their lives in prospecting for minerals, he had formed certain ideas relating to where best to locate, but unlike many he seemed to have formed on the whole pretty correct ideas. Certainly he made some misses, but he has to his credit many strikes.

THE IRON RESOURCES OF THE WEST COAST OF VANCOUVER ISLAND.

To the Editor:

My attention has been drawn to an article entitled "A Desolate Pacific Region," which appeared in the *New York Sun* of the 22nd ult., and originally published in the *Portland Oregonian*. There is little doubt the writer of this article is a well informed man, or rather he is possessed of much varied and curious information. Thus he refers to the West Coast to be the most untamed spot west of Mississippi River, and the Indians are described as "red devils." He further states that "the SS. Queen City, under the command of Captain Townsend, has been sailing up the West Coast for the past year and the respectable white traders and missionaries who now lead lonely lives among the Red Indians, having no more timber to work on are about to return to civilization." I venture to think meanwhile that our mine-owners and prospectors have little need of this gentleman's sympathy, nevertheless he offers it. I quote his words: In justice to a scattering few hard working prospectors and mine owners now trying to discover what the West Coast of Vancouver Island was made for, the above statement should perhaps be qualified. There are numerous mines along the West Coast and several hundred

thousand good American dollars have been lost forever in an endeavour to make producers of them. One of the finest of these Col. Sellar's propositions was largely financed by Portland people. It is a copper mine located on one of the numerous offshoots of Barclay Sound. The wharf buildings and bucket tramway are all in excellent condition, but the mine is oreless and the promoter is in the penitentiary."

Again our sympathetic friend remarks "that in this untamed spot time has stood still for more than a hundred years, and, owing to the topography of the country there is little likelihood of advancement in the next century. I would like to draw this writer's attention to the fact that it is due to the mismanagement of the Portland company's mine, to which he refers, that this locality has been kept in the background, and without considering the gold, silver and copper resources of the West Coast of Vancouver Island, in several localities occur most valuable deposits of high grade bessemer iron ores, and an eminent metallurgist who has spent several years examining the iron ore deposits in British Columbia, Washington and Oregon has emphatically asserted that the West Coast districts are capable of supplying more commercial iron ore than all the other Pacific Coast districts combined. So far as the Port Renfrew district is concerned I know that the deposits are large and the ore of excellent quality, and these one day will be profitably operated. All we on the West Coast require is a fair field and no favours, and we shall not be afraid of the result.

J. B. ATKINSON.

PUBLICATIONS RECEIVED.

Report on the Great Landslide at Frank, Alta, 1903, by Messrs. R. G. McConnell and R. W. Brock, extract from Port VIII., Annual Report 1903 of the Geological Survey of Canada.

The Copper Handbook: A Manual of the Copper Industry of the World; Vol. IV. for the year 1903. Compiled and published by Horace J. Stevens, Houghton, Michigan, 1904.

The present edition of this excellent annual is a great improvement on its predecessors. The information is not only more extensive, but the compiler has taken the greatest pains to ensure its reliability. Hence we do not find in the references to our British Columbian copper mines those glaring inaccuracies to which we felt impelled to call attention in our notice of the 1903 edition. The volume is strongly and tastefully bound in cloth, and in its existing form is probably the best work of reference on copper mining, technology and trade, published.

PROVINCIAL MINING ASSOCIATION.

MR. JOHN KEEN, president of the Provincial Mining Association, last month made arrangements with Dr.

W. A. Hendryx, of Spokane, to treat by his electrocyanide process a few samples of schist containing arsenical iron and carrying gold, so as to determine whether or not these schists can be treated at a profit by that process. Mr. Keen has already sent several lots of schist to Spokane free of cost to the prospectors supplying them.

The secretary of the Association has received the following reply from the widow of the late Hon. Senator Reid to the letter he sent conveying to her the resolution of sympathy with her in her recent sad bereavement in the death of her husband, passed by the Executive Committee, of which the deceased gentleman was a member up to the time of his death. Mrs. Reid wrote: "Will you convey my grateful thanks to the Executive Committee of the Provincial Mining Association for their kind sympathy with me in my sad loss. The Association has lost a faithful and interested friend. Although not successful in his mining enterprises Mr. Reid never lost faith in the future of British Columbia as a mineral country."

The following correspondence is published for the information of all interested:

From the secretary of the Association to the Minister of Mines:

"With this I send for your information copy of a letter received by this Association from its Poplar Creek branch and an accompanying report upon the case of the location of the Shamrock placer claim over the Lucky Jack lode or mineral claim. This matter having been referred to the Executive Committee of this Association, it was considered at a meeting of the committee held recently at Nelson. Copy of a resolution hereon, passed by that committee, is also enclosed.

"I would add that Mr. J. B. Hobson wrote, for the information of the Executive when it should discuss the above-mentioned question as follows: 'The members of the Bullion branch are a unit in favour of such legislation as will prevent a placer mining claim or lease from covering a mineral claim, either in part or as a whole.' The president of the Quesnel Lake branch wrote: 'We are in favour of legislation which will prevent a placer mining claim or lease from covering a mineral claim.'

"Your early attention to this matter is, therefore, respectfully requested."

From the Deputy Minister of Mines to the secretary:

"I have the honour, by direction of the Honourable the Minister of Mines, to acknowledge the receipt of your letter of the 8th inst., enclosing a report from the Poplar Creek branch of your Association upon the location of the Shamrock placer claim over the Lucky Jack mineral claim, also a copy of a resolution adopted by your Executive Committee thereon, and also expressing the views of Mr. J. B. Hobson in the matter.

"In reply I am directed to say that this Department is advised by the Honourable the Attorney-General's Department that it seems to be quite clear that a placer claim may be located over ground covered by a mineral claim, and that the above mentioned case is not one that can be dealt with under Sec. 150 of the Placer Mining Act, nor Sec. 143 of the Mineral Act.

On the ground of public policy it is not deemed desirable to adopt Orders in Council under either of said sections, or to amend the Mining Laws by legislative enactment, to meet isolated mining cases which may be brought before the Courts of the Province."

COMPANY MEETINGS AND REPORTS.

PAYNE MINING CO., LTD.

THE directors' report, for the year ended March 31, 1904, submitted to a meeting of shareholders held recently, gave reasons why development below the level of No. 8 tunnel had not yet been practicable, mentioned that considerable success had been met with in the discovery of high-grade ore in the mine, stated that the magnetic zinc-separating plant had operated satisfactorily, and acknowledged the benefit derived from the Government bounty on lead. The resident manager's report showed that during the twelve months under review 846 feet of development work—490 ft. tunnelling and drifting and 356 ft. sinking and upraising was done. The principal part of this exploration work was done in tunnel No. 8, which represents the most important section of the mine, owing to recent discoveries in it of particularly high-grade ore. The total length of this tunnel, together with all connecting cross-cuts and drifts, is 2,128 feet and the total distance of pay ore exposed in it about 282 feet. During the year 64,548 tons of ore were milled. Of this quantity 5,086 tons was concentrating ore from levels Nos. 5, 6 and 7, while the balance was from old dumps and fillings. The ratio of concentration was about 25 tons into 1, all products—galena, zinc and iron—totalling 2,568 tons. The average silver and lead contents of the concentrates were 129 oz. silver per ton and 68.8 per cent. lead. The average prices obtained were 56½ cents per oz. for silver and \$1.48 per cwt. for lead. A total of 1,106 tons zinc, plus 140 tons of an iron by-product was produced, of a value of \$13,470. Besides putting in a zinc separating plant, the power plants at both mine and concentrator were materi-

ally increased. With the present prospects for opening up valuable ore bodies in No. 8 tunnel, together with an efficient plant for treating all silver-lead and zinc ores mined, the outlook for the property is considered to be good.

GOLD RUN MINING & POWER CO.

At a special meeting of shareholders held last month at Canton, S. Dakota, a resolution was passed empowering the board to retire all stock of the above mentioned company and issue in lieu thereof a *pro rata* amount of stock in the following named companies: the Gold Placer Mining Co., the Bull River Falls Power & Light Co., the Prichard Townsite Co.; and also authorizing the board of directors to transfer therewith all the rights, privileges, powers, etc., belonging to the company. The new companies have been incorporated; the shares of the Gold River Power & Light Co. called in, and stock issued as directed.

COMPANY NOTES AND CABLES.

TYEE COPPER Co. (Mt. Sicker).—The smelter returns for May were: Smelter ran 18 days, treating 4,040 tons of Tye ore affording a return, after deducting freight and refining charges, of \$47,028.

LE ROI No. 2 (Rossland).—From the mine manager's report for April: Output—81 cars were shipped, of an average weight of 23.4 tons, giving a total of 1,900. The grade of ore was probably higher than that of the preceding month, owing to the admixture of high-grade ore from the two latest strikes of ore in the 600-ft. level. Development—On the 500-ft. level west drift 101 feet were driven. The country is still fairly well mineralized and broken up by innumerable slips at right angles to the drift. On the 600-ft. level east 28 feet were driven, following a 1-ft. streak of well mineralised, but only medium grade ore. On the 600-ft. level 23 feet were driven on a lean streak. In No. 2 cross-cut, 600-ft. level, one round (5 feet) was blasted, but disclosed no ore. On the 700 and 900-ft. levels no development work was done. Diamond drill work—The following diamond drill work was done during the month of April: Hole 19 on 900-ft. level was advanced 142 feet, making a total length of 406 feet, for the purpose of prospecting for cross leads in a southerly direction. Hole 50 on the 900-ft. level was started in a direction north 14 degrees east, thus extending hole 19 northwards; this explored the ground north of its starting point for cross leads for a distance of 109 feet. Neither hole has proved the presence of any ore.

A later cable states: "Horizontal bore on 600-ft. level west struck the ore at an angle of, approximately, 30 degrees; core not sorted; from 36 feet to 53 feet, assays \$4.75; 53 feet to 56 feet., \$5.45; 56 feet to 64 feet., \$5." Office note: "This ore-body, which has been cut on the 600-ft. level, is most probably the continuation of the body being worked in stope 20 on the 500-ft. level, which is still yielding excellent ore. The diamond drill having cut it at an angle, it cannot be assumed that it is 28 feet thick at 600 feet; but the fact that the unsorted ore over 25 feet (without taking into account the few feet of high-grade ore) gives an assay value of about \$5 is very satisfactory."

The secretary has issued the following circular to shareholders:

"The directors having had the advantage of an interview with Mr. Coudrey, your manager in Rossland, who is at present in London, think that the following information may be of interest to the shareholders. Since the report circulated at the time of the last general meeting, announcements have from time to time been made of the discovery of fresh bodies of shipping ore of good value on the 600-ft. level, at which depth no considerable body of such ore had been previously encountered, so adding appreciably to the life of the mine as a shipping proposition. This being so, the question of concentration now becomes of secondary importance, as long as the mine continues to ship ore of good grade, only certain low-grade ores resulting from sorting (or otherwise) in producing the shipping ore will be put through

the concentrator. It is satisfactory, however, to be able to state that this can be done at a fair margin of profit. Your directors have pleasure in declaring an interim dividend of 15. per share, free from income tax, payable on the 9th of June."

WHITE PASS & YUKON.—The gross earnings for nine days to April 30th, \$34,026, and for seven days to May 7th, \$34,092.

LE ROI (Rosslund).—Mr. A. J. McMillan, the managing director, last month sent the following lengthy cable to London, explanatory of the conditions at the mine:

"As a result of a very careful inquiry since my arrival here on 5th of May, I can state the large estimated profit reported by Rosslund office during recent months, especially since last December, apparently could not have existed. Faulty assaying and sampling at the mine, with shipments to smelter which included a great deal of ore too poor to yield a profit, must be held accountable for this.

"S. F. Parrish has sent in his resignation, which I accepted. I have made, and am making, changes in management. Sampler and assay office at the mine have been closed. New sampling mill at the Northport smelter is running most satisfactorily. I have appointed temporarily the firm of J. H. Mackenzie and Bradley, of San Francisco, as consulting engineers.

Concentrating has been strongly recommended by Mackenzie to treat low-grade ore, shipping high-grade ore and concentrates to Northport smelter. I have secured the services of an expert from Anaconda. He has had considerable experience with concentration tests in a mill we have leased near the mine. I have had this question under consideration for some time, and hope to be able to decide the matter shortly.

"The lack of suitable fluxing ore resulted in the shut-down of the Northport smelter near the end of March, but we are now getting about 160 tons daily from the mine and some custom ores. We are now running four furnaces, thus realizing upon some 40,000 tons of ore in the yards. We are also carrying on the development of the mine. Permanent smelting on a large scale requires large deliveries of custom ores for flux. These are difficult to obtain regularly. I will give every care and attention to this matter. The Great Northern Railway has announced the immediate construction of a railway to the Boundary district. This would greatly benefit us in the present condition of affairs.

"The company owed to the Bank of Montreal, Rosslund, on 30th April, in excess of assets quickly realizable, about \$130,000. Independently of the value of the mine and the Northport smelter, the company has other assets not immediately realizable, including the old dumps, which are largely in excess of the above amount. I have arranged with the Bank of Montreal, Rosslund, for the present. The Northport smelter furnace bottoms sent to Tacoma, estimated by J. H. Mackenzie at about \$85,000, realized \$100,000.

"J. H. Mackenzie states that the mine is looking well and in good condition, with large ore body in sight, which should yield a good profit by concentration, though too poor to pay to smelt. There is also considerable tonnage of high-grade ore suited to smelting which can be easily and cheaply extracted when handling low-grade ore."

IRON MASK (Rosslund)—Mr. D. C. Corbin, as trustee for various interests, has foreclosed on the mortgage held by him on this property. Proceedings were commenced some time ago, but Mr. Corbin signified his intention of protecting shareholders, willing to pay a pro rata of the indebtedness. The ownership of the mine is now vested in Mr. Corbin's name, he acting as trustee for the other interests concerned.

AMERICAN INSTITUTE OF MINING ENGINEERS.

The eighty-seventh meeting of the Institute will be held in the Lake Superior iron and copper regions, beginning at Duluth, Minn., on Wednesday, September 14th. The congress, arranged by the American Society of Civil Engineers, will be in session at St. Louis from Oct. 3rd to Oct. 8th, and the Institute's programme has been arranged to permit of members attending the congress if they so desire.

MACHINERY NOTES.

MACHINERY for the mill being erected by the Reliance Mining Company on Forty-Nine Creek in the Nelson district is now being delivered.

It is reported that it is the intention of the Elwood Tinworkers' Mining Co. to install a compressor plant on the Silver Dollar group, in the Calborne district this summer.

The new Overstrom concentrating table, manufactured by the Allis-Chalmers Company, is giving very great satisfaction at the Fern mill, where now ten stamps are working.

Concentration operations were resumed at the Rambler mine, McGuigan, in May, and it is expected that the output in consequence will be considerably augmented. A new ten-drill compressor and two machine drills have been installed at the mine.

The Rosslund Power Company's new concentrator at Trail is now completed and operations, it is expected, will be commenced shortly. Satisfactory progress is also being made in the construction of the White Bear concentrator, which should be ready for use by about the end of July.

An air compressor and other plant has been consigned from Chicago to the Company operating the Betts and Hesperus mine, on Hardy mountain, near Grand Forks.

The new classifier recently installed at the Slovan Star concentrator was designed and invented by Mr. Chas. Culver, the mill foreman, who has also been responsible for several important improvements in the mill equipment at this mine.

COAL EXPORTATIONS AND TRADE.

OPERATIONS at the Harewood mine, which some time ago was re-opened by the Western Fuel Company, at Nanaimo, have been suspended, partly on account of differences with miners, but chiefly for the reason that the property was not a paying one. By this decision a number of men are thrown out of work, while also the recent fire threw others out of employment. It is hoped, however, that ere long production will start at the new mine at Departure Bay.

Harrison's last report states that "Coals mined in Australia specially adapted for steam purposes, are likely to find in San Francisco an unprofitable market for several months to come, as they have come in direct competition with British Columbia and Washington coals, which are being landed there at prices with which they cannot possibly compete. Prices remain unchanged, although slight concessions are being made for round lots. The volume of business is extremely light, and complaints thereof are very general. The present rates of freight on grain carriers are exceedingly low with a dismal outlook for any improvement in the near future. This will not prove very seductive to coal carriers from Australia seeking this port for profitable business."

The Wellington Colliery Company is endeavouring to find a market for the Vancouver Island coal in Mexico, the San Francisco demand, having in late years decreased in consequence of the introduction of oil for fuel purposes.

Work at the Morrissey colliery, East Kootenay, has been resumed after a five weeks' suspension of operations.

RECENT INVENTIONS AND NEW REGISTRATIONS.

The following companies have been registered during the month:

Kootenay Coal Co., Limited, capital \$1,000,000 in 25 cent shares.

Minnie Mining Co., Limited, capital \$125,000, in \$1 shares.

Palmata Mining & Development Co., Ltd., capital \$15,000, in 1 cent shares.

Mt. Meadow Gold Mines, Ltd., capital \$90,000, in 3 cent shares.

White Channel Gold Hill Hydraulics, Limited, capital \$575,000, in \$1 shares. Of the said shares there are set apart 75,000 shares as preference shares.

The Royal Banner Copper & Gold Mining Co., Ltd., capital

\$1,000,000 in \$1 shares, has been registered as an extra-provincial company. The head office of the company is at Grand Forks, and Mr. G. W. Averill acts as attorney for the company in the province.

MINING MEN AND MATTERS.

MR. GEORGE L. FRASER, for ten months master mechanic at the Le Roi mine, Rossland, has resigned to accept a similar position with the International Coke Company at Coleman, Alberta. Mr. Fraser was presented with a gold watch by the employees of the Le Roi shops in token of the esteem in which he was held by them.

Mr. William Turner, for a year past superintendent of the Spitzee mine at Rossland, has resigned that post.

Mr. Richard Marsh is reported to have been appointed superintendent of the Spitzee mine, near Rossland, in place of Mr. Wm. Turner.

Mr. R. H. Anderson, late superintendent of the Le Roi mine, Rossland, has been presented with a diamond ring by employees of that mine.

Mr. A. H. Sperry, of Spokane, was engaged for several days during the past month in sampling the dumps at the Iron Mask mine at Rossland.

The library of the Canadian Mining Institute has been removed from Ottawa to 80 Stanley Street, Montreal. Mr. F. Cirkel, M.E., being in charge thereof.

Mr. Frank Robbins, formerly of the North Star mine, East Kootenay, but now of Los Angeles, has been examining mining properties in San Bernardino County, Cal.

Mr. Eugene Coste, of Toronto, will probably spend three months of the ensuing summer and autumn in Alaska. Mr. Coste is president of the Canadian Mining Institute.

Mr. Wm. Magenau, mining engineer, of Omaha, Nebraska, has gone to Trail, B.C., says *Mines and Minerals*, to take charge of cyanide works for the Rossland Power Co.

Mr. Herbert Carmichael, Provincial Assayer, will shortly visit Siwash Creek, near Yale, to obtain information for the Department of Mines as to development in that locality.

Mr. A. I. Goodell, formerly manager of the Boundary Falls smelter, is now busy installing the plant at the 100-ton smelter he is erecting at Takilma, Oregon, for the Takilma Smelting Company.

Mr. C. B. Hitle has returned to Nelson from a visit to the Fire Valley, whence he proceeded to arrange for the commencement of work on the properties then owned by the Lightning Peak Mining Company.

Dr. Otto Sussman, an eminent metallurgist, of Frankfort, recently spent some days examining the Granby Company's mines and smelter. Dr. Sussman is connected with the German branch of the American Metal Company.

Mr. H. H. Claudet, the Canadian Ore Concentration Company's manager of Rossland, is at present engaged in making further tests of local low-grade copper-gold ores, and it is said, is obtaining very satisfactory results.

Mr. Richard B. Batey, president of the Metropolitan Gold & Silver Mining Co., Ltd., of Minneapolis, Minn., is now in charge of the company's Triumf mine, near Ferguson, Lardeau district.

Dr. W. A. Hendryx is expected to shortly visit Poplar Creek for the purpose of examining the schists that occur in that locality and are said to carry gold which it is believed can be extracted by the Hendryx electro-cyanide process.

The appointment of Mr. G. Harold Grant, M.E., of Victoria, as attorney for the Copper Mountain Mining & Development Company, in place of Mr. W. C. Spicer, has been gazetted.

Mr. S. F. Parrish, late general manager of the Le Roi Mining Company, Rossland, has gone to California, having sufficiently recovered from his recent severe illness to admit of his making this change for the benefit of his health.

Mr. E. F. Roberts, of the Federal Mining & Smelting Co., has assumed the management of the Sullivan group, East Kootenay, while Mr. F. D. Weeks has been entrusted with the re-modelling and construction of the Company's smelter.

Mr. R. W. Hinton, of Rossland, for nearly two years master mechanic at the Le Roi No. 2, is to supervise the work of construction of the concentrator at the Velvet-Portland mines, near Rossland, Mr. A. Larson is superintendent of these mines.

Mr. Wm. Fleet Robertson, Provincial Mineralogist, left Victoria on 10th ulto. for the Slocan, in which district he will remain several weeks. Later he will visit other mining sections, probably winding up the season's out-door work late in the autumn in the Atlin district.

Mr. D. C. Johnson has resumed his business connection with the American Smelting & Refining Company, after having for some time acted in the capacity of ore buyer for the Le Roi Company's smelter at Northport. He is making Spokane his headquarters.

Mr. J. H. Trevorrow, for several years foreman of the Snowshoe mine, at Phoenix, Boundary district, the practical development of which mine from little more than a prospect to its present producing capacity of about 600 tons of ore daily he had charge of, has been appointed general foreman of the Le Roi mine, Rossland, in succession to Mr. R. H. Anderson.

Mr. J. Mitchell, who is conducting a series of experiments in connection with the concentration of the Le Roi ores, for that company at the O. K. mill, which was leased for the purpose, proposes to first test the ore by crushing and amalgamation and then endeavour to save the unrecovered values by the employment of jigs and vanners and subsequent cyanidation.

The death occurred on May 12th of Mr. Howard C. Walters, who for some years past was prominently identified with mining in British Columbia. In 1889 he organized a company to acquire the Providence mine in the Boundary district, which has lately been placed on a dividend-paying basis. He also promoted the local company which subsequently sold the Britannia mine at Howe Sound for a large sum to the present owners. Mr. Walters' more recent ventures in Mexico were not so successful, and it is believed disappointment in this regard hastened his death.

Mr. Ernest R. Woakes, A.R.S.M., M.I.M.M., the general manager of Messrs. John Taylor & Sons' lead mines and smelting works in Spain, has been granted the official title of "Mining Engineer" by the Spanish government, thus enabling him to officially direct mines in Spain. The *London Mining Journal* states that the Council of the Royal School of Mines, London, assisted very materially in his gaining this diploma, which it is believed has not before been granted to a graduate of that school. Mr. Woakes will be remembered as having for some time been connected with the Duncan United Mines, Ltd., Nelson.

Those intimately acquainted with the late manager of the Le Roi, Mr. S. F. Parrish, are indignant at the insinuation which has been made by one or two London journals that the illness under which he suffered for several weeks was feigned, the suggestion being that Mr. Parrish was party to a disreputable share-rigging scheme. This story is of course utterly and absolutely unfounded. As to Mr. Parrish it is only fair to add that when he assumed the charge of the Le Roi he found a mine badly gutted, practically worthless. To-day it is in a better condition than ever previously, large new ore bodies have been opened up; the mine has been developed to the 1,350-ft. level and good ore there found.

A Toronto correspondent states that on May 30 several members of the Dominion Geological Survey left Ottawa for the season's field-work. Messrs. R. W. Brock and W. H. Boyd are to continue their examination of the Lardeau district; Dr. R. A. Daly resumes his geological work in connection with the survey of the International boundary line between British Columbia and the State of Washington, while

Mr. D. B. Dowling will prosecute marches in the Rocky Mountains, near the main line of the Canadian Pacific Railway. Messrs. R. G. McConnell, F. H. McLaren and Joseph Keele passed through Vancouver last month on their way north, the last-named to continue work in the vicinity of the Stewart River and the others to make an exhaustive topographical survey of the Alsek country.

In response to a letter addressed to Mr. J. P. Graves, general manager of the Granby Company, we have received the following information: "Mr. A. B. W. Hodges, the present superintendent of the Granby smelter, has been appointed general superintendent of the smelter at Grand Forks and the mines at Phoenix. Mr. W. Y. Williams, the former superintendent of mines at Phoenix, has been appointed to fill the position of consulting engineer for the company governing its mining operations. He will probably make his headquarters at Spokane. Mr. Williams has been superintendent of the mines at Phoenix since the latter part of the year '96. His work at Phoenix has been highly appreciated by the Granby Company, and his retention by them in an advisory way in their mining operations is sufficient proof of that appreciation. The success of the Granby mines is attributed entirely to Mr. Williams' integrity and constant care and attention of our interests, and we will appreciate any mention that the RECORD makes of his services to this company. Mr. Hodges, who has been appointed general superintendent, has been with the Granby Company since the commencement of its smelting operations at Grand Forks. Upon him has rested the entire responsibility of the construction and success of the Granby smelter, and his promotion as general superintendent bespeaks the confidence of his work by the Granby Company."

Mr. A. C. Garde, manager of the Payne mine, recently took the opportunity of visiting the World's Fair at St. Louis. In an interview published in the *Lead and Zinc News* he referred as follows to conditions in the silver-lead districts of British Columbia: "Conditions have improved materially since the lead bounty became effective. There has been in excess of \$100,000 distributed in this manner and the payments during the remainder of the year will be still heavier, owing to the fact that the production of the district is to be materially increased during the second half of the year. Naturally, the zinc industry is attracting much attention as well. The idea of having a well-known expert on zinc make a careful examination of the zinc resources of the Province is meeting with much favour and it is quite probable that such an examination will be made during the next few months. No choice has been made for the task, although Mr. Walter Renton Ingalls has been frequently mentioned in connection with the work. Since the addition of a single dollar in net returns over and above mining and milling costs means so much profit, the interest in zinc possibilities can be better understood. Since the majority of the larger silver-lead mines of the Kootenays and the Slocan carry zinc values, you can readily see why it is that any opportunity to add to the commercial value of a ton of ore is grasped at by men whose properties have not been recently worked at a profit. We in British Columbia are looking forward to an era of prosperity, which we hope to be able to extend beyond the period of bounty payments. It is quite probable that British Columbia will be manufacturing her own lead products before many more months ensue and in that way we propose to foster 'home industry.'"

TRADE NOTES, CIRCULARS AND CATALOGUES.

MR. ROWLAND MACHIN, representing in Canada Holman Bros. and Camell, Laird & Co. Ltd., has received the following letter from Mr. A. G. Street, superintendent of the Great Northern mill at Camborne, speaking in very favourable terms of the quality of the steel used in the shoes and dies manufactured by the last mentioned Sheffield firm: "As you requested me to make a note of the shoes and dies that the company bought of you I will say we put them on on the 28th of January and took them off on the 30th of April. During that time we ran 89 days

8 hours and 15 minutes, running 100 drops per minute. I consider them an exceptionally good shoe and die."

The demand for silver-plated amalgamated plates for saving gold in both quartz and placer mining operations, manufactured by Denniston's San Francisco Plating Works, 743 Mission Street, has, we learn, greatly increased, orders having been received there for from so far south as Australia, while in the far north all the large Alaskan stamps mills are equipped with Denniston plates. Mr. E. G. Denniston, the proprietor of the works has now been engaged in the business for no less than 36 years, during which time he has been the recipient of 25 first awards from exhibitions where his plates have been shown. In the manufacture of the plates only the best Lake Superior copper and refined silver are used.

The Canadian Westinghouse Company, Limited, announce (in a very tastefully printed circular by-the-way) that they are erecting a large plant at Hamilton, Ontario, and purpose there manufacturing electrical apparatus of every description. This plant will undoubtedly be an important addition to Canadian industries, being equipped, which goes without saying, with machinery of the most modern improved type, and giving employment, so it is stated, to over a thousand hands. The company announce their intention of employing only Canadian workmen and using nothing but Canadian material.

The Jeffrey Manufacturing Co.'s Bulletin No. 8 deals with Electric Locomotives for Gathering Purposes, the pamphlet being written by Mr. C. E. Wayborn, who enlarges therein on the saving in costs that have followed the employment of electric locomotives in coal mines. The type of locomotive here described is intended to replace mules for gathering work and is thus designated the "Electric Mule." It, Mr. Wayborn tells us, has met with extraordinary success and at last the old darkey's exclamation, "Fust dey freed de darkey, now dey freed the mule," has come true.

The Abner Doble Company's (San Francisco) tangential water wheels are very comprehensively, though tersely, described in a catalogue just issued by this enterprising firm. They point out that modern hydro-electric power generation and transmission has led to great improvement in water-wheels, and it is now imperative that these should possess the qualities of large units in highest economy, close regulation and absolute reliability in service. Hence the tangential water-wheels designed to operate under highheads of water. The catalogue, which is profusely illustrated, very efficiently describes the water-wheel and its special characteristics and advantages.

The Canadian Westinghouse Company, Limited, of Hamilton, Canada, have sold to the Northern Electric & Manufacturers of telephone apparatus, a 300-k.w. steam turbine unit, consisting of a Westinghouse-Parsons turbine and a Westinghouse-turbo-alternator. They report numerous inquiries for these units and anticipate a brisk demand for them in Canadian territory.

Mr. C. C. Tyler has resigned his position as superintendent of the works of the Westinghouse Electric & Manufacturing Co. at East Pittsburg, Pa., and has been appointed General Superintendent of all the works of the Allis-Chalmers-Bullock interests in the United States. Mr. Tyler, who will enter upon his new duties on June 15th, will make his headquarters at Milwaukee. His record in the practical management of great machine-shops is one of the best in the country, and it has long been under the appreciative observation of men who understand the value of such ability. Before Mr. Tyler went to Pennsylvania he had made an excellent reputation, and at Pittsburg, where he has been for half a dozen years, he enhanced this by the results he achieved in increasing the efficiency of the Westinghouse electric works. In the equipment of manufactories, in the design and construction of machine-tools, in the handling of machinery and material, in processes of manufacture, and in fact in all that pertains to the economy of machine-shop administration, Mr. Tyler is recognized as an expert who has no superior in this country. In entering upon his larger field of duty, he is sure to carry with him the congratulations of the engineering profession. His appointment is another evidence

of the care and strength by which the Allis-Chalmers Co. organization (which, it will be remembered, now also controls the Bullock Electric Manufacturing Company) is being wrought together.

The directors inform us that the Metallurgical Company of America has been incorporated under the laws of the State of New Jersey, with a capital of one million dollars. The company intend doing a general metallurgical business.

At the St. Louis Exposition, Machinery Hall, unlike the other buildings, is not closed in the evening, being open until 11 p.m., and visitors in the evening will find at work there, among other objects of interest, the big 5,000-H.P. Allis-Chalmers-Bullock engine and generator producing the electric current to keep aglow the 120,000 or more decorative lights which glitter all over the buildings and grounds.

The Jenckes Machine Co. (Sherbrooke, Quebec) have issued a new catalogue described as Series F, Bulletin 616, dealing with Standard Crushing Rolls. They introduce the subject as follows "Crushing rolls, originally brought out in Cornwall, England, have been in use many years as necessary adjuncts to the crusher or breaker. They are generally simple in construction, may be run at comparatively high speed, as their motion is rotary, not reciprocal, and they give a very uniform product. Owing to the nature of their motion, less expensive foundations are needed for a set of rolls than for a crusher of the same weight." The catalogue illustrates the standard types and sizes of crushing rolls now built by the Jenckes Machine Co.

We direct attention to an advertisement appearing in this issue of a new rock drill, known as the Little Wonder Air Hammer Rock Drill, which has, we learn, already won a high place in the esteem of miners and quarrymen in the United States. The machine weighs but 17 pounds and can be operated successfully with 14 cubic feet of air per minute at a pressure of from 80 to 100 pounds. It is moreover fully guaranteed by the manufacturer and inventor, Mr. Martin Harbsoeg, who states that if the drill does not give absolute satisfaction, proving all he claims for it he will refund the price thereof to the purchaser. The drills are now in use in following States in the United States: California Colorado, Arizona, South Dakota, New Mexico, Missouri, Kentucky, New York, Ohio, Utah, etc., and even in Alaska, South Africa and Japan, the little drilling machine has been sold on its merits. The Alaska-Treadwell Gold Mining Co., of Douglas Island, Alaska, has accepted the agency for this drilling machine. In a recent issue an Alaskan contemporary published the following in reference to the work of the drill: "A number of mining men visited the Ebner mine yesterday to witness a practical exhibition of the Little Wonder Air Hammer Rock Drill. An average of one inch a minute was made on the hardest rock and the test proved the machine to be one of the best inventions towards the reduction of the cost of breaking down rock. The Treadwell company are using the machines with the most satisfactory results."

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