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# MINING REVIEW

VOL. 4.—No. 5.

1886—OTTAWA, JUNE—1886

VOL. 4.—No. 5

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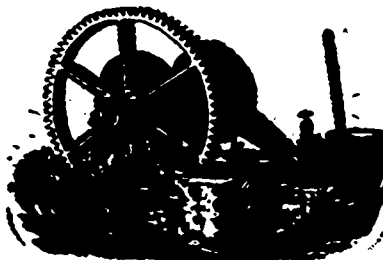
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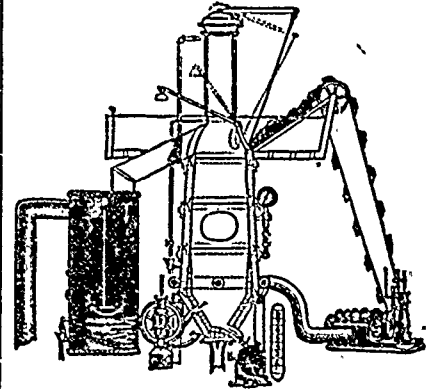
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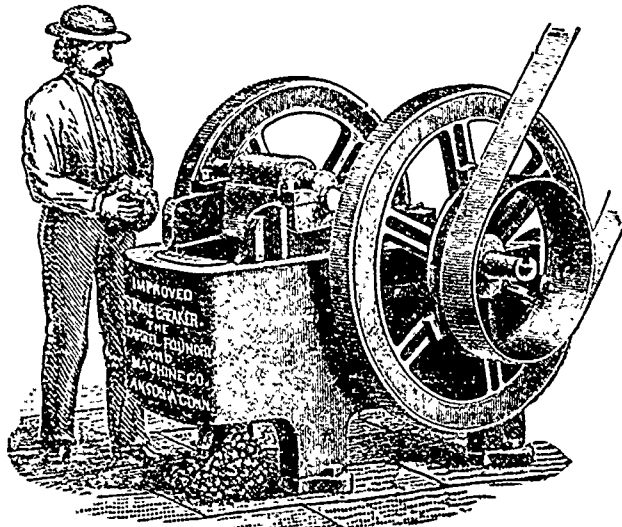
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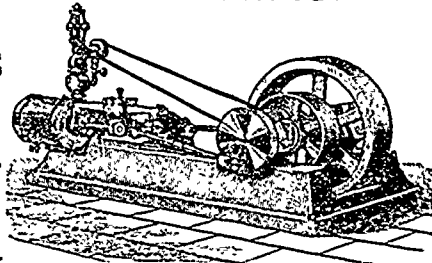
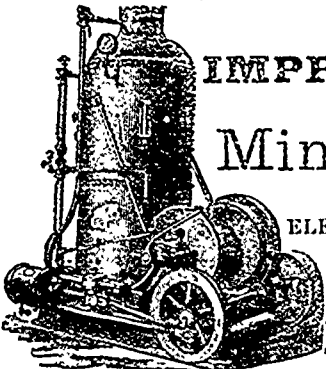
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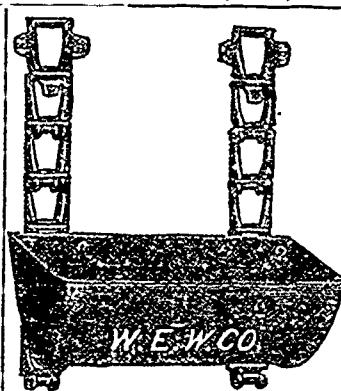


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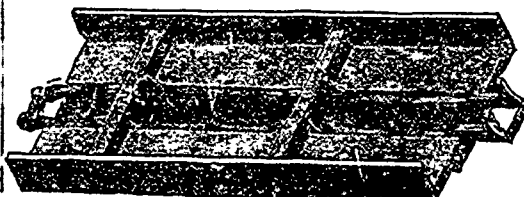
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SEALED TENDERS, addressed to the Postmaster General, will be received at Ottawa until noon, on FRIDAY, 18th JUNE, 1886, for the conveyance of Her Majesty's Mails, on a proposed Contract for four years, three times per week each way, between

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FROM THE 1st JULY NEXT.

Printed notices containing further information as to conditions of proposed contract may be seen, and blank forms of tender may be obtained at the Post Offices of Dunrobin, March and South March, and at this office.

T. P. FRENCH,

P. O. Inspector.

Post Office Inspector's Office,  
Ottawa, 20th May, 1886.



**Notice to Contractors.**

SEALED TENDERS addressed to the undersigned and endorsed "Tender for supplying coal for the Public Buildings, Ottawa," will be received at this office until FRIDAY, 2nd July next.

Specifications can be seen and Forms of Tender obtained on and after Tuesday, the 15th inst., at this office, where all necessary information can be had on application; also at the office of James Nelson, Architect, Montreal, and at the Dominion Public Works Office, Post Office Building, Quebec.

Each tender must be accompanied by an accepted bank cheque made payable to the order of the Honourable the Minister of Public Works, equal to five per cent. of the amount of the tender, which will be forfeited if the party decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

The Department will not be bound to accept the lowest or any tender.

By order,  
A. GOBELL,  
Secretary.

Department of Public Works,  
Ottawa, 7th June, 1886.

## Canadian Mining Review.

OTTAWA.

PUBLISHED MONTHLY.

ANNUAL SUBSCRIPTION . . . \$1.00  
ADVERTISING RATES—15c. per line (12 lines to 1 inch).OFFICE:  
UNION CHAMBERS, 14 Metcalfe Street.

*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.*

It is not to be expected that the work of collecting and compiling information and statistics in connection with Canadian mines and minerals can be done in a manner that will be acceptable to the mining public until such time as a distinct branch has been added to the Geological Survey for this purpose.

Messrs. Coste and Ingall, the two Mining Geologists of the Survey, have been entrusted with this important work, and what these gentlemen will do in the direction of organizing and conducting a mining and mineralogical department will no doubt be well done; but their united efforts will be inadequate to supply the mining community with the desired information within the next decade of years, if ever, unless efficient assistants are appointed under them and they themselves are allowed to devote their whole attention to the work. At the present moment these gentlemen are pursuing their geological research in the field and will continue to do so during the summer months, after which they must prepare their reports and maps. Meanwhile no progress is being made with mining statistics. If there is to be such a thing as a mining and mineralogical department attached to the Survey, it must be established on a permanent basis with an adequate and efficient staff under one officer. Then, and not until then, may we look for such organization as will produce the end aimed at, and furnish us with the information so urgently needed by the mining public and of such vital importance to the country at large.

Professor Chapman, of Toronto, visited Ottawa recently on his return from the Beauce gold district where he had spent several days examining the property now being worked by the St. Onge Gold Mining Company. He expressed himself highly pleased with what he had seen and greatly astonished at the richness of the ground, and is firmly of the belief that gold mining will pay largely if properly conducted. He witnessed the washing of gravel from one of the drifts from the main shaft, from which a quantity of coarse gold was obtained, the nuggets varying in size from that of a pea to a bean.

Dr. Robert Bell, Assistant Director of the Geological Survey, will shortly proceed to Hudson Bay, where he will prosecute further exploration in the interest of mineralogy, geology and science. He will go by the overland route and will be absent for some months. Dr. Bell has already furnished the Geological Survey with a vast amount of information on the mineral resources of that far north country, acquired by personal observation. He has given a great deal of attention to portions of the Hudson Bay mainland, and has suffered hardships in order that his researches might be of practical service to the public.

Mr. A. C. Lawson will leave Ottawa during this month to continue his survey of the Rainy Lake district and will be absent for the rest of the summer. Mr. Lawson's report of that section of country will be published in a complete form in the next Report of Progress of the Geological Survey, and, as his work is always thoroughly and well done, his report will undoubtedly abound in interesting information.

Mr. Eugene Coste, Mining Geologist for the Geological Survey, is at present engaged in the mining district of the County of Hastings and expects, during the summer, to complete his examination of that section, begun last year. Mr. Coste's report will be looked for with much concern as it will no doubt be replete with interesting mining statistics and valuable information bearing on the mineral resources of the Hastings district, where rich gold-bearing veins and extensive iron ore deposits are known to exist.

Mr. E. D. Ingall, the other Mining Geologist of the Geological Survey is now in the Port Arthur district continuing his last year's survey of the Thunder Bay mining region in order that he may be enabled to complete a geological map of that interesting section of country and make an exhaustive report of its mineral resources. Mr. Ingall will have an opportunity of inspecting some of the mining properties in the neighborhood, and we earnestly hope he will collect statistical information of work done and such other information as will enable outsiders to form an intelligent idea of the possible future of the north shore of Lake Superior as a mining section.

The Gold Commissioner of Cariboo, B.C., in his annual report for 1885 to the Minister of Mines, states that in his district another year has passed without any material development of the quartz ledges, and, with the exception of the efforts put forth by the Quesnelle Quartz Mining Company, nothing had been attempted in this direction. The Quesnelle company were, he states, making a most laudable attempt to prove the value of their mine at Hixon Creek, and had purchased an engine and other machinery at San Francisco and engaged the services of experienced Californian quartz-miners.

In our next issue we will publish a report of Mr. G. A. Koch, addressed to the Trustees of this company, which is highly satisfactory, and goes to show that at no distant day we may receive the intelligence that a valuable mine has been developed in this out of the way district, which will be an important gold producer. Mr. Koch, the present manager for the Quesnelle Quartz Mining Company, was temporarily engaged last year at the Huronian gold mine, Lake Superior district, and the work he accomplished there, gave ample evidence of his ability to successfully conduct the development of a mining property.

The *Iron Trade Review*, of Cleveland, Ohio, one of our most valued exchanges, has done us the honour of reprinting an article which appeared in the editorial columns of our last issue on the *Morrison Tariff*, and in so doing preface it with the following complimentary notice:

"Our excellent contemporary, the CANADIAN MINING REVIEW, is possessed of a degree of frankness which is to be envied in this day of deceit and dissimulation. It would be pleased to see the United States open its markets to Canadian iron ore and coal, for the very simple and obvious reason that such an arrangement would benefit Canada first, last and all the time, and it isn't afraid to say so. At the same time it doesn't hope much for any substantial aid from the advocates of Free Trade, either in this country or in England."

And we are yet of the opinion that the Dominion of Canada would benefit by such an arrangement, whatever might be the result to individual interests. Now, would it not be in order for the *Iron Trade Review* to adopt for a brief spell, that degree of frankness for which it so highly commends us? We would be pleased if it would condescend to come down from its lofty pinnacle of patriotic virtue to *hard pan* and favor us with an unbiassed opinion as to how Mr. Morrison's tariff bill, in its entirety, would affect the interests of the United States as a nation. If the *Review* were quite unprejudiced by local interests we think it would agree with us in the belief that the benefits to accrue from reciprocity in iron ore and coal between the United States and Canada would be very evenly shared by the two countries.

Want of space compels us to hold over for our next issue an interesting article by Mr. E. J. Ball, Ph. D., London, England.—"Notes on the Progress of Mining in Europe."

## THE PHOSPHATE TRADE.

Since our last report on the phosphate industry of Ottawa county the transportation of ore from the mines to the railway terminus at Buckingham, and thence to Montreal over the Canadian Pacific Railway, has been pushed with great activity. The Riviere du Lièvre, dotted with ore vessels plying between the mines and the landing at Buckingham, presents a busy scene, and although there has been a large accumulation of ore since the close of navigation last year the increased carrying facilities on the river insure its delivery at point of shipment early in the season. As will be seen by our statement of shipments for May, some phosphate was forwarded from Montreal during that month to Liverpool and Hamburg, the amount, however, being but 1,562 bags ground phosphate and 737 tons crude. The first shipment for the year was on May 12th per SS. *Kehweider* to Hamburg. Last season the first shipment was to Liverpool per SS. *Sarnia* on May 21st, and the shipments for the month aggregated 1,393 tons, all crude. Thus it will be seen that between May 21st and 31st in 1885 the shipments of crude phosphate exceeded those of this year from 12th to 31st of May by 656 tons. This is accounted for by the present unsettled condition of the fertilizer market in England and on the Continent and by the fact that miners show no desire to sell and are not offering their output at present prices. There has been some uncertainty with regard to ocean freight, which has, in a measure, checked the forwarding of phosphate. Miners are not uneasy as to the prospects for the future and are sanguine that the fertilizer market abroad will recover later in the season and that better prices will be obtainable for Canadian phosphate, which is always more or less in demand. They are also hopeful of securing lower freight rates than are being offered at the present time, and they have good reason to expect this. Meanwhile the ore is finding its way to Montreal in large quantity and will there remain ready to be forwarded when sold. It is not improbable that in future a large quantity of ground phosphate will be shipped to Hamburg and other European ports, and that there will henceforth be a large and increasing demand in the United States for Canadian phosphate in a ground state is already assured.

The Portland (P.Q.) Phosphate Mining and Milling Company have taken orders that will tax their mill to its full capacity for several months. This company's mill is one of the most complete of its kind in America and performs its work in a most satisfactory manner. The several operations to which the ore is subjected reduce it finally to an impalpable powder and by ingenious contrivances a large percentage of the foreign matrix is expelled, thus bringing up the percentage of tribasic phosphate of lime several units. The mica extracted in this manner is saved and sold at a fair price. In the last issue of the REVIEW we reported sales of 4,000 tons of ground phosphate for the Buffalo, Cleveland and Chicago markets. This, according to newspaper reports, has been magnified to 10,000 tons, but we have received no verification of these figures and are not inclined to think that any such quantity has been sold. This would represent quite one-third of

the entire year's production, besides which the capacity of the mill is only 40 tons per day, and if worked night and day it could not grind 10,000 tons in less than six months, all things considered.

### THE MINES.

The force of miners employed in the *du Lièvre* district has not varied since the winter and the mines are yielding ore in abundance. *High Rock*, the *Union* mines, the *North Star*, the *Little Rapids* and the *Emerald* have large reserves of ore in sight and at other mines in the district important developments have been made. At the *Glasgow-Canadian* mine in the Township of Derry, the shaft is now down 140 feet cutting two parallel veins, one of green and the other of red and green phosphate, aggregating about six feet of mineral. The ore is of very high grade and appears to be comparatively free from impurities. Another instance of successful deep mining is at the *Battle Lake* mine where a large body of ore has been laid bare in the bottom of the main shaft. The ore here is also very pure and the manager is of the opinion that all the small veins in the vicinity of the shaft are feeders to this ore body. This last mentioned mine is in the Township of Templeton and has recently been acquired by the Anglo-Canadian Phosphate Company. The *McLaurin* mine in Templeton continues to occupy a place on the list of heavy producers, and many less important mines in the County of Ottawa are contributing to the output of the district.

Important mining operations are going on at the phosphate mines in the Perth district. Messrs. Wilson & Green, of Montreal, are opening up a very promising location in North Burgess in the interest of an English company. Suitable machinery has been erected on the property which, it is expected, will develop into a rich and valuable mine. The Anglo-Canadian Phosphate Company are also preparing for extensive operations on the tracts of phosphate land they have acquired in this district. A much larger quantity of phosphate will be forwarded from the Perth district during this season than was forwarded last year.

### Phosphate Quotations.

Comparatively little phosphate has yet been sold for shipment and owners are holding back. Shippers report that at the prices asked by miners, little business can be done. Miners, on the other hand, cling to the belief that prices will stiffen, and are not disposed to sell at the present ruling quotation of one shilling for 80 per cent. with a fifth of a penny rise. London brokers report that they can sell Canadian mineral phosphate at 1s. for 80 per cent., ex ship London or Liverpool, and the lower grades, viz., 75, 70 and 65 per cent., at correspondingly lower prices. South Carolina, and in fact all mineral phosphates, have been selling at lower prices than last year, notwithstanding that manufacturers are delivering largely to farmers. The present sluggish condition of the market in raw material is partly due to the season being a late one.

#### PHOSPHATE SHIPMENTS FROM MONTREAL FOR MAY 1886.

Date.	Vessel.	Destination	Shippers or agents.	Tons.
May 25	S.S. Oxenhalome	Liverpool.	Wilson & Green.	27
"	"	"	Lamer, Rohr & Co.	350
May 12	S.S. Kehweider.	Hamburg.	W. M. Knowles	*1562 bags

\*Ground phosphate.

### Ocean Freight.

Shipping brokers of Montreal expressed some uneasiness after the opening of navigation in the St. Lawrence, on account of apparent uncertainty of freight rates for phosphate transportation. This, however, appears now to have been unfounded, as we learn of shipments having already been made at three to four shillings per ton to Liverpool, and future shipments have been contracted for at similar rates. The ruling ocean freight rate for phosphate for this season will, in all probability, be much the same as for 1885, viz.: about five shillings and sixpence per ton.

### Villeneuve Mica Mine.

During the past month the British and Canadian Mica and Mining Company have been actively opening up this valuable property and constructing a good waggon road from it to the Riviere du Lièvre. A commodious cutting-house has been established by the company in Buckingham Village, to which the mica is forwarded from the mine in sacks after having been carefully examined and split into convenient thicknesses. Experienced cutters have arrived from Franklin, North Carolina, until now the headquarters of the mica industry, and a number of boys and women are employed to split the mica for the cutters and to clean it when cut into sizes preparatory to sorting and packing it into 1 lb. packages for the market. The daily production of the *Villeneuve* mine will soon reach one hundred pounds of merchantable mica, which will be considerably in excess of that of any other individual mica mine on this continent. We purpose giving a full description of this mine in our next issue.

### Oil Discovered.

Some excitement has been caused by the discovery of oil wells four miles from Shequanah on Grand Manitoulin. On May 17th, while a number of men were boring under the supervision of Mr. W. Thomas Newman they struck oil at a depth of 58 feet. It spouted out in a clear stream over the heads of those who were drilling. They continued boring, and at a depth of 75 feet came upon a vein of mineral water, iron and salt, from which there was a strong flow of gas. Mr. Newman then proceeded to Toronto, taking samples with him, and has since purchased tanks and pumps and will put down the latter as quickly as wells can be bored. Upwards of 14 tons of machinery are already on the ground and it is the intention to continue boring to a depth of 300 to 400 feet. The oil met with at 58 feet is surface oil of a very valuable description and peculiarly suitable for machinery.

COAL IN FRANCE.—The output of coal in France in the second half of last year was 10,157,630 tons. This total presents an increase of 780,919 tons, as compared with the output in the first half of 1885. The production of coal in France for the whole of 1885 was 19,534,311 tons, as compared with 20,023,514 tons in 1884.

DISCOVERY OF QUICKSILVER MINES IN RUSSIA.—A very important discovery of cinnabar mines has been recently made in the mining region of the Don, Russia. The ore is stated to contain from 69 to 80 per cent. of pure mercury.



## MINES NORTH OF LAKE SUPERIOR.

## PORT ARTHUR DISTRICT.

Work was resumed at the *West End* mine (Silver Mountain) about the end of April and a tunnel started at the foot of the mountain towards the vein which will be utilized for drainage purposes. The vein proper has prospected well and promises to develop into a rich silver mine. Its outcroppings are visible for several feet along the surface.

At the *East End* mine work on the vein is progressing satisfactorily, and its owners are much encouraged by the manner in which the vein is developing. It is steadily improving in extent and richness, and several large nuggets of pure silver, one weighing three pounds, have been taken out. The richest part of this vein is not more than 1,000 ft. from the vein on which the Cleveland company did some prospecting, and the opinion prevails that, had better judgment been exercised, the Cleveland men would not have abandoned the location. A recent visitor to Silver Mountain reports having seen very rich silver ore taken from the drift where the Cleveland company formerly worked, and pronounces the vein at this point to be well impregnated with native and black silver.

*Crown Point* mine has come to the front and is likely to become one of the important producers of the district. The miners are working in two drifts, one at the base of the mountain and the other directly above it, both on the vein which is unquestionably a true fissure. The ore from the upper portion of the vein has been shown by assay to be very rich, but recent development has produced ore from the lower drift which is said to be much more heavily mineralized. A very rich streak has been encountered which shows abundance of silver and has created quite an excitement among the miners. As far as the vein has been worked on it shows silver well disseminated and occasional very rich streaks, some of the vein matter containing nuggets varying in size up to one and a half inch long. Most recent advices report that at the point of contact of three feeders with the vein proper much native silver is visible. This mine is owned by mining men of St. Louis and other western cities who have ample capital at their disposal. It is their intention to greatly increase the number of miners so soon as sufficient ground has been opened to admit of a larger force being employed.

On location "223," at the north end of Silver Mountain, a considerable amount of development work has been done with encouraging results. A tunnel has been driven for upwards of 400 feet and a shaft put down 40 feet. Native silver has been met with at several points and the present appearance of the vein has inspired its owners with confidence. Assays of the vein matter have given large quantities of silver and the location promises to increase in value as work progresses. About twenty miners are now employed on night and day shifts, but their work has been somewhat retarded by water, which is coming in very rapidly.

Latest advices from the *Beaver* mine report that the air-compressor and steam-drills were nearly ready to start work. The lighter parts had been brought on the ground, but the delivery of the heavier machinery would be delayed until the road to the mine, which was in an almost impassable condition, had been improved. A large force has been steadily engaged at the *Beaver* mine and a great deal of important development work has been accomplished.

Work at *Rabbit Mountain* mine is being energetically pushed and great results are anticipated after the mill has been in running order. The machinery is all on the ground and will be put in place so soon as the mill is erected, which is now rapidly approaching completion.

Recent work at *Silver Falls* mine has exposed a good-looking vein dipping to the north at an angle of 35°. The vein is 5 feet wide, is well charged with mineral and promises well.

## JARVIS ISLAND MINE,

Thunder Bay District.

TO BE WORKED BY A NEW COMPANY.

In our last issue we published a letter from "A Miner" in which our correspondent referred to this property in the following words: "*Jarvis Island* was worked and tested to a depth of 130 ft. and found to carry native silver and silver ore, and when abandoned there was a good show of silver. The owners of the property intend, I believe, to start work again this spring." We are now in receipt of the report of the directors of the company, to be submitted to the shareholders at a meeting to be held in London, Eng., on the 15th inst. The report is as follows:—

"In placing the accounts before the proprietors, the directors have to announce that they have decided to make a change in the constitution of the Company.

Subject to the approval of the shareholders, they propose to dispose of the whole assets of the existing concern to a new Company, to be entitled, "The Jarvis Silver Mining Company, Limited," with a capital of 90,000 ordinary shares and 10,000 preference shares of £1 each; and it is proposed that of the ordinary shares ten fully paid shall be given for each £10 share in the existing Company.

This plan is in substitution of the recent proposal to raise capital by means of a development company, which would have involved the sacrifice of one-third of the Company's property.

The present proposal is more advantageous to the shareholders, who will have the first offer of the preference shares at such price as it may be decided at the meeting to issue them.

Since the meeting a report has been received of the rendering at New York of seven cwt. of samples of the silver ore (poor and rich) taken from the mine, with results that fairly confirm the assays of which you have been informed.

The actual result was 134½ dols. to the ton of ore, after deduction of the loss in extraction, which is of course greater in putting a small quantity through a mill, owing to the impossibility of making a perfect cleaning up.

The experience of the neighboring Silver Islet mine was stated to be that ore of 10 dols. value per ton, passed through the same kind of mill, yielded nearly half profit.

It is therefore evident that should sufficient ore be found, the *Jarvis* will prove a very valuable mine.

The evidence of miners employed when the mine shut down is very encouraging, and all agree that when the mine was stopped for want of funds, by order of the board here, it gave every indication of proving most valuable.

The deepest working where the best ore was found was 146 feet, and as the water was easily kept down by a bucket worked by a horse, the unwatering with an engine and pump will only be the work of a few days.

The shareholders must be reminded that besides the island on which the rich ore was discovered there are 6,400 acres (freehold) on the

mainland two miles off, having much valuable wood, and several outcrops of mineral veins, embracing, moreover, one of the best natural harbors on Lake Superior, so that apart from the promising mine already opened, there is a substantial basis of value unburdened by debt.

It is proposed to wind-up the present company and to appoint Mr. William Cash as liquidator at a remuneration of £100 for his services.

## MINERAL RESOURCES

OF

NOVA SCOTIA.

Continued from page 5, Vol. 4, No. 4.

## Iron Ores.

This, perhaps the most important of Nova Scotia's mineral resources, has not as yet received attention commensurate with its value. The ores are of the most varied species and frequently very pure. They are generally accessible, near water or railway transport, and none of them at any great distance from coal. Beginning at the western end of the province, titaniferous iron sand is met at St. Mary's Bay, and the trap rocks forming the south side of the Bay of Fundy yield abundant indications of specular and magnetite. At Clementsport and Nictaux are beds of red hematite and magnetite, formerly worked to a small extent in charcoal furnaces. From this point, as far west as Windsor, specular, red hematite and bog ores are found, but little is known of their extent or value. Similar ores, sometimes highly manganeseiferous, are found between Windsor and Truro, at Goshen, Mathland, Brookfield, etc.

The following analysis of limonite from the last mentioned place shows very pure ore:

Water.....	11.36
Silicious matter.....	1.54
Phosphoric acid.....	trace
Sulphuric acid.....	none
Magnesia.....	trace
Metallic iron.....	60.00

On the north side of the Bay of Fundy the limonite ores of Londonderry are well known. Their passage has been traced for fifty miles along the range of the Cabeguid Hills, and they have been worked for many years at the Acadian mines. Large amounts of a variety of spathic ores are mined and smelted with the limonite, and a good grade of pig made, part of which is converted into bar iron, etc. There are two large blast furnaces, with rolling mills, foundries, etc., and from 40,000 to 60,000 tons of ore are annually smelted. The following analyses show the character of the iron ores of the Acadian mines:—

	Micaceous Hematite.	Limonite.
Per oxide of iron.....	26.23	52.65
Oxide of magnesia.....	.....	.25
Alumina.....	.33	.56
Lime.....	.01	.15
Magnesia.....	.11	.10
Phosphoric acid.....	.07	.38
Sulphuric acid.....	.03	.02
Water hygroscopic.....	.03	.31
Water combined.....	.79	10.51
Insoluble.....	7.26	4.79
Metallic iron.....	67.85	57.85

## SPATHIC ORES.

Insoluble silicious matter.....	.47
Calcic carbonate.....	.59
Ferrous.....	69.29
Manganous.....	1.37
Magnesian.....	28.73
Ferric oxide.....	.08

Iron ores are known at Pugwash, Wallace, Joggins, Clark's Point, etc., north of the Cabeguid Hills.

The Londonderry iron ore bearing ground passes north of Truro and extends into Pictou county, and may be said to terminate at Cape George in Antigonish county. On entering Pictou county near the line of the Intercolonial railway are met widespread indications of specular ore, which, at several points, show veins of workable size. This specular ore ground extends to the head of the East River, a distance of about twenty miles, and carries ore veins which attain a thickness of fifteen feet. South of this band are deposits of limonite ores, which, however, are yet little known. In the vicinity of Springville, between the specular ore and the Pictou coal field, are large and valuable beds of limonite, sometimes highly manganeseiferous, and bedded red hematites attaining a thickness at some points from 20 to 40 feet. On Sutherland's river these ores approach the eastern end of the coal field, one ore bed, fifteen feet in width, being not more than two miles from Vale colliery. An exposure of a bed of red hematite three feet thick at Arisaig marks the termination of this district, which is fifty miles long, and attains a maximum width of six miles. Clay ironstone is met at several points in the Pictou coal field and between New Glasgow and Pictou.

The following analyses serve to show the character of the Pictou iron ores:—

	Limonite	Clay Iron Stone.	Specular.	Red Hematite
Water.....	7.702	2.132	.....	.....
Iron Peroxide..	57.925	45.361	97.52	65.26
Alumina.....	Trace.	16.962	.....	5.59
Silica.....	3.000	.780	3.20	25.68
Manganese Bioxide.	Trace.	.....	.....	.....
Lime.....	Trace.	Trace.	.91	1.88
Magnesia.....	.500	1.655	.....	1.05
Sulphur.....	Trace.	.612	.06	.....
Phosphorous...	Trace.	Trace.	Trace.	.....
Metallic iron...	65.540	35.000	68.33	43.40
Carbonic acid.....	.....	.....	.....	.....

The following analyses is of the spathic ore from Sutherland's river:—

Sesquioxide of iron.....	20.52
Carbonate of iron.....	57.40
“ of manganese.....	8.29
“ of lime.....	4.02
“ of magnesia.....	5.66
Silica.....	2.38
Moisture.....	1.43
Sulphur.....	none
Phosphorous.....	none
Iron.....	42.07

In Pictou county the conditions for making iron and steel cheaply are most favourable, as within a few miles are collected numerous iron ores, fluxes and good furnace fuels, and there is railway and water communication with all parts of the Dominion.

In Cape Breton indications of valuable iron ores are frequently met, but hitherto there has been little inducement to test or develop them. Near East Bay a bed of red hematite ore from 4 to 13 feet wide has been traced several miles, specimens of which have been analyzed as follows:—

Iron peroxide.....	85.057
Si. ....	5.130
Sulphur.....	.075
Phosphoric acid.....	.032
Metallic iron.....	57.526

### Gold.

The auriferous district of Nova Scotia stretches in an irregular band along its shore. Its area is estimated at about 3,000 square miles. The gold mines are scattered

through this land, the greater number being to the eastward of Halifax. The auriferous district is found to contain numerous veins of quartz from one inch to six feet in thickness, running continuously, in many cases, for miles. Nearly all these veins contain gold, but, as elsewhere, only a certain percentage of them are rich enough to work. They carry the gold in visible grains imbedded in the quartz, and in the various sulphides of copper, lead, iron, etc., invariably found in them. The width of the veins usually worked varies from four to twenty inches, but in some cases they are found to be highly auriferous when much wider.

These veins carry gold in amounts varying from a trace up to several ounces, and in common with auriferous veins of other countries, frequently present it in the form of "pay streaks" or rich zones in the vein. These "pay streaks" are of varied width and depth, and are frequently very rich. In the Sherbrooke district one of these deposits was followed to a depth of 600 feet. The quartz surrounding these richer portions of the veins varies in value from three to ten dollars a ton. Other veins again show a uniform yield, not exceeding one-half to three-quarters of an ounce to the ton for long distances.

Among the more prominent districts at the present time may be mentioned the Salmon River mines. Here work has been carried on for several years on a vein of quartz from three to six feet wide. Several shafts have been sunk to a depth of about 150 feet, and ore has been extracted from a portion of a vein about 900 feet long. The quartz is crushed in a stamp-mill driven by water power and placed about a quarter of a mile from the mine. There are eight batteries, each holding five stamps, weighing about 700 lbs. each complete. The average yield from the quartz has varied between seven dwts. and one ounce to the ton. Owing to the size of the vein and cheapness of the water power crushing, this ore could be profitably treated even if the value of the gold yield fell to five dollars, or say twenty shillings to the ton. Since the opening of the mine 33,253 tons of quartz have been crushed and yielded 18,047 ounces of gold. This can be taken as a sample of others now working in the province, but it will be understood that the narrower the vein the richer its contents must prove, as the expense of mining increases rapidly with the greater amount of dead work. At Montagu, Rawdon, Oldham, Stormont, and Lake Catcha profitable mining has been carried on during the past year.

The Inspector of Mines, in his annual report, expresses the opinion that the great future of gold mining in Nova Scotia lies in the so-called "low grade" ores. In many of the districts are found wide belts of slate and quartzite, intersected by quartz veins, both the veins and rocks being more or less auriferous. Trials on a working scale have been made of such ores as they occur in the province, and the field appears even more promising than in any other gold mining country.

### A Quartz Milling Company Starts in Nova Scotia.

A new and important enterprise has been opened in Yarmouth, N.S. The British American Manufacturing, Mining and Milling Company have opened their works and put in one of their new electric rotary crushing mills, under the superintendence of Mr. J. F. Wiswell, of Boston, son of the inventor. The mill is now in operation and will crush twenty tons of ore

per day, and it is claimed will save from twenty to forty per cent. more gold than the ordinary stamp mills now used in the province. This mill has been put up by an American company who make Yarmouth the headquarters of their operations in Canada. They will have their mills manufactured by the Burrell Johnson Iron Company and will supply them at short notice to any part of the Dominion. The company purpose taking interests in mining properties and aiding in their development, besides handling quartz to order at their mill. Several lots of ore are now in the mill awaiting treatment, and if the crusher saves as large a percentage as is claimed, the value of the auriferous deposits of the Province will be greatly enhanced. The new mill is formed of four heavy iron wheels running in a groove and giving a continuous crushing surface with much less expenditure of power than that required by the stamp mills. A constant current of electricity from a powerful dynamo prevents "sliming" and greatly aids the process of amalgamation. The amalgam can be drawn off from a quicksilver trap at any time without stopping the mill. The mill is the first of the kind ever put up in Canada, and has been proved in many gold districts of the continent.

### CORRESPONDENCE.

#### IRON SMELTING IN CANADA.

ST. IGNACE, MICH., U.S.,  
May 12th, 1886.

Editor Canadian Mining Review,

Sir,—I received, a few days ago, from a friend in Toronto, the intelligence of the unfortunate termination of Messrs. Parry & Mill's enterprise in the blast furnace line, in the Madoc district; I also received a copy of the Hamilton Times containing a criticism on Mr. Bartlett's book (recently published by Dawson Bros, Montreal), and as it is evident, from the information given in your March number of the REVIEW, that Canadian mines and minerals are at last beginning to receive recognition of their value, I have thought that a letter from one deeply interested, as I am, in the prosperity of the country, and well acquainted with its peculiar difficulties in this department, might be of value to your readers.

The Hamilton Times styles, and perhaps rightly, the production of iron, "One of Canada's lapsed industries." Why is it so? Mr. Bartlett lays the blame on defective legislation. Let us see if there is not some other cause. In the case of Mr. Van Norman, detailed in Mr. B's work, we find that he succeeded well in stove and brittle casting, making about 3 tons per day from bog iron ore. He afterwards purchased the Marmora works where he had a totally different ore which he knew nothing about, and so situated that it cost perhaps \$10 per ton to get it to market. Success could hardly be hoped for under such conditions, and no government would be justified in protecting such an industry. Mr. Van Norman's next effort was in a branch of blast practice, which was then in its infancy, namely, making car-wheel iron. He worked along evidently for some time, making no test of his product, till he had accumulated 400 tons, which, on being shipped to the car-wheel foundry, was found useless for that purpose. Had Mr. V. known anything about the business he would have found this out by the first cast taken from the furnace, and would then have either abandoned the works or have endeavoured to find some

ore which, mixed with his own ore, would give the required properties to the metal; in either case he would have avoided the loss incurred in making 400 tons of a product which had to be sold for less than its cost; this case is, I think, also beyond the help of legislation, and forms a fair example of these enterprises. Let us take the last case, that of Messrs. Parry and Mills. These gentlemen may, or may not, have understood the business in which they embarked. I am informed that owing to an unfortunate error of judgment they met with a heavy loss in the destruction of a portion of their plant; be that as it may, it is evident that they went into the business with insufficient capital, and that even had they completed their works they could not have withstood the slightest failure in the working of their furnace at the outset. My own experience in blast furnace work has taught me that to start a furnace in a new district with untried ores, it is necessary that the parties engaged in it should possess sufficient capital to enable them to stand from six to nine months unsuccessful running till they have learned how to mix their ores and what ores to use, in order to obtain the desired product. It is possible that they may succeed from the start, but the probabilities point the other way, and their iron for some time may be saleable only at the market price of ordinary coke iron (I am of course taking it for granted that a furnace located in central Canada would make charcoal iron) and they may even have trouble in producing that. None but the initiated can understand the difficulties in the way of making car wheel iron so as to obtain a product of the required strength which will not show "skin-chill," "chill-cracks," "manganese chill," etc., etc. And here is where, in my opinion, the Government might fitly, and at a very trifling cost to the country at large, assist the struggling furnace man by giving a sufficient bonus on the manufacture for a limited time till the work had passed the experimental stage, care being taken that this experimental stage was not fraudulently prolonged for the benefit of unprincipled parties interested in the enterprise.

The establishment of a bureau of mining and mineralogy is also an important step in the right direction, which, besides being an assistance to the mining industries, would help to remove one of the greatest difficulties in the path of Canadian iron manufacture. It is well known that there is an abundance of magnetic ore in Canada, it being easily discovered and traced out by the use of the dip needle, but to run a furnace successfully on car-wheel iron, it is necessary to have a mixture of magnetic, specular, and hematite ores. Respecting the deposits of the two latter ores, but little is known so far as I have been able to ascertain. I know of some deposits in Frontenac County, having examined some of them, as well as in other districts, but nothing sufficiently definite to satisfy a furnace man is yet known about them; so that until the mining bureau or some other agency throws light on the subject it will not be easy to get practical men to invest money in that line (furnace building). As regards the tariff, I consider protection an absolute necessity, but it may be over done and so induce rash and ignorant speculation.

SAMUEL D. MILLS,  
Supt. Martel Furnace Co., St. Ignace,  
Mich., (late of Kingston, Ont.)

DISCOVERY OF GOLD IN PATAGONIA.—A gold fever is raging in the Argentine Republic in consequence of the reports of the discoveries of the precious metal in Patagonia.

GRANITE CREEK,  
(British Columbia.)

LETTER FROM THE GOLD COMMISSIONER.

Promising Quartz Ledges in the District.

The following letter from Mr. G. C. Tunstall, addressed to the Minister of Mines, contains a warning to those who may be tempted to try their luck in the Granite creek diggings:

GRANITE CITY, April 21st, 1886.

The Honourable the Minister of Mines, Victoria, B.C.:

SIR,—I have the honour to inform you that the prevailing freshet on Granite creek and the Similkameen and Tulameen rivers has almost entirely suspended mining operations. The period between the present high water and the summer freshet will be of too short a duration to justify claim owners to repair their dams and flumes to again run the risk of having them swept away. The other creeks are still so much encumbered with ice and snow that it is probable no mining activity will be exhibited before the middle of June, or perhaps later.

This is a very unfortunate state of affairs for the district, as few of the new-comers can afford to remain idle, and many have left with reports of an unfavourable nature, calculated to encourage the belief that the mines are a partial failure. But confidence will be restored when the difficulties mentioned are removed.

Several promising quartz ledges have been taken up and recorded. The appearance of the ore is highly spoken of by persons experienced in that important branch of mining in Colorado and Arizona, and I think it would be advisable for the Government to have assays made gratis of the various samples I may forward for that purpose, in order to afford some definite idea of their value, and stimulate a search for the gold and silver bearing claims.

I have the honour to be, Sir,  
Your obedient servant,  
G. C. TUNSTALL,  
Gold Commissioner.

The following extracts are from a letter of a more recent date from the Gold Commissioner to the Minister of Mines:

"I have the honour to inform you that a new creek named 'Boulder creek,' has been lately discovered. It crosses the Granite-creek-Nicola trail at a point about eleven miles north of this place (Granite City), and empties into Otter creek on the west side, near the head of the lake of that name.

FIVE PANS OF DIRT YIELDED FOUR DOLLARS. The prospect was obtained on a bench about thirty feet above the present channel. A number of persons have started with the intention of staking off ground.

\* \* \* There are about  
ONE HUNDRED AND FIFTY MEN

at work on the South Fork of Granite creek, concerning which sanguine expectations are entertained. The Spokane company are down 18 feet and daily expect to reach bed rock, the water is still at a high stage, and mining on the rivers and Granite creek is almost entirely suspended."

AUSTRALIAN COPPER AND TIN EXPORTS.—During the month of March, the following were among the exports from Melbourne, Adelaide, Sydney, and Queensland to Great Britain: Copper, 800 tons; copper ore, 300 tons; and tin, 500 tons.

The Australian Gold Supply Continues to Decrease.

The result of gold mining in the Victoria gold fields for 1885 shows an output smaller than that of any year since 1852; that is to say, since within a year of the discovery of gold in that quarter. The year's product, as abstracted by the London Mining Journal from the official returns, is given by quarters as follows, we adding the value at the rate of £3 17s. 9d. per ounce or \$19.43 per ounce:

	ozs.	dwts.	grs.
Quarterly March 31 .....	192,438	11	15
" June 30 .....	154,377	15	10
" Sept. 30 .....	176,169	2	21
" Dec. 31 .....	181,582	16	6

Total weight ..... 735,218 0 4  
Value..... \$14,285,285

For the last quarter we append the table compiled from the estimates of ten mining registrars by districts:

Districts.	Alluvial.			Quartz.			Totals.		
	ozs.	dwts.	grs.	ozs.	dwts.	grs.	ozs.	dwts.	grs.
Ballarat.....	31,599	13	18	22,711	11	21	57,242	5	15
Beechworth ..	8,412	15	1	5,800	3	12	13,722	18	13
Sandhurst ..	1,372	12	13	47,762	13	21	48,975	6	16
Maryborough..	13,898	4	15	4,759	16	21	18,628	1	12
Castlemaine..	5,775	3	21	12,821	14	29	19,566	18	17
Ararat.....	4,994	14	29	2,040	17	14	7,035	12	10
Gipps Land...	2,654	17	4	14,266	15	21	16,421	13	1
Grand totals..	71989	1	20	169,593	14	10	181,582	16	6

The following table shows the product of the same fields during the last ten years for the quarter ending December 31st, of each year:

Year.	Yield.			Year.	Yield.		
	ozs.	dwts.	grs.		ozs.	dwts.	grs.
1876.....	228,640	5	1	1881.....	225,071	14	19
1877.....	218,150	3	14	1882.....	229,304	1	17
1878.....	236,088	0	8	1883.....	199,931	17	13
1879.....	209,411	7	8	1884.....	200,759	16	13
1880.....	228,628	8	20	1885.....	181,582	16	6

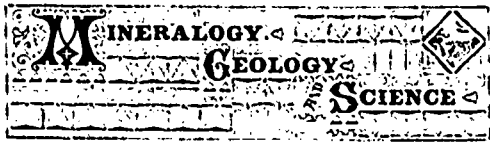
Thus, it is to be seen that there has been a decrease in the same quarter from that of 1880 of 47,045 ounces. The dividends paid by incorporated companies aggregated about \$2,885,000. This was exclusive of a considerable amount paid by privately worked enterprises that make no report of dividends.—P. & M. Record.

A Productive Australian Gold Mine.

The Long Tunnell Gold Mining Company, of Gipps Land, Colony of Victoria, was first registered in 1863. In 1867, the present general manager, Mr. Ramsey Thompson, was appointed the engineer and superintendent of the enterprise. Underground workings by tunnel, with shafts therefrom and various levels at different depths, are very extensive, while a costly plant, of the most improved character, has been provided, including pumping machinery. The first dividend was paid in 1865 of \$5 per share on 2,400 shares. Ever since December 1869 or for seventeen years, this quartz has averaged 1 oz. 11 dwts. 17.24 grs. per ton, and at this time there is enough of similar quartz exposed to keep a 40-stamp mill running for five years. In these seventeen years the amount of quartz milled has aggregated 289,639 tons 10 cwts. with a yield of 459,767 ozs. 8 dwts of gold of the gross value of \$8,102,000. Out of this the shareholders have received \$4,884,000 or \$2,000 per share. Two items of heavy expense are fuel and mine timber which have to be brought some distance and have involved the construction of fourteen miles of tramway amid precipitous mountains with steel, iron and wood rails.

A 9,000-pound mass of tin ore was recently exhibited at a smelting works in New York. It was taken out of a 29-foot vein in the well-known Etta tin mine in the Black Hills.





All correspondence under this head, and scientific exchanges, must be addressed to the Science Editor, Canadian Mining Review.

THE ROYAL SOCIETY OF CANADA held its annual meeting on the 25th ult. and two following days. The meeting was the most important and interesting yet held by that Association, with regard to both the number and the kind of the papers presented to the various sections. There can be no greater evidence of the usefulness of the Society than the vast amount of work accomplished during the past year under its auspices. Single stars which before shone in solitary splendor in the scientific or literary firmament of Canada now emit a dazzling light when clustered in a constellation, and individual abilities which were not wanting in our young country, now roused to emulation, and encouraged by the facilities afforded for an exchange of ideas, produce a hundredfold to the great benefit of art, science and industry.

THE SCIENTIFIC SECTIONS deserve much more than a passing notice. We intend giving a review of the different papers, which cover a wide field of knowledge. Botany and geology, especially geology, gave valuable contributions. Chemistry and physics, though they received less attention, were not neglected, and it was a rare treat for the student of mathematics to witness the ease with which important questions in the higher branches of that science were treated. Canada, and our province in particular, may feel proud of its professors, and it has been said with truth that Ontario is equal to any other province or state in the attention devoted to mathematics in its colleges and schools.

It is SURPRISING, however, to see how little interest is manifested in the work of the Royal Society. Though the press of the city has displayed a most commendable zeal in calling public attention to the important business transacted at the meetings, the members of the Society were practically alone to profit by the information given in the various papers. Many reasons might be given to explain, though not to excuse that indifference of the intelligent public of Ottawa. One will be sufficient. The meetings are held in the Parliament buildings at a time when, the House being in session, a vast amount of noise and bustle must necessarily drown the tranquil echo of scientific discussion. Besides, the rooms in which the meetings are held are not those to which the public usually have access, and the sections are so frequently forced to flit from one room to another as to discourage any but the true lover of science and literature. It is, therefore, much to be hoped that the Society may find in some of our large institutions suitable halls easy of access to the public, and where better accommodation can be had for the discussion of scientific and literary topics.

A MOST HAPPY CHOICE has been made in the person of the very Rev. T. E. Hamel, the new President of the Royal Society of Canada. This gentleman, one of the most distinguished members of the Roman Catholic clergy of Canada, has been for many years Rector of Laval University. He is not only remarkable for his lofty scientific attainments, but is also one of these liberal-minded men whose unselfishness, affability and modest ignorance of personal merit will have the natural effect of removing pre-

judices, and bringing the various sections of the community to work harmoniously together for the common good.

**ARTESIAN WELLS.**—The fifth annual report of the U.S. Geological Survey contains a lengthy paper on the geological and other conditions necessary to success in boring artesian wells. Some facts not very generally known are mentioned in connection with the subject. Crystalline rocks, although frequently containing fissures and channels near the surface, are not to be depended upon as water bearing beds; for these crevices generally disappear at greater depths, and the strata become impervious. Water sometimes makes its way through the fissures of limestone; but, as in granite, these fissures become smaller in proportion to the depth of the rock, until at length they are entirely closed. However, quite a number of important artesian wells spring from a limestone bed. The most porous, and therefore the best water-bearing beds are formed by the sandstones. The best confining beds is a thick layer of fine, unhardened clay. The lower confining bed does not require to be as completely impervious as the upper one, for the leakage will be caught by other layers farther beneath. But the upper confining stratum must be absolutely impermeable, or the great upward pressure will cause the water to escape. Water itself is capable of acting as a confining bed in many cases. If some of the common underground water, in which ordinary wells have their source, lies between the artesian well and its source, at an elevation equal to that of the fountain which feeds the water bed, no leakage can be caused by the upward pressure, even though the upper confining stratum be permeable. If the underground water is higher than this fountainhead, it will penetrate the water-bearing bed, and cause a stronger flow through the artesian well. But if the underground water be situated lower than the fountain, leakage will occur if the upper confining bed be not impermeable. From the use here made of the term fountain, many have been led into the mistake of thinking that the water-beds, from which spring artesian wells, are fed by surface lakes or subterranean reservoirs. The former theory is untenable since the bottoms of surface lakes are impermeable. If this were not the case how could lakes retain their water? Neither are underground pools the feeders of water-beds. When we speak of the fountain head of a water-bed, we mean simply the water absorbed by the highest portion of the bed at or near the surface which is constantly flowing downwards and as constantly receiving a fresh supply from above. D. V. P.

**CAVERNS.**—It is already eight years since the famous underground caves at Luray, in central Virginia, were discovered, and yet information regarding them is not very widely spread. They are hollowed out of Lower Silurian limestone of the Tertiary period, or perhaps an earlier date. At first there was probably but a small fissure in the rock, through which flowed water containing carbonic acid in solution. This stream gradually wore away the limestone in various directions being aided in the erosion perhaps, by sand which it carried in its waters. Naturally, as the supports were hewn away from the bottom, large masses would fall from the top, giving the incipient cavern a lofty altitude. After the water had done its work, it seems to have been turned into another channel by some geological change. Now the period of ornamentation began. The surface water percolating through the limestone, and becoming charged with carbonate of lime

dropped to the floor or evaporated on the roof, forming beautiful stalagmites and stalactites, which being constantly increased by new formations sometimes extended to meet one another, and form whole sheets of carbonate, resembling the most delicate drapery. After this it appears that the cavern became again a drainage channel, this time for the corrosive mud of the glacial period. This mud stained the sides of the cave and its newly formed stalagmitic columns. Its corrosive action is visible in the various forms into which it carved and twisted these columns. At the end of the glacial period the channel was once more free, and new calcite pillars and draperies were formed. When the cavern was discovered in 1878, the skeleton of a human being was found in a secluded part of it. But the hopes of our progressive (?) geologists were not yet to be fulfilled by the discovery of a secondary or tertiary man, for the tufa in which the remains were found was evidently of recent origin. The largest of the halls in the cave of Luray is called the Cathedral. It contains a massive block of stone, resembling in shape an organ. Attached to this are eleven parallel blades of stalactite, each of which when struck gives a different note, so that tunes can be played on them. The Cascade, the Angel's Wing, and the hollow column, the interior of which may be ascended to a height of sixty feet, are among the objects of interest to visitors. The fauna of the Luray caves is not very numerous, the principal specimens being some spiders and a myriapod. The writer in the *S. M. Quarterly*, to whom we are indebted for all the above mentioned facts in this connection, says that no other cavern in the world is so completely decorated with stalagmitic formations. —D. V. P.

### SCIENTIFIC NOTES.

**WATER.**—The best means of purifying water suspected of containing those micro-organisms, which produce so many epidemic diseases, is to filter it through vegetable carbon of lime.

**GEMS.**—In view of the approaching sale of the crown jewels, by the republic of France, it is interesting to note that two of these are of American origin, a very beautiful amethyst and a sapphire, both of which were found in New Carolina.

**THE DAWSON PRIZE**, offered by Dr. G. M. Dawson, F.R.S.C., acting Director of the Geological Survey, to the Mineralogical Society of the College of Ottawa, for the best essay presented to the society by a student of the Institution, has been awarded to Mr. Walter A. Herckenrath, of Mamaroneck, N.Y. The successful essay was a thesis to establish the "Absence of man during the Tertiary age."

**OZONE.**—Sick rooms and hospitals, theatres and other places of public resort, can now be easily ventilated by the ozone machine, which is operated by electricity. The purifying qualities of this gas are thus practically applied where they are much needed. Large bleacheries are also beginning to make use of the well known but hitherto unused bleaching qualities of ozone.

**SULPHUR.**—Prof. Bloxam, the distinguished chemist, has called attention to a fact not generally mentioned in text-books, viz., the crystallization of sulphur from a solution in hot alcohol. This is important, when we consider that in practical organic chemistry alcohol is frequently passed through rubber corks. If a

rubber cork be boiled for fifteen minutes with alcohol, the solution, when cooled, will deposit white, transparent, prismatic crystals of sulphur.

**GAS.**—Dr. Auer, of Paris, has made an addition to the Bunsen's burner, so familiar to every laboratory student, in the shape of a small conical cylinder, made of cotton or woollen fabric, previously saturated with nitrate or acetate of lanthanum and zirconium, or yttrium and zirconium. When the gas flame passes into this cylinder it develops considerable heat, and soon becomes incandescent, giving forth a steady and brilliant white light. This new invention is likely to revolutionize the gas industry.

**TARIFF.**—All who are interested in the progress of practical science in our Canadian schools and colleges must commend the wisdom of the Dominion Government, in replacing scientific apparatus on the list of articles admitted free of duty. This change, it is believed, is largely due to the representations made by the various educational institutions, who proved that it would be a great hindrance to the prosecution of scientific studies, if they were obliged to pay a high duty on instruments, many of which can be manufactured only in one or two cities of Europe.

**CYANOGEN.**—Prof. Dixon, M.A., in a paper read before the Chemical Society of London, compares the results of experiments in the combustion by electricity of cyanogen and oxygen with those obtained from the combustion of carbonic oxide and oxygen. As the presence of aqueous vapour in the latter case increases the force of the explosion, he was led to think that his failure in previous experiments with the former was owing to the absence of moisture. He afterwards discovered that it was the insufficient temperature of the electric spark passed through the cyanogen and oxygen, that prevented the combustion, and that moisture, instead of increasing the explosive force in this case, diminished it. The reaction of carbonic oxide with oxygen, when a platinum wire is heated to redness in a mixture of the gases, is entirely similar to that produced by cyanogen with oxygen under the same circumstances. In one the cyanogen, and in the other the carbonic oxide combines with the oxygen without visible flame. In the case of cyanogen, however, the characteristic orange vapour is generated in the tube.

**METEORITE.**—Mr. Orville A. Derby, who was recently charged with the duty of examining the famous Santa Catharina meteorite, preserved in the Brazilian National Museum at Rio Janeiro, has given to the world through one of the scientific periodicals, some account of his labours, in advance of the memoir about to be published. On the surface of this meteorite, when discovered, there was a strong crust, which M. Daubree, a French mineralogist, who studied the meteorite, thought to be of terrestrial origin. He called it limonite, and supposed that it had been produced by the oxidation of the iron after its fall, and the adhesion of fragments of the granite among which it was found. Mr. Derby claims that this crust, instead of being earthy is an essential part of the meteorite, and a confirmatory evidence of its origin. The crust consists of two parts, the one granitoid, the other porphyritic. The former is composed essentially of olivine, in glassy, crystalline fragments, and of small grains of plagioclase feldspar, with veinlets of black limonite running through the whole. Under a microscope the granitoid resembles porphyry. No grains of metallic iron have been detected in this part of the crust, but its slightly magnetic

quality causes suspicion of their presence. The porphyritic portion of the crust resembles the masses of limonite found in decomposed granite. It consists of grains of olivine mingled with rare fragments of plagioclase. It differs from the granitic form by the feldspar's being clearer and more transparent. Whatever opacity does exist is owing to the vitrification of the margins of the grain, and not to decomposition. To ascertain whether, as he thought, the porphyritic rock was produced by the partial fusion of the granitoid, Mr. Derby performed a synthetic experiment. Taking quartz to represent the infusible, and labradorite the fusible material, he fused together unpowdered fragments of these minerals with iron filings, and some magnetic pyrites. The product of the incomplete fusion resembled very much the meteoric crust, the principal differences being that the glass was clearer, and the grains of feldspar not vitrified, more opaque. It is proved, therefore, that the Santa Catharina meteorite is a mixture of metallic and silicious elements, the stony part being a new type consisting of olivine and plagioclase. The partial vitrification of the stony portion is a sure proof of the meteoric origin. The presence of silicates forming a crust of low conducting power around the iron, accounts for its low magnetism. It was this that led Becquerel to think that the iron had crystallized at red heat, a fact at variance with the well known properties of meteorites.

BOOK NOTICES

**ELEMENT OF THE THEORY OF THE NEWTONIAN POTENTIAL FUNCTION**, by B. O. Peirce, Ph. D., Assistant Prof. of Mathematics and Physics, in Harvard University; 154 pages, large 12mo. Boston—Ginn & Co.

The preface states that the book is intended for "Readers somewhat familiar with the principles of the differential and integral calculus, but unacquainted with many of the methods commonly used in applying mathematics to the study of physical problems." In this respect the book supplies a long-felt want, and gives to those wishing to make a thorough study of physics, especially of those branches in which higher mathematics are used, the most necessary and practical applications of mathematics to physics. In this book of 154 pages are gathered together methods that the student would have to seek out by tiresome search in many different volumes. Numerous exercises are given which will enable the student to retain firmly the methods studied. The book is printed with the taste and neatness characteristic of the textbooks of Ginn & Co.

**ELEMENTARY CO-ORDINATE GEOMETRY, FOR COLLEGIATE USE AND PRIVATE STUDY**, by William Benjamin Smith, Ph. D., Professor of Physics, Missouri State University. Svo., 280 p. Boston—Ginn & Co., 1886.

The student, who, attracted by the title of this book, would attempt to master it, with the ordinary amount of knowledge derived from an elementary course of algebra, geometry and trigonometry, would surely be disappointed. The motto, "maximum reasoning, minimum reckoning," chosen for this work, is not the password of the average student of schools and colleges. But to him who is already familiar with mathematical reasoning, for whom ordinary algebra at least has no mysteries, and who is

able to devote a few hours each week with or without the assistance of a teacher, to the study of analytical geometry, the present work will prove a most efficient guide. Mathematical precision, enhanced by the use of abbreviations, and perhaps even a little exaggerated by the introduction of new terms destined to replace long expressions is the characteristic feature of the work. Another feature is the beautiful selection and gradation of exercises which will prove a real treasure to the private student as well as to the teacher. Despite its title the work treats of many questions which are absent from the text-books now in use; and every question treated, thanks to the vigorous style of reasoning, and the elimination of details, receives a most complete elucidation. We commend this work to all those who understand the necessity of mathematical reasoning for the training of the mind.

MINING NOTES.

NOVA SCOTIA.

Twelve tons of quartz from the Kemptville Mine were put through the mill the last week in May and yielded 21 ounces of gold.

It is stated that a company has been formed to test a lead of gold-bearing quartz which has been discovered in the vicinity of Bear River, Digby County.

A seam of coal which has been recently discovered near the head of the West River is said to be larger than any of the numerous seams known to exist in the Pictou coal fields.

A New Brunswick company has purchased a manganese mine on the East Mountain, Colchester County. Some development work was done last summer on this property which is situated within a few miles of the Pictou branch of the Intercolonial Railway.

The Salmon River gold mine gives constant employment to forty men and the monthly expenditure by the company is \$2,000. Eight batteries, with five stamps each, are now in operation, and the head of water at the mine is sufficient to run a mill of double that capacity. Two pumps, also worked by water power, are in operation night and day and keep the mine quite dry.

The air is thick with rumors of important sales of gold mining property and an immediate and extensive resumption of operations on "The Nova Scotia Central Railway." A glimpse of a \$50,000 bond and the fact that Herr Fink has proceeded to the United States to purchase a crusher, go to fix some of the reports in the land of facts and indicate a busy season.—*Bridgewater Times*.

Letters Patent of Incorporation have been granted to Joseph Robbins Kinney, J. R. Wymán, R. S. Eakins, A. W. Eakins and G. W. Johnson, all of Yarmouth, under the name of the "Kempt Gold Mining Company (limited)." The capital stock is \$30,000, divided into 100,000 shares of 30 cents each, and the company's chief place of business, Yarmouth. The company is now working the *Reeves Mine*

and has already crushed 80 tons of quartz which yielded 114 ounces of gold.

#### QUEBEC.

We have received a handsome specimen of green phosphate taken from a large body of ore at the bottom of the main shaft of the *North Star* mine in Portland East. The shaft is down 300 feet and is the deepest in the phosphate district. The ore at this depth is of very high grade and peculiarly free from impurities.

Professor Chapman, of Toronto, has recently inspected the St. Onge gold mine in Beauce and has been very favourably impressed. Of it he says: "The permanent presence of gold in the mine is fully established, and every cleaning up shows no inconsiderable amount of it." Professor Chapman is of the opinion that the drifts are at present in what must necessarily be the poorest part of the mine, and that consequently, when less broken ground is reached, a large increase in gold may be legitimately expected.

The tramway, recently constructed at the *High Rock* phosphate mine in Portland West, has been in running order for some time, and is proving a valuable addition to the company's improvements. Eighty tons of phosphate are now shipped daily over the tramway from the mine to the river bank. The largest boiler in the phosphate district is now being delivered at *High Rock*. It has a capacity of eighty-five horse-power, and measures 13 ft. 6 in. long by 5 ft. 6 in. in diameter. It was made by W. J. Campbell & Co., of Ottawa, and will be used to run an air compressor and eight drills.

#### ONTARIO.

The town of Wingham now boasts of having the best salt well in the province. It was struck at a depth of 1,160 feet. The Canadian Pacific Railway Company have agreed to extend its line to Wingham on the condition that salt-works will be established in connection with the wells.

Work was resumed last winter in the old shaft at the Michipicoten Native Copper Company's mine. It is now down 450 feet, and a cross-cut is shortly to be started. A recent discovery of native copper, associated with native silver in a two feet vein, has excited new interest in the property.

The Perth district is again coming to the front as a phosphate mining section. The operations of the Anglo Canadian Phosphate Company and Messrs. Wilson & Green, of Montreal, have stimulated the industry in this locality, and prospectors are again busily at work. Some recent developments are of a very important character.

A valuable gold mining location has been taken up at Lake Opinawa, to the north of Thunder Bay. The formation is granite with a belt of talcose slate running through it in an easterly direction. This talcose slate belt is 20 to 60 feet wide, interlaminated with auriferous quartz. One of the quartz leads is 16 feet wide and increases in width as it juts into the lake. A quantity of the quartz, representing a fair average from this lead, has been assayed and found to contain 2.012 ounces of gold per ton. Other smaller leads on the location are rich in free gold.

#### BRITISH COLUMBIA.

Some of the claims on Granite creek yielded \$200 per day before work had to be suspended on account of the freshet.

Another gold-bearing creek has been discovered ten miles from Allison's emptying into the Semilkameen, and is reported by prospectors as showing good colours.

The Kootenay Mining and Smelting company have purchased a seven-eighths interest in Rainee's and Williams' claim on Lake Pend d'Oreille, and will put up a smelter immediately.

Quite a large number of Chinamen have proceeded to the Nanaimo Lakes via Harewood. The Mongolians have struck some bench diggings in the vicinity of the headwaters of the Nanaimo river.

Collin's creek, between Granite city and Otter Flat, shows good prospects and some coarse gold has been secured which is brighter in appearance than that on Granite creek. Those who have claims on the creek are more than pleased with the prospects.

Reports from Alberni state that fifteen Chinamen have been mining on China creek since last fall. Their force has been increasing every week and will soon number 100 miners, which is strong evidence that gold is being found on the creek in paying quantity.

Great confidence is expressed by some in the result of this season's work in the gold diggings at Granite Creek. At present the camp consists of about 800 whites and 600 Chinamen, and it is said that nearly all who intend leaving before the end of the season have already gone.

Advices from Granite city report a few companies at work on the south fork, about three and a-half miles above the city, where, it is expected, paying claims will be found. Portions of the creek at this point have been wing-lanmed for the purpose of testing the gravel on bed-rock.

The freshet in the Semilkameen district has been very strong this season and will not allow full scope for work until the beginning of July. More miners are leaving the district than going to it, which is more from a knowledge that the season will be late than from being aware as to how the field will "pan out."

The New Brunswick Mining Company, one of the wealthiest organizations on the Tulameen, has begun operations on a 2,000 ft. claim. Large results are anticipated as the ground has prospected well. The Californian Company, also owner of a large extent of ground on the Tulameen, has resumed operations.

The lode of the "Queen" quartz mine at Yale has increased in width from 5 feet to 8 feet and gives indications of being a true fissure vein. The gangue is composed of decomposed quartz and porphyry with galena, iron pyrites, magnesia and blende well disseminated through it. If the "Queen" develops well, and there is every prospect of its doing so, Yale will become an active mining centre.

The mining interests on Lake Kootenay are promising. Four or five galena mines have been worked all winter and a large quantity of

ore taken out awaits transportation. The construction of the Kootenay railway is looked forward to and as soon as it becomes a certainty mining in the district will be vigorously pushed. At the town of Rudnaid several houses have sprung up in anticipation of the opening of the Goat river quartz mines.

It is thought that Otter Flat will become the chief mining camp of the Tulameen district. It is one and a half miles from Cedar creek, two from Collin's creek, three from Slaté creek, eight from Bear creek, and fourteen miles from Champion creek. These are all gold-bearing creeks and tributaries of the Tulameen river. Otter Flat is six miles from Granite city and is at the junction of Otter creek with the Tulameen river.

A large number of miners have been attracted during the spring to the gold diggings on the Stewart river, a branch of the Zukon, and upwards of fifty started in April from Juneau. The route taken was from Juneau to Chilcat, 75 miles, thence across the mountains, 35 miles, to a chain of lakes emptying into the Telly river. From this point they proceeded in boats to the Zukon river, a distance of 350 miles, and thence down that river to the Stewart river, the scene of the gold excitement.

#### UNITED STATES.

The Montana Copper Company, of Butte, Montana, a large producer last year, is now raising comparatively little ore.

The Lake Superior copper product for the first quarter of this year exceeds that reported for the same quarter of 1885 by 2,113 tons, of which the Calumet and Hecla furnished about 1,000 tons.

The Plymouth Consolidated Gold Mining Company produced \$155,192.39 in gold during January, February and March of this year, and paid three monthly dividends, aggregating \$75,000. The ore from the mine, situated in Amador county, California, yields an average of \$11 per ton, chiefly in the form of free gold. All the ore goes directly to the stamp-mills, of which there are two. The older and larger mill contains sixteen batteries of five stamps each, with one Frue Vanner to each battery. The new mill has eight batteries of five stamps and two Frues to each battery. The large mill is driven by Keffel turbine-wheels, with a pressure of eighty feet, and a consumption of 600 miners' inches of water. The smaller mill is driven by "hurdy-gurdy" wheels, with a pressure of about 550 feet and a consumption of 150 inches of water.

#### South American Mining Notes.

The *Amigo del Paris* says that gold mining has received so great an impulse in Atacama that there is no doubt this branch of mining will become the industry of the province. Large capital is required for the prosecution of this enterprise, and our miners are beginning to comprehend the truth. With capital, continues the paper in question, Atacama may become a second California for abundance of gold.

The *Constituyente* furnishes the following interesting statistics respecting the production of silver and gold in the Copiapo mineral districts in January: There were sent down to Caldera for shipment from Copiapo 2,032,991 grams of

silver, and from Pabellon 568,064 grams. The receipts in Copiapo of bar silver were 3,730 grams from San Antonio; 935,940 do. from Juan Godi; and 585,710 do. from Puquois. The receipts of gold were 14,242 grams in Caldera, and 2,410 grams in Copiapo. The totals are 7,126,431 grams of silver and 16,952 grams of gold.

The Veterana mine of the Quintana district is paying another dividend of \$100 per share. The steamer which sailed from Coquimbo on the 4th instant, shipped for Valparaiso 168 kilograms, 16 grams of bar silver, the production of this famous mine.

The net receipts of the Huanchaca mines in February amounted to one million dollars, Bolivian currency. Typhus and yellow fever are reported to be prevalent in the Huanchaca district.—*F. & M. Record.*

### First Silver in Colorado.

The first discovery of silver in Colorado was accidentally made in Summit county, something in this way:

Some guleh miners from Blue river, hunting for deer in 1861, ran out of bullets, and happening upon what they took to be a lead vein, manufactured some from the outcropping. A year or two later, happening to be in Nevada, they were strongly impressed with the resemblance between the silver-bearing galena ores of that State and the material in the mountains of Colorado, from which they had once manufactured bullets. They wrote to an old friend at Empire, advising him to go over and locate the once despised lead vein. He finally did so and named the vein *Coalay*. He, however, never made a fortune from his venture, his mine being too far away from the ore markets, and also over the range from them. But the incident led to the recognition of the silver ores of Clear Creek county and resulted ultimately in the developments that have built up so many towns and cities, and added so much to the wealth of Colorado.—*Leadville Herald-Democrat.*

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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 twenty 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 Mines.

Any person having discovered a mineral deposit may obtain a mining location therefor, in the manner set forth in the Regulations which provide 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 Lands 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 operation 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 labour 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 same.

Not 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 100 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 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 of 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, &c., &c.

#### THE SCHEDULE OF MINING REGULATIONS

Contain 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 1881, of the Mining Regulation 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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Sixteen inch diameter of cylinder, twenty-two inch stroke, with governor, twenty valves and starting bar; 69 cut. fly-wheel, 9 ft. pulleys, pump, etc., etc.

ALL IN GOOD RUNNING ORDER.

Hall Mfg. Co., Ottawa, Ont., Makers.

ALSO

TWO THIRTY-HORSE POWER BOILERS.

With safety valves, check valves, pipe fittings 50 feet of smoke stack, etc., etc., only in use six months.

For particulars and price, address  
CANADIAN MINING REVIEW  
Ottawa, Ont.



## 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 75¢ per ton, and which contain 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 said 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 a sample of the same shall have been transmitted to the Minister of Inland Revenue, and the provisions of this 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 intitled "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. MALL,

Commissioner.



## AUCTION.

### Phosphate Lands.

NOTICE IS HEREBY GIVEN THAT about 14,500 acres of Public Lands, situated in the Phosphate region, in the County of Ottawa, Province of Quebec, will be offered for sale by Public Auction, at the

CITY HALL, IN THE CITY OF HULL, P.Q.

—ON—

Tuesday, the 22nd day of  
the month of June, '86

Lists containing numbers of lots to be sold, may be had on application to the Department of Crown Lands, Quebec, or to the Crown Land Agents at Hull and Thurso, P.Q. or Crown Timber Agents, Montreal and Ottawa.

W. W. LYNCH,

Commissioner.

Department of Crown Lands,  
Quebec, 20th May, 1886.

## FOR SALE,

White Marble Quarry on Calumet  
Island.

At this quarry there is an inexhaustible supply of most beautiful white marble. Samples to be seen and information obtained at the office of the MINING REVIEW.

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A Competent Expert is permanently engaged for the purpose of making Unprejudiced Reports on all Mines placed in our hands for Sale, such reports being at all times open to intending purchasers for examination.

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Gold and Silver Mines, and Marble and Sand-  
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