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THE Canadian Mining Review

Vol. V.—No. 5. 1887.—OTTAWA, JULY—1887. Vol. V.—No. 5

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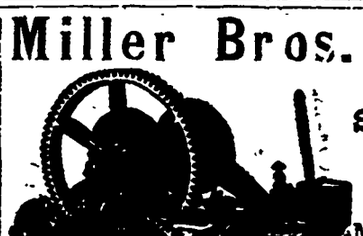

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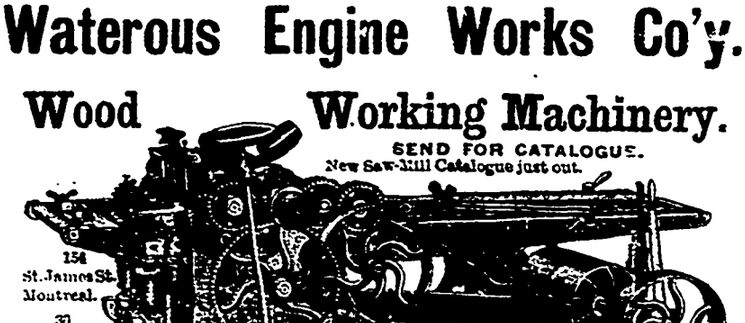

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Notice to Contractors.

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Superintendent's Residence at Experimental Farm; near Ottawa, Ont.," will be received until FRIDAY, 24th June next, for the several works required in the erection and completion of the

SUPERINTENDENT'S RESIDENCE AT EXPERIMENTAL FARM, NEAR OTTAWA, ONT.,

Plans and specifications can be seen at the Department of Public Works, Ottawa, on and after Friday, the 10th June next.

Intending contractors should personally visit the site and make themselves fully cognizant of the work to be done, according to the said plans and specifications, before putting in their tenders.

Persons tendering are further notified that tenders will not be considered unless made on the printed forms supplied, and signed with their actual signatures.

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

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

By order,
A. GOBEIL,
Secretary.

Department of Public Works,
Ottawa, June 2nd, 1887.

MAIL CONTRACT.

SEALED TENDERS addressed to the Postmaster General will be received at Ottawa until noon on FRIDAY, 5th August, 1887, for the conveyance of Her Majesty's Mails, on a proposed Contract for four years, six times per week each way, between

METCALFE
AND
OTTAWA,

from the 1st September next.

Printed notices containing further information as to conditions of proposed contract may be seen and blank forms of Tender may be obtained at the Post Offices of Greely, Leitrim, Billings' Bridge, South Gloucester, Ottawa, and at this office,

T. P. FRENCH,
Post Office Inspector.

Post Office Inspector's Office,
Ottawa, June 2nd, 1887.

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TENDER FOR THE WORKS OF CONSTRUCTION.

SEALED TENDERS, addressed to the undersigned and endorsed "Tender for Cape Breton Railway," will be received at this office up to noon on Wednesday, the 6th day of July, 1887, for certain works of construction.

Plans and profiles will be open for inspection at the Office of the Chief Engineer and General Manager of Government Railways at Ottawa, and also at the Office of the Cape Breton Railway, at Port Hawkesbury, C.B., on and after the 6th day of June, 1887, when the general specification and form of tender may be obtained upon application.

No tender will be entertained unless on one of the printed forms and all the conditions are complied with.

By order,
A. P. BRADLEY,
Secretary.

Department of Railways and Canals,
Ottawa, 27th May, 1887.

The Canada Co.

Will issue Licences to Prospect or to work Minerals on any of their Mining Lands and Mineral Reservations,

Covering nearly a

Quarter of a Million Acres

In Eastern Ontario, and principally within the belts containing

Iron, Phosphate, Gold, Galena, Plumbago, Mica, Marbles, Building Stone, and other valuable Minerals.

For list of lands and terms apply to the Company's Mining Inspector,

H. T. STICKLAND,

PETERBORO, ONT.

Department of Inland Revenue.

An Act respecting Agricultural Fertilizers.

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

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

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

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

No fertilizer shall be sold or offered or exposed for sale unless a certificate of analysis and sample of the same shall have been transmitted to the Minister of Inland Revenue and the provisions of the foregoing sub-section have been complied with.

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

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

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

E. MIALL,
Commissioner.

TIMBER AND LAND SALE.

CERTAIN lots and the timber thereon situate in the Townships of Allan, Assiginack, Bidwell, Billings, Carnarvon, Campbell, Howland, Sheguiandah, Tehkummah and Mills on the Manitoulin Island, in the District of Algoma, in the Province of Ontario, will be offered for Sale by Public Auction in blocks of 200 acres, more or less, on the first day of September next, at 10 o'clock A.M., at the Indian Land Office in the Village of Manitowaning.

Terms of Sale.—Bonus for timber payable in cash, price of land payable in cash, a license fee also payable in cash and dues to be paid according to Tariff upon the timber when cut.

The land on which the timber grows to be sold with the timber without conditions of settlement.

At the same time and place the Merchantable Timber of not less than nine inches in diameter at the butt, on the Spanish River Reserve and French River lower Reserve will be offered for sale for a cash bonus and annual ground rent of 1.0 per square mile, and dues to be paid on the timber as cut, according to Tariff of this Department.

For full particulars please apply to James C. Phipps, Esq., Indian Supt. Manitowaning, or to the undersigned.

No other paper to insert this advertisement without authority through the Queen's Printer.

L. VANKOUGHNET,
Deputy of the Supt. Gen'l. of Indian Affairs.

Department of Indian Affairs,
Ottawa, 2nd June, 1887.

NOTICE RESPECTING PASSPORTS.

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

G. POWELL,
Under Secretary of State.

OTTAWA, 15th Feb., 1886.

GRAPHITE

Wanted, fair average samples of about 1lb. each, with prices, F.O.B. Address:

J. S. MERRY, Assay Office,
SWANSEA, WALES.

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—o—

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 17th of the month.*

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

Advertising Space.

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

Mining Engineers and their Responsibilites.

The grave want of common carefulness, worse still, the gross carelessness and in some instances even unscrupulous lying that is sometimes to be found in publications and reports circulated in connection with contemplated mining enterprises has been strongly deprecated in these columns. It is not the practice of vendors of mining properties to under-estimate the value of their possessions when seeking to attract the pockets of capitalists; and this is all the more reason why extra care and precaution should be taken by our mining engineers of repute, to whom is entrusted the examination of and reporting on mining properties, or the responsible task of verifying or otherwise the generally exaggerated statements made by or on behalf of the vendors. This is very well pointed out in a recent issue of an English contemporary, which says:—

"Events which have occurred in connection with recent attempts to float rather pretentious mining undertakings afford the most complete evidence that if this legitimate class of industrial enterprise is to retain its favour with British capitalists some more reliable system must be adopted to ensure greater correctness in the reports published in prospectuses which set forth the value of a property and its probable return. The experts, so called, who are employed to place an approximate value upon mining property have, undoubtedly, a difficult task to perform, and we, who are acquainted with gentlemen of vast mining acquirements and experience in all parts of the world, are aware how earnestly many labour to discharge their duties in the face of many difficulties, and often of many temptations. It is true that many a man, however exact and conscientious he may be, may fall into error, and in such a case every allowance must be made; and generally is made, for any consequences which may result from lack of discretion. But recently a practice has crept in in connection with the examination of and reporting on mines, which is in every way reprehensible, not to use a stronger word. Recent events have shewn that almost culpable negligence or carelessness of the grossest kind has been displayed by mining engineers in connection with mining properties on which they have furnished reports. Examinations of the properties, if they have been made at all, seem to have been made in the most superficial and perfunctory manner. In all cases an investor, to whatever kind of undertaking he inclines, must largely rely on the judgment of others regarding the value and probable prospects of any particular property; but if this be so in regard to almost every kind of industrial undertaking, still more is it so in regard to a mining enterprise, because not only are the properties, as a rule, situated a long way off, but the whole details of management are of so intricate and technical a nature that entire reliance must be placed on those who are, or who profess to be, experts in these matters. Those who are interested in mining and who believe as we do, that it is a legitimate and often enormously profitable means of employing money, should insist that any laxity in connection with the all-important point of through initial investigation of mining properties, will be held to entail grave responsibilities on the part of those who profess to speak authoritatively, on that which they barely know little or nothing."

The history of several Canadian mining enterprises points out in no unmistakable manner how lamentable has been the loss of capital for lack of that careful preliminary inspection and investigation which should be made into the capabilities of every mining property before the public are invited to invest their capital.

A Commendable Enterprise.

Mr. Kamper, who was recently in Ottawa negotiating for the purchase of the Inter-Colonial Railway to a German Syndicate, states that a part of the contemplated scheme is to open up and operate immense iron works at or near Pictou. He says:—

"Our company has already spent some money in "having an examination and report made of the iron "resources in Nova Scotia by a staff of German "engineers, and their report was so flattering that the "company decided to open up immense iron and smelt- "ing works near Pictou, provided the Canadian Govern- "ment would give us protection for a certain number of "years to enable us to cope with American and European "iron manufacturers. If this protection can be obtained "we will at once commence the construction of immense "works near Pictou, and will immediately bring out "from Germany 1,000 skilled iron workers to introduce "the German methods of working iron in Canada. We "have also a very high opinion of the great mineral "resources of Nova Scotia, and are satisfied that if "worked according to German methods, and with "sufficient capital, they would turn out results that "would astonish Canadians."

The Government will no doubt see to it that these experienced Germans get every encouragement within reasonable limits. Their enterprise, if carried through to a successful issue, cannot fail to build up, on a modern and practical basis, our iron industry in the Maritime Province.

We note that the Hon. Mr. Mowat has gone to England. While there the Ontario premier might make a careful study of British mining laws to the advantage of his Commissioner of Lands and Forests. A reservation of Ontario's mineral resources for the benefit of the mining community is badly wanted at present. Unfortunately as matters exist too much provision is made for speculators, farmers, cattle dealers and other *slaughterers* of the mining industry.

The following official figures are given to indicate the quantity of Anthracite and Bituminous coal shipped to Canada from the United States during the past fiscal year:—

ANTHRACITE.	Net Tons.
Ontario	666,785
Quebec	274,232
Nova Scotia	23,248
New Brunswick	49,443
Manitoba	4,540
British Columbia	68
Prince Edward Island	1,587
Total	1,019,898
BITUMINOUS.	
Ontario	829,174
Quebec	94,809
Nova Scotia	1,486
New Brunswick	4,813
Total	930,282
(nearly all to Ontario)	10,416
Coke dust	36,229

The Sudbury Copper Mines.

In an interview with Dr. R. Bell, Assistant Director of the Geological Survey, we gathered the following interesting notes on the above mines. Dr. Bell said in substance: Any information which I can give refers principally to the condition of these mines in January last, when I paid them a short visit, for although I was again at Sudbury in the end of May, I did not then re-examine the works. A considerable village is springing up at Sudbury, which is favourably situated at the junction of the Algoma branch with the main line of the Canadian Pacific Railway. Two places are being worked—one called the Copper Cliff Mine, five miles south-south-west of the village, and the other, called Stobie Mine, four miles north of it. At the first of them the ore was found in the face of a cliff of diorite forty or fifty feet high, and the deposit had been worked from the base of the cliff to a depth of forty or fifty feet, giving a total of eighty or ninety feet at the time of my visit. The shaft or elongated pit showed a vein of solid copper pyrites ten feet or more in width. Splendid masses of yellow pyrites were being taken out. A large quantity of ore was piled up for spauling previous to shipment. A spur track from the Algoma branch has been built to the very mouth of the shaft, so that there is every facility for sending off the ore. Mr. L. H. Ashmun, the general superintendent of the mines, informed me that before winter set in they had shipped some sixty-seven car loads, or between 3,000 and 4,000 tons from this mine to the smelting works at Bergin Point, near New York. Some of it contained as much as 18 per cent. of copper. The percentage of any particular lot depended on the care and labour which had been bestowed on dressing it up by

spauling and colling. The solid pyrites showed different shades of yellow in streaks and patches, according to the proportions of copper and iron combined with the sulphur. I understand that the shaft is now about twice as deep as when I saw it. The works at the Copper Cliff are under the intelligent management of Captain Samuel Hosking.

The Stobie Mine, four miles north of the village, had only been prospected up to January, but since that time, mining has been actively carried on. A branch railway from the junction was then almost completed, and is now in operation. As the ground was covered with snow I could not make a very thorough examination of the deposit at this locality, but from the information given me it must be of great extent. I was told by the superintendent that by costeening they had ascertained the existence of a mass of ore measuring on the surface 1600 feet from north to south, and 1200 feet from east to west. It is in the form of a wide round hill, covered like the surrounding region with naked, burnt trees, and in appearance it does not differ in any way from the other low hills around. In digging through the surface, however, in any part of this hill, the subsoil is found to consist of red ochre, resulting from the burning of the oxide of iron, left by the decomposing ore. Below this are crusts of iron oxide like bog ore, and under them is a layer of black half-decomposed pyrites, which gradually passes into the solid sulphides of copper and iron. The two sulphides are mixed in a mottled and spotted form in various proportions. At the time of my visit they were putting up the machinery for driving an adit under the hill from the low ground on the east side. Since that time I hear that considerable progress has been made in this work. A deposit of such great extent is, of course, capable of furnishing an immense supply of ore and I have lately been told that the proprietors have contracted to furnish over 30,000 tons within the next year.

In addition to the two places which are being worked, promising deposits of copper ore have been found at a number of localities in various directions in the neighborhood. The original discovery of copper which led to the finding of all the others was made in a cutting on the main line of the railway a short distance west of the junction, but this place has not been worked. Judging from present appearances Sudbury promises to become a great centre of copper mining. The accidental discovery of copper at this place serves to indicate what great mineral wealth remains to be found in some of the more promising, but yet unexplored regions of the Dominion.

Geologically the Sudbury copper deposits occur in the Huronian rocks, near the south-eastern edge of the great belt which extends north-eastward from Lake Huron to Lake Abittibi and beyond. More than thirty years ago, copper and iron pyrites, rich in nickel, was found on the north shore of Lake Huron at what was called the Wallace Mine. This is in the same geological horizon as the Sudbury Mines I have examined the mine and the ore has a considerable resemblance to that of Sudbury, which also contains considerable nickel. Copper has been found in several places between the Wallace Mine and Sudbury, and also in the continuation of the strike to the north—eastward—on Tamagama Lake, for example, and again on the Blanche River, further on in the same direction. A belt of Huronian rocks, connected with the one already referred to, runs eastward from near Lake Abittibi to the south end of Lake Mistassini and on the south side of this belt near the latter lake, a notable deposit of copper pyrites was found by the late Mr. Richardson, of the Geological Survey, many years ago. It would be interesting to have this ore analysed to ascertain if it also contained nickel. If it does, it would always be an additional fact in identifying this horizon, and would go to show that we have an important copper-bearing belt of rocks extending all the way from Lake Huron to Lake Mistassini, a distance of some 500 miles or greater than that from Toronto to Quebec.

Copper may also be looked for in a corresponding position on the opposite, or north-western side of the great Huronian belt I have referred to, and in this connection I am reminded of an interesting fact, namely, that in 1875 I discovered a vein worth noting on account of its size and the quantity of copper pyrites which it contained, on the east branch of the Montreal River, which apparently corresponds in geological position with the Sudbury deposits, but on the opposite side of the trough. It is mentioned in my report to Government of that year.

I regard the whole region around the Montreal River as a very promising one for economic minerals, and I am about to explore it geologically this summer.

Our Mines and Minerals.

W. A. Carlyle, Montreal.

Continued from June issue.

Canada is becoming more noted for her extensive and valuable mines of minerals, popularly known, such as apatite or phosphate, graphite or plumbago, asbestos, gypsum, mica, slate, marble, oil and salt. Day by day the value and utility of minerals long neglected and passed by, become more evident and new industries are springing up to convert the unsuspicious, seemingly useless rock into a commodity of commercial importance. It is well known that there are large deposits of graphite as pure as those of Ceylon or Siberia, only their proper development awaits the change of events and the removal of old country prejudices. The great European manufacturers, at Falor, have become so familiar with the graphite of the east or of Russia, that they will not deign to look at ore from new localities. From the mines at Grenville and Buckingham are got pure blocks of graphite weighing from 700 to 4,000 lbs. each.

Among the mining industries of importance none have grown so rapidly or promise greater returns in the future than the mining of phosphates of lime or apatite, which is found in great abundance in the Laurentians of the Ottawa Valley, at Templeton, Buckingham, Wakeland and Portland. With the advent of more capital and better means of access, these mines are being opened up in a proper and systematic manner, working summer and winter, and last year 20,000 tons, worth $550,000, were shipped from Montreal to England and Germany. This phosphate, declared by an agent of the U. S. Government in his official report as apparently inexhaustible in volume, and the finest known in the world as a phosphate fertilizer, sells readily at this port at $18.20 a ton.

In Western Ontario, near Goderich, are the famous salt beds, famous for their great thickness and purity of the rock salt. These beds, aggregating 128 feet in thickness of pure salt, are found at a depth of 1,500 feet, and from them brine is pumped up and concentrated. Dr. Sterry Hunt has estimated that these deposits will yield 880,000 bushels of salt per acre of area. In 1873 the yield amounted to 4,520,000 barrels, while since then the increase has been very great.

Not very far from here, at Petrolia, are the great oil wells of petroleum, a most valuable economic mineral. The wells are bored to a small depth, 500 feet, and now number 2,700, and during the past four years they have produced 6,000,000 barrels of crude petroleum annually.

Throughout the broad lands of our Dominion are scattered very great coal fields, aggregating 97,000 square miles, and containing at a low estimate 100,000,000,000 tons of coal. The collieries of the Maritime Provinces have long been well known, and now the coal beds of the North-West are arousing the keenest interest, as the presence of extensive beds of good coal in these great woodless tracts is imperative for the very existence of the tide of people now settling these new provinces. There is no coal in Ontario or Quebec. On the Pacific coast inferior beds of hard coal are on the Queen Charlotte Islands, while on Vancouver Island are the most productive mines west of the Rockies. In 1885 the collieries at Wellington and Nanaimo produced 360,000 tons of excellent coal, which was shipped to San Francisco, Honolulu, or consumed in British Columbia. The character of the coal in the North-West varies greatly, changing from a poor, watery lignite to good hard coal. Just east of the mountains, in the district of Alberta, are the brightest indications, as through the valleys of the Bow and Belly rivers along the foot of the Rockies, extend great coal beds that will yield from 4,000,000 to 9,000,000 tons per square mile, one seam alone, the "coal bank," containing 330,000,000 tons. The coal is similar to that mined in the Western States for the Union Pacific railway, and is much superior to most of the lignites and brown coals which give rise to important industries in various parts of Europe. This area has crossed beyond the first range of mountains, and at Banff, now becoming familiar to tourists and invalids, the coal is found altered to beds of anthracite that will compare favorably with some of the best beds in Pennsylvania. These coal fields are very easy of access, and already some are being extensively mined to supply the demands of the C. P. R., and of the people. Great lignitic coal beds have been discovered along the valleys of the Saskatchewan and the Souris rivers, and in many other districts; and it would seem as if Dame Nature had carefully hoarded up great

stores of light and heat for the people who will yet inhabit the vast prairies and valleys of this great territory.

In New Brunswick there is an area of coal containing 150,000,000 tons, but Nova Scotia boasts of the best Canadian collieries. In this province are three distinct coal basins, Cape Breton, Pictou and Cumberland, where many of the seams have a notable thickness of 25 feet to 58 feet. The coal is well suited for heating and illuminating, as well as for iron smelting, and is now exported in large quantities. The Sydney mine in Cape Breton was begun in 1785 and has since been in constant operation, yielding in 1885 over 150,000 tons. The Springhill mine in 12 years has produced 1,700,000 tons, while in 1884 the Intercolonial mines produced 120,000 tons, the Acadia mines 115,000, the Albion mines 200,000, and the Vale colliery 74,000 tons of coal. During the past year of 1886 1,430,000 tons of coal have been shipped from Nova Scotia, which will give some idea of the extent of coal mining in this part of Canada.

In 1850, by the bursting of a dam in Albert County, New Brunswick, a vein of black jet-like mineral* was exposed. It was not coal, but as an enricher of coal-gas. This vein, the only known one in the world, brought nearly $1,000,000 to the fortunate possessors.

Canada may be justly proud of her coal measures, as these great deposits must yet play an important part in the political economy of this nation, as it is such stores of wealth that strengthen a nations power and influence the industries and fortunes of her people.

The wealth of copper hidden away in our mountains, especially along the shores of Lake Huron and Lake Superior and near Lake Nipissing is evidently great. This district has been most favourable for the accumulation of iron, silver, copper and gold, as in the valleys or troughs of the Laurentians are the rocks of the Huronian Formation, which have been fearfully twisted and distorted, while there have been great out-pourings of volcanic matter. These great earth movements have left many gaping fissures which have since been filled up with quartz and mineral ores out of the surrounding rocks by the heated waters percolating through them, and in the same vein may be found, all mixed together, arsenic, sulphur, iron, zinc, lead, copper, silver and gold.

Loose copper has been found in British Columbia, and the Coast Indians have used from time immemorial copper brought from the Alaska rivers, which they claim can be found in great abundance. Mining in the Lake Superior district has, for the most part, been suspended, though the most extensive Canadian Copper mines have been developed here. The West Canada Mining Company owned the three most valuable properties, the Bruce, Wellington and Huron Copper Bay mines, of which the Bruce mines were opened in 1846. The veins were large and rich, and most of the ore was shipped to England, after having been dressed so as to yield 20 per cent. of pure copper. In 1875 the works were abandoned owing to the caving in of the richest part of the mine, and the great fall in the price of copper after yielding $3,300,000 worth of metal. Last summer great reports were circulated about the unusual richness of the copper deposits at the Sudbury mines, which are situated near the Canadian Pacific Railway, north of the Bruce mines and west of Lake Nipissing. It is quite possible that beds of exceptional richness may occur there, still these mines, it is now believed, are not at all phenomenal in their extent and value, though the results of this winter's work, where a large number of men is being employed, will give more correct and reliable information.

At present, a copper mine to be paying, must possess exceptional facilities and richness, as in the United States and Europe. such a vast amount of copper is being mined so cheaply as to make this industry with difficulty profitable. In the State of Wisconsin there are copper beds which yield masses of pure metal weighing 100 tons; and in 1882 two mines, the Hecla and Calumet, produced 16,000 tons of copper. In Australia are great veins of pure ore, 80 feet to like jet or asphaltum and proving very valuable 100 feet thick; and in Spain, Hungary and Germany are beds of enormous extent which can be mined very cheaply. With this great competition and the want of proper fuel, Canadian copper mining has been necessarily limited to the most favored areas. At Ascot, in Quebec, are very good mines. From the Crown mines 18,000 tons of ore are being annually shipped to the United States. The Albert mine, 600 feet deep, is producing 25,000 per year, while the Hartford shaft, now closed, can produce 1,000 monthly. The Harvey Hill mines, near Leeds, were worked for a long time but finally closed in 1879. Good deposits are known in New Brunswick, Newfonndland, and Nova Scotia. At Coxheath, Cape Breton, operations of an extensive and successful character are being energeticlly carried on. Careful trials have been made by an expert mining engineer, who has reported that considering the price of fuel, plus labor, smelting can be done at this mine more cheaply than at any mine in the United States, and probably cheaper than at the extensive works of America or Europe. Thus the prospects of prosperous and extensive copper mining and smelting in this part of Canada are now very encouraging. New companies with large capital are being formed to mine the deposits north of Lakes Huron and Superior, and with better and cheaper processes, introduced during late years, this district may again soon flourish with this reviving industry.

The most important gold regions of Canada are in British Columbia, Quebec and Nova Scotia, while the precious metal has been found in the region of the Lake of the Woods and Lake Superior, in veins associated with ores of copper, lead and silver. In British Columbia gold is very generally distributed, but the richest fields follow a region of mountains and high plateaux, comprising the Purcell, Gold and Cariboo ranges. Gold is said to have been first discovered near the junction of the Fraser and Thompson rivers, and in 1858, ten years after the great California rush of '49, miners began to flock in, and the gullies and flats of the Fraser became animated with men eagerly searching for the yellow metal. The gold has been mostly obtained by washing the placer deposits, and in 1860 the Cariboo district, the richest of all the Columbian diggings, was first worked. In 1869 Ominica was developed, Kootanie in 1886, while in 1886 occurred the rush to the Big Bend of the Columbia river. The total yield of the gold from this province up to 1886 amounted to $49,000,000 worth of bullion, of which Cariboo gave nearly $30,000,000. When compared with Australia or California, these gold diggings have not proved so very rich, for in one province alone of Australia, Victoria, during the same period of time, $1,000,000,000 worth of gold has been mined. At present the surface deposits appear to have become quite impoverished, except at Cariboo and Granite Creek, and prospectors have been attracted to the gold bearing veins which a year ago promised remarkable results, but during the past year of 1886 these hopes have been greatly crushed, as many leads which seemed so promising have been found worthless, except with the expenditure of an immense amount of capital. The piercing of the canyons and heights of the Rockies by the Canadian Pacific Railway, now offers better means of access for the heavy machinery necessary, but even yet the cost and trouble of transportation is so great that capitalists cannot be induced to develop these gold veins until they know the results of one large company, which has begun operations on an extensive scale. Still, judging from present authentic information, British Columbia will not be a rich source of gold unless it is found in greater quantity and under more favorable auspices, and those who have foretold the flow of a golden tide from these mines of the Pacific, are doomed to disappointment, or a long waiting for the realization of their prophecies.

The occurrence of gold in the Chaudière Valley, in Quebec, was first noticed in 1835, after which it was seen that nearly every stream would yield gold when the sands were washed. In the Counties of Compton and Beauce, paying deposits have been worked, while mining on the little Ditton River, carried on in a most desultory and primitive manner, has yielded $100,000. Throughout the Chaudière Valley there are many gold bearing veins, while many feet below the present river, are ancient river channels, which, when reached, have proved to be very rich in coarse gold, and will, without doubt, in the near future, make this valley one of the richest mining districts of Canada. Gol

*Albertite.

was first discovered in Nova Scotia in 1859, and in 1862, 7,000 ounces were extracted, since then the yield has been high, 400,000 ounces, worth $8,000,000, having been mined. When it was announced that gold was being found in many places, men and capital poured in, but through reckless and ill-advised systems of mining, failures thickened everywhere. The gold bearing area, 100,000 square miles in extent, reaches from Canso to Yarmouth. The pressure of the ocean bed, as mentioned before, has caused tremendous foldings of the earth throughout this part of Canada, twisting and bending great areas of rock as if so much paper, and great stretches of land have been folded together and thrown completely over. On the summit of these great folds, which have subsequently been greatly worn away by the high action of water, are found the richest veins. The most successful results so far have been attained by small companies, as large corporations with large expenditures have generally met with failure. Indications warrant the expectation that with better experience and skill, these regions, which are certainly rich in gold, will yet become of much greater value and importance.

Silver has been mined in British Columbia, but the chief and most celebrated mines are along the shores of Lake Superior, whither attention was drawn in 1846 by the discovery of silver and copper in the sandstones and limestones. A few companies worked some of these veins for a time, but nothing of much value was done until 1863, when rich discoveries at Thunder Bay again aroused great interest among miners, who met with very discouraging results. In 1868 the Montreal Mining Company sent out a large party under Mr. Thomas McFarlane to survey and examine this wilderness of rock and forest. Many veins of silver and copper were found, and one day, while an assistant was planting his picket for the surveyor on a small rock three-quarters of a mile from the main bend, he noticed a vein rich in lead ore. On blasting near the water's edge rich nuggets of silver were found, and on looking down through the clear crystal waters of this lake, the excited explorers could trace a large vein running far out into the water; detaching and fishing up blocks of the rock, they were found to be rich in lead, while further examination disclosed the great wealth of silver and the most famous silver mine in Canada, Silver Islet, gave up the secret of its hidden treasure. Silver Islet was a small island only 50 feet across at its greatest width, being the summit of the hard quartz vein just appearing above the water, and before operations could be begun, it was necessary to build up all around to keep out the water and to make room for the mills and wharves. This was a source of great trouble, as the island being only 8 feet above the lake, was exposed to the full fury of the gales and the force of the moving ice, which again and again crushed in the crib-work though it was massively built. Between the years 1870 and 1878 $3,000,000 worth of silver was sold, and up to 1884, when work was suspended at a depth of 1,230 feet, $6,500,000 had been extracted from this mine, which ranks among the famous mines of the world.

This closes a rapid and very imperfect summary of the mines of this Dominion. The endeavour has been made to give a few facts about these metal industries, with their present condition and future prospects, as well as the factors or influences which affect and control their destinies. Canadian capitalists, taught by experience, or rather the fruits of inexperience, and the many failures, have become exceedingly wary when allured by tempting offers of mines fabulously rich, and many really valuable and safe properties now remain idle which would yield fortunes if judiciously and sensibly managed. Among the world's industries, none, perhaps, is so uncertain, so liable to failure as that of mining, as there are so many elements of failure with which to contend; and many unsuccessful ventures have been ruined by sheer hard luck.

A traveller through the mining districts of Colorado will see the waste of millions of money scattered through the canyons and along the hillsides, with nothing left to account for the vanished wealth but buildings of useless machinery and a hole in the ground. Such can be seen in Canada. Along the shores of the Lake of the Woods stand monuments to the folly of inexperienced men, who, believing they had found wealth untold, rushed in with machinery and mining appliances worth many thousands of dollars, which any engineer, or anyone familiar with mining, would have at once told were totally unsuitable for their particular kind of ore. Is it any wonder then that these men did not realize their golden dreams, and that now all these valuable mills stand idle and valueless, with the capital all dissipated. This has been the great cause of mining failures in Canada and elsewhere. Companies, instead of securing competent and expert advisers and spending several thousands of dollars in learning the real extent and value of their property, have gone on with their work, trusting to their own judgment and imperfect knowledge, believing that a certain system of mining, successful in another locality, will exactly suit their own, a fallacy to which many a ruined man will attest.

For all this Canadian mines offer many incentives to the miner. This part of her great natural resources will certainly be a valuable and most important factor in her future destiny, and will aid, greatly, in making her the great nation she promises to become.

A British government blue-book has been issued, containing detailed reports relating to the ownership in minerals and mining rents and royalties in France, Germany, Austria-Hungary, Italy, Belgium, Portugal, Spain, Sweden and Norway, and the United States.

Use of the Magnetic Needle in Exploring for Iron Ore.

By Mr. B. H. Brough, Assoc. R.S.M., F.G.S., F.I.C.

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As a general rule, geological and mineralogical methods alone are used in exploring for ore deposits; only in a few exceptional cases are physical methods possible. Thus in exploring for magnetic iron ores the compass may afford valuable aid, and has, in fact, been employed for this purpose in Sweden and the United States for many years.

The theory of its use is based upon the fact that certain minerals deposited in the earth become magnetic by induction under the influence of the earth's magnetism, and that, consequently, the two poles are fixed in the direction of the magnetic inclination at the opposite ends of the deposit. It is well known that there are substances, such as steel and magnetite, exhibiting polar magnetism: that is to say, they retain the magnetism once acquired even if the inducing force ceases to act. Other substances, such as soft iron and magnetic pyrites, exhibit simple magnetism; in other words, they are magnetic only so long as the induction remains

The intensity of the magnetism exhibited by deposits of magnetite varies greatly, and is frequently so slight that only delicate instruments and practised observers can detect it; in other cases the needle is affected at considerable distances. It must, of course, be remembered that a given magnetic force affects the needle to exactly the same degree through 100 feet of granite as through the same distance of air.

If the magnetic north pole of the earth is regarded as negative, and the south pole as positive (in the northern hemisphere), the upper end of a vertical mass of ore will be negative, and the lower end positive. Consequently, if a magnetic needle is brought near the upper or negative pole of the deposit, the north-seeking or positive end of the needle will be attracted. When the point of observation is very near the ore-pole the needle will dip downwards. The lower or positive pole of the ore-mass, being usually situated at a considerable depth, will not affect the observation. Other deposits, coursing in a more or less easterly and westerly direction, are less affected by induction; the poles being situated in the long sides of the deposit. Frequently the deposits are faulted and broken. In this case the separate portions behave like fragments of a broken bar magnet, the adjacent ends exhibiting opposite polarity. In exploring for ore, then, if, on advancing from north to south, the free needle is first attracted and then repelled, a fault in the deposit is indicated.

To explore for ore the ordinary miner's dial or surveyor's circumferenter may be employed. If a straight line is followed with the instrument, the needle will remain directed towards the same point of the dial; or, in other words, will remain in the magnetic meridian as long as it is kept sufficiently far away from iron and magnetic ore masses. But if these are approached, the needle will gradually be deflected. The only case in which there will be no deflection is when the attracting deposit is approached along the meridian passing over its upper pole. It follows that in magnetic surveys the meridian line must be found, and fixed in the field or on the plan. For this purpose at least two straight lines are set out in the magnetic east and west direction, from thirty to fifty yards apart. These lines will at

some point cross the meridian line. If the dial is set up at one end of a line of this kind, at a considerable distance from the magnetic mass, there will, of course, be no attraction. On approaching the meridian the needle will be gradually attracted, and at a certain distance the maximum attraction will be reached. On approaching nearer it will become smaller, until, at the ore meridian itself, it will be inappreciable. The angles of deflection observed at the various stations are noted on pegs driven into the ground, and also in the field-book, or in the plan. Following the same straight line to the other side of the zero point —or, what is the same thing, to the other side of the ore meridian—the same attractions are exhibited, but in reverse order; the needle turning back to the meridian. If similar observations are made along the second east and west line it is easy to fix the ore meridian by joining the two points where there is no deflection. These points are midway between the two points of maximum deflection. This passes over the upper pole of the deposit, and if the pole is approached along the meridian line the dip of the north-seeking end of the needle will, as a rule, be greater the nearer it comes to the pole. This method is, however, not adapted for fixing the position of the pole exactly. This may be done by determining the isogonic lines—that is to say, by joining the points where the needle has the same deflection.

In order to obtain one or more parallel isogonic lines on both sides of the ore meridian, it is necessary to set out a number of lines parallel to the ore meridian, and from ten to thirty yards apart. At the points where these lines intersect the east and west lines, the angles of deflection must be observed, and isogonic lines constructed by joining the points of equal deflection. The needle being drawn so much out of its horizontal position that its free play is hindered, it must be weighted and balanced by a piece of wax. If, now, from some point of intersection in the network of squares made on the field of observation, a line is drawn in the direction of the deflection of the magnetic needle, it will cut the isogonic curve at a second point, and, eventually, the ore meridian. The two points where the isogonic line is cut are joined; the joining line is bisected, and at the point of bisection a perpendicular is erected; then, perpendicularly under the point where this cuts the meridian, is the upper ore pole, and at this point it will eventually be found best to sink the shaft, so as to be certain of cutting the ore mass. The ore meridian, it must be noted, need not always be a straight line.

In cases where a better instrument was not available, excellent results have, in this way, been obtained with the ordinary pocket box compass, held in the hand.

For preliminary magnetic surveys, no instrument is better than the Swedish compass. In this instrument, the needle, besides revolving in a horizontal plane in the usual manner, can also turn in a vertical plane to an angle of about 60° with the horizon. The needle is horizontally suspended in a brass case on a long vertical brass pin by means of a long glass cap. The brass terminates above in a short steel point, on which the glass cap rotates. At the bottom of this is a brass stirrup, provided with fine holes, through which pass the horizontal pins supporting the needle. To enable the needle to dip, there is a long slot cut along the middle of it. The compass box can be suspended by means of three strings passing through three small rings fastened 120° apart on the outside of the box. It can thus be easily carried in the hand. Graduation is not usual, and indeed unnecessary. Only the cardinal points are marked, as in using it, deviations from the horizontal position alone have to be noticed. This compass was invented in the last century by the celebrated Swedish miner, Daniel Tilas, and is still in general use. The dip of the needle is estimated merely by the eye, and is not actually measured.

The miner's or dip compass was invented in the United States in 1866, and was adopted by the Geological Survey of New Jersey in the systematic explorations for magnetic iron ore in that State. In this instrument the magnetic needle is suspended so as to move readily in a vertical direction; the angle of inclination being measured upon the divided rim of a small compass box. The needle cannot move horizontally. When in use, the ring is held in the hand, and the compass box, by its own weight, takes a vertical position. It must, of course, be held in the plane of the magnetic meridian, which can be determined by holding the instrument horizontally. In this way it serves as an ordinary pocket compass. Messrs. W. & L. E. Gurley, of Troy, New York, make several different forms of this instrument. That with a 3-inch needle has the two sides of glass, and is provided, when desired, with a stop for the needle. Another form has a brass back and cover, and a 2½-inch needle. Another represents an improved compass by the same makers. It is a modification of Swedish compass, and has a needle 3 or 4 inches long, resting upon a vertical pivot so as to move freely in a horizontal plane, and thus place itself in the magnetic meridian; while being attached to the needle-cap by two delicate pivots, one on each side, it is free to dip. It is usually provided with brass covers on both sides.

With the dip compass, whether Swedish or American, perfectly trustworthy results can only be obtained when the observer is acquainted by long experience with the peculiarities of his instrument. Compass explorations being in many cases the sole source of income, it can easily be understood that a skilful operator will be inclined to keep his mode of procedure secret. Consequently the uninitiated are apt to believe that the operator must be specially gifted; and frequently the supernatural properties formerly ascribed to the divining rod are transferred to the compass. This excess of faith in some is accompanied by scepticism in others. For this, unfortunately, there are good grounds; the compass being so admirably adapted for dishonest purposes. Thus, Mr. T. B. Brooks mentions an American prospector whose compass needle in the vicinity of an ore mass always showed a dip of 90° when facing west, and the true dip due to local attraction when facing east. The former position, it is said, was very successfully used in selling iron ore grounds, and the latter in buying them. Similarly in Sweden a powerful magnet inserted in a walking-stick has been successfully employed to give a large dip to the needle when it was thought desirable to mislead the purchaser.

As a rule, surveyors assume that the most ore must occur where the tip compass shows the greatest inclination, or is perpendicular. This assumption, however, is erroneous. The place where the needle is attracted most by a vertical ore bed is not directly above, but to the north of, the south pole of the deposit. For, if the magnetism of the earth is powerful enough, there must be somewhere north of the ore pole a point at which the horizontal components of the magnetism of the earth and of the ore bed are equally powerful, but acting in opposite directions. At this point the horizontal forces neutralise each other, and then the vertical forces of the magnetism of the earth and of the ore bed tend to bring the needle into a vertical position.

The evidences afforded by the needle often lead to error. An unimportant pocket of ore near the surface may have as great an action on the instrument as a larger ore mass situated far below the surface.

It is thus seen that in exploring for iron ore, with the magnetic needle, a purely scientific method is necessary. The compass should be employed for preliminary work, in order to save time and labour; but before a shaft is sunk, recourse should be had to a more accurate method. Improved methods, available for the purpose, have been devised by Brooks, Wrede Thalén, and Tiberg.

BROOKS' METHOD.

Mr. T. B. Brooks, of the Geological Survey of Michigan, in exploring for iron ore, determined with a pocket compass variations east or west; the bearings of a standard line being taken as in ordinary surveys. The inclinations or dips were observed on the dip compass held in the hand in the plane of the meridian. Sometimes observations were made with the compass held at right angles to this position, that is, facing north and south. The instrument was always held in the hand and levelled by its own weight. The intensity of the magnetic force for the three positions of the compass was measured by the number of oscillations made by the needle in a unit of time, usually taken at a quarter of a minute. No attempt was made to eliminate the earth's attraction by neutralising it with a magnet while the observation was being made, nor by computation; and the great amount of friction in the compass renders the number of oscillations only an approximation to the number that would be obtained with a delicately mounted needle. Mr. Brooks has, however, done excellent work with this method in the Marquette region and in New York and New Jersey. He also describes another method of, working, which he calls magnetic triangulation. The mode of procedure is as follows:—Remote from any magnetic rocks, neutralise, by means of a bar magnet, the earth's influence on the needle of a solar compass. The needle will then stand indifferently in all directions. If the compensated instrument is set up near the magnetic pole to be determined, the needle will point as nearly towards the local pole as its mode of mounting will permit. The operation being repeated at two other points near the magnetic pole, the three lines must intersect in one point, which will be directly over the pole of which the position is sought. By using a dip compass in a similar manner, data to determine the depth would be obtained. The fact that several local poles often influence the needle at each station renders this method difficult in practice; a place must be sought where but one strong pole exists.

To be continued.

Electricity in Coal Mining.

A number of gentlemen interested in electric lighting met lately in London to witness the capabilities of the "Eclipse" portable electric battery, which, with its low-resistance lamp, has already been tested with gratifying results on the Great Western Railway and elsewhere. The lamp is suitable for domestic illumination, and is said to be the safest and most economical electric light in existence. It is also adapted for railway signals, private carriages, omnibuses, &c. It is conspicuous as a miner's safety lamp, and only weighs 4 lb. or 5 lb. The battery is

charged with the simplest ingredients, viz.: sulphuric acid and common soda, and while the battery and lamp may be obtained for a few shillings, the cost of the charge is only 2d., and it will last for 24 hours. Dr. Sivanus P. Thompson, speaking of the qualities of the "Eclipse" electric battery, and of the miner's lamp in particular, said that a short time ago he, with many other gentlemen, was engaged on the Woolwich Commission in the inspection of 200 different miner's lamps, and that when the test of blowing them up was tried, not a single one would stand the test. He added that there are 100,000 miners injured every year, not only by explosions, but many other causes which arise entirely from deficient light. In the "Eclipse" miner's lamp the light was thrown upwards as well as sideways, and, even if it were true, which it is not, that it cost ten times as much as the ordinary safety lamp, he thought it ought to run the ordinary safety lamp out of existence. He could verify the statement that the batteries would run at least 13 hours. That in itself was quite sufficient to show the advantage of this over the ordinary miner's lamp. Dr. Thompson stated it was quite impossible to blow the lamp up, and that it could not possibly cause an explosion.

PHOSPHATE

The following shipments of Canadian ore have been made from Montreal for month ending 30th June 1887 :—

Date.	Shippers.	Ship.	Destination.	Tons.
May 30	Lomer, Rohr & Co	s.s. Gratitude.	London....	100
" 31	" " "	s.s. Southwold.	do	240
June 1	" " "	s.s. Alcides....	Glasgow..	75
" 2	" " "	s.s. Katie.....	London....	229
" 7	Anglo Canadian Phosphate Co...	s.s. Bannington	Liverpool..	300
" 12	Wilson & Green	s.s. Titania ...	do	74
" 14	" "	s.s. Castledale.	London....	247
" 14	Anglo Canadian Phosphate Co..	s.s. Castledale.	do	110
" 19	Lomer, Rohr & Co	s.s. Ocean Prince	do	160
" 19	Wilson & Green	do ..	do	98
" 22	Anglo Canadian Phosphate Co...	s.s. Concordia.	Glasgow...	125
" 23	Lomer, Rohr & Co	s.s. Merchant's Prince..	London....	200
" 23	Anglo Canadian Phosphate Co	do	do	160
" 24	Lomer, Rohr & Co	s.s. Black Prince..	do	109
" 24	Millar & Co.....	do ..	do	200
" 28	"	s.s. Bayswater.	do	90
" 28	Lomer, Rohr & Co	do .	do	190
" 29	Wilson & Green..	s.s. Ovenholme	Liverpool..	661
" 29	" "	Bar. Lady Dufferin	London....	249
" 29	Lomer, Rohr & Co	do ..	do	40
" 30	" "	s.s. Waudrnham	Hamburg..	40
" 30	Millar & Co.	do .	do ..	250
" 30	Anglo Canadian Phosphate Co..	do ..	do ..	94
" 30	Lomer, Rohr & Co	s.s. Colina.....	Glasgow..	190
			Total....	4,153

LATEST ENGLISH QUOTATIONS.—MINERAL PHOSPHATES.—There is a fair enquiry for High Class Canadian, but very little offers at present. It is, however, expected that now the fine weather has set in, Raisers will soon be in a position to estimate their production, and the quantity they may have to sell over the Summer season. The price for South Carolina Phosphates has advanced with the rise in Steam Freights, and 7¼ to 7½ per unit is now the quotation for River and Land, according to the quantity required. Belgian Phosphate—little has been doing during the month, Raisers of 40 45 per cent. declining to sell more at late prices, and with two more Works lately producing the material closed, it is much scarcer. The higher grades are offering freely, and we could contract for next season on favourable terms. Somme Phosphate of all (except 75 80 which is firmly held by the two Raisers producing it) is offering at lower prices; several of the smaller Manufacturers are getting into difficulties with the Iron and Alumina guarantee.

Owners of phosphate properties have been much encouraged by latest advices, which announce sales at 1s. per unit, which is equal to £4 per ton.

The Templeton & Blanche River Phosphate Mining Company commenced operations on their property early last month, and so far the management are well pleased with their prospects. The deposits owned by the company are located on lot 7, on 11th Concession, half of lot 6, on 8th Concession, and lot 5, on 9th Concession, Township of Templeton. The work, which at the outset was somewhat scattered, is now being concentrated at two special points and will now be conducted vigorously.

At the Otty Lake Mines five pits are now being worked, and others will shortly be opened. One of the pits has been producing a high grade red phosphate until lately, when a change took place in the character of the vein, and now the product of the pit is composed of a beautiful green phosphate of a very high grade. The pit is about 45 feet deep and is worked by one of the steam cranes used some years ago by the Montreal Steam Crane Co. in unloading ships on the wharves at Montreal. Another pit, opened about two weeks ago, is on a vein of phosphate and calcite. The phosphate occurs in seams and pockets in the calcite; and near the surface cavities are found containing on their floors large quantities of fragments of crystals which require only to be shovelled out.

Mr. F. Van Bruyssell, the Consul-General for Belgium, has paid us a visit with the object of obtaining as full information as possible regarding our phosphate deposits. Samples of the ore taken from the leading Canadian mines were given him, and these, we have since learned, have been forwarded to His Excellency Prince de Chemay, Minister of Foreign Affairs, Brussels. The quantity of fertilizers used in Belgium is much greater than we had any conception of.

At the High Rock Mines about 600 tons of high grade ore have been raised during the past month. The management hope to ship over 8,000 tons during the season. Mr. Pickford, Sr., has been at the mines for over a month and states that the pits are looking very well and that everything goes smoothly. A "chute" has been constructed from the end of the tram line over the river bank, which will greatly facilitate the loading of the ore.

Mr. McIntosh has resigned his position at the Union Mines. He will shortly open up his property near High Falls.

The shaft at the North Star Mine has reached a depth of 600 feet, and is still showing a fine vein of ore all the way down. The management are very busy moving their output to the river, which is some four miles from the mines.

About 400 tons of ore per month is being shipped to Montreal from the Union mines. Capt. J. E. Smith has entire charge of the mine.

The tram line at Little Rapids is proving a most successful acquisition, and the ore at this valuable property is now being handled with great facility. Five men can by this means load a scow with 70 tons of ore from the mines in seven hours. As the majority of the hands have been employed on the work of constructing the tramway, the output during the month is somewhat below the average.

Mr. Boyd Smith, of Washington, D.C., who is engaged phosphate mining at Charbot Lake, Mr. Pickford, Sr., and others interested in phosphate mining, paid a visit to this property on 11th inst. They were particularly impressed with the mode of cleaning the ore and expressed themselves much pleased with the working of the property.

At the Emerald Mine a very steady output of high grade ore continues, and the prospects for the season are bright. About 500 tons are being shipped per month.

Work on the new Locks near Little Rapids has at last been commenced. The improvements are badly wanted and it is to be hoped there will be no further delay in the work of immediate construction.

The Canadian Pacific Railway are doing everything in their power to meet the requirements of the miners in the transportation of their ore. Managers report themselves as much pleased at the improved facilities given them by the road since last year.

MINING NOTES.

Nova Scotia.

New Glasgow, says an exchange, is growing to be a busy place. Within a circle of two or three miles there are half a dozen collieries employing 1,700 or 1,800 men, while the glass works, steel forges, foundries, plough works, carriage factories and other smaller industries furnish profitable employment for 1,000 hands. The Short Line Railway gives it closer connection with the West, and if all the expectations of the enterprising men who have built high hopes on the future of New Glasgow are realised it will become the Newcastle of Canada. When Nova Scotia decides to replace its wooden ships by iron and steel, New Glasgow and vicinity is the locality where it will be done, as the material is there and only requires the necessary energy and capital.

Gold mining, says the *Critic*, is being vigorously pushed in all the gold districts in the Province, and with most encouraging results. In Yarmouth County, the Kempt Gold Mining Company are pushing operations on a more scientific scale than before, and from all accounts the Company are likely to be richly rewarded for their determination. The Cowan Mining Company has a splendidly-equipped mine and it is reported that the property is about to be sold at a good high figure. Prospecting is being vigorously pushed, and new finds are likely to be reported at any moment.

The official returns for the month of June are as follows:—

District.	Mill.	Tons Crushed.	Oz. Gold.
Tangier.....	Mooseland.....	21½	15¼
Sherbrooke..	Miners'.....	25	8¼
" ...	Goldenville..	52	8
East Rawdon	Rawdon.....	350	342
Lake Catcha..	Oxford.....	95⅝	138⅜
Brookfield....	Brookfield.....	200	122½
Whiteburn...	Cushing C. M. Co..	20	53⅛

New Brunswick.

The manganese property, at White's Mountain, is reported to be showing up well. It is thought that probably $2,000 worth of ore is on the dumps.

It is understood that efforts are being made to form a joint stock company with a view to operating the manganese property at Petitcodiac.

Quebec.

Our correspondents from the Asbestos districts write:—"We have nothing special to report in Asbestos. Operations have been prosecuted steadily since our last with the exception of some interruption last week from local heavy rains. Men are getting scarce just now, many being employed haying, which has been commenced by the farmers. Prices on Crude Asbestos remain the same and there is a somewhat larger demand this year."

The Oxford Copper and Sulphur Company, of Capelton, Que., Bayonne, N. J., and New York, have suspended payment, but are maturing plans by which they expect to resume business and pay up their liabilities of $600,000 in full. The company owns valuable copper mining property in Canada and the earnings during the last year showed a fair profit, which was devoted to improving the plant and developing the mines. The company have a large stock of copper on hand at their smelting works at Bayonne, as well as valuable mining lots at Capelton, so that the failure is not expected to turn out a bad one, and a fair dividend may be confidently looked for.

Ontario.

The properties owned by Messrs. Jenkins & Chambers in 18th, 2nd, 8th and 15th concessions of Wollaston give promise of being the most extensive iron deposits yet discovered in Ontario. The Station mine shows a continuous length of over 1,500 feet with a width varying from 20 to 100 feet. A Government analysis of ores from the 2nd concession shows 56 per cent. metallic iron with no injurious elements. The deposits in the 2nd and 15th concessions are still larger than that mentioned. It is to be regretted that lack of capital prevents the full development of these very promising deposits.

The *Journal of Commerce* of 8th inst. announces that:—

"A syndicate composed of Milwaukee and Chicago capitalists, of whom Hustis, Coughlan and Ray are the representatives, recently purchased a tract of 200 acres of mineral land in the Township of South Crosby, Leeds County, Ontario. They have been doing some prospecting, and some samples of ore were received in Chicago this week, and the company at once received an order for 1,000 tons at $6 per ton from a Chicago steel company."

There is nothing to report from the Bristol Iron Mines. We hope to give our readers some idea of the progress being made there in our next issue.

A discovery of exceedingly rich native silver has been made on Pitch River, on a location owned by the Ottawa Mining Company.

Another vein of gold is reported to have been found on the property owned by Mr. Coffee, near Sudbury.

PORT ARTHUR DISTRICT.

The mines in the vicinity of Thunder Bay are deservedly attracting considerable attention at the present time, for every day brings fresh evidence of the unquestionable richness of that vast mineral region. Latest advices report a very rich discovery of silver, which has been made at Atick Lake, about fifteen miles west of Silver Mountain and within two miles of the present terminus of the located lines of the Port Arthur, Duluth and Western Railway. The fortunate possessor of what is an undoubtedly very valuable property is Mr. W. A. Allan, of Ottawa, who is bound to realise handsomely on his investment. He will develop the property forthwith. We understand that Mr. Allan's agents are still prospecting in the Whitefish Region. Their reports indicate that further discoveries will very shortly be made public.

Another new find has been made about ten miles west of Silver Mountain and about half a mile north of the railway route and immediately east of the property now being worked by the Queen Mining Company of St. Paul and across whose property, as well as the adjacent one in the east, owned by Mr. Dounais, the vein runs. This has been secured by one of our enterprising merchants who was pointed out the vein by a brother of the celebrated Louison, the discoverer of the Rabbit and Silver Mountain mines.

Messrs. Eschweiler & Buchanan are getting out rich ore from their property near the Porcupine mine.

The Ontario Silver Mining Company has been organised at St. Paul, where the principal office will be, with a capital stock of $2,000,000, shares $5 each, to work property located at Location R 146 and R 147 in Thunder Bay District. The officers are: Edward H. C. Taylor, President; Robert M. Fulton, Vice-President; Albert K. Murray, Secretary; Thomas Tyrer, Treasurer.

Manitoba and North-West Territories.

As already announced the Galt Coal Mines at Lethbridge have been temporarily closed down owing, it is claimed, to the arbitrary action of the miners. An association was formed by the miners some time ago, and owing to the distance of the mines from any centres of population, and the difficulty of obtaining men, the employees have had things practically their own way. Their action at last became so unbearable that the Company decided to close the mines, until new men could be procured from the East. A sufficient supply of coal is on hand to fill requirements until work can again be started. The *Athabasca*, which arrived at Port Arthur on the 5th, brought up seventy miners from Columbus, Ohio, who are going to work in these mines.

Shipments of coal from the mines of the Canadian Anthracite Company, at Banff, are being vigorously conducted. Winnipeg and San Francisco are the points so far to receive the largest consignments.

British Columbia.

A dispatch from Sand Point, Idaho, says: "The first shipment of silver ore into the United States from British Columbia was made on 15th June, from Kootenai, a flag station four miles east of this point on the Northern Pacific Railroad. The ore goes to Montana for reduction, and runs about 400 ounces of silver per ton. It was shipped from the Krao mine, on Kootenai Lake, British Columbia, by one of the owners, A. D. W. Wheeler."

The 80 stamp quartz mill for the Alaska Union Mining Company, on Douglas Island, has arrived from San Francisco.

A valuable discovery of platinum is reported at Granite Creek.

Letters from Big Slide state that the river is receding and that the works at the Foster mines had not been damaged, only the lower floor of the chlorination works having been under water for three or four days. The difficulty in chlorinating the concentrates had been partly overcome, a tub having been "gassed" in nine and a half hours. The tailings show a heavy loss in gold, and steps have been taken to ascertain the reason of the loss and check it.

The *Colonist* states that an immense deposit of finest lime has been located on McDonald's farm, near Agassiz station. A company has been formed for the purpose of bringing it into market, and kilns are now being built for that purpose. It is most conveniently situated, for it can be loaded on steamer or scow direct from the kilns, and a tramway can readily be built to the railway line.

Copper has been found in the Blind River district. The find is reported valuable.

Mineralogy, Geology & Science.

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

The Correlation of the Animikie and Huronion Rocks of Lake Superior.

By Peter McKellar, Esq., Fort William.

In his excellent paper upon this subject read before the recent annual meeting of the Royal Society of Canada, Mr. McKellar, who has had over twenty years practical experience among the rocks of both sides of Lake Superior, gave convincing evidence of the true relations of all the rock formations of these regions. In his opening remarks he referred to the diversity of opinion that of late years has existed among American geologists who have combatted the stratigraphy of the rocks of the North Shore, as defined by Logan and other Canadian geologists alleging that the lower group of the upper-bearing series of Logan (now called Animikie) is identical with the Huronian. Mr. McKellar shows the general dissimilarity of the two formations and thein proceeds to give an analysis: First, of the lithological features and secondly of the stratigraphical arrangement of each, by which their strong contrast is brought out. His intimate knowledge of every part of the ground covered makes it impossible

to controvert his facts, and his reasoning is conclusive and entirely favourable to the position taken by our geologists. The Huronian rocks of the different areas north of the great lakes differ more or less from one another, both as to the presence or absence of some of their lithological constituents, and in relative volumes or proportions of certain kinds of rocks which may be present: but in the main Mr. McKellar thinks that the general lithological difference between these areas may be considered as of degree and not of kind. "No good reason," he said, "has yet been shewn for considering any of them as entitled to a separate classification. To attempt to do so, in the present state of our knowledge, would only lead to confusion. The so-called 'Typical Huronian of Lake Huron,' contains the same kinds of rocks as the 'Huronian areas' of Lake Superior, although the quartzites are in relatively larger volumes, and possibly part of the former series may prove to be a little newer than most of the latter. If the Lake Huron quartzites and their associated rocks could be shewn to belong to a formation distinct from all the rest of the rocks which have been classified as Huronian, it might then become difficult to prove their chronological relation to the Animikie formation. Stratigraphy would give but little aid in ascertaining their relative positions, if their equivalency with the Huronian schists of Lake Superior were in doubt. But I believe that almost all geologists are agreed, Prof. Irving among the number, that they belong to the same system. The somewhat lower angles of dip than the average in part of the Lake Huron region, and the relatively large development of the quartzites are the circumstances which have caused doubts in the minds of some who have lent limited personal knowledge of the Huronian system as to their equivalency with the rocks of the age on Lake Superior, which are generally more schistose. But many other examples could be given of low dips in various Huronian regions. Again the quartzites of Lake Huron are conformably associated with great volumes of crystalline Schists, apparently identical with those of Lake Superior. The white and gray quartzites of different shades are met with in the Huronian bands north of Michipicotau, at Red Lake (to the north Lake of the Woods) and elsewhere. Dr. Bell has shewn that they exist in *great force* among rocks of the ordinary Huronian types on the North-West Coast of the Hudson's Bay. My personal knowledge of the rocks of Lake Huron is not so complete as that of Lake Superior, but from the descriptions of Sir William Logan and others and what I have myself seen on the Lake Huron Strata, the greenstones and schists of the formation there appeared to me to be precisely the same in character as these equivalents on Lake Superior, and they are not in the least like the rocks of the Animikie formations. Even the veinstones of the former region are markedly of the Lake Superior Huronian type and quite different from those of the Animikie series. My impression is that the original Huronian of Lake Huron can never be shewn to be equivalent to the Animikie, any more than the Huronian of Lake Superior. They must either be classified with the last mentioned or as an intermediate formation." Incidentally connected with this question is the relation of the Animikie group to the Keeweenian, and on this subject Mr. McKellar stated the results of his own observations. These questions are of great economic importance in connection with the occurrence of native copper in the Keeweenia, of silver in the Animikie, and of iron in the Huronian series.

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1st. Clark Mine, Lot 11, R. 7 Ascot ..... 187 acres
2nd. Sherbrooke Mine, part Lots 12 and 13, R. 7 Township of Ascot..... 329 "
3rd. Belvidere Mine, part Lots 9 and 10, R. 9 and 10, R. 8 Ascot ..... 292 "
4th. Mining Rights in same vicinity on..... 250 "

All of the above properties lie within 1½ miles of the Village of Lennoxville, at the junction of the Grand Trunk, Canadian Pacific and Passumpsic Railways, and have been developed to a considerable extent, and veins opened 6 to 20 feet in width, yielding 3 to 5 per cent. of copper, also silver, and 35 to 40 per cent. of sulphur. These mines are only 2½ to 3 miles distant from the City of Sherbrooke, and evidently are of the same class of ores found at Capelton, only four miles distant, owned and worked by the Orford Copper and Sulphur Company, and by Messrs. G. H. Nichols & Co., of New York, which have proved so remunerative.

TOWNSHIP OF ORFORD.

5th. Carbuncle Hill Mine, Lots 2 and 3 R. 14, and 2, 3, 4 R. 15, 718 acres. Same class of ore as is found in the Ascot properties above described, but yielding a higher percentage of copper.

TOWNSHIP OF CLEVELAND.

6th. St. Francis Mine, ¼ Lot 25 R. 12, 50 acres, with dwelling houses, smith's shop, ore sheds and office, large winding and pumping steam engine, with boiler, winding and pumping gear, and about forty fathoms Cornish lifting pumps complete, railway tracks, ladders, etc., situated three miles from Grand Trunk Railway. A considerable amount of mining work has been done at this mine. A well defined vein richly charged with vitreous purple and yellow sulphurets of copper traverse the entire length of the property, five feet in thickness, yielding 8 to 40 per cent. metallic copper.

TOWNSHIP OF GARTHBY.

7th. Fifty-six lots of land, 2,938 acres. This property for the most part is unexplored, but copper is found on the greater part of the property. On one of the lots a vein about twenty feet in width has been found. Samples of the ore have yielded as much as 22 per cent. of copper, being also rich in sulphur. Other samples of pyrites from the same property, free from copper, have yielded as high as 48 per cent. of sulphur. The only drawback to this property is in its distance from the railway, it being about four miles from Garthby Station, Quebec Central Railway. A new line is chartered, however, which, when built, will run directly through the property.

TOWNSHIP OF ACTON.

8th. The Acton Mine, 100 acres, with engine, boiler, pumps and appliances. Within three years after this mine was first opened it produced nearly $500,000 worth of copper. It is situated about half a mile distant from the stations of the Grand Trunk and South Eastern Railways.

9th. Brome Mine, part Lots 2 and 3 R. 4, 50 acres.

10th. Bolton Mine, two miles from Eastman Station, Waterloo & Magog Railway, 400 acres.

The above properties formerly belonged to the Canadian Copper and Sulphur Company, and were acquired by the present owner at sheriff's sale, giving an indisputable title thereto.

The whole or any portion of the property will be sold at reasonable prices.

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Mining Regulations

TO GOVERN THE DISPOSAL OF

Mineral Lands other than Coal Lands, 1886.

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

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

QUARTZ MINING.

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

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

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

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

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

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

IRON.

The Minister of the Interior may grant a location for the mining of iron, not exceeding 160 acres in area which shall be bounded by north and south and east and west lines astronomically, and its breadth shall equal it 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 fradulently, 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 by acquired for milling purposes, reduction works or other works incidental to mining operations.

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

PLACER MINING.

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

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

The Regulations apply also to

BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

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

THE SCHEDULE OF MINING REGULATIONS

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

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

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

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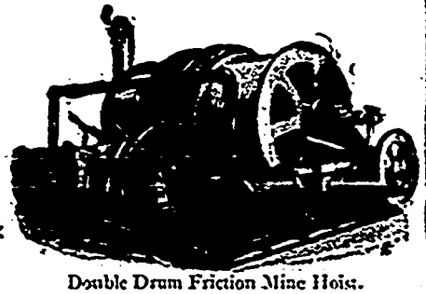

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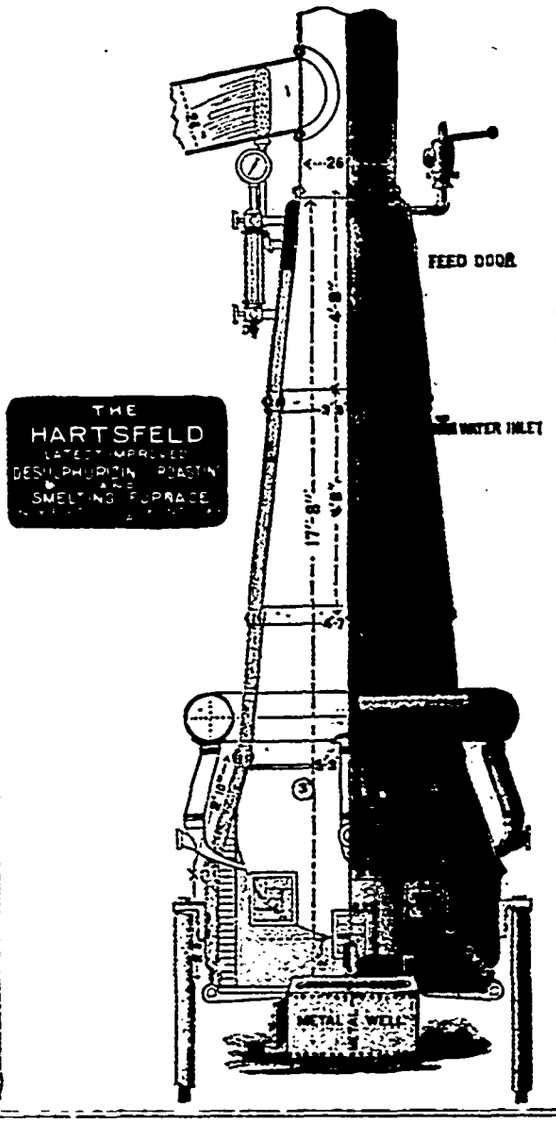

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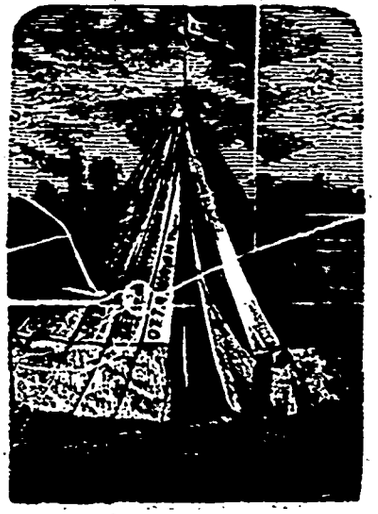
AWNINGS, WATERPROOF GOODS,



DESPATCH AND POST OFFICE BAGS, HORSE, WAGGON AND STACK COVERS, RUBBER TENT BLANKETS, &c.

All Goods are made of the best materials and finished in the most substantial manner.

Special Inducements to Contractors, Engineers and Miners.

No connection with any other firm in Canada.

CATALOGUES FREE ON APPLICATION.