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CANADIAN

MINING REVIEW

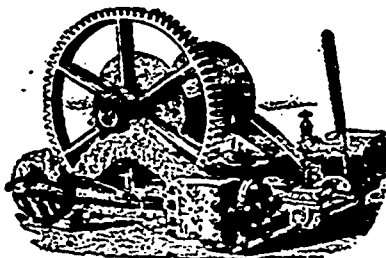
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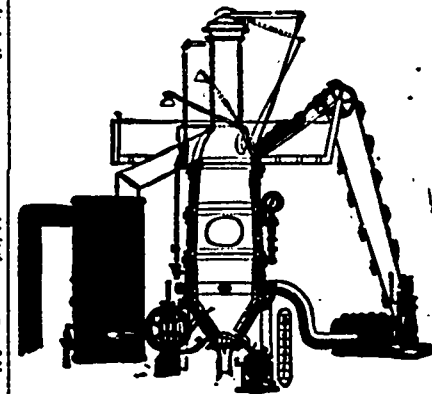
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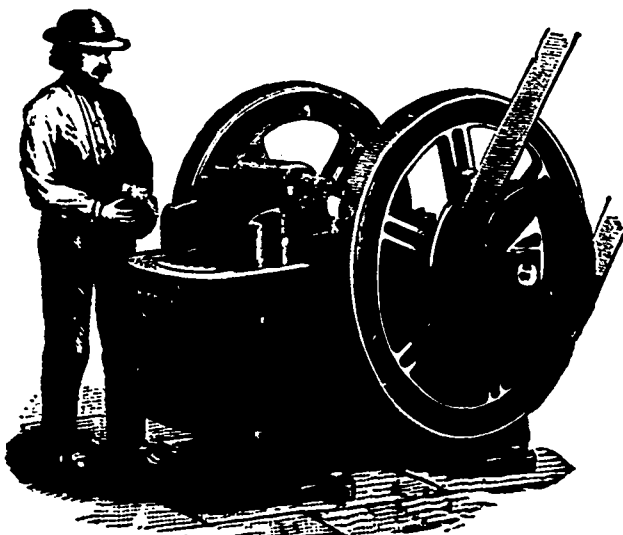
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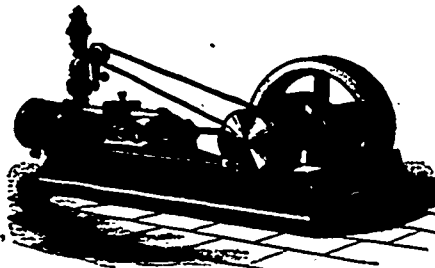
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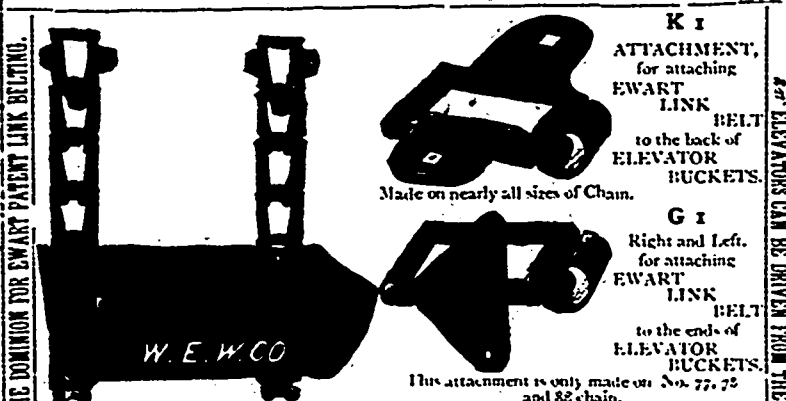
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Persons desirous of tendering are requested to make personal enquiry relative to the work to be done, and to examine the locality themselves, and are notified that tenders will not be considered unless made on the printed forms supplied, the blanks properly filled in, and signed with their actual signatures.

Each tender must be accompanied by an accepted bank cheque made payable to the order of the Honorable the Minister of Public Works, for the sum of one thousand dollars (\$1,000), which will be forfeited if the party 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.

The Department does not bind itself to accept the lowest or any tender.

By order,
 A. GOBEIL,
 Secretary.

Department of Public Works,
 Ottawa, 24th December 1886.

Notice to Contractors.

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Hot-water Heating Apparatus, Post Office Building, Hull, P. Q.," will be received at this office until WEDNESDAY, 19th Jan., for the erection and completion of a

Hot-water Heating Apparatus,
 —AT THE—
Post Office, &c., Building, Hull, P.Q.

Plans and specifications can be seen at the Department of Public Works, Ottawa, on and after SATURDAY, 5th inst.

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By order,
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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.

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TO SUBSCRIBERS.

Through an unfortunate and unforeseen accident the printing of the January issue of the REVIEW was so delayed as to entail the publication of a double number absolutely necessary. The present issue has therefore been increased to sixteen pages.

The Development of the Mines of the Ottawa Region.

(By James Stewart, Ottawa.)

Written for the Canadian Mining Review.

The mineral district of which Ottawa is the centre is a large one, including the western part of Quebec Province and the eastern part of the Province of Ontario, and it is to this section especially that reference is made, although the following remarks apply to the whole of the provinces mentioned, the one under Grit, and the other under Tory rule, and as regards the best interests of the miner, prospector or explorer, the saying, "good and bad everywhere," may be put "bad and worse," applies equally to them both.

The development of the mines has an important connection, with the most complete knowledge of the minerals of scientific interest only; and for this reason, and that of the injustice done to one section of the population, by those in power, is the apology offered for these remarks, which may appear to some to have too much of a technical bearing.

About two years ago, when some of these notes were made, there appeared in the news-

papers of almost all parts of Canada articles and correspondence under sundry headings, showing clearly that there is something materially wrong with the mining interest of these provinces as at present situated, that is, an individual ownership instead of Government holding the minerals for rental, or on lease.

Some writers attribute the lack of mineral development and stagnation of the whole industry (coal mining excepted) to the absence of a Bureau of Mining Statistics, or a neglect on the part of the Geological Survey of Canada in not publishing reports of the extent of mining done each year. In making this discovery they at once saddle the Geological Survey with the total neglect of the mining interests, and find relief in considering it the "Scape Goat" in this case, and none tried to arrive at a clear understanding of the position in which the mining interests of the provinces stand at the present time. Had statistics been collected by the Survey they would tend to make more glaring the error in our laws as regards mining lands; the number and acreage of our mining land monopolies, and show more clearly the error our Provincial Legislators have fallen into in selling the minerals with the surface soil to the farmers; it is desired to point this out as the true cause of the lack of mineral development in this district and suggest a remedy.

Others gave the cause as depending on a foreign market for our ores, and extravagance and bad management, with an ill advised expenditure on the surface, of too much money before the mine was developed in depth, and some to untrue and glowing promises, of "millions of tons of ore in sight" on the part of promoters of a new enterprise. There is no doubt, in some cases, these causes have helped to close the enterprise and deter others from embarking in a similar mine or property.

In Nova Scotia, Newfoundland and British Columbia, the Crown or Provincial Government owns the minerals, and issue licences to parties desiring to open and work mines, and in these Provinces, is the business of mining largely and most successfully carried on. While in Quebec and Ontario the minerals are at present sold along with the soil, and in doing so, the birth right and portion of the explorer, prospector, or miner, is given to the farmer, or still worse to the speculator in mining lands, and these sons of toil, have to beg for terms from the miserly farmer, or independent and extortionate land owner or speculator. Mining lands have been sold in this way, during the last 40 or 50 years in Quebec and Ontario; some few it is true are being worked, but the great majority of the most valuable mining lands and mines are in the hands of speculators, or parties who will not work them, and ask for the mines and properties an exorbitant price should an intending purchaser approach them.

This state of affairs, or the act of the Local Legislators selling the minerals, instead of giving a lease or licence, compelling the owner to work

the mine or quarry or it would revert to the Government, or by exacting a low rent or royalty under such a licence or licence, from the profits derived from working the mine, is the cause of so many valuable properties being locked up, as it were, and development retarded, and the mining industry does not receive the attention it would, if these mining lands remained in the hands of the Government. In proof of this may be mentioned the vast amount of mineral land held by companies and speculators in the Lake district, also in Eastern Ontario, and amounting in many cases to thousands of acres in a block, thereby binding the settlement of the country. In Eastern Ontario, alone the amount thus held amounts to many millions of acres of the best mineral lands. The same is true also as regards the Phosphate region in Quebec. It is this system of unconditional sale of mining lands for speculation, without regard to yearly working, that has ruined the mining interests of this district. The error of anyone party owning a large extent of mining land in a block, arises from the fact, which is well known to experienced miners and explorers, that minerals do not occur by chance (but this subject is too large to be considered at present), that is, certain rocks hold certain minerals, and by selling, say to an Iron Mining Company, a few thousand acres in a block, they got other minerals, which they cannot treat or the use of which they may not know, and the ores other than iron remain unworked.

Compare the system adopted in the Western United States, where a mining claim is given to the discoverer on condition that it is worked, or labor spent on it to the extent of \$100 each year, or it will revert to the Government. Under that system the right of discovery of the explorer, prospector, or miner, is respected; and a reward granted him: (he can locate two claims), but in Ontario and Quebec, he has no rights, and he is, therefore, drawn to the more inviting fields of the United States. The location of the claim in the States is made by the discoverer on the ground, and placed on record in the Land office, but in this district it is made by a clerk in the Land Office, and not by the discoverer, a practice which has proved fruitful of the worst abuses and frauds on Canadian discovery. In the United States, in granting mining claims in that way, ore accumulated through the compulsory clause to work it, at least so much each and every year, and from its accumulation arose the necessity for milling or smelting works to work it up; and had the same inducements and compulsion been in force in Canada, our mines would have been counted by the thousand, instead of the few now in operation.

The chief ores of this region are: iron, (hematites and magnetic), phosphate, or apatite, and a large variety of pyrites, or sulphuret ores of the miners, holding in places copper, gold and silver in workable quantities, lead or galena, plumbago (black-lead), mica, and others of less importance. The ores of iron are found in such variety and

abundance that the only reason they are not now worked is the question of cheap fuel for reduction. Next spring certain tests of machinery are to be made, and should they prove as successful as former trials, this question will be settled on a commercial scale, and the smelting of iron established in the district.

The apatite, in the raw state, is largely shipped to Europe, but home demand, or the super-phosphate of lime for fertilizing purposes, can be supplied from the works of the Brockville Chemical and Superphosphate Co. (Limited). The pyrites used by this company for the last few years, for the manufacture of sulphuric acid, has been imported from New York State, but ores from the County of Hastings have been introduced to them, and the supply in future will be procured from local ores. The extended mining of the pyrites ore of the district is a question of much importance to the city of Ottawa with the cheap water power for dressing ores, and grinding apatite, as the sulphur is used for treating the apatite in the form of sulphuric acid, and would form an important industry, if all we exported was shipped as superphosphate of lime, and the residue of the pyrites ore can be most successfully treated after roasting, along with the lead ores, which we also have, and the copper, gold and silver extracted. Our lead ores are too poor in silver (about 5 oz. or \$5 per ton silver) to pay to work for silver and lead alone, but when smelted along with the residue of the sulphur ores, holding copper, gold and silver, the question of working both is settled.

The more extended production of gold also requires attention. No man has ever possessed too much of it, and no country produced too much. Its value increases with the cost of getting it, and the want of it. It is our highest standard of money and exchange, and is therefore the best investment for surplus labor and capital, when found in workable quantities. The discovery of gold in California and Australia produced periods of great world wide prosperity. All classes and conditions of men were drawn to a new occupation and country by the high wages earned in the mines. A laborer who had been working for a farmer or tradesman, for \$1.00 or \$1.50 a day, could wash out gold to the value of \$10 or \$20 a day. Can a wise adjustment of our mining laws be made to have this effect, if only on a much smaller scale, by granting free great-mining claims in districts where gold is known to exist?

In iron alone, had such measures been adopted, there would to-day have been enough mined and worked to supply our own wants and for exportation, as is done in Sweden and Norway with similar ores, climate and fuel (wood charcoal), as the laws of that country are such that no mining property may remain idle so long as any one desires to work it. In Sweden and Norway a party owning a mine and not working it, another party can do so by paying the owner half the profit of the working of the mine, and if he gives it up the owner or any other person can under-

take to work it on the same conditions, hence no mining properties remain unworked.

In most European countries, and in some parts of the British Islands, the minerals are owned by the Crown, and at one time, even in Ontario, certain reserves of minerals were made in old deeds, but of recent years this is not the case.

Some may say, in advocating the State owning the land, you are advocating communistic doctrines, but that is another question altogether; what is desired is the State to own the minerals, and is British law and custom, and that is advocated "by George."

There are at the present time thousands of British and Canadian subjects in the United States mining regions who would take up claims in Canada were the laws such as would induce them to do so, but at the present time there is no free grant mining claims given, or compulsion to work on owners, and no inducement offered to explorers, prospectors or miners, to locate and develop a claim, unless stealing one's discovery is considered such by those in power, and that act is best described in the words of Shakespeare:

"You take my life,
"When you do take the means whereby I live."

Under the present system 100 acres realizes to the government, say at \$1.00 per acre, \$100; and in 10 years the country gets the benefit of the amount expended on that mine, in labor, &c., if it is developed and worked, but if not, nothing. While under the system where the government holds the minerals, and gives free grants to Miners, or on lease, or royalty, the country receives at least \$100 per year, for the 10 years say \$1,000, less the value of the 100 acres—\$100, leaving a balance of \$900 in favor of the free grant or lease systems.

The country receives from sale at a two years' purchase:			
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To 100 acres @		By Cash	\$100 00
\$1	\$100 00	No work in 10	
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The country receives from free grant, at a ten years' term:			
Dr.			Cr.
100 acres @ \$1.	\$100 00	By 10 years	
Actual benefit re-		work @ \$100	\$1,000 00
ceived by the			
country in fa-			
vor of free			
grant	900 00		
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And under the lease or royalty system, in 10 years the country receives the same as under free grant, together with the additional royalty received when the mine is paying, which may be several thousands of dollars yearly, and increased value of public lands.

But it may be asked, from what source will the government receive revenue, for inspection and office expenses, if they do not sell the lands as at present?

The free grants which proved paying mines, on arriving at that stage, a low royalty is charged on profit, after working expenses are paid, would yield annually a large revenue to the government, than the present system of selling lots.

In proof of this, the British Crown paid the Earl of Derby £50,000 stg. for the Isle of Man, and has been refunded from royalty on mines and quarries, more than the sum paid for the island.

This compulsory working to hold a claim may be considered a small thing in an individual case, as regards the amount of labor employed, but take the returns for a province, or the whole Dominion, and it would amount to a large sum, on all the now known valuable mineral lots throughout Canada.

In thus yearly doing a little on a mining property to hold it, new discoveries would be made, and new life given to what was possibly considered a doubtful prospect. It was in that manner that John W. McKay and other United States millionaires gained their first start: through being compelled to work their claims they made a discovery, which enabled them to sell or work it with profit. The mining interests in Canada will never prosper till similar measures are adopted.

The custom of granting land to farmers under the free grant system, and not giving an explorer, prospector, or miner a free grant, under conditions similar to that of the farmer, or compulsory development of the minerals contained in the property, is an injustice to the mining section of the population, and for that reason settlement has made progress and mining has not.

Some parties argue "but why give away a valuable mine as a free grant?" Ans.—A mining property in this section has no more value than the same amount of land, say \$1.00 an acre, which you now give to the farmer. The miner would return \$100 in labor each year, and develop the mine and prove its value, and if it proved such the Government would receive a revenue from royalty as long as it paid expenses. And some say: "What use would a free grant be to a miner who had not money enough to purchase it at \$1.00 per acre?" Under the free grant plan both the farmer and the miner have energy and skill to develop the value of their claims, with proper provisions imposing on them a certain amount of work yearly, and that is worth more to the country than so many dollars paid into the land office, and the property lie in a state of nature and undeveloped.

There is a wrong system practised in Ontario and Quebec, in selling mining lands by auction. When a valuable ore has been discovered in a section of country the excitement gets strong, and the land office is flooded with applications for lots, and to satisfy, not the discoverer, but contending parties, the properties are advertised and sold by auction, and the competition raises the price beyond that which a miner can afford to pay (the discoverer is not rewarded), and the property falls into the hands of a more wealthy man; but a speculator, who will not work it himself, but purchases it on a speculation of a rise in value, which fails to come, and the properties so sold remain undeveloped. The district ought to be opened as a free grant mining camp, and the properties would be developed under proper

mining laws and inspection, and the country receive many times more benefit than by selling it unconditionally.

A certain Ontario newspaper for the last few years has sent round a reporter to the various mining settlements, whose principal business is to write a description of the mines visited, but more after the style of an election dodge, or blind, to show the splendid development under the present system of management of the Ontario Land Office, but failed to see; even through "spectacles," the much needed "reform" of the mining laws and "reformation of the land office and the number of Grit mining land monopolies in Ontario. If the location of a claim was made by the discoverer *on the ground* (as is done in the Western States), he would not be at the mercy of interested parties, who manipulate the land office for their own purpose.

The vast importance to a country of the proper development of its mineral wealth, renders this subject one requiring the attention and careful consideration of our legislators and citizens.

Precise Geological Position of *Siphonotreta Scotica*.

NOTES ON AND THE PRECISE GEOLOGICAL HORIZON OF *SIPHONOTRETA SCOTICA*. (DAV.)

Written by Henry M. Ami of the Field Naturalists' Club.

At the Montreal meeting of the A. A. A. Sc. in 1883, Mr. J. F. Whiteaves, of the Geological Survey office, read a communication or paper in which there was then recorded for the first time the occurrence of a beautifully fringed or spinose shell which Dr. Thomas Davidson had recognised as the Scottish species, to which he had given the designation *Siphonotreta Scotica*. The specimens referred to in that paper had been collected by Mr. Watts, of our club, who handed them over to Mr. Whiteaves for determination, and through the generosity of Mr. Watts, the specimens in question have been presented to the National Museum, and may now be seen in the cases of the Geological Museum at any time.

These specimens had been obtained from blocks of impure limestone about Mr. Watts' residence near Cummings' bridge, and were said to have come from a well which was sunk on the same property. There was but little doubt from the lithological aspect of the rock, as well as from the few associated species then obtained likewise, that the species was referable to the Utica formation. That such was the case will be clearly seen from recent investigations made with that object in view. As has already been noted on previous occasions, the upper members of the Trenton formation consist in impure argillaceous or clayey limestones, inter-stratified with more or less thin bands of shales, whilst the lowest beds of the overlying Utica formation are themselves not only characterized by shales, as most of the formation is in general, but contain also bands of impure limestone. These bands of impure limestone of the Utica—the lower measures of that formation—are well exposed on either side of the Rideau River, in the vicinity of the Rifle Range, and it is in one of these bands that the beautiful little brachiopod in question is to be found. The precise one in which it occurs in tolerable abundance is in that band which, crossing the river from side to side of the rapids, in line with the targets of the

ranges, gives the peculiar orographic aspect to that portion of the river, and form the head of the rapids or little fall, above which, and as far as Hurdman's Bridge, the river flows quite smoothly. From this easily recognised and accessible band, a number of other members of the club have, besides the writer, had the pleasure of finding several specimens or individuals of this species. As far as we are aware this is the first time that this species has been recorded to have been found *in situ* in this country, and it may be found at any time by any member of the club. There are numerous points as yet to be investigated with regard to the affinities of this species; even its generic relations are not all exactly defined, and there is wanting evidence wherewith to describe its internal structure.

Dr. Davidson and Dr. Schmidt agree that the genus is allied to a *Lingula* and belongs to Prof. King's sub-division *Trententerata*. The mode of preservation of the Canadian specimens, its phosphatic (?) character show its affinities to be as above. In examining the zone of this species, the following notes were obtained on the stratigraphy of the rocks at that place.

The following is a section obtained on the spot and given in ascending order:—

I. Lower bed of section, which is, no doubt, close to the line of contact between the Trenton and Utica formations, is an irregular, uneven bed of impure nodular limestone somewhat bituminous and holds fragments of *Orthisceratites*. This is followed by another similar band of impure limestone which, in its turn, is overlaid by dark brownish black bituminous and very brittle, shaly beds.

Two bands of limestone interstratified with friable shales then occur, upon which rest bituminous and impure shales, holding *Asaphus Canadensis* and other fossils over which the *Siphonotreta* band occurs.

This band marks a special zone in this formation, and from it no less than sixteen species of fossils have already been obtained, and more will no doubt be obtained after further detailed examination is carried on. The following is the list of species:—

Lingula curta—Hall.
Lingula elongata—Hall.
Lingula quadrata—Eichwald.
Siphonotreta Scotica—Davidson.
Orthis testudinaria—Dalman.
Strophomena alternata—Conrad.
Leptaena sericea—Sowerby.
Zygospira Headi—Billings (*typical*).
Zygospira modesta—Say.
Zygospira (*probably new variety*).
Conularia Trentonensis—Hall.
Asaphus Canadensis—Chapman.
Asaphus megistos (Locke), or *platycephalus* (Stokes).
Calymene senaria—Conrad.
Beyrichia oculifera—Hall.
Leperditia cylindrica—Hall.

From these it would then follow that the age of the rocks in question is as near as it can be laid down at the base of the Utica formation not far from the top of the Trenton formation.

On a single specimen of shale there occur the following species:—

Siphonotreta Scotica—Davidson.
Leptaena sericea—Sowerby.
Zygospira Headi—Billings.
Asaphus Canadensis—Chapman.

This association is a very interesting one and worthy to be put on record. Numerous crinoidal fragments also occur with the above species, and in the *debris* of the shales the typical *Triarthrus Becki* was found to occur there, and it is not inserted in the list as it was not found *in situ*.

Every species mentioned in the above list was carefully collected in the same band in which the *Siphonotreta* occurs, so that its exact stratigraphical and palaeontological relations are now pretty well known. There remains, however, much to be done in ascertaining the internal character of this species, which, in Scotland, characterises the Landeilo formation of rocks of Ayrshire, where it was discovered by Mrs. R. Gray at Craighead.

Should any member of the club find any specimens showing either muscular or vascular impressions in the interior of the shell, or other internal characters, it would be conferring a benefit to science to contribute the same in the club's transactions or some similar medium of publication.

Some Economies in Iron Manufacture.

By Alex. E. Tucker, F.C.S.

I have been led to choose this subject for the paper which I have the pleasure of reading to-night for more than one reason, for it seemed to me there are continuing defects in ordinary puddling which may be lessened if they cannot be altogether prevented. I am aware that several excellent papers have been read before this institute on matters more or less connected with puddling, and I therefore hesitated in bringing the subject again before you. Since, however, those papers were read the development of the process known as the Basic-Bessemer and Basic-Siemens processes for the manufacture of steel, with which for some time I have been associated, has thrown considerable light on the practical chemistry of puddling, and although it would be entirely out of place for me to enter into any one of the questions raised as to the exact chemistry of any of these manufactures, yet an attempt at a general application to the subject of puddling of what we now know respecting soft steel making, seemed to me eminently suited to the circumstances in which puddling is at present placed.

I propose to borrow some facts which chemistry has brought out in the development of steel making, and to try to apply them to iron making.

If my judgments in the matter are not in agreement with the more extended practical experience of those gentlemen immediately concerned, I trust our evening will not have been unprofitably spent in discussing the points which I shall raise.

I shall in the foregoing remarks, speak at some length of the relations which chemistry has developed in respect to iron and steel making, and I may premise that it seems to me somewhat remarkable that scientific treatment has so seldom been observed in the art of puddling, because the reactions of puddling are entirely chemical, and although we must confess to ignorance on many of its problems, yet we have a general grasp of the whole subject, and the chemistry which has ensured economies and successes in the spring time, as it were, of steel making has been available in the autumn of iron manufacture.

In treating the subject from this point of view, I am most anxious to avoid any unnecessary chemistry. I feel it would be entirely out of place, and I hope that the wish of your secretary, who enjoined me to treat the matter as practically as I could, may be fulfilled.

I do not wish to suggest that analyses of the materials used and of the products obtained would ever have done for puddled iron what it has done for steel: that is impossible. We must bow to the magnificence of those developments

which have culminated in the possibility of producing 500 tons of steel from two Bessemer converters in 12 hours, but I do not hesitate to say that economies may be effected by knowing more exactly the composition of materials operated on, and the physical and chemical conditions under which the impurities of the pig may best be removed, and it is with such economies that I propose to deal.

The practical process of puddling from a chemical point of view is extremely simple, and consist, as is well-known, in the absorption of silicon, sulphur, phosphorous and manganese contained in the pig iron by the oxide of iron used in the fettling, and in the removal of the carbon by its reduction of the fettling to metallic iron. We have, therefore, a debit and credit account—there is a loss in weight due to the removal of the bodies I have named, and there is a gain in weight due to the production of metallic iron from the fettling. The same removals take place in the basic process, but there is no gain in weight from reduction of oxide of iron, as instead of oxide of iron being used for the lining or fettling of steel making apparatus it is found better principally on account of the great heat developed, to substitute a variety of lime. This point of departure leads to an important matter in economy, of which I shall presently speak at more length. In addition to these differences in the two apparatus, there is the important one that while in the puddling process the whole of silicon, phosphorus, sulphur, carbon and manganese are burnt by the oxide of iron, in the case of steel they are mostly burnt by the air blown through the liquid metal.

Now, leaving these well-known facts it will, on a moment's consideration, be obvious that there must be a certain percentage of these bodies silicon, phosphorus, sulphur and manganese which is best adapted for the particular process concerned. In the case of steel this percentage is that which is just enough to produce the requisite amount of heat to keep the bath of metal sufficiently fluid—you will recollect that there is no fuel used beyond that in the metal itself—any excess of this percentage of course means waste, and any deficiency means waste on account of cold and, therefore, skulls, etc.

It will, therefore, be profitable to consider in what way any excess or deficiency of the elements named affect the quantity and quality of the resulting iron, I will just glance at all of them, but it will be well to bear in mind that it is the percentage of silicon and phosphorus which practically decide the merits of large pig. Take a single case, and let us suppose that the best possible result in puddling in a given furnace is obtained with an iron or mixture of irons giving a percentage composition of:

	Per cent.
Silicon	1.50
Phosphorus	1.00
Sulphur	0.09
Carbon	3.50
Manganese	0.50

and we substitute a mixture containing 2.50 per cent. of silicon, the other elements remaining the same, what do we know will be the result? In the first place we know obviously that one per cent. of the material which cost pig price will be wasted; we know, also, that one part of silicon requires about four parts of iron to slag it off; we therefore have a total loss of five per cent. of iron. This means a waste of about a ton of iron per week per furnace, which must be valued at puddled bar price. The matter does not however, end here, we now know enough of the chemistry of dephosphorizing to say that the complete removal of the silicon is effected, hence

if the puddler does not work at his heat and get this silicon into the condition of slag, before balling-up, it follows that the bar will be crystalline and break short—it will contain too much phosphorous.

This prior removal of silicon before that of phosphorous is well shown in the diagrams before you, they have been worked out from very numerous analyses of samples taken at various stages of the two processes named. I am indebted to my friend Mr. F. Harbord for the loan of that one showing the Basic-Siemens actions. I hope they show in as clear a manner as is possible the point I wish to indicate. I am aware how difficult it is for one unaccustomed to chemical language and figures to fully appreciate the significance of facts stated in chemical language alone, and so I have brought before you some pictures which show the actual progress of the removal of the various constituents.

You will see from them that the waste of iron stated above becomes a necessity unless an inferior bar can be tolerated. Thus in the diagram of the puddling process, you will see that at the expiration of half the time required for the process 98 per cent. of silicon is removed, while only 60 per cent. of phosphorous has gone. So it follows that if we started with the standard charge named, we should at this particular point,

$$\begin{aligned} & \text{have a metal containing } \frac{1.50 \times 98}{150} = 1.47 \text{ and} \\ & 1.50 - 1.47 = 0.03 \text{ silicon, but } \frac{1.00 \times 60}{100} = \end{aligned}$$

0.60, and $1.50 - 0.60 = 0.40$ per cent. of phosphorus. I may here state that such a result would give a splendid bar when the operation was finished, inasmuch as much finished iron contains this percentage of phosphorus, and indicating, therefore, that a much more impure charge has been used than that which is under our notice.

If we now take the case of our inferior charge containing 2.50 of silicon it will be clear that, under the same conditions as regards heat, fettling, etc., the metal at the same stage of the process will contain a very considerable percentage of silicon, probably, I should say, half a per cent., so that we may be sure it will also contain a very considerable percentage of phosphorus. We therefore are conscious of both waste and bad quality of product.

From these considerations you will see how the matter works out in actual practice, and how great the tendency is to steer a middle course, avoiding on the one hand a waste of metal, and on the other a highly phosphoric or hard iron. With a pig ill fitted for the best economy it is not to be expected that any assistance can come from the puddler himself, it being against his own interest. He is bound to make a compromise, and by increasing his yield he must keep the ball impure.

Leaving now the subject of silicon, we come more immediately to the element phosphorus. What do we learn about this in addition to what has preceded. Supposing in our normal charge we have 2.00 per cent. of phosphorus instead of our 1.00 per cent., what is the result? We gather from the examination of practical results in puddling and the basic process, that at least five parts of iron are required to absorb one part of phosphorus, so that we had a loss of some six per cent. of metal, which must be also valued at at least puddled bar, inasmuch as the same, in fact more, work and material is required for its removal, as if it had been absent, so that this element of eliminated is still more wasteful than silicon.

Sulphur does not call for extended remarks, because, although puddlers handle the name pretty glibly, they almost invariably have the wrong bull by the horns, inasmuch as sulphur is not often present in injurious quantity when the pig is a fairly grey forge, and although a high percentage of course occasions waste, I am afraid I have already dwelt too long on other matters to allow of our discussing a much less important element.

The relations of copper and sulphur, however, are of interest in conjunction with the use of purple ore in the manufacture of iron. I am aware that there is a considerable prejudice against the use of this material. I have, however, been associated with its extensive use, both as an ore and as a fettling, and my experience is that the copper and sulphur which it contains in considerable quantity, are injurious only when they appear together in the pig or finished iron. I have seen large quantities of excellent finished iron made from a pig containing a quarter per cent. of copper, as soon, however, as any attempt was made to use commoner or sulphury pig in admixture with the coppery pig, the results were disastrous. I have found also that if there is a tendency to red-shortness in the bar, it may be removed by mixing the purple ore with some five per cent. of very fine lime, no injurious effect need be anticipated from the lime if fine enough, and it will absorb the sulphur. This latter may certainly be set free by the silicon of the pig, but it does not enter the iron, and probably passes up the stack.

Carbon, inasmuch as it does not waste metal, but, as I have said, increases the yield, calls for no special remark. I may, however, repeat that the more the pig contains the less sulphur and generally the less manganese is present.

MANGANESE.—I must claim much partially for this element. I believe it is the key to much economy in puddling. I think there is *prima facie* evidence that it is as important in the puddling furnace as it is in a Bessemer converter, notwithstanding the fact that the finest finished iron will sometime contain only traces of it. It will, however, be found that all the best irons, without exception, are made from pig containing considerable quantities of manganese, and, indeed, in the old days, when all-miné pig—which meant manganiferous pig—was the rule, bad iron was the exception. "Iron was iron" in those cherished days; but with respect to the pig used, it would have been difficult for an ordinary puddler to make a bad bar from it. There are several reasons for this: In consequence of a manganiferous pig containing less sulphur, less work would be thrown on the fettling. The phosphorus therefore, from this cause alone, would be more completely removed. Manganese, again, makes a thin fluid slag, the ball is therefore more thoroughly washed. Again, the oxidation of the impurities of the charge may be pushed much farther than when a pig is free from manganese. This point is well seen in the basic process. In the absence manganese in the pig the bath of metal is unduly burnt or oxidized, and the resulting steel is redshot. Such redshortness is always avoided by taking care to have plenty of this element in the pig, indeed I have myself made several blows of excellent steel by using such a pig without any of the usual additions of ferro-manganese, and I have made many hundred tons of steel of equally high quality in which the additions of ferro was so small that the putting of it in at all might be regarded more as a matter of form than one of actual utility.

This matter also works out practically in puddling, and in addition to what I have said about

all-mine pig, the beneficial effect of manganese has long been recognized in Germany, and there is no doubt that its presence admits of a much more perfect removal of phosphorus. An explanation in addition to that respecting the increased fluidity of the slag may be found in the fact of the strong affinity of manganese and silicon for one another, and we have seen that it is just this silicon which is so desirable to remove.

One more instance of the probable effect of manganese may be noticed. It has been found possible to puddle hematite iron with fettling obtained from ordinary puddling, but when the fettling was itself obtained from hematite pig, the iron produced was redshort. I am inclined to think that the reason of this is that the manganese in the fettling from the phosphoric pig is possibly reduced along with some iron, by the carbon of the hematite pig. The metallic manganese then entered the puddled ball and reduced the liability of it being subsequently burnt. I give this explanation without having any evidence to support it from the facts themselves, but there is no question of the results.

Although alloys of manganese and iron are known, their formation in the puddling furnace is impossible, and there being only the silicon to alloy with the manganese, it follows that beyond the actual loss in weight due to the percentage of manganese, there is no loss in the iron due to its presence.

In this beneficial action of manganese we have the explanation of that observation that the highest class of pigs frequently yield poorer than a medium class—we get a purer iron; it will therefore weigh less. The amount of slag, again, would frequently be small; the heat would, therefore be dry, and some iron would be carried away mechanically.

The economical way of dealing with this dry condition of the heat, which, however, is not I think a frequently occurring difficulty, will be obvious from what has been said about silicon, and it is found advantageous to scatter a few handfuls of sand on the iron just before balling up. The effect of course being to make a more fusible cinder, which will clear the iron without any appreciable bad effect. Again, the use of cinder pig in the subsequent charge will economically bring down any gathering bottom. It will make a more natural cinder. These matters are, however, well known, and I fear appearing presumptuous in alluding to them. The reverse action, *i.e.*, of remedying a scouring cinder and so increasing the life of the furnace, is not so often practised. Scrap is generally used for the purpose, but the desired result may much more economically be obtained by the use of a sufficient quantity of finely-powdered lime, if it be inconvenient to change the mixtures. It is well to drop the damper when this is put in, to prevent the lime being carried on to the neck and roof of the furnace, and so slugging the brickwork. No bad influence will follow if the lime be fine enough. It will absorb the silicon of the iron, and therefore prevent the combination of the two better. It will hence be more economical to use lime than increase the fettling or scrap.

The time remaining at my disposal will not allow me to more than briefly allude to a few remaining points in economical puddling.

From what I have said about the mutual action of silicon and phosphorus in the puddling furnace, you will see the very great advantage of having such a peculiarly constituted metal as refined iron, and it may be useful to show in a tabulated form what the process of removal of the impurities in the refinery is. I give the results taken from my note-book of successive stages in this refinery process, so that you may

see the very considerable changes which have been effected.

The phosphorus in the puddled bar would be extremely low when such a metal was judiciously used with ordinary pig, hence the high excellence of the bars so obtained.

The following are the figures:—

	Per Cent.			
	Carbon.	Silicon.	Sulphur.	Phos.
Rhymney Forge Pig...	3.52	1.86	0.05	1.72
After melting.....	3.42	0.62	0.05	1.65
8 minutes after melting.	3.36	0.52	0.05	1.50
12 " " "	3.32	0.38	0.04	1.46
16 " " "	3.30	0.32	0.04	0.85
22 " " "	3.20	0.23	0.04	0.85
Refined metal.....	3.15	0.20	0.04	0.80

Unfortunately the cost of producing these results is very great, and it seems to be found cheaper to use a more impure pig and do the refining in the puddling furnace itself where, as we have seen, it is done at the expense of the fettling. Now, we know that silicon at least can be removed without any such expense of oxide of iron. The first stage of the acid Bessemer process consists in the removal of silicon, so that by Bessemerising molten pig iron we obtain the desired result.

I have had the pleasure of seeing this done with forge pig in Belgium, where a refinery was attached to the blast furnace and the molten metal run into it. The effect being that some 50 per cent. of silicon and 25 per cent. of phosphorus was removed. I am unacquainted with the reasons which have prevented the more general adoption of this practice. It seems to me to possess very great advantages, and there are works at which it is extremely difficult to obtain silicious pig when using a cinder pig burden.

THE DEVELOPMENT OF MINES.

By C. M. DOBSON, M.E.

For some years the mining resources of Canada have been worked and partially developed by a few enterprising capitalists who have, either from a practical knowledge of the mineral wealth of the country, or from theories of geologists, who in pursuit of their calling have made such discoveries, entered into such speculations that in any other country than Canada would have brought the whole of the capitalists, or their agents, from London to examine and interest themselves in such properties. However, owing to an unexplained laxity on the part of the owners of these properties, the mining interests, and almost inexhaustible mineral wealth, has not been developed in a way calculated to inspire the confidence of capitalists who are comparatively unacquainted with the country and the mineral formations. It is the opinion of several mining authorities that would the promoters of public companies and mines in Canada take more of their speculations into the English market, where Canadian mining stock would acquire a ready sale, sufficient capital could be raised to efficiently develop a property. Whereas at present these great interests are almost confined to Canadian cities and Canadian capital, the result is that a mine is floated with an inadequate capital, development commences, and before any tangible result is obtained the small capital is exhausted and at the vital moment when a result is within the grasp of the speculators they "shut down" and the work that has cost so

much is left to fill up with water and the plant to indicate where another "bubble had burst." The writer could name scores of properties that have gone the same way owing to the improvident and thoughtless way of commencing operations.

Take these valuable concessions to the place where the money is, and where, if it can be proved, as it can be, that there is a chance of realizing a return, they will give all the money that is necessary for the efficient development of a legitimate speculation,

CORRECTION.

In our last issue, through misadventence, it was stated that the Hartford and Capel mines, together with all moveables, had been sold by the Eastern Townships Bank to Messrs. E. H. Nicholson & Co., of New York. The purchasers were Messrs. E. H. Nicholls & Co., and the property belonged not to the Eastern Townships Bank but to Wm. Farvell, Esq., late manager of the bank. The price realised was \$50,000. In another place will be found a list and description of other properties now for sale owned by this gentleman.

Personal.

Mr. C. M. Willmott, of the Geological and Natural History Survey of Canada, has returned from England. He was in charge of the Mineral Court at the recent Indian and Colonial Exhibition.

Mr. C. M. Dobson, C.E., M.E., one of the engineers on the River Niger (West Africa) Survey, 1885, and more recently connected with the Brantford Telegraph, is now resident in Ottawa.

Our Gold Mines.

(From R. C. Colonist.)

QUARTZ MINING.

Now that railway construction within the province has been completed for the present—though it is hoped that many of the numerous projected lines will shortly be commenced—there is time to look after some of the important industries, and to a certain extent this has been done during the past summer. Among what will in the near future prove to be the most important factor in the prosperity of the province is quartz mining, and to this branch during the past year has been paid particular attention. The richness of the ore and the extensive character of the deposits have long been known, but the fiasco upon the first introduction of quartz machinery and the great work later of building the Canadian Pacific through the province served to keep the quartz interests in a dormant condition. However, they are on the eve of a revival and the coming year will see large developments.

Probably the greatest effort being made in the province to work a mine is the work now proceeding on the Foster Milling & Mining Co.'s property, with works at what is known as the Big Slide, some fifteen miles below Clinton. This company have quartz mill and chlorination works in position, have unlimited water power, and, so far as known, a continuous body of rich paying sulphuretic ore. Assays and mill tests go to prove that it will pay richly for its treatment, and a result will soon be known.

The famous ledges of Cariboo in the immediate vicinity of Barkerville are again being developed. The British Columbia Milling & Mining Co., with works at Lowhee creek, have begun to develop their extensive property. This company have already complete buildings, magnificent quartz machinery and engines. Their mine has been prospected sufficiently to show a body of ore eighteen to twenty five feet in width, and mill tests and assays have proved that it will pay for its being treated. Considerable work is now being done in sinking a working shaft, drifting and cross-cutting.

The Island Mountain Mine, owned principally by Mr. P. Dunlevy, of Soda creek, is also being developed. During the present winter tramways to the mine, tunnelling and drifting and the removal of the mill and other machinery to the site selected, fronting on Jack of Clubs lake, is being carried on, and it is expected that during the coming summer matters will be in a sufficiently advanced shape to begin the work of crushing and reducing the ore.

On the old Steadman ledge, crossing William's creek at Richfield, a small sum will be spent in placing the tunnel in good shape and extending it.

Besides these works, various other ledges of promising character will be more or less developed.

At Hixon creek the already largely prospected mine will be further worked, the mill removed to a more favorable location on the opposite side of the creek and everything got in position for extracting gold.

Along the line of the Canadian Pacific, from Kamloops lake to the boundary line, a great deal of work has been accomplished during the past year in prospecting ledges and placing in machinery to crush or smelt the same. In the Selkirk and Rocky Mountains are wonderful deposits of galena and large deposits of gold bearing rock. North and south of the line of railway, in the Big Bend, along the shores of the Columbia and Kootenay rivers and lakes the capitalist and prospector have visited, and there is every promise that soon the rocky canyons and shores and hills will be compelled to yield up their precious treasures to man.

Coming nearer home, several discoveries have recently been made on Vancouver Island, within easy distance of Victoria, of ledges of gold bearing rock, but none of these have been thoroughly tested, though assays and mill tests have proved that there is gold in quantity sufficient to entitle their being milled if the ledges prove to be continuous in extent.

There has been considerable enquiry from many portions of the Dominion, United States and England as to the minerals of this Province, and many assurances have been given by men of capital that they will invest money in the development of the quartz mining industry. Taken altogether the work accomplished toward creating an activity in quartz mining in the past year must be regarded as satisfactory, and it is not too much to hope that 1887 will witness a progress and prosperity in this individual industry that will be of the greatest benefit.

PLACER MINING.

The past year has not been productive of results as good as in the early part there was reason to believe it would bring. In Cariboo district, owing to the very dry season, work had to be shut down on various of the hydraulic claims, there not being sufficient water to work them. The output for the year is somewhere less than that of any other during its history as a mining field, solely on account of a lack of

water. However, a few new discoveries were made, and it is thought that the coming year will again place the gravel mining industry in a prosperous condition.

Granite creek, in the Similkameen district from which such good results were anticipated has not come up to expectations. Though a few claims on the creek have paid well, a great number of miners who went in have returned without securing any pay, and the several other creeks in the neighborhood have also failed to produce gold in paying quantities.

In the Big Bend country a considerable number of men have been at work during the entire year. On Carne's creek moderately good returns were secured. On McCulloch and French creeks, where deep mining and hydraulic mining are being carried on, some rich gold has been secured, but work has not advanced sufficiently to permit of a correct estimate being formed as to the continuous richness of the district. However, those who are engaged in mining work on the various creeks have every faith that Big Bend next year will show good results. The cost of packing in supplies has seriously operated against the success of the camp.

Cassiar has somewhat improved in the past year, better returns having been secured from the old ground and a new field having been discovered which gave large returns for the limited amount of work done. There will likely be an increase in the number of miners who will go into that district this coming season.

Lorne creek has proved a failure, little return being secured, for the large amount of work done. For the greatest part of the year high water interfered with mining and those engaged have either lost money or scarcely made wages.

One of the best fields during the past year has been that of the Stewart river, a large tributary of the Yukon. This is in the northernmost part of the British possessions, and all those who mined there during the past season have made money - some \$600, others \$6,000. There will undoubtedly be a large rush for this field and preparations are now being made to take in adventurous spirits in the early spring before snow and ice disappear from the rivers and lakes.

Kootenay district will return about the same yield as the previous year. Considerable prospecting has been carried on but no new gold bearing creeks have been discovered. Extensive preparations are being made for hydraulic next season on a large scale, notably on Findlay creek. The near presence of the railway and the probable construction of a feeder south from the C. P. R., will likely induce a large development of the latent resources of the district during the coming year.

In many other portions of the Province, especially in Yale and Lillooet districts, gold bearing creeks have been discovered and worked with moderate results being achieved. On Vancouver Island a large number of Chinese are engaged in mining. This is especially the case on Bear river in Alberni district, where it would appear that they have made a rich strike from the number who have proceeded to that point.

Taken altogether the past season's work has been moderately satisfactory, and there is every reason to believe that the year 1887 will be productive of largely increased results from placer mining. Supplies are cheapening, shorter, easier, quicker and less expensive routes to the mining fields are being provided, and many fields that previously would not pay to work on account of the high price of provisions and other necessaries, will be called upon to furnish their quota to the general prosperity of the gold mining industry.

DUST IN COAL MINES.

VALUABLE PAPER READ BY MR. M. MERCER, WIGAN; BEFORE THE MANCHESTER GEOLOGICAL SOCIETY.

It may be taken for granted that all or nearly all colliery managers and mining authorities are now agreed that coal dust does, and has in the past played an important part in augmenting the intensity and disastrous effects of many of the explosions in mines; whilst a great many authorities are of the opinion that coal dust can by itself under certain favorable conditions cause an explosion similar or even more severe in character and effect, to that caused by fire-damp alone

a proof of which may be cited in the late sad calamity at the Altofts colliery. Evidence at the former is amply furnished by the explosion at Seaham, Dinas, Trindon Grange, &c. To go into the proof of the theories is unnecessary, as it is dealt with extensively in the report of the Royal Commission on Accidents in Mines, and also very fully and concisely in the valuable work on "Explosions in Coal Mines," lately added to the literature of the mining world by Messrs. W. N. and J. B. Atkinson, Her Majesty's Inspectors of Mines, and which should be read by all who are interested in so important a subject. Now, in the first place must be considered the causes responsible for the large amount of this dangerous matter in most dry mines, which will probably be accounted for severally or collectively by the following: 1. The working and getting of the coal at the face. 2. Decrepitation of the pillars and coal scattered in the roadways. 3. Leakage from tube and boxes. The remedies for these evils may be found in the following:— 1st. Mode of working, in which there is not much room for improvement; the long wall system being considered much superior to pillar and stall, as it does not leave any pillars to crush and decrepitate, which when being removed produce a large amount of fine dust. 2nd. In the mode of haulage and form of tubs there is probably the most room for improvement, as the systems in use in many collieries are very prolific in the generation of fine dust. The worst of which seems (a) the use of boxes made of green timber which, after a few weeks use in a dry mine, shrink and leave a wide space between the boards, through which the dust is continually falling; (b) the form of boxes in use in some of the South Wales collieries, which have the sides constructed of a lattice work of iron. The remedy for these are—(a). The use of dried and well seasoned timber in the construction of wooden boxes, which should in all cases have grooved or covered joints. (b) The use of sheet iron boxes, fitted with wooden or india-rubber buffers to reduce the shock caused by the boxes jamming against each other. (c) The systems of haulage at high speed are probably the greatest producers of dust, and wherever possible should be superseded by some form of haulage that can be carried out at speeds of two to three miles an hour, such as endless rope or chain with a double line of rails. After having as far as possible remedied the causes of dust generation (which remedies can be only partially successful), there must next be considered the means available for dealing with dust in mines. The first consideration must be its removal from the workings; and the next how to render its properties of danger harmless. With reference to the former: The removal of the dust entirely is not practicable, for to be done properly would require an army of scavengers being kept constantly at work, and even then the finest and most dangerous particles would still remain; again, unless water is copious-

ly applied during its removal large clouds of fine dust will be constantly passing with the currents of air to the danger of the mine, and will be again deposited on the roof, sides, and floor of the roadways. With reference to the latter consideration, viz., how to render the dust harmless, there have been several methods proposed. 1. It has been proposed to raise the temperature of the intake air to the natural heat of the mine; it being claimed that all air entering the mine at a low temperature is gradually raised, in doing which most of the moisture is evaporated from the dust. This anti-ote (which would only prove partially effective) is most impracticable, as it would be very costly to artificially heat the air some 20 to 40 degrees, and as deep mines are at present much too hot for comfortable working, if the temperature of the mine be thus increased, as it would by the suggested method it would probably necessitate the paying of extra wages in the getting of the coal. The heated air would probably affect the roof and sides of the mine, and also decrease the quantity and efficiency of the ventilation, so making the "cure worse than the disease." 2. Strewing the work with common salt or brine has been proposed, and is used to some extent to keep the dust in a moist condition. It gives good results if used on the following basis:—One pound of salt per square yard of area, applied once a week for the first month, and once a month afterwards. Its use has the following disadvantages:—Salt is expensive, costing about 9s. per ton (though if used extensively it could probably be obtained at a cheaper rate). The cost of labour in spreading the salt will be heavy, and additional matter will have to be removed, this again adding to the already heavy cost of working mines. 3. The turning of exhaust steam into the air courses has been proposed, but anyone who has had to do with steam engines in a mine, knows the havoc it works with a roof composed of shale, therefore there is little probability of this method being used to any extent. 4. The best and most practical method is the watering of the roads by (a) water carts or (b) the laying of pipes in the haulage roads and main air courses; both of these methods have their advantages and disadvantages. These require very careful consideration, as it will be in these directions that the solution of the problem must be expected. (a) The watering of main intakes and returns by water carts, of which there were several varieties, viz., ordinary water carts with holes in the bottom, carts constructed on similar lines to those used in street watering, with a pipe at the back to diffuse the water by its flowing through small apertures in the pipe. A very ingenious cart was constructed by Messrs. Smethurst for use in their mines at the Gatswood Hall Colliery. It consisted of an ordinary water barrel mounted on tram wheels; at one end was fixed a hollow circular rose perforated with small holes around its circumference, and connected by gearing to a toothed wheel on the axle of the tram wheels. The water was delivered into the centre of the rose or disc, which revolving very rapidly when the tub was in motion, scattered the water by centrifugal force against the roof, sides and floor of the roadways. The disadvantages of this system are—1st. The cost of conveying the cart about the mine, which will also interfere with the ordinary coal traffic. 2nd. The cost of keeping a road constantly laid in the return air courses. 3rd. The water falling in one place only when the carts are stationary, will have an injurious effect on the floor in that particular spot. This, however, can be remedied by so arranging the cart that it shall automatically close the outlet when the cart is not in motion: The

second system consists of the laying of water pipes along the sides of the main road and air courses; this appears the most feasible, if properly arranged to conduct water from the surface, or any convenient level in the shaft. The pipes being provided at suitable intervals with collections of small holes or apertures to diffuse the water in the form of five sprays into the road. The distance apart of these sprays would have to be determined by practice, and should hardly need to be less than 10 to 20 yards. This system if properly carried out with a good head of water, possesses the following advantages:—1. Is a very sufficient method, as the water can be turned on when the mine is not working so as to cause no inconvenience to the men employed. 2. Does not require the keeping of a permanent road in the return airways. 3. After the first cost of pipes and fixing would not require any heavy expense to keep in working order. 4. Would prove of great service in case of fire in the mine. 5. Can be connected with the working face and drawing roads by flexible tubing. 6. Will not injure the health of the men as the atmosphere will not be saturated with moisture in suspension during the time the men are at work. 7. Can be so regulated that only the proper amount of water shall fall on the roadways to damp the dust, as with a soft flood the water in excess will cause the warrant to heave. Its disadvantages are:—1. First cost of pipes and fixing, which will be heavy. 2. Danger of the small apertures becoming clogged by dust and dirt. 3. Danger of the pipes being broken by falls of roof and sides, and the lifting of the floor. These can be somewhat guarded against by having the pipes slung from the timbers, and providing expansion joints and stop-cocks, so that the water can be turned off at any particular point or branch during repairs. 4. The necessity of having clean water free from all matter in suspension and accompanied by a good pressure, this again being of itself a counter disadvantage as it necessitates the use of stronger pipes. 5. The necessity of having suitable settling tanks and grids, to prevent any solid matter entering the pipes. In conclusion there are several points to be considered. 1st. Is there any necessity to damp the dust in any other than the main haulage roads and the return airways near to the bottom of the upcast shaft. Messrs. Atkinson have clearly demonstrated that in the explosions of which they treat in the book alluded to, "that the blast did not in any of the instances quoted travel to any extent in the returns." They further draw attention to the established fact "that in all explosions the blast travels against the air towards the downcast shaft," as a confirmation of their theory that "the dust in the return being chiefly composed of shale and metal does not transmit the blast." At the late explosion at the Altofts colliery the same phenomena was observed, and this was also the case at Mardy, &c. 2nd. What will be the effect of damping the floor in mines that are subject to creep? Will the frequent slight waterings of the dust be sufficient to keep it moist without allowing the water to affect the warrant? 3rd. Will the spray at specified distances be effectual in rendering the dust on the sides and timbers harmless? 4th. The advisability of dissolving salt in the water so utilised, and will it be likely to crystallise and stop up the apertures? 5. The advisability of hanging a sheet of brattice cloth, saturated with water, over and in front of all shots fired in the coal or metal, as a preventive to the flame during the dust. 6th. The advisability of reducing the velocity of the air in haulage roads by enlarging their areas, or providing additional roads for the intake air. 7th.

The advisability of adopting the remedy, suggested by Messrs. Atkinson, of separating each district by means of lengths of arching, to be kept quite free from dust by brushing and watering, and to confine an explosion to the one district.

Beauce Gold Mines.

AN INTERESTING DISCOVERY MADE ON THE ST. ONGE PROPERTY—ENCOURAGING INDICATIONS.

The St. Onge Gold Mining Co. have established the fact that there is an ancient river channel running through the company's property at a depth of 165 feet from the surface, from which channel a considerable quantity of fine and coarse gold has been washed. News has just been received by the president of the company that the ground is getting richer as the head of the rapid (on which the shaft was sunk) is reached. In January ten feet of drifting produced nine ounces of gold. One nugget was worth \$23.27, another \$13, and so on. The owners deserve every success for the plucky way in which they have stuck to the development of their property. We hope to be able to give a full report of the workings in our next issue. Already a good deal of excitement has been created by the recent find.

WASTE MICA.

SOME USES TO WHICH IT CAN BE APPLIED.

The best employment of the immense quantities of scraps and fragments of waste mica which suggests itself as worthy of a wider field than it now possesses is the substitution of mica for glass in spectacles worn by workmen, especially stone and metal workers, to protect their eyes from chips and splinters. As already made in Germany, these mica glasses are concaved in the shape of watch glasses, and are about one twenty-fifth of an inch in thickness. The advantages gained by this utilization are greater than would at first be imagined. Mica spectacles cannot be broken. Pounding with a sledge hammer merely flattens them, nor does molten metal poured on the mica affect it. The shower of pointed iron particles which issues from lathes merely rebounds from the elastic mica glasses. Another use for mica is its application, when previously colored or metalized, to ornamental purposes. From its unalterable nature, the material preserves gilding, silvering or coloring from deterioration; and from its diaphaneity, the articles so treated will preserve all their brilliancy. Finely ground mica, or colored gelatin, also shows handsome effects, and when mixed with a solution of gum arabic, it makes a good silver ink. The gelatin combination is used for inlaying buttons. Another beautiful application of mica is in the production of bronze-like colors, which bear the names brocades, crystal colors and mica bronzes. Among the advantages of these are that they are indifferent to sulphurous exhalations, are very light in weight, and in some colors are even more brilliant than the metal bronzes. When small particles of mica silver are spread over articles coated with asphalt varnish, the result is a good imitation of granite. The crystal colors are also suitable for calico printing; and fabrics to which they are applied surpass in brilliancy the heavy bronze and glass dust fancy fabrics of Lyons. Such colors have been used to decorate porcelain and glassware, the articles undergoing a second heating up to the fusing point of their

glazing. By suitable dyes, the material is easily colored to a variety of hues.

Mica has been used on board war vessels, in localities where glass would be broken by the concussion due to the firing of heavy guns. It is also employed for roofing purposes, and in several patented processes forms a water and fireproof covering for strata of rubber, tar, canvas, felt, and similar materials.

Mechanical Ventilation of Mines.

At the present time more than ordinary attention is being directed to the best means of ventilating mines, more particularly those where a large quantity of gas is constantly produced. The atmospheric air sent through a colliery undergoes in its passage certain modifications which renders it unable to keep the workings clear of gas. The respiration of men and animals gives birth to extremely deleterious gases. Sulphides become sulphates, carbonates turn into peroxides, whilst vegetable and other matter undergoes fermentation in which the oxygen disappears and gives way to carbonic acid, carburetted hydrogen, nitrogen and ammonia. For the safe working of our mines it is, therefore, essential that there should be a large and constant supply of fresh air sent from the surface so as to permeate every part of the workings. To effect this, various systems have been in operation, including the furnace, fans, steam jets, screws, etc. The furnace has long been the means of ventilating most of the collieries in every part of the kingdom. The amount of air produced by a well constructed furnace varies from 4,000 to 8,000 or 9,000 cubic feet per minute for each foot in breadth of the bars. Still the temperature of furnaces is very variable, and to some extent also the ventilation, while there is considerable danger in the return air containing the gas being carried over the furnace instead of through a dumb drift into the shaft. The furnace is also a source of danger from other causes. For a few years ago the stack for feeding the furnaces ignited at a large colliery in England, then set fire to the coal, and led to a loss to the proprietors of more than \$300,000, and to the pulling down of a powerful fan.

But mechanical ventilation, it may be said, is by no means a new system, although of late it has made very great progress, for we find the Duck machine was in use at the commencement of the present century in Cornwall, Eng. Mr. Strauve, of Swansea, made some important improvements with respect to aerometers. By covering them so as to make them double acting, and placing the valves at the side, he succeeded in producing a machine far superior to any that had preceded it. Of late years however the superiority of the fan has been clearly demonstrated by Mr. Morrison, of Newcastle, the agent of the Guibal, which deservedly takes the highest rank. The Schiele fan, an economical one, taking up comparatively little room, and not requiring either expensive machinery or masonry, has made marked progress of recent years.

Ventilation by means of the steam-jet was revived some years ago, but this system failed.

A new company, under the name of the "Templeton and Blanche River Mining Company," has been formed with a view to carrying on the phosphate industry. The capital stock is \$33,000, divided into shares of \$100 each. Messrs. H. Beaugrand, W. Cassils, L. Sutherland, S. C. Stevenson, P. S. Ross, H. Graham, H. S. Reddy, D. Anderson, J. Beattie, A. Rudolph and A. M. Perkins, of Montreal, are prominent leaders in the enterprise.

PHOSPHATE.

LATEST QUOTATIONS.

There is already some enquiry, chiefly from the Continent, for Canadian Phosphates for delivery during 1887, but as buyers are indisposed to advance upon last season's prices no business has resulted. Ground Canadian testing 60 to 68 per cent. is now likely to become an article of annual importation, and Sellers are disposed to contract for further supplies during the coming season. South Carolina Phosphates.

The possible infliction by the State Legislature of a second dollar export duty upon River Phosphates has caused a slight stiffening in prices, and Raisers are more than ever unwilling to sell at late rates, indeed, contracts have already passed at more money. Some of the manufacturers of Ground Belgian have been obliged to succumb to the unremunerative prices obtainable, and sellers are demanding an advance for their Phosphate, which has become almost a necessity to the trade. The new French Phosphate is now being delivered, and realizing the promises of its sellers. The chemist's report upon two actual shipments made last week show 73.74, 73.85 per cent. Phosphate of Lime, Alumina 0.11, 0.23 per cent., and Oxide of Iron 0.94, 1.09 per cent., respectively. Cambridge and Bedford Coprolites are unchanged, and quoted at 41s. f.o.r., or ground at 48s. in buyer's bags, or 50s. in lent bags, f.o.r., the latter at 26s., f.o.r., or 31s. 6d., f.o.b., Thames.

EXPORTS, 1886.

The report of the Montreal Board of Trade shows that there was exported from that port in 1886, 18,968 tons of phosphate, against 23,849 in 1885, and 20,747 in 1884.

PHOSPHATE IN FRANCE - A NEW DISCOVERY.

The deposit of phosphate of lime discovered about three months ago near Beauval, in the department of the Somme, has proved to be remarkably rich. This deposit had really been located some twenty years ago, but so little attention was then given to its value that, until very lately, these phosphates were sold in the neighborhood as common building sand. Recent complaints having been made about the quality of the sand, one of the owners of the bed took it into his head to have the material analyzed, and then discovered that he owned a perfect bonanza. The analysis of these phosphates shows them to contain 66.43 per cent. phosphate of lime, 5.60 per cent. carbonate of lime, 3.26 per cent. fluoride of lime, and 1.43 per cent. sulphate of lime. The deposit of sand seems to cover the whole of the clay beds of the Beauval district, and varies in thickness from a few inches to 30 and 36 feet. It also fills all the cavities on the surface of the clay. Under the microscope, it shows itself full of shells and infusorial remains. It weighs about 66 pounds to the cubic foot.

A Monster Nugget.

There is at present in Wells, Fargo & Co.'s bank a bit of auriferous rock that any individual might be glad to possess. The nugget is one of the finest unearthed in California, both in size and richness. It is irregular in shape and about the size of an ordinary Derby hat. That there is very little rock and a great deal of gold in it may be determined by its weight, which is thirty-five pounds troy. Quartz of this sort is usually valued at \$200 per pound, and, allowing the large margin of \$1,000 for rock, the nugget would be worth \$6,000. The exposed rock and great globes of gold that hang out of its sides so as to

nearly hide all other composition and make it appear almost as melted metal, are not jagged or rough, but on the contrary, are smooth and polished in a manner that only water is capable of. The proprietors of the nugget are Messrs. Hayes and Steelman, of Sierra City, and they have left it on exhibition for a few days. At the bank it attracts much attention, but the employees could furnish no information concerning it beyond that it came from Sierra county, near Sierra.

The Continental Iron Trade.

The extreme depression which characterises the Westphalian coal trade can hardly be said to extend to the iron trade in the same district. It is possible that there may be a good deal of exaggeration and undue hopefulness in the estimate formed by those concerned in this industry of their immediate future. But it is quite certain that there is increased activity in the trade, and a growing demand for home ores. Prices also have risen, although not to a very material extent. The advance, however, has been sufficient to induce a number of mining proprietors to reopen mines which had long been standing idle. Blast furnaces, too, are very busy, and the demand is quite equal to the production. In these circumstances, it is not surprising to hear that makers are but little inclined to enter into any contracts extending further than the end of March. While on the subject of the iron trade we may say that prices in Belgium also continue firm. But in France the improvement is exceedingly slow. It is remarkable, indeed, how completely the manufacturers and producers of the French Republic seem to be losing their hold on the world's markets.

The *Colonist* reports that two mines have been discovered right along the C. P. R. line through the Selkirks, but the want of machinery and capital has yet prevented their richness being fully tested. They are both along the Illecille river. One mine, situated at Albert Canon, is only 400 yards from the track. It is said to have a vein of gold bearing quartz 20 feet wide. For the past year a few men have been employed in taking out ore, which has to be shipped to outside points to be assayed, as the necessary machinery has not yet been placed in the mine. There is another mine about ten miles beyond the summit of the Selkirks; it is situated about a mile from the track and fourteen ponies are constantly employed in bringing the ore down the steep slopes of the mountain for transmission. Machinery is to be placed in this mine also next summer.

The introduction of ambulance lectures by professional medical men, by which workmen and others are taught how to act in cases of emergency, has already been the means of saving many lives and it is not too much to say that the foreman and leading workmen of all engineering establishments should be encouraged to attend such lectures free of cost to themselves, even, if necessary, in the time of their employers, as their services, should occasion arise, would be freely given, to the great advantage of the unfortunate sufferer. Even keeping a supply of lint, linen rag and sticking plaster upon the premises is not to be lightly prized, as many a poor fellow who has been struck by a hammer or cut by a flying clip or iron can testify, and such slight mishaps are common enough.

At the last meeting of the directors of the Rabbit Mountain mine the sum of \$20,000 was set apart for the development of the property.



SCIENCE.



OTTAWA LOCAL GEOLOGICAL WORK.

The series of "Monday afternoon lectures" under the auspices of the Ottawa Field Naturalists' Club was inaugurated in January last in the Museum Room of the Ottawa Literary and Scientific Society by Mr. Henry M. Ami, of the Geological Survey Staff. Whilst these lectures are meant chiefly to give these members who desire it an insight into the elementary principles of the various branches of natural science which comes within the pale of the club, there is often added information which bears upon the resources that these several studies seek to investigate and develop, whether in mineralogy, geology, zoology, ornithology, botany or entomology. Mr. Ami had been requested to address the members, and in the course of his remarks, which were all of an eminently practical nature to those who desired an insight into that subject as well as to those who sought further information, he briefly sketched the attractions and points of interest which geology affords, presented its aims, and in a lucid manner explained the few leading terms with which it is necessary to become familiar in pursuing such a science, viz.: faults, dislocations, flexures, anticlinal, synclinal, monoclinal, horizontal, inclined, conformity, unconformity and such like in reference to strata and their structure. Having described the various epochs which have been characterized by the introduction or presence of certain types of animal life in the physical history and evolution of the earth up to the present time, the economic minerals to man which were stored up in these several epochs, such as *coal, petroleum, lead, copper, silver, gold, &c., &c.*, the lecturer then applied the principles and elements of the science to the particular district which it is the province of the club to examine—Ottawa and its vicinity. Taking a line of section from King's Mountain, Chelsea, and running it through Parliament Hill at Ottawa a diagram shewing the various geologic formations met in this section was then discussed. The Laurentian system was here represented by two formations, which Sir Wm. Logan referred to as the lower and middle Laurentian formations, characterized by gneiss and gneissoid, as well as nonblendic rocks and cr. stalling limestones, respectively overlying the former. The next formations met belonged to the Palædgon period, or series, and these rested unconformably upon the upturned edges of the Laurentian rocks. There had been a lapse of time between the deposition of the Laurentian and the deposition of the Potsdam formation, which latter was characterized at its base by a series of coarse conglomerates containing huge rounded pebbles of quartz and other rocks of Laurentian age imbedded in a sandy or arenaceous mixture, as one might find along a modern sea shore or beach. The next formations met were the calciferous, the chagy, the Black river, the Newton, and lastly the Utica formation—all Palædgonic rocks—and in a regular unbroken sequence perfectly conformable one on the other and forming a series of sedimentary strata of considerable thickness (to be ascertained yet) and containing parts of petrified organic remains or fossils, which enable the precise horizon or age of the strata to be ascertained. The newer or Post Tertiary deposits were then casually referred to, as the lecturer purposes presenting this subject before the club at one of its soirees next month,

the subject being, "The great Ice age and subsequent formations at Ottawa."

The work done up to date in geology about Ottawa was then referred to and the workers late and present noticed. There had been considerable work accomplished both in mineralogy and palæontology. There was a great deal yet to be done in all branches of geologic investigation, and a small army of workers would not exhaust the field for a long time.

Ottawa was a particularly favorable spot for researches in geology and mineralogy. It was destined to hold a very conspicuous position, as the neighboring rocks teemed with valuable minerals. The *iron, apatite, epaphyite* and *barytes* of the vicinity were only touched upon by the lecturer as they alone would suffice for lecture upon lecture.

An agreeable discussion took place at the conclusion of the *causerie*, in which, besides the lectures, Mr. McLeod (engineer), Dr. Small, Messrs. Harrington, Whyte and others took part.



BOOK NOTICES.



The great advances made in recent years in the industries of the United States has raised the question in England of American competition in the iron and steel trade. It has been asked if the Americans are in a position to dispense, from time to time, in great measure with English assistance in supplying them with iron, and if the day may come when American producers will not only meet them in all the neutral markets of the world but even extinguish the furnaces of Cleveland and Cumberland, of Scotland and of Wales. About twelve years ago Mr. Isaac Lowthian Bell (now Sir Lowthian) represented the English Government at the Philadelphia Exhibition, and during that visit took the opportunity to investigate into the position and prospects of the American iron industry, and since then he has been a careful observer of its progress.

In a recent issue of the *Fortnightly Review* he contributes an able paper on the "Iron and Steel Trade," in which he deals exhaustively with this question and claims that as long as Great Britain can command raw materials at their present cost there does not appear much chance of the United States offering successful competition to it. Some idea of the value of his paper may be gleaned from the following extracts:

"Upon a recent occasion I constructed a table which was brought down to the years of the largest iron production the world has ever known, viz., 1882 and 1883. In it an estimate was made of the actual quantity of the metal consumed in the United Kingdom and in the United States. It commenced with 1878, when our own country used more iron than any other nation. At that time the United States worked up to 70 per cent. of the weight consumed in this country. In 1883 the figures were almost exactly reversed, i.e., the consumption in the United Kingdom was just about 70 per cent. of that of the United States. The estimate was based on the quantity of pig iron used as such, and the equivalent of pig required in the production of the metal in its more advanced states of manufacture, such as steel, malleable iron, &c."

He states that in 1870 England contributed 51.6% towards the world's output of crude iron, and that our share has steadily fallen to 38.4%. Meanwhile, the United States had advanced from 14.4 per cent. to 20.2. These figures are

up to 1884, but when the returns for 1886 are available it will be found that the United States percentage of the total is much nearer 40 per cent. than 20 per cent.

He mentions that whereas the area of English coal deposits is but 7,000 or 8,000, the United States measures underlie 200,000 square miles. On the other hand he thinks that the iron ore deposits of the United States are very little, if at all, more extensive than English beds of ironstone.

In 1870 twenty-nine million tons of coal were raised in the United States; but, in 1885, one hundred and two million tons were extracted, an increase of 248 per cent. During the same period British coal output rose from one hundred and ten million tons to one hundred and fifty-nine million tons, an increase of 44 per cent. Sir Lowthian Bell lays stress on the advantage the home manufacturers possess by reason of the proximity of the ores to the fuel in Great Britain and he refers to the royalties payable there, which greatly add to their cost of production. He estimates that the royalties work out thus:

"Made from the Lias ironstone, amount to 3s.; made from ordinary clay ironstone in Scotland, 3s.; made from Blackband clay ironstone in Scotland, 4s. 10d.; made from hematite in Cumberland and Lancashire, 6s. 3d. In Germany they only come on the ton of pig iron to about 6d. In France they only come on the ton of pig iron to about 8d."



MINING NOTES



Nova Scotia.

The returns from the Oldham gold mining property for the past three months are as follows:

October, - - - -	115 19 oz.
November, - - - -	61 2
December, - - - -	109 28

We are informed that the proprietor cleared \$2,165, the value of a gold brick from the mine. It weighed 113 oz. 18 dwts., and was the result of one month's work by 20 men.

The output of the Springhill mines for December, reached the unprecedented figures of 43,026 tons, which closes the year with a total of 468,000 tons, an increase of 118,000 tons over 1885. The collieries are kept busy at their utmost capacity, and give employment to between eleven and twelve hundred men and boys. The South Slope is being opened out and 200 tons of coal hoisted and shipped daily. Other preparations are being made for a further increase of business this year. Shipments of coal by water from Parrsboro, in 1886, were 40,508 tons, against 26,215 in 1885.

It may not be generally known says the *Critic*, that an American company from Pennsylvania has been boring for oil in the Memramcook Valley, Westmoreland County. They have acquired large areas of territory and within the past three or four years have sunk quite a number of wells, but without success as yet. At present they are boring in what is known as the old Ayers Mill property, about 3 miles northwest of the Memramcook Station. As they have spent large sums of money it is to be hoped that their efforts will be crowned with success. Hon. A. D. Richard, barrister of Dorchester, is solicitor of the company.

Some five or six carloads of matte from the Mineral Vale property, New Ireland, Albert County, have been forwarded for export to Swansea. The value of the matte is placed at \$100 per ton.

An endeavor is being made to engage Nova Scotian miners for work at the Bow River coal mines, N.W.T.

The West mine, Rawdon property, has been sold to Minnesota capitalists, and new machinery including a new 20-horse power engine and boiler is to be added, while steam hoisting and pumping gear will supersede the work now done by horse power. Mr. Dissoway, lately of Moose-land, Tangier district, is mentioned as the new manager.

The main shaft at the east mine, McNaughton property, is now down some 500 feet. A fire recently broke out in one of the buildings, and might have proved a serious conflagration but for the speedy action of the miners, who quickly extinguished it. Some damage, however, was done to the roof of the mill building.

Referring to the very large increase in the output and shipment of coal from the mines of Nova Scotia during the past year, the *Montreal Gazette* in an editorial very clearly points out that this is in very large measure due to the policy of protection adopted by the province. It states the case thus: "With the product of their mines shut out of the United States, and the market of the Upper provinces taken away from them by the competition of United States collieries, the home consumption of the province itself would have afforded employment to but a fraction of the number of miners now actively at work, and an immense amount of capital invested in coal properties would have been deprived of its earning power. As it is, under the protection policy, means of livelihood are afforded within the country to thousands of miners, Canadian vessels and Canadian railways, instead of United States railways, are occupied in the transportation of the product, and large sums of money that would otherwise be sent to foreign lands in payment for coal and freights are kept within the Dominion. And the benefit is not alone to the province, for the supplying of the families of the miners affords a market for the factories and work people of other parts of Canada, to the mutual advantage of each.

The value of the gold exports from this province, for the month of December, amounted to \$18,000.

Gold has been discovered in Hants County, near Ardoise Hill, and at a point about four miles from Mount Ninack. Indications said to be good.

The Egerton Gold Mining Company with a capital of \$40,000, are preparing to open up the Fifteen Mile Stream Gold mine, while it is reported that an American syndicate have purchased extensive copper and iron deposits in Cape Breton, and that the product of the Spring Hill mines for December was larger than ever before. All the different gold districts are being worked to great advantage. Salmon River, Lake Catcha, Cariboo, Moose River, Rawdon, Renfrew, Oldham, Brookfield, and Caledonia districts are yielding regular returns, and Moose-lands, Gold River, Malaga Lake, Millspigate Lake, Mill Village, Carleton and Kemptville, are being rapidly developed, and when the mills in course of construction are finished, will swell the

list of gold producers. Gold has been discovered in Annapolis County, and prospectors in all parts of the Province are preparing for a vigorous campaign as soon as the snow leaves in the spring, and many new and important discoveries will almost certainly be made during the present year.

During the month of December 30 tons of quartz were crushed at the McEwen mines, which yielded 85½ ounces.

Ontario.

PORT ARTHUR DISTRICT.

The ore at the Silver Falls mine is said to be averaging \$28.00 to the ton, with good indications.

The *Sentinel* announces that the latest assays from taken at the Palisade mine realised \$100 per ton.

The shaft at Silver Falls mine is now down about 55 feet. Two recent assays give 18½ and 28½ oz. of silver to the ton.

Work is suspended until the spring at the Silver Hill property. Major Bell is now in England endeavoring to sell the property or to secure a company to develop it.

Two hundred and eight feet have been sunk at the Rabbit Mountain mine.

Few matters so materially affect the well being and wealth of both Eastern and Western Algoma, as the present mining regulations of Ontario. Under them, if a man has money, he has only to employ a surveyor, make an affidavit that there are indications of mineral or metals on the land he wishes to grab, and by paying two dollars an acre, purchase as large a tract of land as his purse will allow, and except upon the small portion reserved for public roads, no person can trespass. This system exists throughout the district, is fast becoming a very serious check to its proper development, and should be promptly put a stop to. The Silver Islet mining company, who operate a spot of a little over an acre in extent, have 27,000 acres thus locked up, whilst there is probably about six times that amount held by speculators in grants of from two hundred acres and upwards.

Recent specimens from the Jarvis property are said to be expected to assay from \$15.00 to \$30.00 per ton. These samples have been brought to Port Arthur by Mr. A. S. McEwan.

A limited liability company, says the *Engineering and Mining Journal*, has been organized in London, with a capital stock of £100,000, shares £1 each, to acquire 240 acres in extent, freehold, consisting of two mining locations on Silver Mountain (Shuniah Weachu), in the Thunder Bay District, on Lake Superior. The vendors receive 25,000 shares and £30,000; 9,000 fully paid-up shares will be allotted to directors in lieu of remuneration for two years, and to other parties for services rendered. The mine is about twenty miles from the Canadian Pacific Railroad, and ten miles west of Port Arthur. Messrs. Frank Tobin and James Nancarrow, M.E., visited the mines in October, and upon their report, which is very unsatisfactory and indefinite one, and which affords no basis whatever for the price asked for the property, its purchase was completed. Messrs. R. J. Battle and E. C. Garlick, mining engineers, of Cleveland, also made equally unsatisfactory reports.

British Columbia.

The latest discovery of coal is reported from Tumbo Island, in the Straits of Haro. The deposits are reported large, and the quality of the coal excellent. A company has been formed to develop the deposit.

Since the year 1858, when the first great rush to the gold fields of the Fraser occurred, until the present date, fully \$50,000,000 in gold dust has been yielded from the mines, and competent authorities state as yet that they have only been scratched over—only the easier secured and rich paying deposits have been worked. Certain it is that as yet the country remains only prospected around the famous fields, and that in many sections of the gold belt nothing has been done. There are in Cariboo and other districts to-day known mining grounds that will richly repay a moderate expenditure of capital in hydraulicizing on improved principles. But this is not the class of mining that is now looked forward to as likely to prove one of the greatest—if not the principal—industries in the province. Recent examinations by mining experts, prospectors, and others who were in a position to judge, have all been productive of highly favorable reports as to the richness and extensive character of the mineral deposits in Cariboo, Yale, Kootenay and other districts. In many places work has commenced and machinery has been placed in position. Capitalists have signified their intention of investing, and everything is now tending towards an extensive treatment of the mineral bearing rocks of the province, and especially of gold. Should results prove, as there is good reason to anticipate, the gold mining industry will branch into a permanent and lucrative one, and one that will hasten the progress of the province.—*Colonist*.

During the past season four strong companies have been engaged on McCullough creek. The Ophir Bedrock Flume Co. commenced work at the mouth of McCullough creek last summer, and have about three hundred feet of ground sluice constructed. Mr. Gray is delaying the clean up as long as possible in these works so that the preparations for putting in hydraulic power may not be interrupted. In the meantime they are starting a tunnel which will enable them to continue work throughout the winter. There is undoubtedly a considerable sum of money now in the Ophir Co's flume, as nuggets of good size have been picked out of the face frequently during the past few months. Indications show that bedrock is not far ahead, and Mr. Gray intends to have a "giant" with the other necessary machinery on the ground in good time to take advantage of the spring flow of water in the creek.

The Baldhead Co. are drifting in their claim a mile and a half above Gray's.

Above the Baldhead claim is the Erickson; their tunnel has been shut down during the close season, or until such time as the Selkirk company's tunnel (immediately above) has been pushed forward to bedrock, these two companies having arranged to co-operate in prospecting the Selkirk claim.

While undermining some coal, which a previous shot had failed to bring down, at No. 1 Esplanade shaft of the Vancouver coal company, a miner was lately crushed to death by the mass falling upon him.

We are informed by the *Critic* that notice has been given that letters patent for the incorporation of a joint stock company, to be called the Montreal Manganese Mining Company, for the

mining of manganese and other minerals in the County of Hants or elsewhere in the province, has been applied for pursuant to statute.

The chief place of business in Nova Scotia will be Maitland, and the intended capital stock is \$100,000, to be divided into ten thousand shares of ten dollars each.

H. T. Harding is solicitor for the applicants. The provisional directors of the company are to be H. T. Harding, David Andrews, and Thomas Ralph. The Hon. David McLelan, Provisional Secretary of New Brunswick, J. T. McBride of Montreal, and W. R. Stockbridge, broker of Boston, are prominent amongst the applicants.

Hants County is celebrated for its large deposits of manganese, and we are glad to note that a company with plenty of capital to work them will soon be in active operation. We are informed that the new company will purchase extensive manganese properties near the Shubenacadie River.

EASTERN TOWNSHIPS.

COPPER AND OTHER MINING PROPERTIES BELONGING TO MR. WM. FARWELL, SHERBROOKE.

DESCRIPTIVE NOTES BY CAPTAIN FRANCIS BENNETT MINING ENGINEER.

TOWNSHIP OF ASCOT.

The Pyrites region of the Township of Ascot, in the Province of Quebec, has proved to be one of the most important in Canada. The ore consists of Pyrites, containing from 3 to 4 per cent. Copper, and from 35 to 45 per cent. Sulphur. It occurs in veins in micaceous and chloritic slates, associated with silicious and calcareous matter. The discovery of gold and silver accompanying these ores gives additional importance to the region.

The properties in this Township, now offered for sale, consist of the following Mines and Mining Lands:

1st. CLARK MINE, Lot 11, in the 7th Range, 187 acres, in fee-simple.

This mine is situated towards the centre of the mining region above described. It has been somewhat extensively worked, and a considerable quantity of ore extracted. The principal mining work has been done by means of open cutting on a vein about 18 feet thick, and containing about 3½ per cent. copper. Other veins are known to traverse the property.

The mine is about a mile and a half from the Lennoxville station of the Grand Trunk Railway, and 2½ to 3 miles from the City of Sherbrooke.

2ND. SHERBROOKE MINE.—Part of Lots 12 and 13 in the 7th Range, 329 acres in fee-simple.

This mine immediately adjoins and is traversed by some of the same Pyrites veins as the Clark Mine, besides some others not embraced in that property. The Sherbrooke Mine property has been extensively explored at surface, but with the exception of a trial shaft (said to be 60 feet deep) it has not been opened up by underground workings. The value of the property is established by the known existence in it of wide veins of Pyrites of which one of the exploratory pits shows a vein of from 8 to 10 feet in width, of which a part yields over 5 per cent. metallic copper. Specimens from this vein are said to have also yielded, according to competent

authorities, from four to five dollars per ton of gold, eleven dollars per ton of silver, with from 35 to 40 per cent. sulphur.

This mine is a little over a mile from the Lennoxville station of the Grand Trunk Railway, and 2½ miles from the City of Sherbrooke.

3rd. BELVIDERE MINE.—Part of Lots 9 and 10 in the 9th range; W ½ Lot 10 in 8th range; 292 acres in fee-simple.

The general condition of the rocks and ores on this property are similar to those of the Clark and Sherbrooke Mines. The workings consist of a shaft, sunk 100 feet on a vein of between six and seven feet wide, rich in Sulphur, and yielding Copper Ores of from 3 to 4 per cent. of that metal.

The following is Sir William Logan's description of this Mine, as given in his general report for 1863, viz:—

"Here there is a considerable breadth of fine white micaceous slates, with which interstratified a bed of greenish quartz, or mica schist; this is in parts chloritic, or talcose, and contains large quantities of a mixture of iron pyrites, with yellow copper ore. Select portions of this gave, when dressed, one-half the weight of ore, which contained one-third of silicious matter, and 7.3 per cent. of copper, the remainder being iron and sulphur. The breadth of this bed is about six feet, and it is estimated that it will yield two tons of dressed ore similar to the above to the fathom."

Other Pyrites beds are known to exist on this property, which is situated from 2½ to 3 miles from a railway.

At the time operations were suspended at the foregoing mines, the value of the sulphur in the ores was not recognized, and it was chiefly on account of its presence in large quantities that the mines were closed.

4th. ASCOT PROPERTIES.—Part Lots 12 in the 7th Range; 12 in the 8th Range, and 14 in the 8th Range; 171 acres, mining rights.

The bands of Copper-bearing rocks are known to traverse these properties, which however have not yet been developed by mining operations.

5th. MORRILL LANDS, as per accompanying list, 1,300 acres in fee-simple.

Originally taken up for Gold mining purposes, discoveries of that metal which were deemed important having been made on adjoining properties—apart from their value in this respect, they are heavily timbered, and would be found useful for the supply of firewood, and timber for use at the Mines.

The Waterloo and Magog Railway (in connection with the Vermont Central R.R.) passes through a part of this property.

TOWNSHIP OF ORFORD.

5th. CARLUNCLE HILL MINE, as per accompanying list, comprises 713 acres of land, in fee-simple.

This mining property is situated in the heart of a mineral region, which combines many of the most essential characteristics, both for the extensive deposition and profitable working of copper and other ores. The rocks consist of chloritic slate, serpentine and diorite, and the metallic veins occur towards the line of contact of these distinct varieties of rock. On the property referred to, several distinct and well defined veins or beds of yellow sulphuret of copper occur, and have been traced by exploratory works along the brow of a hill, elevated about 800 feet above the level of Brompton Lake, situated about half a mile to the east. A small opening on one of the veins, which crops out on the face of the cliff, shows a thickness of five feet, yielding a considerable quantity of yellow

sulphuret of copper of about 12 per cent. of that metal. No regular mining operations have been made on the property, but the copper-bearing veins are proved by surface explorations and by natural exposures to extend over a large proportion of it. The property is now about 11 miles from the nearest railway, but a railway—now projected, and most probably very soon to be constructed—will pass through it, or within a very short distance.

TOWNSHIP OF CLEVELAND.

9th. ST. FRANCIS MINE.—S. E. ¼ Lot 25, in the 12th Range; 50 acres in fee-simple.

On this very promising mine, which is situated about three miles from the Richmond station of the Grand Trunk Railway, a very considerable amount of mining work has been done, and with most encouraging results. A well defined vein, richly charged with vitreous purple and yellow sulphurets of copper, traverse the entire length of the property, or about half a mile, cutting chloritic slates, the gangue being a mixture of quartz and calc spar. The vein is from three to five feet thick, and for a considerable length in the parts worked yielded an estimated average of two tons of 8 per cent. copper ore per fathom, (some portion being estimated to have yielded as much as one ton and a half of 40 per cent. copper ore per fathom). The plant on the mine consists of dwelling houses, smith's shop, ore sheds, office, etc., 1 large winding and pumping steam engine with boiler, winding and pumping gear, about 40 fathoms Cornish lifting pumps complete, railway tracks, ladders, etc.

TOWNSHIP OF GARTHBY.

10th. GARTHBY MINE.—A large block of lands, for the most part unexplored, comprising (as per accompanying list) an aggregate of 2,938 acres, in fee-simple.

On one of the lots comprised in this property, there appears to be a large bed or vein of Pyrites, the entire thickness in which the Pyrites are mingled with the rock being about twenty feet; on another lot and near the main road leading to the mine there is the outcrop of a vein of from 3 to 4 feet wide of solid Pyrites.

Samples of copper ore have been broken on this property that have yielded by assay as much as twenty-two per cent. of copper, while other samples were found to be free from copper. An analysis of the pyrites apparently free from copper, gave: sulphur 48 per cent., copper 1.1 per cent., iron 42 per cent., silica, etc., 8.9 per cent. As the ore contains such a large percentage of sulphur, it is peculiarly adapted for the manufacture of sulphuric acid.

The distance of the mine from the Garthby station of the Quebec Central Railway, (to which a tramroad could be cheaply made), is from four to five miles, and a railway is now chartered which it is expected will run through these lands.

ACTON.

11th. ACTON MINE.—Part Lot 32 in the 3rd Range; 100 acres in fee-simple.

This mine has proved to be one of the most productive and profitable in the Province of Quebec. Within three years after the mine was opened it had produced ores to the value of nearly \$500,000. The ore, which consists chiefly of the purple and yellow sulphuret of copper, is distributed throughout a thickness of from 200 to 300 feet of dolomitic limestone, and is occasionally found in masses of exceeding richness. From three of these masses 16,300 tons of 12 per cent. copper ores were excavated by open cut-

ting. This mine gave employment in 1861 to between 500 and 600 hands, and although its character as a good mine for permanent and profitable working has been very much impaired by the limited regard given to exploratory works, it is highly probable that the ore is still very far from being exhausted. Sir William Logan is reported to have said of this mine:

"Little has been done for discovery, and it cannot be said how near to the present floor of the mine may be found other masses similar to those that have been excavated."

This mine is situated about half a mile from the Actonvale station of the Grand Trunk and South Eastern Railways, about fifty miles from Montreal.

TOWNSHIP OF BROME.

12th. BROME MINE.—Part of Lots Nos. 2 and 3 in the 4th Range, 50 acres in fee-simple.

This property is situated in a region that has deservedly attracted much attention from mining investors. It is characterized by the occurrence of very thick and persistent embedded veins of rich sulphuret of Copper. The mine in question lies on the strike of some of the most important of these, and is in the immediate vicinity of a railway.

TOWNSHIP OF BOLTON.

13th. BOLTON MINE: As per accompanying list 400 acres in fee-simple.

This property is situated between that of the Huntington Mining Company on the south, and the Ives Mining Company on the north, occupying the space between these two properties, and traversed by the veins that have been so extensively worked in the Huntington Mine. About the middle of this property two shafts have been sunk on the vein, to a depth of between 60 and 70 feet. These shafts are connected at this depth by a drift, in which the vein is about six feet wide, composed principally of Iron Pyrites containing large patches of very rich yellow copper ore.

This Mine is about 2 miles from the Eastman Station of the Waterloo and Magog Railway.

TOWNSHIP OF CHESTER WEST.

14th SHAW MINE. As per accompanying list comprises Mining rights, total 630 acres.

Copper bearing beds, apparently of much importance have been discovered and partially developed upon this property. On one of these beds a trial shaft has been sunk to a depth of 40 feet, shewing a thickness of between two and three feet, charged with purple and yellow copper ore to the extent of 4 per cent. metalliferous band of rocks at this place is said to be from 40 to 50 feet, and it has been traced for about 500 feet. Other promising veins crop out in the property, but no regular Mining operations have yet been done on it.

15th. VIGER MINE.—As per list comprises Mining rights, total 1,255 acres:

This property is traversed by several copper bearing quartz veins in chloritic and micaceous schist, which, apart from the quartz veins yields rich vitreous copper bearing rock being about 170 feet. The principal vein has been exposed at surface, over a length of nearly half a mile by shallow pits, from which a considerable quantity of rich copper ore has been incidentally obtained. Two Adit levels, for which the ground is highly favorable, have also been driven to prove the veins in depth, with results that are represented as being highly satisfactory.

This mining property is about 15 miles from the Arthabaska station of the Grand Trunk Railway.

LIST OF LANDS.

Township.	Property.	No. of Lots.	Range.	Acres.	Title.
Acton	Clark Mine	11	7	187	187
do	Sherbrooke Mine	Part 12 and 13	7	329	329
do	Belvidere Mine	Part 9 and 10	9	139	139
do	do	W 1/2 of E 1/2 10	9	50	50
do	do	W 1/2 10	9	100	100
do	do	Pt N. W. end 10	8	3	292
do	Acton Properties	Part 12	7	106	106
do	do	" 12	7	65	171
do	do	" 14	7	65	171
do	Morill Lands	W 1/2 7	8	100	100
do	do	Lot 4	13	210	210
do	do	" 5	13	200	200
do	do	" 1	14	200	200
do	do	" 2	14	200	200
do	do	" 3	14	200	200
do	do	" 4	14	200	200
Orford	Carleton Hill Mine	2	14	65	1300
do	do	2	14	65	1300
do	do	2	14	200	1300
do	do	3	15	200	1300
do	do	4	15	210	1300
Cleveland	St. Francis Mine	SE 1/4 SW 1/4 25-12	12	50	718
Ganby	Ganby Mine	6, 6, 7	1st Nth.	150	50
do	do	8, 9, 10, 11	"	200	200
do	do	14, 15, 16, 17	"	200	200
do	do	20, 21, 22, 23	"	200	200
do	do	24, 25, 26, 27	"	200	200
do	do	28, 29, 30	2nd Nth.	246	246
do	do	31, 32, 33, 34	1st Nth.	200	200
do	do	11, 12, 13, 14	"	200	200
do	do	19, 20, 21, 22	"	200	200
do	do	23, 24, 25, 26	"	200	200
do	do	27, 28, 29	"	150	150
do	do	12, 13, 14, 15	2nd Nth.	200	200
do	do	16, 17, 18, 19	"	200	200
do	do	21, 22, 23	"	150	150
do	do	24, 25, 26, 27	"	242	242
Acton	Acton Mine	Part 12	7	109	2918
Brome	Brome Mine	Part 2 and 3	9	70	100
Bolton	Bolton Mine	6, 6, 7	12	30	50
do	do	E 1/2 5	10	100	100
Chester West	Shaw Mine	North 1/2 10	6	105	400
do	do	11	6	210	210
do	do	12	6	210	210
do	Viger Mine	1A	Craig N.	448	315
do	do	1B	Craig N.	850	315
do	do	1C	Craig N.	2112	315
do	do	South 1/2 17	7	105	915
do	do	Part 8	7	69	915
do	do	14	7	45	915
do	do	North 1/2 12	6	105	915
do	do	S E 1/4 13	6	52 1/2	915
do	do	Part 14	7	53	297
do	do	14	8	21 1/2	297

SUMMARY.

Townships.	Fee Simple.	Mining Rights.	Total Amount.
Acton	2669	171	2840
Orford	715		715
Cleveland	50		50
Ganby	2918		2918
Acton	100		100
Brome	50		50
Bolton	400		400
Chester West	1275	123	1398
	2503	295	2798

FOR SALE.

LOT NO. 17, RANGE 7,

TOWNSHIP OF PORTLAND EAST,

COUNTY OF OTTAWA.

Continuation of the North Star Vein. Partly developed and showing very high indications.

For particulars apply to

Dr. VALADE, Ottawa.

Or to the Office of the

CANADIAN MINING REVIEW.

Late Items.

NOVA SCOTIA.

Since the collapse of the Albion mine affairs have been quiet in the Montague District, but now comes news of a promising strike on the Montreal areas. A small lead has been proved and the quartz which was crushed at the Baker or Annand Mill proved good for 2 oz. to the ton.

The Oxford mine is looking well, and prospecting with most encouraging results is going on on the Anderson, Cogswell, and McKay areas. The richest leads seem to run into or through a swamp, which could be drained at small expense. These areas are held by parties who will not work them, and what the miners consider the best part of the district, good they say for millions, is now lying idle. The swamp could be drained for a few hundred dollars, and then all difficulty in working the properties would be overcome.

The following are the official returns for the month of January, so far as received at the Mines Office:

District.	Mill.	Tons Crushed.	Oz. Gold.
Whiteburn	Barber & Douglas Co.	25	16
East Rawdon	Rawdon	555	244 1/2
Dar's Hill, Salmon River	The Dufferin	827	262
Lake Catcha	Oxford	49 1/2	355 1/2
Sherbrooke	Cummings	18	11 1/2
Castro	Moose River G.M. Co's	219 1/2	162 1/2

TO MINE OWNERS AND CAPITALISTS.

CHAS. M. DOBSON, A.R.S.M., LON.,

REPORTS ON

Mines and Mining Properties.

Certified Mining Engineer, London, Eng., prospector for the West African Gold Mines (Akankoo). Has examined Min. of all descriptions for English Capitalists. Consulting and Practical Mining Engineer. Lodes located, prospected, assayed, and taken into the English market.

Address this office, or

189 Queen Street, Ottawa.

VALUABLE

FARM LANDS FOR SALE IN MANITOBA.

2560 Acres of Splendid Prairie Farm Lands, Class 1.

The Manitoba and Northwestern Railway runs through the district in which these lands are situated.

Section	14	23	640 Acres
" 15	14	23	640 "
" 17	14	23	640 "
" 19	14	23	640 "

Title direct from the Crown. Well settled districts surround these lands, and good roads to them.

Terms of Payment reasonable.

APPLY THIS OFFICE.

McINTYRE, LEWIS & CODE, Barristers, Solicitors & Notaries Public.

Conveying of Properties and Mineral Rights.

OFFICES: UNION CHAMBERS, OTTAWA,

(Adjoining Canadian Mining Review Office.)

ALEX. F. McINTYRE, I TRAVES LEWIS, I W. J. CODE.

WOLFF & COTTON,

Provincial Land Surveyors,

ONTARIO AND QUEBEC.

OFFICE, - 52 Elgin street, Ottawa.

(Opposite Russell House.)

J. OBALSKI,*MINING ENGINEER,*

Will examine and report on mines, and make analyses.

Office, 63 St. Gabriel street, Montreal.

CONSULTATION FREE!

WM. HAMILTON MERRITT, F. C. S.,

Associate Royal School of Mines, &c.,

Mining Engineer and Metallurgist,

Will report on Mines and Mineral Properties.

ADDRESS:

15 TORONTO ST., TORONTO, ONT.

FOR SALE.

A No. 1

Prospecting Drill,

With new steel boiler and complete outfit.

Apply to

ROBERT GEE,

270 ST. JAMES ST., - MONTREAL.

**Notice to Contractors.**

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for New Examining Warehouse, &c., Ottawa," will be received at this office until Tuesday, 1st March, for the several works required in the erection and completion of the

NEW EXAMINING WAREHOUSE, ETC.,

AT

OTTAWA.

Plans and specifications can be seen at the Department of Public Works, Ottawa, on and after **MONDAY, 14th February.**

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 Honorable 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 does not bind itself to accept the lowest or any tender.

By order,
A. GOBEIL,
Secretary

Department of Public Works,
Ottawa, 27th January, 1887.

**Notice to Contractors.**

SEALED TENDERS addressed to the undersigned and endorsed "Tender for Ice, Public Buildings," will be received at this office until Monday, the 14th February instant, for filling the Government ice house at the Rideau Canal Basin, Ottawa.

Sealed tenders endorsed "Tender for Ice, Rideau Hall, &c.," will also be received at the same time for filling the ice house at the Governor General's Residence, Rideau Hall.

Tender to state price per block of the following dimensions, viz.:—3 ft. by 1 ft. by 1 ft., which price must include cost of packing and of the sawdust required for that purpose.

The ice to be measured before being packed in the ice house and payment to be made accordingly.

N.B.—The ice must be taken from the Ottawa River, above the Chaudiere Falls.

By order,
A. GOBEIL,
Secretary.

Department of Public Works,
Ottawa, 5th Feb., 1887.

**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 miners' 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 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 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 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 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 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

RED-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

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 1884, 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.*



The Intercolonial Railway of Canada,

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E. KING,

Ticket Agent,
27 Sparks street,
Opposite the Russell, OTTAWA
ROBT. B. MOODIE,
Western Freight and Passenger Agent,
93 Rossin House Block,
York St., TORONTO

D. POTTINGER,
Chief Superintendent
Railway Office, Montreal, N. B.,
Nov. 22nd, 1886.



Notice Respecting Passports.

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

G. POWELL,
Under Secretary of State.

Ottawa, 19th Feb., 1886.



DEPARTMENT OF INLAND REVENUE.

An Act respecting Agricultural Fertilizers.

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

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

Every manufacturer or importer of fertilizers for sale, shall, in the course of the month of January in each year, and before offering the said fertilizer for sale, transmit to the Minister of Inland Revenue, a sample 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 fertilizer, 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, 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.



Tenders for a License to Cut Timber on Dominion Lands in the Province of British Columbia.

SEALED TENDERS addressed to the undersigned and marked "Tender for a Timber Berth," will be received at this Office until noon on Monday, the 1st day of November next, for four timber berths of ten square miles each, more or less, numbered respectively 4, 5, 8 and 9, situated on Kicking Horse River and Ottertail Creek, a tributary of the Kicking Horse River, near Field and Ottertail Stations, on the line of the Canadian Pacific Railway, in the Province of British Columbia.

Sketches showing the position approximately of these berths, together with the conditions on which they will be licensed, may be obtained at this Department or at the Crown Timber Offices, Winnipeg, Calgary, N. W. T., and New Westminster, British Columbia.

A. M. BURGESS,
Deputy of the
Minister of the Interior.

Department of the Interior,
Ottawa, 14th August, 1886.



Tenders for a License to Cut Timber on Dominion Lands in the Province of British Columbia.

SEALED TENDERS addressed to the undersigned and marked "Tender for a Timber Berth," will be received at this Office up to noon on Wednesday, the 1st day of December next for three timber berths of fifty square miles each, more or less, numbered respectively 16, 17 and 18, situate on the west side of the Columbia River, near Golden City Station, on the line of the Canadian Pacific Railway, in the Province of British Columbia.

Sketches showing the position approximately, of these berths, together with the conditions upon which they will be licensed, and the forms of tender therefor, may be obtained at this Department or at the Crown Timber Offices at Winnipeg, Calgary, N. W. T., and New Westminster, British Columbia.

A. M. BURGESS,
Deputy of the
Minister of the Interior.

Department of the Interior,
Ottawa, 5th September, 1886.

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