

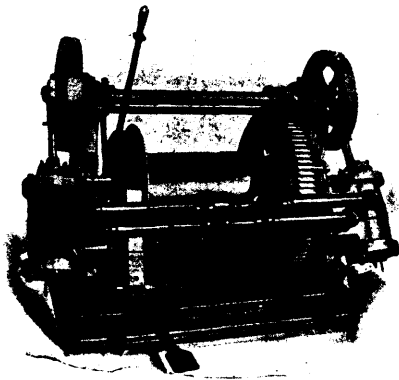
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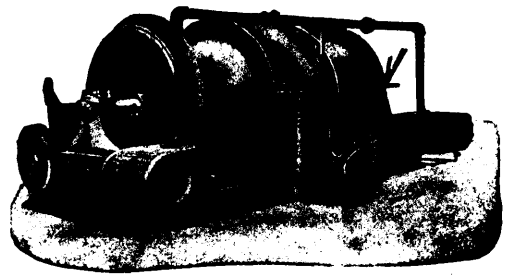
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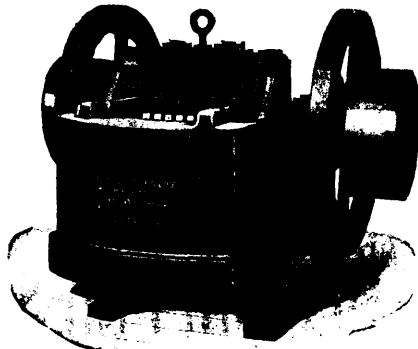
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Earle C. Bacon, Engineer

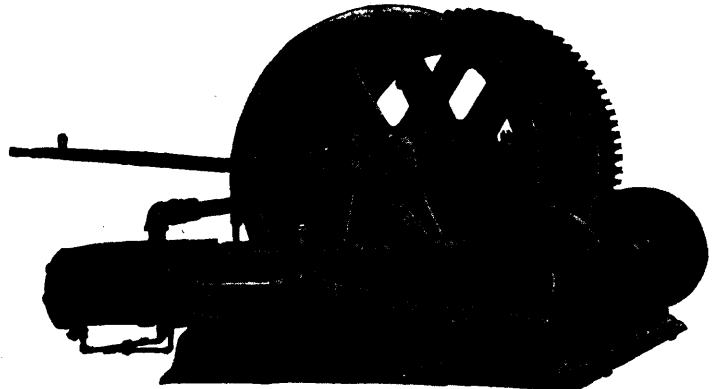
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Conveyor 328 feet centers, handling 4 tons "run of mine" coal per minute.

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Steel Coal or Ash Cars.

ANY MATERIAL.
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THE LINK-BELT MACHINERY CO., Engineers, Founders, Machinists, Chicago, U.S.A.



WM. R. PERRIN & CO., CHICAGO, ILL., U.S.A.

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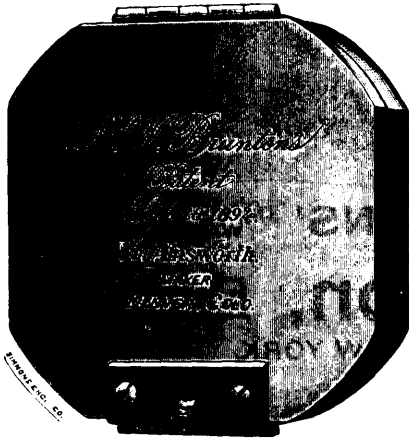
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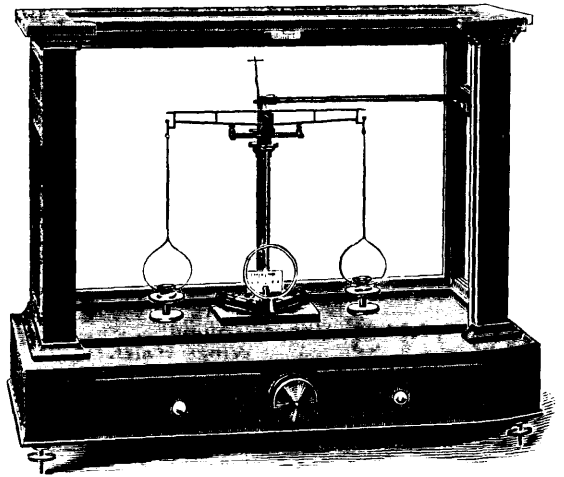
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It has all the latest improvements and is an up-to-date balance in every particular.

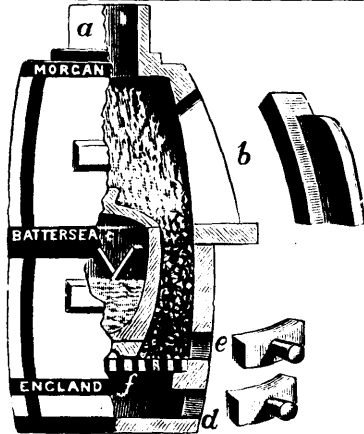
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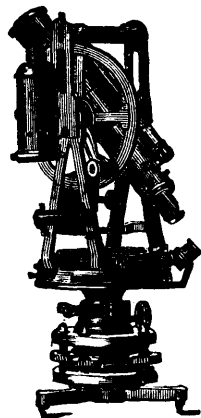
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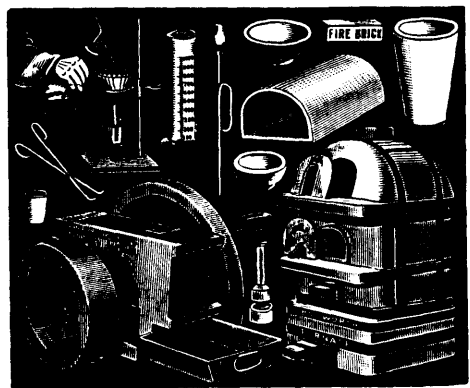
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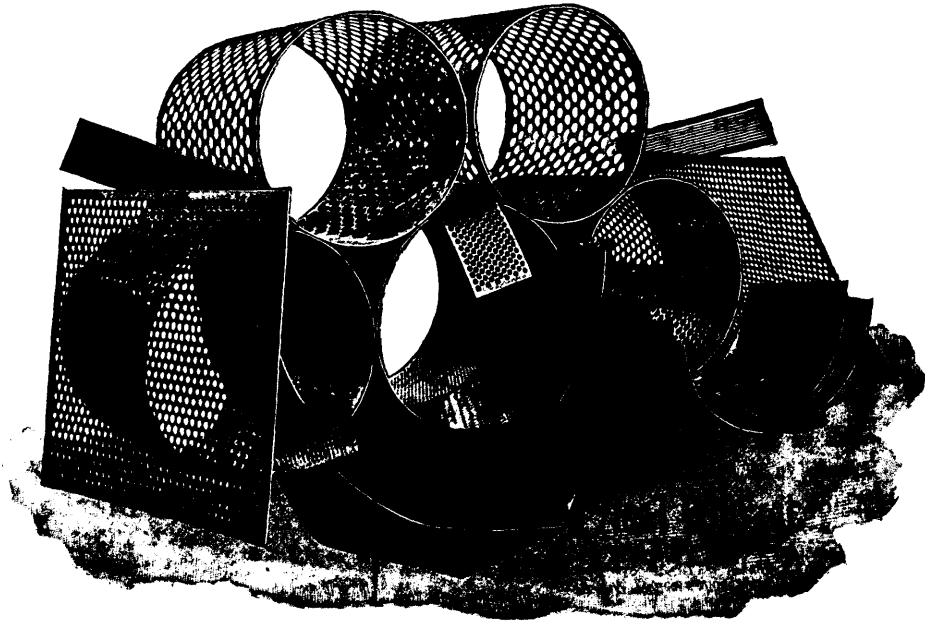
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And equipment of every kind. Our machinery in these lines is more largely used than that of any other manufacturer. It is in use on all gold fields and is recognised everywhere as the best. The Whitewater Deep Concentrator is a recent example of our work. Ball Pulverizers such as used at the Republic Mine and the Helena & Livingstone Mill are of our manufacture. Write for Catalogue.

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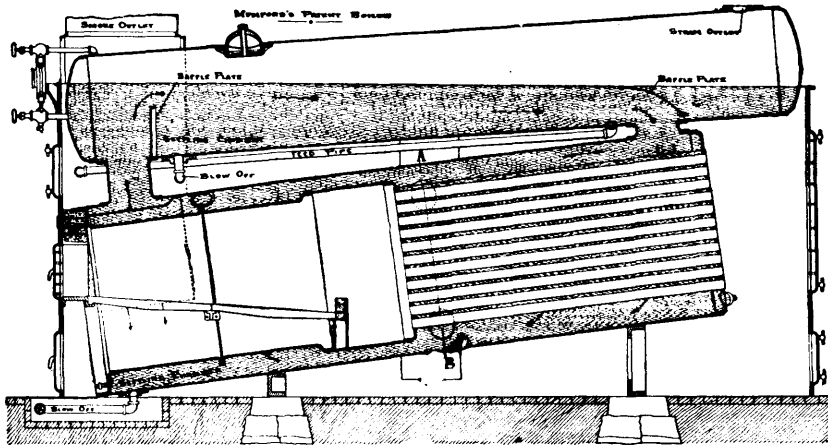
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Gives exclusive attention to the development and utilization of Water Powers by the most modern, economic and improved methods. An experience of more than fifteen years, involving both the theory and practice of hydraulic engineering as relates to power development in its widest range of application, is at the service of customers.

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Adapted to all Heads from
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Our experience of **33 YEARS** building Water Wheels enables us to suit every requirement of Water Power Plants. We guarantee satisfaction.

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The Stilwell-Bierce & Smith-Vaile Co.
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A HIGH TESTIMONIAL.

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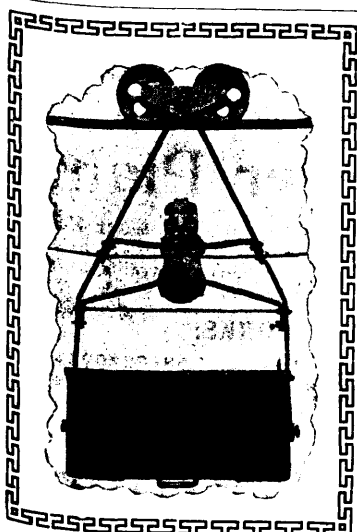
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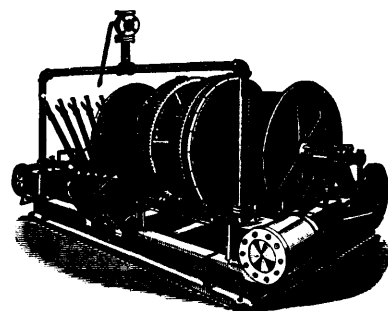
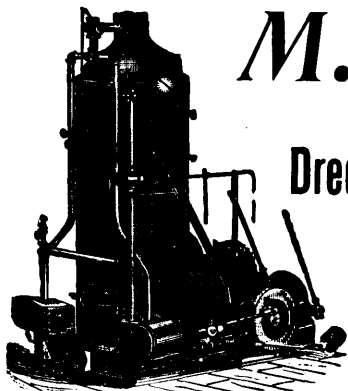
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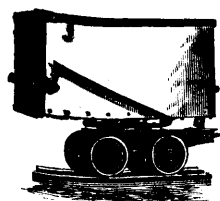
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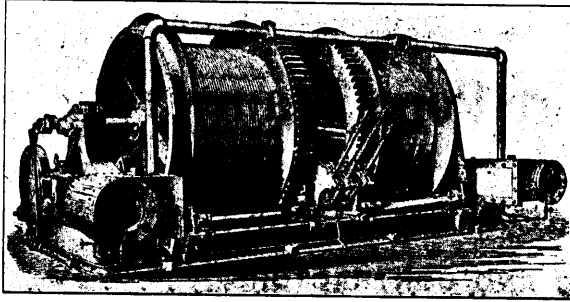
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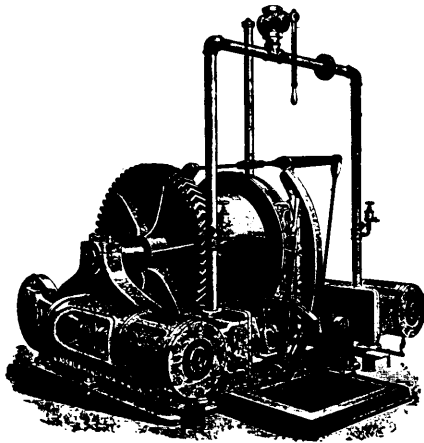
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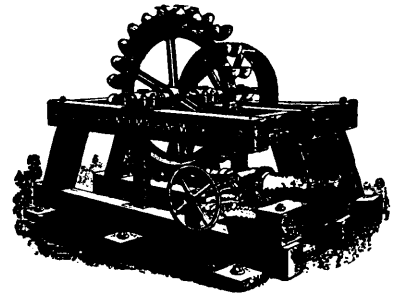
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READY
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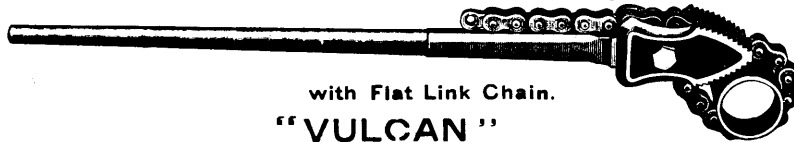
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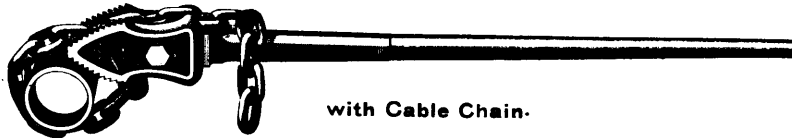
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Patent Drop Forged Chain Pipe Wrench,



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The Mining Record.

Vol. V.

JUNE, 1899.

No. 6

BRITISH COLUMBIA MINING RECORD

Devoted to the Mining Interests of British Columbia.

PUBLISHED BY

The Mining Record Limited Liability.

ADVERTISING RATES ON APPLICATION.

H. MORTIMER LAMB, Managing Editor.
London Office: 21 Coleman Street, E.C.
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Denver, Col.: National Advertising Co.
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All communications relating to the business department of the British Columbia MINING RECORD to be addressed to the BUSINESS MANAGER, B.C. MINING RECORD, P.O. Drawer 685, Victoria, B.C.

A REVIEW of the past month's happenings would be very incomplete without strong reference in these columns to the serious mine accidents which have occurred within the last two and three weeks in the Trail and Boundary districts. Of SAFETY RULES these, the disaster at the War Eagle AND mine, whereby three men were RECENT MINE instantly killed and one fatally ACCIDENTS. injured, demands special attention. It appears that five men entered a skip to descend into the mine, when, without any warning, a bolt becoming detached, the cage fell with frightful velocity to the bottom of the shaft, a distance of 600 feet, with the result we have already mentioned, one man, however, in the most miraculous manner, escaping practically without injury. Meanwhile the coroner's jury in bringing in their verdict, strongly emphasise the fact that the mine machinery in question was defective, inasmuch as safety-pins "should have been inserted in all the bolts to protect the nuts of said bolts," and further express the view that as certain defects took place previous to the said accident, men should not have been permitted to ride on the skips until such time as the machinery at the War Eagle was perfected beyond a reasonable doubt. To this verdict the coroner's jury added several important riders: first, that a daily report should be made by the engineer-in-chief as to the working of the machinery; secondly, that certificated mechanical and electrical engineers should be appointed at mines to examine all machinery in operation; thirdly, that the Government should appoint several mining inspectors, and that a resident inspector should be appointed for the Trail Creek district; and lastly, that the practice of employing uncertificated engineers for positions of responsibility

in the mines of the Province—a practice which is too general—is to be condemned; and that in future the strictest rules should be enforced for the safety of workmen in metalliferous mines. These suggestions are worthy of the best consideration of the Mining Committee of the Provincial Legislature, and it is to be hoped that action will be taken thereon upon the earliest possible occasion. Meanwhile, we are enabled to publish a very admirable set of safety rules—compiled by Mr. J. D. Kendall, the resident partner in this Province of the engineering firm of Messrs. Bewicke, Moreing & Co., and posted by him at the Idaho, Alamo & Cumberland Mines—which, it will be noticed, have a very wide scope and, if properly enforced, would certainly prevent the occurrence of such regrettable accidents as that at the War Eagle Mine. If, for instance, the engineman at the War Eagle had been obliged to make a daily written report of the state of his engines, as here provided, it is highly probable that the bolts at the skip would have been more securely fastened, for the engineman would feel a greater responsibility, and thus conduct his examination of the machinery with greater care; and there would also be the further assurance that an examination had actually been made. It may be added that these rules are in force in the mines of Great Britain, where the respect for human life is far higher than on this continent, and that they have received the approval of the Mine Inspectors of that country:

RULES

To be Observed, as far as Reasonably Practicable, by the Several Persons Under whose Names the Same are Respectively Set, or to Whom the Same Respectively Apply.

MINE FOREMAN.—1.—Shall have the daily supervision and responsible charge of the mine. 2.—Shall see that a copy of these rules is posted in some convenient place in each engine-room near the entrance of the mine. 3.—Shall visit each working place in the mine at least once every shift, and examine carefully and sound with a hammer, when necessary, the roofs and sides thereof. If he finds any unsafe place where men are working, he must withdraw the men at once, and not allow them to return, except for purposes of repair, until the danger has been removed. He shall regularly examine the tram or travelling roads, and if he finds them in an unsafe condition, he must at once take proper means to ensure the safety of the workmen using such roads. 4.—Shall at once inspect such parts of the mine as may be reported to him unsafe, or in any way needing his attention, and so far as possible have any defect remedied at once. 5.—Shall use his best endeavours to prevent any deficient supply of timber or other material, and if there be not sufficient timber on the ground, he must bring the men affected out of the pit. 6.—Before holing into any place, not then working, he shall use additional caution. In approaching workings known or supposed to contain water or carbonic acid in quantities which may be dangerous, he shall keep one or more holes going about ten feet in advance of the forehead for a least twenty feet before he expects to hole into such working. 7.—Shall see that all the working places and travelling roads are properly ventilated, and if the air in any of them shall be in such a state that a newly-trimmed candle, standing erect, will not burn brightly for at least five minutes, he must prevent the miners or any of them entering or remaining in

such working place or travelling road. He shall frequently test the ventilation, and keep a record of such tests in a book provided for the purpose. 8—Shall keep a written account of all complaints made to him by the workmen of the state of the ventilation, or of any other matter affecting the health or safety of the workmen. 9—Shall fence off all dangerous places in the mine, and have the word "Danger," in large letters, fixed on such fences, and he shall see that sufficient light is kept at every entrance to a shaft. 10—Shall see that any rope, not regularly in use, is not employed for raising or lowering workmen, unless it has been properly examined **throughout by a competent person, and pronounced safe.** 11—Shall see that nothing is lowered in any compartment of a shaft in which any one is working, unless such person can remove to another compartment of the shaft. He shall see that all winches, when in use, are in charge of competent persons who thoroughly understand both them and the signals, and who must make a daily written report as to the condition of the winches and ropes, etc., of which they are in charge. He shall not allow any two or more persons to work over one another in a shaft, or elsewhere, unless the lower person or persons be properly protected, where possible. 12—Shall see that all manholes are kept clear, and that all drop holes or mills or other dangerous places in the mines, all pulleys, overhead ropes, winch handles, and other sources of danger are properly fenced. 13—Shall see that all signalling apparatus are kept in good order and regularly tested every day before use. 14—Shall see that the shafts, slides and all ladders and ladders are kept in good order. 15—Shall, to the best of his power, enforce the observance of the Inspection of Metalliferous Mines Act, 1897, and also of these rules, and suspend any one infringing or attempting to infringe the same, and order him out of, or from, the mine.

MINE SHIFT-BOSSSES.—16—Shall act under the instructions of the mine foreman, and to the best of their power enforce the observance of the Inspection of Metalliferous Mines Act, 1897, and of these rules. 17—Shall, on their respective shifts, have the responsible charge of the mine, and shall carry out rules 2 to 14, inclusive.

HOISTING AND OTHER ENGINEMEN.—18—Each engineman shall once a day, at the commencement of his shift, thoroughly examine the engines and boilers under his charge, to see that they are in good order, and shall immediately report any defect he may observe to the superintendent. The engineman on the first shift shall also make a written report of his examination every day. Hoisting enginemen shall carefully examine and sound with a hammer the pulleys and plummer blocks on the pit-head or gallows frame. At the same time the timber supports must be examined, and all defects at once reported to the superintendent, and afterwards recorded in a report book kept for the purpose. 19—Every hoisting, hauling, or winch engineman shall have a thorough understanding of the signals in use and attend to them, and on no account start his engine until he has received the proper signal. If the signal be indistinct, he must not move the engine until he clearly understands it. If he receives a wrong signal, he must at once report it to the superintendent. 20—Enginemen shall not, upon any account, lift a cage or kibble without first giving signal No. 1 to the shaft foot, and not then until after the lapse of a quarter of a minute, unless he has immediately before received the "All Clear" or No. 1 Signal from the shaft foot. 21—Enginemen shall not, on any pretext, leave the handles while their engine is in motion. 22—When raising or lowering persons, they shall work the engine so that the speed of the cages or kibles in the shaft is not more than three miles an hour, or 400 feet per minute, unless there be detaching hooks on the ropes; then the speed may be increased to 600 feet per minute. 24—In the absence of pit-topman, hoisting enginemen shall see that no person is allowed to descend the pit without permission from the superintendent; that no workman or other person goes down the pit in a state of intoxication; that no intoxicating drink be taken down the pit, except by special permission from the proper authority, and that not more than the proper number of persons descend at one time, and, so far as he can, see that the safety gates are in proper position. 25—Before lowering any man in a shaft in which two cages are running, enginemen must ring 2 to the shaft foot. 26—Enginemen of every description shall not allow anyone to be in their engine-house, or to work their engine, without permission of the superintendent, **and they must see that the fencing around dangerous parts of machinery is kept in its proper position.** 27—When acting as firemen as well as enginemen, they shall carry out rules 28, 29, 30, 31, 32 and 33.

FIREMEN.—28—Must not, on any account, put, or allow to

be put, upon safety valve, any additional weight beyond that properly belonging to it. 29—Shall at once report to the engineman and the superintendent any defect in the boilers, tubes, dampers, and fittings. 30—After a boiler has been cleaned or repaired, they must report the same when ready for inspection to the superintendent. 31—Shall keep the water in each boiler at the fixed working level, as far as practicable; but if, from any cause, it becomes dangerously low, they shall at once close the dampers, and either draw the fires or damp them down, and report to the engineman and superintendent. On no account must a large quantity of water be put into a boiler at once when working, but every boiler then must be fed as slowly as possible, and so as to keep the upper surface of the water at or near the level indicated as the "Water Level." 32—After a boiler has been out of use, they shall not re-light the fires unless authorized by the superintendent. 33—Shall strictly observe and carry out the directions of the superintendent in the management and working of the boilers.

PIT-TOPMEN.—34—Shall have control of the shaft top, and shall not allow any person to descend the pit without permission from the superintendent. 35—They shall regulate, subject to any directions of the superintendent, the order in which persons shall enter the cage, skip or kibble, and see that only the allowed number of persons descend at one time. 36—They shall see that no car be on the cage when any person descends, and that workmen's tools be always sent down the shaft in a car otherwise empty, or in an empty skip or kibble. In a sinking shaft no person shall be allowed to ride against a loaded kibble or water barrel. 37—They shall not allow any person to descend in a state of intoxication, nor allow any intoxicating drink to be taken down or into the pit, except by special permission of the superintendent. 38—When men are about to descend the shaft, the pit-topman must ring 2 to the shaft foot. 39—They shall not allow any one to descend in a cage without a cover, nor on the cage top above the cover, without permission of the superintendent. 40—They shall not allow any person to take any tools with him into the cage, skip or kibble. 41—They shall make themselves thoroughly acquainted with the signals, and shall not allow any unauthorized person to interfere with the means of signalling. 42—They shall remain near the pit top when persons are descending and ascending, in order to signal to the engineman in case of accident. 43—When persons are to descend the shaft, the agreed signal shall be given by the pit-topman only. 44—Where shifts are continuous, they shall change at the shaft, so as to insure proper attention when the cages, skips or kibles are being worked. 45—They shall keep the gates at the shaft top closed as much as possible, and not leave the shaft without seeing them properly closed, nor until all the men on their shift have ascended. 46—They shall keep the cages, flat sheets, and all places near the shaft free from ore, stone, and loose material. At sinking pits they shall take every precaution to prevent anything falling down the shaft. 47—They shall see that all timber and other materials sent down the shaft are properly fixed on the cage, skip or in the sinking kibles, or otherwise as may be arranged. 48—On the first shift they shall carefully examine—before the men ride the pit—the ropes, chains, and cages, etc., used in raising and lowering the miners and other workmen, at once report any defect to the superintendent, and make a written report of the inspection. 49—They shall at once report to the superintendent any defect they may observe at any time in the ropes, chains, cages, detaching hooks, safety gates, signals, or other apparatus, and prevent the use of the same until examination of them has been made and their further use been authorized by the superintendent. 50—They shall, to the best of their power, enforce the act and these rules, and report any infringement or attempted infringement of the same to the superintendent.

UNDERGROUND WORKMEN.—51—Every workman shall strictly attend to the directions of the mine foreman and other authorized persons with respect to the safe working of the mine and the proper discipline of the persons employed thereat. 52—No workman shall, unless authorized by the mine foreman or mine shift-boss, go into any part of the mine except that in which he is placed by the foreman or other official, or except as directed in rule 60. 54—No workman shall go beyond any fence, danger board, or other recognized signal, unless specially authorized by the mine foreman. 54—Should the working place of any man become unsafe from any cause, he shall discontinue working in it, and immediately send or go for the foreman or shift-boss. 55—No person shall attempt to enter or leave a cage, skip or kibble whilst in motion. 57—Explosives not required for

immediate use underground must be kept in a box provided for the purpose until they are to be used, and there must be no detonators in the said box. 58—Every miner shall attend to the condition of his working, and the same must be kept properly timbered, where necessary. If this for any reason cannot be done, they must leave their working at once, if remaining at their work is attended with the least risk. 59—If the ventilation of any working be such that an erect candle, newly trimmed, will not burn brightly for at least five minutes, workmen must not on any account remain in such working. 60—Before firing a shot in any place which is likely to hole that place into another, the person about to fire the shot shall first examine the place into which he is likely to hole, satisfy himself that it is safe for firing, and that no person is in it at the time, and shall take precautions to prevent any person going into either place, until the shot has been exploded. 61—All holes fired in the mine must be charged in such a way that no more than five inches of stemming or tamping shall be used. In case of a miss-fire, no attempt shall be made to remove the stemming, but another cartridge must be placed on top of it, and one or two inches of additional stemming. The latter cartridge must then be fired in the usual way. If the bottom cartridge or cartridges should not be fired by this means, the hole must be left and information given at once to the mine foreman or mine shift-boss. Further, in case of miss-fire, no one shall enter the working where such miss-fire has occurred before the lapse of twenty minutes, unless he be using a fuse which cannot by any possibility hang fire. When holes are fired by electricity, the person charging the hole shall see that, during charging, the battery is locked up, so that no one can get at it, and he shall keep the key in his pocket, or he shall see that the battery is not connected to the cable until the charging is complete and every one is out of danger. 62—All workmen must understand when the signal two bells is sent from the surface that someone is about to descend. They shall then send the lower cage or skip away empty.

GENERAL REGULATIONS.—63—No person shall wilfully damage, or, without proper authority, remove or render useless any fence, manhole, place of refuge, means of signalling, signal notice, or notice board, or anything in or about the mine. 64—All persons who are casually employed underground (carpenters, smiths and others) shall be amenable to the act and these rules, and shall make themselves acquainted with the same. 65—Every workman shall strictly adhere to the general rules of the Inspection of Metalliferous Mines Act, 1897, and to these rules, and to the regulations contained in the various notices fixed for their safety and guidance in or about the mine, and any person who may observe or have a knowledge of any neglect or infringement of the same, shall report the case to the mine foreman, so that immediate means may be taken for applying a remedy. 66—No person shall depute anyone to do his work without the consent of his superior official. 67—If any workman shall find any of the plant, driftways, or workings in or about the mine in such a state as in his opinion to endanger life or limb, or if the ventilation be in such a state as in his opinion to affect the health of persons working in any part of the mine, he must at once call the attention of the mine foreman or mine shift-boss to such supposed defect. 68—All notices fixed in or about the mine must be authorized by the mine foreman, and no person shall in any way damage the face, or remove any such notice, or any marks left by the mine foreman or mine shift-boss. 69—Every person is enjoined to thoroughly acquaint himself with the General rules of the Metalliferous Mines Act, 1897, and with these rules. 70—Any workman who neglects to observe any of the provisions of the Metalliferous Mines Act, 1897, and these rules, or refuses obedience to the orders of the officials, or interferes with, or impedes, or obstructs any person in the discharge of his duties, or interferes with or obstructs the working of the mine, shall be suspended or ordered out of or from the mine. 71—Any person suspended or ordered out of or from the mine for breach of the Metalliferous Mines Act, 1897, of these rules, or for any other cause, shall not be employed again until authorized by the superintendent. 72—Where the duties of more than one department are entrusted to the same person, that person shall be bound by and observe the rules attached to all such departments. 73—All workmen having occasion to pass through a fence, gate, door, or brattice, shall immediately close the same. 74—Any person employed in or about the mine wilfully or negligently doing anything (whether expressly prohibited by the foregoing rules or not) likely, in the opinion of the foreman, to endanger life or property, or anyone observing anything aforesaid that is forbidden being done and not reporting the

same to the official in charge, will be deemed guilty of a breach of these rules.

SIGNALS.

For Regulating the Movement of the Cages, Skips and Kibbles in Shafts. They must be Strictly Observed by Enginemen, Pit-Topmen and Miners, as Well as by Every Other Person Ascending or Descending the Shafts.

1—One bell from the mine means all clear, and the engineman is to lift at the same speed as when raising ore. One bell given when the skip, cage or kibble is in motion means stop at once. One bell given by the engineman to the mine, after cages or kibble have stood for more than the ordinary drawing intervals, means that he is about to move them.

2—Two bells mean lower, except when the cage is at the bottom level and the signal is sent from the surface; they then mean that the cage is to be stripped. This signal should always be given before putting on or taking off a car at the bottom level if there are boxes on the cages for the purpose of drawing water.

3—Three bells means men about to get on to the cage, skip or kibble, and the engineman must give one bell back to the shaft foot to signify that he has received "No. 3 Men" signal. Men may then get on the skip, cage or kibble. After that, one bell given from below to the engineman means lift slowly, and two bells mean lower slowly.

4—Four bells, followed at a short interval by two bells, mean lower to the next level where there are more than two levels. Four bells, followed at a short interval by one bell, means lift to next level. If men are above to ride, they must give three bells and receive one bell back from the engineman before giving this signal.

5—Five bells means start pumps. This signal given when pumps are going means stop them.

6—Four bells, followed at short interval by 1, 2, 3, 4, etc., bells mean send down tools to 1st, 2nd, 3rd, 4th, etc., level.

7—Five bells, followed at short intervals by 1, 2, 3, 4, etc., bells, mean send down explosives to the 1st, 2nd, 3rd, 4th, etc., level.

9—Ten bells mean that men are about to get on cage, skip or kibble, and that there has been an accident. The engineman must at once attend to this signal, and give one bell to the shaft foot. On receiving one bell afterwards from the bottom, he must lift slowly, as stated for signal 3.

A Mr. John A. Wauchope, who, as some people have reason to know, has had some short experience of mining in British Columbia, somewhat injudiciously perhaps, under the circumstances, contributed an article to the London *PROCESS AND Mining Journal* of recent date on the subject of "The low grade ores of BRITISH COLUMBIA ORES. British Columbia, and how to make them profitable." This, however, is a subject of very great moment in this country, and if Mr. Wauchope or anybody else can suggest a cheaper or more effective mode of treatment for our low grade ores than that at present in operation, he will be accredited with having contributed in an important degree to the future industrial welfare and progress of mining in the Province. We are inclined to question whether Mr. Wauchope has succeeded in this respect. His proposal, in short, is nothing more nor less than that the low grade ores of British Columbia should be treated by the so-called "Beam process," which he asserts has been in operation in Denver, Colorado, "for some considerable time with the most satisfactory results;" that for two or three years it has been subjected to the severest investigations and tests that could be applied, under the immediate control and supervision of well-known scientists, with the result that "it is being demonstrated more every day that the principles involved in treating ores by this process are so simple as to cause the amazement of everybody who have visited the Company's works

at Denver and Florence." Mr. Wauchope after describing a "Beam" plant which he states is in successful operation at Florence, Colorado, proceeds to sum up under separate headings the peculiar features of the "new" process as follows: 1. Pulverising be not less than 40 mesh (dry crushing). 2. Converting the sulphides to sulphates in an air-tight muffle furnace with converting chemicals. 3. The combination of a low heat and cheap and economical chemicals to produce the result sought after, with accuracy and a saving of time, as distinct from the often complex chemical conditions encountered in the old line reductions. 4. Also being completely under the control of the operator; the time for reducing being lessened, cost of heat being about one-sixth of what is required under the old line, with so much less time consumed, means a lower charge for treatment, with the higher extraction. 5. The ease with which the operator can balance the ore under treatment should any material change occur in the same. 6. The adaptability of this treatment alike to high grade ores as well as low grade. By the cyanide process high grade ores could not be satisfactorily treated, and when this or the bromo-cyanide process is used, great trouble occurs owing to the slimes. By Beam's process all this is obviated. 7. Its adaptability to all classes of ore. 8. It separates the gold more completely, and a higher percentage is obtained from the ore, there being no loss by volatilization. Thus, in comparison with smelter tests, the "Beam" treatment, it is claimed, will return \$60 to the ton of 2,000 pounds as against a return of \$29 accorded by ordinary smelter process. This, taken in conjunction with the fact that a complete "Beam" plant having a capacity of 25 tons per diem can be constructed for less than \$8,000, is surely a sufficiently high recommendation for any process; and if Mr. Wauchope could but afford convincing proof of the truth of the statements he has brought forward in favour of the "Beam" process, within a very few months "Beam" furnaces would be installed at every mine in North America, while not a smelter would be in operation, and one of the most difficult problems British Columbia mine-owners have been called upon to solve would be finally and satisfactorily settled. The "Beam" process unfortunately, however, has not only failed to receive endorsement from any prominent scientist in the United States, but some have even gone to the length of characterising it as an impudent swindle. The argument, it is true, might be brought forward that any process that would so completely revolutionise existing conditions and render smelter treatment no longer necessary, would naturally be opposed and decried by metallurgists and smelter operators; but it is absurd to imagine that the "Beam" process which was first brought before the public nearly eight years ago should not ere this have found disinterested and independent expert testimony to herald its merits. Even granting the existence of a conspiracy among American metallurgists to prevent the "Beam" process from obtaining the recognition to which it was entitled, surely Mr. Beam and his associates, with the advantages at their command in the possession of so extraordinary an invention, have displayed but little enterprise or zeal in not having proved, in spite of all opposition, the great superiority of their process over ordinary and known methods of ore treatment; and in view of their failure to do this, the present scepticism is surely excusable. Mr. Beam, the inventor of the process which, in Mr.

Wauchope's opinion, is to do so much for the low grade ores of British Columbia, first came into prominence by the publication of an article in the *New York Engineering and Mining Journal* of July 28th, 1888. At that time Mr. Beam posed as the inventor of an original method of assaying, and the values he managed to extract from ores that had been previously considered worthless, created the disastrous mining boom of Arkansas in 1888. Mr. Beam was then associated with a "Professor" Aughey. The pair very foolishly agreed to demonstrate the veracity of their test before a committee of competent assayers, of which Mr. Wheeler, assayer for the United States mint, was a member. The article in the *Engineering and Mining Journal* above referred to, contains an account of the proceedings, and thus concludes: "It will be observed that 19 assays in all were made by the methods so successfully used elsewhere by "Professor" Aughey and Mr. Beam. In only two of these was gold obtained—in Assay No. 2 of May 3rd, in which 8 oz. were found, and Assay No. 4 of May 4th, in which 11.6 oz. of gold were obtained. It will also be observed from the statement of Mr. Thacher (one of the committee) that in the former of the two assays "Professor" Aughey forgot to put in any ore, and that in the latter the charge consisted of iron ore and other barren material which had been successfully substituted by Mr. Wheeler for the mixture of roasted Lost Louisiana ore. Further comment is unnecessary." Such is the record of the inventor of the process recommended by Mr. Wauchope to British Columbians. Of the process itself, the following letters on the subject, fairly representing others which have appeared in the American press from time to time in the course of the last ten years, are eminently condemnatory:

Mr. Percy Williams, a very well-known Colorado assayer, writes on December 25, 1897; "My first experience with the 'Beam' process was at Telluride in 1894, where they were operating a small mill and testing various rebellious ores of the San Juan district. The mill was abandoned the same year. At the time I investigated the process carefully, especially in regard to the air-tight roasting feature. It struck me forcibly at the time—and I have since had no cause to change my opinion—that if the Messrs. Beam could indeed save 125 per cent. of the assay value they had a good thing, because 25 per cent. is good profit. I took to their mill some ore to be tested; the results were unsatisfactory, and they frankly told me so. I was a public assayer, but they would not allow me in their assay office where the 'milling' was done, but they courteously allowed me to inspect their mill outside of this department. It seems that they first dried their ore, then pulverised in a dry-stamp battery to 40 mesh, mixed the ore with salt and sawdust, and placed it in the air-tight furnace. I could not witness this stage of the process, as the furnace was 'air-tight,' therefore of invisible interior; so I took their word for it that the roast was 'cherry-red,' and that the gases generated were 'not strong enough to support and carry off particles of the gold.' The next stage of the process consisted in transferring the roasted ore to pan amalgamators, where I was told the gold and silver were amalgamated and the copper subsequently removed by chemicals from the amalgamator tailings. I did not see this operation actually carried out, but they showed me some handsome gold retorts, and bright copper nuggets which were kept in a bottle in the

assay office. It impressed me that a process consisting of so many stages of procedure must be a rather costly one to apply to the treatment of low grade ores, but then I suddenly remembered that their 125 per cent. extraction left Messrs. Beam a safe margin in which to operate and still compete with the smelters. I also distinctly remember that I left Telluride wondering what good was accomplished in roasting ore in an air-tight furnace, when afterward the 'cherry-red' ore was drawn from the furnace and left to the mercy of air currents upon the cooling floor."

The following year Mr. Forbes Rickard, a mining engineer, wrote to the *New York Journal*: "In my observation the 'Beam' process, in various press reports describing mining property, has been invariably connected with the most hopeless prospects, the owners of which, though having little or no prospect of ever shipping, are ever on the point of erecting a mill of the 'Beam' type, and of a capacity of 200 tons daily and upwards, in the hope, I have always thought, of thereby working a miracle in the transmutation of rock into gold. * * * * I would like to ask if there is anywhere after the years that this process has been before the public, a single mill operating the 'Beam' process on a commercial scale; that is, successfully competing in the open market with mills of the stamp, cyanide, chlorination, or mills of any sort? Such enquiry as I have been able to make fails to reveal an instance."

A process, in short, that can perform so many wonders, as for instance the converting of sulphides to sulphates in an air-tight furnace, and the extraction of higher values from ores than they contain, should at any rate be approached with the greatest caution by British Columbia mine-owners.

This combine promises, until broken, to produce many ill effects, among these being a considerable disturbance of industrial conditions in many metal manufactures which call for a large supply of copper. Thus already in the English Midlands, firms manufacturing ammunition and electric appliances have found it necessary—being short of copper and unable to buy satisfactorily in an artificially inflated market—to close down part of their operations. As a result, several thousand skilled workers have been either temporarily thrown out of employment, or else compelled to work half time. And in the end it seems certain, for many reasons, that even copper properties will not benefit, as regards the permanent value of their output, by the forced rise in value of the metal caused by the combine's operations. Thus one among several prominent effects of the obnoxious effort of the Standard Oil Company's group of magnates, will in all probability be the finding of a substitute or substitutes for the use of copper in connection with some of the great manufactures to which the metal is largely applied. Promising efforts in this direction are already, it is stated, being made with aluminum, a metal which in its crude state is present in nature in enormous quantities, being a considerable constituent of even common clay. Up to the present, indeed, although chemical and mechanical skill has continued to reduce very greatly the cost of aluminum production, the value of this light, silvery white metal continues to be comparatively high. It is, however, morally

certain that such an effort as that of the present gigantic "copper corner" will give so large an impetus and offer such special inducements to the many exceptionally able men who are devoting the best of their skill to producing cheaper aluminum, as may well bring about surprising results in that direction. Meanwhile it is interesting to note what usually well-informed English financial opinion thinks of the combine. Such opinion, as it is reassuring to learn, generally holds that the unnatural inflation cannot last long, although it is backed by a vast amount of capital at the command of such men as Marcus Daly and the Rockefeller brothers, who, like Andrew Carnegie, adopt the modern habit of many American millionaires and combine well-advertised pseudo-philanthropy with cunningly elaborated rapacity. Thus a leading journal published in London holds that the present copper combine is bound in the end to collapse, very much as did the like effort of the French capitalist syndicate of the "Societe des Metaux;" though in the present case such men as Daly and the Rockefellers are likely enough to unload and get out before the "slump" begins. And that there will be such a slump is anticipated, not merely from the likelihood of the discovery and large adoption of a copper substitute or substitutes to which we have been referring, but also from the fact that already the effects of the combine—evil in other ways—are being shown in a considerable stimulation of the copper mining of the world. It is furthermore pointed out that several Mount Lyell properties are being energetically developed, with every probability of early large additions therefrom to the world's copper supplies, while South Australia and other promising fields of copper-production are also being energetically worked with every hope of yielding largely. Among these fields of large copper production in the early future it is, as we believe, possible and even likely—though our present gradually increasing output of the metal yet bulks small—that various mining regions of British Columbia may come well to the fore, after the addition to our present copper-producing mines in Nelson and Trail Creek, of big mines in regions like Boundary Creek, East Kootenay and possibly Coast districts which are, though richly promising, only just beginning to be developed.

Of these probabilities and possibilities, London financial opinion believes the promoters of the American Copper Combine to be well aware, and the City Editor of the *Daily Mail* does not hesitate to assert a belief, which many others share with him, that the Copper Ring means to work the Hooley game of company promotions on a large scale, intending thereafter to leave others to face the disastrous outcome. This authority, indeed, avers that the Amalgamated Copper Company, with its \$75,000,000 of capital, is a copy to the life of the notorious Boveril transaction. This is the Copper Company's case: "A miscellaneous assortment of copper shares—Anacondas, Parrotts, and other second-rate mines—was bought on the market, taken into a trust, and in their new form were sold back again to the public at double and, in some cases, treble their original cost. That is the first round in the campaign, and we may expect soon to see the second started. With the seventy-five millions of dollars which the Amalgamated Copper Company will yield them—assuming the brilliant subscription to be correct—they will pick up another miscellaneous assortment of copper shares, convert them into a trust, and unload

them, if they can, on the same kind of gudgeons on whom they unloaded the first lot. If they should succeed a second time they will have a third try, and there is no reason why the game should stop so long as the supply of gudgeons to unload on holds out."

As, however, the world's supply of gudgeons is, though sufficiently large, usually exhaustible in about a twelvemonth at the longest, there is every reason to expect that an end will comparatively soon come to this last venture of the Rockefeller "pietists," though it is, we fear, too much to hope that in their case they will themselves prove sufferers by the ultimate collapse.

We have to congratulate both the shareholders of the New Vancouver Coal Mining and Land Company, Limited, and Mr. Robins, the Superintendent, on the satisfactory statement made by the Chairman, Mr. John Galsworthy, at the annual general meeting of this Company held the other day in London. The total output of the Nanaimo collieries last year aggregate 450,000 tons, on which a profit of £17,000 was shown. This it was pointed out, would, however, have been much less, if the old system had prevailed which prevailed some years ago with regard to tonnage; and for the present change Mr. Robins is entitled to a great deal of credit. Formerly the coal was transported by sailing ships, whose capacity was from two to three thousand tons, and each voyage to San Francisco occupied about a month, whereas now steamships carrying four thousand tons and making the voyage in less than a fortnight are employed. The Company was never in so good a financial position as at present; since not only has the debenture capital been reduced this year by £13,000, but instead of requiring to borrow working capital as formerly, there are sufficient funds on hand available for this purpose, and at the same time the Company is enabled to pay shareholders a dividend this year of 5½ per cent. The Company's assets are now valued at £449,000 against a valuation of £422,000 in 1890.

Some adverse criticisms have of late appeared in the London press with reference to the action of the Provincial Legislature in having cancelled by a repealing statute various concessions granted by its predecessors to companies formed for the purpose of constructing railways through different sections of the Province. The loudest complaint on this score comes from the New B. C. Syndicate, which last autumn purchased for a sum of £3,000 from the Ashcroft & Cariboo Railway Company the charter originally granted some nine years ago to this concern affording the necessary powers for the constructing of a railway from Ashcroft to Barkerville. The proposed railway was conditionally subsidised with a grant of land amounting to twenty thousand acres for every mile of road built; but it was specially stipulated that actual construction work was to be commenced by a stated period. When this time elapsed without any attempt having been made on the side of the holders of the charter to carry out their side of the agreement, they petitioned for an extension of the limit, which was granted not only on this, but on a subsequent occasion, the last extension of time for the commencement of actual construction operations expiring on the 8th of May of the present year. Meanwhile the people of Cariboo

district, becoming disgusted with the shilly-shallying methods of the Ashcroft & Cariboo Railway Co., instructed their representatives in the local parliament to cause the charter to be cancelled, as, in their opinion, the company had no intention of building a railway, and the fact that a charter was held by them prevented more legitimate enterprises from entering the field. This and the circumstance that the new Government had pledged itself to discountenance "charter-mongering" resulted in the cancellation complained of. But before action was taken in the matter, Mr. Cotton, as Minister of Finance, addressed a letter to the representatives of the New B. C. Syndicate, who had purchased the Cariboo charter, asking for a definite expression from them whether or not it was the Syndicate's intention to commence the construction of the line in the immediate future. To this communication a very unsatisfactory reply was received, stating merely that probably work would be begun. If, therefore, the London purchasers of this charter have lost their money they have surely no one to blame but themselves. Had the Government received the assurance for which it asked, there is every reason to believe that the New B. C. Syndicate would have received a treatment in accordance with its intentions; but the country is tired of charter-mongers and their methods.

From an authoritative source we learn that the Minister of Trade and Commerce and the Minister of Finance, at Ottawa, are both favourably disposed towards the proposal that has been made to re-admit into Canada, free of duty, pig lead the product of Canadian mines and smelters, but refined in the United States, and an Order-in-Council is likely to be passed on these lines in consequence. The only objection raised by the Ministry to granting this further concession to Canadian lead smelters is that the Government is now offering a bonus of \$30,000 per annum to lead smelters in British Columbia, and it is questioned whether additional assistance is advisable. Last month we gave our views on this question, pointing out then that, while unquestionably the British Columbia lead smelters would be benefitted by the proposal advanced by Mr. Campbell of the Hall Mines, Ltd., he was wrong in his contention that the lead miners of the Slocan would also profit by the arrangement: that, moreover, if it was a question of improving the condition of the latter, there should be no discrimination in favour of lead ore smelted in Canada, but that Canadian lead miners should continue to enjoy to the full the advantage of competitive smelting rates, their product, no matter where smelted or refined, being allowed to return to Canada free of all custom imposts. On these grounds the point to be determined would be, which industry is it to our best interests to chiefly encourage, that of lead mining or of lead smelting? But while there could hardly be room for a difference of opinion on such an issue, the Federal Government has of course rather to consider how much support should be reasonably extended to our lead smelters to enable them to compete on even terms with United States reduction works. It would be certainly impolitic, and even harmful to the Province's lead mining industry, if we allowed the local smelters to close down, and thus place our miners quite at the mercy of the American Smelter Trust by the withdrawal of Canadian competition. On the other hand, it is the

duty of the Government to endeavour to obtain the highest market price possible for the Canadian lead miner, and this could not be accomplished by the means suggested by Mr. Campbell. The problem is a very difficult and complicated one, principally because at the present time we cannot in this country, as can the Americans, treat the "wet ores" of the Slovan economically. When extensive bodies of "dry" ore are discovered and worked in British Columbia the whole question will be materially simplified.

It is believed that the Provincial Administration is somewhat divided in opinion on the Eight-Hour legislation. The more cautious members, including certainly Messrs. Hume and Cotton, are not without fears on the subject, whilst Mr. McKechnie is enthusiastically in favor of the restriction of hours, which was, as he declares, largely brought about by the electors of the Nanaimo district, which he represents. Mr. Martin has not, we think, declared himself, but he is believed to endorse the legislation, as it follows the general policy, which is strongly approved by most of his special supporters among the electors of Vancouver. Mr. Semlin may probably, on the other hand, be reckoned among the ministers who "hae their doots."

It may, however, be taken for granted that the legislation compelling the adoption of a shorter day of eight hours in metalliferous mining will be enforced, for a majority of the members of the Legislature either themselves favor it on principle, or else must with more or less reluctance yield to the labour vote, which is in almost every principal constituency large, and in most able to control. The Speaker, the Hon. Mr. Forster, is genuinely enthusiastic for the Eight Hours Bill, as a labour representative and also as one who in former days was compelled to work for far longer hours when he plied the pick and shovel as a collier. Messrs. Keith and McPherson also strongly support the measure, from inclination and upon principle, and, as we have said, a majority of other members of the Legislature will for motives of policy, if not from personal desire, support the measure, if the Eight Hours Working Day enactment should next session be threatened, as challenged, with opposition in the House.

Mr. Hume, as Minister of Mines, has recently stated that while in his opinion the general effect of the Eight Hours legislation should on the whole be beneficial, it may and, he fears, will bring about cases of hardship that will call for legislation making provision for such exceptional instances. Mr. Hume will, however, find the making of such exceptions a matter of the greatest difficulty, it being not only by no means easy to make legislative inroads on a measure that receives wide approval amongst the masses, but almost impossible to define clearly and make elaborate provisions to meet the cases of individual mine-owning hardships resulting from the compulsory adoption of the Eight Hours Day. Mr. Hume will find, as others have found before him, that such hard cases make bad law, if it be attempted thus to meet and provide for them. The legislation will in all probability have to stand or fall, as a whole.

Meanwhile the Silver-Lead Mine Owners' Association of British Columbia have published an announcement this month of the course that employers in the Nelson and the Slovan districts have very nearly unanimously decided to adopt. Both the Sandon and Nelson notices are very temperately and sensibly worded, and it is pointed out that the mine owners of this district were not consulted in any way as to this radical change in the mining law, and on being informed of the passage of the Act, made every effort in their power to have the law held in abeyance until it could be carefully considered by those interested; that the standard rate of wages for miners, \$3.50 for a ten-hour shift, was as high as paid anywhere in the United States or Canada, and that this rate was satisfactory to both mine owners and employees; that by reducing the hours of work from ten to eight hours, the wage-earning capacity of the miner would be more than proportionately reduced as far as the mine owners are concerned. The most amicable relations existed, and still exist, between the employers and the employed at the mines. The men were earning good wages, equal to any being paid in camps in the United States, and higher than those paid in many, and they were rendering good services for these wages. If any discontent was rife at the existing state of affairs, it was not generally known. It is therefore deeply to be regretted that the legislature has seen fit to disturb the existing harmony, to interfere with the growing prosperity of the mining districts, to reduce the wage-earning power of the men employed, and to interfere with the free right of contract hitherto enjoyed. It is then stated that on the 1st of June the rate of wages for an eight-hour day will be three dollars at the majority of the Slovan and Nelson mines. Whether the Miners' Union will agree to accept this reduction is not at the present time known, and the reports that have been circulated on this point are very contradictory. It is sincerely to be hoped, however, that the matter will be satisfactorily adjusted, if needful, by arbitration, under the Industrial Dispute and Conciliation Act, of 1893, as suggested by a Nelson paper, and that the enforcement of this very ill-considered piece of legislation will not be responsible for the "closing down" of our great silver-lead mines at the very period when the market and other prospects are so exceptionally bright.

Last month we took occasion to adversely criticise the action of Mr. Hastings, of the War Eagle Mine, and Mr. Carlyle, of the British America Corporation, in having conditionally agreed to the miners' terms. It appears, however, that this criticism was hardly fair. A few days after the signing of the Act, the Government Inspector gave the management of the War Eagle and Le Roi mines imperative orders to adopt the eight-hour working day. Neither Mr. Hastings nor Mr. Carlyle had any recourse but to conform, and as Mr. Carlyle was seriously ill at the time he avoided the precipitation of trouble and allowed the wage-question to remain in abeyance. Again, the conditions prevailing in Rossland are very different to those in the Slovan. The wages paid in Rossland are three dollars per shift to miners, three dollars and a half to machine men and two dollars and a half to muckers and car men. Even so, the experimental working of the eight-hour system, according to a press despatch, has not proved satisfactory, from a mine-owner's point of view, in this district, and

expenses have largely increased in proportion to the amount of work done. Fortunately, the Miners' Union in Trail Creek is a very sensible body of men, and as the mine-owners in this camp are willing to act in a spirit of fairness, there is not likely to be any friction in this district, at least.

On the 30th of May the announcement was made that in consequence of the demands of the miners, who, it is stated, have decided to hold out for the three-dollar and-a-half wage for eight hours' work, a number of the big Slocan mines, including the Payne, Last Chance, Sovereign, Ruth, Idaho and others, have "closed down." This action on the part of the mine-owners will, doubtless, bring matters to a head and, it is to be hoped, the Union to its senses.

The London *Critic*, on the whole a very fair critic indeed, refers in a recent issue to the London and British Columbia Goldfields, Limited, as "by far the most prudently administered English company operating in the province." In view, however, of the way in which the great majority of English concerns are operated in British Columbia this can hardly be regarded as very warm praise, although it is intended as such. Meanwhile the London and B. C. Goldfields is without doubt, the example in this province of how a mining company should be administered. It has paid fair prices for its properties, but those properties have in every case been worth buying. Enormous profits have not gone into promoters' pockets, but on the other hand, money has not been spared in securing the best professional advice and opinion both as to the value of the mines before purchase and subsequently with regard to their operation. Then too, the engineers engaged for this work were well versed in local mining conditions and not, as is often the case importations from South Africa or Australia. The capitalisation of the London and British Columbia Goldfields is sensibly moderate, and with such mines as the Ymir, Whitewater and the recently acquired Enterprise, substantial and regular dividends should ere long be the order of the day.

The eminently commendatory notices and reviews with which the press not only of British Columbia, but throughout Canada and the United States, has generally received, the 1898 Report of the Minister of Mines of this Province, must necessarily afford Mr. Robertson, the compiler of the work, a high measure of gratification and go a long way towards repaying him for the great labour and care bestowed on the production of this his first official report as Provincial Mineralogist. So far as we are aware, British Columbia has adopted, in the issue of the annual mine reports, a strictly original course, which in the interest of investors might well be imitated by other countries. The New Zealand Mines' Department returns, for example, are excellent in their way, but one may look in vain therein for expert, which is likewise official, information, respecting undeveloped prospects and mines, the like of which has constituted for the last two issues the special features of the British Columbia reports. It is often the case that the mere prospect is served up to the public in a dish so richly garnished with "boom" statements, furnished by so-called mining engineers, that it is almost a cause for wonder that relatively so few people are taken in thereby. Hereafter, however, thanks to our

annual official Reports, the public will have only itself to blame if gulled under such circumstances.

For several years past the subject of securing a thoroughly representative exhibit of the resources of British Columbia for the annual Winnipeg Exhibition has been discussed by the Industrial Exhibition Association of that place; but owing to the lack of space accommodation, it was not found possible to take any steps in this direction. However, this year the Association has received special assistance from the Department of the Interior at Ottawa, and a suitable building will be erected for the reception of a British Columbia exhibit at Winnipeg. This is very gratifying intelligence, for there can be no doubt that a display of our mineral and other resources at Winnipeg will arouse much interest and create a very favourable impression among the many thousand visitors from the States and elsewhere who throng to the annual Exhibition. The "American Day" feature of the Fair, we are told, is becoming most important, and last year no less than five thousand excursionists from the United States visited Winnipeg for the occasion. All mineral exhibits from British Columbia will be carried to the Fair free of cost, and it is therefore to be hoped that our mine-owners and mine-managers will show their appreciation of the efforts put forward by the Winnipeg Industrial Exhibition Association by sending as complete and representative a collection of mineral specimens to the forthcoming Exhibition as possible.

Mr. Morris Catton indulged, as usual, in numerous misstatements and gross exaggerations of modicums of fact at the recent general meeting in London, England, of the Klondike and British Columbia Goldfields Company, Limited. He could not, however, disguise the facts that the only dividend yet declared by the company was illegally paid out of capital and that a considerable loss was made last year on the shipping and trading operations of the concern, this amounting to no less than £9,395, or about \$45,000. However, Mr. Catton made in doubtful compensation huge promises as to the future, stating in particular that the company's representative in the Yukon was applying for bench claims on Indian River and Soda Creek, which would be worth millions sterling. Mr. Catton then capped this by asserting that the coming output of the Yukon would be from £8,000,000 to £10,000,000, or well nigh \$40,000,000 to \$50,000,000. And the credulous shareholders present at the meeting seem to have accepted the above statements, which are worthy of a modern Munchausen, though they emanated only from a personaly travesty in miniature of Mr. Ernest Terah-Hooley. Mr. J. H. Turner was present, as we are sorry to note, at the meeting, though he only seems to have indulged in a few tolerably safe generalities. It would, however, be infinitely better for the ex-Premier, if he once for all severed his connection with such doubtful London financiers as Mr. Morris Catton and his leading associates. Not a single financial paper of any authority in England has a good word to say for Mr. Catton, who stands, moreover, condemned, as an utterly untrustworthy man to follow, by the fact that he is unable ever to make any deliverance concerning mine or other properties in which he is interested, without indulging in language of extravagant exaggeration.

THE VAN ANDA MINES AND SMELTER,
TEXADA ISLAND.

TEXADA ISLAND has of late claimed a goodly share of public attention, owing largely to the operations there of the Van Anda Copper and Gold Company, and the installation by this concern of a fifty-ton water-jacket furnace on the properties for the treatment of its own ores. The company own eighteen mineral claims, four of which, namely, the "Copper Queen," the "Cornell," the "Florence," and the "Little Billy," have been to a certain extent developed. As yet, however, none of the properties can be described as mines, although from all accounts the showing on the "Cornell" is particularly encouraging and

from the beach in a contact between lime and granite, having about fourteen feet of heavy mineralized matter, shipments of which have brought returns of 15 per cent. copper. The "Florence" is still another parallel vein similar to the others, a shipment from which at grass roots to the Everett Smelter returned 18 per cent. copper and \$18 in gold per ton.

The Van Anda Mines are situated in a crystalline limestone belt on the northeast coast of Texada Island, being a contact of lime and granite, in which are dykes of porphyry, feldsite and diorite, the richest mineral as a rule being along the contact of the lime and feldsite, often permeating the lime as far as the porphyry. The veins and dykes as a rule carry a direction of northwest and southeast (60' west of north),



VAN ANDA TOWN—FROM SOUTH.

two or three hundred tons of very fair ore has been taken out. On this claim, sinking is now being carried on at two points, in addition to which a tunnel is being run in on the ore-body, which is here said to be fully ten feet wide and to have an average value of \$35 per ton. Mr. Treat, the company's manager, is our authority for the statement that from this opening thirty tons of ore is mined during the twenty-four hours. A road is being built to the property, on which ore-bins, providing for automatic handling, are being constructed. On the "Copper Queen" two air-drills are at work in the bottom of the shaft, which is now down to a depth of approximately three hundred feet, sinking being continued at the rate of three feet per day. The "Little Billy" is located about 150 feet

the mineral varying in width of from 1 to 16 feet in the "Copper Queen," and reaching a width of 30 feet in the "Cornell." The vein matter is a chalcopryite and bornite, carrying molybdenite and frequently sylvenite and free-gold. The veins dip slightly to the south and are not exceedingly wet.

While the enterprise and energy displayed by the Van Anda Company is to be highly commended we are inclined to question whether the erection of a smelter on the Island at this juncture is not somewhat premature. To keep the smelter in operation for twenty days of each month at its full capacity the output from the properties would necessarily be a thousand tons per month, which equals the total production of the Van Anda mines to date. According to the



CORNELL—TUNNEL NO. 1.



CORNELL—TUNNEL NO. 2.

recently published report of the Minister of Mines, last November there was no large amount of ore "in sight" in the "Copper Queen," and at that time the "Cornell" was an undeveloped prospect. If since, the development has been sufficient to warrant the erection of a smelter, it is an instance of remarkably successful and rapid mining. We can, however, cheerfully express the hope that the enthusiastic expectations of the Van Anda Company may be realised. Meanwhile, a description of the smelter plant, written by Mr. Thomas Kiddie, the superintendent, a very clever and competent metallurgist, and formerly connected with the Orford Copper Company, is appended.

"The Van Anda smelter, now under construction, is located at Van Anda Bay. The works are laid out at

The charging platform level, 15 feet above, connecting the furnace with the ore-bins, coke, flux and roast-piles, and the upper level of ore-bins 18 feet above, where material of all kinds is received, weighed and sampled. From this general arrangement, which is common to all smelters, there will be the minimum amount of handling. A water tank 16 feet in diameter and 10 feet high is placed 70 feet above high-water mark, which affords ample water supply for the furnace and protection in case of fire, the large pump also being connected with the salt water in case of fire or any mishap to the water supply from Van Anda Creek.

In the smelter shed the furnace stands in the centre with the charging platforms and scales in the rear. The gases of the smelter pass through a long iron pipe to the dust chamber in the adjoining building,



THE COPPER QUEEN.

right angles to a line drawn from the Copper Queen shaft to the wharf, a distance of 2,800 feet, with an elevation of 225 feet and is connected therewith by a well-graded road.

The smelter site is located on rising ground, giving the necessary elevations between the smelter and ore-bins, where all material—ore, coke and fluxes are received. Ores from the "Copper Queen" and "Cornell" mines pass over scales, where they are weighed and sampled. Ore, coke, etc., which come in from the coast mines will be unloaded at the wharf and hoisted up the incline, connecting the ore-bins with the dock, weighed and sampled, the ore either being dumped into bins or trammed to the roast piles.

There are three general levels—the smelter level, 15 feet above high-water mark, where the furnace, boiler, engine, dust chamber and matte-cracker are located.

where the flue dust—rich enough to be re-smelted—is saved. The gases, after passing through this chamber, pass into the air by a 50' stack placed outside the building. For some time to come the slag will be taken out in ordinary slag-pots, but provision has been made to use water for this purpose in the future.

The ores after being roasted will be trammed to the furnace direct, where they are mixed with the necessary quantity of flux, lime or iron, and dumped at the mouth of the furnace, together with the requisite quantity of coke to be shovelled into the furnace by the feeders. The iron ore and limestone being previously cracked and laid down near the scales ready for use.

After smelting, the matte and slag will run into a settler or fore-hearth on wheels high enough to admit of the matte being run into matte pots, the slag over-



COPPER QUEEN ENGINE ROOM.

flowing into slag-pots, which are allowed to cool and dumped out as waste, while the matte is taken in ordinary pots to the matte shed, where it is allowed to cool, coarsely broken and passed through a crusher, driven by shafting from the main engine; it is then

sampled and sacked. A track connects this shed with the dock for shipping facilities.

The plant, now being installed, consists of a 42" copper-lined circular water-jacket furnace, with all necessary appliances for the same; 2 positive



FLASH LIGHT VIEW IN SHAFT COPPER QUEEN.



LITTLE BILLY—SHAFT AND TUNNEL.

blowers, 2 horizontal slide-valve engines, 1 80-h.p. boiler, and 1 20-h.p. hoist, 2 12 x 7 crushers, 1 set of Cornish rollers, sample grinder, and general sampling appliances; 1 8" x 4" pump, 1 16' x 10' water-tank, placed at an elevation of 70' above high-water mark; 1 dust chamber 10' x 30', connected with an iron stack 50' high by 3' in diameter.



THE LITTLE BILLY DUMP.

without interfering in any way with the general levels already established.

Texada Island is well supplied with lime and iron ore, while the supply of coke will be obtained from Union, Vancouver Island.

All things considered, the Van Anda Company have made a wise selection in establishing their smelter at Van Anda. It will also give the mines along the coast an exceptional opportunity of marketing their ores and getting regular smelter returns on their shipments without the great expense of sacking and freighting to Europe or the States."

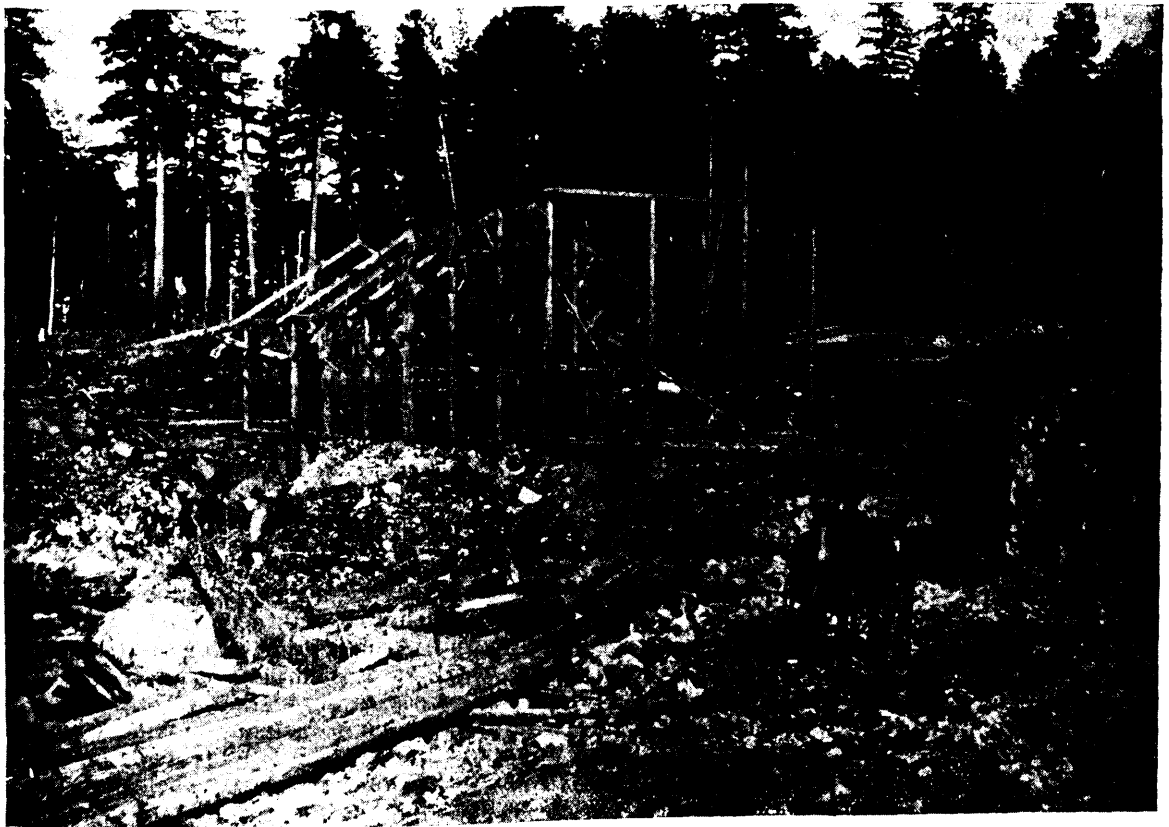
HAFOD COPPER WORKS,

A Brief Description of the Welsh Process of Copper Smelting as Practised at Messrs. Vivian & Sons' Hafod Copper Works, Swansea, South Wales.

(By J. O'Sullivan, F.C.S.)

CLASSIFICATION OF THE ORES, ETC., TREATED.

THESE vary both in percentage of metal and in composition, according as the supplies of them arrive from various countries. Of all it may be said that they are sure to be



THE SMELTER IN COURSE OF ERECTION—TEXADA ISLAND.

The water supply for the furnace is obtained from Van Anda Creek close by, and is pumped up by a No. 80 hydraulic ram, delivering 2,500 gallons per hour, 100 feet high, the boiler being supplied from the waste water of the furnace.

While the present plant is of 50 tons capacity, the buildings are arranged so that this may be doubled

accompanied by a large amount of gangue (that is non-metallic mineral vein-stone), which is commonly siliceous in composition. Five classes are, however, distinguished by the smelter, which must be either treated differently or carefully mixed.

1st Class.—Poor ores, containing a little copper pyrites and a considerable quantity of iron pyrites;

in these the percentage of iron and sulphur (from the two minerals) is of course large; copper being present only to the extent of from $1\frac{1}{2}$ to 9 per cent.; for example; Norwegian pyrites $1\frac{1}{2}$ to $3\frac{1}{2}$ per cent., Rio Tinto pyrites 3 to 6 per cent., Seville ore 4 to 6 per cent. Betts' Cove (Newfoundland) ore 7 to 9 per cent.

2nd Class.—Sulphides, carrying from 10 to 18 per cent. copper, such as New Quebrada ore, 10 to 12 per cent.; Copiapo ore, 15 to 17 per cent.; Libiola ore, 12 to 18 per cent.

3rd Class.—Richer sulphide ores, Chalcopyrite, Bornite, etc., running from 20 to 50 per cent. copper; for example, Chili ore 20 to 28 per cent., Namaqua ore 30 to 35 per cent., "Cape" ore (peacock) 35 to 45 per cent., and, formerly, Anaconda ore 40 to 50 per cent.

4th Class.—Oxides and carbonates of copper (cuprite, melaconite and malachite) with a little of the sulphides, silicates, copper precipitates, native copper ores, i.e., ores carrying native copper (metallic copper) and copper barilla (copper sand).

5th Class.—A product of ores which have already undergone a metallurgical process abroad (fusion), and constitutes a regulus or matte, generally rich in copper, yielding from 45 to 60 per cent., and sometimes 72 per cent of the metal; for example, Chili regulus 45 to 48 per cent., Columbian matte 47 to 49 per cent., Montana matte 53 to 60 per cent., Boleo matte 60 to 62 per cent., Anaconda matte from 62 to 72 per cent. copper.

Large lots of Chili blocks (copper), assaying from 97 to 98 per cent. copper, are also matted and refined at these works. Also, rich argentiferous and auriferous Anaconda furnace-bottoms have been treated from time to time at Messrs. Vivian & Sons' Silver and Gold Works.

CALCINATION OF THE ORE.

1st Operation—

Note: This operation, the object of which is to expel the large excess of sulphur in the cupreous pyrites, and to oxidize the sulphide of iron into oxide of iron, is dispensed with in the case of the richer sulphide ores of the 2nd and 3rd classes.

The calcination is conducted in reverberatory furnaces, called "Calciners" at a very low temperature with free access of air. The charge, three to four tons, is introduced into the furnace by means of a hopper on the roof. After about two hours, it is turned over by paddles; this is repeated from time to time during the calcination, which is completed in twelve hours, when the charge is withdrawn. The sulphur dioxide produced in this case escapes into the atmosphere; but the poorer "cupreous sulphur" ores of the 1st class are calcined in the automatic calciners of Herr Gerstenhoffer called "patent calciners," when the sulphur dioxide formed is carried by the air currents into the sulphuric acid chamber, and thus utilized for the manufacture of that acid.

MELTING OF THE CALCINED ORE, ETC.

2nd Operation—

The charge, 42 to 46 cwts. consists of a mixture of the calcined ore and a proportion of the sulphide ores of the 2nd class, that do not need calcining, and metal furnace slag. "Sharp Slag," containing about 3 per cent. copper.

It is melted in a reverberatory furnace called "ore furnace" for about six hours, whereby a regulus, or matte, called "coarse metal" or "ore metal," is pro-

duced, carrying from 20 to 25 per cent. copper; and a slag, "ore furnace slag," composed of silicate of iron and earthy bases, and containing from one to three-tenths of one per cent. of copper.

The metal thus produced should not contain more than 35 per cent. copper, since that would mean a small proportion of sulphide or iron (Fes.), which would be likely to have oxidized copper in the slag; and not less than 30 per cent., if possible, since that would not be economical.

CALCINATION OF THE COARSE METAL.

3rd Operation—

The charge, four tons of the crushed metal, is calcined for from 24 to 36 hours at a low heat, in a reverberatory calciner. The object of this is to oxidize the sulphur, combined with iron and the iron and the iron itself, leaving cuprous sulphide (Cu_2S) untouched; this point, however, may not be reached, or it may be over-reached in actual practice. (Some sulphate of copper (CuSO_4) is unavoidably found in this operation.) If the calcination be very imperfect it can be corrected in the 4th operation.

4th Operation—

Melting of the calcined coarse metal in the metal furnace (reverberatory furnace), mixed with certain proportions of rich ores of the 2nd, 3rd and 4th classes, rich copper slag from the 5th and 6th operations (roaster and refinery slag), copper scale and siliceous matter, called "cobbing," i.e., old pulverized bricks from furnaces (foul).

Result: A rich metal (matte) whose copper percentage varies according to circumstances from, say 55 to 80 per cent. These products are classified into red, blue, white and pimple metal. Red, from 55 to 65 per cent.; blue, from 65 to 72 per cent., white from 72 to 78 per cent.; pimple, from 78 to 80 per cent. copper. Of course there may be every grade of quality between these estimates.

The percentage can be judged, however, by a practised eye to within one or two per cent. The slag from this process contains about 3 per cent. copper as silicate of copper. It is also rich in oxide of iron and is charged into the "ore furnace," as mentioned above, when the oxide acts as a flux and the silicate of copper is reduced to sulphide of copper.

ROASTING.

5th Operation—

The pigs of fine metal, red, blue, white or pimple, as the case may be, are piled up loosely in the roaster furnace and heated with a gradually increasing heat, the current of air rushing through at the same time. The metal as it melts and drips (called "sweating down") passes through the current of air, and is oxidized; sulphur to sulphur dioxide (SO_2); copper to cuprous oxide (Cu_2O) the oxidation occurs only on the surface of the drips, so when the whole charge is melted we have really a mixture of cuprous sulphide and cuprous oxide, when the reaction occurs.

$\text{Cu}_2\text{S} + 2\text{Cu}_2\text{O} = 6\text{Cu} + \text{SO}_2$, the gas (SO_2) escaping through the melted charge, causing ebullition, thus bringing further quantities of Cu_2S in contact with the air and meanwhile metallic copper collects at the bottom. Metallic copper, however, is able to dissolve limited quantities of the Cu_2S and therefore, when the whole charge becomes metallic the same reaction continues, but slower. If tapped at this point the reaction occurring in the pig before setting produces pimples on the surface, and is known

as "pimple copper." If, however, it is allowed to work a little longer in the furnace less Cu_2S will be contained when tapped. Now, the reaction occurring so slowly will not produce pimples, but raise the chilled crust into blisters; such copper is known as "blister copper."

REFINING.

6th Operation—

About ten tons of either pimple or blister copper is charged into the refinery furnace and sweated down; this oxidizes the large exposed surface. When melted down oxidation is continued by flapping, that is, beating the copper with a rabble-like tool, so as to expose fresh surfaces of the copper to the air. The object of this oxidation is to oxidize and slag off impurities, such as iron, arsenic, antimony, phosphorus, and sulphur as a gas (SO_2). But in separating these the copper oxidizes as well to cuprous oxide. The bath of metallic copper dissolving it as produced; by and by the point may be reached when metallic copper will dissolve no more cuprous oxide; further oxidation of copper would slag copper itself. This pitch of the copper is called the "dry." A ladleful is taken out and allowed to set, when, if it be "dry" a depression, a furrow of the surface is formed; it is brittle, as a brick red, fine granular fracture. The slag is now removed from the surface and anthracite coal or charcoal is thrown upon the charge, and a green pole is plunged beneath the surface. The water of the pole produces steam, causing great disturbance, thus bringing fresh surfaces to the action of the carbon of the anthracite, as well as the pole itself; this oxide of copper is reduced to metallic copper— $2\text{Cu}_2\text{O} + \text{C} = 4\text{Cu} + \text{CO}_2$.

In reality the impurities are not perfectly removed. The copper on being perfectly reduced is not "tough," and malleable in consequence; by an excess of poling this condition is brought about; the copper is then said to be "overpoled."

The fracture of such copper would appear brass-yellow in color and coarsely fibrous.

The presence of certain quantities of cuprous oxide corrects the effect of these impurities, so the poling is carried only to that point where sufficient oxide of copper is present to balance the iron arsenic, etc.

This being now called the "tough pitch."

If that pitch should be passed, it is restored by giving a little air. The refiner decides by taking a "test," a small ladleful, which he cools and hammers, then breaking it in a vice. The fracture should be finely fibrous, silky and pale salmon color. There are three qualities of commercial copper, viz.: "Tough pitch," as produced above; "best select," a pure copper for best brasses; and "tile," a very impure copper, for hard brass. The "best select" is made from a selected regulus, made in this way: Ordinary white metal is partially roasted until some metallic copper is formed as a bottom under the regulus, copper having a greater affinity for sulphur than the other metals present; the metallic copper will contain most of these, leaving the regulus exceptionally pure; this being stripped off from the bottom is roasted by itself to "blister copper," which, when refined, is "best select." The impure copper being refined, makes the "tile copper."

In addition to their extensive reverberatory copper smelting plant, Messrs. Vivian & Sons have had for

many years, several water-jacket furnaces in full blast, producing copper matte carrying from 50 to 56 per cent. copper.

This matte is crushed fine and six-ton charges of it calcined in the modern automatic calciner, "revolving calciner," in which a most perfect calcination is effected in about twelve hours. The calcined product is subsequently reduced to metallic copper by a special treatment. They have also in operation two of Manhes' converters, in which very poor "purchase" matte, carrying 12 to 15 per cent. copper, is blown into white metal of 75 per cent. copper in about thirty minutes—the color of the flame issuing from the converter indicating the desired pitch of the metal.

The methods of copper assaying employed are: "Cyanide," "battery," "subsulphide," and "iodido." The old Cornish copper assay (fire assay) is still practised by this firm.

In conclusion it may be remarked that the success of this world-famed firm, during the last forty years, is in no small degree due to the exceptional skill and ability of its eminent and genial chief chemist, Mr. Suchsland, in charge of the Hafod laboratory, where there are about twenty-five assayers and assistants employed under him, and where about sixty thousand assays of all kinds are made in a year.

MINING AND CO-OPERATIVE EFFORT.

(By R. E. Gosnell, late Provincial Librarian).

SEVERAL years ago I wrote a series of articles for the MINING RECORD on co-operative mining, pointing out how in my humble opinion it was possible to conserve to the people of the Province in a greater degree the wealth which before it is alienated is the absolute property of the Crown—that is, if the people are so inclined. In other words, a man or a company may divert to his or its use the whole of the mineral claim in a claim or group of claims by payment to the Crown for a Miner's license, the fee for recording the cost of labour of assessment (\$500 per claim) and the total capital necessary for development and operation, be the same more or less. I pointed out that labour was the principal item of expense in connection with the development of a mine, and that the same number of men by co-operating among themselves, or with capital, on a regular joint stock business basis could achieve the same results as is done by hiring themselves out to capital at the market price of labour. Theoretically, at least, by the co-operation of labour, mining experience, engineering and mechanical skill and capital on a profit-sharing basis similar results are possible. The only difference would be that the profits would be more widely and equitably distributed. The strong argument against such a system is that a labourer cannot afford to risk his labour, which is his only capital, while capitalists risk as a rule only their surplus, or part of their capital, which, if the worst comes to the worst they can always afford to lose. As a matter of fact, this has always been the stumbling block of co-operation. The labourer prefers, and it is possible always will prefer, to take a sure thing in the way of a certain, though minimum, return in wages to the risk of a common result of pooled labour.

On the other hand, the prospector, who is the pioneer miner, does take not only the risk of his labour, but the risk of his person as well; and practi-

cally the miner, even though he gets a good wage, being free and easy with his money, has little or nothing more at the end of a year than a living to show for his toil. In settled mining communities his wages practically represent his living. Under certain conditions, therefore, it seems quite practicable that a co-operation such as has been suggested should be effected. Of course, there are a hundred and one considerations that would affect success, but mainly the business management; and while there have always been great difficulties in the way of managing a co-operative concern, that the problem is capable of solution has been demonstrated over and over again. In my opinion, and in the opinion of many others more capable of discussing economic questions, the only practical solution of the labour problem lies in co-operation. If labour and capital instead of flying at each others throats, and then remaining at arms length, sullen and unyielding, would join hands on a platform of mutual business understanding and productive profit, the benefits to both would be greater, not to speak of the happiness arising out of such harmonious relations. But I did not start out to write about co-operative mining in particular; rather some general phases of the subject, of which co-operation is incidentally and only one phase.

In considering the various resources of the Province, one cannot help but be impressed with the great, the overwhelming predominance of the mining interests. He is further impressed, if he looks at it from a national or a Provincial point of view, as well as from an individual standpoint, that under the present system of exploitation, the Crown, or the country, or the people, just as you like to regard the communal aggregate, are not getting, and in the future are still less likely to get, a due or equitable share as a community, of the mineral wealth that is being raised. It must not be forgotten for a moment that in the first place the mineral valuants of the soil are the property of the Crown, or more properly the people for whom it is held in trust by the Crown. It is all absolutely their property, and I speak in no socialistic or demagogic sense. It is legally and in fact theirs.

It must be borne in mind, clearly, too, that minerals differ essentially in their potential value from all other valuants or assets of the Province. Fish and animals of all sorts will continue to multiply each after its kind. Trees will grow again, and as for agriculture, we are told that when the rainbow was set in the sky it was a token and pledge to Noah and his descendants that as long as time lasted there would be seed time and harvest. Minerals once lifted are gone for ever, and unless the alchemy of the scientist can solve the problem of transmuting ordinary matter into silver and gold and copper and iron, they can never be replaced. When the secret recesses of the earth give up their treasures to the miner, they represent so much of the capital assets of our great natural and national bank spent. It may be true that our mineral wealth is so great that so far as the present generation or two or three generations to come there need be but little anxiety about their wants; but apart altogether from the consideration of supply the question arises—Does the Province now, or is it likely in the future, to derive sufficient returns from its mines for the purposes of government for public purposes?

It is true we derive a certain income from miners'

licenses, assessments and Crown grants. For some time past the revenue arising from those sources has been considerable, and for a few years yet will be considerable; but in the very nature of things when mineral properties become wholly alienated and the land is all spied out, that source of revenue will have shrunk to small proportions. We exact one per cent. tax on the net smelter or other returns; but when we take into consideration the requirements created by population as the result of mining development in the way of roads, trails, public buildings, education, civil government, the administration of justice, etc., etc., the one per cent., the incidental taxation, and the per capita tax all together fail to carry us on to that point where revenue and expenditure meet. When our net mineral output will have reached the \$100,000,000 mark, and that seems some distance off yet, it will yield only \$1,000,000, and the present expenditure is \$1,500,000. Education alone makes up one-third of the total, and is rapidly increasing. This may look like rank heresy in a mining paper, but it is a situation we have to face.

We are reminded again that mining creates an industry, that is, that it employs labour and thus distributes a vast amount of money, which goes into the pockets of not only the miners, but the merchants and every other class of the community. This is very true, and every weight must be given to such consideration. This is the most important aspect of all; and if a co-operation of capital and labor were possible, whereby mutual profits as the result of mutual risk were derived the benefits would be proportionately greater. That is a matter for the labour element more especially to consider. In the meantime it must be content with the minimum of benefit in the way of a direct wage. I have no doubt that if forty or fifty reliable, practical miners, under proper business management, were to club together in the development of one or more mining claims which showed good indications, trusting to results, that capital would be only too willing to accept such a practical proof of their faith, and co-operate, if it necessary. At least, the value of many a claim in this way could be demonstrated, which is all that capitalists require for investment. One reason why it has been and still is so hard to sell claims is that claim owners have not sufficient faith in their property to accept interests and small cash payments, instead of all cash and high prices at that. From a practical point of view the problem is not so hard a one after all.

There is still, however, the main question to be considered as to the interest of the whole people in the mineral wealth. I pointed out in the former articles in the RECORD referred to that the tendency in mining development was the consolidation of interests through large companies and syndicates mainly representing outside capital. In a few years, as experience in other countries shows, nearly all the mines will be in the hands of a comparatively few of such companies, the headquarters of which, and the principal shareholders of which, will be in Montreal, Toronto, New York, London, Paris, and so on. The profits in the form of dividends will all go out of the Province, and all that will remain is the price of our labour or what represents labour, bought in the cheapest market. To what extent in proportion do the people of the mining States of the Union, Australia, and South Africa benefit on account of the immense wealth that has been taken out? or how much

better off are the people living there now, considered as individual unit or as governmental units? To what cause do we attribute the phenomenal, almost overpowering wealth represented in the large money centres, which is in the hands principally of a few hundred millionaires. Is not this very system of mining exploitation accountable in some measure for it? I am not frightened of millionaires, and have no objection, though little desire, to become one myself; but in the activity of mining speculation and our feverish desire to get a share of the good things as they go, we forget the outcome of it all. As an instance of what I mean, since mining has become an industry in this Province the following mines have paid the following dividends:

LeRoi.	\$ 825,000
War Eagle.	309,000
Cariboo-Amelia . . . . .	.....
Payne.	1,000,000
Slocan Star	400,000
Ruth	450,000
Reco	350,000
Idaho	150,000

Of course, there are others, but these represent a few on a preliminary canter, which will be doubled and trebled shortly. How much of the dividends thus represented so far have remained in the Province? How much more is likely to go out in the next twenty-five years alone at the present rate of progress? I have no quarrel with capital, and no one more thoroughly realizes how necessary it is for the development of mines and in the creation of industry. Nor would I favour the imposition of any burdens on mining in its incipient stages. On the contrary, it should be relieved of every burden and encouraged in every way possible. Having, however, once placed it in the position to reap profits, the possibilities of which may be judged by the figures above quoted, the suggestion of the country out of which it is taken, the assets of which it originally formed a part, deriving a greater share is worthy of serious consideration. Moreover, the suggestion of the brawn and muscle, responsible for its uplifting, being turned in as part of the capital and reaping a share of the dividends over and above its own market value, is also highly seasonable and fraught with possibilities. The shibboleth of "Capital" is heard throughout the land, and "foreign capital" is the one thing we pray for without ceasing. "Foreign capital," however, as I have shown, is not altogether an unmixed blessing. It does appear that we are not unlike the farmer who invited all his relatives, near and far, to come and help him to harvest his already ripe fields of grain, and then sat down and waited for them until his crops spoiled. Is it possible to supply a great deal of capital ourselves, and reap the harvest which is voluntarily yielded to others?

AERIAL TRAMWAYS IN WEST KOOTENAY.
(By B. C. Riblet.)

THE question of transportation will always be a prime factor in the working of mines. In mountainous country, where railroads are impossible and waggon roads or trails can be used for only a few months of the year, aerial tramways best solve the problem for the conveyance of ore, timber and supplies.

In the Kootenay district of British Columbia, the

steep and precipitous mountain sides, broken as they are by gulches and canyons, down which sweep the irresistible snowslides preclude the use of surface trams or waggon roads.

In the early days of mining, the pack train and rawhiding was the means of transportation. Lack of means, or the undeveloped condition of the mines being such that the investment of any great amount of machinery was not justifiable, so the trails were lined with pack mules or sacks of ore were being rawhided over the snow down the mountain sides to the railroads or smelter.

The expense of rawhiding ore being about one-half that of packing. Mining operations were carried on most exclusively during the winter months. The summer months being occupied in development work or blocking out ore.

When the development proved the permanency of the ore body, and large quantities of ore were blocked out, the question of transportation became the prime factor. But the system of aerial tramway from the comparative small cost of construction, and in operation unaffected as they are by the elements, solve the problem for the economical transportation of ore from mine to smelter or railroad. Many have been constructed, and it has been the good fortune of the writer to superintend the erection of most of them. In the Slocan District there are ten or twelve—aerial and surface.

The first to be built was the aerial tramway for the Noble Five Mining and Milling Company, and is one of the best in the country. It transports by steel ropes and buckets ore from the mine near the top of Noble Five Mountain to the company's concentrator a mile and a half away at the town of Cody.

Running parallel with this is the Last Chance tram, of an equal length, which crosses the dreaded Noble Five slide at an elevation of seven hundred feet in one long span of over a half mile.

The Payne mine has its ore transported to its ore-house by a surface tram and to the C.P.R. railroad by an aerial tramway.

The Porto Rico mine at Ymir, the Idaho mines at Three Forks, and the Lucky Jim have tramways in successful operation.

Near the City of Sandon, B.C., the Ruth mine is constructing an aerial tramway, which will carry the ore to its concentrator now being built within the city limits.

There are many tramways in operation in the Kootenays, and they are the accepted means for economical transportation of ore. Aerial tramways may be divided into two general classes—the single rope and the double rope system. The single rope system has been largely superseded by the double rope, owing to its greater capacity, durability, simplicity and small cost of operation. During the past three years, I have designed or erected in West Kootenay several modifications of the double rope aerial tram, adapted to the topographical features of the country and the requirements of the mine. Opinions differ among mine operators in regard to the utility of the styles of tramways. There are a number that give entire satisfaction. Of the double rope aerial tram the Finlayson, erected by the writer two years ago, is perhaps the best type for long distance and large capacity. Buckets holding seven hundred pounds suspended by cranes attached to trolley wheels, which are run on one-inch cables and hauled by a smaller cable, is the style of this tram. Fifty-two buckets are used,

drawn by three-fourth inch cable, passing around grip sheaves of eight feet in diameter at each terminal.

The buckets are loaded and dumped automatically at the mine and concentrator.

The single rope system is not used in this country.

The two bucket, gig-back, tram for short distance haul and the Finlayson for long distance are the universal style adopted here.

The Payne mine has been operating one of the former style for the conveying of ore from its crusher to the railroad for over a year.

There is one span of nine hundred and fifty feet across a deep ravine and a short span of three hundred and fifty feet. The difference in elevation of the terminals is four hundred and fifty-five feet.

The carrying rope is three-fourth inch crucible cast steel of flattened strand and the running rope is three-eighth inch steel of high tensile strength. This small tram, representing a very low cost, has a capacity of one hundred and fifty tons in ten hours, and is operated by one man.

For the Last Chance Mining Company has been recently constructed a double rope aerial tramway. From the mine to the ore-house near the railroad is 6,500 feet, and a difference in elevation of 4,000 feet. At the mouth of the lower tunnel is located the upper terminal of the tram. Ore is dumped out of the car from the mine into the ore-bin and the tram conveys it to the crusher, where it is sacked for shipment in cars to the smelter. From the upper terminal there is one great span of 2,800 feet—the longest on record. I believe,—crossing a deep gorge reaching out to a tension station nearly half way distant on the line. The buckets, suspended in the air and so far from the supports look like black specks.

After the tension is reached the country is more regular and towers for the support of the ropes occur every 400 feet until the ore-house and lower terminal is reached, and the ore is automatically dumped into the company's bins.

The Last Chance ships a carload every day to the smelter and hauls up all their supplies and material for the mine.

The tram is operated by one man in hauling the ore. The same with the Noble Five, which has a capacity of 400 tons per day. But the Last Chance tram differs from the latter in the fact that the buckets are fastened permanently to the running rope and a stop is necessary whenever a load is placed in the bucket. With the Finlayson system no stop is necessary. The bucket is automatically detached and another is attached without the stopping of the tram. It can be readily seen the advantage of the Finlayson system and the increased capacity of this tram.

But a tramway must be built to meet the capacity of the mine and the condition of the country over which it must run.

The following styles are used:

For 2,000 feet or less when gravity is the motive power, the two bucket double rope gig back is the most economical and serviceable tram.

One hundred and fifty tons per day is an ordinary capacity and such is handled by the trams at the Porto Rico mine and the Payne mine. Another is being constructed by the Ruth, near Sandon.

Where long distance is met, but small capacity is required, the intermittent system used by the Last Chance Mining Company is an economical and satisfactory system of trams and the Finlayson system for long distance and great capacity.

An aerial tramway is not affected materially by the season of the year or the condition of the elements. The abundance of snow and the precipitous condition of the country makes the hauling of ore an impossibility in some of the winter months.

A tramway will pay for itself in a short time. The following reasons are given:

The low cost of transportation. One man is employed instead of a pack train. It works the year round, night and day if necessary. Carries up all supplies and material for the mine and has a passenger service, if one has the necessary courage to ride them. Accidents to the trams are very few and break-downs seldom. The towers are built so that an even grade is maintained and the buckets are above the snow, and little danger of fire in the summer.

The cables are flattened strands so that the wear is on a greater surface and a change can be made by twisting the rope. Rope grease on both the cables is used and the wear is reduced to the minimum.

All the tramways constructed by the writer are in successful operation and many facts and figures could be given on this subject of aerial tramways, but no one will doubt the utility of cheapness of conveying ore who has once tried or seen this method of transportation.

THE MINES OF BOUNDARY CREEK—No. 3.

THE LAST CHANCE.

(By Con-Centrate.)

TO those who were in the district in the early days, five and six years ago, when the Skylark, Providence, Defiance and other claims made shipments of high-grade ore, the news that a bona fide company has again commenced operations in the well-known section of Boundary Creek, called Skylark Camp, will be welcome. This company, the Boundary Mining Company, Limited, with headquarters in Spokane, and registered at Victoria, owns the Last Chance, one of the best properties in the group of claims which constitute the Skylark Camp.

To those unfamiliar with the history of the camp it may be interesting to learn that when mining in Boundary Creek was at a discount; when the prospect of the district securing transportation facilities was extremely far distant; when Boundary Creek was a practically unexplored and unknown section of the Province, and its mineral wealth was not by any means recognized; in the years immediately preceding the staking of the first claims in the Trail Creek district, the Skylark, Providence, Defiance and other claims were then being worked and from time to time made shipments of ore. It is almost unnecessary to state that the ore shipped was very high grade, as in those days, working a mining property in Boundary Creek was an expensive and difficult operation, involving no little faith, pluck and perseverance. Planks and mining timbers had to be hewn or made by whip-saw, necessities of every kind were expensive, and the ore shipped had to be carried on the backs of cayuses over a rough miner's trail and then hauled long distances over an apology for a waggon road. Still ore was shipped though not in large quantities. When, however, it became apparent that the district must necessarily within a few years' time obtain transportation facilities and after the best-known claims in the camp had changed hands, and in some cases been acquired by companies, then, although the Skylark, Last Chance and other properties were developed, no fur-

LONDON AND B.C.

(From Our Own Correspondent.)

ther shipments were made, it being obviously better policy to await the advent of a railway and allow the ore to remain on the dump than to continue to send the ore to the smelter by waggon or pack trains over many miles of badly constructed roads. Thus it happens that the claims which in the pioneer days of mining in Boundary Creek helped greatly to furnish work and give heart to the early pioneers, will, under different conditions, again come into prominence as being amongst the first of the Boundary Creek mines to take advantage of the facilities afforded by the construction of the C. & W. Railway to consign ore to the smelter.

The Last Chance is a full-sized claim, for which a Crown grant was obtained in 1897. The original owners, Messrs. Cook and McCormick, did a considerable amount of work on the property, exposing a four-foot lead, on which they sank a shaft over forty feet deep on the lead. In the spring of 1895 the present company was formed and the claim passed into their hands. The original shaft was then continued to a depth of 110 feet, following the ore down. Leaving a few feet for a slump a thirty-foot drift on the lead was then made at this depth. The vein along this drift is four feet between walls in a diorite formation, and has a pay streak of eighteen inches. The ore carries ruby silver and grey copper in a silicious gangue and the pay streak averages \$1.20 in gold and silver. This lead has been exposed by deep cross-cuts on the surface for about 1,000 feet, and also on the adjoining claim, the Lake, for 200 feet. Its strike is northwest and southeast, and it dips to the east at an angle of over 45 degrees into the mountain side. It is highly probable that this lead is a continuance of the well-known Skylark vein, for which over \$15,000 worth of ore was shipped.

Three hundred feet to the east a large parallel vein of porphyrite, carrying gold and copper values, has been exposed by surface work. Between the two leads a vertical double compartment shaft, timbered with square sets, has been sunk 110 feet, and the intention of the company is to sink this shaft another 65 feet and then (leaving 25 feet for a slump) cross-cut for both ore-bodies at the 150 level. This policy will commend itself to mining men.

At the present time a hoisting and pumping plant is being installed on the claim, consisting of a ten-horse power boiler, hoist and cable, and a No. 7 Cameron pump.

The present buildings consist of a commodious shaft house and a roomy bunk house and some miners' cabins, to which additions are to be made.

The claim is well situated, lying alongside the main stage road and within a mile of transportation at Greenwood. It is well timbered, the timber being of a size suitable for mining purposes.

The Boundary Mining Company is incorporated for \$1,000,000, in \$1 shares, fully paid up and non-assessable. So far, practically no stock has been placed on the market, the promoters having contributed 1/5 of their personal holdings in order to meet calls for the development so far accomplished.

Considering the quality of the ore, the situation of the claims, which will render development and production less difficult than in most mining ventures, and the permanent nature of the lead so far developed, the Boundary Mining Company can be congratulated on having secured the Last Chance mine and can safely count on having acquired a property of great promise.

THE month just ended has witnessed a very noticeable expansion of public interest in the British Columbian section. It is true that there has been little speculation outside British Americas and Le Rois, but there has been a good deal of buying of the better class shares like the London and British Columbia Goldfields, Athabascas, Ymirs, Whitewater, New Goldfields of British Columbia, Queen Bess, etc., as will be gathered from the little table which I have prepared, showing the highest and lowest prices since the date of incorporation. Here are the quotations at the end of 1898, and at the time of writing:

Stock.	Highest and Lowest. 1896.	Highest and Lowest. 1897.	Highest and Lowest. 1898.	December 15.	May 3.
1. Hall Mines.....	3 1/4 - 5/8	1 15-16, 1-16	1 13 16 - 3/8	1/2	5/8
1. { Lill, Fraser River } { & Carib. Goldfields }	2 - 1 1/4	1 15-16 - 3/8	5/8 - 1 1/8	7-6	7-6
1. Lon. & B.C. Goldfields	1 - 7/8	3-16 p. 1/4 d.	1 1/8 - 15-16	1 1/8	115-16
1. Vancouver Syndicate.	7 1/2 p. 2 p.	7 1/4 p. 1/4 d.	2 1/4 p. 1/4 d.	par	1/2
1. B.T.C.....	1/4 p. 1/4 p.	1/4 p. 1/4 p.	2 3-6 - 12	16	25-9
5. Le Roi.....	.....	.....	3/4 p. 5/8 p.	11-16	8 7-16
1. Fairview.....	.....	7-16 p. 3-16 p.	1 1/2 - 16 - 6d.	1 -	1
1. New Goldfields of B.C.	.....	3/4 p. 1/2 p.	1 15-16 - 9-16	13-16	1 1/4
1. New Fraser River.....	.....	.....	22-6 - 1	1/2	1 1/2
1. B.C. Devel. Ass'n.....	.....	.....	1 1/2 - 3/4	1	1 1/4
1. Queen Bess.....	.....	.....	1 1/2 - 5/8	15-16	1 1/8
1. Tangier.....	.....	.....	1 7-16 - 3/8	7 1/8	7 1/8
1. Whitewater.....	.....	.....	1 1/2 - 13-16	1 1/4	1 1/4
1. Ymir.....	.....	.....	13-16*	1 1/2	1 1/2
1. Athabasca.....	.....	.....	.....	5/8	1 1-16

*Ven'd 13-16.

A glance at this table will show the very pronounced extent of the recovery. No doubt the improvement is due to a very large extent to the substantial advance in the shares of the Whitaker-Wright group, and notably Le Rois and B. A. C. But quite apart from this, interest is widening in this section, and although there does not seem at present much prospect of that much discussed "boom," yet at the same time the public have been disposed to acquire holdings in all the better class securities, such as those mentioned above. Investments in all the better class British Columbian shares can probably be made with a certain amount of safety, but at the present moment dealings are restricted to shares in English registered companies, and the public shows little disposition to purchase even War Eagles, much less Nelson Poormans, a large parcel of which latter, I am told, has been on offer here at 25 cents. Of course, it was not to be supposed that the opportunity to push the less attractive shares would be overlooked, but I do not think that much success has attended these efforts, although investors can hardly expect immunity from attacks on their pockets. However, it is quite probable that the recent increase in the tax on the nominal capital of new companies, just sanctioned by the House of Commons—and which has to be paid before a new company can be launched, may help to act as a check on the most dishonest promoters, who as a rule are blessed with more brains than cash, and will find Sir Michael Hicks-Beach's new departure a serious obstacle on the registration of wild cats.

I saw a prominent broker this afternoon, and asked his opinion as to the prospects of a B.C. "boom" in London this year. Representing, as he does, a very powerful group who have largely associated themselves with British Columbia and the Yukon, his opinion is sure to be of interest in the province. In reply to my inquiries he said:

"I do not think we are going to have a boom," but I do think we shall see better markets for all the better class of B. C. shares. The 'boom,' in my opinion, would be harmful, because it would enable our friends, the promoters, to unload large quantities of stock upon the public, and this at the moment certainly would not be good for either the market or the province. At the present time there is not a vast amount of speculation, and I am sincerely glad of this. I hope the market will restrict its efforts to all the better class

shares and particularly those which present every prospect of becoming steady dividend payers. We certainly do not want a "boom" yet awhile, for the result would be that the public would get loaded up with good, bad and indifferent securities. When they wanted to realize they would probably find it extremely difficult, and would become disheartened and distrustful of all class of B.C. investments. This, of course, would react on both the country and the market. What I would like to see is a period of steady development with proportionate market appreciation. That there are quite a number of promising properties I am prepared to admit, but I do not think these are likely to be overlooked by investors, and in proof of this opinion, I can refer you to the very pronounced improvement which has recently taken place in the leading shares."

TWO WAYS OF FLOATING PUBLICITY.

Although B.C. is not to be officially represented at the Greater Britain Exhibition, which opens on Monday next, at Earl's Court, I am pleased to see that some effort is being made by Mr. W. Walker, the new Agent-General, to bring B.C. before the public by means of advertisements in the public press. I hope that when Mr. Cotton is here Mr. Walker will do his best to impress upon him the importance of a more liberal policy in connection with advertising the province, and its mineral resources. With the market reviving, and the public disposed to invest in B.C. shares, an excellent opportunity is offered those in authority to bring the province very prominently before the home investor, and the intending emigrants. Of course we do not expect B.C. to spend the thousands of pounds that the Dominion Government lays out in attaining publicity, but it really does seem short-sighted to leave everything to private enterprise. The Government, I suppose, could not see their way to support the Mining Department of the Exhibition to be held here this year, and will thereby miss a magnificent advertisement, but they surely could afford a few hundreds for judicious expenditure at the hands of Mr. Walker.

But apart from the question of direct advertisement in the public press I do hope that they will see the importance of making early arrangements for collecting statistics regarding the doings of the various camps. As an indirect advertisement nothing could be better than this, and it has the additional advantage that after allowing for the cost of collection and cabling to the Agent-General monthly, the distribution would be practically nil. Agents should be appointed in every district, if the present machinery could not cope with the matter, and all companies should be compelled to supply the necessary statistics regarding development, tonnage mined, and treated, cost of working, and profits; the latter could be actual or estimated, and corrected month by month. The Minister of Mines could condense the whole into a short cable, and Mr. Walker could easily make arrangements on this side for circulating same to every important paper in England, in the same way as older colonies do. I have no hesitation whatever in saying that South Africa gained more in publicity from its prompt and reliable statistics than from all the market doings. West Australia quickly recognized this, and I hope it will not be long before British Columbia follows the excellent example set it by these two leading colonies.

THE GOVERNMENT AND THE ASHCROFT-CARIBOO RAILWAY CONCESSION.

The action of the Government in connection with the concession for the construction of the Ashcroft-Cariboo Railway Company is much to be regretted, for it will arouse in the minds of London financiers much doubt as to the bona fides of the British Columbian authorities. Into the merits of the dispute I am not disposed to enter, but I certainly think that the Government would have done better to act in a spirit of generosity to the concessionaires rather than to pursue the policy of confiscation, which seems to have characterized them in this respect. The concession for the construction of this railway was, I believe, originally granted to Major Dupont, but in due course was acquired by the New B.C. syndicate. Although to all intents and purposes this limited concern has remained a private venture, that it is powerfully supported may be gathered from the list of directors, which I append:

R. L. Newman, Newman, Hunt & Co., Director of the Bank of England.
 F. Owen, Vancouver.
 C. A. Paull, Stock Exchange, London.
 R. P. Setton, Managing Director Brush Electric Light Co.
 H. Walters, 7 Tokenhouse Yard, London.
 G. H. Whitehead, Stock Exchange, London.

It seems to me impossible that the B.C. Government can be so short-sighted as to recklessly range against them such a powerful group as this. I hear that the action of the Government is bitterly resented, and can only hope that wiser counsel will prevail at Victoria before it is too late to withdraw from the attitude which seems the very essence of hostility to English capital. As I have before said, I do not know the pros and cons of the case, but in view of the fact that the date of the concession expired on May 8th, it would certainly have been in better taste if the Government had waited to the due date before cancelling the concession.

SOME RECENT MEETINGS.

Among recent meetings were the Hall Mines, the B.C. and New Find (of which Mr. Turner, jr., is secretary) the Klondike and Columbian (the parent of the Morris-Catton group), and the B.C. Development Association. At the Hall Mines gathering power was given to the directors to create sufficient new capital to provide for the obligations in connection with the new issue of 6 per cent. debentures—£25,000, of which have already been subscribed privately.

The B.C. and New Find was chiefly noteworthy, for the very satisfactory statements about the Athabasca.

Mr. J. H. Turner was present at the meeting of the Klondike and Columbian Gold Fields. I wonder what he thought of the Auditors' comments upon the methods by which that famous dividend was paid, and the scathing criticisms of such well-known financial leaders as the *Financial News* and *Financial Times*. The meeting was an interesting one, and it is a pity that a little more attention was not given in the reports to the discussion which followed Mr. Morris Catton's speech. A project is on foot to amalgamate the company's forming the Morris Catton group. Mr. Hess, in the *Critic*, is both analytical and censorial, and the *Pall Mall Gazette*'s city editor was very pronounced in his opinion of the company, with which Mr. Turner, Mr. Pooley, and Mr. Boscowitz have been so closely connected from the very first.

At the B.C. Development Association's adjourned meeting there was another breeze, but Mr. Byron Johnson, and his colleagues seemed to have the confidence of the proprietors, and won the day. I regarded Mr. Johnson's speech as straightforward and convincing, and I am not surprised that he carried the meeting with him.

AUDITORS AND THE PUBLIC.

In all the circumstances it is hardly surprising that after their adverse comments upon the Morris Catton methods, that highly respectable firm of auditors, Messrs. Deloitte, Dever, Griffiths & Co., did not seek re-election. The city would be, healthier (in a financial sense) if we had more auditors imbued with the same high spirit regarding the duties they owe to those they are primarily appointed to protect.

BRITISH COLUMBIANS IN LONDON.

The province is well represented in the city just at present. We have Mr. Mackintosh, Mr. Turner, Mr. Owen, of Vancouver, (in connection with the Ashcroft-Cariboo Railway Concession), and many others, not the least of whom is Miss Leigh-Spencer, of Vancouver and Nanaimo, who is over here in connection with certain B.C. interests. It is whispered that she intends to set up here as a broker, but I cannot vouch for the accuracy of the statement. Mr. Catton is due here in connection, primarily with the new loan. Let us hope he will profit by his visit.

THE MONTH'S MINING.

KAMLOOPS.

(From Our Own Correspondent.)

There is no diminution in the activity shown by miners and prospectors in their efforts to prove the value of the various ore deposits found in the districts tributary to Kamloops. Jamieson Creek, Shuswap and Kamloops Lakes, Coal Hill, the North Thompson River, Nicola, etc., are all receiving more or less attention, and new discoveries have been made in nearly all these localities within the past few weeks.

At Nicola, a large body of ore carrying, native copper, has been found on Ten-Mile Creek, and a number of claims have been staked. This is supposed to be a continuation of the Mamette Lake—Highland Valley copper ore area.

On Jamieson Creek, eighteen miles north of Kamloops, two attempts are being made to work placer ground there. One party, composed of local men, with James Guerin, an old Cariboo miner in charge, is at work on the upper part of the creek. It is the intention of this party to sink a shaft to bedrock and they feel pretty confident of striking good pay.

Another enterprise is being conducted by Mr. H. R. Bellamy, of Nelson, who intends dredging the lower reaches of the creek, and two miles of the North Thompson River, at the mouth of Jamieson Creek. Mr. Bellamy is satisfied with the ground and has every hope that the venture will prove successful. Coal Hill is still being prospected, and with encouraging results. A large mineralized dyke was located a few weeks ago near the Pythan claim. The rock carries copper, galena and free copper, and assays as high as 7 per cent. A strong vein of copper carbonates and chalcopyrite was discovered recently on Peterson Creek, near Mellor's ranch, and work is being prosecuted on this new claim, the result so far being eminently satisfactory. At the Pothook prospect a force of twenty-eight men is employed. The ore is very low grade—about 5 per cent. copper—but there is plenty of it. There is some talk of putting in a concentrator. Six men are working on the Copper King, which is turning out splendidly. In the October issue of the MINING RECORD I pointed out the excellent showing made by this claim, and expressed my opinion that it was from the then present indications, the most promising copper-gold prospect in the camp. This opinion was adversely criticized by some local mining men, who, however, now admit that the Copper King is all and more than was then claimed for it. This claim, with others included in the group, is situated at Cherry Creek, on a hill overlooking the Roper ranch. A shaft is down 45 feet, following ore almost from the grass roots. The ore shute is about 6 feet wide, two feet being high grade chalcopyrite and crutite. The highest gold values are found in a narrow seam of pyrites lying between the copper ore and the foot-wall. The shaft being a very wet one, it was decided to tunnel and this work is now in progress. A tunnel of 150 feet will give a vertical depth of not quite equal extent. Sufficient ore was shipped by the owners to pay all expenses of development. Several offers of purchase on bond were rejected by the owners. Recently the property has been stocked with a capital of \$200,000 in \$1 shares, a number being subscribed for locally. The new owners have refused a bid of \$150,000 for the group, which besides the Copper King, includes the Copper Jack and Tacoma, contiguous claims. The owners of an adjoining claim, the Eureka, have had several offers from their property. At least one of the four Copper King leads has been located on the Eureka, and although the work so far done on it has shown nothing, it is possible it may turn out a valuable holding.

The Jacko Lake section keeps well to the fore, the most recent find being a vein of white quartz well mineralized with chalcopyrite and grey copper. The vein varies from 18 to 24 inches wide, and is said to carry a fair amount in gold.

Every few days prospectors come in with reports of new finds, some in new localities, but many on ground already gone over by hundreds of claim-hunters. The fact is, of course, that it is only now that Coal Hill and other sections near at hand, are being carefully prospected. Nine out of every ten claims recorded were staked because of their location only, and not on account of any actual discovery of mineral, any outcrop doing service for discovery. Now, however, the ground is being more carefully gone over and what was considered until recently as barren waste has in some instances proved to be of greater value than previously thought, and to contain mineral deposits worthy of thorough examination. The Copper Mines, Limited, own several promising claims on Coal Hill. The Norma, Earncliffe and Converdant are in a good position in relation to other properties of known value, and the showing on each claim is sufficient to warrant a further expenditure. The Gold Field looks promising for the very small amount of work done. The company could do worse than paying more attention to the Gold Field than it has hitherto received. It is near the Kimberley group, considered by some mining men one of the best showing in the camp. The capping on the Gold Field is identical with that found on the Kimberley.

What is wanted in this camp is more thorough development of prospects. This want is recognized, and there is a movement on foot to organize a local development company whose purpose would be to develop certain properties sufficiently to attract a customer, and with the proceeds of the sale, repeat the process with another likely claim, and so on. The scheme is regarded with favour, and will possibly materialize ere long.

M. S. WADE.

FAIRVIEW.

(From Our Own Correspondent.)

The Dominion Consolidated Mines Company have purchased the three mineral claims known as the Flora, Virginia

and Western Hill. These claims apparently contain the extension of the Stenwinder ledge, which crops out on the surface in places throughout the entire length of the three claims. This property is bound to place the company on a sound footing and I understand that development work will be pushed on vigorously at once.

The Fairview corporation have met with wonderful success in their operations on the Stenwinder mine, which has increased both in value and worth at the deeper levels. Negotiations are, I believe, under way for the erection of a 60-stamp mill at or near the mine, and this, if the present prospects are not deceptive, should convert the Fairview corporation into a dividend paying concern within a very short time. The Smuggler Company is pegging away, sometimes at one claim, sometimes at another. At present the Admiral Dewey occupies the engineer's attention, and he hopes to convert it into a mine. We Fairview people cannot understand why the Smuggler dump is not run through the mill. Even at the rate of the last mill run the ore would most certainly more than pay milling expenses, and since the mill is idle and there is an abundance of wood and water available there is surely no reason why the machinery should be allowed to rust in idleness.

BOUNDARY CREEK.

(From Our Own Correspondent.)

The official statistics of the Kettle River Mining Division for the period of five and one-half months, to May 15, show that the mining records in this division, the present most important part of which is the Boundary Creek district, are being well maintained in point of numbers. The period from November 30, 1898, to May 15, 1899, includes the winter months, for which fact due allowance must be made in comparing the records for the expired portion of this year with those for the eleven months to November 30 last, as published in the report of the Minister of Mines for 1898. As the period includes the winter season, when the snow lies too deep on the ground to admit of effective surface prospecting work being done, it naturally follows that location records are fewer. Neither is the winter season favourable to an appreciable increase in the number of free miners' certificates, the majority of which are obtained or renewed during the fine-weather seasons of the year. The numbers of records made at Midway, which is the recording office for the Kettle River division, between December 31, 1897, and December 1, 1898, are as under:

Free miners' certificates	653
Location records	563
Certificate of work do	528
Conveyance do	361
Certificates of improvements	49
Abandonments	55
Water grants	5
Permits	3

For the later period to May 15 inst., inclusive, the figures are:

Free miners' certificates	653
Location records	563
Certificate of work do	528
Conveyance and agreement do	361
Certificates of improvements	49
Mill site lease	1
Abandonments	55

The smelter question has lately excited much interest in Greenwood business circles, where a very general feeling is prevalent that it would be distinctly to the advantage of Boundary Creek generally and of Greenwood in particular were the first smelter in the Boundary country to be located on Boundary Creek. But a serious drawback to the obtaining of this advantage lies in the fact that at certain seasons of the years the flow of water down Boundary Creek is insufficient for the requirements of a large smelters. It is, therefore, necessary that there should be co-operation with Greenwood, on the part of those most interested in Midway and vicinity, in order to secure the establishment in the Boundary Creek valley of the smelting industry, since a site near the junction of Boundary Creek with Kettle River—that is, at Midway—would be the only one that would serve the double purpose of placing the smelter near a larger water supply, and at the same time secure to Boundary Creek towns the business that the operation of a large industry would necessarily attract. At the time of writing, though, it is claimed that the decision of Mr. J. P. Graves, representing the Granby Mining and Smelting Company, is in

favour of a site on the North Fork of Kettle River, two or three miles above Grand Forks. This contention is not yet officially confirmed, yet it is quite probable it is correct, since large inducements, in the way of concessions of land and water rights, have, it is understood, been held out, with the object of securing the erection of the Granby Company's smelter in that neighbourhood. There is this consolation, however, for Boundary Creek merchants and others interested if it be true as has been freely asserted that there will be enough ore turned out of the Boundary Creek mines to keep half a dozen smelters running, then the advantages offered by the Midway site will not suffer from a little delay, but will in good time be utilized by a smelting company that will not expect to be heavily subsidised to establish an industry that, properly, should stand or fall on its own merits.

The commencement of the work of construction on some of the spur lines of the C.P.R. Company intends running to several of the Boundary Creek mining camps is a gratifying evidence of progress, further demonstrating the confidence of that company in the permanency of the mining industry in the district, and evidencing the expectation that some of the mines in the several camps to be tapped will shortly be in a position to ship ore. The right-of-way of the Deadwood camp branch is now being cleared and gangs of men are at work near Greenwood rock cutting and otherwise advancing the work of grading. This branch may later be continued to Copper camp, situate six or seven miles west of Boundary Creek. Perhaps the most important branch line in the district will be the one that will connect Summit, Greenwood, Wellington and Central camps with the main line at Eholt, which is the name of the new town the C.P.R. Company is establishing on the summit of the divide between the valleys of Boundary Creek and the North Fork of Kettle River. The chief properties in Deadwood camp, which it is expected will push on with development work so as to be ready to ship, are the Mother Lode—at present a long way in the lead, Sunset and Morrison. There are other promising claims in this camp that will likely swell the list of shippers next year. In Summit camp the B.C. should easily have 4,000 or 5,000 tons of shipping ore on the dump before cars are ready to commence its removal, and, too, a lot of ore blocked out below ground ready for stoping. In Greenwood camp the Old Ironsides, Knob Hill, Brooklyn, Stemwinder, and Snowshoe, should all be on the shipping list when the branch line shall have been completed. The Golden Crown and Winnipeg in Wellington camp and the City of Paris, No. 7, and others in Central camp should add their quota of ore—and a considerable one, too—to the general output of the districts. Of course there are in the several camps other promising claims, a score or more of which probably will come into prominence within twelve months from now, but these named, together with the Jewel at Long Lake constitute a majority of the best known properties in the district.

The steady increase in number and power of the mining plants—hoisting, pumping and drilling—noticeable in the district is another evidence of substantial progress. In the early part of 1897 the only steam mining plant in the district was that at the Jewel. Later the Old Ironsides had one installed, and soon afterwards the B.C. followed suit. Then in 1898 the Golden Crown, Winnipeg, Athelstan, Knob Hill, Brooklyn, Stemwinder and Mother Lode were equipped with power plants. Now the list includes the King Solomon, City of Paris, Morrison (removed from the Athelstan), with the Last Chance, Snowshoe and others about to add to the total. Compressor plants, with machine drills, are in operation on at least half a dozen of the above-named properties, and on one—the Mother Lode—there is an electric light plant, electricity being also used in this mine for firing the blasts. Later in the current year, after the railway shall have been opened and transportation expenses, delays and difficulties have thereby been reduced, more machinery will be brought in, so that an estimate of twenty to twenty-five mining power-plants in operation by the close of 1899 should prove a conservative one.

The Forks and other tributaries of the upper main Kettle River are attracting the attention of prospectors to a larger extent this spring than at any previous time. There are probably 150 to 200 already in that country and it seems quite likely that this number will be doubled within three months from now. Mr. J. S. Harrison, who for nearly two years past has attended to the mining abstract business at Midway is now located near the ferry, just above the junction of the West Fork with the main river. His familiarity with the surrounding country and the records of location,

thereabouts to date will, no doubt, be of service to many prospectors going in and seeking to make new locations. The promised expenditure by the Provincial Government upon roads and a bridge will, if carried out, materially assist in opening up a district that is very likely to provide a valuable addition to the mineral resources of Southern British Columbia, and in which C.P.R. surveys are already being made. PERCY VIRENS.

ROSSLAND.

(From Our Own Correspondent.)

With all due deference to other mining divisions in the province and on the principle of 'sacien cinque' the progress of mining operations in Rossland is reaching the stage when the prosperity of the industry can be measured by its production. To arrive at a just conception of the progress this industry is making one has only to station himself at a convenient point, say, near the Nickel Plate mine and count the ore cars as they are drawn Northportwards by the Great Northern locomotives, where the ore is treated at the smelter there, or again, say near the Enterprise mineral claim, just below the Iron Horse, a partially developed mine, in order to appreciate the activity which accompanies this industry, and if the observer be one of the pioneers of Trail Creek he cannot help comparing the present day with those earlier times when Rossland mining was so young that the few tons making up the daily production were hauled out by rickety waggons and very ancient mules, in charge of western drivers, whose type is fast disappearing. When one compares these hopeful and often despondent days with the present, ore being now moved out by the hundreds of tons daily, it is, perhaps, as good a comparison as can be made of progress. Ten, eleven, and even twelve cars a day move out from the station on the line of the Great Northern for the smelter at Northport, and all of this ore comes from the Le Roi mine, and each car has a capacity of thirty-two tons. Then on the Canadian Pacific Railway Company the ore is carried in smaller cars, each having a capacity of fourteen tons, at present, and hauled to the Trail smelter, where it is treated. From twelve to eighteen of these cars often go out on a string, but as a rule the string is much less, and the service continues night and day, so that it may be said the work in this particular is well performed on both lines.

Meanwhile, as the staple industry of the mines here must be measured by its production the output from the mines is a fair criterion of progress. The weekly outturn has now reached the highest figures recorded in the progress of these mines. The output for the week ending May 6th amounted to 4,345. The ore was shipped from the Le Roi, War Eagle and Iron Mask. Since that time, the weekly shipments have continued about the same, so that it may be safely stated the shipments to date for this year amount to 45,427 tons which, valued at \$25 net per ton, gives a net valuation of \$1,135,675, not a small sum for a little over a third of the year.

I have noticed that a great spirit of exaggeration accompanies the local statistician in his reports of this industry. There is a vast amount of aerial conjecture, and it is regarded in some quarters as essential to the progress and prosperity of the mining industry. The fact that the industry is measured by the financial world according to the results of that industry appears to be lost sight of in the calculations made by these romancers.

It must, however, be said in explanation of the outturn of Rossland mines since last year that there are good and sufficient reasons for this apparently small output, though it is more than half the output for the whole of 1898. The chief reasons for this were more or less explained in my letter last month. They may be repeated here without annoying your readers.

(1) The Le Roi management had to overhaul the mine and introduce a new system and one, too, which is only preparatory to a more extensive system that is to be put in force in the near future, a system that will treble the present daily output to 1,000 tons at least. At present the output is 350 tons per diem over a somewhat ancient tram built in the earlier days of the mine and totally inadequate to the new order of things created by the purchase of the mine by its present owners.

(2) Details of these improvements have already been published, I believe, on the authority of Mr. Carlyle. They include the sinking of a shaft near the company's big compressor to the depth of 2,500 feet, and a regular westward movement of the mining operations of the company to their Black Bear ground, where there is a great showing

of ore on the surface, and in which direction their extensions are.

(3) These new works will be materialized without any interference with the present arrangements.

(4) Similarly with the War Eagle Company, who are shipping from the old works, their new hoist not yet being ready. There have been many predictions that the new hoist cannot be made to do its work successfully, but those responsible for its management are confident that it will eventually be satisfactorily operated.

(5) The War Eagle and the Centre Star are under one manager, Mr. J. B. Hastings, who is hence a busy man. The Centre Star is making summer shipments from the old workings. These two companies some time ago made arrangements with the Trail Smelter for treatment of 300,000 tons of ore on a two years' contract at rates practically equivalent to cost.

Now with regard to the partially developed mines, such as the Nickel Plate, the Great Eastern, the East Le Roi, and the Columbia and Kootenay, a word or two may be said. The Great Western is temporarily closed owing to water in the shaft and the necessary pumping and other machinery has been ordered. Supt. Harkins has these three properties in hand. He is an energetic and capable superintendent, and is a tireless worker.

The Sunset, since its management commenced to sink, has had some good luck in finding two additional ore chutes. All of the various ore chutes on this property will be found coming together probably at the 500-foot level.

The White Bear has reorganized. Its capital is now 3,000,000 shares at 10 cents a share, instead of 2,000,000 shares at \$1 per share.

This re-arrangement is a good one. The shaft is about to be emptied and operations will be regularly resumed, the company having ample capital in its treasury.

One of the coming properties is the Mascot, of which Mr. W. Y. Williams is the able and respected superintendent. A great deal of development has been done on this property. The ore showing has always been good.

The Iron Mask is increasing its shipments, and a very extensive plan for future operations has been laid down. Deepening and cross-cutting, etc., have been decided upon, and the shipments will soon reach 350 tons a week.

In the western part of the camp, taking in the west flank of Red Mountain, the Josie, Gertrude, West Le Roi, and No. 1 are showing more signs of animation.

Rosslund, after its long siege of winter, in spite of a very backward spring, is prepared to make these changes which the vast proportions already outlined foreshadow. The prospects for legitimate mining certainly never looked better than they do now.

The friends of the miners killed in the War Eagle accident, Albert J. Horeford, James O. Palmer, Thomas Neville and W. O. Schofield, may rest assured that so far as post mortem respect is concerned the people of Rosslund were not wanting. The funeral services were impressive and thoroughly sincere, and the gentlemen who are to be credited with the suggestion which was eventually carried out are deserving of an honest expression of thanks. It is to be regretted, however, that there was a lack of precaution in the first instance, and that those who are responsible for having employed an uncertificated engineer should not have foreseen the inevitable consequences of entrusting an electrical apparatus to the hands of a man who possessed no previous proof of his competency, no matter how capable that man may have been in other respects. This is the crux of the whole matter, and the least punishment that can be inflicted on Rock Hull, the engineer, is to dismiss him. The ultimate responsibility may well include his employers. The fact that the Inspector of Mines does not appear to have investigated the question of the engineer's competency shows that the public business in this respect has not been conducted as it should have been. We trust that the lives of miners will be better safeguarded in the future than they appear to have been heretofore.

Y.M.R.

(From Our Own Correspondent.)

Since the last issue of the MINING RECORD there has been considerable activity in this neighbourhood, and now that the snow is disappearing many are preparing to go out to work on their claims, and perform the yearly assessments. Many of the large companies are also preparing to place machinery on their properties, the All Gold Mining Company who are operating the Bullion mine having ordered from the East the necessary equipment to successfully operate their property which is in an advanced stage of development. The

owners of the Wilcox mine are also thinking of putting in a mill. There seems to be a great demand for Ymir properties for promotion purpose, and since my last letter the following companies have been incorporated: The Broken Hill Mining and Milling Company, Ymir; Black Cock Mining Company, Ymir; Delight Gold Mining Company, Ymir; Rosslund and Ymir Mining and Milling Company, Ymir; and there are three or four others in the course of incorporation. Meanwhile Ymir's prospects are very bright and there can be no doubt that here is the making of a very rich camp. What Leadville is to Colorado, Ymir will be to B.C. We have the properties but what is needed is capital, which I am pleased to state, however, is being gradually supplied. Probably no other district will receive more attention this coming summer than the Cariboo Hump section. The Hon. Mr. Hume during his recent visit to Ymir promised us a trail to that locality. There are many locations which have been held since 1894, which is in itself a good sign as there must be something good when prospectors will hold their locations that length of time. The Ymir and Dundee mines have stated that they will only give \$3 per day for eight hours' work. There seems to be some dissatisfaction among the miners at this prospect, but it is hoped that any difficulty which may arise between capital and labour may be overcome by an amicable settlement on the principles of give and take on both sides. Mr. S. L. Long, P.L.S., of Rosslund, who is well and favorably known in this camp has been appointed general manager of the Canadian Pacific Exploration Company property, the Porto Reco mine, and it is his intention to commence work at once as there is now sufficient water to operate the mill. The Ymir mine people are building at the Ymir station a large shed for the purpose of storing their concentrates which are now being shipped daily and the contract was let for hauling these concentrates from the mill to the mine, a distance of five miles at the price of \$1.75 per ton, which is a very low figure. Mr. S. S. Fowler, of the London and B.C. Gold Fields has been reporting on the Dundee mine, it is presumed, for the Bank of British North America, who it is said, is interested in this property. I have it upon good and reliable authority that the mine and mill will shortly commence running again as the buildings which were destroyed by the late fire have been rebuilt.

NELSON.

(From Our Own Correspondent.)

There has been much activity in mining of late in this neighbourhood, and the outlook for a busy year is very favourable. Perhaps the most important deal that has been put through is the bonding of some twenty claims on Toad Mountain to an English syndicate, one of these properties being the well-known Dandy mine, on which very extensive development has been performed. The Dandy is one of the oldest locations on that mountain, and is contiguous to the Silver King, which has proved so valuable. Unfortunately the season is so extremely late, being almost a month behind, that not much work can be done on the claims yet, but as soon as the snow goes off there will be a great many men at work on them, and the mountain will be even more thoroughly explored than it has been so far. Another important deal has been consummated, the final payment on the Royal Canadian and Granite groups on or near Eagle Creek having been made by the Duncan Mining Company who have bonded that property and have now taken up the bond. It is intended to erect a stamp mill on the ground, as much of the ore is of the free milling variety. The Athabasca is looking as well as ever, producing gold bricks (genuine ones) with much regularity, and the Exchequer, not far away, is also looking extremely promising, so that it is safe to prophecy a very busy summer. Nelson itself is going to be unusually lively, as not only is an electric car service promised this year but a large gas and coke works will also be established here within the next few months. Very good reports come in from all the surrounding districts, particularly from Ymir and Erie, but there are indications that East Kootenay is going to prove enormously rich—possibly even rivalling the Slocan in the size and value of its galena and other veins that are known. The only thing that may interfere with the general prosperity is the recently enacted eight-hour bill, and that rather astonishing piece of legislation is very likely to cause trouble, at any rate at first. Exactly how it will work out is a matter of conjecture, but the mine-owners have agreed to pay only eight hours' wage for eight hours' work, which will probably cause much dissatisfaction among the miners. It is unfair to condemn the measure altogether, but certainly a

little less haste in making such a vital change would have been more satisfactory to those most interested.

The other new measure, providing for the proper qualifications of assayers practising in B.C. is in the main most advisable, and will be hailed with delight by all thoroughly trained and certificated analysts; but it seems a very heavy tax to insist on the payment of so large a sum as \$15 by an already certified assayer for his provincial certificate. Surely a fee of \$5 is ample, and it is to be hoped that the objectionable clause will be repealed or modified before March, 1901. Twenty-five dollars is not excessive probably for an examination fee, but in many cases the expense of presenting one's self at a distant town for that purpose will greatly add to the cost. This is a very serious matter, and would greatly cripple the finances of many a young man just starting up in a business which is by no means quite such a profitable one as some suppose it to be. Like the eight-hour bill, however, it is too soon to condemn it, and as the principal object is most praiseworthy, possibly some way can be arranged to remedy the inconvenience. One effect of the bill will probably be the formation of themselves into an association by the assayers in the province to protect their own interests, and another effect might well be the general increase of fees charged, which are too low at present; both of these arrangements being very much to be desired.

SLOCAN.

(From Our Own Correspondent.)

The Slocan continues to pursue the even tenor of its way, apparently oblivious or unmindful of the sword which hangs suspended over its head. The decision of the Government to enforce the eight-hour law next month, has, nevertheless, created a painful impression in this district, where centres the gravest opposition to the movement. It is not too much to say that with the exception of the miners belonging to the recently formed union, the majority of whom are controlled by the utterances of the few, everyone here exhibits the greatest hostility to the measure. To afford relief where it is unsought by imposing a burden on a region just coming into prominence in financial centres and therefore particularly desirous of appearing at its best, is poor return for the support which the Government candidates were accorded in these constituencies. It would have been a comparatively small, though popular act on the part of the Government, and more in conformity with their own promises and the views of the majority, had the obnoxious miners' license been done away with, if relief in any form was contemplated. However, the course appears to have been finally decided upon, and there seems to be nothing for it but to accept the inevitable with the best grace possible. An amicable arrangement between employer and employee is now all that is desired, and I am expressing the views of every true citizen and those interested in the welfare of the industry in praying that wise and moderate counsel may prevail on both sides. The mine-owners have already taken the initiative in the matter, coming out flat-footed in an ultimatum which states that "owing to the action of the Legislature they will be obliged to pay only \$3 per day for skilled miners after June 1st, other classes of labour to be paid in proportion," thus anticipating by two weeks the enforcement of the act. This has been signed by representatives from all the principal mines in the Nelson and Slocan divisions with few exceptions, the most noticeable being in the case of the Slocan Star, the cause of which action is not known. The miners, too, through their unions have also displayed great activity, delegates having been appointed from all the districts to convene at Nelson next Saturday. In the face of the action of the Government and the very thorough organization and unanimity of the mine-owners, the most sensible course is obviously for the miners to submit, and I rather think this will prove eventually what will be done; failing which, there is trouble in store, which can only result disastrously to the province and our staple industry.

Shipping has been temporarily suspended from many of our more important mines and consequently the amount credited to this district for the past month is uncommonly light, being less than 1,700 tons for the four weeks ending May 12th, over half of which comes from the Payne. This, of course, is not to be construed as an evidence of retrogression, but is due solely to the breaking up of the roads, a condition which seems destined to last longer than usual one would judge, from the very leisurely way in which the show is going. Several of our at-one-time famous producers have either completely retired from the shipping list or been relegated to a back seat. In most cases there is good

reason for all this, and we may confidently expect to see them re-assert their supremacy at a not very distant date. The Slocan Star which, has immense reserves of ore on hand, has recently been enabled to commence operation at the concentrator, which should result in steady shipments from this on; although another temporary close down has since been necessitated on account of trouble with the water. The Ruth, too, although apparently idle, is engaged busily in the construction of a similar plant, work on which has already begun.

Final arrangements have not yet been concluded with regard to the sale of the Enterprise, although everything is practically settled with the exception of one or two minor details, which will probably be satisfactorily adjusted before it is convenient to commence operations.

Rumours are revived anent the deal on the Mountain Chief. Owing to unfortunate differences of opinion on the part of the owners, this property, although it has shipped over a thousand tons of high-grade ore, has not been operated to any extent for nearly four years. It is reported, however, to be now under option to the company which recently acquired the Lucky Jim, but like a good many other such transactions it will probably require time to materialize.

The recent speculation indulged in with reference to the Arlington has proved correct. A new company appears to have acquired control, and every effort is being made to commence operations in a systematic manner. Another manager has been appointed, and men and machinery will be sent up as soon as the condition of the ground will admit.

It is getting to be quite a common thing to meet directors from London in the Slocan, the latest arrival being Mr. H. C. Oswald, of the North-West Mining Syndicate, who expresses himself as highly pleased with the condition of the Boson and other properties owned by the syndicate.

The upward tendency of the silver market while not creating anything in the nature of an excitement, has been a source of satisfaction and some profit, increasing slightly the returns on shipments; but in the absence of any sustaining influence too much importance has not been attached to the movement.

I can hardly conclude my letter this month without referring to the very disappointing nature of the returns from this district as shown by the Minister of Mines' report for last year. That they would barely reach the high-water mark of '97 was fully anticipated, because conditions were nothing like so favourable for economic production, but a falling off of nearly 12 per cent. in tonnage and over 20 per cent. in value was a good deal more than we bargained for. Still, we have the satisfaction of retaining our position at the head of producing districts, though for how long is a question. One feature of the returns is quite interesting and would seem to the uninitiated to indicate that gold mining in the Slocan is on the decline, the production of this metal being reported at 60 ozs. as compared with 193 and 152 ozs. in '97 and '98, respectively.

GOLDEN.

(From Our Own Correspondent.)

There has been very little doing in mining matters here during the winter months, but now that spring has at last arrived things are brightening into activity. A great point of attraction at the present time is Tete Jaune Cache, on the British Columbia side of the Yellowhead Pass, and about 180 miles distant from Golden. Last spring some prospectors from here went to that country on exploration bent. They found excellent rim-rock prospects on Swift Current Creek, a large and rapid glacial stream which flows into the Fraser River a little east of Tete Jaune Cache. The party returned to Golden and outfitted for the winter, getting back to Tete Jaune Cache in October. They built the necessary cabins and did prospecting work along the whole of the creek with a view to locating the best ground. Good prospects were obtained everywhere at rim-rock, the dirt running from 5 cents to 30 cents to the pan. The best dirt was found at the foot of a canyon about a mile above the Fraser and here the dirt averaged 15 to 20 cents to the pan. Ground was located and one party set to work sinking a shaft to bed-rock, but they only got 35 feet when the rising water of the spring freshets drove them out, and they have been so far unable to test bed-rock, and will not now be able to do so till fall. Great trouble was experienced with big boulders in the wash of the creek. Another party confined their energies to getting ready for work in the spring. They made sluice-boxes, built a dam to divert the water for washing up, and ran a cut to a depth of twelve feet. They reckon this will drain to bed-rock at the point where they are located. This

Party expresses no doubt about being able to work its ground all the year round. So far no gold has been taken out of the creek so that it is yet a matter of a mere prospect, but these parties found gold in several creeks in the neighbourhood and consider that the locality fully warrants prospecting. A good many people are going in there from Edmonton and Kamloops and at present there are about fifty men and one hundred horses waiting at Golden for the snow to clear off the summit before starting. The Government have made a trail from here to within forty miles of the scene of the excitement, and arrangements have been made to put boats on the rivers and to build a ferry over the Fraser River at Tete Jaune Cache. This latter is being done by parties here. Some excellent mica deposits exist in the neighbourhood of Tete Jaune Cache, and a paper has just been published on the district by Mr. McEvoy, of the Dominion Geological Survey. He describes the geological disturbances as very great in the vicinity, which possesses one of the grandest features of the Rocky Mountains, namely Robson Peak, 13,500 feet high, and the highest known peak north of the International boundary. The rocks of the district are favourable to mineral depositions as will be seen from the following extracts from Mr. McEvoy's report:

"Some mountains in this vicinity were visited, four on the east side and three on the west side of the valley. It is evident that the valley not only marks a great division in the topography, but also forms a dividing line of geological importance. On the east side, the first rocks met with are conglomerates, now squeezed so as to assume the outward appearance of coarse mica-schist. These are overlain, near the summits, by undulating folds of black argillite and yellow schists, including beds of dark flaggy limestone, yellow, finely crystalline, dolomitic limestone and talc. The former of these probably correspond with the Bow River series, and the latter with the Castle Mountain group of Cambrian age. The western side is composed entirely of rocks not met with previously on this exploration. They consist of garnetiferous mica-schists and gneisses, with some blackish micaceous schists and light-colored gneisses that represent a foliated granitoid rock. The garnet-mica-schist is the predominating rock. In some places it is made up almost entirely of mica and garnet. These rocks, although differing somewhat from the Shuswap series as seen further south, are pretty certainly referable to that series. They hold numerous veins of coarse pegmatite, which, besides the ordinary constituents, contain tourmaline, garnet, cyanite, beryl and apatite.

"The rocks of the Shuswap series, mentioned above as occupying the south-western side of the great valley, do not carry gold, but on the other side colors can be obtained in most of the tributary streams. On the mountains about seven miles from the Cache, in the rocks before mentioned as probably corresponding to the Castle Mountain group, numerous quartz veins were observed. Where these were noted, the cleavage of the rocks dips south at high angles, while a secondary vertical cleavage or jointage runs north and south. The larger and more numerous quartz veins run parallel to this secondary cleavage, and have a thickness of from one to five feet, while smaller lenticular veins follow the principal cleavage. These veins show a good deal of oxidized iron-pyrites and some galena. The galena proved to be argentiferous.

"Quartz veins are to be seen in many places along the route, all the way from this place to the Athabasca River."

A company has been formed in Quebec to work the Certainty group of copper prospects on Fifteen-Mile Creek, twelve miles from Golden, and work will be started at once. The Government are showing every desire to encourage development and have granted \$200 towards the opening of the trail necessary to get in supplies.

Development work will also be done on the Burns group in McMurdo district and in Cariboo Basin, Prairie Mountain, and Bald Mountain. The Bald Mountain Mining Company are preparing their ground for examination by the representative of an English company as soon as snow goes sufficiently.

The boom in copper is causing a great deal of enquiry for properties in this district as it is a noted gold-copper camp, but the transportation problem has been the one point hitherto unsolved and which has prevented the more active development of our mines. That difficulty is about to be overcome, however, as the C.P.R. and the Kootenay and Northwest Railway companies are in the field for the purpose of constructing lines along the valley of the Columbia connecting the Crow's Nest road with the C.P.R. line at Golden.

EAST KOOTENAY.

(From Our Own Correspondent.)

North Star Hill.—This month a rich ledge of galena ore is reported to have been struck at the 200-foot level in the North Star mine, but as yet the particulars of the strike have not been made public. It is, meanwhile, certain that this locality will be well exploited in the near future. The Gem and Soney claims, extensions of the Sullivan, on the northeast, and the Headlight group, extensions of this mine, on the southwest, have both been recently floated, the former on a capitalization of \$75,000 and the latter having been placed on the market by a group of prominent Toronto financiers. We have the satisfactory assurance that development work on an extensive scale will ere long be commenced on both properties.

Wild Horse Creek.—From here the most important piece of intelligence comes, that the Big Chief group on Boulder Creek, eight miles distant from Fort Steele, has been transferred by Mr. Egan, who held a bond on the property, to a strong company. A very considerable amount of work has already been done on these claims, the ledge having been opened up by a series of tunnels and shafts for a distance covering 1,100 feet, a road is now being built from the property to Fort Steele, and upon its completion a ten-stamp mill is to be forthwith installed. Very high values have been obtained from the Big Chief ore and the facilities for working and economic advantages of water power and fuel are exceptional. Situated immediately above the Big Chief are the Dupont group of claims, which have recently been bonded to American capitalists, and Mr. Hannington, formerly connected with the C.P.R. proposes directly the snow leaves the ground to thoroughly prospect these properties, whereon the surface showings indicate ledges forty feet in width, the average value of the ore being \$5 per ton. As operations can be carried on in the nature of quarrying and there is every facility for economically treating the product, these properties have every promise of proving of value.

Bull River.—The energetic Spokane investor has made his appearance in this neighbourhood, and negotiations are now in progress for the sale of the Mabel group on Bull River to a syndicate of this Washington city. On this property the work consists of a 20-foot tunnel, following the lead, and in addition drives, open cuts and shafts. Already forty tons of good ore, averaging over \$50 per ton, has been taken out. The ore is a sulphide and can be treated locally at small cost, and power, if required, can be obtained from the Bull River Falls, which are situated only about five hundred yards from the property.

Moyai Lake.—For the new St. Eugene concentrator, 30,000 feet of lumber has been cut and is in readiness for floating down the lake to the site of these works; an additional 40,000 feet having meanwhile been contracted for. The St. Eugene will have a capacity of 150 tons per diem, the ore being brought down thereto from the mine over an aerial tramway. This mine has so far shipped out over 350 tons of ore for treatment, while the Lake Shore is steadily shipping three carloads a month. Shipments from the St. Eugene have been for the present discontinued owing to the bad state of the roads, and in consequence there are over two thousand tons of clean ore, besides concentrates, awaiting more favourable transport conditions ere being consigned to the smelter.

THE IRON MASK-CENTRE STAR LITIGATION.

EXTRA LATERAL RIGHTS.

(From Our Rossland Correspondent.)

The adjournment of the case before the Supreme Court of this province between the Iron Mask and the Centre Star Mining companies will, no doubt, give ample time for consideration, especially on some of the points bearing directly on the questions involved. I have already stated that the learned judge, Mr. Justice Walkem, has given the fullest latitude to counsel on both sides of the case. The adjournment was granted on the application of the plaintiff company—that company having agreed to pay all proper costs occasioned by the adjournment. During the course of the discussion which arose in court on this application, it was admitted by the defendant company that the expert witnesses were to be paid by the month, and that the amounts were not excessive or oppressive.

While anxious to explain to your readers the principle involved in the question of extra lateral rights as maintained by the Centre Star Company as covering their contention,

we do not rush 'pendente lite' to state anything here but bare facts of the case and the chief principle involved.

The contention of the Centre Star, the defendant company, is that there is an apex of a vein on the ground of the Centre Star Company, and that the vein is continuous on the ground of the Iron Mask where it has been followed by the workings of the Centre Star Company as shown by the two arrows in Figure 1 of the diagram. In Figure 2 nothing but the general principle theoretically is laid down, where a vein intersects the end lines. So far the evidence in the case does not show a vein intersecting end lines, though it may. The evidence is somewhat contradictory, so far as the experts are concerned.

Nothing positive as to the continuity of the vein which is alleged to apex on the Centre Star ground has been established as yet.

STURTEVANT ROLL JAW FINE CRUSHER.

CRUSHING is the first and least expensive step taken in rock reduction. Any of the standard crushers will reduce the hardest ores at one-fifth the cost of other machines. For this reason, in all well managed works the rock is broken as fine as possible in the crusher. For many years fine crushing has been impossible, as all crushers, when set up for fine reduction, clog and refuse to work.

The above cut shows the Sturtevant Roll Jaw Crusher, which reduces the hardest ores at one operation to gravel and sand, in fact doing the work of *both* crushers and rolls, which has been heretofore impossible.

The jaws of this machine do not advance and recede as in the ordinary type of breaker, but give the ore a long, rolling

Fig. 1.

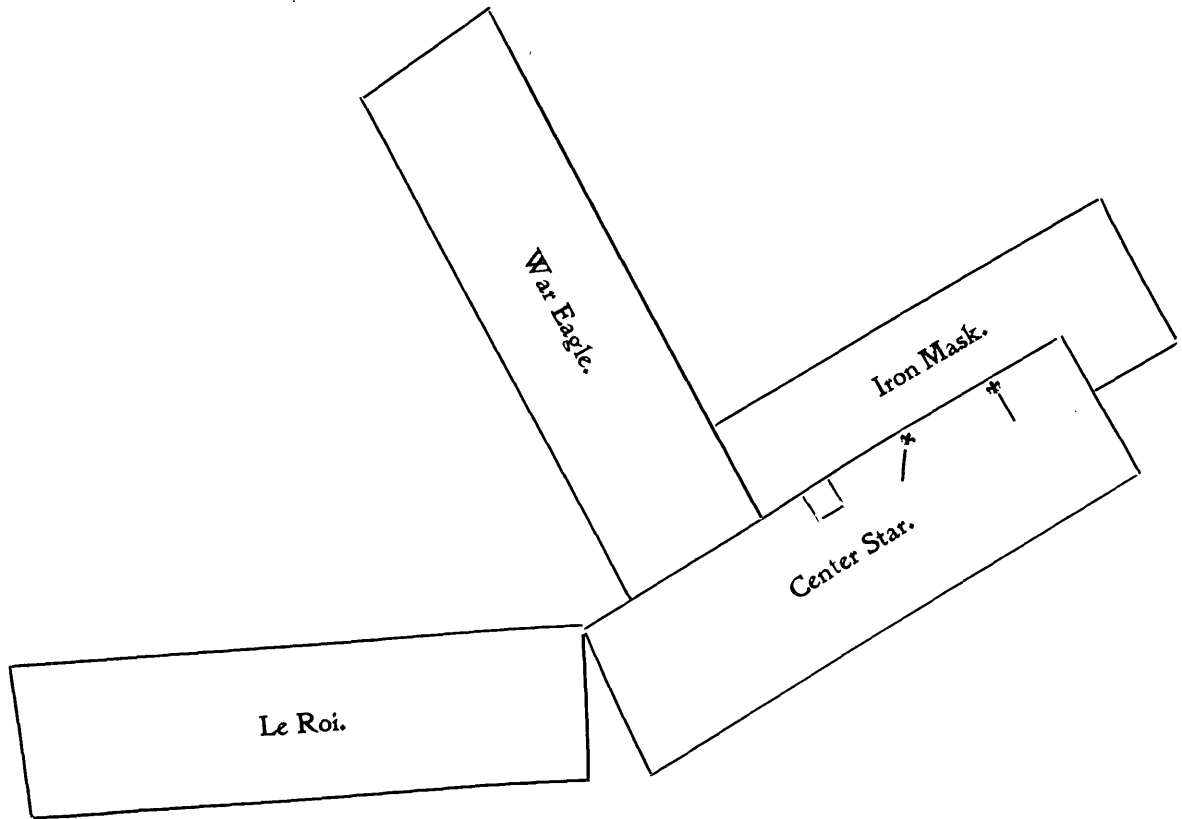


Fig. (1). Inclined shaft running on Iron Mask ground from Centre Star ground. Arrows show direction of tunnel and cross-cut from Center Star ground into Iron Mask ground.

Fig. 2.

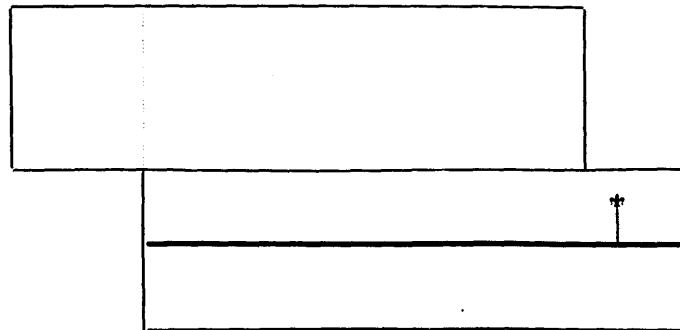
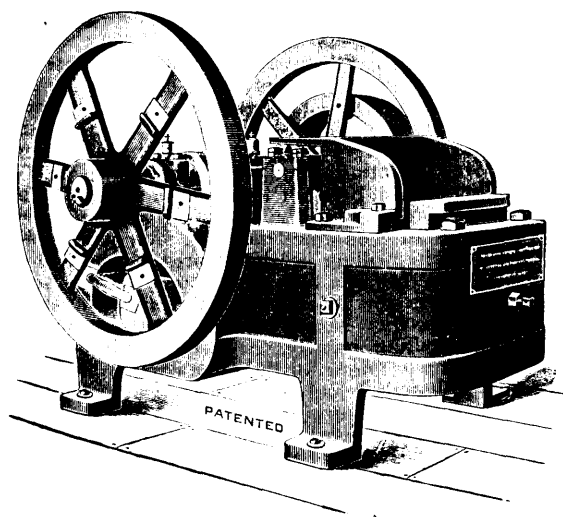


Fig. (2). Dotted line shows general principle of extra lateral rights continued from end lines. Heavy line represents vein, theoretically; arrow indicates direction to follow.

crush instead of a direct pinch, which the hardest ores cannot withstand. This rolling motion of the jaw does away with the tendency to clog, as the crushed stone is dropped after the jaw has passed over it, and the reciprocation of the roll jaw checks the tendency of the jaw faces to groove.

The roll jaw is a long lever, backed by toggles; but the usual crushing power is not required in these machines, for, as above stated, the roll jaw face is not biting the rock, but is rolling upon it, and the hardest ores break down easily, for no mineral can withstand a crushing and a rolling stress applied at the same time. Owing to the rolling motion, rocks are crushed without any rubbing action whatever, which of course promotes durability.

This is a simple, economical and durable jaw and toggle crusher, requiring no skilled labor to operate, and no auxiliaries. It is adjustable when in motion, and not expensive to buy or maintain.



The Sturtevant Mill Co., of Boston, Mass., have issued a circular fully describing this machine, which they will be pleased to send to any address.

PUBLICATIONS.

PROSPECTING, Locating and Valuing Mines—By R. H. Stretch, E.M. Scientific Publishing Co., New York: Price \$2.00.

This is a practical work, that can be studied with advantage not only by professional mining engineers and others, but even by those who have had no previous knowledge of mineralogy and the allied branches of this science. The prospector will find in this book a vast amount of strictly scientific information, expressed in the simplest language, from which he is certain to derive great benefit.

Many hints are given that will prevent loss of time in searching for ore deposits in unlikely places. The chapters on "Mistakes in Mining" and "What Constitutes a Mine," are likely to prove most useful not only to miners, but to the investing public. Many points usually come to the prospector and miner as a result of years of experience and a severe struggle with problems in rock, are here plainly set forth and lucidly explained. The would-be investor in mines and undeveloped mining prospects will find in this book a great deal of valuable information which is calculated to remove, to some extent at least, the element of chance from mining ventures.

The principles underlying an intelligent search for ore deposits are here very clearly stated, and cannot fail to be useful, even to the veteran searcher for hidden mineral wealth. The chapters relating to laying off and locating mineral claims have been framed for use in the United States, and are not directly useful to miners and prospectors in British Columbia.

A valuable feature of the book is the concise description of all the useful ores and minerals.

At the end of the book are a series of well-executed plates and diagrams, which serve to illustrate various matters mentioned in the text. A few points might have been made clearer and more generally useful, as for instance, while the specific gravity of each mineral is mentioned there is no formula given for finding the specific gravity. This, however, is comparatively unimportant, and we can certainly recommend the work as one of the most useful of its kind.

THE ALBERNI GOLD DEVELOPMENT SYNDICATE, LIMITED,

TO THE EDITOR,—I am instructed by my Board to point out that your March publication contains a communication with reference to this Syndicate, and to inform you:

First—That the Regina mine was never "launched on the London market" at the price you name, or any other price, nor was the company ever even registered. The facts are that certain underwriting was offered and other underwriting held in suspense, when an offer was made by Capt. de la Mar to purchase the property. An agreement was entered into by him whereby he sent out his expert to examine the property, but the report being unfavourable the offer was withdrawn. Having regard to this, my board did not feel justified in proceeding further in the matter and returned the underwriting, and as you say, "The bond lapsed." The property had previously been reported upon most favourably by the syndicate's engineer, Mr. W. H. Bainbridge, and a Mr. Thomas Bateman, and there reports we can produce.

Second—That it is news to my board that any hydraulicing had been done for the purpose of illustrating the value of the ground which, I presume, is what your correspondent desires to convey. As a matter of fact whatever was done was done for the sole purpose of getting to bed-rock quickly. His statement as to the fate of the company previously owning this mine is quite within my board's knowledge. But your correspondent here, as in many other portions of his letter, only tells a half-truth.

It is a well-known fact that in August, 1896, a fire swept over the Cataract ground after the original holders had spent \$16,000 in putting in a dam, etc. This fire destroyed the labour of years and the fate of the previous company is not to be wondered at if they had no further capital to renew their operations. There are, not only in British Columbia, but elsewhere, plenty of instances of fires having caused absolute ruin and stoppage. Reports on this property by the engineer already mentioned and by other leading hydraulicing experts of B.C. and America are in our possession, and my board are quite satisfied as to the prospects of the mine.

Third—No properties have been bought without inspection by a representative of the syndicate.

Fourth—Your correspondent would appear from his letter to desire to show himself to be remarkably conversant with the expenditure of this company on the various properties. It would be interesting to know how he has acquired this seeming knowledge, and whether he has ever been in the employ of the syndicate and if so, for what reason he was discharged or left their employ. My board are, however, thankful to find that your correspondent has some regard for one of the holdings, viz.: "Happy John," and that in this case at any rate he is in accord with other mining engineers who have reported.

Fifth—No venture, "wild cat," or otherwise, has been placed before the British public by the Alberni Gold Development Syndicate, Limited, and I desire only to add for the benefit of your readers generally that the syndicate is purely a private one which has never gone to the public for funds, and that my board neither desire nor acquire any outside instruction as to how they should spend their own money.

Yours truly,

JOHN ERNEST GIBNEY,

Secretary Alberni Gold Dev. Syn., Ltd.

24 James street, Liverpool.

THE PELATAN-CLERICI PROCESS AND MR. WEBBER.

TO THE EDITOR,—With reference to Mr. L. H. Webber's reply to my article on the Pelatan-Clerici process I must first remark that I certainly wrote without the sanction of the B.C. Bullion Extracting Company. I have never been in any way connected with that company, nor am I aware of having made any remark calculated to create such an impression. Furthermore, I did not condemn the process as being inapplicable to gold-copper ores, for it is well-known to metallurgists that no judgment can be passed upon any process merely from a theoretical standpoint and without a large number of experiments on the large scale, but I merely pointed out what I considered a very probable source of loss, namely, the destruction of cyanide by copper. Mr. Webber remarks that the time of contact of the ore with the cyanide is so short that the copper has no effect. The destruction, however, of cyanide by copper is the ordinary quick laboratory process of determining copper, the destruction is

just about as quick as it well can be. The time taken to decolorize an ammoniacal copper solution is only a second or two. The copper will destroy the cyanide as soon as it goes into solution and herein lies the difference between the Pelatan-Clerici process and the ordinary cyanide process for treating gold-copper ores. Mr. Webber remarks that with the ordinary cyanide process the copper destroys the cyanide owing to the length of time the ore is in the cyanide solution; so far from that being the case it is, as a Yorkshireman would say: "T'other way round." In the ordinary process the copper never goes into solution at all if roasted right down to oxide first, and therefore it remains harmless, whereas in the Pelatan-Clerici process the nascent chlorine obtained by the electrolysis of the salt solution is always liable to dissolve copper and thus render it harmful to the cyanide. Nascent chlorine also, that is chlorine in the act of being set free from its combinations is more active than in the ordinary way. Many bodies are very active when in the nascent condition while quite inactive at ordinary times. One cannot reduce a Ferric-chloride (chloride of iron) to Ferrous-chloride by hydrogen, but by setting free hydrogen from its combination with chlorine in the same solution, the reduction is complete.

This belongs to the subject of nascent action and I have introduced it to show that in the Pelatan-clerici process nascent chlorine plays a part and may sometimes be detrimental whether to a very serious extent can only be shown by large scale experiments.

Yours faithfully,

A. A. WATSON.

Vancouver, B.C., April 10th, 1898.

THE MINING INDUSTRY AND UNWISE LEGISLATION.

TO THE EDITOR.—When a new country begins to open up its mineral resources, and to invite outside capital to invest in this class of venture, the matter of legislation affecting the industry should occupy the first thought of all those who wish to see the country advance in prosperity. A few mistakes made at the beginning might well do irreparable harm, for there is not perhaps another industry which is so sensitive to mistaken or unjust laws, as that of metalliferous mining. It is of the greatest importance that legislation for this industry should not be done hurriedly or merely to meet a passing demand, but only after mature and exhaustive consideration to meet the demands of the future.

Any experienced miner who studies the mining laws of British Columbia, I believe will come to the conclusion, that there is a decided tendency on the part of your legislators to commit this grave error of hurried and ill-considered legislation. With the fairest and most promising future before it of any country that I know, as regards gold mining, it is heartrending to see laws passed which are bound, in the future, to seriously handicap the country, and I sincerely hope that all genuine well-wishers may join their voice to mine in earnestly begging your legislators not to pass mining laws until these have been submitted to experienced, competent, and honest miners.

The above observations have been called forth by the "eight-hour law," which, with all due respect to the good intentions of your legislators, I cannot but qualify as about the worst example of ill-considered and harmful legislation which could be cited. It is one of these measures which in a new mining district, appears insidiously as fair, just, and harmless, but which in the future will do more to hamper and upset metalliferous mining than anything I could imagine. Your lay readers will no doubt refuse to take my "ipsi dixit" without explanations and reasons, but I appeal to all those who have had experience in deep metalliferous mining on a large scale, both managers and workmen, to bear me out in the following necessarily incomplete observations:

To begin with, the general idea here of an eight-hour day in mines, is no doubt, that three shifts could be worked in the twenty-four hours. Now the three-shift system is a desirable and convenient way of working in some cases, but when it comes to a deep and extensive mine where blasting is necessary, I fail to see how the three-shift system could be adopted, even if deemed desirable. In the case of ordinary day and night shifts as applied to mines where a large number of miners are employed in deep and extended underground workings, all the blasting has to be done at a fixed hour, and then the mine allowed to ventilate itself of the fumes before work can be resumed. In practice this can-

not be done more than once in each shift, which means that the miners of each shift are required to drill a certain number of holes of a certain depth, by, say two o'clock, and that all the holes must be ready and charged by that time. The miners then leave the mine and the blasting commences. When the mine clears itself of fumes it is well on to the time when the other shift is due to commence work at six o'clock. This is a rough outline of what, in my experience, I have found to be the general practice in large mines. In many cases where the blasting is done by the miners themselves, the hour is still fixed at about 2 o'clock, and the miners have to wait after the blasting until they can go in and knock off the loosened material from the respective faces. In either case the actual drilling work does not last, in all, to more than seven hours at the most, the other five hours being taken up in blasting, ventilating, and preparing the faces for fresh drilling, besides arriving at the work, starting to work, and the dinner hour. That is ten hours are used in preparatory work, and fourteen in actual drilling, out of the twenty-four hours. Now, see what the result would be in attempting three shifts. The preparatory work per shift would probably be about the same, that is, fifteen hours out of the twenty-four, leaving only nine hours for drilling, or three hours per shift, and in hard rock three hours drilling is not worth blasting. Even granting that time were saved, still four hours' drilling would be poor economy to blast. This is how the matter presents itself as to actual work and organization, but from an economical point of view it must be remembered that the drilling is what represents work done, it therefore appears that in a two-shift system the mine-owners pay a day's wages for seven hours' drilling, whereas in a three-shift system they would pay the same for only three or four hours' drilling, namely, they would only get half the effective mining work done for the same cost. I must frankly confess that although I had been an advocate of and often used the three shifts in urgent work in shafts, headings, or cross-cuts, where such work could be carried on independently of the general work of the mine, I have never even attempted it in general, simply because I saw it would not answer. Perhaps other managers may have succeeded in adopting the three-shift system in deep, extensive, hardrock mines, and if so, I should like to know how they organized the work; in the meanwhile I think the foregoing reasons are sufficient to show that the system will be an impossibility in the British Columbian mines, if in the future they prove to be as good as we all wish them to be.

We therefore come to this that if the eight hours' law is founded on the idea of a three-shift system, it is founded on a basis which will not work in the future, and it is a poor and a bad law, which is only applicable to the present infantile stage and not to the mature and prosperous future, which it gravely imperils.

If on the other hand the law was passed with the idea that only the two-shift system should be continued, then I can only appeal to any one carefully reading the foregoing statement of work in a large mine, to say whether it is not self-evident that for real, serious mining, the law is not required. In deep blasting mines, and those of this province will not be good if they do not become such in the future, the miners do not actually work more than eight hours. It may be urged against me that this being the case, the law can do no harm, but legislation, when not actually required, when no evil or injustice has to be remedied, and when interfering between employer and employed, is always harmful. It seems to me that under the present circumstances, and for the sake of the future mining prosperity of the province the matter ought to be left to an amicable arrangement between mine-owners and miners, and seeing that in the future, if mines are to turn out good, the miners will be natural causes, not have to work more than eight hours, the mine-owners could well agree from now, not to demand from a miner more than eight hours effectual work in the face, for a day's wages. Moreover, in preliminary development work, such as must be general in the province now, mine-owners will find that the three-shift system is often the most economical in the long run.

I trust that the above rough observations may be received in the spirit in which they are meant, viz.: with a keen desire to see mine-owners and miners pulling together in amity towards a prosperous mining future in this province, equally profitable and advantageous to both Capital and Labour.

I am, Sir,

Yours truly,

W. JAMES NEWALL,

(Member Institute Mining Metallurgy).

Vancouver, B.C., May 6th, 1899.

SHIPPING MINES.

NELSON.

We are indebted to the General Manager of the Hall Mines, Limited, for the following results of this company's smelting operations for the four weeks ending April 28, 1899: 17 days' 3 hours' smelting, 2,086 tons of ore were smelted, yielding 35 tons copper, 29,530 ozs. silver.

For April the returns from the Athabasca mill were:

Number of days run	29 days 11 hours
Number of tons crushed	412
Approximate value of bullion recovered	\$7,532 61
Gross value of concentrates	2,218 52

Total value recovered	\$9,751 13
Value of bullion recovered per ton of ore crushed...	18 28
Value of concentrates recovered per ton of ore crushed	5 38

Total values recovered per ton of ore crushed

SLOCAN.

The ore shipments from the Slocan mines from the 21st of April to May the 26th inclusive, were:

Sandon—	Tons.
Payne	1,170
Last Chance	300
Slocan Star	20
Total	1,490

McGuigan—	
Rambler	87
Dardanelles	20
Total	117

Whitewater—	
Jackson	32
Whitewater	81
Total	113

SLOCAN LAKE (From Jan. 1 to May 13.)

Boston	460
Marion	20
Fidelity	23
Vancouver	320
Wakefield	580
Emily Edith	60
Comstock	120
Total	1,583

Total shipments from Slocan to date

YMIR.

The total output of ore, crushed and shipped from the mines of Ymir, for the four months ending April 30th, is as follows:

Ymir	2,250
Porto Rico	1,400
Dundee	750
Total	4,400

Black Cock	188
Tamarac	6
New Victor	6
Total	4,600

The following report of mine exports is made from Nelson for the month of April:

Coke, 72 tons	360
Ore, 361 tons	18,106
Total	\$18,466

The exports of ore from Rossland for the same period were:

Ore	\$228,817
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ROSSLAND.

The ore shipments from the Rossland mines during the last two weeks in May were exceptionally heavy, and it is believed that henceforward the output will show a considerable increase. For the first time this year the Centre Star entered the list of shipping mines. The following returns have been received for the three weeks from the 22nd of April to the 27th of May inclusive:

Le Roi	10,328.5
War Eagle	7,492.5
Iron Mask	199
Centre Star	148
Total	18,168

The total production of the camp for the year to this date aggregates 47,759 tons, made up as follows:

Le Roi	31,859
War Eagle	14,757
Iron Mask	941
Evening Star	36
Deer Park	18
Centre Star	148

COAST MINES.

We are indebted to Mr. J. J. Lang, General Manager of the Fairfield Exploration Syndicate, Ltd., for the following report of this company's operations at the Dorothea Morton Mine for the month of April:

Ten stamps ran 18 days 17 hours 53 minutes; tons crushed, 984; crushed per stamp per day, 5.2 tons; ore treated by Cyanide, 867 tons; average assay value, gold, \$7.52, silver, 70c.; calculated extraction, 89 per cent. gold, 73 per cent. silver; actual return in bullion, 1,670 oz, valued at \$8,673.

Five hundred tons of the above was a trial crushing of quartz outside of pay-streak and nearer footwall.

COAL SHIPMENTS—APRIL.

The New Vancouver Coal Co.	44,925
Wellington	13,218
Union	6,225
Total	64,268

The New Vancouver Coal Mining & Land Co., Limited, foreign shipment to 20th May, 1899:

Date.	Vessel.	Destination.	Tons.
2—	SS. Titania	San Francisco	5,164
3—	SS. Amur	Alaska	203
3—	SS. Wyefield	San Diego	4,926
4—	Schr. J. M. Colman	Alaska	300
5—	SS. Mineola	San Francisco	3,397
6—	SS. Siam	San Francisco	4,505
12—	SS. Amur	Alaska	156
15—	SS. San Mateo	Port Los Angeles	4,304
16—	SS. Titania	San Francisco	5,170
Total	28,125		

The Collector of Customs at Comox kindly sends us the following return of foreign coal shipments from Union from 20th April to 18th May, inclusive:

Date.	Vessel.	Destination.	Tons.
20—	Str. Edith	Tacoma	5
22—	Str. Edgar	Mary Island	25
24—	SS. Athenian	San Francisco	828
25—	SS. Aorangi	Australia via Vancouver	630
1—	SS. Cottage City	Sitka, Alaska	100
4—	SS. Wellington	San Fran. via Nanaimo	1,485
9—	SS. Brunswick	Mary Island	464
18—	Bk. Oregon	St. Michael's Alaska	2,300
Total	5,837		

THE METAL MARKET—MAY.

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

On the whole the market this month has been fairly active, and there has been no decrease in the volume of general business.

SILVER.

Silver has not quite maintained the high level of April's closing prices. The excitement induced by speculation has died out, and buying from the East has practically ceased; on the contrary, China has been selling, and but for repurchases by the "brass," which had a steady effect, the decline would probably have been more noticeable. The recent rise, therefore, appears to have been purely brought about by manipulation on the part of brokers. The highest price

touched during the month was on the 9th and 10th inst., when the market closed at 61 $\frac{1}{4}$ ¢. Our telegraphic quotations to-day (May 29) from New York are 60 $\frac{1}{2}$ ¢ and 61 cents. The average price of silver in April was 60.10.

COPPER.

The market at the commencement of the month opened firm, with April's high prices steady. Since then, however, while prices have practically remained unchanged, very few transactions are reported, and seemingly manufacturers, though unusually busy, have concluded to await further developments before making additional purchases. Lately Lake copper has dropped slightly, our latest quotations being 18 and 18 $\frac{1}{2}$ ¢, or a fall of from a half to one cent, since the beginning of the month. Electrolytic in cakes, bars or ingots, is selling at 17 to 17 $\frac{1}{2}$ ¢; electrolytic cathodes, 16 $\frac{1}{4}$ to 17¢; and casting copper, 17¢. The London market has been bare of any interesting features.

LEAD.

The Idaho labour strikes have had the effect of advancing the price of lead to \$4.45 in New York, and this figure has been maintained for the past three weeks. The markets are strong and fairly active both in New York and St. Louis. The average price of this metal last month was \$4.31.

SPELTER.

Spelter continues in good demand at the prevailing high prices, the last few days of May showing a still further advance, quotations from New York on May 26th and 27th being respectively \$6.80 and \$7.

PLATINUM.

This metal is gradually becoming more extensively mined in British Columbia, the New York quotations may therefore be considered of interest. The demand for platinum is active, and prices are exceptionally high at the present time. For large lots \$15.50 per ounce is now quoted in New York; for smaller orders, \$16 to \$17. The London quotation is 62 to 64¢ per ounce.

THE LOCAL STOCK MARKET—MAY.

OWING largely to the recent official announcement that the clause inserted in the Metalliferous Mines' Inspector Act at the last session of the Legislature, naming eight hours as constituting a legal day's work underground, would be strictly enforced after the 12th of June, proximo, the local stock market this month has again been conspicuously dull. It is, however, hoped that a satisfactory adjustment of

the wage question may be arranged between the Slocan and Nelson mine-owners and workmen, employers in these districts being more particularly affected by this legislation. Once the matter is disposed of an exceedingly prosperous and active summer may be expected, the improvement in the prices of both silver and lead having exercised already a stimulating influence on the Slocan production.

The sudden rise in Van Andas from 4 to 9 cents within a week was a special feature of the market for May. The price has, however, since fallen to 6 and 6 $\frac{1}{2}$ cents, but another "boom" in these shares may be looked for shortly when the smelter now being installed is in operation. Among other coast securities, a few sales of Consolidated Alberni are reported at from 4 $\frac{1}{2}$ to 5 cents, work having been resumed on the company's property at Alberni.

Camp McKinney stocks remain unchanged, excepting Fontenoy, for which a good demand is springing up on account of recent developments at the mine, whilst Waterloo has weakened to 10 cents. Cariboo remains around \$1.40.

In the Fairview Camp Smugglers have fallen to 4 $\frac{1}{2}$ cents, while Fairview Corporations have again been in demand; the bidding, however, has not come up to the price asked. A number of sales have been made at from 10 to 11 cents.

Montreal is still buying heavily in Boundary Creek and large blocks of Morrison at from 17 to 18 cents have been sold in this market. Winnipeg is also a favourite, and is now selling at 31 $\frac{1}{2}$ to 32 $\frac{1}{4}$ ¢, and Brandon and Golden Crown at from 28 to 30. Both Winnipeg and Golden Crown are very promising and there can be no doubt that when the C. & W. Railway, now under construction, is completed, prices will advance very considerably.

The Rossland market has been quieter than usual, the chief movement being confined to Evening Star, White Bear, Iron Mask, Monte Christo and War Eagle. Since last month Virginia has slumped from 50 to 21; Iron Colt from 18 to 13; and Iron Horse from 18 to 15. Le Roi, on the other hand, has advanced to quite a remarkable degree on the London market, the latest quotation showing a rise of over £3. It is reported that French investors have bought heavily at the increased price.

Slocan shares have sobered in sympathy with the general deadness of the market, but the rather sensational advance of Rambler-Cariboo from 28 to 40 cents within a few days relieved the monotony. This, however, was an entirely "boom" movement and the price has fallen back to 32.

A meeting of the Dardanelles Company was held in Victoria recently. The capital was increased from a million to a million and a half dollars. Two hundred hundred thousand shares at 12 cents being taken up by the Directors at the meeting. The sale of these shares gives the company \$24,000 with which to continue the development of the mine.

St. Kerenie and Noble Five have been in demand, but holders are not selling at prices offered.

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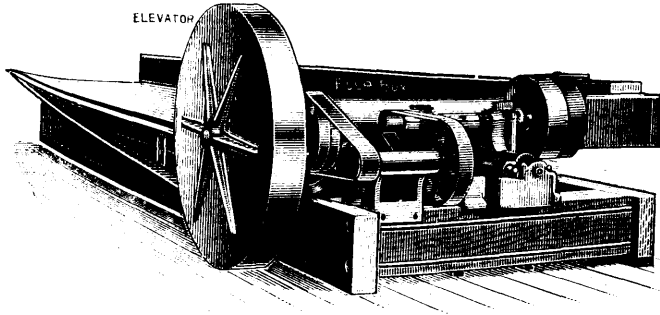
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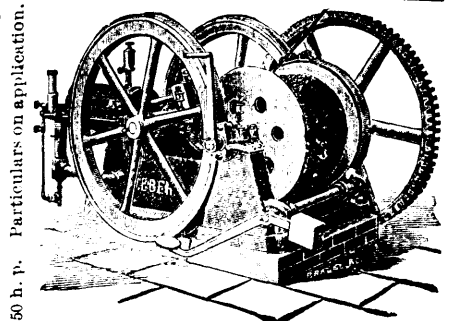
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Mining Stocks.

Prepared by A. W. More & Co., Mining Brokers, Victoria, B.C., May 26, '99.

Company.	Capital.	Par Value.	Price.
TRAIL CREEK.			
Alberta	\$1,000,000	\$1	\$ 4½
Big Three	3,500,000	1	27
Bruce	1,000,000	1	10
Butte	1,000,000	1	02
Caledonia Con	1,000,000	1	5½
Centre Star	3,300,000	1	
Commander	500,000	1	11
Deer Park	1,000,000	1	36
Enterprise	1,000,000	1	20
Evening Star	1,000,000	1	12½
Georgia	1,000,000	1	05
Gertrude	500,000	1	11
Golden Drip	500,000	1	15
Gopher	1,000,000	1	03
Hattie Brown	1,000,000	1	03
High Ore	500,000	1	05
Homestake	1,000,000	1	6
Iron Horse	1,000,000	1	16
Iron Mask	500,000	1	66
I.X.L.	1,000,000	5	10
Iron Colt	1,000,000	1	13
Iron Horse	1,500,000	1	1 15
Jumbo	500,000	1	40
Le Roi	£1,000,000	£5	£10
Lilly May	\$1,000,000	1	\$0 20
Mabel	1,000,000	1	15
Mayflower	1,000,000	1	10
Monita	750,000	1	19
Monte Cristo	2,500,000	1	12
Nest Egg-Firefly	1,000,000	1	05
Northern Belle	1,000,000	1	4
Noyalty	1,000,000	1	4
Palo Alto	1,000,000	1	05
Poorman	500,000	1	14
R. E. Lee	2,000,000	1	5
Red Mountain View	1,000,000	1	3
Rossland, Red Mountain	1,000,000	1	13
St. Elmo	1,000,000	1	07½
Silverine	500,000	1	6
Silver Bell Con	500,000	25	1
Victory Triumph	1,000,000	1	10
Virginia	1 00 000	1	21
War Eagle Consolidated	2,000,000	1	3 80
White Bear	2,000,000	1	5
AINSWORTH, NELSON AND SLOCAN.			
American Boy	1,000,000	1	11
Arlington	1,000,000	1	6½
Argo	100,000	0 10	10
Athabasca	1,000,000	1	42
Black Hills	100,000	0 10	10
Buffalo of Slocan	150,000	0 25	—
Channe	250,000	0 25	06
Dundee	1,000,000	1	26
Dardanelles	1 0 0000	1	15
Dellie	7 00000	1	12
Exchequer	1,000,000	1	13
Fern Gold	200,000	0 25	50
Goodenough	800,000	1	11
Gibson	650,000	1	17½
Hall Mines	£300,000	£1	—
Lerwick	\$1 500,000	\$1	10
Leviathan	2,000,000	1	04
London	150,000	25	25
Miller Creek	1,000,000	1	10
Minnesota	1,000,000	1	66
Nelson-Poorman	250,000	0 25	25
Northern Light	250,000	1	16½
Noble Five Con	1,200,000	1	30
Ottawa and Ivanhoe	1,000,000	1	12½
Payne	3,000,000	1 00	4 10
Rambler Con	1,000,000	1	36
Reco	1,000,000	1	1 00
Slocan-Reciprocity	1,000,000	1	—
Slocan Star	500,000	50	1 25
Santa Marie	1,000,000	\$1	05
Silver Band	250,000	0 25	12½
Slocan Queen	1,000,000	1	10
Star	1,000,000	1	07
St. Keverne	1,000,000	1	04½
Sunshine	500,000	10	—
Tamarac	1,000,000	1	17
Two Friends	240,000	30	06
Washington	1,000,000	1	25
Wonderful	1,000,000	1	07
LARDEAU.			
Lardeau Goldsmith	200 000	1	04
Consolidated Sable Creek Mining Co.	1,500,000	1	10
Lardo-Duncan	1,500,000	1	—
TEXADA ISLAND.			
Gold Bar	100,000	10	05
Raven	1,000,000	1	10
Texada Proprietary	250,000	0 25	25
Texada Kirk Lake	600,000	1	1 00
Treasury Mines	250,000	1	25
Van Anda	5,000,000	1	07
Victoria-Texada	150,000	0 25	04
VANCOUVER ISLAND.			
Alberni Mountain Rose	250,000	1	05½
Consolidated Alberni	500,000	1	5
Mineral Creek	500,000	1	05½
Mineral Hill	750,000	1	05
Quadra	500,000	1	05

Company.	Capital.	Par Value.	Price.
CARIBOO.			
Cariboo Gold Fields Ltd	£100,000		
Cariboo Hydraulic Consolidated	\$5,000,000	\$5	1 50
Cariboo M. & D. Co.	300,000	1	2½
Golden River Quesnelle	£350,000	£1	1 40
Horsefly Hydraulic	\$200,000		
Horsefly Gold Mining Co	1,000,000	\$10	1 50
Victoria Hydraulic	300,000	1	85
LILLOOET DISTRICT.			
Alpha Bell	500,000	1	
Cayoosh Creek Mines	500,000	1	
Excelsior	500,000	1	
Golden Cache	500,000	1	02
Lillooet Gold Reefs	200,000		25
FAIRVIEW CAMP.			
Smuggler	1,000,000	1	04½
Fairview Corporation	1,000,000	25	11
BOUNDARY CREEK.			
Banner	100,000	10	05
Boundary Creek M. M. Co.	1,500,000	1	05½
Brandon and Golden Crown	1,000,000	1	31
King	1,500,000	1	25
Knob Hill	1,500,000	1	96
Morrison	1,000,000	1	18
Old Ironsides	1,000,000	1	1 13
Pathfinder	1,000,000	1	16
Pay Ore	1,000,000	1	07½
Rathmullen	1,000,000	1	07
Winnipeg	1,000,000	1	31½
CAMP MCKINNEY.			
Camp McKinney Development Co.	600,000	1	23
Cariboo	1,250,000	1	1 40
Minnehaha	1,000,000	1	25
Waterloo	100,000	1	11
Fontenoy	1,000,000	10	18
O'Shea	10,000	10	02
Waterloo No. 2	50,000	10	02
Mammoth	50,000	10	03
Little Cariboo	100,000	10	02½
Shannon	50,000	5	03
REVELSTOCK E.			
Carnes Creek Consolidated	1,000,000	1	—
VERNON DIVISION.			
Hidden Treasure	100,000	10	10 00
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Crow's Nest Pass Coal Co.	2,000,000	25	41 00

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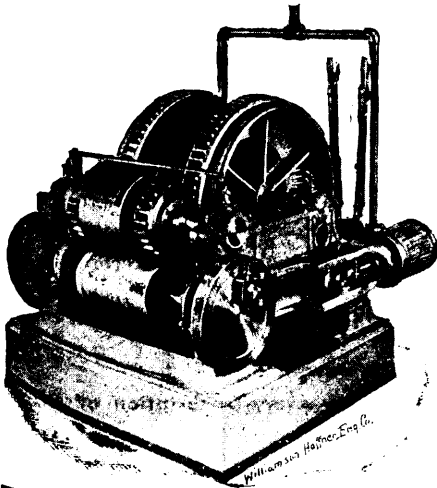
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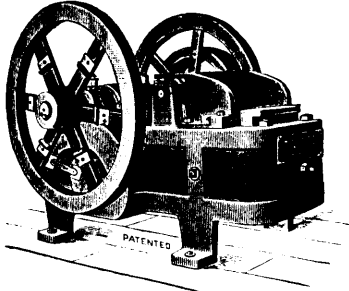
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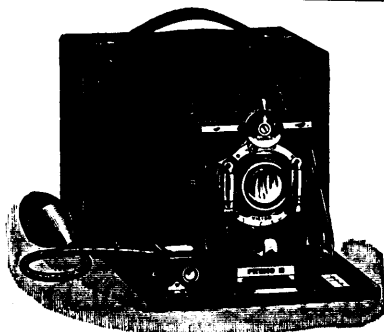
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For Moresby and Pender Islands—Friday at 7 o'clock.
Leave New Westminster—For Victoria Monday at 13.15 o'clock.
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For Plumper at 7 o'clock.
For Plumper and Moresby Islands—Thursday at 7 o'clock.

FRASER RIVER ROUTE.

Steamer leaves New Westminster for Chilliwack and way landings every Tuesday, Thursday and Saturday at 8 o'clock during river navigation.

NORTHERN ROUTE.

Steamship of this Company leave Victoria for Fort Simpson via Vancouver and intermediate ports on the 10th, 20th and 30th of each month, and for Queen Charlotte Islands on the 10th of each month.

KLONDIKE ROUTE.

Steamers of this Company leave weekly for Wrangel, Juneau, Skagway and Dyea.

BARCLAY SOUND ROUTE.

Steamer "Willapa" leaves Victoria for Alberni and Sound ports the 1st, 7th, 14th and 20th. Extending latter trip to Quatsino and Cape Scott.

The Company reserve the right of changing this Time Table at any time without notification.

G. A. CARLETON,
General Agent.

JOHN IRVING,
Manager.