Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- [x] Coloured covers/ Couverture de couleur
- [ ] Covers damaged/ Couverture endommagée
- [ ] Covers restored and/or laminated/ Couverture restaurée et/ou pelliculée
- [ ] Cover title missing/ Le titre de couverture manque
- [ ] Coloured maps/ Cartes géographiques en couleur
- [ ] Coloured ink (i.e. other than blue or black)/ Encre de couleur (i.e. autre que bleue ou noire)
- [ ] Coloured plates and/or illustrations/ Planches et/ou illustrations en couleur
- [ ] Bound with other material/ Relié avec d'autres documents
- [ ] Tight binding may cause shadows or distortion along interior margin/ La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure
- [ ] Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/ Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- [ ] Additional comments:/ Commentaires supplémentaires:

- [ ] Coloured pages/ Pages de couleur
- [ ] Pages damaged/ Pages endommagées
- [ ] Pages restored and/or laminated/ Pages restaurées et/ou pelliculées
- [x] Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- [ ] Pages detached/ Pages détachées
- [x] Showthrough/ Transparence
- [ ] Quality of print varies/ Qualité inégale de l'impression
- [x] Continuous pagination/ Pagination continue
- [ ] Includes index(es)/ Comprend un (des) index

  Title on header taken from:/ Le titre de l'en-tête provient:
- [ ] Title page of issue/ Page de titre de la livraison
- [ ] Caption of issue/ Titre de départ de la livraison
- [ ] Masthead/ Générique (périodiques) de la livraison

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
										✓	

Canadian Mining Review

Established 1882

Vol. VI.—No. 6. 1888.—OTTAWA, JUNE—1838. Vol. VI.—No. 6.

Superstitious Regard of Asbestos.

Mr. R. H. Jones, of London, England, who has just published an interesting little brochure on "Asbestos: Its production and use; with some description of the Asbestos mines of Canada," is responsible for the following story: A labouring man, who had left the old country to seek a better fortune in the Dominion, found employment at once on arrival in one of the many lumber yards on the St. Lawrence, where his energy and activity, supplemented by great bodily strength, soon secured him a good position. It so happened, however, that one evening, on returning from their daily toil to their common apartment, some of his fellow-workmen saw him deliberately throw himself into a seat, kick off his boots, and then pull off his socks, and having opened the door of the stove, coolly fling them in on to the mass of burning wood. Possibly no particular notice would have been taken of this, judged as a mere act of folly and waste on the part of the new-comer; but when, almost immediately afterwards, they saw him open the stove door again,

take out the apparently blazing socks, and, after giving them a shake, proceed just as deliberately to draw them on to his feet again, that was a trifle too much! Human nature could not stand that. Consequently the horrified spectators, having for a moment looked on aghast, fled precipitately from the room. To them the facts were clear enough. This, they said, was no human being like themselves; such hellish practices could have but one origin. If not the devil himself, this man certainly could be no other than one of his emissaries. So off they went in a body to the manager and demanded his instant dismissal, loudly asseverating that they would no longer eat, drink, or work in company with such a monster. Enquiry being at once set on foot, it turned out that sometime before leaving England the man had worked at an asbestos factory, where he had learned to appreciate the valuable properties of this mineral; and being of an ingenious turn of mind, he had managed to procure some of the fibrised material and therewith knit himself a pair of socks, which he was accustomed to cleanse in the manner described. He was, as has been said, an unusually good workman, consequently his employers had no wish to part with him. Explanation and expostulation, however, were all in vain: nothing could remove the horrible impression that his conduct had made upon the minds of his superstitious fellow workmen: go he must and did, nor could the tumult be in any way allayed until he had been dismissed from his work and had left the yard."

Great Britain's Mineral Production.—As a raiser of minerals, Great Britain still maintains the proud position of being in front of the United States or any other nation. The quantity of iron ore raised in the States last year is estimated at eleven million three hundred thousand tons, against ten million tons in the previous year. It is interesting to observe that in Great Britain the quantity of ore mined in 1886 was fourteen million one hundred and ten thousand tons: the exact figures for 1887 are not available. Turning now to coal, the facts of the case show yet more in England's favour. The coal raised last year in America is returned as thirty-four million six hundred and forty-one thousand tons from the anthracite seams, and eighty-five million five hundred thousand tons from the bituminous seams, making an aggregate production of one hundred and twenty million one hundred and forty seven thousand tons. The returns of the inspectors of mines for Great Britain give a gross tonnage of one hundred and sixty-two million one hundred and twenty thousand tons. The position which America has attained as an iron and steel and mineral producer should not be cause wholly for envy, but rather of admiration—for is not America the child of the mother country?

The Canadian Mining Review

CONDUCTED BY - - - - H. T. A. BELL.

OFFICE:

UNION CHAMBERS, 14 Metcalfe St.

OTTAWA.

Vol. VI. JUNE, 1888. No. 6.

Subscribers in arrear with their subscriptions will oblige with an early settlement. All unpaid accounts of this nature will be placed in the hands of our Solicitors for collection.

Minerals and Geology of Ontario and Quebec.

Chapman's Minerals and Geology of Ontario and Quebec, a copy of which is before us, is the most valuable manual of its kind which has made its appearance in Canada to the geologist and student, and is evidence of the deep interest taken by its writer in that branch of study—a study which, from the attention now being given to our mineral resources, promises to become the most valuable from every point of view, whether of the capitalist or the man of scientific pursuits. A similar work on a small scale preceded the present publication, but the exigencies of the times demanded and have called forth this new work in which the subject matter of the previous edition has been greatly extended. The properties by which minerals are determined are clearly stated, with descriptions of the same, and so plainly is this effected that the name of any ordinary mineral met with in Ontario and Quebec can be easily ascertained. The geological features of the two provinces are accurately described, and palæontology is so well placed before the reader with the means of studying it, that fossils need no longer be the sealed book they hitherto have been with the collector and the student. The whole is embellished with cuts and plates, which materially help those using this handbook to determine for themselves various specimens of a doubtful nature. A complete index, which acts as a table of reference is found at the end of the book, and besides being of great use as a table of contents, it forms also a list of the mineral products of the provinces which it embraces. To the prospector and the mining engineer the work must prove of great value; and in the Port Arthur district, amongst the Buckingham phosphate miners, and wherever iron deposits are being worked, we predict its usefulness will create a ready sale and active demand for it. In part III, the section devoted to mineral veins, is especially worthy of notice, and the various theories as to their origin, formation and existence are carefully written, and throw much light on a long vexed question. In part V, the section devoted to the Lower Ottawa district is of great interest to us locally, and the fossil fish and other organic remains found in the vicinity of Green's Creek, and in the boulder clay of the surrounding country are treated of. Geology as a study is more deeply followed by the present generation, than by their forefathers, to whom the surface soil was of greater value for their farming purposes than the underlying strata, whose hidden treasures were unknown to them. But with the progress of the country, education has progressed also, and the desire is now manifest on all sides to gain an insight into these natural resources of wealth which nature has so long ago stored up beneath our feet, waiting only the prying eye of science to explore. Professor Chapman's book will materially aid this search, and a careful perusal of its pages will save much unnecessary labour in prospecting where the signs he gives are wanting; whilst the knowledge given by indications pointed out by him will lead with a little care and discretion to the finding of mineral veins in places probably unlooked for or passed by from want of that knowledge. The value of this book to the public at large is far superior to the ordinary reports published by the Geological Survey, for while the latter deal with areas and sections of country from a scientific point of view, they convey no recommendations as to the probable results, or to richness and extent of mineral deposits. This volume in fact contains the pith of those reports, embellished with the writer's own ideas and deductions, and is in so concise and readable a form that its very size contributes to add to its usefulness. We consider it a handbook which should be in every library, and which no one interested in mining matters should be without. The publication is well got up, and although some of the cuts, particularly the fossils, are a little indistinct, the type, paper and binding are all good and would compare favourably with any English production. The publishers are Copp, Clark & Co., Toronto.

Natural Combustible Gas.

The Report of the Commissioner of Crown Lands of the Province of Quebec for 1887, just received, states that the gold mining license fees last year amounted to $28, while the expenses incurred in their collection, and for the maintenance of police in connection therewith, reached the sum of $2,416.80. The yield of gold is not stated.

The Report contains, in addition to the ordinary appendices on its transactions, a very interesting and exhaustive report by Mr. J. Obalski, Government Mining Engineer, on natural combustible gas, and the gas resources of the Province of Quebec, a subject which at the present moment is engaging general attention and which is worthy of more than a mere passing notice.

Mr. Obalski gives it as his opinion that the discovery of gas in a district would immediately raise the value of property considerably, while new industries would spring up there, especially should facilities be afforded them in the shape of cheap land and cheap gas. Opinions, he says, vary as to the origin of natural gas. Some admit that it is produced by the decom-

position of animal or vegetable organic remains accumulated since the earliest geological period. Others, whom he styles the practical class, hold that it is formed continuously by chemical reaction in the earth where hydrocarburets are formed which pass off into the higher parts when they find outlets and porous rock to absorb them. The companies, however, operating in natural gas maintain the first theory, and foresee exhaustion in time; to remedy which, it is proposed to manufacture artificial combustible gases at a very low cost.

Amongst the conditions under which workable accumulations of gas are likely to exist are the presence of organic remains in the rock, strataporus enough to store oil or gas, impermeable above and below, and with wrinkled or elevated parts where gas may collect. The principles are also laid down that as gas and oil have a common origin, they must be found in the same regions in variable proportions. In Ohio the gas is found in the Trenton limestone, composed of fossil shellfish, and Mr. Obalski remarks, by the way, that it is this formation in which the Province of Quebec is interested. The reason why the strata must be wrinkled is that if they were perfectly even the gas would be spread over a considerable surface, and no great repositories could exist. This is called an *anticlinal*, and in the Pittsburgh region of Pennsylvania all the rich gas wells are found on anticlinals, whilst outside of them the wells are poor. The gas is stored in its repositories under considerable pressure, and it is owing to this that it can be conveyed in pipes to long distances, the decrease in pressure being estimated about four lbs. to the mile. The mean pressure ranges from 375 to 500 lbs. and upwards at the repositories. Gas borings are similar to those made for oil, and to exclude water, an absolute necessity, special tubing and contrivances are employed. Judging from an estimate of similar work in the States, boring 2,000 feet through such rock as it is expected would produce gas in the Province of Quebec, with tools and tubing, would cost $3,000. Boring, he says, is the best test in exploring, with judgment and regard to natural conditions. In boring in Ohio for gas, petroleum was struck: and on this point Mr. Obalski says: "In our Province we find ourselves placed in identical circumstances, and *it is a matter of no doubt* to me that we shall also find petroleum." After mentioning various points in the valley of the St. Lawrence where natural gas has been discovered, one boring at St. Gregoire being 1,115 feet, and another at Maissonneuve 1,500, he points out the fact that the Trenton limestone along the valley of the St. Lawrence, overlaid by the Utica, Hudson River and Medina schists, covered again by a layer of alluvium from 50 to 80 feet thick is favourable, wherever the limestone is covered and does not crop out on the surface, for the production of gas; and he adds that he is "thoroughly convinced, and his special study of the subject justifies him in expressing the belief, that rich gas and petroleum districts exist in the region indicated by him." He believes that driving borings down to the Trenton limestone will give the best practical results, rather than working at random. Mr. Obalski states that when natural gas was discovered in the valley of the St. Lawrence the attention of the Geological Commission was called thereto, but it attached no importance to the fact. Now the whole utility of the Geological Survey ought to consist in aiding to develop any important discovery, and its report thereon would be of great importance to parties interested. This subject we commend to the notice of the Director of the Geological Survey. We further hope this short review of Mr. Obalski's report will draw out some remarks from our local geologists, and that their opinions may be given as to the probability of borings in this immediate vicinity yielding results that could be utilized here for manufacturing or illuminating purposes. We shall be happy to publish any such communications as being of great importance, not only to this vicinity, but to the community at large.

Government Assayists.

We are authorised by the Department of Interior to contradict the rumor that the Dominion Government have under consideration any proposal to establish Government Assayists at the various mining centres. Such a step, however desirable, is not at present contemplated.

Timber and Mineral Exhibit at Glasgow.

Recognising the importance of the opportunity offered in the International Exhibition recently opened at Glasgow, the Minister of Agriculture, in conjunction with Sir Charles Tupper, has secured one of the courts opening from the main gallery of the building, and this has been set apart wholly for the display of Canadian exhibits. The importance of this step will be readily admitted when it is remembered that Scotland has, from the commencement of the development of our country, supplied a most desirable class of settlers, many of whom have been in almost every walk of life, largely instrumental in helping Canada forward to the position in which she finds herself to-day. Like other portions of Great Britain, Scotland is at present suffering from agricultural and commercial depression, and it is certain that the opportunity thus afforded of examining the samples of our products will be largely taken advantage of, with the result that much useful information will be disseminated, and an impetus given to emigration from that portion of the United Kingdom. It is worthy of note that, although Canada has taken part in exhibitions in France, Belgium and England, this is the first occasion in which she has taken part in any exhibition in Scotland, and there can be little doubt of the wisdom of this step, which will give Scotchmen an opportunity of judging for themselves of the capabilities of our country and of its great natural resources awaiting development. In an excellent mineral exhibit a sample block of Bituminous Coal is shown from Lethbridge Mines, in the district of Alberta, North-West Territory. It is taken from a seam 5 feet 2 inches in thickness, and lies in a field of great extent, which is computed to contain 5½ million tons to the square mile. A sample of the Anthracite Coal from the mines of the Canadian Anthracite Company in the National Park District of the Rocky Mountains is also shown. According to recent explorations this seam extends over a distance of 16 miles, and is found varying from a few inches to 40 feet in thickness. The metals embrace samples of iron, gold, silver, copper, lead and other ores, principally from mines in British Columbia and the eastern portion of the Dominion. A large obelisk represents the output of gold in British Columbia during the last twenty-five years, and a smaller one represents the yield in Nova Scotia during the same period.

The forest wealth of the Dominion is admirably displayed in a trophy of the woods of New Brunswick, which also serves to illustrate the growth of the Eastern Provinces generally. This trophy, which is about 30 feet in length, and 10 feet in height, has for its base 15 blocks of timber in the bark, comprising the kinds of greatest commercial value. The coniferous varieties being represented by hemlock, red and white pine, spruce and cedar; and the deciduous varieties embracing black and white birch, rock and scarlet maples, beech, black and white ash, red and grey oak, butternut, elm, basswood and poplar. The upper reaches of the trophy show polished samples of the boards and cross sections of these varieties, and an inclined frame running along the middle of the trophy is composed of samples of 30 smaller varieties of trees such as are for use in decorative work, and for other purposes. Besides this trophy, samples are shewn of the fir, maple, oak, yellow cypress, yew and arbutus, grown in British Columbia, while the dimensions of the Douglas pine of that Province are illustrated by means of a 45 inch cube of that variety, which was cut from one of the trees, which, until recently, occupied the town site of Vancouver, the terminus of the Canadian Pacific Railway.

"The Colliery Engineer."

A welcome addition to our list of exchanges this month is the *Colliery Engineer*, published monthly by the Colliery Engineer Company, at Shenandoah and Pottsville, Penna., under the joint editorship of Messrs. Thos. Jas. and Rufus J. Foster. The typographical appearance of the *Engineer* is good; its editorials are ably written; the descriptive and technical articles cover a wide field, and are contributed by thoroughly competent writers, while the selected matter is valuable and well chosen. We have to express our thanks to Mr. Rufus Foster for his courtesy in so kindly furnishing the cuts illustrating the article in this month's issue on "Untimbering of Stalls," which has been reproduced from this excellent journal.

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.

The Profits of Asbestos Mining.

THETFORD, QUE., 12th June, 1888.

The Editor

THE CANADIAN MINING REVIEW:

SIR,—Referring to my letter in last month's issue on this subject. In the prospectus of the recently formed Bell's Asbestos Company, the *net* profits of Mr. Bell's asbestos business are stated as: in 1885, £7,990 2s. 4d. stg.; in 1886, £9,133 1s. 5d.; in 1887, £15,859 5s. 7d. This alone shows the immense business done in asbestos, and as Mr. Bell is one out of a dozen, we can form some idea of the profits on the whole industry.

Yours, etc.,

"ASBESTOS."

General Geology of the Metalliferous Deposits of the Region North-West of Lake Superior.

By Andrew C. Lawson, M.A., Ph.D.

A brief statement of the broad relations which exist between the occurrence of the more valuable economic minerals and the various geological formations in the country north-west of Lake Superior may be of interest to those familiar with that region, and of practical service to those engaged in prospecting. Many of the facts are not new to students of the geology of the region, nor to old prospectors; but they are not likely to be known to new men coming into the country. They are, therefore, given here, not as any contribution to our accurate knowledge of the features of the region, but as a *resumé* of salient facts which should be recognized by men in any way engaged in exploring for minerals.

The rock formations of the provincial districts of Thunder Bay and Rainy River are first separable into I. Archæan; II. Post-Archæan (non-fossiliferous, so far as yet known).

The Archæan is easily separable, as every gold prospector in that country knows, into two main divisions, each composed of very different rocks from the other. These, though often much involved by the disturbances which have affected the crust of the earth, can be shewn by careful field study and mapping to be related to each other as upper and lower. They are, therefore, for convenience designated as Upper and Lower Archæan. The Lower Archæan is what is ordinarily known as Laurentian, and is made up almost entirely of a few kinds of granite and gneiss. These are geologically the lowest rocks known in the region.

The Upper Archæan comprises the various schists, greenstones, felsites, agglomerates, &c., which have ordinarily been known as Huronian. The studies of the writer in different parts of the region have shewn that this Upper Archæan is distinctly separable into at least two geological series of rocks; and as there are some grave doubts as to the correctness of correlating either one of these series with the Huronian of Lake Huron, local names have been applied to them which will be of service till sufficient evidence has been collected to settle the question of their proper correlation—a question which is at present exciting considerable interest among geologists, both in Canada and in the United States, owing chiefly to the valuable investigations of the late Prof. R. D. Irving, of the United States Geological Survey. To avoid for the present, therefore, this question of correlation, these two series are known as the Keewatin and the Coutchiching series. The latter is geologically the lower of the two, and is developed in great volume on Rainy Lake, Nameukan Lake and Nequaquon Lake. It is composed, so far as known, entirely of mica schists and fine grained, evenly laminated gneisses or feldspathic mica schists, with metamorphic minerals such as garnets, staurolite, &c. The series is remarkably evenly bedded, and all the evidence points to its being a series of metamorphosed sediments, no volcanic rocks being recognised in its entire thickness.

The Keewatin series is of wide distribution, and is the most interesting from an economic standpoint of the Archæan formations. It is ordinarily known to prospectors as the "green slate formation." In more precise, yet very general terms, it is composed of hornblende schists, greenstones or greenish altered traps, soft fissile green schists, more or less chloritic, quartz porphyries and the allied rocks, felsites, felsite schists and sericite schists, some clay slates, micaceous slates and mica schists, quartzites, grey-wackes and great thicknesses of greenstone and felsitic agglomerate. The Keewatin series, made up of more or less lenticular strata of these rocks, forms sharply folded troughs sunk into the Laurentian gneiss or resting upon the intervening Coutchiching schists. These troughs form on the surface belts which traverse the country in various directions. These belts have been traced more or less continuously from the Lake of the Woods to Thunder Bay, and, to anticipate, they are the gold-bearing rocks of the region. The Post-Archæan of the region includes the Animikie and the Keweenawan or Nipigon series.

Thus, beginning at the top of the geological column and going downwards, we have the following scale of formations, all of them of enormous thickness:—

Post-Archæan (non-fossiliferous)		Keweenawan or Nipigon. Animikie.
(Profound geological break or interval.)		
Archæan	Upper	Keewatin. Coutchiching.
	Lower	Laurentian.

Each of these five different assemblages of rocks is peculiar with reference to the occurrence of economic minerals. So far as experience teaches the Laurentian gneiss and granite is the most barren of all the formations of the region. Economic deposits do not, as a rule, occur in it, and this fact has become so well known that prospectors spend no time searching for gold in the "granite" country, but get back to the "green slate" or Keewatin rocks as soon as possible. There are, however, in many parts of the country veins of coarse pegmatite which traverse the Laurentian, and some of these will doubtless be found to yield white mica in sufficiently large sheets to be of value.

The rocks of the Coutchiching series are equally barren and are prospectively good, so far as the writer knows them, only for mica in the coarse granites which traverse them in certain parts.

The Keewatin rocks may be said to be rich in the various ores of the metals and in native gold, although it is only occasionally that they are sufficiently concentrated in nature to be of economic value. The more prominent metalliferous deposits are gold (native and probably also as telluride), silver with the gold, magnetite, copper pyrites, iron pyrites and mispickel, with also galena and zinc blende.

The Post-Archæan Animikie is known to the miners as the "black silver bearing slates," the most prominent and characteristic metal of this formation being silver either native or as sulphide. Other metals are associated with it, but play usually a quite subordinate rôle in the vein deposits. The silver is quite as characteristic of the Animikie as the gold is of the Keewatin. Iron is also a characteristic metal of the Animikie just as it is of the Keewatin; but while it occurs in the latter as magnetite, usually it would appear with some titanium in it, which lessens its value or renders it worthless if it be in considerable quantity, the iron of the Animikie is usually in the condition of hematite, and appears to occur in beds at the base of the series, associated with jasper and chert. Hematite, however, probably also occurs abundantly in the Keewatin rocks.

The still higher Keweenawan or Nipigon series is known as the Copper-bearing series, and is characterized by great deposits of native copper.

It is a very difficult matter to suggest an explanation yet of the fact that these different formations should be so characterized by the presence of different economic metals, and although there are considerations which enable us to understand the peculiar relationship, no attempt will be made to go into them here. But the one great fact should be noticed that all the formations which are so characterized by the occurrence of peculiar metalliferous deposits are more or less abundantly made up of volcanic rocks, and that the formation of the deposits in question is intimately associated with the presence of these.

In the Coutchiching series, where we have no evidence of volcanic rocks, but a series of schists, evidently the result of the metamorphism of a great series of sedimentary strata laid down in a time of quiescence, we have no metalliferous deposits. In all the series above the Coutchiching volcanic rocks abound and so do metalliferous deposits. How is it with the Laurentian? Here we have an immense assemblage of rocks, all the evidence concerning which points to their having solidified from a hydro-thermal fusion. They are plutonic rocks that have crystallized from a magma. How is it that we find no metalliferous deposits in them? The simplest explanation of this fact, and that which is in accord with all the other facts which have come to the writer's notice in his study of the region is this: The Coutchiching and Keewatin series being eminently stratiform and in one case made up of sedimentary rocks and in the other of alternations of sedimentary and volcanic rocks must, *a posteriori*, have had a hard floor of some sort upon which they were deposited. As the strata accumulated upon this floor, to the depth of many miles, the floor sank within a zone of such temperature that it was fused. Along with the fusion of the floor there were included portions of the Coutchiching and Keewatin rocks. This fusion gave rise to a magma upon which rested as an unfused crust the rocks now known to us as the upper Archæan. Various disturbances and movements served to emphasize the sharpness of the line between the unfused rocks and the magma. This same disturbance seems to have facilitated the shattering of the crust in places so that very many detached pieces of it near the contact were caught up in the magma

and retained there up to the time of solidification. These two processes, viz: the detachment of fragments of the crust so that they became imbedded in the magma, and the penetration of the same magma within the cracks of the crust gave to the contact of the upper and lower Archean its eminently brecciated character. The solidification of this magma gave rise to the Laurentian gneiss and granite. Those rocks of the upper Archean which are closest to the contact of the Laurentian, display the most pronounced metamorphism, while those which are farther from it are as a rule least altered.

Now by the fusion of this floor any metalliferous deposits that may have existed in it, in consequence of its being perhaps partly built up of volcanic rocks, would become disseminated through the whole magma and in any portion of it would be in too minute proportion to be detected by ordinary means. Of course if the floor upon which the Coutchiching and Keewatin rocks were deposited was the original crust of the earth then we would hardly expect metalliferous deposits to be segregated in it, and its refusion by sinking would not alter it in this regard.

The Untimbering of Stalls.

By Andre Dumont, Professor of Mining at the University of Louvain.

The support of the galleries and of the intervening stalls is often a considerable item in the cost of output per ton of coal. In Belgium the cost of timbering generally varies between 0·60 fr. (1) and 1·20 fr. per ton of coal extracted. In France the cost is from 0·30 fr. to 2 fr. In England—thanks to the condition of the strata and to the methods of working—it only costs from 0·20 fr. to 0·30 fr. In these different countries exceptional circumstances have now and then caused the price of timbering to overstep the limits which we have just indicated, and they have sometimes risen to 3 or 4 fr. or fallen to 10 centimes and under.

In short, the timbering is generally heavy in consequence of the yielding nature of the surrounding ground, principally the roof. It may be added that even in good ground the expense of timbering is of importance in proportion as the thickness of the bed increases. It would never do to proportion the length only of the props to the height of the roof; it is necessary also to give to them a section in relation to their length.

The quantity of wood which is every year buried in the workings, and which is entirely lost, is considerable. We have not the exact statistics of the wood consumed in the Belgian coal mines, but we believe that it shows an annual expenditure of about eight million francs. For a long time the question of supports has engaged the attention of coalowners, and they have made serious efforts to reduce the figure of the prime cost in the column of "timbering."

In bad ground the insufficiency of the supports has caused many accidents, and any direct economy has had to be given up. Certain owners have secured themselves against an exaggerated expense by an agreement for furnishing the necessary timber, based upon a rate per ton. This system does away with one of the cares of supervision, but it is nearly always burdensome for the owner. Before abandoning the galleries and filling them up again, it is occasionally the rule to draw out a part of the framework. But is this system of untimbering regularly carried out? Undoubtedly not. And who would think of compelling the filler-up to save, at the peril of his life, an old frame, rotten, of which perhaps not one piece would be used again? Are we to imagine him working at the mouth of a blind alley, the exhausted ceiling of which no longer holds for a considerable length, save by a state of equilibrium, which would not allow of the slightest derangement? Such a work would only be carried on easily by assuring the retreat of the miner by a supplementary support sufficiently strong to bear the weight of the earth when put in motion. And what expense then would be incurred in order to draw out an amount of timber of which three-fourths would be solid per cubic metres at the pit's mouth as broken wood.

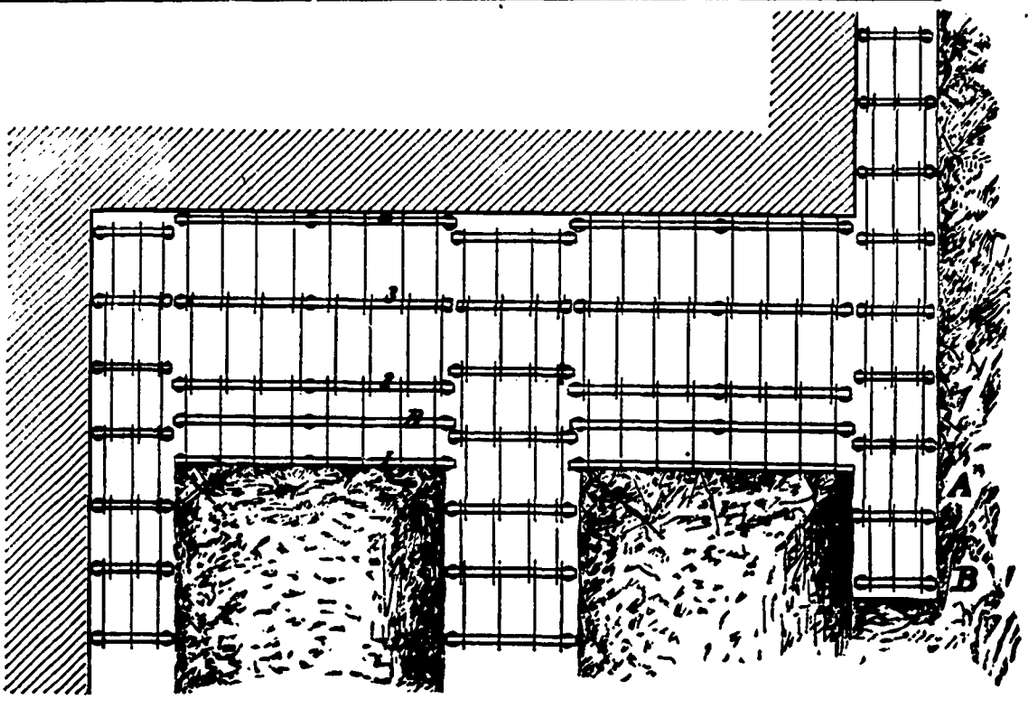

FIG. 1. SCALE $\frac{1}{100}$.

In back currents, and badly ventilated air passages, where the timber, unless it be of oak, rapidly decays, or is consumed by dry rot, we have come, as well as in heavy ground, to the exclusive use of iron for the frames and even for the casing, and there is already a great saving in the cost of repairs. But as to the stalls, no serious progress has been realized to this day. We have had the Johnson buttress, and the Anzin screw; the last named, the use of which is known, has been in some request, but its numerous disadvantages have caused it to be abandoned by its most enthusiastic admirers. It could only be used with security in light ground, free from fissures. Besides, under great pressure, and above all in beds which were somewhat inclined, the screw bent and it was sometimes difficult to draw it out again. It was not, moreover, without a liability to mislead, and as the price was rather high, this mode of support did not, in the end, produce any economy on the old system of timbering.

In certain cases they draw out as they can, it will be said, here and there, a piece of stall boarding, but what saving can that represent? Besides, except under the most minute surveillance, we believe that these arrangements are more theoretical than practical, and it is not in the filled-up stalls of Belgium that they will be followed to the letter. In the large stalls and the open spaces of English mines, a partial untimbering is done, but the object of this operation, being exceedingly dangerous as it is practiced, is not so much for the sake of economy as to facilitate the falling-in of the roof when it is slow in doing so. In France, in the working of thick beds by the horizontal system several special miners go over the front of the part filled in and contrive to draw out about 80 per cent. of the poles, when they are paid about 25 per cent. of their value. As for the props, which are about 2·30 metres (2) in height they are often abandoned.

M. Baily, divisionary engineer of the Compagnie-de-Marles, whose technical services bring him distinction by the numerous improvements that he has already introduced in mining art, has just bestowed an important benefit upon the mining industry. He has attained in, we think, a most satisfactory way, the desideratum indicated by the title of this article. The untimbering of stalls is from this time possible in almost every case, and it can be practiced with economy and security.

The importance of such a fact is evident; it has already been proclaimed in France by the mine owners and by the body of miners. With us, without doubt, the method of which M. Baily is the inventor, will be still better received if it is borne in mind that the conditions of working are much less favorable than those of most of the French basins. Many Belgian mines have a cost of output hardly inferior to the selling price, while the difference for the most favorably situated amounts at the most to 80 or 90 centimes. (3) Now, by this system of untimbering, the cost of output is lowered by 10, 20 or 50 centimes per ton. Great profit will, therefore, result not only to the owner, but also to the miner.

It is of consequence then to introduce this method in our workings as soon as possible, and it is in order to aid in doing so that we take the following description of it from the record of the Union.

M. Baily's system of support is mixed. It is constituted of metallic lengthening bars supported by wooden props. The shape and dimensions of the lengthening bar will vary according to circumstances. However, M. Baily has arrived at a certain type which we will give further on, and which seems likely to

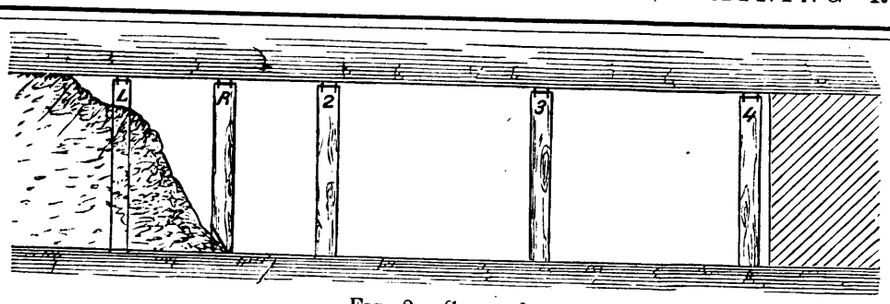

FIG. 2. SCALE $\frac{1}{40}$.

suit the majority of cases. In his first attempts he made use of two flat pieces of iron separated at regular intervals by a clamp, which ran through the joint-bolt. This lengthening bar was very simple and inexpensive, but it was not sufficiently rigid when placed edgeways, but easily lost its proper shape under the heavy weight of bad ground. He has since then used the cross-girder **M**, and then **I**. Finally, he has adopted the cross-girder **H** placed flatwise. The resistance of the materials seems to indicate that it would be more advantageous from that point of view to place it edgeways. Nevertheless practice favors the arrangement adopted by M. Baily. Indeed, the method of placing it flat is more easy, demands less care, and is done more rapidly. The cross-girder well wedged up to the right of the props cannot upset so easily as when placed edgewise. Under the pressure of the roof the last named often gives way, and is twisted. The making it straight again is then upset, and the support is destroyed. By the flat position none of these inconveniences accrue. Under the pressure of the roof the projections of the lengthening bar penetrate into the head of the wood, this fitting in is so strong that it would be impossible to upset the timber transversely without splitting it throughout, and the operation of untimbering longitudinally, according to the Baily method, is sometimes only possible by disengaging the drop at the foot. The lengthening bar placed flat does not require so much height, which is an appreciable advantage in thin beds.

Lastly, when the pressure of the soil is too great a crack is produced to the right of the props in the two upper projections, with a detonation similar to the discharge of a gun. At this moment the resistance of the frame is still intact, and forewarned, the miners have time to strengthen the propping, or to take such other measures as are expedient.

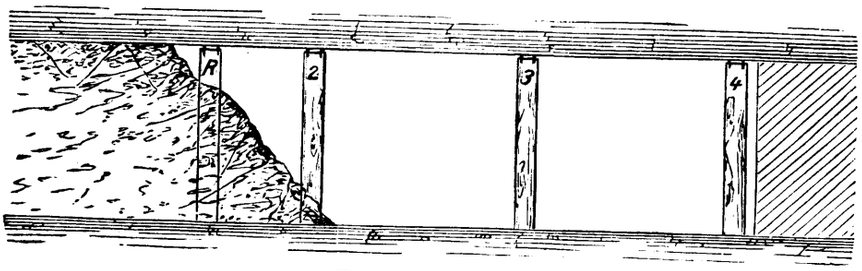

FIG. 3. SCALE $\frac{1}{40}$.

difficult and requires it to be withdrawn from the mine. The lengthening bar placed flat is inflected in such a way that the deformation is slight, the lengthening bar is used again by turning it upside down, when its resisting power is greater still. If the curvature is too pronounced the miners themselves straighten it by grappling it between two props, and pressing on the projecting part in the way desired. If the piece is bent several times it is straightened by means of a small hand machine invented by M. Baily, which is very simple, and which, with the help of two men, will straighten twenty lengthening bars an hour. The method of placing them flat better preserves the props. It has been noticed that in galleries where the usage of old rail as lengthening bar has been introduced, the pressure of the rail often splits the wood longitudinally or carries away one of the projections between which it is held. In both cases it is

The cross girders which M. Baily usually employs are 80 by 45 millimetres, (4) and 8 millimetres in thickness. Four metres in length is considered most convenient. The lengthening bar is of No. 4 iron. Iron of good quality is essential if vexation is to be avoided. The weight is 8·75 kilogrammes (5) per metre, or 34 kilogrammes per lengthening bar, and the prime cost 1.30 fr. per metre. The lengthening bar of 4 metres is supported by three props, which are always more than 80 millimetres in diameter. The head of the prop is not embellished but sawn straight.

The Placing of the Lengthening Bar.—The setting is very easy. Two men take hold of the bar by the ends, and place it against the roof, a third man props it in the middle, then finishes alone the propping of the ends, after taking care to put good wedges to the right of the stays. The setting of the ashler pieces is done as in the ordinary system of support. In the ways and false ways shorter lengthening bars are used, supported by two props. The lengthening bars of the way are not taken out.

The Removal of a Lengthening Bar.—The middle timber is first knocked down by striking the head of it longitudinally, or by disengaging it at the foot. The end props fall next, and both lengthening bar and props are quickly drawn out. These operations must be performed under the shelter of neighboring lengthening bars. In any case the miner will not be able to remain under a portion of roof which is deprived of support. That is a principle which must not be departed from, and which constitutes one of the rules of the method. It will frequently happen that the part of the stall comprised between the way and the ventilating pillar will correspond with the length of a lengthening bar, and the miners, in order to pull down the end props and pull out the cross girder, will place themselves under the protection of the support of the ways. If the length of the stall is such that it requires the use of two lengthening bars they will be arranged so as to leave a space between them, which the embankment will lengthen somewhat. This will receive the support of a way, and it will be untimbered when beating a retreat. If the ground is good, support in the false way may be dispensed with, the size of which is only large enough to allow the miner to work free from danger.

(To be continued.)

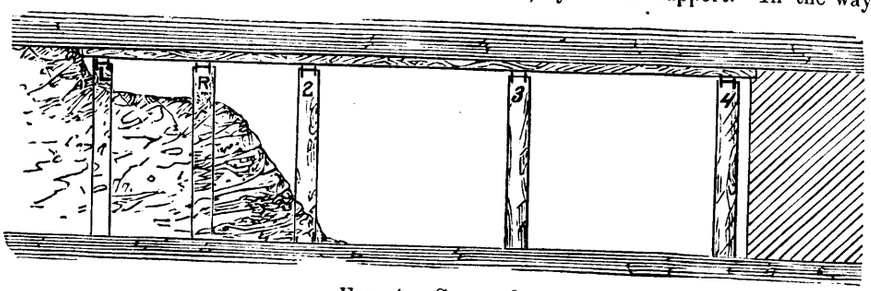

FIG. 4. SCALE $\frac{1}{40}$.

New Chemical and other Works at Capelton.

As many of our readers are aware considerable improvements have been taking place during the past year at the Capelton Copper Mines, owned and operated by Messrs. G. H. Nichols & Co., of New York. For the following interesting description of these operations we have to express our indebtedness to the *Engineering and Mining Journal* of New York:

Messrs. Geo. H. Nichols & Co., of 41 Cedar street, New York, who are the owners both of the Albert mines and Capelton Chemical Works, as also of the Laurel Hill Chemical and Copper Works on Long Island, showed their good judgment and their faith in these mines when, during the depression in the copper market, instead of abandoning the properties, they determined to meet the difficulties by introducing every labor-saving appliance they could, and so improving their whole plant that they would be able to continue the mining, concentration and shipping of their ores to this city at a profit, even during the most unfavourable state of the markets. This work of the entire reconstruction of their whole plant is now finished, and all the departments are running most successfully, and a short description of the new works will not be uninteresting.

The vein is being worked now from three shafts instead of one as heretofore. The shafts, which are numbered 1, 2 and 3, are respectively 800, 500 and 150 feet deep; they are all inclined at an angle of about 60° and cut diagonally through the ore chutes of the great deposit. The ore mineral is a mixture of copper and iron sulphides in a gangue of quartz and talc. Each of the three shafts has been most thoroughly equipped with first-class machinery. Numbers 1 and 2 are worked by large automatic dumping skips, operated by a 150 horse-power double drum engine, and number 3 shaft is run by an independent 50 horse-power engine.

The new crushing and concentrating mill is situated exactly over No. 1 shaft, and is so connected by surface incline planes with shafts 2 and

3 that the ore from all these shafts is delivered automatically to the dressing floors, and crushed, sized and concentrated without any but mechanical handling, except at the picking tables, where boys do the actual sorting. The whole design of these works reflects the greatest credit on Messrs. Copeland & Bacon, contractors for the plant, and Mr. Earle C. Bacon, who is the consulting engineer for the company, and from whose designs and under whose direction, aided by the superintendent, Mr. Richard Penhale, the work has been so successfully carried out. The crushing and concentrating mill is run by a 100 horse power cut-off engine, supplied with steam from a battery of 400 horse-power boilers. In addition to the mill engine, these boilers supply steam for two large air compressors, an Ingersoll and a "Norwalk Compound," which supply and run 18 drills underground.

The ore coming from the three shafts is first dumped from the automatic skips on to a "grizzly," with the grates set three inches apart: below this "grizzly" is a second one with the grates set one inch apart. All the material which will not fall through the upper "grizzly" is fed direct to the large 30 by 15 Farrel foundry Blake crusher, from which the ore is discharged on to the second "grizzly" with the fines from the first "grizzly." What passes through the one-inch bars goes on down to the concentrators, but all the material between 1 inch and 3 inches is fed to an endless picking table. Boys are stationed on each side of this table and pick out the lean and barren rock. The lean ore goes to a 20 by 6 crusher and thence to two sets of 30 inch Cornish rolls and from these to the concentrators, while the clean and rich ore is discharged over the end of the travelling table and fed to two 20 by 6 crushers, from whence it drops into bins and is ready for shipment. The fines from the screens and the lean ores from the tables are conveyed to the double compartment plunger jigs, of which there are six, and the concentrates are conveyed into bins for shipment. The ore from these bins is then fed automatically again into the buckets of a wire rope tramway, which carries it down the mountain side and delivers it direct into the railroad cars, 4500 feet from the mine. This tramway, which has also proved a very great success and a source of great economy, was built by the Trenton Iron-Works of Cooper, Hewitt & Co., of New York. The capacity of the mill and tramway is 300 tons per day. The fines from the mines are conveyed by tramway to the chemical works at foot of the hill and made into sulphuric acid. This is probably the most complete sulphuric acid plant on this continent. It will thus be seen that practically, from the time the ore is first loaded into skips at the bottom of the shafts, its progress through all the different operations of sizing, crushing, separating, concentrating and transporting to railroad is entirely automatic.

Both the designing and carrying out of the whole plan is worthy of great commendation, and is an example of mechanical skill well worth examining and following by mining engineers in general.

Cost of Colliery Surveys at Westphalia.—It is stated that at the 191 collieries of the Westphalian district, during the years 1880-1 and 1882, the average annual expenditure on the preparation of mine plans and on other mine surveying operations amounted to £9,323 16s. This sum represents an average of 17 cents for every 100 tons of coal raised, or fifty cents for each workman employed.

PHOSPHATE.

In General.

The following shipments of Canadian ore have been made from Montreal from 18th May to June 9th, 1888:—

Date.	Ship.	Destination.	Shippers.	Tons.
May 18	s.s. Oxenholme	Liverpool	Wilson & Green	550
" 22	s.s. Baumewall	Hamburg	Lomer, Rohr & Co	150
" 25	s.s. Durham City	Liverpool	Wilson & Green	180
" 25	s.s. Washington City	London	Lomer, Rohr & Co.	230
" 31	s.s. Cynthia	Glasgow	" "	30
June 1	s.s. Cremon	Hamburg	" "	240
" 1	"	do	Wilson & Green	49
" 2	s.s. Canopus	Liverpool	" "	410
" 7	s.s. Dominion	Bristol	Millar & Co	317
" 8	s.s. Holstein	Hamburg	Wilson & Green	100
" 9	s.s. Bonnington	Dublin	Lomer, Rohr & Co	310
			Total	2,526

*384 bags—30 tons.

RECAPITULATION.

Wilson & Green	1,239
Lomer, Rohr & Co.	960
Millar & Co.	317

Judge Burbidge will not give his decision in the case of Fraser v. The Queen for a few weeks yet.

Markets.

The British market quotations stand at 11½d., with a fifth of a penny rise.

Templeton District.

The celebrated Blackburn Mine is undergoing some improvements in its workings and is producing a steady output of first class mineral. A large quantity of ore has been shipped since the season opened.

Messrs. Gillespie & Patterson will shortly resume operations on their property.

The Templeton and Blanche River Company's main shaft has reached a depth of eighty feet, where a well defined vein is yielding rich ore, and gives most promising indications as the workings increase in depth.

Kingston District.

Captain Boyd Smith arrived in New York from Great Britain on 2nd instant. A good force is working the Blessington and St. George's Mines, and the output is most satisfactory. At Blessington one of the shafts is yielding a very good iron ore. Every preparation has been made for extensive operations during the summer. A large number of new shows have been opened. A shipment of 200 tons will be made in a few days from the St. George's Mines to Philadelphia.

Du Lievre.

The shipments from the High Rock Mines continue very large, something over 1,500 tons having been shipped during the past month. This company is building a freight shed at Buckingham landing. On Monday, the 11th, 55 tons of high grade ore was taken out of No. 11 pit, the result of one blast. How is this for a record?

The Dominion Mining Company have an immense quantity of phosphate at their landing place ready to ship; their shipments will probably amount to 4,000 or 5,000 tons this season. It is believed that this company will re-open their workings at the "Lansdowne" Mine, adjacent to Mr. S. P. Franchot's property.

The Canadian Phosphate Company's output for the week ending 16th instant was close upon 150 tons. Captain Smith proposes to put a new steamer on the river to facilitate the moving of his company's output.

A party named Carriere has eight or nine men working a phosphate find in the vicinity of Donaldson's Lake, and claims that it is in the interests of an American firm located at Chicago. Nothing wonderful has turned up in the way of discoveries so far. There seems to be a little mica intermixed, but it is all small stuff, and black at that. Felspar occurs here and there.

The grinding mills at Seabury are busy again. Mr. Hunton, the manager, reports that 100 tons of 60 per cent. are being ground for the High Rock people, to be distributed in the United States. The North Star Mines are also having a similar quantity crushed for the new chemical works of Messrs. G. H. Nichols & Co., at Capelton.

A number of new openings at the Emerald give excellent promise of good returns.

At the Little Rapids Mines two new openings on the east side of the hill have met with good results, while the drifts between the shafts "A" and "B" expose a mass of very rich ore. The owners of this property will continue exploration and development for a few months longer, when the extraction of the mineral for the market will begin in earnest. Judging from a recent inspection, there must be several thousand tons of phosphate now in sight.

MINING NOTES.

We shall be greatly obliged to mine owners and superintendents for such authentic reports of their operations as may concern share holders and the public.

Nova Scotia.

Reports from Halifax state that John R. Bothwell of New York has interested several New York capitalists in the purchase of a number of Cape Breton coal companies, which are to be consolidated into one management. Among the companies selling to the syndicate are the Sydney & Louisburg Coal and Railway Company, the International, and the Caledonia Company. It is also likely that a number of collieries now owned in Halifax will be taken into the consolidated company.

A new 15 stamp water mill constructed by the Truro Foundry Company has been put in operation at the Moose River Mines and gives every satisfaction. Mr. Touquoy has a large quantity of quartz ready for the crusher, and as a result of 4½ days' work with the new mill secured a bar of gold weighing 80 tons of quartz.

At the Lake Lode Company's properties in the Caribou district 106 ounces of gold were got for the first fortnight's crushing in May, and it is thought that 100 ounces more has been obtained up to the 1st of the present month. The leads are now yielding quartz well filled with coarse gold.

The opening of navigation has not been productive of steady work at some of the Pictou County Collieries. At the Dummond mines there has been much idle time, owing, it is said,

to an insufficiency of vessels to carry the coal to Montreal. It is a pity that this should be so, as no expense has been spared preparing for a large output, and the management is now in a better position to fill orders than it has been for a long time past. In one day, recently, no less than 1100 tons of coal were shipped from these mines. Operations have been resumed in the No. 4 slope, giving employment to between 30 and 40 men and boys.

The Black Diamond Mine is still working steadily, doing a local trade. The output though not large is steadily increasing. More machinery for the further development of this mine is expected shortly.

Messrs. Russell and Fraser, along with Alex. Purvis, late underground manager at the Drummond Colliery, are prospecting in the neighbourhood of Westville, and it is reported that they have discovered a seam of coal. Nothing definite is, however, yet to hand to confirm the report.

At the Albion mines, the Acadia Coal Company continue to push vigorously the opening of some of their valuable properties. In the new slopes, which have been closed since the explosion in January last, extensive explorations have been made with very encouraging results, and the opening of at least one of these slopes may be looked for in the near future. The sinking of the new slope to the Cage Pit seam has been much impeded by a "step," but this has now been got through and the working goes on as hitherto. The draining of the Foord Pit, although frequently interrupted, continues, and the bottom of the shaft will soon be reached when pumping will have to be resorted to before much further progress can be made.

Notice is given by the Commissioner of Works and Mines that on the 5th day of July he will declare forfeited a number of gold mining leases in the 15 Mile Stream district, unless it can be shown that the requirements of the law have been complied with. This is as it should be.

A gold brick valued at $2,000, the result of three weeks work, has lately been sent by the Egerton Gold Mining Company to the Glasgow Exhibiton.

A destructive fire at the East Rawdon Gold mines, on the 12th instant, destroyed thirty buildings, including seventeen dwellings, store, the company's office and store room, and the crusher and hoisting gear. The loss is estimated at over $30,000.

The following are the official gold returns so far received at the Mines Office for the month of May :—

District.	Mill.	Tons Quartz.	Oz. Gold.
Dar's Hill.....	Dufferin Mining Co	875	376
Oldham.....	Oldham United.....	68	39
Lake Catcha...	Oxford.....	115	158½
" ...	J. Anderson.....	1	78
Sherbrooke	Stormont.....	112	263

A meeting of the shareholders of the Amherst Coal and Mining Company was held at the mine on the 12th. S. H. Holmes, D. L. Patrick, D. J. Patrick and Wm. Patrick were elected Directors for the ensuing year; William Patrick, elected Secretary and General Manager; and F. B. Robb President. The meeting of shareholders stands adjourned until 26th instant.

New Brunswick.

Major Markham has completed arrangements for continued operations at his Manganese mines pending a settlement of the estate of Messrs. W. C. Pope & Co., and the mines have accordingly been reopened and work resumed.

The annual meeting of the Westmoreland and Albert Mining and Manufacturing Company was recently held in Moncton, N.B., at which Mr. H. R. Emerson was elected president, and Mr. E. B. Chandler was re-elected secretary. The property of this company is situated at Rockland, N.B., and consists of oil and shale works. It is understood that negotiations are pending which will probably lead to the active working of the property by American capitalists. The company has been reorganized with this end in view and to complete the negotiations.

The work of prospecting in New Brunswick is steadily going on in different counties, principally in Albert, Kings, and some others. New finds are being continually brought to light, and several new deposits of manganese have been discovered in Kings and Albert Counties.

Amongst the mines that are at present being worked is the New Brunswick gold and silver mine, in King's County, about 8 miles from Waterford. The ore is silver and copper, and the width of the vein at the surface is 30 feet, with well-defined walls. There are other veins on the property, and with the careful outlay of capital it should prove a paying investment.

Quebec.

We have to acknowledge a first-rate specimen of clear amber mica from Mr. H. A. Church's property near Chelsea.

Extensive mining operations are being successfully carried on this season at the Beauce gold fields. Recently a nugget weighing 8½ ounces and valued at $124 was, with much coarse gold, taken out of a claim recently opened on the River du Moulin, about one mile from St. Francis Church.

Ontario.

By the explosion of two torpedoes in the 500 foot gas well shaft of the Collingwood Rock Well Company at Collingwood on the 1st inst., the flow of gas was increased. There are indications of the presence of gas in West ward also, and the company is going to sink a shaft there.

The Canada Copper Company's mines at Sudbury are developing nicely and producing a satisfactory output. A number of new buildings are in course of erection at the mines.

Mr. J. B. Miller is reported to have made a rich discovery of silver in the Sudbury district. Specimens assayed by Mr. Willmet, of Sault Ste. Marie, gave 182 ounces of silver to the ton.

Col. Robert Hill, A. C. Buell, J. B. Kirk, A. N. Young, E. H. Reed and Volney W. Foster, Chicago capitalists directly interested in the Denison gold finds, paid a visit to their property during the month. On their return to Sudbury a company was organized under the title of the Vermillion Mining Company of Ontario (under the Joint Stock Companies Act) with a capital of $240,000. All the capital is allotted, half of it being given for the property. One assessment of five per cent. has been made. The following is the Board of Directors : B. E. Charlton, of Hamilton (President), A. G. Duncan, of Sudbury (Vice-President), John Oliver, of Chicago, (Secretary-Treasurer), Robert Hill, of Chicago, E. H. Reed, of Chicago, Henry Ranger, of Sudbury, and V. W. Foster, of Chicago. At the mines, which are superintended by Mr. A. G. Duncan, a Canadian, a number of buildings for the accommodation of the men have been erected. Thirty men are at work, and a small three stamp mill is kept running night and day. The company own 2,800 acres.

The Orillia *News-Letter* continues to hold out the promise of the existence of coal in that neighborhood, and calls on public-spirited citizens to assist in ascertaining the truth. Over $600 has been subscribed by a few persons to make the test ; they are asking the people of the town to make up another $600. Just what the reasons are for making the assertion that a bed of coal underlies the County of Simcoe we cannot say other than that an expert, a native of the county, who has wide experience elsewhere, has made a surface examination and found good indications.

At the annual meeting of the K. & P. Railway and Mining Company, held recently, the following officers were elected for the ensuing year :—Henry Sibbett, of Brooklyn, president ; B. W. Folger, vice-president ; D. L. Gibbons, secretary and treasurer ; and a board of directors composed of the following : Henry Sibbett, Brooklyn ; F. S Flower, W. E. Cooper, D. L. Gibbons, H. S. Hollister, New York ; W. G. Pollock, Cleveland ; W. R. Stirling, Chicago ; and F. A. Folger, Kingston. A statement presented showed the available assets to be $90,000, and for the past year on mining operations, $10,000 net profit was realized. No dividend was declared. Several American firms have asked to be supplied with the ore, and one of them, the Carnegie Bros., of Pittsburg, have asked for 500 tons per day.

The attention of mine owners and operators, quarrymen, and managers of reduction or manufacturing works, is directed to the advertisement in another place, regarding the Centennial Exposition to be held at Ohio from July 4th to October 27th. Every effort is being made by Mr. Blue to have Ontario's mineral wealth represented by a first-class exhibit, but he cannot very well do this unless he receives the hearty co-operation of all in any way interested in the growth and advancement of the mineral wealth of the province. At present there is every indication that the Ontario exhibit will be large and varied, and we trust our readers will assist him in this undertaking as far as possible by sending their private collections of minerals, or by sending specimens from their mines. Such an exhibit cannot fail to do good to the mining industry of the province.

We have received a copy of the prize list, just issued, for the Tenth Industrial Exhibition, to be held in Toronto from the 10th to the 22nd of September next. Any of our readers, who may think of sending contributions to the mineral exhibit, for which an excellent prize list is provided, can readily obtain a copy of the printed list by dropping a post card to Mr. H. J. Hall, the Secretary, at Toronto. The prospects of the success of this year's exhibition are very promising.

At the Bristol Iron Mines the engineers have started work on the short line of railway necessary for the development of the property. Mr. Hiram Robinson, one of the Directors, is confident that everything will be in good working order at an early date. New calcining furnaces will also be put in operation.

Re Cartier gold discoveries our correspondent writes: "I have made enquiries in this matter and find that a man named Joseph O'Harze, living at Larchwood, has found gold and silver in the vicinity of Cartier Station, and I understand the find to be important. I believe that parties willing to invest capital in mining in this district can secure some good locations with every prospect that they will turn out remunerative. At all events the district here will bear inspection. There are a good many prospectors out now and capitalists have experts in the field. It is said that some of the properties will shortly be taken up by English capitalists."

Manitoba and North-West Territories.

Not the least interesting portion of Mr. J B. Tyrell's report on the region of Northern Alberta is the chapter on economic minerals. Regarding the coals and lignites he writes:—"The enormous deposits of coal and lignite that underlie an area of more than 12,000 square miles in the western part of this district must be considered as first in value and importance among its economic minerals." The only true bituminous coal yet found within the district is that outcropping in the neighborhood of Bow River. On the north side of that river only one seam—two feet ten inches thick—was observed. If the thickness of the coal on the south side be taken as seven feet and the dip be assumed to decrease gradually to the eastward, the seam would contain about 9,500,000 tons to the square mile. There is reason to believe that the bed extends north and south of the known outcrops for many miles. Nearest in character to the bituminous are the lignitic or semi-bituminous coals found on the Red Deer river at the eastern edge of the foot hills. There is an irregular seam at the Rocky Mountain house varying from 8 to 2 or 3 inches thick. Probably other and thicker outcrops may be found in the vicinity. There is an important seam in the North Saskatchewan above the mouth of Buck creek, which in one place is fifteen feet thick. The area may be underlain by some 140,000,000 tons of lignite coal. Another area yields probably 150,000,000. All through the Edmonton series in fact there are seams of greater or less extent, many of which will be opened as the country becomes developed. Compared with American coal, the quality of our Northwest lignite can hold its own. Many samples from the seams above mentioned may be favorably compared with those of eastern America, while generally they are quite equal to those of Colorado, Wyoming and other western states.

The output of coal from the Lethbridge Mines for the month of May was close upon 500 tons per diem.

The Local Legislature of Manitoba offers to loan to the C.P.R. $7,500 per mile, so that the company may experience no difficulty in extending their Southern and South Western branches into the Souris District. The completion of these lines would undoubtedly prove of much benefit to the province in the opening up of the large coal deposits of the Souris River. This coal is of very good average quality and is suitable for general use and for steam purposes. One great fault, however, is the large amount of hygroscopic or contained water which greatly exceeds that found in bituminous coal, and which causes the lignite to slack and crumble to some extent on exposure to the atmosphere. Another is the percentage of ash, which is greater than that contained in higher grades. Practical men, however, contend that both these faults can be largely counteracted by improved methods of preparing the coal and by alterations on existing stoves and grates. The coal burns well, gives a good strong heat, and can be laid down cheaply throughout the province. The development of these deposits will prove of immense value to this comparatively treeless province.

Operations at the gold mines of the Lake of the Woods has been commenced.

H. G. McMicken, Winnipeg, has just returned from his gold location, seven miles east of Rat Portage. He and his partners have put up a house there; have a gang of workmen; and drilling outfit on the spot. They have traced some very fine leads right across their property, and are getting out several car loads of ore which they will ship to Omaha next week to have it reduced and its exact value determined. So far all they had to go on was a number of assays which resulted very favourably.

The Dauphin Oil Company has been formed in Winnipeg to work the petroleum said to have been recently discovered in the Riding Mountain District, north of Minnedosa. A board of seven directors consisting of the following gentlemen were elected: Dr. Clark, C. Stewart, C. F. Brown, T. G. Mathers, T. G. Moore, C. O. Wichenden, F. H. Schofield, A. R. Anderson, W. L. Harrison and W. P. Johnston. Mr. Case, an expert with twelve years experience in the Pennsylvania oil regions and four years in Ohio, states that he examined the district in winter and traced the oil by the discoloration of the snow. Whenever the snow was discovered, the ground underneath was not frozen, a fact which is quoted as a sure indication that oil was present in large quantities. It is further stated that there are better indications of oil on the surface in the Lake Dauphin district than could be found 200 feet below the surface in Pennsylvania, and that the shale exposed on the sides of the hills by land slides was so saturated with oil that it could be ignited with a match and would burn freely. The surface oil, which is said to have been struck, is on top of a rock bed, and the rock will have to be bored to reach the genuine or rock oil. The new company has resolved to make application to the Legislature immediately for letters patent of incorporation under the provisions of the Joint Stock Companies Act. The capital stock has been placed at $100,000, divided into shares of $25 each.

The Manitoba Oil Company, which owns property in the same district, has decided to resume operations this month.

Mr. George Bradford, M.E., of London, England, passed through Ottawa during the month on his way to the North-West, where he will examine and report to an English syndicate on the coal deposits of that region.

British Columbia.

E. A. Mackenzie & Co., of Jamieson Creek mines, some twenty miles north of Kamloops, have bonded their property to a California syndicate, who have agreed to expend between $3,000 and $4,000 on the property within ninety days. If the syndicate desire to purchase the property at the conclusion of the option they have agreed to pay to each of the three owners the sum of $15,000. The ore looks well and the prospects are encouraging.

The *Colonist* is our authority for the following from Illecillewaet:—Corbin & Kennedy are breaking the trail over the mountain, and expect to be running their pack train bringing out ore in about a week. It is quite improbable that the wagon road up the North Fork will be attempted as the appropriation is only $3,000, and the government ask that seven miles of road be completed before they will give this amount. The cost of these seven miles will be at least $7,000.

McGillivray & Co. are working upon the Silver-tip mine, and report a well developed vein, with ore of the same class as the Lanark.

The Selkirk Co. will soon have their pack train running and shipping several tons of ore daily.—The Lanark looks splendidly, large deposits of ore showing up in different portions of the mine.

The Hon. Robert Dunsmuir states that four shafts are at present being sunk on his New Comox mines:—The prospect shaft on the eight-foot seam is being widened for the purpose of making it an air shaft. There is a great deal of work to be done, and it is doubtful whether coal will be shipped this fall or not. The line is graded for several miles, and its whole length will be ready for the rails by the time they arrive from England.

The Nicola Mining Company's shaft is down 153 feet, the ore body at that point being 3½ feet in width, the quality improving as depth is attained. The ore carries more gold than silver, averaging about $60 to the ton of the former and 25 ounces of the latter. It is the intention to sink to a depth of 200 feet.

The President of the Hamilton Powder Company has been in Vancouver, and, with characteristic enterprise, has decided to erect a magazine for their business at a point a few miles from Hastings. The C. P. R. has agreed to construct a switch to the magazine from the main line, which will facilitate the receipt and delivery of their explosives.

The Mount Cenis tunnel, the property of the Perry Creek Gold Mining Company, has been driven in anew about 400 feet, and it takes only 100 feet more to reach the face of the canyon which impeded the old working. The Kootenay pioneer, Mr. W. Fernie, who originally opened this tunnel, gave his opinion only a few weeks since that as soon as the rock is reached enough gold will be taken out to pay expenses, and after getting through the canyon a very big find may be expected.

The British Columbia Smelting Company (limited) has been registered in London, England, with a capital of £65,000, divided into 65,000 shares of £1 each, for the purpose of carrying on the business of miners, and to win, get, mine and work ores, minerals and metallic substances and compounds of all kinds, smelters, refiners, and dealers in bullion, metal, and other products of smelting.

The mining season at the various camps is being turned to account with great spirit. The extent and character of the minerals are now thoroughly known and it only requires the presence of the requisite facilities in the shape of smelters, to create a new era for the province. A great deal of discussion is now going on as to the proper localities for the reducing works, a point which outsiders would suppose to be easily settled. If smelters are to be erected in this province, they should be as near as possible to the place where the ore is taken from the mine. The mere site of the smelters, so far as surrounding conveniences are concerned, is a very secondary affair; the chief requisite is shortness of carriage from the mine to the smelter.

Latest advices speak highly of the outlook of the Lanark mines, Illecillewaet. The work performed during the winter and spring has uncovered a very rich body of ore. A tunnel has been run lengthwise upon this ore body, extending about 115 feet, with a width of 8 to 25 feet, and a depth of 20 feet, proved, and probably 15 or 20 feet deeper. Ninety feet below this a second tunnel has just struck the same body, but narrower. It seems to widen out as the body goes into the mountain. Still lower, at a further depth of 150 feet, the contract vein with narrower veins of galena, has been discovered cropping out on the surface, and a third tunnel will probably soon be started to explore this depth. Mr. Tilton, the superintendent of the work, is now preparing to ship ore, and hopes in a week or two to be shipping five tons per day of first-class ore. With the number of animals at present available by the company, about 40, there is much more ore in sight than they can pack out during the summer. The yield of this galena ore is perfectly uniform—and the result of the season's work will astonish those who have no faith in *results* in British Columbia mines. It is very satisfactory to the company to know that every extension of the underground work exposes large deposits of paying veins. Several English and American experts are expected at the mines this summer to watch the smelting, and it is thought they will invest their money in the enterprise.

Something About Explosives.— All quarries have a certain amount of covering which must be removed before the stone can be taken out. This deposit is either a part of the stone which has become disintegrated by the weather or is a later deposit. The first consideration in removing this deposit, or "stripping," and in forming a quarry face, is to get the broken stone out of the way as quickly and cheaply as possible regardless of its size. For this purpose no especial skill is required in the management of the explosive, but for breaking rock which is to be used, much skill and knowledge are required in order to reach the best results. Furthermore, a knowledge of the particular stone which is being worked is necessary. Every quarry has its peculiarities and must be worked according to the best method for that peculiar stone.

The use of a sudden explosive, like dynamite, is to be avoided. The effect of such explosives is to shatter the stone in many directions, as does a blow from a hammer. Coarse gunpowder is better. Repeated light charges of powder covered with sand are much better than heavy charges tamped in tight. A rock may be detached without breaking by means of often repeated light charges, which would be badly broken were a single heavy charge strong enough to detach the rock employed. Where a heavy charge is employed the shape of the bottom of the drill hole influences the direction in which the rock will split to a greater extent than does the rift. When light charges are used, the bottom of the drill hole influences the direction of the breakage, but to a less extent. Much rock has been wasted through a lack of knowledge on this point. If one examines the bottom of a drill hole which has been made with a steel bitted precussion drill, it will never be found round, and a hole made with a hand drill is always triangular at the bottom. A charge will ordinarily break the rock in three directions corresponding with the shape of the bottom of the drill hole. In the sandstone quarries of Portland, Conn., they have controlled the blast very successfully by the use of the following device:

Deep holes from ten to twenty or more feet in depth are drilled with a diameter of ten to twenty inches. These holes are made by machinery, and the direction of the blast is determined by placing the charge of powder in cannisters of tin, shaped according to the kind of blast required. These cannisters are placed in the drill holes and tamped in with sand so that the effects of the blast are the same as though the holes were the shape of the cannister. Where a break across in a straight line is desired, the cannister is made of two pieces of sheet tin, the edges being left unsoldered and the ends covered with paper or cloth. A horizontal cross section would show the cannister bounded by two minor segments of a circle. The blast is in the direction of a plane passing through the edges of the cannister. Where the shape of the blast is not considered a great waste of rock necessarily follows.

In most quarries where the shape of the rock is to be considered, powder is only used to detach large pieces which are further worked up by means of wedges. The drill hole is put down to the depth to which the rock is to be broken and light charges of powder are employed. Afterwards a heavy charge is employed which forces the block forward. As every rock has a different structure, the direction of cleavage planes influences the management of the blast. There must be at least one free end to allow the rock to move out to the face. Where the ends are cut off by natural joints they are called "end joints;" horizontal joints, called "bottom joints," are more common.

It sometimes happens that the bottom joints occur only at great intervals. The Penryn quarries, in California are of this kind. Here they cut an underblast along the first bottom joint from one end joint to another. A line of lewis holes is put down 15 or 20 feet from the face and the blast breaks out the block between the joints and down to the bottom joint which is about eighty feet from the top. Such blasts act more like wedges than ordinary blasts and are capable of breaking off blocks containing 100,000 cubic feet of stone.

For quarrying sandstone in the larger quarries powder is not often used. Granite is less liable to be injured by the use of explosives than softer stone, but even in quarries of this class of stone, blasting is not often used except for detaching large blocks which are removed by other means.

Deep Boring for Coal.—The deepest bore-hole in the world is said to be at Schladenbach, near Kotchau Station, on the railway between Corbetha and Leipsic, and has been undertaken by the Prussian Government in search for coal. The bore-hole, which in January, 1885, had reached a depth of 4,600 feet, was commenced in June 1880, but left after a years work, recommenced at the end of 1882, and is still progressing.

Chlorination of Zinc Ores.—The Iron Silver Mining Company, of Leadville, Colo., has entered into a contract with the Omaha & Grant Smelting Company for the erection of a plant in connection with the latter company's works, to extract the zinc from the ores mined by the Iron Silver Company. The process is an experiment, the success of which will be of immense importance to Leadville. It will

consist of a partial roasting of the ore for desulpurizing, and then an application of electricity to a chlorination process, which will precipitate the metallic zinc and leave the residue a free smelting ore. It is the application of Plattner chlorination to zinc instead of gold ores.

Slag Fertilizers.—The manufacture of basic slag manure is proceeding steadily, and a much larger market might be found for steel-works' waste if greater quantities could be readily ground. The Staffordshire Steel Company have now three grinding mills at work turning out 200 tons per week, and the heavy stock which was laid in during the autumn months is now going off rapidly to the order of London fertilizing contractors. The selling price to the local agriculturists is 40s. to 45s. per ton, as against 55s. or 60s., which has to be paid for phosphates.

(1) 1 franc = 19.4 cts. U. S. currency. (2) 1 metre = 3,281 ft.
(3) 1 centime = 1.94 cts.
(4) 1 millimeter = .0394 inches.
(5) 1 kilogramme = 2.2046 lbs. Avoird.

FREE ADVERTISING.

Mine Owners and Operators, Contractors and the heads of other business undertakings requiring working plant or machinery can have their wants made known in this columns free.

Inquiries from Employers in want of Superintendents, Engineers, Metallurgists, Chemists, Mine or Furnace Foremen, Engineers or assistance of this kind, will be inserted without charge.

WANTED—Situation as Foreman Engineer at Mines. Sixteen years experience erecting, repairing and running Hoisting, Pumping and Air Compressing Engines and machinery. Would undertake in connection with above, the duty of Time and Storekeeper or Outside Overman. References if required. Address "Engineer," office of THE CANADIAN MINING REVIEW.

WANTED—SMALL SECOND-HAND STEAM PUMP for Phosphate Mines. Write with full particulars to "T," THE CANADIAN MINING REVIEW Office.

THE SUBSCRIBER begs to inform those interested in Mining Properties that he is about to go to England, and will be glad to effect sales of any properties that are really good, having unequalled facilities for disposing of same. FRED. J. PENFORD, Coaticooke, Que. Cable Address, Ouvrage, Folkestone, or Folkestone, Kent, England.

Trustee's Sale.

Anthracite Coal Lands.

To settle controversy among parties in interest I will sell to the highest bidder at public sale, at my office in St. Paul, Minnesota, on the 22nd day of June, 1888, at 11 a.m., 1,240 acres of anthracite coal lands, located about one mile from Canmore Station, on the Canadian Pacific Railway, Province of Alberta, described as follows:—

The NE¼, NE¼ of NW¼ and NE¼ of SE¼ of section twenty (20), the W½ of NW¼, SE¼ of NW¼, SW¼ and W½ of SE¼ of section twenty-one (21), the N½ of NE¼ and SE¼ of SE¼ of section thirty (30), and the W½ of NE¼, SE¼, NE¼, NW¼, E½ of SW¼ and SE¼ of section thirty-one (31), all in township twenty-four (24), range ten (10), west.

Terms: one half cash within thirty days, remainder in two equal annual payments with 7 per cent. interest.

A deposit of 10 per cent. required at the time of sale. This is the best block of coal lands in the Bow River Valley. For further particulars address

E. F. DRAKE, Trustee,
St. Paul, Minn.

NOTICE.

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Indian Supplies," will be received at this office up to noon of THURSDAY, 7th June, 1888, for the delive y of Indian Supplies during the fiscal year ending 30th June, 1889, consisting of Flour, Bacon, Groceries, Ammunition, Twine, Oxen, Cows, Bu'ls, Agricultural Implements, Tools, &c., duty paid, at various points in Manitoba and the North-West Territories.

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

Parties may tender for each description of goods (or for any portion of each description of goods) separately or for all the goods called for in the Schedules, and the Department reserves to itself the right to reject the whole or any part of a tender.

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

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

The lowest or any tender not necessarily accepted.

This advertisement is not to be inserted by any newspaper without the authority of the Queen's Printer, and no claim for payment by any newspaper not having had such authority will be admitted.

L. VANKOUGHNET,
Deputy of the Superintendent-General of Indian Affairs.

Department of Indian Affairs,
Ottawa, May, 1888.

SEALED TENDERS addressed to the undersigned and endorsed "Tender for Post Office, etc., Lindsay, Ont.," will be received at this office until Tuesday, 26th June, 1888, for the several works required in the erection of Post Office at Lindsay, Ont.

Specifications and drawings can be seen at the Department of Public Works, Ottawa, and at the office of Messrs. Hudspeth & Jackson, barristers, Lindsay, Ont., on and after Friday, 8th June, and tenders will not be sonsidered unless made on the form supplied and signed with actual signatures of tenderers.

An accepted bank cheque made payable to the order of the Minister of Public Works, equal to five per cent. of amount of tender, must accompany each tender. This cheque will be forfeited if the party decline the contract, or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

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

By order,
A. GOBEIL,
Secretary.

Department of Public Works,
Ottawa, 5th June, 1888.

Department of Inland Revenue.

An Act Respecting Agricultural Fertilizers.

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

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

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

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 mine alsand 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 quartz mine." "Receipt for fee paid by applicant for mining location." "Receipt for fee on extension of time for purchase of a mining location." "Patent of a mining location." "Certificate of the assignment of a mining location." "Application for grant for placer mining and affidavit of applicant." "Grant for placer mining." "Certificate of the assignment of a placer mining claim." "Grant to a bed-rock flume company." "Grant for drainage." "Grant of right to divert water and construct ditches."

Since the publication, in 1884, of the Mining 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.