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# THE Canadian Mining REVIEW

Established 1882.

Vol. VI.--No. 1. 1888.—OTTAWA, JANUARY—1888. Vol. VI.—No. 1.

## Department of Inland Revenue.—An Act respecting Agricutural Fertilizers.

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

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

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

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

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

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

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

A copy of the Act may be obtained upon application to the Department of Inland Revenue, as well as a copy of a Bulletin which it is proposed to issue in April, 1888, concerning the fertilizers

E. MIALL,
15th Dec., 1887. Commissioner.

**The Canadian Mining Review**

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OTTAWA.

The REVIEW is published purely in the interests of the Canadian Mining Industry, and its publishers will be thankful for any encouragement they may receive from those 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 offices not later than the 19th of the month.

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

## About Ourselves.

With this issue THE CANADIAN MINING REVIEW enters upon the sixth year of its existence. An examination of its pages will demonstrate that our publication is one of exceptional value, not only to those who have any interest, pecuniary or otherwise, in the progress and development of the vast mineral resources of our country, but equally so to capitalists and investors of every class, manufacturers of mining machinery and supplies, and all engaged in large commercial undertakings.

THE REVIEW is in the widest sense a Canadian journal, having a large staff of reliable correspondents and able contributors in every portion of the Dominion. Under the head of Mining Notes is to be found an immense amount of condensed information regarding the monthly development and production of Gold, Silver, Lead, Iron, Manganese, Antimony, Coal, Asbestos, Mica and other mines in active operation throughout the country. The monthly notes from the Phosphate Region are special features.

Our advertisers may rest assured that our subscribers are exceptionally widely distributed and business men whose interest it is to reach the leading mine owners and operators of the country will find no medium in Canada equal to THE CANADIAN MINING REVIEW for their purpose. It reaches every quarter of the Dominion where mining is carried on and has an extensive circulation in the United States, Great Britain and Europe.

And now, before proceeding with our sixth volume, we must say a word of thanks to those who have in the past given such warm support and substantial encouragement to our undertaking. We ask all who have the interest of our mining industry at heart to follow their example. Their co-operation, by subscribing themselves, by obtaining the subscriptions of others, by giving us hearty support among their friends, and by sending in communications of interest, will do much to lighten a task the responsibility of which can never be anything but heavy.

The present number has been enlarged to twenty pages, and as indicated in a former issue, the REVIEW will now be paged continuously and indexed for such of our subscribers as may wish to bind them together for reference.

## Mineral Statistics.

We have had laid on our editoral table a copy of the "Statistical Report of the Production, Value, Exports, and Imports of Minerals in Canada during the year 1886 and previous years." The work is compiled by Mr. Eugene Coste, M. E., and forms an appendix marked "Part S "of the Annual Report of Dr. Selwyn, Director of the Geological and Natural History Survey of Canada.

This work, to be of value to the parties who consult similar works for business purposes, should be published as early as possible after the close of the year for which its tables have been compiled, and this could readily be effected by having the various tables prepared at the end of November up to that date, leaving only one month's details for final addition at the end of the year. We believe this plan is adopted in several of the departments of the Government whose reports are made for the calendar and not for the fiscal year. We do not make these remarks in any spirit of fault-finding, but simply as a suggestion to enhance the value of future issues.

One of the most useful tables in the work is that on page 7, which shows at a glance a summary of the products of the mine for the year; it closely follows the same plan which was adopted in an excellent pamphlet on our Canadian Minerals largely circulated a few years ago by the Department of Agriculture, but which being more general in its character, wanted the extended details supplied now by Mr. Coste.

It is to be regretted that the exports and imports given by the latter do not correspond with the calendar year, since, as the figures now stand, they are apt to be misleading. The movement, however, is an excellent one, and as the work bears the impress of the Government, it can be taken as accurate, and its correctness as vouched for by Dr. Selwyn himself. From this table we learn that the total value of the Products of the Mine for 1886 amounted to $10,529,361, of which $3,830,821 worth were exported, thus realizing for Canada that amount of foreign capital.

The statistics of the minerals most familiar in commercial circles will, of course, receive the chief attention at the hands of those who consult this publication for commercial purposes, but in addition to this the information it conveys respecting minerals more or less worked in Canada, and of the existence of which many of our readers probably possess a very indistinct knowledge, or no knowledge at all, is of great value. From the descriptions of these latter, ideas may be gathered as to their locality, and consequent accessibility. This information could, however, be supplemented with an official estimate of the probable extent of the mines, or veins, or property containing them, not so much from a geological as from a business point of view. This would save an intending speculator a large amount of correspondence and enquiry, as it would afford him at a glance all the preparatory knowledge he required prior to forming his decision of investing in such mineral or mineral lands.

Judging from the comparison between exports and imports of most of the ordinary minerals of trade, such as Coal, Copper, Lead, Salt, Petroleum and Graphite, these respective minerals would bear a large expansion of capital in working them for native use, and if the Canadian mercantile community desire to see the National Policy firmly established their object should be to supply from native industry and natural production those wants which now have to be supplied by imports from sources foreign to their own country. We have avoided mentioning iron in the above list as iron ore is not one of our imports, but out of the very large amount of iron imported, the question naturally arises in looking at the figures of the export of iron ore, how much of that very same ore is again returned to the land of its production as an import after having been smelted? To render our iron industry remunerative, and to develop our vast and almost inexhaustible supply of ore, smelting works are a necessity, and there is no reason why they should not be established at all iron centres. The review of a work like the present is not a fitting place for a discussion on this point, but we allude to the subject with the view of drawing attention to it, and in hopes that the hints offered may lead to some final action. Our columns are always open to a discussion on this point and to the publication of the views of parties interested in our iron trade.

It is a mystery why our Plumbago or Graphite deposits, which have been acknowledged to be next, if not even equal, to those of Ceylon, are not worked. It is not so long ago since the hum of the Graphite industry was heard in this vicinity, and the Plumbago exhibits at the various World's Fairs, sent from the Ottawa district, have always carried off high prizes, and evoked great admiration; but the fact remains, the mines are at a standstill. Here is an enterprise open to capitalists.

Under the head of Coal, no mention appears

to be made of the lignite of the Souris district in Manitoba, of which so much was said and predicted when its discovery was first announced. If this formation is of any value at all as a fuel, the settlers on the almost treeless districts around Brandon and the adjacent country would be much benefitted by such fuel being made accessible. We notice also that no mention is made of Peat or Peat deposits. Whether this formation can be classed as a mineral we do not profess to know from a geological point of view, but we fancy it would not be a very easy matter to state accurately where Peat ceases and where lignite begins. We hope the next issue of this report will include these products of the mine.

The amount of labour bestowed on the Report by Mr. Ceste and his assistant, Mr. Brumell, does those gentleman great credit, and although the tables as they appear do not look very formidable, we can assure our readers that no one who has not buried himself in statistical reports can form any idea of the vast amount of time and labour, and burning of the midnight oil that goes to make these very tables. Sheets of calculations and pages of addition are often represented in a plain table of one or two columns, occupying perhaps in their totals half a page of matter. We bespeak the thanks not only of the mining community but of business men generally for this useful and concise Report—a report which will be consulted in the United States and in Great Britain equally with Canada. An official report always carries weight, the sources from which its information is obtained being authentic, and as reliable as any such information can be. The only wonder we can express is that the Government has not called for such a report long before this. To the mining industry and to the general public it certainly is the most useful of all the reports that can emanate from the Geological Survey, being shorn as it is of the scientific parlance peculiar to the ordinary geological reports.

## Ontario's Imbecile Mining Laws.

It is very gratifying to notice that other journals are now taking up the question of the backward condition of the mineral development of the province consequent upon the present unsatisfactory state of the mining laws. The Toronto *World* of the 9th inst. advocates as a necessity "A mining policy for Ontario," and continues daily to show evidence of its necessity, and other papers have followed suit with equally good cause for complaint. The total neglect of the interests of the mining community by the authorities (save and except in the instance of a few chosen parties and the district in which they operate) has been too well carried out for the benefit of the few favorites, and to the detriment of the real workers—*the discoverers of minerals*. As we have again and again pointed out in these columns, the present system of granting mineral lands is nothing short of legalized fraud, and is too glaring an injustice to be allowed to remain any longer in this condition. Are the Ontario legislators blind or asleep? If not, let them read carefully the pages of THE CANADIAN MINING REVIEW during the past year, as well as the recent issues of the *World*, and awake to the urgent claims of the mining community for justice. Our demands are:—The *location* of a *mineral claim* by the discoverer *on the ground*, instead of the present system of having it done, or rather having it *not* done, as it is too often the case in the land office, that Mr. Speculator has a prior and unlimited application for a whole district. *Free grants* of mining claims *to miners*, and *compulsory development* of these claims, under just and proper regulations for the manner of working. Surface lines as boundaries of mining claims are not the just mineral boundaries. A miner should follow the dip of the lode, vein or bed of ore, as surface lines or boundaries are not those in the interest of development, or protection of capital or labor invested. Auction sales of mining lands are in the interests of speculators only, and ought to be discontinued. *Competent mine inspection*, and *complete provincial mining statistics*, and *trustworthy mineral reports*, and not political advertisements, as at present, by "special agents" of questionable standing. Equal educational advantages to mining and agricultural students, or none, to any one.

## Iron and Steel Institute.

We have to acknowledge this month the second volume of the Journal of the Iron and Steel Institute for 1887. Among the many interesting features of its extensive and well edited pages we need only select the titles of a few of the principal papers in order to show its scope: "On the Metallurgical and Mechanical Exhibits at the Manchester Royal Jubilee Exhibition," by Mr. Thomas Ashbury; "On the Reduction of Ores of Iron in the Blast Furnace," by Sir Lowthian Bell, Bart., F.R.S.; "Notes on the Basic Open-Hearth Process," by Mr. J. W. Wailes; "On Electric Lighting in Works and Factories," by Professor J. A. Fleming M.A. An old pamphlet published in London by the iron manufacturers of Great Britain as far back as 1756, and entitled "The Case of the Importation of Bar Iron from our own Colonies of North America," is also reproduced, and will be read with peculiar interest by the iron manufacturers of the Dominion.

## Raw Phosphates.

Previous to the year 1770 it is difficult to find any record of the use of bones for agricultural purposes. In 1740 their value for a top-dressing for grass lands was accidentally discovered at Sheffield, where a heap of bone shavings, scrapings, &c., was buried in a field with marvellous results.

The mechanical division of bones in their raw state was difficult and so costly that it precluded their use in any other form than crushed.

Liebig, some fifty years ago, found that by the application of sulphuric acid to bones it reduced them to a finer state of division than could be done by then known mechanical means.

This application is often called dissolving bone in acid. There is no clear solution.

It is a mere breaking up, it is a softening, pap-forming process, and bone in this state, would more appropriately be called bone pap.

The bone is merely so far reduced that, when rubbed between the thumb and finger, no grit is felt. Bone cannot all dissolve, for the sulphuric acid, when added rightly, unites with the lime of carbonate and phosphate, and forms with that insoluble sulphate of lime or plaster.

It is this which gives the grayish white look to the bone porridge.

At the present time comparatively few bones are used for fertilizing purposes; phosphate rock, phosphorite, apatite and coprolites having been substituted generally in place of bones in manufactured superphosphates and commercial fertilizers. Where originally it was impossible to get raw bones ground fine by machinery that difficulty does not exist with phosphate rock, phosphorite, apatite and coprolites, as they are all easily reduced to an impalpable powder at a low cost with the present machinery now in use, and it has been found by repeated experiments by competent authorities that if the phosphates are ground to an impalpable powder, they are as available to crops as if they had been treated with sulphuric acid, the carbonic acid of the soil and the soil water being as efficient a solvent as the sulphuric acid.

In saying that phosphoric acid is insoluble it is meant that it is insoluble in pure or distilled water. Water which contains carbonic acid, ammonia or common salt (and all water contains one or more of these) has the power of liberating the phosphoric acid from its base lime and rendering it available to roots. The action is slow, but it is sufficient, and it is more rapid the finer the pulverization of the phosphate.

In fact phosphates treated with sulphuric acid to render them soluble before, but not after they are applied to the soil and sold under the name of superphosphate, when applied to the soil reverts or goes back to its original condition; this is generally admitted, but it is soluble in the acids of the soil in the same manner as are the phosphates ground to an impalpable powder. It is estimated that 400,000 tons of sulphuric acid, 50° strength, are used annually in the United States to convert insoluble phosphoric acid into soluble phosphoric acid, and that this quantity will be doubled during the next five years.

As it requires about a ton of sulphuric acid of this strength for every ton of phosphate rock containing sixty per cent. of phosphate of lime, it is readily seen that the sulphuric acid will cost more than the phosphate of lime, and reducing the quantity of phosphoric acid in the resulting superphosphate one-half.

Certainly this is a most costly way for the farmer to obtain the phosphate of lime, finely divided so that the acids of the soil can act upon it. The present machinery in use is by far the cheapest method, for in addition to the great cost of the sulphuric acid and the necessary expenses attending its use, there comes the expenses of transportation which has been doubled by the addition of the sulphuric acid. It is claimed by some that for tilled and quick growing crops, (it is conceded that it will for grass and winter grains) the phosphoric acid will not be liberated as fast as the crops require it from the phosphate when in an impalpable powder; but there can be applied at the same cost, four times the quantity of phosphoric acid in phosphate of lime in an impalpable powder, than there can be in phosphate of lime treated with sulphuric acid, and there can be no question but that with using four times the quantity as much phosphoric acid, if not more, will be as available for the growing crop as if one-quarter part was used that had been treated with sulphuric acid; again the additional three-quarters used is not lost, but becomes assimilated in the soil for the drafts of future crops upon it.

But we are not confined to the use of sulphuric acid or the slower operations of nature to render the phosphoric acid in phosphate of lime immediately available for crops. It has long been known that fermenting manure or peat with phosphate of lime powder scattered or mixed through it, would render the phosphoric acid at once available.

This certainly is a better as well as a cheaper way for the farmer to procure soluble phosphoric acid, than to get it in phosphate of lime, treated with sulphuric acid at four times its first cost and the expenses for transportation doubled.

The theory of scientific agriculture is based upon a complete knowledge of soils, plants, animals and manures, and it is evident that until these elements are thoroughly understood, no attempts at improvement or plans for increased production can possibly be successful. The manure question is the most important one connected with agriculture or horticulture. With fine ground phosphates as the basis of operations, we can now obtain complete manures for any culture, made according to any formula and containing in a readily assimilable form all the ingredients called for.

A. H. W.



## A Visit to Ohlendorff's Chemical Works.

Frank D. Adams, M.Ap., Sc., Geological Survey, Ottawa.

While in London in 1886 in connection with the Colonial & Indian Exhibition, an invitation was extended to a number of gentlemen from the various British Possessions represented at South Kensington, by the Manager of the Anglo-Continental (late Ohlendorff's) Guano Works to visit and inspect the company's well known establishment. As the subject of phosphate manures is one of special interest to Canadians, and this company do about the largest business, as manure manufacturers and guano merchants, in the world, a few notes on our visit may perhaps prove of interest to your readers.

Meeting at St. George's docks early in the morning our party embarked in the company's smart little steamer, which we found gaily decorated with flags awaiting our arrival, and started down the Thames, under the various bridges, past the tower and then by the interminable wilderness of warehouses and manufactories lining the banks of the river, till we reached the Tidal Basin, where the company's works are situated. On landing we were cordially welcomed by the manager, who, in a short speech, gave us a few general facts concerning the works. The London factory, we learned (for the firm owns three others situated at Hamburg, Antwerp and Emmerich-on-Rhine respectively), covers no less than eight acres of ground and turns out weekly over 1,000 tons of manufactured manures, giving regular employment to about 300 men in addition to a number of women. Being situated on the bank of the Thames with convenient wharves, steam cranes, &c., it has great facilities for loading and discharging vessels, and a siding of the Great Eastern Railway connects the factory with the various railway systems of the United Kingdom. This factory, together with the other three above mentioned, were taken over in 1883 by the Anglo-Continental (late Ohlendorff's) Guano Works with a paid up capital of £800,000.

The stores and warehouses, which were first visited, are lofty buildings with the floor space laid off in regular streets walled on either side to a height of 30 feet by continuous piles of bags of raw guano. At the time of our visit, we were informed, there were about 10,000 tons of this guano in stock, and when we looked at the immense number of bags, each of which was, roughly speaking, worth about £1, or $5.00, some general idea could be obtained of the immense money value represented by this stock, which, together with the value of the other goods here stored, frequently exceeds £200,000. Although the day was only a moderately warm one the odour of ammonia exhaled from the guano was distinctly perceptible, but I was informed that in hot weather it was quite strong.

We then went on to the factory where superphosphate was being manufactured from South Carolina rock. The crude phosphate was first cracked, then ground in roller mills and then sifted by means of a blowing machine. The fine powder was then placed in a rather shallow circular decomposing chamber constructed of masonry and provided with a rotating stirrer, the chamber was closed and the necessary amount of oil of vitriol run in from above. The chamber was then connected with a Root's Blower and the stirrer set in motion. When the re-action was finished the mass of semi-liquid superphosphate was allowed to run through holes in the bottom of the chamber into a closed bin below, in which it cooled. When raw Peruvian guano is used, it is first pulverized in a Carr's disintegrator and sifted to free it from stones before treating it with the sulphuric acid.

In smaller storehouses, adjacent to the factory, were various other crude phosphates which the company employed or were experimenting upon. Among them were bones, Belgian phosphate, Guadeloup phosphate, Australian phosphate and Basic Bessemer Slag. I enquired from my guide, who was one of the gentlemen connected with the works, whether Canadian phosphate was employed, and he replied that some of it had been used, but that it was not liked for three reasons: 1st, on account of its greater hardness it was more difficult to grind than other crude phosphates; 2nd, being less easily decomposed by sulphuric acid it was found difficult to render the whole of it soluble; 3rd, on account of the quantity of fluorine given off on treatment with the sulphuric acid. He acknowledged that the first two difficulties might be overcome, to a certain extent at least, by more powerful machinery and finer grinding, and the third objection did not seem to be a very vital one, seeing that the South Carolina phosphate, which they were using at the time, contained some 2 per cent. of fluorine, which was set free on treatment of the rock with sulphuric acid and carried off by means of a blower. If a blower is used at any rate the presence of a few per cent. more of fluorine did not seem to be a matter of much importance. These objections do, however, still tell decidedly against Canadian phosphate as shown by the fact that at that time Sombrero phosphate, of 70 per cent., would in England, bring as high a price as Canadian phosphate of 80 per cent., and the former does not contain a trace of ammonia.

The Basic Bessemer Slag above mentioned, although by no means very rich in phosphoric acid, is nevertheless so cheap, and contains this acid in such a soluble form, that it will undoubtedly meet with a rapidly extending use. In the year 1886 rather over 400,000 tons of it were produced, containing, on an average, from 17 to 20 per cent. of phosphoric acid, and as Mr. Gilchrist, one of the inventors of the basic (Thomas & Gilchrist) process, remarked to me in course of conversation, the iron master who produces

it can give it away and make sixpence a ton on it, as it is a bye product in the manufacture of his steel, and it costs him that amount to cart it away. As a cheap source of phosphoric acid, it, therefore, leaves but little to be desired, and its production must be regarded as one of the triumphs of modern times, seeing that great deposits of iron ore which, previously, on account of a high content of phosphorus, could not be worked into steel, are now profitably employed for that purpose, and the deleterious element phosphorus removed in it is not wasted, but rendered available for enriching the soil. The phosphoric acid, furthermore, exists in such a state that the slag does not require to be treated with sulphuric acid, as in the case of most crude phosphates, but can be applied directly to the soil. In the report of the Connecticut Agricultural Experiment Station for 1886, the director, Dr. S. W. Johnson, speaking of this slag as a manure, says: "During the last year it has been introduced into this country. The following analysis has been made on a sample from one bag sent to the station:

| | |
|---|---|
| Phosphoric acid, soluble in Ammonium Citrate..... | 19.59 per cent. |
| Phosphoric acid, insoluble in Ammonium Citrate..... | .30 " |

"The slag was a fine meal, which passed a $\frac{1}{50}$ inch sieve. It is sold bagged in New York for $12.50 per ton. The phosphoric acid which it contains costs, therefore, about 3½ cents per pound." The same phosphoric acid in ordinary phosphates was at that time selling for 7½ cents per pound.

Our party then visited the sulphuric acid works, which had, unfortunately, a short time before, been partially destroyed by fire. Workmen were engaged in soldering, or, rather, melting, together, by means of oxyhydrogen blowpipes, the lead plates for the construction of the acid chambers, the joints produced being extremely neat. Spanish pyrites supplies the sulphur required by the works.

After visiting a small museum, in which were exhibited samples of the various crude materials and manufactured products of the factory, as well as many curious remains of birds, some of them still showing the feathers, which are occasionally found in the guano, we returned to the wharf, passing through another portion of the great warehouse where the manufactured manures are stored in bulk, in hills or small mountains, often containing thousands of tons. Cards showed the amount of phosphoric acid contained in each of the brands, the richest which I saw being a small heap of superphosphate manufactured from Canadian apatite.

In addition to the regular phosphatic manures, such as superphosphate, dissolved guano, dissolved bones, etc, most of which also hold ammonia, the firm manufactures a number of special manures, such as "grain manure," "flax manure," "tobacco manure" and "cane manure," a large amount of the last mentioned being exported to the West Indies, and also deals in raw fertilizers, such as nitrate of soda, kainit, bone dust, etc. The various manures for exportation are carefully weighed, bagged and the bags sealed. Every bag is accompanied by a guaranteed analysis, the large scale on which the manufacture is carried on, and the testing of the manure by chemical analysis, from time to time during the process of manufacture, leading to a great uniformity in the finished product.

Having thanked the various gentlemen connected with the works for their very kind invitation and our most enjoyable visit, we re-embarked in our little steamer and returned to London the same evening.

## LETTERS TO THE EDITOR.

We invite Correspondence upon matters consistent with the character of the REVIEW.

Be as brief as possible. The writers name in all cases required as a proof of good faith.

One dozen copies of the issue containing his communication will be mailed free to any correspondent on request.

We do not hold ourselves in any way responsible for the opinions expressed in this section of the REVIEW.

### Chromic Iron.

QUEBEC, 11th Jan., 1888.

*The Editor*

THE CANADIAN MINING REVIEW:

SIR,—Will you give me a few lines in your interesting journal to direct the attention of chemists, capitalists and investors to the question of establishing works for the manufacture of Bi-Chromate of Potash in the eastern townships. Chromic Iron is, as many of your readers are well aware, found in considerable quantities in this district, notably in South Ham, Lake Nicolet, Leeds, Thetford, Wolfestown and other points within the great serpentine belt in the Province of Quebec, and assays of the ore have given as much as 60·0 of chromic acid. In the United States the Tyson Company, of Baltimore, the Kailon Chemical Company, of Philadelphia, and other large manufacturing establishments are purchasing Canadian ore at $18 per ton, paying duty and freight and returning the manufactured product for sale in the Dominion. There is also a very large annual consumption in Great Britain and Europe. Does it not seem reasonable to suppose that the manufacture of Bi-Chromate of Potash in our own country would pay? The late Sir William Logan evidently thought so when he wrote (Geology of Canada, 1863, p. 150):—

"The process of manufacturing the Bi Chromate of Potash is one which might be very well carried on in this country. It consists simply in calcining the finely ground ore with Crude Potash, in a proper furnace, exposed to a certain current of air, by which the chromic oxyd. is acidified, and unities with the potash. The resulting mass is lixiviated with water, and the solution, being mixed with a certain amount of sulphuric acid furnishes by evaporation chrystallised Bi-Chromate of Potash. In the absence of sulphuric acid, a crude neutral Chromate of Potash might readily be prepared by simple evaporation and shipped to England to be there converted into Bi-Chromate."

The facilities for obtaining quantities of Potash from the woods, the cheapness and facility with which the ore and requisite fuel may be obtained, the immediate vicinity of railway transportation, are such as to offer much encouragement for the working of chrome ores in the eastern townships.

I am, etc.,

R. J. R.

[When Mr. Thomas Macfarlane, F.R.S, first suggested in his Report to the late Sir William Logan, in 1863, the advisability of establishing such manufactures in this section of the country there was a strong monopoly in the English and Scotch markets, and prices ranging from £11 10s. to £12 could then be obtained for the ore. At the present time competition on the European market is keen, and prices comparatively low. It is true that as high as 60% has been obtained from Canadian ore, but this average would be more properly stated as a little more than 40%—too low to compete in Europe with the mineral from Russia and Siberia which goes as high as 70%. Three samples of Canadian Chromic Iron, taken, we believe, from the Province of Quebec, were tested at the Colonial Exhibition held in London two years ago with results ranging from 43.25 to 49.4%, and it was learned from a Glasgow firm doing a large business in the mineral that manufacturers there did not care to purchase any containing less than from 50 to 52% of Chromic acid. Ore of that percentage was worth about £4 per ton delivered in Glasgow. In the "Mineral Resources of the United States," published by the United States Geological Survey, the following facts concerning Chromic Iron are given:—Production in United States 1884 2,000 long tons, value $35,000; 1885 2,700 long tons, value $40,000. Price varies according to cost of transportation to a manufacturing centre. In San Francisco it is worth about $15 a long ton, subject to all the fluctuations of the imported ores from Russia and Turkey. In 1885 the price delivered at Baltimore or Philadelphia was $26. The price of Potassium bichromate fell from 10½ cents in 1884 to 9⅞ cents per pound in 1885. In 1885 2,500 short tons of Potassium and sodium bichromates were made in the U.S.A. A large amount of Chromic Iron was imported from Russia and Asia minor.] – EDITOR

### Will Coal be Found in Ontario?

Westville, N. S.

*The Editor*

THE CANADIAN MINING REVIEW:

SIR,—The question whether coal will be found in Ontario, or, rather, in the upper provinces, I may more correctly put it, is one of such vast importance to the Dominion that it demands more consideration than it apparently gets at the present time. From observations I was enabled to make, during a brief sojourn in Ottawa, after my arrival in this country from England, I was led to believe that coal will sooner or later be found within 100 miles of that city, and that belief was shared by a man who has for a great number of years been employed boring for Coal and other minerals in England and Scotland. I will not at the present time go into any particulars as to what gave rise to that belief, but will be pleased to communicate more fully with any capitalist who may be interested in the subject (my name and address may be had at the office of this paper). I must confess I felt somewhat disappointed at hearing what opinion some eminent geologists are reported to have expressed on the Rock Formation of Ontario; disappointed because if such

reported expression of opinion has actually been made it will, I fear, have an injurious effect inasmuch that it will have a tendency to deter capitalists from investing the capital necessary to put down deep borings (the only means by which coal is likely to be found). I hope other and more able pens than mine will now take it up.

I will here put a few questions which I trust some of our geologists will kindly note and answer.

1st. Has the knowledge of the formation of Ontario and Quebec as gained by geological surveys, &c., being such as would justify geologists in advising against boring for coal?

2nd. What reason is there for supposing that Coal will not be found in Ontario, where the Strata is the same as overlies and underlies coal in other parts of Canada and, to my own knowledge, at over fifty collieries in England?

3rd. What is Natural Gas and what is its origin?

This last question is brought out by the fact that several discoveries of Natural Gas have recently been made in Canada, and I am informed that in Pictou County, Nova Scotia, holes were frequenty made with sticks, etc., in the soft ground near the banks of the East River, and Natural Gas would arise therefrom which would burn freely. Is there any reason to think that the gas as given off there would be different from that found in other parts of Canada, or that it would have a different origin?

I am, yours respectfully,

BRITON.

## An American View of our Mining Laws.

Ottawa, 20th. Jan. 1888.

*The Editor*

THE CANADIAN MINING REVIEW.

SIR,—Allow me a small space in your valuable journal to compare your Mining Laws with those of the United States, under whose laws I have been mining for some time past, and to endeavour to demonstrate the impracticability of developing your mining industries where such laws exist.

It is a well conceded fact, patent to every fair minded person, that the development of a country, the prosperity of a country, its industries, its wealth, must originate in its mines, its lumber and its fisheries. California, and indeed the whole of the Pacific Coast, owes her prosperity to her mines and to the indomitable will and energy of her miners, who risked their lives and their health, their all, in developing the mineral wealth of the country and the Pacific Coast in general.

In the first place the Government of the United States reserve the right to all her mineral lands, coal included; and mineral lands cannot be purchased except under conditions herein after mentioned, giving to the discoverer the first Right of Patent, thus preventing parties from purchasing mineral lands for the purpose of speculation.

Sections 2324-2325 of the revised Mining Laws of the United States say, that any bona-fide miner can locate 1500 feet upon any location (not already located), and after recording the same can, upon showing the actual outlay of $1,000 upon such location, obtain a United States Patent for it—or the miner need but spend an outlay of $100 per year to hold such location, and at any time in the future may obtain his Patent upon the proper showing. Now, I find in your mining regulations that a claimant must file his declaration and obtain a receipt and pay $5.00 which receipt only holds good for the period of one year, and must be renewed every year, which, in fact, is in reality a licence in every acceptance of the term, and which with us, in California or on the Pacific Slope, would only retard mining or prospecting, as how many poor fellows work from hand to mouth, and to compel them to put up $5.00 per year would, indeed, be wrong. Were your Government to abolish all such fees and encourage honest mining; not by subsidizing companies, but by protecting the miners in their locations against these land sharks who obtain large concessions of land and hold it to the detriment of the good interest of the country. I, for my part, was formerly a Canadian, but have mined in Australia and New Zealand under the license system; and also in California, Nevada, Alaska and the Pacific Coast generally, under our United States system, and can only say that for prosperous mining and unhampered prospecting in my opinion, and I echo that of thousands, our laws are the most generous.

In regard to the sale of mineral lands, especially in large concessions, to parties who only hold them for speculative purposes, no one can deny that the policy of the Canadian Government must surely work a great wrong on the people and be a detriment to the development of your mining interests, which in the estimation of every thoughtful person, are among the most extensive in the world, and have caused an interest to be awakened, not only here in Canada, but in the United States, England and in Europe generally. Were it not for the foreign capital invested in the mines of the United States to-day, it is hard to say where our miners would be—what would be the condition of the Pacific Coast? To avoid capital from leaving your country and seeking the United States, it is only necessary to open up and develop your mines, and in order to do so the miners must be encouraged and protected, every inducement must be extended to them and not hampered by licenses, and such regulations that would necessarily be a drawback. Space will not permit me to enter into a *résumé* of your Mining Laws, but from careful observation I can see much to change for the better, with all due deference to your law makers. In regard to what is called the "California" or "Ledge" claims it is a well conceded fact that never was a law yet made that had not two sides to the question, nor ever a law framed that did not work a hardship to some. I do not write these lines for the purpose of provoking an argument on the merits of your laws, but to give you the views of an old miner who has prospected in California and in other parts of the Pacific Coast, and has yet to find laws that are better or more generous than those of the United States for the protection of her miners and the development and encouragement of her miners.

In the Toronto *World* of Saturday, January 14th, I find several well written articles on the mineral wealth of Canada, and I am singularly struck with the several opinions of those gentlemen, who are of the same opinion as myself, in regard to what your Government should do in development of your immense mineral resources, and can only echo one sentiment of Mr. C. M. Dobson, M.E., "why should a colony like Canada be so much in the rear of Australia and Africa?"

Yours respectfully,

WILL. H. NETTLE.

## The Alleged Conspiracy Case—Evidence Continued.

Isaac Tatten sworn, said: I live on Tumbo Island; know Mr. Campbell and Mr. Kennedy; got acquainted with the latter when he was watchman on the Rosenfeld, about two years ago next March; the first time I met Campbell was when he came to look at the island with Mr. Gabriel; the next time I saw him he brought Mr. Gabriel's brother up to induce me to sell my underground rights, Mr. Kennedy came up with them, they were up on business connected with this coal mine, I believe; the next time Campbell came up, he came to survey it and Kennedy came with him; they told me they had come to survey my claim off; Kennedy said Campbell was a surveyor; had no conversation with Campbell before the survey; they partly surveyed the ground, then went to Victoria and came back again; I asked Mr. Campbell where he was going to put the shaft, and he told me he did not know exactly, and he asked me if I would give him half if he put it on my land; I said I would, and after the survey was completed he told me I had better go down to Victoria with him; asked him how much he thought he could get for putting it there; he replied that he thought the company would stand about $500; the company held a meeting in Mr. Sayward's office; Campbell did not give me any instructions what to say to the company; I came to Victoria with Mr. Campbell and Mr. Kennedy; when we got to Victoria we went to Mr. Sayward's office; the company asked me how much I wanted for sinking the shaft on my land, and I said $500. I think I made a mistake a minute ago, I do not think Mr. Kennedy was there; Mr. Campbell, Mr. Muirhead, Mr. Gabriel and Mr. Sayward were in the latter's office; I believe that was all; I spoke to all hands about the $500; they agreed to give me the money, and I went up to Mr. Gabriel's store and he gave me a cheque; before that, however, Campbell told me to meet him at Capt. Clark's office; got the cheque and carried out Campbell's instructions; when I got there he asked me if I had got the cheque; I said yes, and he said "Well, we will go to the bank and draw the money;" we went and drew the money, and he took it out of my hands and counted $250 out, and gave me $250; he put the other $250 in his pocket; I asked Mr. Campbell several times if there was any coal on the island and he told me he didn't think there was; also asked Mr. Kennedy if the government would take Campbell's survey; he said yes, as he was a government surveyor; asked Kennedy what he got for his interest in the mine, and he told me that he had got about $400 or $500, and thought that I would get about $350 for my underground rights; I did get that sum; when I got that amount I signed a document in Mr. Mill's office; that is my signature on the document produced marked "B;" signed another document in Mr. Sayward's office when I got the $500; the document produced marked "C" bears my signature.

Cross-examined by Mr. Pooley—The second time I saw Campbell was on the 2nd of May, with Mr. Kennedy and Mr. Wilkes; do not know if Mr. Wilkes surveyed the place or not as I was not there; I told Campbell the shaft was on my land; I did object to the way the lines were run as I wanted them drawn the way I had taken my land up; I attempted to make several trips with Kennedy to bring Campbell from Orcas Island; the first trip we made Campbell was not there, the second trip we found him and brought him to Tumbo Island;

we got on to the island about 7 o'clock in the morning; I went home to my house and that same day came down and told Kennedy that I objected to the way the lines were drawn on my land. I wanted them a little to the eastward; I told them the lines should be drawn as I wanted them because I had the first right to the island; I did not in the presence of Mr. Kennedy and Mr. Wilkes say that I would make the company pay dearly for it, as Mr. Gabriel had not treated me rightly; neither did I say that I would make the company pay for every gallon of water used if they put an engine on the land; I made the remark that I would sell out if they would give me a good price; I wanted to sell out my farm and the whole business to them; had on the 4th of April sold my underground rights; was not alluding to the particular shaft that the company was going to sink, that I wanted a good price for; it was the whole of the farm, 160 acres; only a small part of my farm is good; Campbell and Kennedy returned to the island about the 27th May; Mr. Wilkes came up with them; there were six or eight miners; that was after the survey; then it was that the shaft was staked off; did not on this occasion demand $1,000 from the company before any shaft was put down on my land; Campbell asked me to come down to Victoria to see the company and I went; do not remember telling Mr. Wilkes not to do any work on that shaft till I returned; when I met the company there was a little talk; did not agree to give them all the timber on the land, only enough for the shaft, in consideration of the $500; when I met Mr. Campbell at Capt. Clarke's store, I think Mr. Muirhead was present; did not show them the cheque until we got to the bank; they asked me if I got the cheque and I told them yes; Muirhead and Campbell did not advise me to deposit the cheque neither do I remember Muirhead telling me that the cheque was drawn on the bank of B. N. A.; Campbell identified me at the bank as Isaac Tatten; I drew the money and Mr. Campbell took it and counted it out; he counted $250 for himself and gave me the other $250; the money was in $50 bills; I put $200 in the bank and kept $50; we came out of the bank together; I went one way and he the other; we had a drink together afterwards; Campbell asked me if I would give him half when we were alone on the island; I do not remember whether any one was present at the time; do not know if Gabriel and Muirhead left Sayward's office together; I did not state on the 9th of May in the presence of Mr. Campbell, Mr. Kennedy, Mr. Muirhead and Mr. Wilkes, that the company had paid Kennedy $4,000 and that I was going to make them pay handsomely for it; I know Mr. Huson; did not tell him that I had banked my $500.

To Mr. Drake:—Tumbo island is almost two miles long; there are about 250 acres; I have my homestead and preemption certificates, one at home and the other in the land office; first knew Kennedy in March 1886; cannot tell on what date I met Campbell; did not see him there before Olsen came.

To Mr. Mills—Was told on the 4th of April that I would be entitled to compensation if my surface rights were touched.

T. B. Hall, sworn, deposed as follows: My place of business is on Store street; have an interest in the Tumbo Coal Company; know Mr. Campbell and have seen Mr. Kennedy; Mr. Campbell has one-sixth interest in our company; do not know Olsen; had no conversation with Campbell; was introduced to him at one of the meetings at Mr. Sayward's; Mr. Campbell said that the coal limits were a good property and by spending a little money on developing they could be sold well; the next thing, if I remember correctly, was to get all Tatten's rights and I was under the impression that we had all these rights until I was told that our rights were surface; I understood when we bought the rights we could do as we liked on the island; Campbell has repeatedly told me that the property is good; remember the meeting when Tatten came down with regard to the shaft; we all demurred against paying him that money; it was upon Campbell's suggestion that it would be better to pay the money and have the matter settled at once that the money was paid; Campbell never told me that he was going to get half of the money; no one ever told me personally that I should buy the mine; knew very well that $7,500 was to be paid for the property; really cannot say what conversation took place on that point when Campbell was present except that the mine might bring $25,000 if it were developed; never knew Kennedy until he came to our office and introduced himself; he told me that he had $100 against the company; told him it it was the discount on the note I knew of it as Mr. Campbell had already told me of it; he expressed surprise at that and said that he and Campbell were not on speaking terms; told him that if $100 was due him he should have it; he told me the reason he and Campbell were not on speaking terms was that the latter had refused to show him the report; he then left my office.

Cross-examined by Mr. Pooley—It was not Mr. Campbell who induced me to join this company; no inducement was offered; I went in of my own free will, in consequence of what I heard from Mr. Gabriel; he told me that two or three Japanese had been up there and had pronounced it a good property; Mr. Gabriel did not tell me at that time that the Japanese had made a report in writing; had not seen Campbell's report; I got my impression that we could do as we liked on the island from the conversation that took place in Mr. Sayward's office; it is quite possible that I asked Campbell what his opinion of the mine was; was not told when I went into the company that $2,000 had already been expended, and do not recollect Mr. Campbell saying that the work that had already been done was perfectly useless. Mr. Hall here said that he could not possibly take an interest in what was going on as he had so much to do with his own business, and it was almost impossible for him to remember the conversations that took place last spring.

To Mr. Drake—Went into the company on Mr. Gabriel's representations; Mr. Kennedy was in my office several times on that $100 business; do not know, as a matter of fact, that a note was given to Mr. Kennedy; I have a quarter interest after Mr. Campbell's sixth interest is deducted; Mr. Gabriel is the financial manager, and all accounts pass through his hands.

To Mr. Mills—Mr. Gabriel told me that he had perfect confidence in Mr. Campbell's opinion; did not know Campbell before I entered the company; and had parted with no money when I first entered the company.

Mary Olsen, sworn, said—Am the wife of Mr. B. Olsen; knew Campbell and Kennedy; saw them first in my house on Douglass street; am living now on View street; they came to the house in the forenoon to see my husband and myself about a coal mine; heard a conversation; Campbell and Kennedy called my husband a fool and a silly for not going to Gabriel and getting his money, and they wanted him to meet them at Gabriel's store in the afternoon to get the money; my husband never went out of his house that afternoon, as he got excited; they told him if he did not do as they wanted him to do, they had plenty of friends in San Francisco, and only had to write a letter and he and Mr. Lang would be killed; they wanted my husband to go to Gabriel's and get the money and divide it between them; Kennedy was present all the time; they told Mr. Olsen to get his money as quick as possible, and if he thought he was cheating himself, he was working for Mr. Gabriel; they never said anything about the coal on this occasion; Mr. Campbell told my husband that he had better get his money before he (Campbell) went to work in the mine; he said he had made $2,000 and, with a snap of his fingers, said he could make plenty more from the company; Campbell and Kennedy said Gabriel was a thief, and would take the bread out of my husband's mouth, and when he found out that there was no coal in the mine he would not pay, that is the reason Olsen should get his money; on Sunday evening Mr. Campbell came to the house just as I was going to church; my husband was in San Francisco; he wanted to know what arrangement my husband had made about the mine before he left; told him I did'nt know; he wanted to know why my husband had gone away before he got the money and why he had left it in Mr. Gabriel's hands; he wanted me to go on Monday with him; said he could get money for me and if he could not get it on Monday he would get it on Thursday at the latest; I told him I did not know my husband's business; Campbell went away saying he would be back on Monday to see me before he went to the mine; I never saw him after that at the house; Kennedy came once or twice with my husband and once when he was away; he also wanted to know the reason that my husband had not got the money before he went away; Kennedy said nothing about Campbell but said the mine was no good and after Campbell went up to the mine Olsen would not get a cent; Kennedy intimated that he was advising this on account of myself and the children; about 2 o'clock one morning Campbell came around the house, when I was alone; he tried the back gate and hearing the noise I got up; I opened the window and asked who was there; he said, don't get frightened, it is me; I looked close into his face and saw it was Campbell; he came close to the window and I got frightened and let the window down and hollered twice; Campbell ran across a field; I am afraid of Campbell because I never liked his face, and warned my husband against him.

Cross-examined by Mr. Pooley—Cannot remember the date when Campbell first came to my house; it was last year; had never talked to anyone about this matter; I never had a chance to speak to the police about some one coming to my house at 2 o'clock in the morning, because I have been sick; am quite sure that Campbell is the man who came to the house; have never talked to Mr. Gabriel about this matter; was told by the lawyer to come to the court; had no conversation with anyone as to what I was to say; have never told anyone what I was going to say here; signed a paper of the evidence I was to give here with the lawyer; I can swear on the Bible that the man who came to the house at 2 o'clock in the morning was Campbell; the first time Campbell and Kennedy came to the house they had a glass of punch; when I came in they were fighting; I mean by that they were quarelling; I did not see them drinking as I went into the kitchen; they started to quarrel when Campbell talked

about the mine and my husband got mad; about half an hour after Lang came; they stopped quarrelling; as soon as he came I left the room; they started to quarrel again.

This closed the evidence for the prosecution. Mr. Drake said he would like to cross examine all the witnesses.

Chas. Gabriel (re-called), cross-examined by Mr. Drake—I charged Mr. Kennedy with conspiracy for obtaining a larger sum of money than there was any necessity of; the court will be the judge of "necessity"; when I first saw Mr. Olsen he told me that he and some others had discovered some coal; he told me that it was Mr. Kennedy; told Mr. Olsen that if this mine was good I could find capital; the prospecting licence was taken out some time after that; Mr. Harris, Mr Kennedy and myself went over to get the license; sent up two Japanese before the prospecting license was taken out; they told me that there was plenty of coal all under the seam; did not tell Lang that I was satisfied with the report of the Japanese, but told Campbell so in his presence; can not tell the exact date of the month that I went up to the island, but think that it was December. Mr. Prior said the island was worthless as far as the coal was concerned; did not believe him, as I don't think any man would be able to judge who had only made a cursory examination; he did not go far on shore; sent the Japanese up to Tumbo Island in charge of my brother, who is a gold miner; was introduced to Campbell by Olsen; Campbell gave in a report [report read]; I know Mr. Wilkes; we engaged him to sink a 400-ft shaft; the Japanese did not do much work; have only a half interest and never tried to get a further interest; there was never any row between Kennedy and myself; thought at the time the price paid was too high, but Campbell's arguments convinced us. We have paid $5,400 between Kennedy and Olsen; Mr. Wilkes said that the coal on Tumbo Island was the very best he had ever seen; Messrs. Hall, Sayward and myself agreed to pay Tatten the $350 for the underground rights; the total amount paid in respect to the mine was between $8,000 and $9,000; promised to pay Kennedy and Tatten $3,750 for the mineral claims; Tatten signed the agreement; [the original agreement was here read aloud in court by Mr. Gabriel]; Mr. Kennedy has fulfilled his part of the agreement; I charged Kennedy with conspiracy on evidence that has already been produced in court; after Kennedy had been purchased out men were sent to sink the shaft; had a special agreement with Olsen; Kennedy was present when that arrangement was come to. [A document signed by Mr. Gabriel was read aloud; stated that Gabriel had paid Olsen $3,750]: Kennedy signed a receipt for $7,500 to Mr. Pooley; took three trips to Tumbo Island; don't know the dates; Kennedy and Campbell slept together in a room on the steamer; they told me they slept in the one room; knew they slept together, because early in the morning they came out together; do not remember telling Kennedy to buy Tatten out for $350; if Campbell had acted honestly we would not have paid Tatten so much; Mrs. Campbell told Mrs. Wilkes that Campbell had received $1,000 from Kennedy; Kennedy brought samples of coal from Tumbo Island and analyzed them; the samples were good; the Japanese reported favorably on the mine; induced Mr. Hall to become a partner on the strength of Campbell's report; Wilkes was introduced to me as a man having a great deal of experience in shaft-sinking

To Mr. Mills—Purchased the mine on Mr. Campbell's advice; he put the value of $25,000 on the mine; Kennedy and Olsen's interests were estimated as being worth $10,000; Campbell and Kennedy were bitter enemies; they both told me that they never saw one another; gave Kennedy $500 in cash because he wanted to go to Alaska; you (Mr. Mills) advised me not to pay the cash, because you thought the men were defrauding me.

W. P. Sayward, re-called for cross-examination by Mr. Drake—Joined Mr. Gabriel in the Tumbo Island company about a year ago; it was about the time the Japanese went up to make an examination; received a verbal report from Mr. Gabriel that the property was good; the report was so favourable that I went to see the property; when I saw it I was not favourably impressed; was a party spending some money before Mr. Campbell went up; saw Mr. Campbell's report in March last; the report made by Mr. Campbell was a geological report; this report says there are indications of coal; did not go so much on the report as I did on the conversation I had with Mr. Campbell; Mr. Prior went to the island with me, and his opinion coincided with mine; would have placed some reliance on Mr. Prior's report, only he had no opportunity to form a report; Mr. Prior is a mining expert; his opinion would have been better in my estimation than that of Mr. Campbell; know Mr. Wilkes; he took a contract to sink a shaft; Mr. Wilkes thought the measures good for coal; Mr. Wilkes' contract was to sink 400 feet at 10 per foot; for the $350 paid to Tatten we expected to get the mineral right; only saw Mr. Wilkes a few days ago; he made no statement to me regarding Tatten's lines and the place where the shaft was sunk; am under impression that Mr. Wilkes was at Tumbo Island before I paid Tatten $500; the reason why I think too much was paid Campbell and Kennedy was that he had been humbugged through reports and statements; Mr. Kennedy made no statements; Mr. Campbell always reported the mine in a favourable light; don't know that the reasons were correct; have no reasons for taking proceedings against Kennedy, only that he was a party to the conspiracy to get money out of the company; do not know whether Mr. Kennedy had something to sell; bought something from Mr. Kennedy; know nothing about the value of the property; it remains to be proved whether we paid too much; if we found a valuable coal field we would not have paid too much; we cannot tell the value of the mine unless we sink a shaft; had no knowledge of Kennedy being a party to the conspiracy until these proceedings were taken; did not give instructions for these proceedings.

To Mr. Pooley—I think I introduced Mr. Wilkes to Mr. Gabriel and said he was an experienced miner and we could depend on his report; Mr. Wilkes went to the island with Messrs. Muirhead and Campbell; when Mr. Wilkes returned he said he was favourably impressed; after Mr. Wilkes' return I let the contract to sink a shaft; if Wilkes had been unfavourable, I don't know what I would have done; was not present when an agreement was made to pay Mr. Kennedy $3,750; was in favour of paying him $2,500 and the balance when we struck bed-rock; was not in favour of paying him $3,900; we did not meet when the agreement was made to pay Kennedy $3,750; objected to the agreement before it was made; find no fault with Mr. Campbell's report on the coal mine; Mr. Campbell went up with Mr. Wilkes and made surveys; Campbell said Tatten would allow no one on his land unless he was paid, the result was that I sent Campbell to Tumbo Island for Tatten, and paid him $500 for permission to sink the shaft; Tatten agreed to allow us to open the mine and roads and to allow us use timber for general mining purposes, I do not know how much work was done by the Japanese; if a witness states that there is only enough work done for a man to cover with his hand he is drawing on his imagination.

To Mr. Mills.—Before proceedings were taken I heard Olsen's statements and Tatten's statement regarding the $500; I agreed to these proceedings before action was taken; Campbell valued the mine at $25,000, and thought if we got it over $10,000 we would get a good bargain; I did not place much reliance on the Japanese report, but I did place much reliance on Mr. Campbell's report; I interred that Campbell and Kennedy were not friendly, and I did not know that they were holding meetings; I spoke to Mr. Wilkes before any arrangement was made and asked what he would charge for sinking in sandstone; Campbell went up with Wilkes and gave up the contract because it did not pay him.

Charles Wilkes said: "I have been a coal miner for 28 years; Mr. Sayward sent for me and introduced me to Mr. Gabriel; they asked me to explore a mine on Tumbo Island; went there and selected a spot for a shaft; when I returned to Victoria told Mr. Sayward I saw the best indications for coal on the island; Mr. Gabriel said to me that the Japanese told him the indications were good; went to Tumbo Island in the steamer Hope to sink a shaft: there were nine men at work, and Messrs. Campbell, Wilkes and Muirhead arrived there next day and started to work; Tatten came to the shaft where we were at work; we started to sink the shaft on Tatten's ground.

To Mr. Mills—I did not say what date I went to survey the land; had a contract to sink the shaft at $30 per yard; threw up the contract because the men would not work; was not going to work all summer for nothing; from the word go the company acted the scoundrel towards me; Mr. Sayward would not pay me and sent me to Mr. Gabriel; I don't know anything about signing the contract; you will get very little out of me.

Allan Muirhead, sworn, said: I know all parties connected with this case; went to Tumbo Island on 3rd May with Wilkes and Kennedy; Campbell left us at Clover Point; on the 5th we reached the island; after arriving there I marked a tree and Mr. Wilkes said it was the best place to sink a shaft; in the evening Tatten came to the tent and Wilkes asked him to look at the shaft; Tatten said he wanted the lines changed and the shaft would then be on his (Tatten's) property; Tatten said if they could afford to pay Kennedy $4,000 they could pay him $1,000 for sinking the shaft; we went for Mr. Campbell on Thursday; did not get him; on Monday they brought Campbell; Tatten showed him his boundary post and his line; the eastern line was cut through the bush; the shaft was about a chain and a half outside Tatten's line; we started surveying and Mr. Campbell was chief surveyor; next morning Tatten told Campbell that he wanted the lines changed further east; he said "I have the first right on the island and will have the lines where I like;" he finished the survey, and before he left Tatten came to the tent and said he wanted $1,000 before he would allow the company to sink on his land; Campbell said he might get $200 or $300; Tatten said he would not take less than $500.

Tatten also said the company did not use him right, and he was going to make them pay; they had no water on their land, and he was going to make them pay for water; we returned to Victoria; Campbell called a meeting of the company; I was present; Mr. Campbell told the company that Tatten wanted $500. Wilkes corroborated Mr. Campbell's statement and said the best indications for coal existed on the island. Mr. Gabriel asked me to draw up the agreement with Mr. Tatten; I returned to the island with Mr. Campbell and ten others; we laid out the shaft and Mr. Campbell to come down, the company wished to see him; Tatten told Wilkes not to start work on the shaft before he returned from Victoria; Campbell asked me to take the agreement to Mr. Sayward's office; the company held a meeting and there were present Messrs. Hall, Sayward, Gabriel, Tatten and myself; Mr. Gabriel told Tatten that the company had no right to pay Tatten $500; Tatten became angry and said he would go back; finally they agreed to pay $500, and the agreement was signed; I went into the outer office to insert a clause regarding timber for mining purposes; Mr. Gabriel followed me and said that he wanted to get even on Tatten who could neither read or write; he asked witness to insert a clause giving the company all the timber they required; I refused to insert the clause; Mr. Gabriel left the meeting in Company with Mr. Tatten; I went to Capt. Clarke's store with Mr. Campbell; after leaving Capt. Clarke's we met Mr. Tatten; the latter was shaking a cheque and said he had $500 from the company and intended to get $200 more; Tatten asked witnese to identify him at the bank; I did not care about going and told Tatten to ask Mr. Campbell to identify him; Campbell came from the bank about five minutes before Tatten; the latter came to us and said he banked the money. After the contract was thrown up I was engaged to go to Tumbo Island to take charge of the company's tools. I remained on the island for two months, expecting a few days when I came to Victoria to find out whether the contract was let. I did not know Mr. Kennedy when he received $3,350; Mr. Campbell and myself met Olsen one Sunday afternoon near Wriglesworth's store; Olsen asked Campbell to help him get some money from Gabriel as he believed the company would try to swindle him. Campbell said he would have nothing to do with it.

To Mr. Mills—Mr. Campbell introduced me to Mr. Gabriel; I have known Mr. Campbell for two years; Mr. Campbell engaged me to survey the island; I went to Mr. Campbell's last night; what we were talking about you will never get from me; we talked about everything in general and nothing in particular; we did not speak about this case; on Sunday last went to Mr. Campbell's we spoke about the case; I wrote the agreement at Mr. Campbell's residence; a portion of the agreement was taken from a form supplied by Mr. Campbell; I received no assistance in drawing up the agreement from Mr. Campbell; Mr. Gabriel instructed me to draw up the agreement; Mr. Campbell told me to take the agreement to the meeting of the company; I was first introduced to Mr. Campbell by Mr. Eli Harrison; I have had a little experience in engineering; I remember meeting Messrs. S. P. Mills and Gabriel, and I said the company had treated me right; Campbell had used me like a gentleman and I did not wish to say anything about the case; Mr. Campbell introduced me to Mr. Kennedy.

This closed the evidence for the defence, and after some argument from counsel on both sides the defendants were bound over, Campbell in the sum of $2,500 and Kennedy in $1,000, to appear at the next assizes.

## Disastrous Colliery Explosion in Pictou Co., Nova Scotia.

[Special to The Canadian Mining Review.]

Westville Pictou County, N. S. Jan. 16th. 1888.—Yesterday (Sunday) about 2 p. m. the inhabitants of this town, were startled by a severe shock which shook the buildings like an earthquake, and on looking out to ascertain the cause, dense volumes of smoke and flame were seen issuing from the New Winning, a coal mine at the Albion mines about two miles distant, owned by the Acadia Coal Co. Ld. Your correspondent at once proceeded to the scene of the accident, and was gratified to learn that no lives had been lost. The seam worked there lies some 100 feet below the Cage Pit seam which has been on fire for over seven years, and during the past summer, the management decided to extract the Pillars out of a portion of the New Winning with the result that the roof gave way, making a connection with the Cage Pit in which it was soon discovered that the fire still existed; the extraction of the Pillars was at once discontinued, that portion of the mine built off, and to all appearance made secure and safe. From inquiries made on the spot yesterday it appears that an accumulation of gas in the Cage Pit had come in contact with the fire during Saturday night and the explosion thus caused blew down the building between the Cage Pit and the New Winning. As soon as this became known General Manager Poole and a large force of officials and workmen at once went to work to rebuild the buildings and once more cut the connection between the two mines. A temporary stopping having been put up the whole of the men proceeded to the surface, and the last of them had only been a few minutes on the surface when a terrific explosion took place, sending a stream of flame out of the two Slopes which set fire to the bank house, an extensive and well equipped building at one end of which stood two winding engines and a boiler house containing three multitublar boilers. In a few minutes the whole buildings were a mass of flames and were soon totally destroyed; the engines and boilers being seriously damaged, if not rendered entirely useless for further use.

At the time of writing I have not ascertained whether the explosion has set fire to the coal in the New Winning but under the most favorable circumstances the work of re-opening the mine will be a very difficult task owing to its connection with the Cage Pit.

The loss to the company will be very great; but it is a great consolation to them and the community at large that the explosion took place at the time it did; had it been when the miners were at work the loss of life would have been fearful. It was indeed a sad sight to stand by and see such a destruction of valuable property, but what sadness would have been added to the scene had wives and mothers been there mourning for loved ones lost.

The output at this mine was over 200 tons per day, and a great number of men and boys will be thrown out of employment, but it is expected the management will be able to find employment for many, if not all, at their other mines shortly.

Since the commencement of coal mining at the Albion the following pits have been lost by explosions: the Bye Pit, the Dalhousie Pit, the Foster Pit, the Foord Pit, Cage Pit, and last, the New Winning; and it is an unfortunate fact that the whole of these pits are connected.

**An Improved Method of Laying Coal-Dust in Mines.**—Mr. T. O. Robson* gives a description of an apparatus attached to an ordinary water-tub which is made to travel along the wagon-ways of a colliery. The water is conveyed from the tub through a hollow spindle projecting at the back through a stuffing-box, and having at its outer end a hollow boss perforated round its circumference. Over this boss is fitted a chamfered wooden boss similarly perforated and surrounded by a circular bristle brush. The wooden boss is made removable, so that the brush can be renewed or repaired. The spindle, boss and brush are made to rotate by means of an endless chain and tooth wheels connected with one of the axes of the tub, and a simple stop-valve is added to regulate and cut off the supply of water. With this apparatus 100 gallons of water have been sufficient to thoroughly saturate 1,700 yards of way, a superficial area of 150,000 square feet, the tub travelling at a speed of about four miles an hour.

**A Fire-Damp Indicator.**—At the Manchester meeting of the British Association, Mr. J. Wilson Swan read a paper on fire-damp indicators. The old tests for the presence of fire-damp in coal mines have become entirely insufficient. It is now a matter of vital interest to ascertain the presence of small proportions of fire-damp in pit air. The danger is usually tested by means of the flame of the safety lamp, which shows, by elongation, when the air had become foul to the extent of 2 per cent. of fire damp; but it would show nothing at all if the proportion was less than 1 or 2 per cent. Yet 1 or 2 per cent. is quite a dangerous proportion if the air is heavily laden with coal dust, and there happens to be a long tongue of flame projected into it by a blown out shot. The author has been lately striving to supply the want of a more sensitive indicator of fire-damp, and the outcome of his efforts was the apparatus he exhibited. With this apparatus tests were made for fire-damp in various parts of a colliery; in a well ventilated portion of the pit one-eight of 1 per cent. was detected, and near a blower of gas 6 per cent.

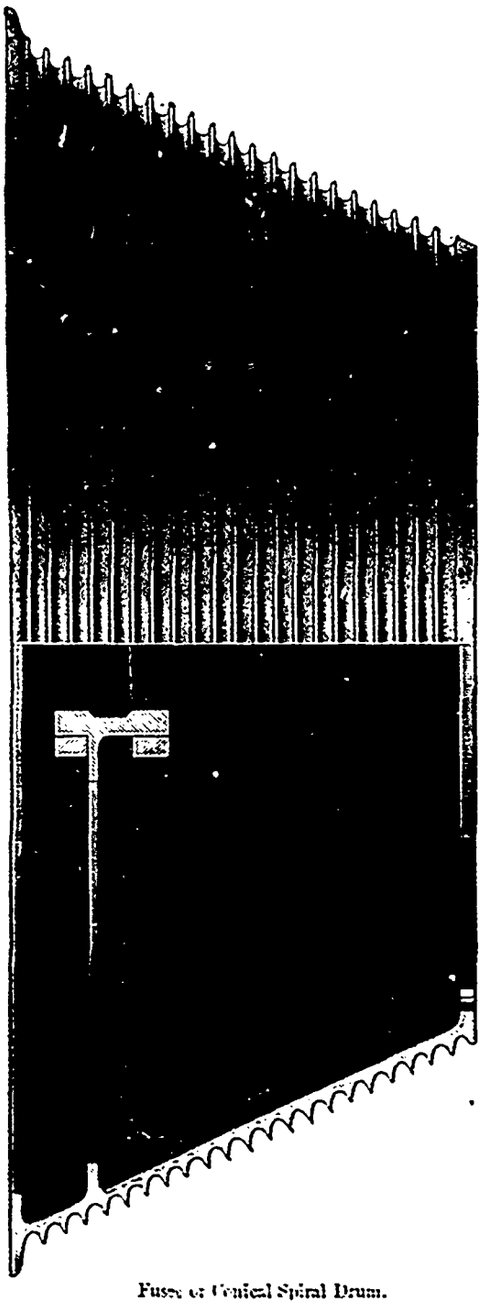
**Long-wall Working in Successive Stages.**—According to C. Demanet,† the use of self-acting inclines worked by the weight of the descending tubs is open to considerable objections in cases where the proportion of dirt is excessive as compared with coal. The objections may be obviated by having recourse to the following methods:—The inclines are laid with a single road, and a small hauling engine, worked by air at a pressure of from 45 to 60 pounds, is fixed at the foot of each incline at its junction with the gate road. The engine is mounted on a bed-plate about 5 feet long by 3 feet 3 inches wide, and has a drum about 2 feet 3 inches diameter by seven inches wide, capable of containing 275 yards of rope ½ inch diameter, and driven by gearing at two different speeds of 6 to 1 and 4 to 1 respectively. The cylinder is an oscillating one with reversing gear, and is 5½ inches diameter by 10 inches stroke. During the day-shift, when there are only empty tubs to be drawn up to the working face, the quick gear is employed.

## Wire Rope Haulage and its Application to Mining.

By Frank C. Roberts, C.E., Philadelphia, Pa.*

Progress in the facilities for handling mining products has been largely superinduced by the necessities of commercial economy rendered requisite in order to meet the demand of competition. So rapid has been the depreciation in the value of mineral products, primarily due to the disproportionate increase of output over consumption, that it may be justly claimed that mining, when considered as a commercial success, depends largely upon the ease and cheapness by which the products are brought to the surface of the ground. In all methods of performing this operation, wire rope enters as an important factor; and the object of the present sketch will be to explain, as fully as is consistent with the space allotted, the various adaptations of wire rope employed in placing coal and ores within the reach of our overground systems of transportation.

FIG. 1.



Fusee or Conical Spiral Drum.

These adaptations will be considered in the following order:

I. Hoists.
II. Inclined planes.
  *a.* Engine planes.
  *b.* Gravity planes.
  *c.* Aerial planes.
III. Haulage.
  *a.* Tail-rope system.
  *b.* Counter-rope system.
  *c.* Endless-rope system.

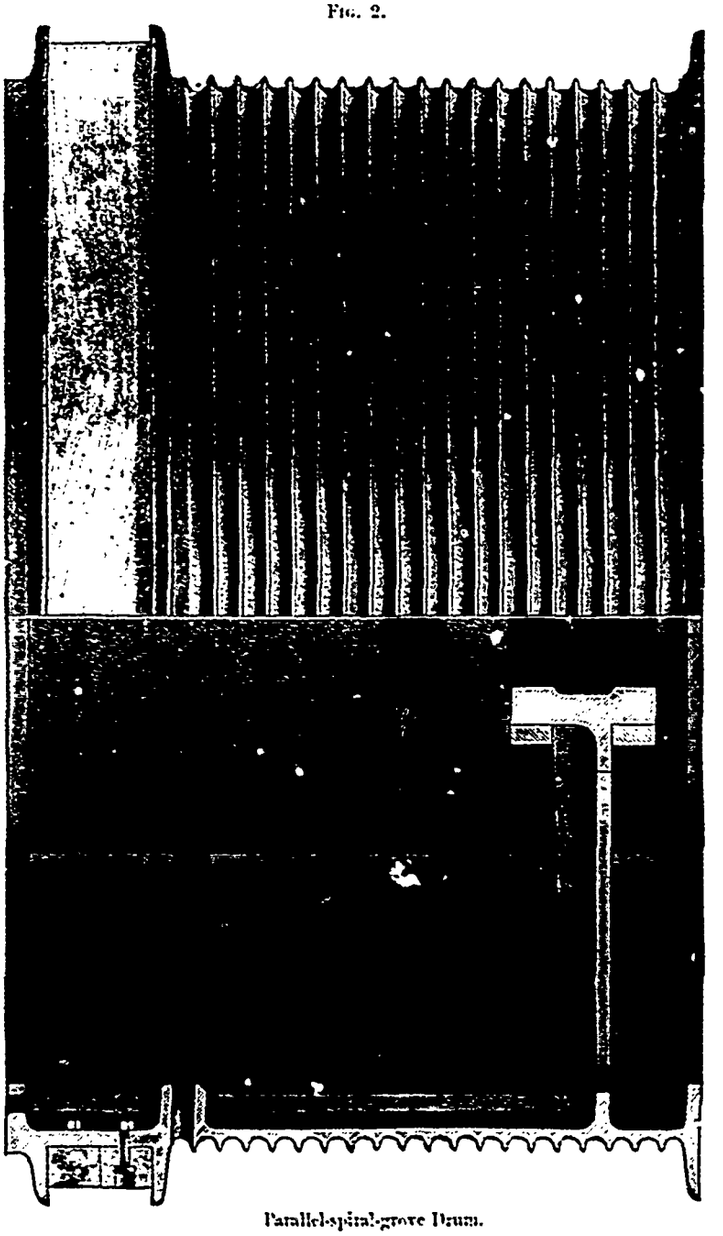
### I. Hoists.

The term "*hoist*" is applied to the system whereby the mine-product is elevated from the mine-level to the surface through vertical shafts. In our country this system finds its widest application in the anthracite coal-regions, where it is the prevailing method. The principle, briefly described, is as follows: A vertical shaft is sunk to the level which it is proposed to operate, and from this point the various workings penetrate. At the head of the shaft is placed an engine with a wire-rope drum attached. To this drum is fastened the hoisting-rope, which is led over a grooved wheel and attached to the carriage or cage upon which the cars rest while they are hoisted. The cage being at the foot of the shaft, loaded cars are run upon it and the signal is given to the engineer to start the hoisting-engine. In this manner the cars are hoisted to the surface and switched off to their destination.

Hoists may be divided into two classes, viz: *single* and *double* hoists. The former have a single shaft and drum, with a non-reversing hoisting engine, the cars being lowered by means of a friction clutch attached to the rope-drum, and sufficiently powerful to hold the cage when loaded in any position. This system is exceedingly economical of fuel, the work of the engine being almost constant. The *double hoist* consists in a plant of two shafts or shaft-compartments and drums, with the hoisting gear so regulated in operation that when an empty car is descending on one side a loaded car is ascending on the other. This arrangement requires, of course, a reversing engine; and although the plant is more expensive in instalment, it is to be recommended where large capacity is required.

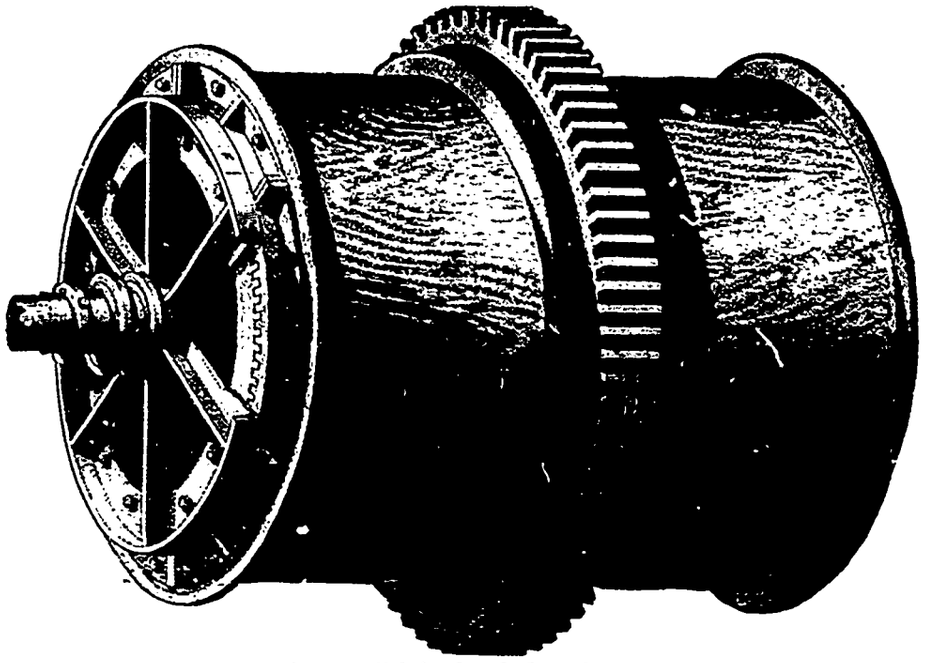
Two types of hoisting engines are constructed viz, *first* and *second* motion engines. In the

FIG. 2.



Parallel-spiral-grove Drum.

Fig. 3.



Drum for Hoisting from Different Levels.

former, two engines with cranks at right angles, to each other are coupled direct to the drum-shaft; in the latter, the engine carries a pinion, meshing with a spur-wheel keyed to the drum-shaft. The rope-drums in either case are proportioned in diameter to the size of the rope employed, and in length to the depth of the shaft. In single shafts but one drum, of course, is necessary, but double-shaft hoisting-engines are provided with two rope-drums, each having its separate rope.

Fig. 1 illustrates what is known as the fusee or conical spiral drum. Two of these drums are placed end to end on a common shaft with a strap-brake seat between them. The wire-ropes are attached to the small ends of the drums and the engines wind one rope while unwinding the other. In this manner the leverage of the rope performing the function of hoisting is diminished, while the descending rope has an increased leverage; and, as a result, the work done by the engine is more uniform and the gentle starting of the load is more easily accomplished. These drums vary between 5 and 15 feet in diameter, and are of such lengths as may be suited to the depth of the mine.

Fig. 2 represents the parallel-spiral groove drum, which has a wide application, although lacking the advantage obtained in the fusee by the equalization of leverages. When applied to double hoists, two of these are keyed to one shaft, the end-flanges being bolted together. The ropes are attached as to the fusee, one winding while the other is unwinding.

In many mines or shafts, work may be progressing at different levels below the surface. Fig. 3 illustrates a design of hoisting-drum suitable to such requirements. It will be seen that, by means of a toothed wheel, the driving-power is transmitted to the drum, the arrangement being such that the gear meshes with a circular rack fixed in the end of the drum. When it is desired to adjust the length of the rope to a different level, the wheel is slipped out of the rack by means of a lever, and the drum is revolved until the proper length of rope is wound or unwound. The wheel is now returned to its former position, and the drum is ready for use.

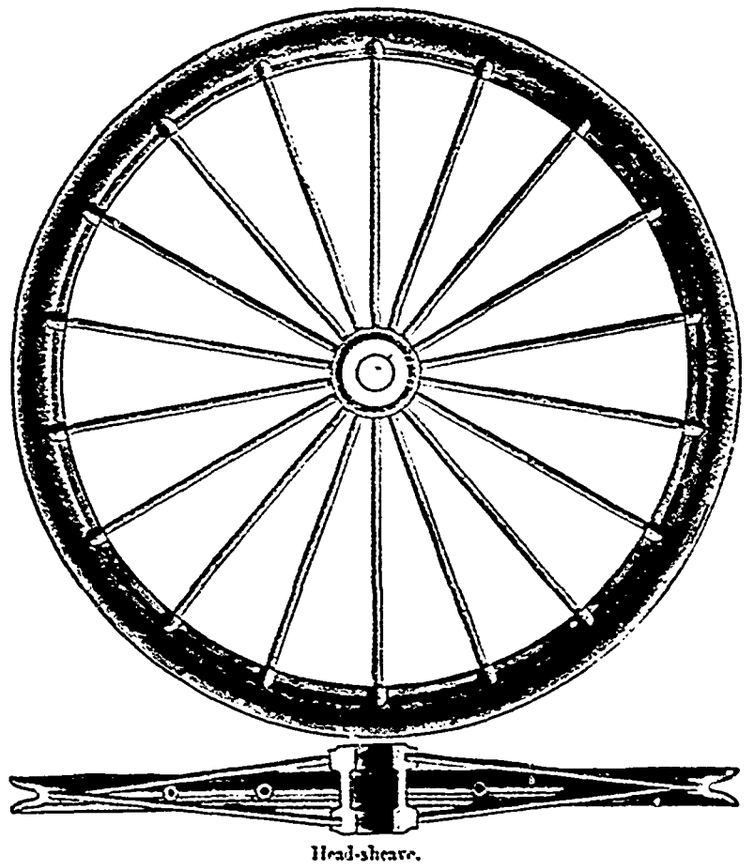
In a vertical hoist, the wire rope, after passing off the drum, leads to what is know as the *head sheave* (Fig. 4), which is so located that its outer circumference is directly over the centre of the pit, and from which the rope leads vertically downwards into the mine and is attached to the *cage* upon which the mine-cars are hoisted to the surface. Fig. 5 represents a modern hoisting-cage, such as is used in the coal regions. Upon two opposite sides of the pit are located the guide-bars, which are usually constructed of hard wood. In order to provide against accidents in case of the rope breaking, the cage is provided with safety-catches, the action of which is such that the instant the tension on the rope is released the quadrant-racks shown at the side of the cage imbed themselves in the guides and the cage is arrested in its descent. This movement is affected by a series of rubber springs set in telescopic distance-rings through which the draw-head-bolt passes, the whole being encased in the spring-pocket shown underneath the draw-beam. When the rope is in tension, the draw-head-bolt passes through and underneath the spring-pocket and compresses the springs; but upon the release of the tension in the rope the springs push the draw-head-bolt in toward the centre of the cage, and thus act upon the levers connected with the quadrant-catches.

Another arrangement contributing towards the safety of hoists is that known as *cage landing-fans*. These consist of arms or prongs so arranged that the cage with its contents is landed upon them, where it is perfectly secure until the car is run on or off. The signal being given to lower, the fans are thrown back by means of a series of levers, and the cage is allowed to descend.

In connection with safety-apparatus may be mentioned the *hoist-indicator*, whereby the position of the hoisting-cage is shown at any moment. This is useful to prevent "overwinding." The simplest arrangement of this device is worked from the drum-shaft by means of a worm and gear actuating a pointer on a dial.

In addition to the indicator as a safeguard against overwinding, all shaft-heads should be equipped with *safety detaching-hooks*. These hooks are so arranged that if by any accident or unforseen cause the hoisting-engine is not stopped when the cage reaches the surface or the landing-place, then instead of the cage being drawn up into the poppet-head, causing its own

Fig. 4.



Head-sheave.

destruction and the wrecking of the whole shaft-head, it becomes simply detached from the rope and remains hanging in the upper guides, while the loose rope-end is merely wound round the drum.

In Fig. 6 may be seen a general arrangement of a double-shaft first-motion hoisting-plant fitted with two fusee-drums.

*Ropes.*—In proportioning the wire rope requisite for a vertical hoist of a given capacity, great care should be taken to assume a safety-factor of sufficient magnitude. Not only should the weight of the cage and loaded truck be considered, but also the friction of the guides and head-sheaves and the weight of the rope itself. It is the latter factor that has led many European mine-operators to employ what is known as "taper" ropes, *i.e.*, those having an increased diameter towards the drum-end. The peculiarities of each application must be noted and a safety-factor of not less than five adopted. The drums and head-sheaves must be properly proportioned to the size of the rope, or else the continual bending and unbending will soon destroy the elasticity of the wire. Nothing but the best Swedes iron or *reliable steel rope should be employed. The danger to* life and property is too great to permit the risk of non-uniformity in the material of the rope.

Wire rope for vertical hoists should be composed of six strands of nineteen wires each, wrapped about a hempen centre. The latter adds much to the elasticity and life of the rope. Ropes of small diameter (up to $\frac{3}{4}$ inch), with six strands of seven wires each, are sometimes employed for hoisting purposes; but their use necessitates larger head-sheaves and drums and, consequently, increased cost.

Crucible steel ropes, when composed of good material, are more durable than iron ropes, and have entirely replaced the latter in some mining regions. It must be borne in mind, however, when making a change from iron to steel, that the aim should not be to reduce the diameter of the rope, but to increase its durability.

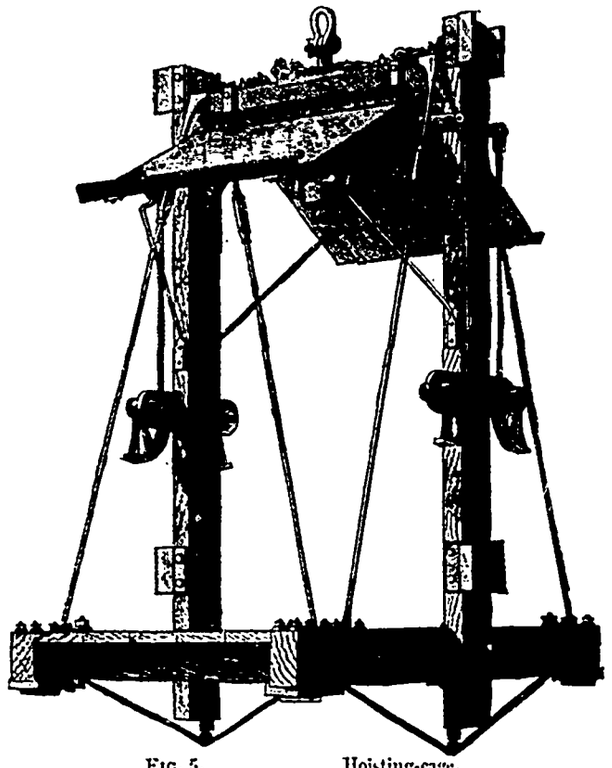


FIG. 5. Hoisting-cage.

When starting the cage from the bottom of the shaft, the rope should be taut; the presence of slack causes a sudden and dangerous stress in the rope. The following table shows clearly the necessity for care in this direction:

*Table of a Series of Tests Showing the Extra Stress upon a Hoisting-rope due to a few inches of Slack Rope.*

| | | Strain in pounds. |
|---|---|---|
| | *First Test.* | |
| No. 1, | Empty cage, lifted gently..... | 4,030 |
| No. 2, | " " ..... | 4,030 |
| No. 1, | With 2½ inches slack rope..... | 5,600 |
| No. 2, | " 2½ " " " ..... | 5,600 |
| No. 1, | " 6 " " " ..... | 8,950 |
| No. 2, | " 6 " " " ..... | 8,950 |
| No. 1, | " 12 " " " ..... | 12,300 |
| No. 2, | " 12 " " " ..... | 12,300 |
| | *Second Test.* | |
| Cage and 4 empty cars weighed by machine. | | 6,375 |
| No. 1, | Cage lifted gently..... | 6,725 |
| No. 2, | " " " ..... | 6,725 |
| No. 1, | With 3 inches slack rope..... | 11,200 |
| No. 2, | " 3 " " " ..... | 11,200 |
| No. 1, | " 6 " " " ..... | 12,250 |
| No. 2, | " 6 " " " ..... | 12,250 |
| No. 1, | " 12 " " " ..... | 15,675 |
| No. 2, | " 12 " " " ..... | 15,675 |
| | *Third Test.* | |
| Cage and full cars weighed by machine.... | | 11,300 |
| No. 1, | Cage lifted gently..... | 11,300 |
| No. 2, | " " " ..... | 11,325 |
| No. 1, | With 3 inches slack rope..... | 19,025 |
| No. 2, | " 3 " " " ..... | 19,025 |
| No. 1, | " 6 " " " ..... | 23,500 |
| No. 2, | " 6 " " " ..... | 25,750 |
| No 1, | " 9 " " " ..... | 27,950 |
| No. 2, | " 9 " " " ..... | 25,750 |

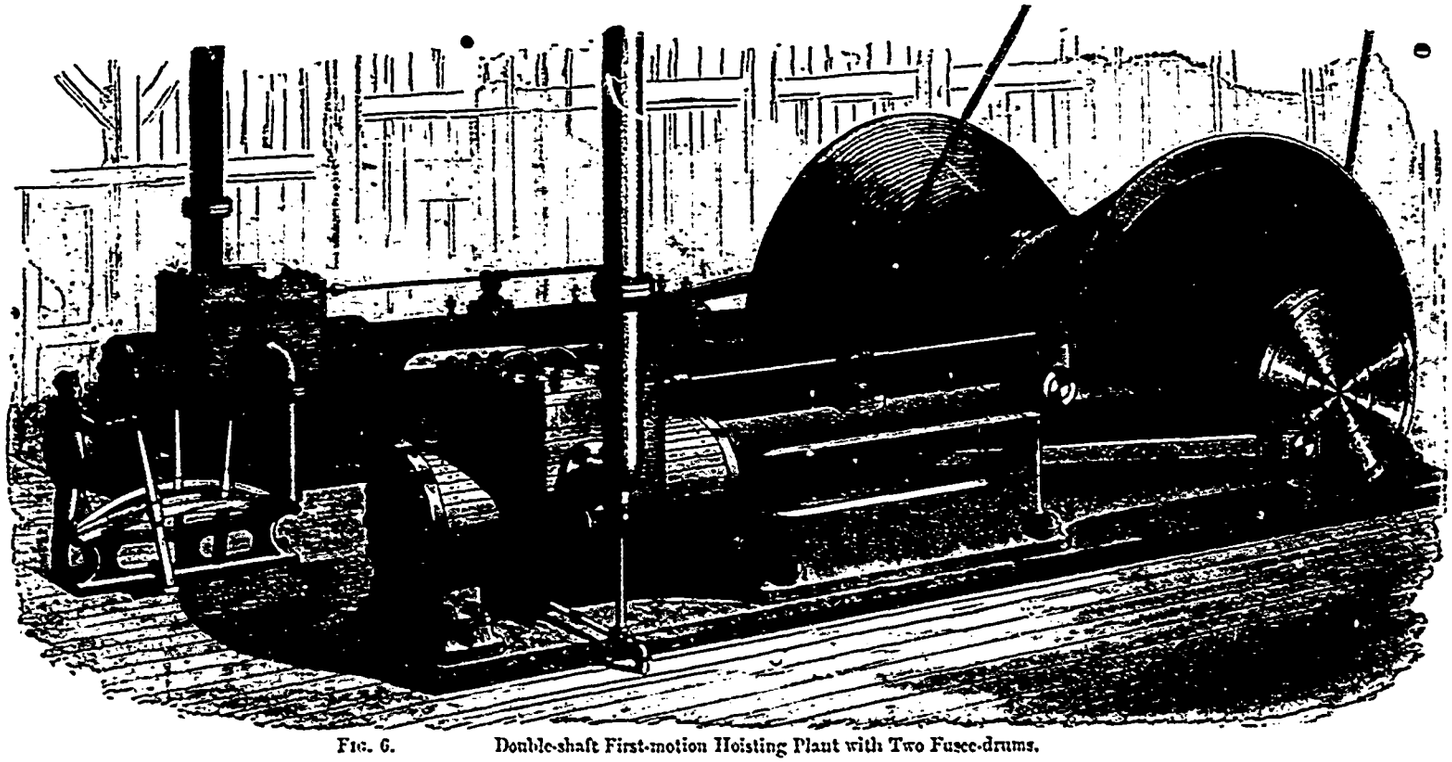


FIG. 6. Double-shaft First-motion Hoisting Plant with Two Fusee-drums.

The following table gives the necessary data to be used in selecting hoisting-ropes of nineteen wires to the strand. It is taken from the circular of the Trenton Iron Co.

| Description. | | | | Iron. | | | | Steel. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Trade No. | Diameter in inches. | Circumference in inches. | Estimated Weight per foot, in pounds. | Breaking Stress, in tons of 2,000 pounds. | Proper working load in tons of 2,000 pounds. | Circumference of Hemp Rope of equal strength. | Min. size of drum or sheave, in ft. | Breaking Stress, in tons of 2,000 pounds. | Proper working load, in tons of 2,000 pounds. | Circumference of Hemp Rope of equal strength. | Min. size of drum or sheave, in ft. |
| 1 | 2¼ | 7 | 7.75 | 74 | 15 | 15½ | 8 | 164.69 | 32.9 | .... | 9 |
| 2 | 2 | 6¼ | 6.11 | 65 | 13 | 14½ | 7 | 132.37 | 26.5 | .... | 8 |
| 3 | 1¾ | 5½ | 5.09 | 54 | 11 | 13 | 6½ | 108.13 | 21.63 | .... | 7½ |
| 4 | 1½ | 5 | 4.00 | 44 | 9 | 12 | 5 | 97.17 | 19.44 | .... | 6 |
| 5 | 1⅜ | 4¾ | 3.55 | 39 | 8 | 11½ | 4½ | 86.38 | 17.3 | 16½ | 5½ |
| 5½ | 1⅜ | 4¼ | 2.90 | 33 | 6½ | 10½ | 4½ | 72.38 | 14.46 | 14 | 5½ |
| 6 | 1¼ | 4 | 2.42 | 27 | 5½ | 9½ | 4 | 50.17 | 10. | 12¼ | 5 |
| 7 | 1⅛ | 3½ | 1.95 | 20 | 4 | 8 | 3½ | 38. | 7.7 | 11 | 4½ |
| 8 | 1 | 3⅛ | 1.53 | 16 | 3 | 7 | 3 | 29.2 | 5.8 | 9 | 4 |
| 9 | ⅞ | 2¾ | 1.16 | 11½ | 2½ | 6 | 2¾ | 21.55 | 4. | 8 | 3½ |
| 10 | ¾ | 2⅜ | 0.85 | 8.64 | 1¾ | 5 | 2½ | 14.99 | 3. | 6½ | 3½ |
| 10½ | ⅝ | 2 | 0.60 | 5.13 | 1¼ | 4½ | 2 | 12.53 | 2.5 | 5½ | 3 |
| 10½ | ⅝ | 1⅞ | 0.47 | 4.2? | ? | 4 | 1⅞ | 8.81 | 1.75 | 5¼ | 2½ |
| 10¾ | ½ | 1½ | 0.37 | 3.48 | ¾ | 3½ | 1½ | 7.52 | 1.5 | 4½ | 2 |
| 10⅞ | ½ | 1¼ | 0.26 | 2.50 | ½ | 3 | 1 | | | | |

*(To be continued.)*

## PHOSPHATE.

The following is a statement *in extenso* of the phosphate shipped from Montreal during the year 1887 :—

| Date. | Shippers. | Ship. | Destination. | Tons. |
|---|---|---|---|---|
| May 18 | Wilson & Green.. | s.s. Oxenholme | Liverpool | 613 |
| " 23 | Gillespie, Patterson & Co. | s.s. Bannewall | Hamburg | 104 |
| " 25 | Anglo Canadian Phosphate Co | s.s. Colina..... | Glasgow .. | 200 |
| " 27 | Wilson & Green.. | s.s. Canopus. | Liverpool. | 63 |
| " 30 | Lomer, Rohr & Co. | s s Gratitude | London .. | 100 |
| " 31 | " " " | s s. Southwold | do .... | 240 |
| June 1 | " " " | s s. Alcides.. | Glasgow.... | 75 |
| " 2 | " " " | s.s. Katie..... | London.... | 220 |
| " 7 | Anglo Canadian Phosphate Co... | s s. Bonnington | Liverpool | 300 |
| " 13 | Wilson & Green.. | s.s. Titania.... | do .. | 74 |
| " 14 | " " " | s.s. Castledale. | London... | 217 |
| " 14 | Anglo Canadian Phosphate Co.. | s s " | do .... | 110 |
| " 19 | Lomer, Rohr & Co | s.s. Ocean Prince | do .... | 100 |
| " 19 | Wilson & Green.. | s.s. | do .... | 93 |
| " 22 | Anglo Canadian Phosphate Co... | s.s Concordia. | Glasgow . | 125 |
| " 23 | Lomer, Rohr & Co | s.s. Merchant's Prince. | London | 200 |
| " 23 | Anglo Canadian Phosphate Co. . | do | do .... | 169 |
| " 24 | Lomer, Rohr & Co. | s s. Black Prince.. | do .... | 109 |
| " 24 | Millar & Co..... | do | do .... | 200 |
| " 25 | " " ..... | s.s. Bayswater | do .... | 91 |
| " 25 | Lomer, Rohr & Co. | do | do .... | 190 |
| " 29 | Wilson & Green. | s.s. Oxenholme | Liverpool | 661 |
| " 12 | " " .. | Bar. Lady Dufferin | London.... | 240 |
| " 29 | Lomer, Rohr & Co. | do | do .... | 40 |
| " 30 | " " .. | s.s. Waudraham.. | Hamburg | 40 |
| " 3 | Millar & Co ..... | do | do .... | 250 |
| " 30 | Anglo Canadian Phosphate Co... | do | do .... | 91 |
| " 30 | Lomer, Rohr & Co. | s s. Colina..... | Glasgow.. | 190 |
| July 5 | Wilson & Green | s.s Henri IV. | London.... | 199 |
| Aug. 6 | Lomer, Rohr & Co. | s.s. Canopus.. | Liverpool.. | 335 |
| July 13 | " " .. | s.s. Westcumberland.. | London... | 162 |
| " 19 | " " | s.s. Dracona.. | do .... | 165 |
| " 19 | Gillespie, Patterson & Co. | do | do .... | 116 |
| " 21 | Lomer, Rohr & Co. | Bar. Jeda..... | Montrose | 50 |
| " 21 | " " . | s.s. Anerley.... | London.... | 336 |
| " 21 | " " .. | Bar. Beltrees.. | Fleetwood. | 100 |
| " 22 | " " . | s.s. Cremow... | Hamburg. | 220 |
| " 22 | Wilson & Green . | s.s. City of Lincoln.... | London.... | 388 |
| Aug. 10 | Lomer, Rohr & Co. | s.s. Navarro.. | do .... | 107 |
| " 10 | Wilson & Green.. | do ... | do .... | 285 |
| " 10 | Anglo Canadian Phosphate Co .. | do . . | do .... | 150 |
| " 10 | Lomer, Rohr & Co. | s s. Alcides.... | Glasgow ... | 187 |
| " 11 | " " . | s.s. Berbice.... | Liverpool.. | 120 |
| " 12 | " " .. | s.s. Scotland... | London.... | 292 |
| " 16 | " " .. | s.s. Avlona.... | do .... | 90 |
| " 20 | Wilson & Green.. | s.s. Oxenholme | Liverpool.. | 704 |
| Aug. 22 | Lomer, Rohr & Co | s.s. Gallego.... | Liverpool.. | 360 |
| " 22 | R. C. Adams..... | do .... | do ... | 133 |
| " 22 | Gillespie, Patterson & Co | do ... | do ... | 147 |
| " 24 | Lomer, Rohr & Co. | s.s. Cynthia... | Glasgow... | 223 |
| " 27 | " " . | Bar. Jessie Rennick. | Greenock.. | 136 |
| " 31 | " " . | s.s. Toronto . | Liverpool.. | 226 |
| Sept. 3 | " " .. | s.s. Washington City.... | Londn .... | 235 |
| " 3 | Wilson & Green . | do ... | do .... | 250 |
| " 5 | Lomer, Rohr & Co | s.s. Frl King. | do .... | 133 |
| " 12 | " " .. | s.s. Kehrweider | Hamburg. | 259 |
| " 13 | Wilson & Green.. | s.s. Lake Nepigon.... | Liverpool.. | 216 |
| " 16 | " " .. | s.s. Thorndale. | London.... | 318 |
| " 16 | Lomer, Rohr & Co. | do | do .... | 235 |
| " 17 | Wilson & Green.. | s.s. Thammore. | Liverpool | 236 |
| " 23 | " " .. | s.s. Ocean King | London .. | 359 |
| " 24 | Lomer, Rohr & Co | s.s. Katie..... | do .... | 230 |
| " 24 | Millar & Co ..... | do ..... | do .... | 135 |
| Sept. 29 | Wilson & Green.. | s.s. Oxenholme | Liverpool.. | 294 |
| " 29 | Anglo Canadian Phosphate Co.. | do | do .. | 260 |
| " 29 | Gillespie, Patterson & Co .. | do | do .. | 54 |
| " 30 | Wilson & Green.. | s.s. Canopus... | Liverpool.. | 393 |
| Oct. 3 | Anglo Canadian Phosphate Co... | s.s. Panama. | Havre..... | 210 |
| " 5 | Lomer, Rohr & Co. | do . . | do .... | 100 |
| " 6 | " " .. | s.s. Concordia. | Glasgow.. | 290 |
| Oct. 13 | Lomer, Rohr & Co. | s.s. Colina..... | Glasgow... | 220 |
| " 13 | " " .. | s.s. Grassbrooke | Hamburg.. | 462 |
| " 23 | Wilson & Green.. | s.s. Harbinger. | London .... | 493 |
| " 12 | Lomer, Rohr & Co. | do . | do ... | 175 |
| " 12 | Millar & Co..... | s.s. Euskan.... | Liverpool.. | 93 |
| Nov. 10 | Lomer, Rohr & Co. | s.s. Cynthia... | Glasgow... | 95 |
| " 10 | " " . | s.s. Thorndale. | London.... | 300 |
| " 10 | Millar & Co ..... | do .. | do .... | 80 |
| " 12 | Anglo Canadian Phosphate Co. . | s.s. Kehrweider | Hamburg | 355 |
| " 12 | Wilson & Green.. | do | do .... | 566 |
| " 11 | Lomer, Rohr & Co | s.s. Toronto. | Liverpool. | 160 |
| " 16 | " " .. | s.s. Concordia. | Glasgow... | 118 |
| " 16 | Millar & Co.... | s.s. Lake Ontario..... | Liverpool | 112 |
| " 16 | Wilson & Green.. | do ... | do . | 156 |
| " 18 | Lomer, Rohr & Co. | s.s. Montreal | do | 200 |
| " 19 | " " .. | s.s. Lake Huron | do . | 200 |
| " 19 | Gillespie, Patterson & Co. .. | do | do . | 141 |
| " 19 | Wilson & Green | do | do . | 132 |
| " 12 | Lomer, Rohr & Co. | s.s. Scotland | U. K. ..... | 200 |
| " 13 | Wilson & Green. | do | do ..... | 195 |
| " 13 | " " .. | s.s. Katie..... | do ..... | 95 |
| " 13 | Millar & Co..... | do ..... | do ..... | 40 |
| | | | Total.... | 19,713 |

As stated in our last issue, the Montreal Board of Trade gives the total amount as 20,349 tons. The difference is caused by the "*ground phosphate in bags*" not being included in this estimate.

### In General.

Prof. Saunders, of the Central Experimental Farm, states that he has under consideration a series of experiments at the farm with ground phosphate in its raw state. The experiments will be made during the coming season

Mr. Coste estimates the total quantity of phosphate exported from Ontario from the year 1877 to 1886 as 8,983 tons, of a value of $110,888; from Quebec during the same period 146,044 tons, of a value of $2,704,447. The total quantity exported from both provinces is computed at 155,027 tons, of a cash value of $2,815,335.

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Latest advices state that phosphates are reported a little higher for the low grades, the French and Carolina phosphates having advanced a halfpenny.

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Mr. Adolphe Lomer, of Messrs. Lomer, Rohr & Co., Montreal, has returned from his visit to England.

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We are informed that Captain Henwood, superintendent of the Emerald mine, has tried raw phosphate on his garden with most satisfactory results. He has been in the habit of taking small quantities of finely ground ore from the borings at the mines and applying it as a manure to the soil. The wonderful growth of his flowers and vegetables attest to the success of his experiment.

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Complaint reaches us of the manner by which Canadian ore is handled when it reaches the other side. It is said that frequently the tests are made by interested parties, who grade the ores down below their true quality, and thus force shippers to take any price they may choose to offer. The true way to remedy this state of affairs, or rather to avaid it, is to cultivate a market on this side of the Atlantic both for the trade and the chemically treated product.

### Du Lievre.

The Union mines have been sold to the Canadian Phosphate Company (Limited), which has been organized in London with a capital of 110,000 shares at £1 each, and is formed to acquire, work, and, by the introduction of additional capital, further develop the property of the Union Phosphate and Land Company, of New York, now in operation, and, it is stated, producing considerable profit. The property consists of the Star Hill, Williams and Ruby mines, 1286 acres in extent, all freehold, situated in the Township of Portland, Ottawa County, Quebec. The Star Hill and Williams mines include three distinct deposits. One of these is at present unexplored, but the other two have a length of 3355 yards, and an average breadth of not less than 100 yds., measured by the outcrops. The running so far has been conducted on a small scale, amounting to about 5000 tons annually. The cost of mining, dressing, and shipping ore, including freight to the United Kingdom, commission on sales, and all expenses in Canada, is put at £2 5s. per ton. Thus, at the lowest price ever touched, there is a profit of £1 14s. per ton, and at present prices over £2 on the first quality and £1 2s. on the second. These figures are verified by the engineer's report. The purchase money has been fixed at £90,000, the whole of which the vendors were prepared to receive in shares, but in order to comply with the rules of the London Stock Exchange, to which application will be made for an official quotation and settlement, £36,666 will be taken in full-paid shares and the balance in cash. The mines have been reported upon by Messrs. Bainbridge, Seymour & Rathbone, of London. The new company entered into possession on 1st January, and its representatives will meet in Buckingham

shortly. Among the principals are Mr. Couper, of Messrs. Couper, McCarnie & Co., London, and Mr. W. H. Williams, of New York.

The show recently discovered about quarter of a mile from the deep shaft of the Little Rapids mine, and on the same property, is yielding highly satisfactory results.

Templeton District.

At a meeting of shareholders held in Montreal recently, the Templeton and Blanche River Company decided to put in steam working plant and machinery on their property at an early date.

Wakefield.

Mr. W. H. Fuller has suspended operations until spring opens, when work will be resumed on his property, lots 17 and 18, in the 2nd Range.

Perth District.

Captain R. C. Adams, Managing Director of the Anglo Canadian Phosphate Company, sailed for England early in the month to attend the annual meeting of the shareholders.

Kingston District.

Under the careful superintendence of Mr. Joseph Harris some 55 men are presently working on Captain Boyd Smith's Blessington mines. Four shafts, averaging from 70 to 100 feet, have been sunk since November and a large quantity of No. 1 ore has been mined. The prospects for next season are reported to be most encouraging.

## MINING NOTES.

### Nova Scotia.

At the Coal Mines of Pictou County business continues good for this season of the year. The absence of snow enables the railways to handle their traffic and keep a fairly good supply of cars at the various collieries.

The Intercolonial Company keep their full complement of men working at their Drummond Mine, a fact which speaks well for their trade, as it has been found necessary for several winters past to reduce the number of workmen.

During the past month, the output from the Acadia has fallen off somewhat, not, however, through any scarcity of orders, but owing to the present lift being worked out faster than the new lift can be opened up. At the Albion Mines (also the property of the Acadia Co., Limited), slow but steady and sure progress is being made in the draining of the Foord Pit. The company purpose putting into their new slope a hydraulic pump, worked by an engine and transmitter on the surface.

At the Vale Colliery, the Acadia Co. has had the water pumped out of the 6th seam which has been closed for some time, and a few men are now at work. It is expected to be in full operation at an early date.

A discovery of coal is reported from Antigonish County, but particulars are not yet public.



The Joggins Coal Co. in Cumberland County, has orders booked for 25,000 tons of coal. There is a demand for experienced miners at this mine.

At the Gowrie Mines, Cape Breton County, boring operations have been going on, and at a short depth below their present workings an excellent seam of coal has been found.

The Lingan Mining Co. intend to re-open their Lingan and Barrasois Mines next year, and will build a railway to connect these mines with their Victoria Mine, where a new slope is to be sunk and the output increased twenty-five per cent. This will bring their output up to some 80,000 tons.

Mr. Joseph Hudson, son of Mr. Hudson, formerly General Manager of the Albion Mines, has been appointed Manager at Victoria.

Work at the various collieries has been very brisk during the past year, and the output notably at Springhill, Sydney Mines, Gowrie, Caledonia and Victoria has been larger than in former years. The total shipments are estimated to be over a million and a half tons, the total increase being over 150,000 tons. The workmen generally have had more regular employment, but it is much to be regretted that owing to keen competition there has been little, if any, improvement in prices. There has been no advance in wages although, owing to steadier employment, better average pay has been earned.

The *Colonial Standard* (Pictou) says: The output of Coal during 1887 has been the largest in the history of Nova Scotia, while the prices obtained have been higher than in any year since 1873.

At Springhill the output of coal has been nearly half a million tons, which it is contemplated to largely increase during the coming year. A new Slope, and also, it is said, a new shaft is to be sunk. The complaint of the miners here is that the pits are overcrowded with men. Everything has gone on fairly and smoothly between management and men during the year.

This company has purchased a large tract of Coal land at Cow Bay, Cape Breton. Operations are in progress to sink a shaft to a depth of some 350 feet, where it will tap the coal at a point in the centre of the basin where levels and cross-cuts will be entered.

At the Joggins Mines the shipments for 1887 reached 14,000 tons. This year, owing to the mine having connection with I.C.R., the output will be largely increased. A new company has lately taken hold who intend to push business. There are orders already in to keep the mine running for five months. More miners are wanted.

The Chignecto Colliery announce a fair increase in output over 1886.

Owing to the strike at the mines of the Halifax Company, work at the Drummond Colliery was brisker than usual during the first four months of the year. The management contemplate considerable extensions during this year. A number of miners are presently idle as they refuse work in places at wages offered.

The total output from the mines operated by the Acadia Coal Co. (Limited) shows a considerable falling off from former years owing to the long strike. Notwithstanding this, however, there has been a decrease of some 6,000 tons at Acadia, while the Albion actually shows an increase of 7,000. The increase from Vale, however, reaches 37,000 tons.

The shipments from Caledonia Mines include 73,000 tons round, and 29,000 tons slack. A fine increase of 29,000 tons over '86.

From the Gowrie the shipments were very large, next in quantity to the Sydney Mines. Of round there were shipped 95,000 and of slack 23,000 tons. It is a coincidence that the increase at this mine is exactly the same as at Caledonia, viz., 29,000.

Sydney Mines still take front rank with a total of 147,000—of which 9,000 tons only were slack—an increase over '86 of 27,000 tons. Victoria Mines, also, show a handsome increase, the totals being 65,000 against 46,750 for '86, an increase of 19,000 tons.

The largest increase over '86 is shown in the shipments from Little Glace Bay. In '86 they only amounted to 28,000, whereas last year they footed up 76,000, a handsome increase of 47,000 odd tons.

The *Trades Journal*, Stellarton, gives the following comparative statement of output for the years 1886-87:

| | '86 | '87 | In. |
|---|---|---|---|
| Spring Hill | 389,476 | 442,000 | 53,000 |
| Chignecto | 7,527 | 12,742 | 5,215 |
| Joggins | 18,797 | 14,000 | d. 4,797 |
| Other Colleries | | 500 | |
| **Pictou Co.** | | | |
| Drummond | 121,779 | 143,530 | 21,751 |
| Acadia | 92,532 | 86,270 | d. 6,262 |
| Halifax | 60,501 | 67,230 | 7,029 |
| Vale | 95,136 | 38,520 | d. 56,616 |
| Muir's Mine | est | 2,500 | |
| **Cape Breton Co.** | | | |
| Bridgeport | 12,000 est. | 12,000 | |
| Block House | 3,000 est. | 5,000 | 2,000 |
| Caledonia | 73,000 | 102,000 | 29,000 |
| Gowrie | 89,000 | 118,000 | 29,000 |
| Glace Bay | 29,000 | 76,000 | 47,000 |
| Intercolonial | 105,000 | 103,000 | d. 2,000 |
| Ontario | 8,000 est. | 8,000 | |
| Reserve | 83,500 | 81,500 | d. 2,000 |
| S. Mines | 120,000 | 147,000 | 27,000 |
| Victoria | 46,750 | 65,000 | 18,250 |
| **Totals, by counties (round numbers.)** | | | |
| Cumberland | 416,000 | 469,000 | 53,000 |
| Pictou | 369,000 | 338,000 | d. 31,000 |
| Cape Breton | 588,000 | 717,000 | 129,000 |

Grand total for 1886: 1,373,000.
" " 1887: 1,524,000.

At the Albion Mines 9,000 tons of Coke were made and sold during the year.

The *Critic* is unofficially informed that the Lake Lode Gold Company, of which Mr. Sawyer, of Boston, is managing director, and Hon. L. L. Wadsworth, manager, has during the past year, realized net profits sufficient to pay for the mine. During this time, the mine has been thoroughly opened up and placed in a position to yield large profits during the coming year. The wise management have resisted the temptation to invest in expensive machinery, and the five stamp mill which was on the property when they purchased, has continued to do all their work. The Lake Lode Mine is only a fair sample of the value of our gold mines when they are properly worked.

The following are the official returns so far received at the Mines Office for the month of December, 1887:—

| Mine. | District. | Tons Crushed. | Ounces Gold. |
|---|---|---|---|
| Empress | Renfrew | 236 | 104½ |
| Oxford | Lake Catcha | 69½ | 112 |
| Moose River Co. | Moose River | 301 | 224 |
| Dufferin Mining Co. | Dars Hill | 922 | 417 |

The last return from the Dufferin Mine gives 417 ounces from 922 tons crushed. This we believe says the *Critic* places it in the lead of gold producers for the year, although the Oxford must be close on its heels.

Since these notes were written the Albion collieries have again been wrecked by explosives and are on fire. These mines are the scene of the great explosion of 1880, when forty-five lives were lost. This time, fortunately, no lives were lost, but four men were badly injured, and fifteen men working in the Halifax pit when the fire was discovered had a hair breadth escape. The fire was discovered in the Halifax pit at 10 o'clock Saturday night, the 10th instant. Hardly had the men reached the surface when the mine exploded. Two explosions occured on Sunday, the second one at 1.30 of tremendous force, wrecking the engine house, destroying the fan, burning all the hoisting gear and destroying all other buildings in connection with the mine. This explosion was so great as to be felt like an earthquake shock in the surrounding country for twelve miles distant. The mine is still on fire. It is supposed to have been communicated from the Cage pit, which has been on fire since the great disaster eight years ago.

## Quebec.

Messrs. Hodgins & Ostrum have made some excavations on the Creighton Iron lode on lot No. 2, Concession 7, Township of Clarendon.

Since our last issue Dr. Reed has taken out of his Antimony Mine, at South Ham, twenty tons of ore, said to average over 40 per cent., from a portion of the vein or measure five feet wide and eighteen feet long. The cost of taking the ore to Garthby Station, Quebec Central Railway, is $2 per ton; freight, commission and insurance to Liverpool $4 per ton; making a total cost of $15.50 per ton, as follows:

| | |
|---|---|
| Mining | $7.50 |
| Cartage, freight, etc | 8.50 |
| Total | $15.50 |

The management state that the ore is worth £8.00 in England—giving a profit of $24.00 on each ton to the mines.

We are indebted to Mr. Coste's report for the following comparative statement of Asbestos shipped up to 1886. These returns were obtained from the mines of the Eastern Townships:—

| Years. | Tons. | Value. |
|---|---|---|
| 1879 | 300 | $ 19,500 |
| 1880 | 380 | 24,700 |
| 1881 | 540 | 35,100 |
| 1882 | 810 | 52,650 |
| 1883 | 955 | 68,750 |
| 1884 | 1,141 | 75,097 |
| 1885 | 2,440½ | 142,441 |
| 1886 | 3,458¼ | 206,251 |
| Total | 10,024½ | $624,489 |

Mr. Francis D. Taylor, M.E., Lennoxville, who has lately been engaged as one of the principals in the celebrated Tortilita case, leaves shortly on a business trip to Mexico.

The recent heavy snowfall has impeded traffic on many of the roads to the various mining camps, and, on this account, most of our provincial correspondence has been delayed until too late for publication this month.

Work is going on briskly at the Villeneuve Mica Mine, and the output of first-class mica continues good.

## Ontario.

Latest advices from the Bristol district state that the iron mines are now fully equipped with the best machinery, and that the workings continue to prove the ore deposits to be immense and of great value. The miners are now drifting through solid ore over sixty feet wide. The two Calcining furnaces are turning out about one hundred tons of ore per day, and when desirable the quantity can be increased by four times this amount. About 10,000 or 12,000 tons of Calcined ores are expected to be hauled to Wyman's Station during the next two months. A road has been opened from the mines to the railway for this purpose, but nothing short of a railway or a tram line will adequately handle the immense quantity of ore that is being developed. The Bristol Iron Mining Company expect that either the P. P. J. Ry. or the C. P. R. will run in a spur track, and it is understood that either of these companies are favourably disposed to tap the mines in this way as soon as arrangements can be made. As hauling must necessarily be limited to the winter months, it is to be hoped that one or the other of these lines will give their attention to the matter before spring opens. The Bristol Iron Mining Company have effected many improvements in the locality; large numbers of men and teams are finding employment, and business generally has been much enlivened since the commencement of their operations in the district.



A discovery of Magnetic Iron Ore recently made on Lot 28, 4th Concession of Bedford Township, Frontenac County, promises to rival others in the well known Iron Mining District of the Kingston and Pembroke Railwaw. It is owned by Messrs. D. G. MacMartin and W. Davies of Perth who, preliminary to move extensive work in the spring, have contracted with a party of miners to take out one thousand tons this winter at one dollar per ton. They have had offers for the purchase of the ore from several parties in the United States who have received samples. A surface piece tested by Prof. Hoffman, of the Geological Survey Office, gave 62·98 metallic iron. The outcrop is very strong, and with the help of a dip-needle shows a width of from 30 to 150 feet which can be traced for about a quarter of a mile.

Messrs. Tough & Stobie, original discoverers of the Sudbury Gold properties, have formed a joint stock company with a capital of $240,000 in which a number of prominent American capitalists are largely interested.

On lot 6, concession 9, North Burgess, a mica mine of much promise is being developed by Mr. D. G. MacMartin with very encouraging results. A shaft has been sunk 50 feet showing crystals of good size and quality all through the rock. At the south-west end 8 feet from bottom a drift has been driven in. The entire drift is a mass of mica, showing crystals of large size and of excellent quality. Mr. W. A. Allan, of Ottawa, is part proprietor with Mr. MacMartin.

A new discovery of gold is reported at the Richardson Mine, Township of Madoc.

### Port Arthur District.

Since the date of our last issue the Rabbit Mountain Mine has been closed down just when everything had got into good working order with large improved machinery, and when a new mining captain of experience had taken it up enthusiastically.

The reasons assigned are an impending law suit instituted by one of the original owners and the necessity for better financial arrangements. This trying to make a mine pay as it goes along from the daily yield is a paltry way to operate an extensive mine.

Captain Hanson goes to the Transvaal gold fields with Mr. Furlonge—a strong team.

The Beaver Mine continues the even tenor of its way—ore coming out as fast as it can be economically handled.

The late manager entertained about forty of his friends from Port Arthur lately at the new hotel—the party driving out in sleighs, staying over night and returning the next day. In spite of the extraordinary deep snow and prevalent cold a most enjoyable time was spent.

Professor Eschweiler is making very good work at his pet "Badger" mine, a short distance south-west of the famous Beaver Mine. The Professor evidently knows what he is about, and has everything in good shape. Teams are engaged in hauling logs and preparing the site for his mill. The ore, we are told, looks very good indeed.

At Silver Mountain work is progressing with the full force of seventy-five men. In addition to the tunneling westward, both No. 3 Shaft and the winze in No. 1 Drift are going steadily down. The vein in No. 3 Shaft is seven feet wide, and the work in the winze shows a very good looking vein, three and a half feet in width, carrying silver combined with the usual blende and galena.

Crown Point Mine is progressing slowly but carefully under the supervision of Capt. Montgomery, who is hopeful as ever of making this mine take the lead. About fifteen feet more will bring him under the winze in the upper pit. Want of capital is the great drawback in working this promising property.

Besides the railroad commenced and constructed some ten miles from Port Arthur to the mining region another competitor, attracted by the outlook, has come to the front. It is called the "Ontario, Manitoba & Western Railway." It is projected to run through the mining region south of the C.P.R. and make direct for Winnipeg, crossing Lake of the Woods at the Narrows. The promoters expect to reduce the present travelled distance by about thirty miles and gain considerable on better grade. The Provinces of Ontario and Manitoba are expected to bonus this enterprise.

Mr. Peter D. McKeller, of Fort William, gave us a call during the month. He states that nothing will be done on the immense deposit of Magnetic Iron Ore owned by himself, his brother and Messrs. Graham, Hall & Co. for some little time yet. It is likely that a spur track, connecting the mines with the C.P.R. at English River, will be constructed, and Mr. McKellar entertains hopes that a better tariff will yet be obtained from the United States for the export of iron ores to that country. The property is some 240 acres in extent and is located adjacent to the Seine River.

## Manitoba and North-West Territories.

Messrs. Sache and Walliss have begun mining coal on the claim of the former, near Edmonton. The seam is reported to be fully three feet thick and the coal hard and bright, approaching more closely to Anthracite than any other coal yet mined in the neighbourhood.

## British Columbia.

The gold shipments for 1887 show a decrease from 1886 of $174,118.81,

| | |
|---|---|
| Bank of British Columbia | $ 320,794 32 |
| Bank of British North America | 58,774 00 |
| Garesche, Green & Co | 19,356 19 |
| Total for 1887 | $578,924 52 |
| do do | 753,043 33 |
| Decrease | $174,118 81 |

The placer mines of Williams, Lightning Grouse, Antler, Mosquito, Keithley, Horsefly, and the numerous other gold bearing creeks of Cariboo, not forgetting the Quesnelle and Fraser rivers, are still being worked, principally by means of hyrdaulic plant, and in some instances good pay is secured. Last season was peculiarly dry, and only a few weeks washing was had by most of the claims, and as a result the returns have been poor.

The following are the returns of gold yield in the Cariboo District for 1887:—

| | |
|---|---|
| Barkerville 1st Jan. to 15th Nov | $ 79,373 |
| Lightning Creek, " " | 30,700 |
| Quesnellemouth, " " | 61,000 |
| Keithley Creek, " " | 66,600 |
| Desultory mining, " " | 10,000 |
| Mining from Nov. 15th to 31st Dec | 10,000 |
| Total | $247,673 |
| Yield of 1886 | 286,300 |
| Decrease | $ 30,627 |

At the Corbin and Kennedy claims in the Selkirks, several tunnels have been run in, extending from ten to fifty feet, and there are now about 300 tons of ore on the various dumps. Developments have proved permanent veins, some from two to four feet in width; others from six to nine feet. Numerous assays have been made giving averages between $80 and $100 per ton.

In the Stump Lake district a shaft 100 feet deep has been sunk on the Star. Assays give from $29 to $150 per ton.

In the same district the Nicola Mining company, of London, England, are estimated to have taken out from $20,000 to $30,000 of ore. On their property there is a 250 foot tunnel and over 300 feet of shafts.

In the Kootenay district the Otter Tail Gold and Silver Mining Company were fully prepared to commence work this season, they having erected a quartz mill, saw mill, and intend to erect a smelter, having made roads and tramways to their mines, and had likewise a quantity of ore on hand. Unfortunately, both for the company and the district, their property was destroyed by fire in June last—totally annihilating about $60,000. The timber limits the company had secured are burnt up. This company owns four or five claims, and in some of their leads there is known to exist a large quantity of ore (silver) assaying from 30 to 55 oz. to the ton, close to the railway, and other parties own five or six claims adjacent thereto, one of them assaying 40 oz. to the ton. The leads vary in thickness from one to six feet, fully justifying the erection of a smelter in that locality.

In Upper Kootenay the season for those working in the placer or creek mines was pretty fair. On the old camping ground, Wild Horse Creek, Chinamen and others made a fair summer's work work hydraulicing, etc.

The total output of gold from the Cassiar district for 1887 is $55,305; last year it was $63,610—a considerable decrease. The miners are hopeful of striking better ground soon and Cassiar may again become a notable gold district.

During the year 198 placer claims and 26 mineral claims were recorded in the Lillooet section by the mining recorder, 22 of the latter being on Cayoosh Creek, three at Anderson Lake and one at Pemberton Portage. Five mineral claims were also located on Big Bar Creek.

The gold output is secured from the following sources:—

| | |
|---|---|
| A. W. Smith, Lillooet | $ 65,605 |
| F. W. Foster, Clinton | 20,432 |
| E. Bell, Clinton | 5,000 |
| Other reliable sources | 8,894 |
| Total | $100,022 |
| Yield of 1880 | 132,000 |
| Decrease | $31,978 |

The apparent decrease is probably accounted for in the fact that Cayoosh Creek, the principal source of supply, is chiefly in the hands of Chinese, from whom no reliable returns can be learned. If the output could be learned it would probably foot to an amount greater than last year.

In North Kootenay the most important work of the past season has been that accomplished in the Illecillewaet mines, where about 250 men were altogether engaged in mining and prospecting. In the Big Bend about thirty men were engaged in placer mining in Carne's Creek, McCulloch Creek, French Creek and Smith's Creek. On the first-named creek no gold was secured on account of high water during the entire season. The Ophir Co.'s hydraulic claim on McCulloch Creek has been well opened out and good prospects of handsome returns were taken from the gravel. It will be spring time before it is possible to make a clean-up. On French Creek there are four companies at work running tunnels into the hill. The Victoria Co. are making good wages—from $7 to $10 to the man. The French Creek Tunnel Co., have recently got into good pay in their creek claim, they having sunk and drifted under the stream. The May Mining Co. and the "Three Dollar Co." are engaged in sinking. Smith's Creek is a newly discovered ground, the stream emptying into the Columbia from the west side. About half a dozen men have been working there during the summer, taking out small wages. Nothing has been accomplished in the way of developing the quartz ledges in the Big Bend.

The coal output for 1887 is considerably in excess of any previous year, being 410,573 tons. The nearest approach was in 1884, when 394,070 tons were mined. The output for 1887 would have been much greater but for the melancholy disaster at the Vancouver Colliery. The chief market for the coal is San Francisco, to which point 335,854 tons were shipped.

The output from the Wellington Mines (R. Dunsmuir & Sons) for the year ending 31st December last was 242,723 tons, with a total value at $4 per ton at mines mouth of $966,892. 715 men were employed.

The output from the Vancouver Company's Mines has been 137,850 tons, of which 114,800 tons were shipped to San Francisco and other points while 20,050 was consumed locally. The unfortunate accident in May reduced the output from 16,039 tons in April to 4,351 in May.

It is thought that the total yield of coal from the East Wellington Mines has been in the vicinity of 30,000 tons.

The total from the province may be placed thus:—

| | Tons. |
|---|---|
| R. Dunsmuir & Sons | 242,723 |
| Vancouver Coal Company | 137,850 |
| East Wellington (probable | 30,000 |
| Total | 410,573 |





* Transactions of the North of England Institute of Mining Engineers, vols. xxxvi., pp. 99-102.

† Annuaire de l'Association des Ingénieurs Sortis de l'Ecole de Liége, vol. vi. pp. 15-26: Minutes of the Proceedings of the Institution of Civil Engineers, vol. xc p. 537.

* Paper read before American Institute, Mining Engineers.

‖ Figs. 1 to 6, inclusive, are from the catalogue of the Dickson Manufacturing Co Scranton, Pa.

¶ See tables on page 13.

# Mining Regulations

## TO GOVERN THE DISPOSAL OF

# Mineral Lands other than Coal Lands, 1886.

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

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

### QUARTZ MINING.

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

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

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

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

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

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

### IRON.

The Minister of the Interior may grant a location for the mining of iron, not exceeding 160 acres in area which shall be bounded by north and south and east and west lines astronomically, and its breadth shall equal it length. Provided that should any person making an application purporting to be for the purpose of mining iron thus obtain, whether in good faith or fradulently, possession of a valuable mineral deposit other than iron, his right in such deposit shall be restricted to the area prescribed by the Regulations for other minerals, and the rest of the location shall revert to the Crown for such disposition as the Minister may direct.

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

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

### PLACER MINING.

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

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

The Regulations apply also to

### BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

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

### THE SCHEDULE OF MINING REGULATIONS

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

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

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

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