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MINING REVIEW

VOL. 4.—No. 4.

1886—OTTAWA, APRIL—MAY—1886

VOL. 4.—No. 4

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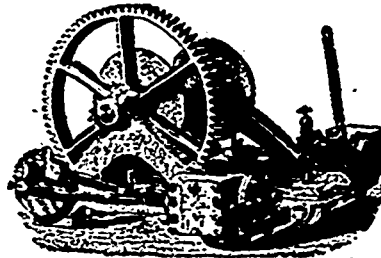
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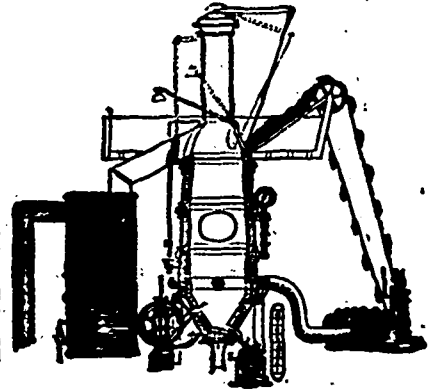
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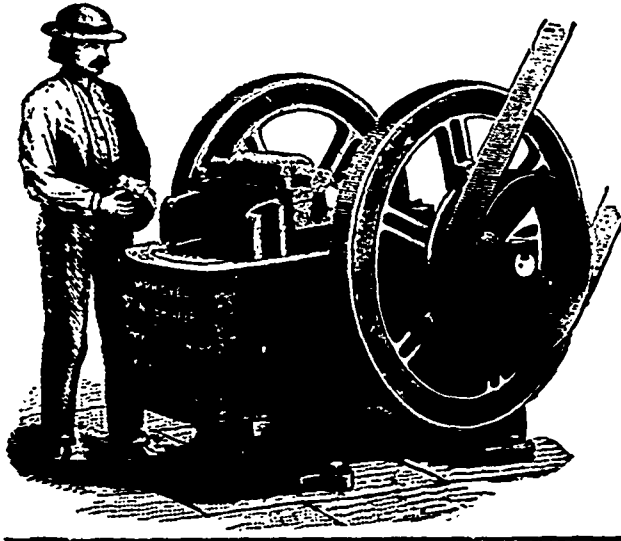
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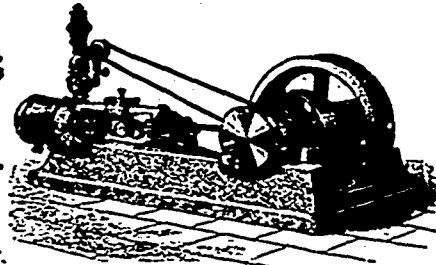
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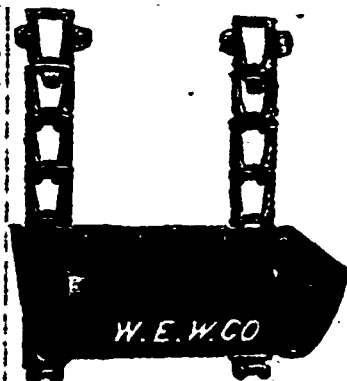
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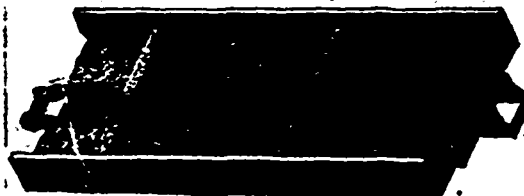
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The CANADIAN MINING REVIEW is devoted to the opening up of the mineral wealth of the Dominion, and its publishers will be thankful for any encouragement they may receive at the hands of those who are interested in its speedy development.

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.

We understand a start has been made towards preparing a statistical report of Canadian mines, and while we welcome this information we would express the hope that this very important work will be proceeded with without interruption.

It now looks as though the collection and publication of mining statistics will receive some attention from the Geological Survey, but we fear the staff which has been told off for this special work, with the meagre assistance at its command for collecting and compiling statistics, is quite inadequate to do justice to this important work. The ability of Messrs. Coste and Ingall, the two Mining Geologists of the Survey, to whom this special work has been assigned, is not brought into question, but it is unreasonable to expect that these two gentlemen, in addition to performing their professional duties in the field, as heretofore, can organize and conduct the mining and mineralogical branch of the Survey, and collect and compile statistics in connection therewith in a manner that will do themselves justice or satisfy the mining public. If the information that this work is to supply is to be of any value it must be full and complete. That it may be so, it will be necessary to thoroughly organize a special branch of the Survey with an efficient and adequate staff under a competent and distinct head. Proper organization will produce valuable results, and it will be money well spent if a certain sum be set aside annually for the support of a useful mining and mineralogical department. It has been argued by the Director that the present appropriation for the Geological Survey is not more than sufficient to carry

on strictly scientific work and research. If this be so it would not be unreasonable to expect the Minister of the Interior to ask Parliament for a special appropriation to defray the expense of conducting a mining and mineralogical department in the interest of the mining public.

We have refrained from commenting on the Morrison tariff bill for the reason that it must be clear to every one interested in the production of coal and iron ore in Canada that they would be benefited by reciprocity between the United States and this country in these two articles. We would of course be much pleased to hear that Mr. Morrison had succeeded in carrying his bill as originally presented to Congress, but we have felt at the same time that nothing we could say would convince those who have so strenuously opposed the bill that they would derive substantial benefit by removing the duty from foreign iron ore, and that we advocated its removal with a purely unselfish and disinterested motive. We prefer that our cause should be taken up by Mr. Morrison, Mr. Shriver, Secretary of the New York Metal Exchange, backed by Mr. Herbert W. Griffiths, Editor of the London (Eng.) *Iron Trade Exchange*, and other able champions of free trade; but, so far, these gentlemen have not been able to befriend us against such a powerful combination as the representatives of the iron ore industries of the Lake Superior region, supported by Mr. James M. Swank, of the *Bulletin of the American Iron and Steel Association*, Mr. Wilson Day, of the *Iron Trade Review* (Cleveland, O.) and other red-hot protectionists.

If it has been proved conclusively that the manufacture of iron cannot be profitably carried on in the provinces of Ontario and Quebec, and if the vast ore deposits of these two provinces are ever to become remunerative to their owners, something must be done towards developing them. There is a market in the United States for all the ore we can produce suitable for steel making, and at a price that should return a fair margin of profit to the miner. The present duty on iron ore imposed by the United States is not a prohibitory one for the higher grade ores, and by a reasonable expenditure in improving the handling and shipping facilities, the cost of transportation could be so reduced that the reduction from present freight rates would be sufficient to cover the duty. It is childish to sit and gaze at our extensive ore deposits and wait for reciprocity or removal of the duties from iron ore by the United States.

We are not disposed to admit that iron cannot be manufactured to great advantage in central Canada. The ore is, for the most part, such as few countries can boast of, and the deposits are surrounded by dense forests of wood suitable for charcoal; and limestone beds are close at hand. In the western and eastern provinces, British Columbia and Nova Scotia, the iron ore deposits and coal seams lie almost alongside each

other, yet, where in these provinces is iron profitably manufactured? The cause for this should be searched for until discovered and then overcome. Proper encouragement should be given to those who are disposed to work out the problem and are prepared to demonstrate that iron can be profitably manufactured in Canada, and such encouragement must come from the Government in the form of a bounty on pig and bar iron, and steel, for a term of years which will be equivalent to what would be considered a reasonable duty on the same, and when it had been conclusively demonstrated that Canada is capable of supplying her market with these articles of home manufacture, then let the bounty be withdrawn and a protective duty be imposed. In his budget speech this session the Finance Minister read to the House a list of articles, which, being raw material, as he described them, would be admitted free of duty. Pig iron appears on this list, and while we object to it being classed as raw material, we would not advocate a duty being levied on imported pig until such time as we are sure of a fair portion of our requirements being supplied by home manufacturers.

THE PHOSPHATE TRADE.

The annually increasing importance of this industry in Canada is very marked. Canadian phosphate has gained high favour amongst British manufacturers of superphosphate, and if the high standard of last year's shipments is maintained the demand for it will continue to rapidly increase. These assertions are emphatically endorsed by Mr. John Dyke, the Liverpool agent of the Department of Agriculture, who, in his annual report to the Minister of Agriculture, dated Liverpool, 31st December, 1885, says: "I have had a large number of enquiries from British and continental manufacturers in reference to Canadian phosphate, for which there is an annually increasing demand. Phosphate being a new but important interest in Canada, and destined to become one of the leading industries of the Dominion, I have obtained some special information on the subject from one of the leading merchants of England, and indeed of Europe, in this particular mineral. The shipments of phosphate during the past year from Canadian mines have been of an improved quality. The grade in percentage has been well maintained, even above the average, due chiefly to the greater care taken in dressing and cleaning before the ore has been milled. Previous to last year (1884) the percentage of the ore ran about 80 per cent. to 82 per cent., while some parcels received this year (1885) have come up to 85 or 86 per cent. of tribasic phosphate of lime. There is no reason why the regular output of Canadian phosphate, or, at any rate, a larger proportion of it, should not run to 85 per cent. It might be shipped continuously as pure as that, if proper care were taken in dressing and in separating it from foreign matter. The Canadian phosphate has, during the past few years, been in great favor amongst

manufacturers, and if producers can continue, and it is thought they can, to maintain the grade shipped during the past season, there is no reason why it should not take the lead of favour for prime phosphate. Although the volume of business done during the past year has been on the increase, and above the average, prices have receded, and closed 2d. per degree lower than they began the year, the ruling rate at the close of the season being 1s. for 75 per cent., with one-fifth of a penny rise. This price ruled for the last three months of the year, and it may be anticipated that if any change does take place it must be an advance.

With regard to ocean freights, the average for phosphate shipments from Montreal to London over the past season (1885) was 5s. 6d., having varied from 3s. to 7s. per ton. To Hamburg 12s. 6d. was the ruling rate."

Up to within a very recent date no definite action had been taken in Canada for the manufacture of superphosphate. Steps, however, have now been taken which may lead to the establishment of that industry. At the Basin du Lièvre, a point convenient to the mines, a mill has been erected, and is now in running order, for crushing, grinding and pulverizing the raw phosphate rock. A bolting apparatus is affixed to the machinery by which the pulverized material is reduced to an impalpable powder. This mill has a capacity equal to the production of forty tons per day, of ten hours, and to it there are blowers attached by use of which extraneous matter is separated. It is to be hoped that before long agriculturists in Canada will see the necessity of retaining in our own country a portion of the product of the mines, so valuable for renewing lands worn out by perpetual cropping.

THE MINES.

The mine which has attracted the most attention in the district during the past year is owned by the Dominion Phosphate company, and known as the "North Star." The Dominion company were the first to engage in deep mining in the phosphate deposits of Canada, and were actuated in doing so by a desire to prove a theory advanced by eminent scientists, including Prof. Wm. Boyd Hawkins, of Manchester, England, one of the leading geologists of the day, who, in 1884, visited the phosphate mines and did not hesitate to publish his opinion that at none of the mines visited by him had a sufficient depth been reached at which it should be expected that the main body of the deposits would be met with. His theory was that the larger bodies of ore would be found at depths varying from 300 to 1,000 feet below the surface. This theory has been practically proved correct. At the "North Star" mine the main shaft, from which upwards of 5,000 tons have been raised, has reached a depth of 300 feet, at which level it is penetrating a body of ore much larger than anything ever before met with in the district, and having the appearance of the main body of the deposit.

The "Union," "High Rock," "Emerald" and "Little Rapids," as well as the "North Star," mines, are producing high grade ore in large quantity and have already upwards of 14,000 tons awaiting shipment. This, together with the output of the McLaren & Blackburn mine in Templeton, and the

less important mines of the phosphate district makes a total of about 17,000 tons which has been mined since the close of navigation last year and is now ready for shipping. As we have already stated, more attention than formerly is being given to deep mining, and those who have so directed their operations have been much encouraged.

TRANSPORTATION OF ORE.

Among the important improvements which have recently been made for the more economical and expeditious transportation of ore, may be mentioned the completion of a tramway by the Phosphate of Lime company from their "High Rock" mine to the bank of the du Lièvre River. The company will begin to forward ore over the tramway early in May and will be enabled to deliver their entire output at point of shipment without interruption and at a much reduced cost. Five new ore scows have been launched since the ice left the du Lièvre river, and Messrs. Lomer, Rohr & Co., have put on another steam tug, the "Kate," which is the best boat now on the river. There are now a sufficient number of ore vessels to supply transport accommodation that will insure the delivery of the entire output of the mines at the railway terminus during the summer months.

Transportation of ore has not yet begun on the river on account of the unusual force of the spring freshet, and ore will not begin to move until the water has sufficiently receded, which is not likely to be the case before about the 10th of May.

GRINDING PHOSPHATE ROCK.

This is the first year that this branch of our phosphate industry has been engaged in. The Portland Phosphate Mining and Milling Company's mill at the Basin du Lièvre is now working and turning out about forty tons a day of ground phosphate. About 4,000 tons of the product of the mill have been contracted for by manufacturers of fertilizers in Chicago, Buffalo and Cleveland; the two former taking low grade and the latter the higher grade phosphate. It is not unlikely that the principal market for Canadian ground phosphate will be in the United States and that for sometime to come the lower grades will be most in demand, until manufacturers have come to appreciate the value of the high grade fertilizers such as can be produced from the better quality of Canadian phosphate rock.

The Portland M.M. & P. Co. have it in contemplation to erect sulphuric acid Works alongside their mill and to establish a factory for the manufacture of superphosphate in connection therewith. This company's operations will be watched with much interest, and it is to be hoped they will make a success of this new enterprise.

Phosphate Quotations.

It would appear from the most recent quotations received from abroad that Canadian phosphate rules in London and Liverpool at one shilling a unit for 80 per cent. mineral with a fifth of a penny rise, and in Hamburg at one shilling and five-eighths of a penny per unit with a fifth of a penny rise. This is not quite so good a price as was being offered at this date last season, but it will, nevertheless, admit of a very handsome margin of profit. One shilling a unit for 80 per cent., with a fifth of a penny rise, is equivalent to \$17.25 per ton for 80 per cent. and \$18.50 per ton for 85 per cent., delivered on board ship in Montreal, with freight between Montreal and Liverpool and London at the same rate which ruled last year.

Villeneuve Mica Mine.

The British and Canadian Mica and Mining Company are now systematically at work in their Villeneuve mine and are taking out a large amount of excellent mica, but owing to a scarcity of cutters a large quantity has accumulated which awaits being cut into plates and otherwise prepared for market. As this is the first mica mine which has been opened in the district the company have found it difficult to procure additional hands, experienced in cutting, cleaning, sorting and packing, to keep abreast of the output since the force of miners has been increased; and have been obliged to send to North Carolina for this description of skilled labour. Several men of long experience in the North Carolina mica mines have been engaged and are on their way to the Villeneuve mine. There is now a rapidly increasing demand for this mica, and the mine is capable of supplying all the consumers. The drifts and cross-cuts are developing some strong micaceous leads, carrying large and perfectly formed crystals, and it may be said that the mine is now being practically worked. The feldspar, one of the by-products of this mine, is of a very superior quality and commands a market value which is nearly sufficient to pay all the mining expenses. It is very white and quite free from iron, and has been pronounced suitable for the manufacture of porcelain. The British and Canadian Mica and Mining Company are to be congratulated on having acquired so valuable a property and on the satisfactory way it has developed since they became its proprietors and took possession.

MINERAL RESOURCES

OF NOVA SCOTIA.

There are in this province extensive deposits of coal and iron ore, and her gold fields are increasing in importance with each year's development. Copper, manganese, antimony, barytes, gypsum, marble, etc., also occur in abundance, and the deposits have been worked to some extent. These resources are being gradually developed, and offer a promising field to the miner and capitalist.

The Inspector of Mines for Nova Scotia, in his annual report, recently published, gives a summary of the mineral production of the province for the year 1885, compared with that of the previous year, as follows:—

	1884	1885
Gold..... Ounces	16,079	22,203
Iron Ore..... Tons	59,885	48,129
Manganese Ore..... "	302	3533
Copper..... "	110
Lead..... "	100
Barytes..... "	300
Antimony..... "	600	758
Coal raised..... "	1,359,295	1,352,205
Gypsum..... "	111,068	87,644
Building stone..... "	750	3,827
Coke made..... "	40,085	30,185
Limestone..... "	25,567	16,429
Grindstones, etc..... "	2,200	2,208

* Amount exported.

COAL.

Nova Scotia coals belong entirely to the bituminous system of Dana, and may be sub-divided into coking, free burning and cannel coals. It may be remarked that the coals of this country belong to the same geological horizon of the carboniferous system as those of England and the Eastern United States, and present many points of intimate connection in fossil remains and in the associated strata.

The Sydney coal field occupies the eastern shore of Cape Breton County. Its land area is estimated at 200 square miles, and it now forms the rim of an extensive coal field extending under the Atlantic. Experience has proved that nearly all the seams can be followed in their subaqueous extension. Estimates based on the system of enquiry adopted by the Royal Commission on the duration of the coal supply of Great Britain, put the amount of available coal in these submarine areas, after making proper deductions for waste, etc., at not less than 2,000,000,000 tons. The amount of available coal contained in the seams now opened in this district, in the areas leased for the purpose of working them, is estimated at 212,000,000 tons. This estimate does not include the coal in the seams which are unopened in the land areas in operation, nor the value of the seams in the leases which are at present awaiting a favorable opportunity for development, which items would swell the coal supply of this district to figures representing many years' output greatly exceeding any yet obtained.

The following analyses show the general character of the seams of this district:—

COMPOSITION.	NAME OF SEAM.		
	Sidney.	Phalen.	Harbor.
Moisture	1-260	9-21	8-0
Vol. Comb. Matt. Fast Coking	35-514	30-312	29-40
Fixed Carbon	59-111	62-334	65-50
Vol. Comb. Matt. Slow Coking	33-840	28-625	27-85
Fixed Carbon	60-785	64-021	67-05
Ash	4-115	6-433	4-30
Sulphur	1-705	1-105	1-29
Theo. Evaporative power	8-33	8-78	9-19

The Springhill coal field lies north of the Cobequid mountains, in Cumberland County, the northern edge of which has been traced from the Joggins shore of Cumberland basin, about 18 miles, to the Styles mine, but its deflection to the south to join the Springhill coal mines district has not been followed. On the southern or Springhill side of the basin there is a large and important development of coal seams. The productive measures stretch for many miles in a westerly direction to the Cumberland basin at Apple river, but have not yet been prospected. The chief development has been at Springhill by the Cumberland Railway and Coal Company, whose output is now at the rate of 350,000 tons per annum, and is largely used for steam purposes on Canadian railways, steamboats, etc. The coal is also adapted for domestic purposes, and its coke is extensively used at the Londonderry iron works.

The following analyses show the quality of the coal of this district:—

CONTENTS.	North	Main	South
	Seam.	Seam.	Seam.
Moisture	1-625	7-8	1-39
Vol. Comb. Matt.	28-672	31-32	31-32
Fixed Carbon	65-431	62-54	61-58
Ash	4-272	5-34	5-79
Sulphur	7-83	1-35	8-0
Evaporative power	8-99	8-46

The extent of country underlain by the productive measures is not yet clearly known, but has been estimated at 300 square miles. The district is intersected by the Intercolonial Railway, and a branch railway runs from the Springhill collieries to Parrsboro, on the Bay of Fundy, where extensive shipping docks are being constructed.

The principal collieries now in operation, and the respective output of each for 1885, are as follows:

Name of Colliery.	Situation.	Output for 1885.
Chignecto	Cumberland County.	Tons. 6,084
Joggins	"	17,664
Minudie	"	7,702
Springhill	"	335,055
Acadia	Pictou County	98,150
Albion	"	129,195
Intercolonial	"	109,139
Yale	"	76,125
Sydney	Cape Breton County.	124,274
Victoria	"	47,614
Lingan	"	21,761
Reserve	"	83,276
International	"	67,959
Bridgeport	"	13,278
Little Glace Bay	"	39,400
Caledonia	"	58,859
Block House	"	11,075
Gowrie	"	74,414
Unimportant collieries		1,320,924
Total		31,271
		1,352,205

The sales of Nova Scotia coal for 1885 were as follows:—

	Tons.
Provinces of Nova Scotia	444,652
New Brunswick	145,634
Newfoundland	74,322
Prince Edward Island	52,770
Quebec	493,917
West Indies	5,732
United States	34,483
Total (long tons)	1,254,510

(To be Continued.)

Improved Hoisting Engines.

We have received the most recently published catalogue of the Lidgerwood Manufacturing Company, whose extensive works are in Brooklyn, N.Y., and offices and salesrooms in New York city and Boston. This company are manufacturers of the most modern high-speed hoisting engines, and boilers, for marine service, contractors, miners and railway corporations. A great variety of their engines are illustrated by beautifully finished engravings, and are fully described in the catalogue. All the work of this company is done on the *duplicate part system*, enabling them to fill orders promptly for duplicate parts, which are made to gauge and will fit without trouble. Their system for testing is very complete, and all engines are run with steam on before being shipped, and boilers are thoroughly tested by steam, as well as by the usual hydrostatic test. As will be seen by their advertisement in another column, this company give special attention to engines for mining purposes, and will furnish estimates, &c., on application.

Gold Mining in British Columbia.

The official annual report of the Minister of Mines for 1885 shows a falling off in the year's production of \$22,427 from that of 1884, and the statistics show a large increase in the number of miners engaged in gold mining in some of the gold districts of the province. The total amount of gold known to have been exported by lanks, etc., amounted to \$594,782 for the year, and the amount estimated to have been carried away in private hands \$118,956,

making a total yield of \$713,738, as against \$736,165 for 1884. The number of miners employed during the year was 2,902 and the average yearly earnings per man was \$246, as against 1,858 miners employed in 1884 with an average yearly earning of \$396 per man. The decrease in the average yearly earnings is accounted for by the rush to Granite Creek towards the close of the mining season, and by an increased number of Chinamen working during the autumn months on the bars of the Fraser (already worked and re-worked) with but little return for their labour. The statistics show that the increase in the number of miners occurred chiefly in the Yale district, where towards the close of the season there were 998 at work, and the year's yield of gold was only \$146,500. This had the effect of reducing the general average earning for the year, but as nearly nine-tenths of the miners did not reach the diggings in the district until shortly before the season closed, it is reasonable to suppose that next year the total yield from the Yale district will be largely in excess of these figures, and that the general average earning for the province will be increased in like proportion.

The Gold Commissioner of Cariboo states that in his district another year 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. The Commissioner estimates the gold yield of the district for 1885 to have been \$347,700, and adds that Cariboo has not as yet derived any benefit from railway construction. Freight rates are still high, and Cariboo prices have undergone but little change during the year.

GRANITE CREEK.

This stream, to which there has been a great rush, is a tributary of the Tulameen, or north fork of the Similkameen, and falls into that river on its right bank, about twelve miles above its junction with the South Similkameen at Princeton—better known as the "Vermillion Forks," and "Allison's." About five miles from its mouth Granite Creek is joined by a small creek from the south-west, which point is called the "Forks." With the exception of a few hundred yards at its mouth, Granite Creek runs from the forks downwards in a deep V shaped gorge, through which the yearly freshet, evidently of great volume, has washed everything except the gold and some gravel—in fact this portion of the creek has been ground sluiced by nature. Mr. T. Elwyn, Deputy Provincial Secretary, visited Granite Creek last autumn, and reports that from near its mouth to a point something over half a mile below the "Forks," a distance of about four miles, no claim which has been tested on either side of the bed of the stream has failed to yield good returns, the ground for that distance averaging over an ounce a day to the hand. On 31st October, on lower Granite Creek, there were 62 companies owning creek claims, averaging probably 500 feet to the company, who were working. Of these, 34 were taking out gold and 28 either preparing to do so or prospecting. The gold admitted to have been taken out by the several white and Chinese companies, from 5th July to 31st October, 1885, amounted to \$90,000, which, considering the great loss of time caused by the freshet, and the difficulty of obtaining lumber

for sluice-boxes, is a creditable showing. On the morning of November 1st one company washed up \$750, the result of the labour of eight men for thirty hours. Mr. Elwyn believes that the discoveries on Granite Creek will lead to the opening up of an extensive gold field which will be of more benefit to the province than any yet discovered, except, perhaps, Cariboo. He states that he was particularly impressed with the fact that those who were warmest in praise of these new diggings were amongst the most experienced miners who had gone into the district.

CANADA'S IRON TRADE.

We are indebted to the publishers, Messrs. Dawson Bros., of Montreal, for a copy of a very interesting work entitled "The Manufacture, Consumption and Production of Iron, Steel and Coal in the Dominion of Canada, with some notes on the manufacture of iron, and on the iron trade, in other countries." Mr. James Herbert Bartlett, Associate Member of the Institute of Civil Engineers, &c., &c., &c., the author of this work, is deserving of much praise for the careful manner in which he has compiled the information it contains. The author's aim has been to bring into prominent notice the importance to the Dominion of Canada of the manufacture of iron within her borders, and to show how this industry would benefit the country and develop her resources. The subject suggests many important questions which are ably dealt with by the author, whose researches in the direction of statistical detail have been of an exhaustive character, and it is evident no pains have been spared in tabulating the same in an intelligent and comprehensive manner. Mr. Bartlett appears to appreciate the fact that reliable, practical information in connection with the manufacture of iron in Canada has been much needed, and, in treating the subject from a commercial rather than from a scientific point of view, he points out the conditions under which other nations have succeeded and gives the value of the manufactured articles imported into Canada and the quantities consumed.

Statistics of the imports and exports of iron and the manufactures thereof have been compiled from the Dominion Trade and Navigation Returns, and show that the value of the imports, including duty paid thereon, for the seventeen years since Confederation—1869-1884, inclusive—has reached the enormous sum of \$252,638,613.44, or an average of about \$14,860,000 a year. The classification and tabulation of statistics in connection with the various branches of the iron and steel industries represent a remarkable amount of patience and perseverance on the part of the author and have been so arranged by him as to be easily available for reference. As a statistical work the book will prove very valuable, and besides being replete with interesting and useful information it will undoubtedly draw attention to the very important subjects on which it treats. The book reflects great credit on the author and we feel ourselves much indebted to Mr. Bartlett for having put into our hands so much information in so concise a form.

In the Smithsonian Institution at Washington is the small nugget of gold, a little larger than a pea, that first met the eyes of James Marshall in the sawmill raceway at Sacramento, and was the beginning of those discoveries in California that have added nearly \$1,500,000,000 in gold to the world's stock of the precious metals.

CANADA —AT THE— COLONIAL & INDIAN EXHIBITION.

Her Natural History, Mineral & Fisheries Exhibit.

In the west transept of the exhibition building at South Kensington, will be found the collection of natural history specimens, which must prove to visitors one of the leading features of the Canadian display. The Canadian Geological and Natural History Survey has, in itself, enough to form a separate display, though supplementary to it are the Hudson's Bay, the Renfrew and Hubbard collections, thus representing adequately the whole game of the Dominion. The centre of this west transept is, correspondingly with the east transept, occupied by a commanding trophy of game and game birds, and even those of the migratory class, arranged with no little tact and judgment. From this point the west gallery is reached. *Here the mineral resources of Canada are set out in full array. So rapid has been the growth of the mining industries of the Dominion during the past decade, that the 549 specimens exhibited at Philadelphia have increased to 725 at South Kensington, contributions coming in large numbers and great variety from the mines of Nova Scotia, New Brunswick, Quebec, Ontario, the North-West and British Columbia, and including many specimens of considerable value shown in the process of various dressings from the simple ore. The practical results likely to follow from this mineral exhibit are considerable. One may, perhaps, be not too sanguine in anticipating that so powerful a witness to Canada's vast and rich mineral deposits will even do much to overcome the prejudice of English capitalists against embarking in enterprise in this direction—a prejudice not altogether unnatural, when one remembers the hands into which some Canadian mining ventures have fallen in recent years. Intimate knowledge, such as the present exhibit will encourage, must, however, bring about a different state of things.* In the west gallery the shafting provided will be used for the display of machinery in motion—always an interesting feature to visitors. Here the skillfully-designed agricultural and general products of the Birmingham of Eastern Canada will undoubtedly be the object of much curiosity to English mechanics, agriculturalists and manufacturers. Beyond the west gallery is the west arcade, in which Canada has been provided with some 2,000 feet for the display of the products of her fisheries. The exhibit made in London three years ago is here brought into requisition, with, of course, large additions of stuffed and preserved specimens of fishes and marine invertebrata, as well as schooners, models of salmon hatcheries, fishing tackle and all utensils for sea and lake fishing. The National Fish Culture Association is taking charge of the ova until a fitting receptacle is ready for it. An interesting feature of this part of the Canadian display will be the intended shipment of fish periodically, from Canadian waters, under the refrigerator process, not for sale, but to demonstrate the practicability of direct shipments of the fish of Ontario, Manitoba and British Columbia by direct Canadian rail to the Atlantic port, and thence to England.—*Canadian Gazette, London, Eng.*

The Drum Lumon mine of Montana distinguished itself during January by the largest production on record. Sixty stamps working thirty days crushed 3,456 tons, yielding \$100,831.19.

Notes on the Progress of Mining and Metallurgy in Europe.

By E. J. BALL, PH. D.

Assistant in Metallurgy at the Normal School of Science and Royal School of Mines, London.)

Written specially for the Canadian Mining Review.

The action of coal-dust in colliery explosions continues to excite considerable discussion, notwithstanding the attention it has already received, and R. Schneider, in remarking on the results of some experiments made at the Segen-Gottes Colliery, Moravia, which showed in direct opposition to those obtained in Dr. Hilt's experiments with dust from the same colliery in the Neunkirchen level—that free-lying dynamite would always explode the Segen-Gottes dust—states that Dr. Hilt suggested that this was probably due to the detonators that were used being too weak, and to their consequently not exploding the dynamite properly, and that it would be therefore well to repeat the experiments with the triple force detonators manufactured by A. Barnhardt, of Brunswick. This was done, but the results were the same as before, the dust being exploded every time without any gas being present. Schneider is consequently of opinion that the difference in the results of the experiments made at the colliery and at Neunkirchen were due to the excessively fiery nature of the dust, which, he considers, must either have been damp or not sufficiently powdered when used in the trials at Neunkirchen. The general conclusions derived from his experiments have, however, tended to confirm those obtained by Dr. Hilt, and attention is drawn to the fact that in all cases where dry and dusty fiery pits are worked the present method of shot firing cannot possibly be practised without danger.

In referring to the investigation recently made at the Gabriel Colliery in the Karwin district, Austria, on the influence of the changes in barometric pressure on the escape of fire-damp, the results of which confirmed those obtained in previous experiments, showing that the danger increased with a falling barometer, J. Mayer remarks that although this may be true in some respects, the chief danger lies in accumulations of coal-dust.

J. Haller has described the method of treatment adopted in working the brown-coal deposit at Liescha, Austria, which is 25 feet thick, and he states that the one originally employed—stopping—caused the ventilation to be so bad, and the temperature so high, that it was abandoned, and a modified post and stall work introduced in its stead. The result was that not only was the ventilation greatly improved, but the work done per man and per shift increased by 39 per cent. The drawing engines in the pit were, until two years ago, worked by steam brought down to them in pipes; this has now been replaced by compressed air with very satisfactory results. The wooden timberings, which had to withstand considerable pressure, and, in consequence, to be frequently renewed at certain places, has been replaced by steel rails, and although their first cost is greatly in excess of that of the wood, they have proved in the long run much more economical.

With regard to the sinking of shafts, J. H. Poetsch has taken out additional patents in Germany, and elsewhere, in which he proposes to employ the pipes he has used in freezing the quicksand through which it was desired to sink the shaft, after it has been sunk and the ground thawed again, either in connection with pumps to partially remove the water or as supports by

filling them with cement, or by otherwise strengthening them.

H. Thomas, of the French Geological Survey, discusses in the *Génie Civil*, the size of the pillars which should be left to support the roof in underground workings, and he gives some figures relating to building stone, calculated from the resistance offered by the materials to crushing stress.

The mineral wealth of Spain is exceedingly great, and its natural advantages are such, that should the country ever succeed in obtaining a settled form of government, its mineral resources are sure to receive considerable attention, and this tends to endow the description by R. A. de Yarza of the mineral deposits of the Province of Guipúzcoa (*Revista Minera of Metalúrgica*, 1886, Jan. 17 and Jan. 24) with considerable interest. The ores found are chiefly those of lead, zinc and iron, as although copper ore has been found it has only been in small quantities, and up to the present is of no importance. No coal beds have been discovered, but some lignite deposits exist in the cretaceous rocks. The galena occurs principally in lodes in palæozoic measures, those occurring in the cretaceous being of far less importance. Zinc blende is also found both in the palæozoic and cretaceous rocks, and calamine also occurs in considerable quantities. Iron ore deposits are abundant, and would be of great importance were they not so close to those of Biscaya, with which it will be difficult for them to compete successfully. The ores, which are of good quality, occur partly as contact deposits between granite and palæozoic rocks, partly in the palæozoic rocks themselves, and occasionally also in the cretaceous.

H. Tweddle describes in *Engineering* the petroleum regions of Europe and Asia, and he states that they extend from the north-western extremity of Great Britain diagonally across Europe, the Crimea, and the Caucasus, and that they terminate in Central Asia. This zone embraces nearly all England and Scotland south of the Grampians, Hanover, Bohemia, Galicia, Moldavia, Roumania, Transylvania and Hungary, the Crimea, the Caucasus chain, and in the trans-Caspian regions, the Island of Tchelen, Krasnovodsk, the Nest Gori, the Heri Rud, and Tashkent, the last explored petroleum region in Central Asia. He remarks on the great similarity of the geological measures where petroleum is known principally to exist, viz., in the cretaceous, though it is found in every formation from the granite and volcanic rocks to the highest and most recent deposits of the Aral-Caspian, and he considers that the zone may fairly be regarded as more or less similar to the petroleum fields of North America. These, it may be mentioned, have been recently described at considerable length by C. Zincken, of Leipzig, Germany.

Turning from mining to the kindred subject, metallurgy, the iron and steel industry first claims attention. The chief object of discussion at present is as to the relative advantages of large and small Bessemer converters, and it would seem to be the general opinion, that however advantageous small converters may be under certain conditions, yet, that under ordinary circumstances, it will be impossible for them to compete successfully with large ones.

The basic process is making rapid progress on the continent of Europe, but the progress is somewhat slower in Great Britain, where the abundance of pure ore renders it unnecessary to work deposits of ore which are of lesser purity. Magnesite is coming into considerable use in the manufacture of basic bricks.

Arrangements for the collection of the waste products from coke ovens are gradually being

made use of in the case of those already constructed, and a considerable number of the more modern forms of ovens have been lately erected, the tendency being to employ almost solely horizontal ovens of the modified Coppée type. Compressing the coal by means of rollers after charging, has, it is stated, enabled, in the case of certain German coal, a much better coke to be produced than would otherwise have resulted. It appears to be generally considered that the collection of the ammonia from the waste gases of blast furnaces using coke as fuel is not likely to prove very profitable.

The Manhès process for the Bessemerizing of copper regulus is assuming considerable importance, and the latest form of converter proposed by Manhès, and exhibited by him at the Antwerp Exhibition, resembles in shape the boiler of a horizontal engine. It is cylindrical, and rests on a truck. The tuyère box runs along the side, and holes in its back facing each tuyère permit of rods being inserted through them to keep the nozzles free. The converter is revolved by means of a tooth-wheel and gearing, and the throat is in the centre of the upper portion.

Electrolytic processes are also making considerable advance, though their progress has not been so rapid as was at one time anticipated, the chief reason being that the comparative abundance of fuel and of skilled labor renders it impossible for processes which rely chiefly on the saving effected in these respects at the expense of time to compete with others which enable the capital invested to be turned over far more rapidly. In the case of copper, too, although electrolysis enables the gold and silver present in the material treated to be collected, and a metal to be produced which commands a higher price in the market, still the great majority of the ores contain such small percentages of the precious metals that they, and the higher value of the copper produced, would not compensate for the loss of interest on the capital invested. In countries, however, where fuel is either scarce or costly, and labor expensive and unskilled, electrolytic processes certainly deserve a far greater consideration than they usually receive, more especially in such places where water-power can be made use of, or where the materials to be treated contain an appreciable amount of the precious metals. Electrolytic plants for the treatment of cupriferous materials are, however, being built in various parts of Europe. There are several in the United Kingdom, and they chiefly use metallic anodes, concentrating the silver and gold in "bottoms," which are afterwards cast into the desired shape; anodes of regulus have also been tried, but, I believe, without marked success, although works have recently been erected at Stolberg, in Austria, and in the neighborhood of Genoa, where regulus alone is intended to be used.

Scarcely any attention has been paid in Europe to the employment of electrolysis in the case of lead, but attention is beginning to be directed to its use in the case of zinc ores, though I am unacquainted with any works employing as yet such a process on a commercial scale.

Very many different types of dynamos are in use at works, and in choosing one it seems customary to select that which converts the greatest percentage of energy into electricity; but, however correct this may be from the point of view of an electrician, from that of a metallurgist this perfection of the machine should be by no means the sole consideration, as simplicity of construction and the ease with which repairs can be carried out should receive careful consideration, more especially in such cases where the position of the works will render it impossible

to obtain skilled assistance in case of a breakdown, and where the machine will have to be entrusted to persons who, it may be, have had no experience in its management, and who are wanting theoretical knowledge. Of course no machine should be chosen unless it gave fair results, but I lay stress on the advisability of its being as simple as possible in construction, as this is very frequently overlooked, and my attention was drawn to the subject in the Works where I studied the process.

Two or three adoptions of electricity to the treatment of gold ores have been more or less discussed of late, but opinion is still very much divided as to their merits.

Numerous so-called improved forms of amalgamators, &c., have been proposed, but most appear worthless, and the great majority of the others have scarcely advanced beyond the patent stage.

CORRESPONDENCE.

MINING RECORDS.

Editor Canadian Mining Review.

Experience in the old world may be of use in the new. In Ireland, the earliest written record I can find is one A. M. 3656; and since then they are few and far between. There are, however, other records, in the old attics and other waste heaps; but who were the miners? and when were they worked? or what they did underground it is impossible to say. The latter is even the case with works carried on within the present century, not a record having been kept except in a few cases, and if an adventurer starts a mine in or near an old sett, he has to take chances, while after he has come on a good lode and made all preparations for working a mine, he may find that the "old men" have been before him and cut out all "the riches." This has been the case over and over again in our modern mining operations; "old men's workings" have spoiled many a good mine. Yet what can be done? Out of the thousands of mines that, from time to time, have been in operation in Ireland, I believe there are not the records of fifty, if of half that number.

I read with great interest the evidence given before the Enquiry held sometimes in Ottawa, and had a fellow feeling with the geologists examined, as no matter how zealous, anxious or painstaking a geologist may be, unless he has the power to say—stand and deliver! he cannot get records from unwilling hands.

At the present time, according to the new act, mining agents must annually return records of their working—but not of old workings which are those of most importance in connection with further research. During the last 30 years or more, I have been endeavouring to get copies of these old plans and sections, and in no important mine have I perfectly succeeded. In some few small workings I was able to do so, but invariably in the large ones I was unsuccessful. In most cases the mines had gone through different hands, and at each successive sale of the property, the sellers had either kept back or destroyed all records, except those that they considered advantageous to themselves; consequently to get full plans and sections would necessitate expensive surveys that the company or I could not undertake—or the agent or company might be unwilling to allow the extent of the works to be made public—they might let you look at the plans and sections and say you might copy them, but invariably I found it hard to accomplish the latter,

and never without an amount of tact. When an agent pretends to be willing and at the same time intends to prevent you getting copies of his plans, it takes a great deal of stratagem to circumvent him.

These are my experiences. Some agents cannot give statistics unless he went to great expense in new surveys, while others will not, as they are afraid it might possibly be hereafter detrimental to their interest. To get statistics, therefore, it is necessary to make it compulsory that plans and sections of all mining operations should be furnished to an authorized official, as otherwise no one, no matter how energetic or painstaking, can procure them. The great losses due to unrecorded mines in the "old countries," British and foreign, ought to be a lesson to the new, and teach them to "take time by the forelock." Let them have properly appointed officers whose duty it is to record all mining operations, and to whom all statistics of such operations must be given. In a new country this could be easily managed by insisting on all mining adventures being registered. The register fee might or rather ought to be merely nominal, but coupled with it should be an obligation to furnish, at specified times, full accounts of all mining operations, the neglect of complying with the latter subjecting them to severe penalties. Such a law would not prevent individual research, while it would protect subsequent adventures and the losses so often due to bogus companies.

J. HENRY KINAHAN.

NOVA SCOTIA GOLD FIELDS.

PAY-STREAKS.

Editor Canadian Mining Review.

Not having had the advantages of a personal knowledge of the "Pay-Streaks," I was led, from the descriptions that I had seen, to suppose they were the filling in of vertical shrinkage fissures. Mr. Gilpin's very instructive description of them in March number of the REVIEW, however, seems to suggest that they are the shrinkage fissures on the arch of an anticlinal curve, dipping or "hading" more or less at a high angle at the line of axis of that curve; and these in each district in accordance with the strike of the line of axis, occur in local systems having similar strikes and underlie the strikes being parallel to the line of axis. If this is the case the fissure ought invariably to decrease in width gradually in depth; the decrease in width being more gradual the more perpendicular the streak—that is, the less the angle between the dip of the streak and the vertical of the axis of the curve, the less the variations in the width of the fissure—that is, the fissures at or near the crown of the arch of the curve, ought to be more uniform in width as followed down than if away from the line of the crown of the arch; the farther from the crown the greater the opening at the surface. This can be seen in sharply folded strata, the quartz veins filling such shrinkage fissures when nearly perpendicular thinning very gradually, while, if underlying at lower angles, the change in their widths is much more rapid. If "Pay-Streaks," are the filling in of fissures of this class they must die out in depth and finally end. There is, however, the converse to this: What are the shrinkage fissures in the sides of a synclinal curve? Ought they to open in depth? Is the tension in the strata forming the anticlinal curve similar to the tension in the strata forming the synclinal curve? Of the latter, however,

I cannot speak, as my experience has never furnished an example.

J. HENRY KINAHAN.

Office of

The Geological Survey of Ireland,
Dublin, Ireland.

NORTH SHORE MINES.

LAKE SUPERIOR DISTRICT.

Editor Canadian Mining Review,

Sir,—Seeing in your valuable paper for frequent accounts of the tests at the silver mines in this district, also at the Huronian Mine in the gold region, during the past year, I think a word would not be out of place respecting some of the silver mines upon this shore which were worked more or less twelve years ago.

I speak as a miner who worked in most of the mines mentioned below, and can vouch for the facts in each case.

I will first take the "Silver Harbour" mine. The main shaft at this mine was sunk 120 feet, and another some 30 feet. There was a large amount of black sulphide of silver and silver ore taken out, sufficient, if the mine had been properly handled, to pay working expenses; and when the work was stopped the mine looked well, so much so that an American gentleman would have worked it right along if he could have procured the property on reasonable terms and without restrictions. The company who worked this mine literally squandered their money by erecting a splendid building, which cost some fabulous sum, and was wholly unnecessary; they also spent a large amount for engines and machinery for stamp-mill, which were never used and subsequently went to ruin, instead of opening up and testing their mine at the outset—which has never been done. It is my belief that had the company been mining men, or their manager a practical mining man, this mine would be working and paying large dividends at the present day.

I will next take the "3 A" mine, which is upon the adjoining location to "Silver Harbour," but a distinct vein. The main shaft is down 140 feet, and another about 40 feet. There was a large amount of native silver and nickel silver taken out at this mine; certainly some of the largest specimens of native silver ever taken out on the North Shore were from "3 A," and there was a very fair show of silver when work was suspended. "3 A" may be classed with "Silver Harbour" as regards mismanagement, for there was sufficient silver taken out to pay all expenses and leave a handsome balance had it been properly taken care of.

Should the owners of either "Silver Harbour" or "3 A" mines place their properties upon the market as assessable stock, I am assured the people in this district would readily take them up.

At "Thunder Bay" mine there was only one shaft sunk, about 100 feet in depth, from which a large amount of native silver was taken out, sufficient to pay working expenses if the mine had been worked economically; but here again the company incurred the expense of valuable machinery and stamp-mill, which were afterwards left to ruin, before proving their mine in any way. It is my opinion that should a strong company take hold of this mine and have it thoroughly tested it would turn out well.

"Jarvis Island" was worked and tested to a depth of 130 feet, and found to carry some native silver and silver ore, and when abandoned there was a good show of silver. The

owner of this property intends, I believe, to start work again this spring.

"Spar Island" has not been worked for some 40 years, though it is said to be one of the best mines on this shore. The main vein carries grey copper ore and native silver, a large amount of each, and is 12 feet wide; there is also another vein four feet wide. Some few years ago a gentleman in Port Arthur, who has the control of this estate, had some very fine specimens taken out. The vein shows equally good upon the mainland.

The only mine which has in any sense been tested in this district is "The Duncan." The main shaft was sunk 900 feet, and another shaft 150 feet; the longest drift is 400 feet. The company was a good one, the best upon this shore to the present day, and for 700 feet along vein from main shaft the mine was very fairly tested. They obtained a large quantity of native silver for about 400 feet upon surface, and considerable at a depth of 100 feet, and the core from diamond drill usually assayed silver wherever tested upon vein. The testing upon this 700 feet of the main vein was considerable, but the company did no work or exploring except upon this one vein, although there are several others upon the location all carrying good mineral. It has been reported that a large deposit of silver has recently been discovered upon the location by one of the men who previously worked at this mine.

All the above mines are easy of access, either water, road or rail facilities being excellent, and there are numerous other locations around this district which could be profitably worked under efficient and economical management.

There is no doubt that the owners of the properties in the new silver district and gold region have taken warning from the previous experiences of mining upon this shore and have gone to no unnecessary expense until assured of an adequate supply of mineral to pay for expensive buildings and machinery; but as I see in your paper that capital is seeking investment in mines and mineral lands, I am sure it would amply repay the capitalist to visit and take note of the mines above mentioned, in addition to the new mines which are being opened up all around us.

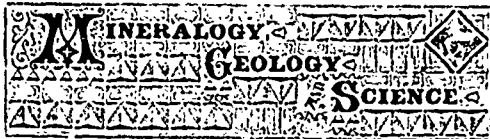
Yours truly,

"A MINER."

Port Arthur,
Lake Superior.

Fossil Human Footprints.—Herr H. E. Low has obtained and forwarded to the Imperial Museum in Vienna twelve large stone slabs bearing the foot-prints discovered last year in the solid rock in the quarry over Lake Managua, in the territory of Nicaragua. The interest was increased by the statement that those foot-prints had been overlain by eleven different layers of stone, extending to a depth of four meters, and indicating an antiquity for our race quite transcending all conjectures hitherto hazarded. They are about three quarters of a meter square. They can now be inspected by European geologists. The foot-prints are sunk into the stone to a depth of from eight to ten centimeters. The stone itself is a porous tufa, and the superincumbent layers, which had been removed for building purposes, were all of a more or less solid volcanic conglomerate. The foot-prints are very conspicuous, and seem to be those of three distinct persons, one of whom was a child.

The proprietor of Montvale Springs in Blomet County, Tenn., has sunk a shaft ninety feet deep on his property and claims to have found a rich vein of silver ore.



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

Mineralogy of Pliny:

To a student who is following a course of science and literature, many questions of strange interest present themselves. In his scientific studies, on the one hand he becomes aware of the latest discoveries of the day; he is perfectly acquainted with the physical structure of the globe, and seems as conversant with what is written in the records of nature, as the book-worm is with the productions of his favorite author. On the other hand, his literary pursuits transport him into the far past, into the ages of antiquity, and bring before him the simplicity of men of by-gone days, with their odd superstitions and quaint beliefs. He cannot fail to remark the striking contrast between the opinions of the most intelligent and learned of the ancients, and those of the mere student of science of our day.

To exemplify this general idea, we may consider a particular case. See what difference there exists between the knowledge which we have to-day of mineralogy and that which the ancients possessed. A mineralogist who has been so happy as to fall in with Pliny's treatise of mineralogy cannot fail to be amused. During the days when Pliny flourished, a scientist was far different from what he is at present. Whatever was known at Pliny's time, Pliny knew; and whatever Pliny knew is to be found in his admirable works. By reading this author, therefore, we can have an adequate knowledge of what the ancients knew, and in Pliny we can study the light in which mineralogy was once regarded.

Five lengthy books of his "Natural History" are devoted to minerals. But, gentle reader, were you to peruse a work on moral philosophy or a volume of rhetoric, you would then know nearly as much mineralogy as you would after the perusal of Pliny's dissertations.

What, indeed, are these five books if not mere rhetorical dissertations, replete with moral reflections! Admirably written, indeed, his works cannot fail to interest. He has paid great attention to his style and choice of words. He discourses on the ill effects of gold and silver and of the precious stones, and does not hesitate to denounce them as the bane of Roman society. He is loud in his lamentations because of the introduction of these "articles of luxury," the cause of effeminacy, the corrupter of morals. This is his unceasing strain while he is speaking of gold, and occasionally he is strong in his invectives against the unknown inventor of such and such a perfidy.

In the first of his five books he treats of metals, beginning with gold. After a severe criticism of Roman luxury, we are presented with a complete history of rings, then of crowns, and lastly of gold coin, the invention of which "was an enormous crime against humanity." A slight allusion to the ductibility of gold and the manner of procuring this metal is what comes nearest to the subject of mineralogy. Read what he says about silver, and you have a good idea of ancient mirrors, vases, plates and statues of silver. Read his second book, on copper, and you have a perfect knowledge of bronze statues and chandeliers. We must not

omit medicine; this is a strong point in Pliny's works. He delights in dwelling on the medicinal properties of the metals, most of which were used for that purpose in his time. In fact, iron and lead are scarcely treated under any other head.

The third book is an excellent treatise on painting; the fourth is devoted to marble sculpture, while the fifth treats of precious stones. This is by far the most useful part of Pliny's work. He displays in it a wonderfully extensive knowledge of the gems which had become at that time very extensively used in Roman society. It is needless to state that, in a strictly mineralogical sense, his ast erudition fails to give even a clue to the science of gems. His classification is entirely artificial. Gems which, for instance, are varieties of quartz are given as totally different species; whilst others, widely different in composition and crystallographic characters, are brought together with regard solely to their external properties. But we are inclined to be indulgent towards the old Roman *savant* when we consider the amount of invaluable information he imparts and the graceful diction he employs, and we willingly admit that science would soon become popular if all scientists could and would imitate Pliny's attractive style.

W. A. H.

Aluminum.

"The metal of the future" is the designation given to aluminum by the President of the Scranton Board of Trade, in an address before that body. Possessing all the good qualities of iron without its weakness, it will, he thinks, in time totally replace that, at present, most useful of metals. Aluminum is now principally used in alloys. But its resistance to oxidation eminently fits it for household utensils; its lightness compared with its bulk makes it very suitable for architectural purposes, and its use in building steamships, and furnishing railways with their rollingstock, would revolutionize present rates of travel. It is a much better conductor than iron, and would replace that metal in telegraph wires; knives, swords and axes made of alloys of aluminum receive a much better temper than the finest steel. The great objection to the use of this metal, which is so abundantly diffused, has hitherto been the cost of reducing it from its ores. But President Price asserts that the price of aluminum is now only \$15 a pound, which is 50% less than it was thirty years ago, and a company in Cleveland claims that within the past year, by a new process, they have made it possible to reduce the price to \$4 a pound. If aluminum really possesses all these qualities in such a high degree, we may indeed prepare to witness new achievements, which will throw those already accomplished into the shade.

D. PHALEN.

Germanium.

Prof. Clemens Winkler, writing in a recent number of *Nature*, announces the discovery of a new element by himself. In the summer of 1885 a new mineral was discovered at Himmelsfürst, near Freiberg, in Saxony. This mineral was a rich silver ore, and received the name of *argyrodite*. Before the blow-pipe it yielded sulphur, silver, and a little mercury, in the following percentage: mercury 0.21 per cent., silver 73 to 75 per cent., sulphur 17 to 18 per cent. A small quantity of iron and traces of arsenic were also present. But there was always 6 or 7 per cent. un-

accounted for. Prof. Winkler claims to have discovered that this portion of the mineral contains a new element, which, in honor of his country, he has named *Germanium*. Germanium resembles antimony in its properties. The presence of arsenic and antimony in the minerals accompanying argyrodite made the discovery of the new element very difficult. On heating argyrodite in a current of hydrogen a black, crystalline and moderately volatile sublimate is formed, consisting of the sulphides of germanium and mercury. Germanium sulphide dissolves in ammonium sulphide and is precipitated in a pure state by hydrochloric acid. On heating germanium sulphide in a current of air, or warming it with nitric acid, a white oxide, non-volatile at a red heat, is produced. This oxide is readily reduced by hydrogen, but the reduction of the sulphide is more difficult on account of its volatility. Germanium, like arsenic, has a grey colour; and a moderate lustre. It is volatile only at a full red heat, but much less so than antimony. Its crystals could not be mistaken for those of the latter metal. The atomic weight of germanium, when ascertained, will show whether this element is to occupy the vacant place in the periodic system between antimony and bismuth.



COAL GAS.—It has been lately discovered that the heat value of coal gas has been rated too high, up to the present. A French chemist has ascertained that the real heat value is 15 per cent. below what it was thought to be, or 5,200 instead of 6,000 calories per cubic meter at 0°.

TIN.—Some of the supposed causes of the disintegration of tin are discussed in the *Mining and Scientific Press*. The idea of a dimorphous tin is suggested by the fact that the disaggregated tin is of a lesser specific gravity than was the tin in its former state. The presence of mercury in the metal is another possible cause of its disintegration.

GEMS.—The *Jewelers' Journal* gives the following chemical directions for making artificial gems. To make the *sapphire*, heat 4 oz. of aluminum oxide and 4 oz. of red lead to a red heat. When smelted add 10 grs. bichromate of potassium and 17 grs. cobalt oxide. Stir up well and keep cool. The *ruby* is produced by the following process: Heat 4 oz. of aluminum oxide and 4 oz. of red lead to the smelting point, and add from 7 to 16 grs. of potassium bichromate. For the *emerald*, to the same quantity of oxide of aluminum and red lead, add from 8 to 12 grains of sodium uranate, and treat as above. Parisian or Alaska *diamonds* are made by heating 65 per cent. of pulverized crystal quartz, 20 per cent. of red lead, 8 per cent. of pure carbonate of potash, 5 per cent. of boric acid, and 2 per cent. of white arsenic. The brilliancy of the diamonds depends upon the purity of the red lead and of the carbonate of potash.

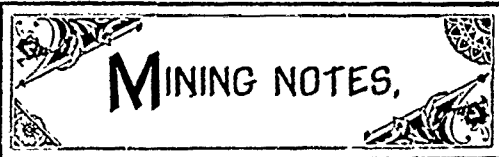
COPPER AND NITROGEN.—M. Blendlot, of the French Academy of Sciences, has observed a curious phenomenon with respect to the action of nitrogen on copper. A disk of platinum and a disk of copper, 0.03 meter in diameter, were placed 3 or 4 millimeters apart, under a bell jar of porcelain open below, and were fixed vertically in front of each other by means of platinum stands. The whole apparatus was then heated for three hours by a gas furnace.

At the end of that time, although there had been no electric current, the face of the platinum disk was found blackened with a deposit containing copper and platinum. In short, the copper had crossed over to the platinum. By repeating the experiment in a different gas, M. Blendlot ascertained that the nitrogen of the air had been the agent of the transfer by combining with the copper, which it afterwards deposited on the platinum.

MELDOMETER.—Prof. Joly, of Trinity College, Dublin, has described, in *Nature*, an apparatus contrived by himself, by which he can determine or compose the melting points of minerals, and their behaviour at high temperatures, either alone or in the presence of reagents. To this apparatus, which is to be attached to a mineralogical microscope, he gives the name of meldometer. He says, "As I now use it, it consists of a narrow ribbon of platinum (2 mm. wide), arranged to traverse the field of the microscope. The ribbon, clamped in two brass clamps so as to be readily removable, passes bridgewise over a little scooped-out hollow in a disk of ebony (4 cm. diam). The clamps also take wires from a battery (3 grooves cells), and are adjustable; the resistance being placed in circuit, the strip can be raised in temperature to the melting point of platinum." The platinum strip is placed in the field of a 1" objective, and a wedge of tinted glass is used in photographically estimating the temperatures, by extinguishing the field. Approximate estimations of the temperature are made in terms of the resistance of the platinum strip. These observations may be compared with the readings on the wedge, which are then used for ready determinations. The mineral is placed in small fragments near the centre of the platinum strip, and the current increased till the melting point is apparent. By means of this apparatus, Prof. Joly has melted beryl, orthoclase, and quartz, and discovered for the first time that the last fuses below the melting point of platinum.

BEAUTIFUL MARBLES IN ALGIERS.—The rediscovery of the ancient quarries where the beautiful antique marbles were obtained is interesting. An extensive quarry, covering two thousand acres, has been quite recently discovered in the province of Oran, near the Mediterranean coast, in Algiers. The deposit has been obtained by an Italian who has constructed roads and begun operations. The deposit contains giallo antico, breccia, and cipoline, besides black and white marble. These fine colored stones can be had on the wharf at Oran for about one dollar a cubic foot. The beautiful yellow marble, giallo antico, has, until this late rediscovery, been unknown, save by the fragments found in Roman ruins two or three years ago.

AN IMPORTANT EXPERIMENT.—The mining public will be much interested in the results obtained from the experiments which are to be made by means of a dynamo to be set up on the Truckee river in Nevada to transmit thence the whole motive power of that stream—furnished by a Laffel turbine, with a full head of water, with 100 feet fall—to a receiving dynamo at Virginia City. Those engaged in this operation claim that in this way a motive power can be furnished at Virginia City for a hundred-stamp mill for \$200. At present, the daily cost of transporting Comstock ores from the mines to the mills on Carson river is \$1,000, nearly all of which will be saved by having the mills directly at the mines.



NOVA SCOTIA.

Considerable attention is now being directed to Lunenburg county as a promising gold field.

The Empress mine in Renfrew district produced 281 ounces of gold during the month of March.

Miners have been working on tribute at the Mount Uniacke mines and have been earning about \$75 per month per man.

It is stated that a rich streak has been struck in the Rawdon mines, and that one thousand ounces of gold were taken from it during the first two weeks of March.

The first clean up at the Crow's Nest mine, in the Sherbrooke district, Gaysborough county, showed a yield of 75 ounces of fine gold from 37 tons of quartz put through the mill.

At the Antimony Mines at West Gore, Hants County, two inclined shafts and one perpendicular have been sunk. The ore is at present hoisted by horse power, but it is the intention of the owners to put in steam hoisting gear. Forty men are now employed in the mine, and their number will be increased to 60 or 70. 100 tons of ore, valued at from \$50 to \$55 a ton, are shipped monthly to England via Halifax.

Those interested in the development of the gold mines of this province are anxious that the local government should incur the expense of sinking a shaft to the depth of 1000 or 1200 feet for the purpose of proving the continuity or recurrence of the "pay-streaks" in quartz veins. As no practical test has yet been made, and as there is good reason to believe that deep mining would pay, it is not unreasonable to ask for government aid in settling the question. The government receives a royalty on all the gold mined in the province, and would, therefore, be warranted in incurring the expense of so practical a test, in view of the possibilities which might result therefrom.

ONTARIO.

(Thunder Bay District)

It has been reported that the miners at *Rabbit Mountain* have come upon a very rich vein, but the report has not been verified.

At the *Huronian* mine the shaft is now down 200 feet and at this level the vein is six feet wide, and producing ore that mills \$20 a ton.

A mica deposit, situated about fifty miles west of Port Arthur, will probably be developed this Spring and its actual value ascertained.

At the East end of Silver Mountain a branch vein is being followed alongside the main one. It carries rich ore and is eighteen inches wide.

Steam drills, air compressors and miscellaneous machinery, arrived at the *Beaver* mine in March, and are probably in working order by this time.

Some fine ore is now in sight at *Silver Falls* mine but the work of development is not being driven as actively as the location deserves.

The main vein has been reached at East End Silver Mountain mine. It shows very rich and work is being vigorously pushed ahead.

Work is progressing favourably at *Crown Point* mine and the promising character of the ore warrants continued efforts being made towards further development.

The site on which the mill for the *Beaver* mine is to be erected is on Silver creek, in a position convenient to the *Beaver* and *Silver Creek* mines, and a tramway has already been located thereto.

Mr. Richard Crow has been engaged to operate the mill at the *Beaver* mine. This gentleman was employed last year by the *Huronian* Gold Mining Company, and proved himself a competent mill man.

Preparations have been in progress to open up four mining locations in Black Bay country along the line of the Canadian Pacific railway, between Loon Lake and Black Sturgeon river. These include three argentiferous galena veins.

BRITISH COLUMBIA.

About six miles of McGulloch creek is available for mining and it is thought several hundred miners will make good *pay* there during the coming season.

A large amount of eastern capital is finding its way into Big Bend country, and it is expected that the placer and quartz claims will be vigorously worked.

The Homestake company, who are working on the Tulameen fifteen miles above Granite creek, took out \$523 in gold for three days work the last week in March.

Until the water lowers in the creeks of the Semilkameen district it will be impossible to resume mining operations, and this is not looked for until the end of May, or later.

Mining on Granite Creek received a check in the beginning of April. Work had been in progress for some weeks when a warm spell caused a freshet, necessitating the suspension of mining for an indefinite time.

Camp creek, Cairn creek, French creek, Gold creek and McCulloch creek, in the Big Bend district, will be worked to some extent this season, and it is expected a lively camp will spring up near the mouth of McCulloch creek.

It was expected that bed-rock would be reached about May 1st on the Barrett claim which is located on McCulloch Creek, higher up than the Ophir Bed-Rock Flume Company's. The tunnel is in 600 feet.

Mr. D. Jordan, of San Francisco, who recently purchased a tract of coal lands contiguous to the Wellington mines, has been superintending the sinking of prospecting bores and the extension of the slope. He is well satisfied with the result of these operations up to the present time.

In accounting for the failures in quartz mining in the Cariboo district heretofore, it is said to be due to improper treatment of the pyritous quartz which is said to carry \$20 to the ton in

finely disseminated gold locked up in the sulphuret and which has been worked as free milling ore. Thus, for the want of concentrating machinery, the pyrites passed off, carrying the gold with it.

At a public meeting in Farwell in February it was decided to petition the Local Government to aid in improving the means of communication between the Big Bend mines and Farwell, including the construction of a waggon road from La Porte to Ground Hog Basin, at the head of McCulloch's Creek, so as to facilitate the transportation of machinery and supplies to the various mining camps.

The Ophir Bed-Rock Flume Company propose constructing a flume the entire length of their ground which extends for a mile and a half along McCulloch Creek, in the Big Bend district. Into this will be hydrauliced the gravel for 100 feet in width down to bed-rock, 60 feet below the surface. The flume will be seven feet wide, through which it is intended that 1000 yards of earth will pass each twenty-four hours. The gravel prospects ten cents to the pan.

UNITED STATES.

Colorado is credited with a bullion product for 1885 of \$22,800,000, of which \$13,000,000 was silver, \$5,000,000 gold, \$4,000,000 lead, and \$500,000 copper.

The Ropes gold mine, Michigan, for the month of February, produced from bullion and concentrates, about \$3,000 in precious metal, averaging about \$6.50 per ton of rock treated.

The shipments of last season from the Quincy mine, Mich., to Detroit smelters, aggregated 7,091,765 pounds of mineral which yielded about 82.47 per cent., or 5,848,197 pounds, of refined copper, and gave a mining profit of \$229,895.45.

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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 160 acres in area, which shall be bounded by north and south and east and west lines astronomically, and its breadth shall equal its length. Provided, that should any person making an application purporting to be for the purpose of mining iron thus obtain, whether in good faith or fraudulently, possession of a valuable mineral deposit other than iron, his right in such deposit shall be restricted to the area prescribed by the Regulations for other minerals, and the rest of the location shall revert to the Crown for such disposition as the Minister may direct.

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

Locations taken up prior to this date may, until the 1st 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, leach, 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

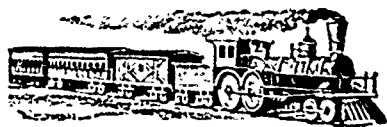
Contain the forms to be observed in the drawing up of all documents, such as:—"Application and affidavit of discoverer of quartz mine." "Receipt for fee paid by applicant for mining location." "Receipt for fee on extension of time for purchase of a mining location." "Patent of a mining location." "Certificate 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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DEPARTMENT OF INLAND REVENUE.

AN ACT RESPECTING AGRICULTURAL FERTILIZERS.

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

The expression "fertilizer" means and includes all fertilizers which are sold at more than TEN DOLLARS per ton, and which 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 the foregoing sub-section be 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. MIALL,
Commissioner.



NOTICE.

SEALED TENDERS addressed to the undersigned and endorsed "Tender for Indian Supplies" will be received at this office up to noon of TUESDAY, 20th APRIL, 1886, for the delivery of Indian Supplies during the fiscal year ending 30th June, 1887, consisting of Flour, Bacon, Beef, Groceries, Ammunition, Twine, Oxen, Cows, Bulls, Agricultural Implements, Tools, etc., duty paid at various points in Manitoba and the North-west Territories.

Forms of Tender, giving full particulars relative to the Supplies required, dates of delivery, &c., may be had by applying to the undersigned, or to the Indian Commissioner at Regina, or to the Indian Office, Winnipeg.

Parties may tender for each description of goods (or for any portion of each description of goods) separately or for all the goods called for in the Schedules.

Each tender must be accompanied by an accepted cheque in favour of the Superintendent General of Indian Affairs on a Canadian Bank for at least five per cent. of the amount of the tenders for Manitoba and the North-west Territories, which will be forfeited if the party tendering declines to enter into a contract when called upon to do so, or if he fails to complete the work contracted for. If the tender be not accepted the cheque will be returned.

Tenders must make up in the Money columns in the Schedule the total money value of the goods they offer to supply, or their tender will not be entertained.

Each tender must, in addition to the signature of the tenderer, be signed by two sureties acceptable to the Department, for the proper performance of the contract.

In all cases where transportation may be only partial by rail, contractors must make proper arrangements for supplies to be forwarded once from railway stations to their destination in the Government Warehouse at the point of delivery.

The lowest or any tender not necessarily accepted.

L. VANKOUGHNET,

Deputy of the Superintendent-General of Indian Affairs.

Dept. of Indian Affairs,
Ottawa, 3rd March, 1886.

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