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CANADIAN MINING REVIEW

Vol. V.—No. 1.

1887.—OTTAWA, MARCH—1887.

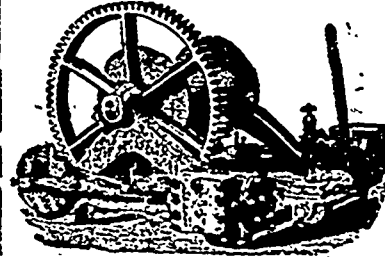
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Nov. 22nd, 1886.



NOTICE RESPECTING PASSPORTS.

PERSONS requiring passports from the Canadian Government should make application to this Department for the same, such application to be accompanied by the sum of four dollars, in payment of the official fee upon passports as fixed by the Governor-in-Council.

G. POWELL,

Under Secretary of State.

OTTAWA, 19th Feb., 1886.



Department of Inland Revenue.

An Act respecting Agricultural Fertilizers.

The public is hereby notified that the provisions of the Act respecting Agricultural Fertilizers came into force on the 1st of January, 1886 and that all Fertilizers sold thereafter require to be sold subject to the conditions and restrictions therein contained—the main features of which are as follows:

The expression "fertilizer" means and includes all fertilizers which are sold at more than TEN DOLLARS per ton, and which contains ammonia, or its equivalent of nitrogen, or phosphoric acid.

Every manufacturer or importer of fertilizers for sale, shall, in the course of the month of January in each year, and before offering the same fertilizer for sale, transmit to the Minister of Inland Revenue, carriage paid, a sealed glass jar, containing at least two pounds of the fertilizer manufactured or imported by him, with the certificate of analysis of the same, together with an affidavit setting forth that such jar contains a fair average sample of the fertilizer manufactured or imported by him; and such sample shall be preserved by the Minister of Inland Revenue for the purpose of comparison with any sample of fertilizer which is obtained in the course of the twelve months then next ensuing from such manufacturer or importer, and which is transmitted to the chief analyst for analysis.

If the fertilizer is put up in packages, every such package intended for sale or distribution within Canada shall have the manufacturer's certificate of analysis placed upon or securely attached to each package by the manufacturer; if the fertilizer is in bags it shall be distinctly stamped or printed upon each bag; if it is in barrels, it shall be either branded, stamped or printed upon the head of each barrel or distinctly printed upon good paper and securely pasted upon the head of each barrel, or upon a tag securely attached to the head of each barrel; if it is in bulk, the manufacturer's certificate shall be produced and a copy given to each purchaser.

No fertilizer shall be sold or offered or exposed for sale unless a certificate of

analysis and sample of the same shall have been transmitted to the Minister of Inland Revenue and the provisions of the foregoing sub-section have been complied with.

Every person who sells or offers or exposes for sale any fertilizer, in respect of which the provisions of this Act have not been complied with—or who permits a certificate of analysis to be attached to any package, bag or barrel of such fertilizer, or to be produced to the Inspector, to accompany the bill of inspection of such inspector, stating that the fertilizer contains a larger percentage of the constituents mentioned in sub-section No. 11 of the Act than is contained therein—or who sells, offers or exposes for sale any fertilizer purporting to have been inspected, and which does not contain the percentage of constituents mentioned in the next preceding section—or who sells or offers or exposes for sale any fertilizer which does not contain the percentage of constituents mentioned in the manufacturer's certificate accompanying the same, shall be liable in each case to a penalty not exceeding fifty dollars for the first offence, and for each subsequent offence to a penalty not exceeding one hundred dollars. Provided always, that deficiency of one per centum of the ammonia, or its equivalent of nitrogen, or of the phosphoric acid, claimed to be contained shall not be considered as evidence of fraudulent intent.

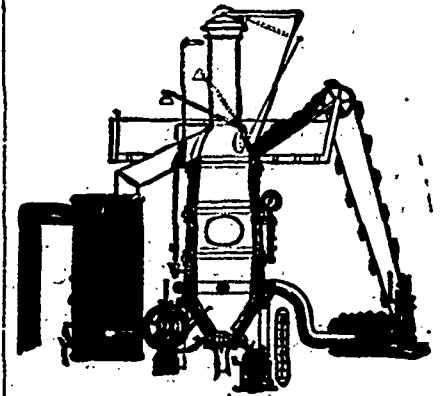
The Act passed in the forty-seventh year of Her Majesty's reign, chaptered thirty-seven and entitled, "An Act to prevent fraud in the manufacture and sale of agricultural fertilizers," is by this Act repealed, except in regard to any offence committed against it or any prosecution or other act commenced and not concluded or completed, and any payment of money due in respect of any provision thereof.

A copy of the Act may be obtained upon application to the Department of Inland Revenue.

E. NIALL,

Commissioner.

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The CANADIAN MINING REVIEW, is devoted to the opening up of the mineral wealth of the Dominion, and its publishers will be thankful for any encouragement they may receive at the hands of those who are interested in its speedy development.

Visitors from the mining districts, as well as others interested in Canadian Mineral Lands, are cordially invited to call at our office.

Mining news and reports of new discoveries of mineral deposits are solicited.

All matter for publication in the REVIEW should be received at the office not later than the 20th of the month.

Address all correspondence, &c., to the Publishers of the CANADIAN MINING REVIEW, Ottawa.

Advertising Space.

The circulation of the CANADIAN MINING REVIEW, which has steadily been going up since its first publication, more than five years ago, has now more than doubled the estimate upon which we had reckoned, and its value as an advertising medium to business men who wish to reach the best classes of mine owners and operators, and the mining centres and camps of every province in the Dominion, is consequently very greatly enhanced. The REVIEW is in the widest sense a Canadian journal belonging to all provinces alike; it is the only journal published in Canada wholly devoted to the interests of her mining industries and mineral resources. We would simply draw the attention of those who have hitherto overlooked it, to this matter, promising our best attention and most reasonable terms on any application for advertising space.

TIMBER AND MINES

Of the Provinces of Quebec and Ontario as a Means of Producing Revenue.

John Stewart, Ottawa.

The timber area of these provinces is being lessened each year by fire and the axe to an extent beyond that which it is yearly increased by the renewing of the capital stock by the natural growth of the forest. The timber is considered such a permanent means of revenue that in selling lots of land certain reserves of timber are made by the local authorities, and the settler or farmer is not trusted as a fit and proper custodian of this source of the country's wealth. Timber lots are, however, sold to lumbermen or speculators out of the area included in a timber limit; he, therefore, is considered a proper person to hold the timber

reserves of the Province for his future use, and possibly to control the price of lumber or prevent it falling into the hands of a competitor in the same line. The timber area so held is very large, amounting to millions of acres of the best timber lands in these Provinces. The yearly decreasing supply of timber is accompanied by an almost yearly increase in value, not to the revenue and capital account of the Province, but to the fortunate owners of the lots so purchased. As a result of the custom of selling lots with timber, any increase in value of the capital or reserve stock on hand goes to the benefit of the holder of it on speculation; whereas, that benefit would go to the Province, if not sold, but was retained for lease as it ought to be.

Mining lands are sold at prices ranging up to \$2.00 per acre, in Ontario, and up to \$2.50* per acre, in Quebec, and no reserves of minerals are made, excepting for gold in Quebec. This industry is not considered of sufficient value to be held as a means of revenue. In consequence of the system of selling minerals along with the soil, the farmer or speculator in mining lands becomes the person who holds this source of national wealth and revenue; whereas, the mining right and mining lands ought to be held for the use of the miner by the Provincial authorities. A glance at the manner in which mining lands are secured will show the want of system, and the injustice done to explorers and prospectors, where a party under the present system, now in force, makes application at the Department of Crown Lands for a larger or smaller area of mining lands, and no notice of such grant, or location, its area, or time of option, or period of exploration, is made, either on the ground or in the Local Land Office, or in the local newspapers of the district in which the location is made. A party, or speculator, applies for the unoccupied lands in half a township, or a whole township, or possibly more; he may make a money deposit or not, according to the influence he possesses, with the "powers that be." He may explore the lands or not, it is not compulsory for him to make a report of such exploration; nor does the Land office acquire any information of the nature of the part not accepted from the option so granted. There being no law, regulating his actions, he may do just as he pleases in the matter. Sundry explorers and prospectors, as A, B and C are at work in this district, in which the option has been granted, and are of course ignorant of its existence, and prosecute the search for the hidden treasures they are in quest of, quite ignorant of the sad fact that the Government under the present (to them dishonest) system will only rob them of any discovery they may make. Having made a discovery, or find of minerals, A, B or C, makes application for one or more lots, and receives a reply to the effect that the lots in question have been applied for by Mr. Speculator! Mr. Speculator is also notified, and either accepts

the lot or lots, on the exploration or reputation of A, B or C, if it is good, or sends quietly to have it looked at, and if good, resolves to take it, and as A, B, C are not entitled to make their own location on the ground, as it ought to be, consequently there appears no irregularity in the manner in which the transaction is completed, in favour of Mr. Speculator, who has stolen the discovery. A, B or C, the actual discoverer, or the person entitled to it, has no redress, unless he shares his claim with an influential political friend, or two who will champion and fight his cause.

Is this a just and fair system to the mining section of the population? Is it a wise system that scatters the capital or revenue earning resources of the Province, and disposes of them at the price of, and along with the soil, to the wrong owner?

On the one hand the Province offers inducements to immigration, and under a wrong system of laws renders the Province an unfit place for the location of a mining population, as the laws now in force do not encourage exploration and deprive the worthy discoverer of minerals of the just reward of his labour.

In discussing the desirability or not of Government control of certain matters, some do not discriminate or appreciate the difference between cases which are not parallel. In one case, there is an ownership or proprietary, by the state, for the general good, of an article which is tangible and real, such as land, minerals or money, and mail matter; in these cases there is an ownership or responsibility on the part of the State, as these things constitute matters of national magnitude and importance, and prevent monopoly and frauds under proper regulations, thus giving better public satisfaction and confidence than when in private hands. In the instance of others, which are purely matters of trade, with no vested interests in that which is tangible, and no ownership, trust or charge is placed with the Government, but merely a trade, or business conducted, and has no material existence is liable to change of value or subject to inflation in price, and that cannot be manufactured or made, having no reality other than mere sentiment, or the product of the brain of man, as in the case when the state controls the schools and religion; these two, had best be left in private hands to permit of the full development of the individual capacity and competition, producing the survival of the fittest, or that conducted under true principles of right and truth. The condition of Mexico is an instance of the above line of argument. The Government of that country controls the mining industry and owns all minerals, and mining has consequently prospered and been the chief means of revenue.

With forests fast decreasing in area, and mining resources ruined or undeveloped, and the system goes on as at present, from what source in the future is the Provincial Revenue to be derived?

The large extent of mining territory of known, and in part some of it yet unknown value, that these Provinces still hold, intersected as it is by lines of railway, and the benefit of it to be derived from the active development of that wealth to the country at large, but more especially to the settlements in and around the various mining locations, renders the enactment of a better system of mining laws and inspection a necessity which cannot longer be delayed.

[By an amendment passed by the Lieutenant-Governor in Council, 10th December, 1885, it is ordered under the provisions of section 124, of the Act 43-44 Vict., Chap. 12, (Quebec General Mining Act of 1880), that in all future sales of lots of land in the Province of Quebec, for mining purposes, the following prices be exacted:—

For phosphate lands, five dollars (\$5) per acre, as at present.

For iron and ochre, two dollars (\$2) per acre.

For all other mining lands including gold, silver, asbestos, lead, mica, graphite, plumbago, copper and generally all mines other than iron and ochre, five dollars (\$5) per acre.]—Editor.

PHOSPHATE.

The Latest Quotations.

MINERAL PHOSPHATES—Some transactions have already taken place in Canadian at about last year's prices, but Raisers are not prepared to do further business at present without an advance for the best qualities. Ground Canadian is also enquired for, but sellers are indisposed to contract until the season for shipment draws nearer. South Carolina Phosphates.—There is no new phase to report; a large contract from a new deposit of land has been made at \$d. for delivery to a safe port in U. K., and sundry ballast parcels have realized from 7½d. to \$d. according to port of discharge. The new Somme Phosphate continues to turn out satisfactorily, and is being eagerly sought after by both Home and Continental Manufacturers to such a degree that we have had to decline any but small trial orders for prompt shipment. Belgian.—A large contract in low class material has been made to close a liquidation account, otherwise the business transacted has been at late prices, which still remain temptingly cheap for this useful material. A new make of 45 to 50 per cent. and 50 to 55 per cent. both with a guaranteed maximum of 2 per cent. Iron and Alumina, is being offered which may supersede the old ferruginous quality. Cambridge and Bedford Coprolites are unchanged, and quoted at 43s. f.o.r., or Ground at 50s. in Buyer's bags, or 52s. in lent bags, f.o.r., the latter at 26s., f.o.r., or 31s. 6d., f.o.b., Thames.

Township of Loughboro'.

Mr. J. Sloan, of Perth, is prospecting on the Pardy Bros. lots. Operations will be begun as soon as the snow is off the ground.

Satisfactory reports have been received from Messrs. Smith & Lacey's deposit in the same township.

During the present existing depression in the phosphate market but a few hands are employed at the Foxton property, in the Township of Loughboro'. The present depth of the shaft is about 70 feet, and drifting is being pursued in a north-easterly direction from the bottom on a capital vein of pure ore. The indications are most encouraging.

Buckingham District.

The Du Lievre Company are making improvements at the basin below Buckingham. They anticipate a brisk business in the spring.

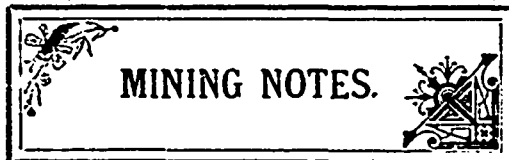
The construction of the new tram line at the Little Rapids mine is nearing completion. This line, which is already graded, runs from the workings on the summit of the hill to the wharf at the river side. The transportation of the ore by this means will be accomplished in a couple of month's time.

The output from this property during the past month was about 115 tons of high grade ore. Mr. George Smith, the superintendent of the mine, states that he can mine ore in pit No. 2, for a considerable less price than from the bottom of the shaft where last month's product was raised. He says that with 50 to 70 men he can lay the ore at the river's bank for about \$5.00 per ton and not work off vein II.

The property is now thoroughly equipped with first class plant of the most modern and approved pattern, and the quality of the ore is of a very high grade. "Dr T. Sterry Hunt has said that from present appearances, in my opinion, no property on the Lievre offers better or surer prospects for extensive and remunerative operations than does this mine."

South Carolina.

2,775 men were employed last year in mining phosphate in South Carolina.



Nova Scotia.

The yield of gold at the Oxford mines for the month of February was 341 ozs. from 78 tons.

The annual meeting of the stockholders of the Acadian Coal Company will take place at New York, on Wednesday, 23rd instant.

Work has been resumed in the 100 feet shaft at the Cowan Gold Mining Company property, Yarmouth Co. A milling of about 10,000 lbs. of dirt taken from the new discovery is reported to have given about 3 ozs. of gold.

The shales of the Georges River Mining and Manufacturing Company, a West Virginia corporation which holds a Government lease of one square mile of mining area at Georges River, near North Sydney, Cape Breton, are at present on the New York market. The veins that have been discovered on the property are:—First, vein of grey magnetic iron 20 feet wide at surface. Second, vein of silver and other metals 20 feet wide and carrying ten ounces of silver at surface. Third, vein of iron pyrites, copper and other metals, samples of which taken from cut about 15 feet deep, carry about 10 per cent. of copper, besides other minerals, and strong indications of silver and gold.

The strike of the Picton coal miners which, it was reported, had been settled, unfortunately still continues, and Halifax is at present suffering from a coal famine that is particularly hard on the poor, who have been unable to lay in enough coal to last through the spring. We have not examined into the cause of the strike, and so are unable to pronounce upon its merits, but, for the sake of the Halifax poor, we hope that it may be brought to a speedy termination. Cargoes of coal are now being received from Baltimore. Dealers in Sydney coal have evidently been taken by surprise, and will hardly let another season go over without greatly increasing their winter supply. The completion of the railroad to Sydney will put an end to all possibility of our coal merchants being caught in this way again.—*Critic*.

At the North Brookfield mine, Queen's County, the work of development is being vigorously pursued. Four shafts have been sunk, one to the depth of 80 feet, and cross levels have been run for at least 300 feet.

Reduced rates for transportation over the Inter-Colonial are wanted by the iron miners in this province. At present the cost of transportation from Nova Scotia to Ontario is about equal to the cost from England to the same market; so that the protection given by the National Policy to Nova Scotia iron mines is lessened by the extra cost of transportation from the mines to the market.

New Brunswick.

The gold mining areas at Eagle Lake, Salmon River, owned and operated by Messrs. Hattie & Ross, have been bonded to English capitalists.

Quebec.

The annual meeting of shareholders of the Intercolonial Coal Mining Company was held at Montreal on Wednesday, 2nd March. The following were elected directors of the company for the ensuing year:—Messrs. Gilbert Scott, H. A. Budden, James P. Cleghorn, Robert Anderson, Alexander Gunn, Peter Redpath, W. M. Ramsay, Henry J. Tiffin and H. S. Macdougall. At a subsequent meeting of the board Messrs. Gilbert Scott and H. A. Budden were re-elected president and vice-president, respectively, and Mr. W. J. Nelson was re-appointed secretary-treasurer of the company.

Ontario.

The annual general meeting of the British and Canadian Mica and Mining Company (Limited), was held in their offices at Ottawa on the 17th ult. The following gentlemen were elected office-bearers for the ensuing year:—President, B. A. Buxton, Esq., of London, England; Vice-President, C. W. Spencer, Esq., Montreal; Secretary-Treasurer, W. A. Allan, Esq., Ottawa.

The various reports presented showed that the property was in a most flourishing condition, and that the output of mica from the mine and the demand for it, both in Canada and in the United States, during the past season, had been eminently satisfactory. The demand for the product had more than trebled since the last meeting of the company.

Increased facilities, including new steam power for the breaking up of the ground, have been added to the property, and among other machinery a couple of Ingersoll drills, worked by compressed air, are kept constantly in opera-

tion. The quality of the mica is Muscovite of pure transparency and lustre, and the quantity in sight is apparently unlimited.

There is no reason why this corporation should not become one of the best dividend paying concerns in Canada. At present the indications are most satisfactory. An old miner has given it as his opinion that the property is capable of producing more fine mica than all the mica mines of North Carolina. From what we have seen of the property we can heartily endorse his opinion.

PORT ARTHUR DISTRICT.

Sixty men are at present employed at the Silver Mountain Mine.

A thirty stamp mill will shortly be placed in operation at the Beaver Mine. This will virtually double the mills.

Machinery is to be put in at the Malaga mine as soon as the spring opens. About ten men are presently at work.

Mr. T. A. Keefer has received instructions to commence work on both the Huronian and Huron Bay gold mines. Operations will be resumed at once.

The capital stock of the Shuniah Weachu Mine Company, which has recently been organized in London, to develop the Silver Mountain Mine, is placed at £100,000, shares £1 each. The vendors receive 25,000 shares and £30,000; 9,000 fully paid up shares is to be allotted to directors in lieu of remuneration for two years. The property which is situated about 10 miles west from Port Arthur is 240 acres in extent.

The *Miner* reports that the Rabbit Mountain Mining Company has given instructions for the erection of a smelting plant for the purpose of reducing their ore into silver bricks. No more concentrates or ore will be shipped out of the district from this mine, and it is one of the best signs of substantial progress chronicled for many a day. At the last meeting of the board of directors of this company the sum of \$20,000 was set apart to continue the work of developing the mine.

Judge Ingraham, of the Superior Court, New York, has given judgment in the action against the Silver Islet Consolidated Mining Company, brought at the instance of Theodore C. Weeks, Boston. From his decision it appears that the circumstances under which the stock of the company was issued in this case was a ingenious device for the purpose of evading the provisions of the Act. After reviewing at length the nature of the case and discussing the question of the assessments and forfeitures, the judge said: "On the whole case I think that the plaintiff is entitled to judgment; that on payment of the amount due on the assessment within thirty days after the entry of judgment, with interest from the date when the assessments respectively became due, the plaintiff shall be relieved from the forfeiture."

LAKE OF THE WOODS DISTRICT.

Messrs. Dolier & Co., of the Pine Portage Mine, will resume operations on their property shortly. Some difficulty has been experienced as to the most economical method for the

treatment of their ore, but it is expected that a steel furnace will obviate the difficulty. The ore though refractory is said to be rich.

The Gold Hill Mining Company expect to commence work at an early date. With the exception of some surface prospecting work and the sinking of some forty feet of a prospecting shaft but little work has been done so far on the claims.

North-West Territories.

Coal is reported to have been found within easy distance of Battleford.

At a recent meeting of the directors of the Canadian Anthracite Coal Company, held at Ottawa, the general manager reported that operations are now being conducted on seam No. 6, which was found to be five feet three inches thick. The deposit in this seam is found to be much harder and superior to the others so far operated on. One hundred men are in camp and ninety-three of these are on the regular pay roll of the company.

British Columbia.

During the year 1886 twenty accidents to persons employed in or about the collieries have been reported. Of these three were fatal.

The output of coal from 1874 to 1886 has been as follows:—1874, 81,000; 1875, 110,000; 1876, 132,000; 1877, 154,000; 1878, 171,000; 1879, 241,000; 1880, 268,000; 1881, 228,000; 1882, 282,000; 1883, 213,000; 1884, 394,070; 1885, 365,000; 1886, 326,636.

The Burns Mountain Quartz Mining Company have, during the greater portion of last season, had men at work running drives in search of the main lode on their property in Cariboo. Over eight hundred feet has been driven and the indications are considered good.

The value of gold exported by the banks of Victoria during '86 is placed at \$750,643. This shows a bank export of nearly \$160,000 in excess of 1885, and adding one-fifth as the estimated value of gold leaving the province otherwise than through the Victoria banks, gives a total yield of over \$903,000 for the past year—a very substantial and gratifying increase.

The following gentlemen have been elected office-bearers of the British Columbia Milling and Mining Company for the ensuing year:—Directors: Hon. J. H. Gray, J. Earle, F. S. Barnard, C. E. Redfern, J. Heywood, J. Irving, and J. Grant. W. J. Heywood was elected president, W. C. E. Redfern, treasurer, and Mr. G. A. Sargison, secretary. The auditor of the corporation is Mr. G. A. Sargison.

Cunningham Creek, where the ubiquitous Chinese made a lucky strike during the summer, and a company of four men has been taking out from \$20 to \$50 a day to the man, is said to be, on investigation, a discovery of no great importance. The location being on a point across which the old bed of the creek passed at a much higher level than the present bed of the stream.

The remarkably dry season together with a further decrease of the population in the Cariboo district has had the effect of further diminishing the annual yield of gold. Mr. Bowron states that the product of the past year is per-

haps not less than in 1885, in proportion to the number engaged and the time consumed in working, as for a considerable portion of the year quite a number of white men have been engaged upon quartz ledges which are, as yet, non-productive; besides, not a few miners left the district in the spring for the Granite Creek mines.

The Forest Rose Company of Cariboo, which yielded largely as a drifting claim in years gone by, and which has been at great expense for the past six or seven, in opening up so as to work as a hydraulic claim has at last reached bed rock with their cut, and during the past season have been rewarded with good pay. The commission think that this claim will yield good returns for the next fifteen or twenty years as the extent of their ground is large.

Mr. Bowron, Gold Commissioner for the province, in his report to the Minister of Mines, estimates the gold yield for the district of Cariboo for the past year as follows:—

Barkerville Polling Division.....	\$96,000
Lightning.....	54,800
Quesnelle Mouth.....	45,800
Keithley Creek.....	62,000
Amount from time of collecting statistics to December 31st.....	15,000
Amount of which no account was obtainable.....	15,000
Total.....	\$288,300

Mr. J. L. Crimp, in his annual report, gives the following particulars of the work done during the past year:—"There have been fewer white miners in the district this year than last, but more Chinese; and it is chiefly owing to them that the increase in the yield of gold has taken place, and if it had not been for the continued rains during the month of September, the increase would have been considerably larger. During that month the several creeks were very high, and in consequence carried away many of their wing-dams, thereby causing a severe loss to them. Although these creeks have been worked over—some portions of them two or three times—the Chinese, by their excellent management and industry, are enabled to take out small wages. On Dease Creek, the increase was the largest. More Chinese were on that creek than any of the others, and most of them worked in the bed of the stream. All of the white men on the same creek have been working in the hills, and some of them have done very well; and the same may be said of the other creeks, for the beds of those streams having been worked over so many times, there is no inducement for the white miners to open claims in the old worked out creeks.

"The yield for this past season, as far as I can ascertain, is as follows:—

Laketon Division.....	\$11,460
McDame Division.....	22,150
Total.....	\$63,610

"There has been but little prospecting done in this district the past summer. There has been four white men prospecting on Mosquito Creek the past year, and although they have found very encouraging prospects, they have not found gold in sufficient quantities to pay; but are still in great hopes of striking good pay when they reach more favourable bed-rock, for the rock is so hard and smooth where they are working that it is impossible for gold to lodge. There were also three white men, Messrs. Hil-

ton, Sainsbury and Beely, prospecting on the Muddy River, a large stream to the east from the present mining district, situated about ninety miles east of Sylvester's Landing. The stream is a large one, running through a very wide valley, and emptying into the Laird River, about eighty miles below Mr. Sylvester's trading post. Mr. Hilton informs me that if it had not been for the high state of the river, he thought they would have done very well. In consequence of the high water most of the bars were covered; but wherever they found bars, at the head of them they prospected very well. On one occasion, two of them rocked out \$100 in one day; and on another, one man rocked out \$140 in seven days. The character of the gold is fine, and has to be saved with quicksilver. In 1874, there were eight men on the same river, some distance above, where the mountains come much closer together, and I have been informed by one of the parties a few days ago, that they found coarse gold, which he thought would pay five dollars per day; but at that time wages were eight dollars per day on Dease Creek, so they concluded that it would not justify them to remain there. He tells me, also, that he thinks the distance from Dease Lake to where they got these prospects is from 90 to 100 miles, in an easterly direction from Dease Lake. Taking into consideration the excellent prospects found on the bars, of fine gold, it leads to the conclusion that its source is in the mountains. I would strongly recommend that the Government make a small appropriation to assist, say three or four men to get an outfit next summer to proceed there and prospect this stream, or creeks emptying into it, for unless some new discoveries are made, this district will be soon reduced to a very small number of miners. The number of men wintering in the mining portion of the district is 29 white men and about 70 Chinamen. The health of the miners during the past season has been generally good, and good order has prevailed all over the district."

United States.

Mr. James M. Swank, Secretary of the American Iron and Steel Association, estimates the consumption of pig iron in the United States for the past twelve years as follows:—

Year.	Gross Tons.	Year.	Gross Tons.
1874	2,500,000	1881	4,982,565
1875	2,000,000	1882	4,963,278
1876	1,900,000	1883	4,834,740
1877	2,150,000	1884	4,229,280
1878	2,500,000	1885	4,348,844
1879	3,437,534	1886	6,208,656
1880	3,990,405		

If we may judge from the old fashioned method of bringing round asphyxiated miners in the early days of English coal mining, Choke damp must have been a source of sore trouble to the miners, for the remedy, we are told, "was to dig a hole in the earth and lay them on their bellies with their mouths in it; if that failed they turned them full of good ale; but if that failed the case was concluded desperate indeed."

CALIFORNIA.

The product of the Plymouth Consolidated Gold Mining Company during the year 1886 was as follows:—January, 55,683.47; February, 45,611.11; March, 53,897.81; April, 50,778.91; May, 49,502.13; June, 44,166.43; July, 44,566.75; August, 51,528.16; September, 51,812.36; October, 56,513.95; November,

61,449.52; December, 61,467.80. Total, \$670,059.85. The average monthly product was \$51,555.924. This is said to be the best gold mine in America, it is fully developed with large reserves, and is now paying larger dividends than any other similar property in North America. The stock is selling at about \$1,650,000. The company is said to possess the largest quartz mill in the world, with a single exception. From the printed report just published, it is stated that a piece of rock one foot square and one mile in length represents the amount crushed by the Plymouth mills every 24 hours.

The bill appropriating \$30,000 for a State Mining Bureau has been finally passed by a vote of 32 to 5.

Great Britain.

THE SCOTCH MINERS' STRIKE.

Recent English exchanges report a great labour demonstration, held at Edinburgh, at which it is computed about 10,000 persons were present. The main object of the gathering was to express sympathy with the miners of Scotland in their existing position; and resolutions were adopted calling for the nationalisation of land, mines, machinery, and all means of production for the common good. In order fully to appreciate the meaning of these resolutions, it is to be borne in mind that in Scotland alone there are between 60,000 and 70,000 miners, of whom about 30,000 are located in Lanarkshire, the remainder hailing principally from Ayrshire, Fifeshire, and the Lothians. In Lanarkshire the men have returned to their work discontented, and in Ayrshire the 7000 miners on strike have been recommended to go back to the pit "in the meantime," and pending the result of the forthcoming Conference. It is more than hinted—and the tone of the speakers bore out the inference—that should that Conference fail a national strike will ensue. In the west country wages have fallen as low as 3s. per day, while in the east the rate varies from 3s. 9d. to 3s. 11d. for eleven days' work in the fortnight. But from these sums have to be deducted, on an average, about 2s. a week for pick-sharpening, powder, oil, medical officer, &c., with the result that the West wages average 12s. 9d. and in the Lothians about 18s. weekly. It was pointed out, that a miner, while he got only 4½d. or 6d. for raising a ton of coal, paid 6s. to his master for it at the pit-mouth if he wanted to give warmth to his family; that the fines and charges imposed upon him in a day were often more than the total amount of his earnings; and that the net result of all this was starvation to the men and unlimited wealth to the masters, who, in many cases, spent their ill-gotten gains abroad in gambling, or at home in luxury. "In fact," said one speaker from the West, "unless the miners have their grievances redressed they are determined to make a desperate movement which will shake Scotland from one end to the other."

During the year 1886, 116 persons lost their lives from mining explosions in England and Wales. Since the Mines Regulation Act came into operation in 1873, there has been a marked diminution in the number of lives lost owing to explosions.

On 1st March there were 377 furnaces working and 506 idle throughout the United Kingdom.

The Canadian Anthracite Coal Co.

LIMITED.

Miners & Shippers of Coal.

McLEOD STEWART, Pres., J. G. THROP, Vice-Pres.
OTTAWA, CANADA. EAC CLAIRE, WIS.
A. PUGH, General Manager, W. B. SCART, Secretary,
ST. PAUL, MINN. WINNIPEG, MAN.
O. H. INGRAM, Treasurer
EAC CLAIRE, WIS.

Mines at Anthracite,

N. W. T., CANADA. v-1-1y

COAL MINING.

Report of the Minister of Mines of British Columbia.

The Government Inspector's Interesting Figures—Work Done During 1886 at the Various Collieries.—Most Encouraging Prospects.

The report for 1886 of the Hon. John Robson, Minister of Mines in British Columbia, is just to hand. It is a capital resumé of the work done at the various mines, and is replete with valuable statistics and other information. The following is an excerpt taken from the report of Mr. Archibald Dick, the Government Inspector of Mines:

NANAIMO, B. C.

1st February, 1887.

"SIR,—I have the honour to lay before you my report as Inspector of Mines, for the year ending 31st December, 1886, as required by the 'Coal Mines Regulation Act, 1877.'

"The collieries operated in the year 1886, are the following:—

"Nanaimo Colliery, of the Vancouver Coal Mining and Land Company, Limited.

"Wellington Colliery, belonging to Messrs. Robert Dunsmuir & Sons.

"East Wellington Colliery, owned by R. D. Chandler, Esq., of San Francisco.

"There has not been any work done at the Alexandria Colliery, which was started in 1884, in Cranberry District, by the Esquimalt and Nanaimo Railway Company.

"The output of coal for the year 1886 amounted to 326,636 tons, as follows:—

Nanaimo Colliery.....	112,761 tons.
Wellington Colliery.....	185,846 "
East Wellington Colliery....	28,029 "

Total output in 1886.....	326,636 "
Add coal in stock 1st January,	
1886.....	25,653 "

Total coal for disposal
in 1886.....352,289 "

The exports of coal for the year 1886 amounted to 249,205 tons, as follows:—

Nanaimo Colliery.....	79,637 tons.
Wellington Colliery.....	144,526 "
East Wellington Colliery....	25,042 "

Total exports for 1886..249,205 "

"This quarter of a million tons of coal was shipped principally to California, but shipments were also made to Portland, Oregon; Alaska, Petropavloski, Mexico, and the Hawaiian Islands; besides which, coal for fuel has been regularly supplied to the ocean mail steamers, gunboats, and vessels calling.

"In order to arrive at the total amount of sales for the year, the sales of coal for use in this Province must be added to the tonnage of the exports; but as these local sales are included

in the returns of coal under the heading of 'home consumption,' aggregating 85,787 tons, which comprises the coal consumed in the colliery furnaces (excepting in the East Wellington return), I can only refer you to the returns.

"The following comparison of the aggregate output and export of coal for the years 1884, 1885, and 1886, will give at a glance an idea of the fluctuating character of our coal operations:—

	Output.	Export.
1884.....	394,070 tons.	306,478 tons.
1885.....	365,596 "	237,797 "
1886.....	526,636 "	249,205 "

"From the above it will be seen that the output of 1886 is below that of 1884, and 1885, considerably below the former; and, also, that the exports of 1886, while exceeding that of 1885, is far less than that of 1884.

"The year 1884 was one of unprecedented prosperity in our coal industry, both in volume of trade and prices realized; but the drooping figures of the succeeding years, with the lower rates which our collieries have had to submit to in return for their product, urge me to again bring before your attention the necessity for the adoption of some active measures for the relief of our collieries from the imposition of 75 cents per ton levied in the United States upon our coal when it enters their ports. With the removal of this inequitable tax by a judicious reciprocity treaty, our coal industry will at once recover itself, and years unexampled in activity and progress will become our happy lot. We begin the year 1887 with 25,653 tons of coal 'stock in hand' at the collieries.

"The following statement shows the position of British Columbia in the chief market for the produce of our mines for the past four years, and according to the outlook the position of our Province as an exporter to California will be fully maintained during the year 1887:—

	1883.	1884.	1885.	1886.
	Tons.	Tons.	Tons.	Tons.
British Columbia.....	128,503	291,545	224,288	253,896
Australia.....	174,143	180,497	206,751	287,283
England and Wales.....	131,355	106,308	170,656	164,869
Scotland.....	21,922	21,143	20,228	19,795
Eastern States (Anthra- cite, &c.).....	43,861	38,124	29,634	19,517
Seattle.....	139,099	125,000	75,112	57,552
Carbon Hill.....	149,135	122,060	157,241	124,527
Green River and Mount Diablo.....	76,102	77,485	1,611	90,664
Renton, Newport and South Prairie.....	43,600	69,413	67,604	73,654
	899,301	1,335,076	1,024,339	1,067,691

"It will be seen that the importations of the State of California in 1886, were larger than for any previous year; the market there for coal is steadily increasing in capacity for absorbing our product, which is a most encouraging feature in our future prospects.

"Our collieries are equal to the supply of coal of first-class quality for steam, gas, or household purposes, sufficient in quantity to meet the requirements of all markets at present within our reach; with harbour accommodation, wharves, and dispatch in loading, second to none.

"We are looking also to the establishment of the great ocean mail service between this Province and Australia, China and Japan, as introducing an additional customer for our superior coal, and I trust our expectation in this respect will soon be realized.

NANAIMO COLLIERY.

"This colliery, as has been the case with all

*These totals represent the quantity of coal actually received in San Francisco, and other ports in California, during the years indicated, not necessarily the quantities shipped to those ports in the years named.

the other collieries in this district, has not been worked very steadily during the past year, on account of the dullness in the coal market.

"The Douglas Pit and the New Douglas or Chase River Mine, have 'stopped working,' and the machinery, rails, and dumps are all taken out. These mines are now filling, or are full of water.

"No. 1 Pit, Esplanade, Nanaimo.

"This is a mine mentioned in a previous report, and belonging to the Vancouver Coal Mining and Land Company (Limited). Everything about this mine, both on the surface and underground, is done in the strongest and most workmanlike manner. The workings about the bottom of this shaft having been already reported upon by me, I need not again describe them.

"The level on the south side of the shaft is yet standing idle.

"The level on the other side, known as the North No. 1 Level, has not been working steadily during the past year, except when it was necessary to make repairs. The company have had great difficulties to contend with in this level, in the shape of faults and wants in the coal, yet they persevered until they have got this level at the face over 1,500 yards in from the shaft, and under the water of the harbour nearly all the way. They have not yet got good coal in the face of the level, as they are trying to get through a fault; but the stalls, in a few yards after they leave the level, get over the fault and get into good coal, where the company have now got quite a large piece of it opened out, which proves to be very good and hard, varying in thickness from 6 to 10 feet, so that once the level, or main gangway, gets clear of the faults and into the good coal they will soon be able to make a large opening, which will greatly increase the output of coal.

"There is also a slope in this mine (mentioned in a former report). This slope is now down over 1,000 yards, going direct under the water of Nanaimo Harbour, with about 850 feet of rock, etc., intervening, so that little or no water comes from the roof, and what does come is free from salt. In this slope, as in the No. 1 Level, there is much ground which will not be profitable to work, and at present the coal is not very thick at the face of the slope. In this slope have been three levels on each side; those on the north side are known as No. 2, 3, and 4, north levels, and from those levels the company take a large amount of coal daily; although there are many bad places, yet when the coal is good it is generally very thick, and turns out well. On the south side the levels are known as No. 2, 3, and 4, south levels. About 50 yards down the slope to the south side there branches off what is called the Diagonal Slope at an angle from the Main Slope of fifty-four degrees; this slope intersects with No. 2 and 3 levels. The engine at the top of the slope takes away the coal from these places, causing a great saving of labour in not running the coal to the main slope. The coal down here is very thick sometimes; at one time they could not tell how thick it was, as they could neither see top nor bottom; this slope is being pushed ahead, so, also, is the No. 4 Level, which is near to the bottom of the main slope, and eventually this level will intersect the Diagonal Slope, when the engine at the top will also take away the coal in place of running it out to the main slope by men or mules. As you will have observed there is very much ground that is not workable, yet the company are now sending out over 800 tons of coal per day, with prospects of improving.

"Ventilation is good; the motive power has

been a furnace in connection with a steam jet, and the engine at the top of the slope exhausting into the No. 2, or upcast shaft. When I was down on the 23rd December there were 45,000 cubic feet of air in circulation per minute for the use of 118 men and boys; here the ventilation is on the separate split system, the main division being from the slope, taking the levels on either side as the intake returning by the way of the stalls, and as the pure air gets to the lowest place first, it is gradually on the ascend after it leaves the slope.

"There is now very little gas seen in this mine, but sometimes the firemen come across a little of it, and the appearance of a little reminds them of the necessity of being very careful.

"You will have noticed that I stated that the motive power of the ventilation has been a furnace and steam jet, but now it is a suction fan of the largest size. This fan has been erected about 100 feet from the upcast shaft, where an excavation has been made to the depth of about 18 feet, and continuing the excavation from the fan to the upcast shaft with a down grade going to the shaft. This part of the airway has been heavily timbered and planked, and covered over with fine ashes, so that everything may be closely sealed. This fan has been put up at a great expense to the company, but they could see that it was what their extensive mine required, and they have got a machine which, I expect, will ever do the requirements of this mine. The diameter of the fan is 36 feet, and its width 12 feet; it is worked by an engine of 26-inch cylinder with 30-inch stroke; the engine, and nearly all the machinery in connection with the ponderous machine, came from England, and it is a relief to the company, and also to the manager, to know that they have got appliances to keep in motion all the air that will be required to dilute all noxious gases that this extensive mine is likely to give off. This fan is now a running machine. I know this, but have not tested it. The manager, Mr. W. McGregor, has, however, tried its power on different occasions, while running quite slow, and he never found less than 60,000 cubic feet per minute.

"Everything about the mine is kept in good order, and no expense is spared to make it safe (as far as can be seen); there is always plenty of timber and every other material on hand that is necessary. It is to be hoped that this valuable mine, after all the expense the company have been put to, will yet be a financial success, which will be good for the company, people of Nanaimo, and the Province in general.

"It will be interesting for me to add that in this mine, at the bottom of the No. 2 or air shaft, the company have been prospecting by putting down a bore-hole with diamond drilling machinery. Here they have been very successful, for at a depth of 70 feet below the bottom of the shaft, or 700 feet from the surface they struck coal, which this bore-hole proves to be 6 feet thick, good and hard; and on testing some of the coal that was got out of the hole as to its gas making qualities, it was found that it was equal to the Douglas coal. This bore is being continued and is now down 100 feet, and there are yet very encouraging prospects of finding another seam of coal. I have good authority to say that when this hole is stopped, at no distant date thereafter the company will start to sink the shaft and push it with all haste down to the coal or coals that may yet be got at, and it is to be hoped when they get their shaft down that the coal will exceed their expectations, both as regards quality and regu-

larly. This is a valuable discovery to the city, and a place where a great many will be employed; it will also be beneficial to every person about the town and in the Province generally. Last, though not least, it may be a reward to the Vancouver Coal Company, which has been so liberal in furnishing the means to search for and find such hidden treasures.

"SOUTH FIELD MINE.

"This is also one of the Vancouver Coal Company's mines. During the past year this mine has been about at a stand, except so far as the keeping out of the water; but that is no fault of the mine; the officers of the company found they could supply the demand from their other mine. The mine stands to-day almost as it stood a year ago, when the miners brought their tools out, and when the market revives, which I hope will be soon, the company will be well prepared, as they will be able to start work with two days' notice and have an output of coal the first day.

"WELLINGTON COLLIERY,

"Belonging to Messrs. Robert Dunsmuir & Sons. The Wellington mine is the original of the Wellington Colliery; this mine has been in operation for about 16 or 17 years, and now it is getting nearly worked out, not on account of the coal being done, but owing to other mines cutting off all round.

"This has been a valuable property, and is yet. During the year that is past the work has been principally at the pillars (of coal) and other coal along the outcrop; all the lower levels are now finished and they are now working at the pillars in the upper levels, which will continue to give a good supply of coal for quite a long time yet. The coal that is being got out is of the best quality of the Wellington coal and similar to what was got out 12 or 14 years ago, this being the coal they went through and left to support the workings behind them.

"Ventilation is good; motive power, a large furnace, with two air shafts or outlets; gas is seldom or never seen here, except on some occasions, as when a large 'cave' takes place. The fireman examines all the mine, by night as well as by day, to see if any of the caves let off any gas, and that none collects, and to report to the workmen whether or not the mine is in a safe condition for them to proceed to work. In connection with this mine there is what is known as the Adit level, that is a level going out into the valley of the Millstone River, the coal being taken out that way. Here there has been considerable idle time, as the coal trade has not been in a condition to work it steadily; but here, as in all the other mines belonging to Messrs. Dunsmuir & Sons, they only work when there is a demand and means of taking away the coal.

"Ventilation is good. This part is partly ventilated by the Wellington mine and partly by an air shaft with a furnace. At either of the above mines I always saw plenty of timber and other things necessary for general use about the mines.

"NO. 3 PIT, WELLINGTON COLLIERY.

"This is the only shaft worked in the valley of the Millstone by Messrs. Robert Dunsmuir & Sons, with the exception of the air shaft. This mine is worked by a slope, with the top of it near the bottom of the shaft, with the levels from either side. Here the coal is worked on the pillar and stall system, and as the workings are under the valley they leave large pillars to support the roof. In this mine there is a long stretch of coal in sight, and as good as any coal

that has ever been opened out in the Wellington Colliery, from 7 to 11 feet thick, all hard and good.

"Ventilation is very good; when I was down in December there were 43,875 cubic feet per minute in circulation for the use of 70 men. This mine is also ventilated on the separate split system, and as the workings are from both sides of the slope the main divisions of the air are also from the slope to either side; on the one side going in the level and returning by the way of the faces or stalls, and on the other, going around the faces of stalls and coming out in the level, thence to the upcast shaft; the motive power here is a fan on the top of the upcast shaft. This being the first fan that was erected in this Province on a large scale for ventilating of our mines, which has done such good service and gives such good satisfaction, so that in this colliery there are three of them working. There is now little or no gas seen in this pit. Everything is kept in good order, with plenty of everything that may be required for the successful working of a mine.

"NO. 4 PIT, WELLINGTON COLLIERY.

"This is the pit overlooking the valley of the Millstone. Mining in this pit is carried on very extensively; but here, as in all the other mines, there has been considerable idle time during the past year, and that owing to the depression in the coal trade. The coal is worked from this pit by what is known as the North and South side workings. The coal in this mine is very good, although they meet with a small fault occasionally, but not enough to hinder them much. Here in this pit they have a large area of good coal in sight, which will last for years to come. This mine is now connected with the shaft previously mentioned as the No. 6 pit, and which is now the No. 4 Air-shaft, and on this shaft there is a large ventilating fan. Ventilation is good, and is conducted on the separate split system, the main division being at the bottom of the shaft to each side, and other divisions further in the workings. When I tested the air, one of the last times I was in the mine, I found there was 75,500 cubic feet per minute for the use of 112 men. This was when all the divisions had again united in one, and going towards the upcast shaft. This mine continues to give off gas at times in different places; but it is seldom the fireman finds any, as it is carried away as given off. In connection with this mine, and on the top of the upcast shaft, there is a large ventilating fan, 30x10 feet wide, worked by a large steam engine; and here there is also a large steam jet in readiness at any time to turn on steam, in case of any accident to either fan or engine. At this mine I have never found less than 400 cubic feet per minute for each man or boy.

"NO. 5 PIT, WELLINGTON COLLIERY.

"In this pit there has also been considerable idle time, for the same reason as that which caused the dullness in the other mines. At one time this mine did not look as well for getting out coal as may have been wished, but for some time back it has taken a change for the better. At present it looks well, and if the coal trade and prices would justify them to do so, they have places here standing idle, where they could employ 50 more miners than they are working at present. This mine is worked on the pillar and stall system, as are all the mines belonging to Messrs. R. Dunsmuir & Sons. The coal is of the usual good quality of the Wellington seam.

"Ventilation is very good. You will observe

in my previous report that they were sinking a shaft about 80 yards south of this, the No. 5 Pit. This shaft was got down early in the year, and connected with the workings here; and now that shaft is the upcast and return for the No. 5 Pit. Motive power here is a steam engine with a fan on the top of the upcast shaft, and the last time I was down there was 54,250 cubic feet of air per minute, for the use of 70 men and 3 mules. This mine is also ventilated on the separate split system, the main divisions at the bottom of the shaft taking the levels on the east and west sides, and returning by way of the faces to the upcast shaft. Here there is also a steam jet standing in readiness to turn on steam to ventilate this mine, if any accident should happen to either engine or fan. Here, as at all the other mines in colliery, there is always plenty of timber on hand, and every other thing which may be thought necessary to the use and working of a coal mine."

EAST WELLINGTON COLLIERY,

"The property of R. D. Chandler, Esq., San Francisco. There is only one mine in this colliery and that is in the valley of the Millstone River, and south-east of the Wellington Colliery. In this mine they have been very much troubled with wants and faults in the coal, and at the best the coal has been thin. The coal worked here is what is known as the Wellington coal. The mine has been worked steadily the most of the past year. Although not taking out much coal, yet what they do get is very hard and of good quality.

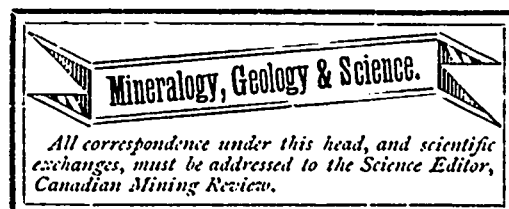
"You will have seen in my previous report that in the level going west they were in about 400 yards, and at the face they got a fault which put the coal 34 feet above the level. They went up over the fault, and continuing their level for nearly 300 yards on the upper side of the fault, with the coal varying from 5 to 6½ feet thick, good and hard, and improving as they go in. This is a good prospect, and to all appearances there will yet be a good and profitable mine here. The place where they have got the coal is a long way from the shaft, and it will be very expensive to make a good road up to get the coal down; but Mr. Wm. Chandler, the Manager, told me that if the coal keeps as good as at present, there is a likelihood of their putting down another shaft in the spring. The coal in the lower side of the fault is being worked on the long wall system, and they are very successful with it, the coal averaging about 2½ feet thick. The refuse, and the rock taken out of the roof to make the roadway, fill the waste works full, so that the roof does not settle much, the roofing being a strong hard rock bending down gradually behind them as they work out the coal. As the roof does not break at the face, the workman hardly knows that it is settling.

"Ventilation is good; motive power, a furnace. The last time I was down, the air in circulation was 250 cubic feet per minute for each man employed. Owing to this being long-wall work, there is very little powder used, and in most of the places none at all. Sometimes the breaks in the roof, out a considerable distance from the face, give off a little gas, but at the face they never see any. There are not many men employed here, and as there is only one single shaft, they work what men they have on two shifts, sometimes three shifts a day. It is to be hoped that the coal will continue to keep good on the upper side of the fault previously mentioned, and also that it may get thicker on the lower side. Such improved prospects would be beneficial to all about the district, and the proprietor in particular. He

is deserving of such success, seeing the perseverance and push he has made here in bringing about the present position and prospects of the mine.

GENERAL.

All the above works I have frequently inspected during the past year, and I found them generally in good order, with plenty of timber and every other thing necessary on hand that was required, or may have been wanted for the carrying on and working of a mine. In the course of my inspection of the several mines, I sometimes have drawn the attention of the overman, or whoever happened to be with me at the time, to something I thought necessary to be done; and whatever it may have been, it was attended to at once. I nearly always found the brattice, as close to the face as it was convenient to have it, and it was no uncommon occurrence to get it broken down when blasting; and very often the miners complain on that account, as they do not like to break it. But in the places that are suspected of giving off gas they keep the brattice boards as close to the face as possible, if it should be broken down; and then for a few feet further they have a canvas or brattice cloth hanging from the roof, not being so much in the way as boards and serves the purpose of brattice equally well."



A Chemical View of the Metallic Minerals.*

C. F. Marsan, O.M.I., M.A.
Professor of Chemistry, University of Ottawa.

In the midst of the universal advancement of science, mineralogy is too useful and practical, not to have made immense progress during these late years. In fact every branch of it has received a new impulse. Petrography and the use of polarizing instruments has made crystallography available even in massive specimens, and in rocks of the most complex composition. Mineral chemistry, thanks particularly to the perseverance of German investigators, has discovered many new, accurate, and rapid methods of determining the constituents of minerals. Spectrum analysis has penetrated the recesses of rare elements, and found secrets so far left unrevealed. The list of species has received many curious additions, whilst in a more practical field all the mining industries have found in science most profitable suggestions.

Yet, surprising as it may seem, the elementary study of mineralogy has not benefitted by all this progress. The science, itself, has advanced, but the teaching of it has continued in the old paths, opened in the infancy of the science, and ever since trodden by routine. The result of this has been to discourage every effort for making the study of minerals more attractive and popular. If we except the analyst, who examines minerals as he would any other substance, and the practical min-

*Paper read before the Field Naturalist Club, of Ottawa, March 3rd, 1887.

eralogist, who uses the blowpipe to verify the determination suggested mainly by the familiar appearance of the minerals. There are very few who pay any attention to mineralogy. You have not here, as in the other sciences, that multitude of young naturalists, who, though not conversant with all the scientific mysteries of their favorite branch, are, however, ardent and enthusiastic pursuers of the most accessible truths of Botany, Ornithology or Entomology. It is a well known fact also, that mineralogy has never yet received much consideration as a means of forming the intelligence of youth. Its place, when it had any, outside of exclusively scientific or technical programme of study, has been insignificant. Teachers have doubted its efficiency in training the mind, and students have either repulsed it as an unnecessary taxation of the memory, or adopted it only as a mechanical amusement.

In a lecture delivered before the Mineralogical Society of the College of Ottawa two years ago, and in a paper read before the Ottawa Field Naturalist's Club, in February, 1886, I advocated the introduction of a new system for the teaching of Mineralogy. Convinced that the failure of making this study both beneficial and attractive, was the outcome of certain defects, I suggested a method which to me seemed to avoid most of these defects and to introduce certain features which belong essentially to the science, though they had not been taken advantage of in the elementary study of the science. My first opening on this subject was rather a speculative venture, but ever since I have endeavoured to make a practical application of the method then outlined. The result of my experiment, with special reference to the study of metallic minerals, is the subject of this paper.

Practices must always be based upon principles. The first principle in the matter now before us is the absolute dependence of mineralogy upon chemistry. Mineralogy has no laws of its own, no principle; these it has borrowed from chemistry. This may at first seem strange, as chemistry belongs to physical science, whilst mineralogy is justly regarded as constituting a branch of natural history, as botany, zoology, &c. But there is a great difference between mineralogy, and its sister natural science. Whilst botany and zoology themselves depend upon chemistry for the laws which govern all matter, in whatever form it may exist, they take their special features and ultimate constitution from biology, the great science of life. For in the vegetable and animal kingdoms, the universal forms of inanimate matter, though governed by the same physical and chemical agencies, are absorbed by that mysterious power which is called life. Not so in the mineral kingdom. In the absence of life matter displays its own remarkable power, and the results coming from this single source follow with a mathematical accuracy. In the cabinet of the chemist, or in the secret laboratories of nature itself, the same agencies are ever at work, and the merely conventional distinction between artificial substances and minerals proper falls to the ground in presence of the production, by the chemist, of the very wonders of the mineral world. Chemistry is, therefore, the parent science of mineralogy. It supplies to the latter its principles, its laws, its very classification. And yet in one actual system the study of mineralogy has very little connection with chemical science. Though as a rule a course of chemistry precedes that of mineralogy, yet the student who ventures into the class of mineralogy, without any chemical knowledge, is scarcely less favoured than his

better prepared companions. Thus severed from its natural source, descriptive mineralogy is little more than a list of species more or less connected with each other, but never sufficiently to give a general view of the science, and to exhibit these great principles of chemical theory of which some mineral groups are the most striking illustration. You easily perceive how this separation detracts from the practical usefulness of mineralogy as a means of training the mind in general, and in particular raising it to the comprehension of the beautiful principles of natural science. But it has also another effect detrimental to the study itself. The separation of mineralogy from chemistry must necessarily entail the separation of determinative from descriptive mineralogy. For as soon as the determination of minerals is effected independently of chemistry, other characters are resorted to, and properties of minor order must serve almost alone to identify mineral species. A new system of classifying minerals has thus been created, a system as distinct from the logical classification as would be an entirely new science. One must of course use this system in the absence of any other; and practical mineralogists have at all times made use of it. But how could it be rationally introduced in a higher science or art? Would it not necessarily create confusion instead of light in the mind of the student? Must it not destroy all sentiment of order, all idea of logic, and induce men to believe that nature is a vast museum, where all specimens are labelled, but classified, and where the writer may begin at the end, or in fact at any part of the vast collection, and adopt whatever system his fancy may originate. Yet, with its imperfection determination plays an important part and cannot for usefulness and interest be replaced by any other mode of study, whether in this or any other branch of natural history.

The question, therefore, naturally arises: Is it possible to construct a system of teaching where everything will take its proper place, and where chemistry specially will be given the prominence due to it? Will that same system employ determination as the natural road to lead to the knowledge of minerals? Finally, will that system admit of being sufficiently elementary to agree with the manifold requirements of the programmes of our high schools and colleges, and yet sufficiently thorough not to deserve to be ranked with that superficial dabbling of science which is next worse to complete ignorance?

I hope that the system which I want to propose may be itself a satisfactory answer to all these questions, and I proceed without any further preliminary to give the details of this new scheme.

(To be Continued).

Summary of Meetings.

Mineralogical Society of the College of Ottawa.

February 2nd.—The society held its semi-annual elections; the meeting being presided by the director, Rev. C. F. Marsan, O.M.I., M.A. The following officers were elected: President, M. Fallon, class of 1889, of Kingston, Ont.; Vice-President, J. P. Reynolds; Treasurer, E. Leonard; Recording Secretary, D. R. Macdonald; Scientific Secretary, Rev. Bro. Gauvreau, O.M.I.; Councillors, F. Mudget, T. Smith; Chemist, A. L. Tourchet, B.A.; Librarian, R. Paradis; Curator of the Museum, J. Paradis.

February 16.—Mr. D. R. Macdonald read a paper on "heat" as a geological agent.

February 23rd.—An analysis of *Celestite*, by Rev. G. Gauvreau, elicited a certain proportion of Barium Sulphate, and some curious observations with respect to the crystallization.

March 2nd.—Mr. D. B. Thibaudeau read an instructive essay on the properties and manufacture of iron. A publishing committee was then appointed, composed of the following gentlemen: M. M. C. Kennedy, L. Dausereau, F. Mudget, E. Leonard, J. Paradis and C. Gaudet.

British Columbia.

Railroading Across the Rockies—Natural Obstacles, and How They are Overcome—A Brantford Firm's Contribution to the Work.

The Waterous Company, of Brantford, have received the following interesting letter:—

Ross SAW MILL, Duggan's Siding, B. C.

C. H. Waterous, Jr., Waterous Eng. W. Co.
Brantford.

DEAR SIR,—As I have now finished here cutting with the mill, I thought that you would be pleased to know how it worked and what amount this mill is able to cut when run with proper care. As it is the first of this particular style of mill (25 h. power) you have sent to the Rockies, and as I have kept an account of all expenses of running this mill and the amount it cut, I am able to give you a correct statement of what it cost to handle lumber in this part. Any of your customers may rely upon the truth of my statements. As you are aware, I left Brantford on the 26th May, the mill being shipped at the same time. I arrived at the Rockies on the 8th of June, by way of the Canadian Pacific Railway. The mill arrived on the 12th and on the 21st we started to saw, and by the 8th of November we had cut 3,500,800 feet. The last month's cutting was the largest, amounting to \$17,000 feet. There are the figures of the measurer employed by the C. P. R., and are correct, making an average of 31,423 feet per day of not more than 13 running hours per day. This was all cut into inch boards, and 3 and 4 inch planks, and all sized to 8, 10, 12 and 14 wide. All the cutting and edging had to be done with the large saw as we had no edger. The timber was spruce, pine, fir, cedar and hemlock. I see in some of your circulars that you give the amount of what has been cut per hour and per day, but I thought it would be more satisfactory to you and to your customers to know what such a mill could do in the season, and you may rely upon this statement as being absolutely correct during this time. The expenses for repairs only amounted to \$1.50, viz., for 1 bolt in friction lever, 1 bolt in saw lever, and repairs on timber gauge. This mill was never stopped one working hour during the whole season. The new pulleys are a complete success, they are quick and sure to hold every time. I am satisfied that there need be no trouble or delay in running these mills if they are properly looked after. There was no extra chance to make this mill run any better than any other. The men were all picked up as they came along. The only man that had any experience in a mill was the sawyer. I filed the saws myself and kept all other things right. It might be interesting for you to know how much timber it takes to build one of these snow-slide sheds per mile. It takes over 6,461,300 ft. of timber and 62,030 bolts 36 in. long, and 200,000 spikes 10 in. long. I do not refer above to the ordinary snow sheds such as used on the Intercolonial Railway, these are used here also where snow is likely to drift in, but in speaking above I refer to what might more properly be called snow slides. They are built at a point where snow-slides are apt to occur, always in the face of steep and high mountains. One side (the high side of shed) is built up into the side of the mountain and has a slant over the track something like a shed roof. They are wonderfully strong and you may be sure none too much so, as the accumulated snow of many years may start from the top of these lofty hills and come thundering down in masses 50 to 100 or 200 feet thick, with a force that nothing can resist unless it is the mountain on the other side of the valley from which the slide takes place. The snow in passing down slides over the top of the snow slide and passes on down into the valley and on up, may be several hundred feet up, the side of the mountain opposite. One can imagine what would be the result of such a slide striking a passing train. Certainly nothing but pieces of the smashed up wreck, that would be unrecognizable, would ever be found. Near where I am one of these slides happened. The snow came down the mountain in a body estimated to

be 175 feet thick. It struck the track and carried it bodily down the mountain to the valley across the river that flowed through the valley, and up the opposite side to about the same height. There was where the railway track was found after the snow melted. Some cars were wrecked at the same time, and were never found, probably the remains were carried down by the melting snow to the Columbia River, and then out to the Pacific Ocean. The location here is a very beautiful one. A photographer who is out among the mountains taking views for the Canadian Pacific, came along one day and took a picture of the mill, and I send you one which will give you a very fair idea of what the place looks like. The mountain that you see to the left is over 5,000 feet high from the railway track. The white spot between the higher and lower peak is snow, and lies in that hollow place all the year round, and that snow is supposed to be 250 feet deep, and is a glacier, it is full of numerous cracks. The men have dropped lines down some of these cracks for over 190 feet without reaching the bottom. The sharp high peak seen on the picture is rough and rugged and difficult to climb. There was a rain cloud floated up against this peak once and burst, letting out a flood of water that brought everything down the mountain with it. Enormous rocks and trees were apparently no obstruction whatever. The course of the water made a clear sweep, and its peak is easily seen yet. As it came down the rocks and trees that it bore up would sometimes lodge in narrow places on the sides of the mountain and be piled up 150 or 200 feet high, but the weight of water behind would soon be so great that the dam would give way, and down would come the water again, and rocks, trees, etc., and so it kept on until it reached the river, which was raised by this flood until the water stood 20 feet over the track. This cloud burst did a great deal toward preparing the mill site. Level places, large enough to build a mill on are hard to get up here in the mountains. There are some very interesting things up here, and one need not get very lonesome if he has any taste for curious nature. A little way from the mill are soda springs and hot springs, so you can have both a plain soda and a hot bath, one or both, as you choose, and no thanks to any one. Soda plain, however. No liquor is allowed up here, which is a good thing, where so many and such different kinds of men are employed away from law and order.

I have been up the Roumanian, Bulgarian and Thuringian mountains, but the mountains here, I think, are much grander. It is not possible to picture them. However, as you have been on the Andes and Alps, you can think back a few years to the time we were in Santiago, Chili (I now see by the papers you are the Hon. Vice-Consul of that progressive republic), and used together take a walk to the top of Santa Lucia and look off to the snow-capped Andes it will give you an idea of this place. Only I am here in the very midst of them; then we were at a distance. Should you or any of the Brantford people be taking a trip over the Canada Pacific to British Columbia they can remember when going through these sheds that Brantford saw mills with Brantford brains and muscle cut the six million or more feet of lumber that is required to build each mill. For this is not the only one of your mills here; there are a number of them, and I can tell you it does me good to know that no other mill, American or Canadian (and there are a good many, especially of the former, scattered around the mountains), have done as much or as good work as our own mills. I naturally feel a pride in the old shop and what it does. I have been with you now some 30 years, and there are there still at work men who commenced before I did, and I want you to let them know what this mill has done up here, for I know they will be glad to hear from it, and that their work is a success. As I am writing, my mind turns back to a time when we were having one of our annual stop picnics about the time the Canada Pacific was first being talked about. Mr. Robertson, of the Bank of British North America, was making a few remarks and spoke about the great railway, and said that it was sure to be built, and would carry from ocean to ocean the Brantford saw-mills. We have seen that now all come to pass, and that his forecast of the future was correct. I have seen the Brantford saw-mills go ahead and cut the timber to build the railway bed, the stations, and the fences, and now we have turned back and are cutting the timber and plank to cover the road where it is necessary to protect it from the snow. I have made this letter too long, but there is so much here to be seen and to write about that when you start to write you do not know when to stop. But I know you take an interest in such things as are to be seen here. And I would say come along and see for yourself, and I am sure you will be well satisfied and paid for your trip. With no more at present,

I am your old fellow-traveller,

JOHN INYK.

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Mining Regulations

TO GOVERN THE DISPOSAL OF

Mineral Lands other than Coal Lands, 1886.

THESE REGULATIONS shall be applicable to all Dominion Lands containing gold, silver, cinnabar, lead, tin, copper, petroleum, iron or other mineral deposits of economic value, with the exception of coal.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein either by surface or subterranean prospecting for mineral deposits, with a view to obtaining under the Regulations a mining location for the same but no mining location or mining claim shall be granted until the discovery of the vein, lode or deposit of mineral or metal within the limits of the location or claim.

QUARTZ MINING.

A location for mining, except for iron on veins, lodes or ledges of quartz or other rock in place shall not exceed forty acres in area. Its length shall not be more than three times its breadth and its surface boundary shall be four straight lines, the opposite sides of which shall be parallel, except where prior locations would prevent, in which case it may be of such a shape as may be approved of by the Superintendent of Mining.

Any person having discovered a mineral deposit may obtain a mining location therefor, in the manner set forth in the Regulations which provides for the character of the survey and the marks necessary to designate the location on the ground.

When the location has been marked conformably to the requirements of the Regulations, the claimant shall within sixty days thereafter, file with the local agent in the Dominion Land Office for the district in which the location is situated, a declaration or oath setting forth the circumstances of his discovery, and describing, as nearly as may be, the locality and dimensions of the claim marked out by him as aforesaid; and shall, along with such declaration, pay to the said agent an entry fee of FIVE DOLLARS. The agent's receipt for such fee will be the claimant's authority to enter into possession of the location applied for.

At any time before the expiration of FIVE years from the date of his obtaining the agent's receipt it shall be open to the claimant to purchase the location on filing with the local agent proof that he has expended not less than FIVE HUNDRED DOLLARS in actual mining operations on the same; but the claimant is required, before the expiration of each of the five years, to prove that he has performed not less than ONE HUNDRED DOLLARS' worth of labor during the year in the actual development of his claim, and at the same time obtain a renewal of his location receipt, for which he is required to pay a fee of FIVE DOLLARS.

The price to be paid for a mining location shall be at the rate of FIVE DOLLARS PER ACRE, cash, and the sum of FIFTY DOLLARS extra for the survey of the same.

No more than one mining location shall be granted to any individual claimant upon the same lode or vein.

IRON.

The Minister of the Interior may grant a location for the mining of iron, not exceeding 160 acres in area which shall be bounded by north and south and east and west lines astronomically, and its breadth shall equal its length. Provided that should any person making an application purporting to be for the purpose of

mining iron thus obtain, whether in good faith or fraudulently, possession of a valuable mineral deposit other than iron, his right in such deposit shall be restricted to the area prescribed by the Regulations for other minerals, and the rest of the location shall revert to the Crown for such disposition as the Minister may direct.

The regulations also provide for the manner in which land may be acquired for milling purposes, reduction works or other works incidental to mining operations.

Locations taken up prior to this date may, until the 1st of August, 1886, be re-marked and re-entered in conformity with the Regulations without payment of new fees in cases where no existing interests would thereby be prejudicially affected.

PLACER MINING.

The Regulations laid down in respect to quartz mining shall be applicable to placer mining as far as they relate to entries, entry fees, assignments, marking of localities, agents' receipts, and generally where they can be applied.

The nature and size of placer mining claims are provided for in the Regulations, including bar, dry, bench creek or hill diggings, and the RIGHTS AND DUTIES OF MINERS are fully set forth.

The Regulations apply also to

BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

The GENERAL PROVISIONS of the Regulations include the interpretation of expressions used therein; how disputes shall be heard and adjudicated upon; under what circumstances miners shall be entitled to absent themselves from their locations or diggings, etc., etc.

THE SCHEDULE OF MINING REGULATIONS

Contains the forms to be observed in the drawing up of all documents such as:— "Application and affidavit of discoverer of quartz mine." "Receipt for fee paid by applicant for mining location." "Receipt for fee on extension of time for purchase of a mining location." "Patent of a mining location." "Certificate of the assignment of a mining location." "Application for grant for placer mining and affidavit of applicant." "Grant for placer mining." "Certificate of the assignment of a placer mining claim." "Grant to a bed rock flume company." "Grant for drainage." "Grant of right to divert water and construct ditches."

Since the publication, in 1884, of the Mining Regulations to govern the disposal of Dominion Mineral Lands the same have been carefully and thoroughly revised with a view to ensure ample protection to the public interests, and at the same time to encourage the prospector and miner in order that the mineral resources may be made valuable by development.

COPIES OF THE REGULATIONS MAY BE OBTAINED UPON APPLICATION TO THE DEPARTMENT OF THE INTERIOR.

A. M. BURGESS,

Deputy Minister of the Interior.

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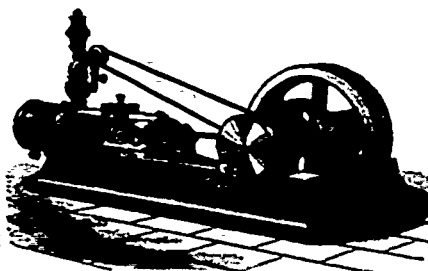
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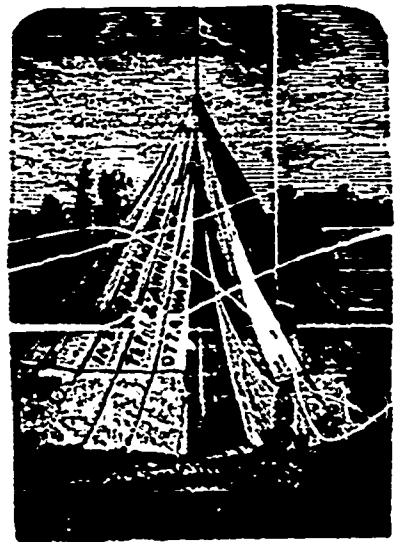
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