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CANADIAN

MINING REVIEW

Vol. 4.—No. 8. 1886—OTTAWA, NOVEMBER—1886. Vol. 4.—No. 8.

Notice to Contractors.

SEALED TENDERS addressed to the undersigned, and endorsed "Tender for Du Lievre Works," will be received until FRIDAY, the 27th day of NOVEMBER, next, inclusively, for the construction of a Lock and Dam and works in connection therewith, on the River Du Lievre at Little Rapids, Ottawa County, Quebec, in accordance with a plan and specification to be seen at the Department of Public Works, Ottawa, on and after Friday, the 5th of November next, where printed forms of tender can be obtained.

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

Each tender must be accompanied by an *accepted* bank cheque made payable to the order of the Honorable the Minister of Public Works, for the sum of two thousand five hundred dollars ($2,500) which will be forfeited if the party decline to enter into a contract when called upon to do so, or if he fail to complete the work contracted for. If the tender be not accepted the cheque will be returned.

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

By order,

A. GOBEIL,
Secretary.

Department of Public Works,
Ottawa, 30th October, 1886.

MAIL CONTRACT.

SEALED TENDERS, addressed to the Postmaster General will be received at Ottawa until noon on FRIDAY, 17th December, 1886, for the conveyance of Her Majesty's Mails, on a proposed Contract for four years, three times per week each way, between ASHTON and PROSPECT, from the 1st January next.

Printed notices containing further information as to conditions of proposed Contract may be seen and blank forms of Tender may be obtained at the Post Offices of Ashton, Munster, Dwyer Hill and Prospect, and at this office.

T. P. FRENCH,
Post Office Inspector.

Post Office Inspector's Office,
Ottawa, 23rd Oct., 1886.

Notice to Contractors.

SEALED TENDERS addressed to the undersigned will be received at this Office until FRIDAY, the 19th instant, for the Clearing and Removal of Snow, etc., from the Public Buildings, Ottawa; and also for the Removal of Snow, etc., from the roofs of buildings, out-buildings, walks, avenues or roads, etc., etc., at Rideau Hall.

Forms of Tender and Specifications can be had at this office, where all necessary information can be obtained.

Separate Tenders will be required for each work, and must be endorsed "Tender for Removal of Snow, Public Buildings," and "Removal of Snow, Rideau Hall," respectively.

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

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

By order,

A. GOBEIL,
Secretary

Department of Public Works,
Ottawa, 12th Nov., 1886.

Canadian Mining Review,

OTTAWA.

PUBLISHED MONTHLY.

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

Visitors from the mining districts as well as others interested in Canadian Mineral Lands are cordially invited to call at our office.

Mining news and reports of new discoveries of mineral deposits are solicited.

All matter for publication in the REVIEW *should be received at the office not later than the 20th of the month.*

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

Many of our readers will regret to learn of the death of Mr. James W. Lynch, superintendent of the Derry Phosphate Mines, near Buckingham, Que. The deceased gentleman, who was favorably regarded in mining circles, passed away at Derry, on Thursday, 25th November, from an attack of inflamation of the lungs.

We learn that Mr. E. Gilpin, Inspector of Mines, succeeds the late Mr. John Kelly as Deputy Commissioner of Mines for the Province of Nova Scotia. The new appointment, and the amalgamation of the two offices thus provided, is very favorably received in mining circles throughout the province.

At the meeting of the Iron and Steel Institute, held last month in London, Eng., it was stated in one of the papers read, that a small amount of chromium added to steel renders that metal much harder and improves it for a variety of purposes. If this important fact be universally recognised it will undoubtedly create an increased demand for chromic iron, of which, as our readers know, there are large deposits in the Province of Quebec. Several large blocks of this metal were on exhibition at the Mineral Court of the Colonial and Indian Exhibition.

Messrs. Foster and Gregory, the gentlemen appointed by the Royal Commission to report on the minerals and rocks shewn at the Colonial Exhibition, have completed their examination of the Canadian exhibit. Mr. Foster, who is Her Majesty's inspector of mines for North Wales, reports particularly on the ores, building stones, and other minerals of economic importance, and we learn that he expresses himself much pleased with the extent and excellence of the collection brought together by our geological survey. Particular mention is made of the large series of silver ores from the Port Arthur district, many of which are very rich, and he expresses the opinion that as that country is opened up, it will become one of the most important mining districts in the Dominion.

It will be remembered that several specimens of chromic Iron, from the Canadian Mineral Court, at the Colonial Exhibition, were recently tested by an English firm with a view to importation. The report on these samples, says the *Canadian Gazette*, "shows that some of the ore is sufficiently rich to suit the requirements of manufacturers in Great Britain, while in the case of other samples it is expected that either by a process of careful selection, or by striking new ground, an ore may be obtained of sufficient richness to be profitably exported. The chromic iron ore occurs in the same districts as the asbestos, which of late years has been so extensively mined. The Quebec Central railway has recently made the deposits much more accessible than formerly. It may be remembered that many years ago a trial shipment, consisting of ten tons of the ore, was made to England, but it was then found to be too poor in chromic oxide to be profitably handled."

The action of coal dust in bringing about colliery explosions, was very clearly explained by Herr Nasse in his address to a recent meeting of German mining engineers at Düsseld. From experiments it appears that risk of explosion depends upon four circumstances and conditions, each of which affect the explosiveness of the air in a large degree. These are (1) the quantity and degree of firmness of the dust, circumstances that depend upon the hardness and the structure of the coal; (2) its chemical constitution; (3) the quantity of carbonated hydrogen present; and (4) the degree of moisture in the dust. The last is a matter of great importance, and demands careful attention. It is a variable condition in the same mine; for dust may be very dry in one part of the workings and saturated with moisture in another. Also, the moisture contained in the coal-seam may be much less in one mine, or in one locality, than in another; so that great variations in the dryness of the dust at the working faces may be observed. Generally, the seams that do not reach the surface are much drier than those that crop out. The former usually contain about 4 per cent. of water; the latter, from 9 to 15 per cent. Herr Nasse believes watering to be desirable, and where shot-firing is carried on, necessary. But he admits that practical difficulties have hitherto stopped the way against a general adoption of this precautionary measure. He thinks that the subject should receive more attention from mining engineers.

The following interesting item, on the state of the Nova Scotian coal trade, appears in a recent issue of the *Canadian Trade Review*. "When we had a reciprocity treaty with the United States, the Americans were the principal purchasers of Nova Scotia coal. In 1865 and 1866, out of an average of 595,000 tons mined, about three-fourths of the entire product went across the border. After the abrogation of the treaty, the American import duty upon bituminous coal of course interfered with the sales to the United States, and gradually those sales have decreased, until last year the Americans took but 34,000 tons, only a thirty-eighth part of the entire product. We then protected our coal miners, and the manufacturing industries. The first movement gave the miners an extended home market, the second increased the consumption and consequently the demand for coal. Now, instead of mining only 595,000 tons annually as in 1886, or 700,000 tons as between 1871 and 1880, the Nova Scotia output had reached 1,352,000 tons, at which it stood in the year 1885. Of this quantity Nova Scotia, owing in part to the increased demand for manufacturing purposes, used 450,000 tons, while New Brunswick took 150,000. The Upper Provinces took 493,000, and the remainder was taken by Prince Edward Island, Newfoundland and the West Indies. The total sales of Nova Scotia coal in 1879 reached 688,624 tons. The total sales in 1885 reached 1,250,000. and the output 1,350,000. Thus the business has doubled since 1879. The total sales to Ontario and Quebec in 1881, two years after the introduction of the National Policy, were 268,000 tons. The total sales to the same provinces in 1885 were 493,000 tons, an increase of not quite one hundred per cent. in five years.

At the present time, writes the *Chicago Mining Review*, there is occasional enquiry concerning the probable exhaustion of our coal, oil and gas fields. The assumption generally being that these supplies were created ages ago, and stored up in reservoirs, in which they are now discovered to meet the requirements of the present time. Some years ago the problem of the future supply of coal assumed large proportions and was considered with much anxiety. The discovery of petroleum and its adaptation to use as fuel, removed and destroyed much of the interest connected with the discussion of the question of supply. As attention was turned to the supply of oil, and its outlines were beginning to be definitely established in the minds of speculative investigators, the value and importance of the wide-spread discoveries of natural gas still farther removed the date of the exhaustion of our fuel supply. At the present time there is much difference of opinion concerning the permanence of the supply of natural gas; many holding that it has been collected in reservoirs, which, when depleted can never be refilled, hence predict a short season of spasmodic activity in the life of this new agent, which is already becoming an important factor in the industrial history and advancement of the present time. As we have stated, much of the difficulty and confusion comes from a lack of definite

knowledge concerning the productive causes or the creative forces which, by their action, gave these important productions as a result and until this can be more positively established and is better understood, all discussions and conclusions in regard to the magnitude or permanence of the supply must be problematical and unsatisfactory. Our own opinion, in regard to this matter, is that the creative forces of nature are ever present and ever active; that the creative period is never ending, and wherever favorable circumstances exist the union of chemical elements, according to established laws and affinities, will unite and produce their diversified product and results.

"Since the days of '49," writes an authority, "prospectors have mistaken mica, or 'fool's gold,' for gold itself. Mica, in nature, is very abundant; it is met with in every camp; we are brought face to face with it in every mountain range as its forms are of three constituents of which granite is composed (mica, quartz and felspar). It is also a prominent constituent in granite, gneiss, and mica-schist. We find it again in our soil, formed from the disintegration of the above named rocks. From a mineralogical standpoint, common mica is called 'botite,' which is a magnesia-iron mica, part of the alumina being replaced by sesquioxyd of iron, and protoxyd of iron and magnesia existing among the protoxyd bases. Black is the prevailing color, but brown, green, yellow to white also occur. Prisms, commonly tabular; often in desseminated scales, sometimes in massive aggregations of cleavable scales. The hardness is 2.5 to 3. Now note the specific gravity, which ranges between 2.7 and 3.1: while that of gold raises from 15.5 to 19.5; according to its purity. In countries where mica-schist abounds, yellow mica in the sand is very abundant, and often deceives the eye of the prospector in his search for gold. This silvery and golden mica in scales is the 'cat-silver' and 'cat-gold' of Mediæval Europe. Others mistake iron and copper pyrites for gold, and arsenical pyrites are mistaken for silver; this last, in fact, is a very common mistake, even in old camps. Gold is sometimes found in a finely divided condition in pyrites, but vast masses, or perhaps it would be better to say mountains, of it in California and Colorado do not carry a trace of gold. Pyrite or bi-sulphuret of iron is very brittle; its hardness is about 6.5, while that of gold is 2.5. It occurs commonly in cubes, usually of a brass color. The cubic faces are often stricted, with strictions of adjoining faces at right angles. Chalcopyrite is a double sulphurate of copper and iron of a brass-yellow color and metallic lustre; on exposure to moist air it becomes iridescent on its surface. It is easily scratched with a knife, giving a greenish black powder. It is the principal ore of copper at the Cornwall mines. Arsenopyrite or mispickle has a hardness of 5.6, and is very brittle; of a metallic lustre and a silvery-white to steel gray color. This metal occurs in small particles in the partly oxidized ores of this camp, and is very often mistaken for silver. Pyrites, being brittle, are readily reduced to powder before the blow of the hammer, while gold and silver in their native state will flatten."

As much as the miner may oppose the scientist and the school-taught expert, there is much reason for a larger increase in knowledge in every branch of mineralogy and metallurgy. The history of the loss and waste in connection with mining operations and ore treatment during the past few years, when its immense magnitude is fully comprehended, will not prove to be a very strong support in favor of the methods that have prevailed, or the management and skill of those directing them. Those who more fully comprehend the question, clearly understand that a union of practical and theoretical knowledge is most to be desired, and that neither the theorist and student, or the practical miner or mill man, can afford to ignore the other. Every increment of knowledge, from whatever source, or however gained, is an additional element of power to be used in the accomplishment of any purpose. The wider the range of information, the more comprehensive the understanding, the deeper the insight and investigation, so much better fitted and more valuable is the possessor to accomplish the best results in the most economical manner. It is more than probable that some mistakes and some losses have accrued from the inexperience of scientists and experts, but the mining territory from Alaska to Mexico is covered with the monuments of inexperience and ignorance, erected at a vast expenditure of time and money, by men claiming to be practical. Practically, notwithstanding the wonderful results, the mining territory has been one vast scene of costly experiments; and to-day even the present methods, as great as is their improvement over those of the past, are by no means creditable to the intelligence and advancement of this century, as shown in the activities of every other industry. We stand, as yet, upon the threshold of improvement in this direction, where such methods and appliances prevail that would ruin any other business not so prolific in resources. The bleaching bones of thousands of enterprises lost in this desolate desert, and the stagnation that hangs like a gloom over so many promising localities, the indifference of capital to the most alluring stories of glittering wealth, the lanquishing camps that appeal in vain for assistance to open the treasure-houses within their limits, all show the uselessness of attempting to proceed by old methods; and the imperative necessity for a wiser management, a more comprehensive knowledge, and the inauguration of new methods in developing the vast mineral resources of our country; which will some day, when these questions are practically met, give results that will astonish and outshine the most flattering and wonderful statements yet recorded in the history of this great industry.—*Chicago Mining Review.*

Miners returning from the Lorne Creek mines, B.C., report a very unfavorable season there owing to the continued high water.

Phosphate Shipments from Montreal for Season of 1886.

Date.	Shippers.	Ship.	Destination.	Tons.
May 22	Wilson & Green	S. S Oxenholme	Liverpool	387
" 22	Lomer, Rohr & Co	"	"	350
June 5	Wilson & Green	Bq. Rhine	London	220
" 4	" "	S. S. Ashton	Sharpness	290
" 10	" "	Bq. Dictator	London	140
" 11	Lomer, Rohr & Co	S. S. Lake Leman	"	500
" 12	" "	S. S. Berbice	Liverpool	100
" 19	" "	S S M. Bedington	London	350
" 26	" "	Brig. Move Rose	"	95
" 26	" "	S. S. Carmona	"	400
" 30	Wilson & Green	S. S. Benbrac	Liverpool	416
July 2	Lomer, Rohr & Co	S. S. Cairo	London	157
" 7	" "	S. S. Oxenholme	Liverpool	765
" 13	Wilson & Green	Bq. M. E. Seed	"	523
" 13	" "	Bq. M. Mitchell	"	150
" 15	Lomer, Rohr & Co	S. S. Benison	"	260
" 22	" "	S. S. Erl King	London	330
" 24	Wilson & Green	S. S. Dracona	Avonmouth	492
" 30	Lomer, Rohr & Co	S. S. Acton	London	535
Aug. 4	Wilson & Green	S.S. River Judus	Liverpool	597
" 4	W. M. Knowles	"	"	189
" 7	Wilson & Green	S. S. Juliet	London	170
" 10	" "	S S. Kehrweider	Hamburg	590
" 9	Lomer, Rohr & Co	S. S. Benacre	Barrow	225
" 11	W. M. Knowles	S. S. Bonhope	Liverpool	276
" 12	Lomer, Rohr & Co	S. S. Carmona	London	150
" 14	" "	S. S. Crete	"	332
" 19	" "	S. Princess	Liverpool	310
" 20	" "	Bq. Fergerson	London	252
" 20	Wilson & Green	S. S. Cononbury	"	220
" 20	Lomer, Rohr & Co	"	"	230
" 21	" "	S. S. Oxenholme	Liverpool	630
" 25	" "	S. S. Plessey	London	480
" 26	" "	S. S. Benbrac	Liverpool	435
Sept. 1	R. C. Adams	Bq. M. C. Smith	Belfast	72
" 1	R. C. Adams	S. Panthia	Liverpool	253
" 1	Lomer, Rohr & Co	"	"	150
" 1	W. M. Knowles	"	"	225
" 3	Gillespie & Moffatt	S. S. Emiliau	"	57
" 3	Lomer, Rohr & Co	"	"	100
" 3	Millar & Co	"	"	125
" 3	Wilson & Green	"	"	260
" 6	Lomer, Rohr & Co	S. S. Dunholme	London	360
" 8	Wilson & Green	S. S. Clare	"	224
" 18	Lomer, Rohr & Co	S. S. Cotherston	"	400
" 18	" "	S. S. Grafton	"	235
" 24	" "	S. S. Berbice	Glasgow	95
" 29	" "	S. S. Fernholme	London	150
Oct. 6	" "	S. S. Concordia	Glasgow	215
" 9	" "	S. S. Oxenholme	Liverpool	525
" 9	W. M. Knowles	"	"	230
" 12	Lomer Rohr & Co	S.S. Windraham	Antwerp	150
" 13	" "	S. S. Burton	London	381
" 21	" "	S. S. Erl King	"	190
" 22	Wilson & Green	S. S. Phœnician	"	600
" 20	Lomer, Rohr & Co	Bq. G. Metzler	Belfast	95
Nov. 3	" "	S. S. Alcides	Glasgow	160
" 3	Wilson & Green	"	"	355
" 3	Lomer, Rohr & C	S.S. Ocean King	London	205
" 6	" "	S.S. Gothenburg	"	295
" 6	Wilson & Green	"	"	227
" 10	Lomer, Rohr & Co	S. S. Burnwall	Antwerp	145
" 15	" "	S. S. Carmona	London	290
" 17	Wilson & Green	S. S. Scotland	"	310
" 19	Lomer, Rohr & Co	S. S. Montreal	Liverpool	150
" 16	R. C. Adams	"	"	265
" 20	Wilson & Green	S. S. Inverway	Sharpness	180
" 20	Gillespie & Moffatt	"	"	19
		Total shipments for 1886		18,972

GROUND IN BAGS.

May 12	W. M. Knowles	S. S Kehweider	1,560
Sept. 17	Lomer, Rohr & Co	S. S. Scotland	200
		Total bags	1,760

Iron Amnong the Ancients.

Iron was first used in Western Asia, the birthplace of the human race, and in the northern parts of Africa, which are near to Asia. The Egyptians, whose existence as a nation probably dates from the second generation after Noah, and whose civilization is the most ancient of which we have any knowledge, were at an early period familar with the use and manufacture of iron. Iron tools are mentioned by Herodotus as having been used in the construction of the pyramids. In the sepulchres at Thebes and Memphis cities of such great antiquity that their origin is lost, butchers are represented as using tools which antiquarians decide to have been made of iron and steel. Iron sickles are also pictured in the tombs at Memphis, and at Thebes various articles of iron have been found which are preserved by the Historical Society at New York, and are probably three thousand years old. Thothmes the First, who is supposed to have reigned about seventeen centuries before Christ, is said in a long inscription at Karnak, to have received from the chiefs, tributory kings, or all of

sovereigns of lower Egypt, presents of silver and gold, "bars of wrought metal and vessels of copper, and of bronze, and of iron." An expedition which the same king sent against Chadasha, returned bringing among the spoil "iron of the mountains, 40 cubes." Belzoni found an iron sickle under the feet of one of the sphinxes at Karnak, which is supposed to have been placed there at least six hundred years before Christ. A piece of iron was taken from an inner joint of the great pyramid at Gizeh in 1837. Both of these relics are in the British Museum. The reference to iron in Deuteronomy, iv, 20, apparently indicates that in the time of Moses, the Egyptians were engaged in its manufacture, and that the Israelites, if they did not make iron for their taskmasters, were, at least, familiar with the art of manufacturing it; "but the Lord hath taken you, and brought you forth out of the iron furnace, even out of Egypt." This expression is repeated in 1st Kings, viii, 51. A small piece of very pure iron was found under the obelisk which was removed in 1880, from Alexandria to New York. The country which lies to the south of Egypt is supposed to have produced iron in large quantities in prehistoric times. Iron was known to the Chaldeans, Babylonians, and the Assyrians, who were contemporaries of the early Egyptians. Some writers suppose that the Egyptians derived their supply of iron principally from these Asiatic neighbors, and from the Arabians. Among the articles discovered by Layard, at Nineveh, were iron scales of armour from two to three inches in length. He also found a perfect helmet of iron, inlaid with copper bands. The Old Testament teems with incidents in which iron is mentioned. In the wanderings of the children of Israel, iron is frequently mentioned. When they smote the King of Bashan, they found him within an iron bedstead. Canaan, the land of promise, is described in Deuteronomy as "a land whose stones are iron." The Medes and Persians, India, and China, and other eastern countries appear to have been acquainted with its manufacture from a very early period. It is worthy of mention that the mythologies of both Greece and Rome attributed the invention of the art of manufacturing iron, to the gods, a fact which of itself may be regarded as establishing the great antiquity of the art in both centuries. Homer, who is supposed to have lived about 850 years before the Christian era, and, therefore, before the era of authentic Grecian history, makes frequent mention of it in his poems. Some of the swords and javelins of the Romans were made of iron and steel in fourth century before the Christian era, but their agricultural implements, were made of iron at an earlier period. The Romans used a battering ram, which had a head of iron, at the siege of Syracuse, in the year 213 before Christ. In the Acts of the Apostles, a statement is made which indicates that iron was used at this period for architectural purposes, "when they were past the first and the second ward they came unto the iron gate that leadeth into the city." Pliny says that iron ores are to be found almost everywhere. Iron has also been found in the ruins of Pompeii, about the time the Coliseum was built.

New Jersey Cedar Mines.

Among the strange productions of Cape May are the "Cedar Mines"—swamps of dark miry stuff, in which are buried immense trees of White Cedar, *Cypressus Thyoides* of the botanists. These mines contain enormous trees buried to a depth varying from three to 10 feet. The logs lie one across the other, and there is abundant evidence to show that they are the growth of different successive forests. Indeed in these very swamps forests of the same trees are now growing. The miners become very skillful at their work. An iron rod is thrust into the soft mud, over which often the water lies. In striking a buried tree, the workman will by several soundings, at last tell how it lies, which is its root end, and how thick it is. He then manages to get a chip off the tree, and by its smell determines at once whether it is worth the labor of mining—that is, the workman will tell unerringly whether the tree be a *windfall* or a *breakdown*. If a breakdown, it was so because it was decayed when standing; if a windfall, the tree fell while sound, and has been preserved ever since by the antiseptic nature of the peat marsh in which it was buried. The soft earth is then removed. This makes a pit in the swamps. Into this the water soon flows and fills up. The saw is now introduced, and at regular intervals a cut is made through the tree. It is curious that the log of a sound tree will sure to turn over when it floats up, the lower side thus becomes uppermost. Trees in this way are sometimes obtained, which yield 10,000 shingles worth $20 per thousand, thus one tree will yield $200. The age of many such trees, as the season rings have been counted, has been made out to be from ten to twelve hundred years, and even more. A layer of such trees is often found covered by another layer, and these again by another, and even a third, while even living trees may still be growing over all. It is evident, indeed, that New Jersey has experienced what the geologists call "osilations." Cape May contains abundant evidence of having been lifted out of a modern sea. The recent oyster and clam are found in natural beds, just as they did in the ocean, but now in positions many feet higher then the contiguous oyster beds; while buried trees exist at depths lower than the beds of mollusks.

POSPECTING.

Indications that will Facilitate the Search for Minerals.

(SELECTED.)

The search for minerals in any given district should not be undertaken unless there is some previous indication as a reason for it; because, save the most ordinary building materials, the mineral substances to which the art of mining is applied are sparingly distributed in nature; and in any given point of the earth's surface we are authorized to suppose *a priori* that these substances do not exist.

More or less proximate indications of their existence may be deduced:

1st. From a knowledge of the geological structure of the country.

2nd. From the presence at the surface of the ground of fragments of veinstone or of ore.

3rd. From the presence of the outcrops.

It is advisable to give a few details on the value which should be attached to each of those indications.

The geological structure of the ground sometimes furnishes *positive*, sometimes *negative* indications.

It is evident, for instance, that the existence of an igneous rock, such as granite, shuts out the possibility of there being coal *at the same point;* but this conclusion only holds good *for the very point under consideration;* and it is known, for instance, that a large number of more or less developed coal mines in France are scattered over the primitive central plateau, and thus rest either upon granite itself or upon such ancient rocks as gneiss or mica-schist. As an example *of a positive indication* it may be said, on the contrary, the presence *of the Coal Measures, properly so-called*, may fairly lead us to suppose that coal is present also. It is rare, in fact, unless in the case of a mere insignificant patch of the rocks, that the coal measures do not contain some workable seam of coal, and we have seen from the examples of the Belgian coalfields that they sometimes contain a very large number. It may also be said that the existence of Permian rocks may lead us to conjecture the presence of copper; that of the Trias, and more especially of the variegated Marls, the presence of rock salt (at all events in the north east of France); that of the supraliassic Marls the proximity of iron ore.

The presence at the surface of the ground of fragments of useful substances (shoad-stones), or even of sterile, substances known to be often associated with the first, is an indication which deserves to attract attention. In prospecting a country, an examination should be made of all denuded parts, escarpments, sides of valleys, etc., and particularly of ravines and beds of the different water courses. Standing in the bed of a torrent we find everywhere, in some measure, a collection of mineralogical specimens derived from all the region higher up. Each mineral species has its own value from the point of view under consideration. Among rocks consisting of mica-schist, for instance, we shall attach very little importance to fragments of quartz with a simply resinous or even saccharine fracture, as this substance frequently occurs interposed in reinform lumps between the folia of the schist. Well crystallised quartz will deserve more attention. Substances that are foreign to the composition of the rock and known to be pretty commonly veinstones of lodes, such as calc-spar, flor spar, harytes, etc., will deserve still more attention. The same thing will be the case *à fortiori*, if spots of pyrites, or galena, or any traces of a green coloring due to the decomposition of copper ore, etc., are found on breaking these fragments.

In carrying out observations of this kind it is necessary to ascend the beds of the torrents step by step, examining the sand and pebbles carefully and minutely in order to ascertain how high up the fragments which awakened attention by their special nature, are found, and thus to discover the point whence they are derived. An idea of the distance of this point may be formed from the more or less rounded shape of the fragments, due consideration being paid to their hardness. When this point has been discovered it will only remain to examine whether the substances noticed have a purely adventitious character of the rock, or whether they belong to a deposit apparently of some extent. This verification is quite essential, for the first case is perhaps that which presents itself most frequently to the observer.

Mineral springs furnish us with indications with regard to soluble substances, analagous to those obtained from fragments of rock concerning insoluble substances. It is thus that brine springs, or springs charged with chloride of sodium, have led to the discovery in the east of France, and especially in the department of Mewithe, of thick beds of rock salt, which are being actively worked at the present day.

If by direct observation, or by proceeding in the manner described in the preceeding paragraphs, we have ascertained the presence of an outcrop, this outcrop should be made the subject of a special examination. As the lode is *of a different nature* to the enclosing rocks and has been exposed to *the action of the same atmospheric agents*, it will not have resisted in the

same way. It will often appear at the surface, either as a hollow or in relief, according as its hardness is greater or less, than that of the enclosing rocks. It is in this manner that hard quartz ore lodes are seen standing out above the surface of the ground in the form of prominent walls, many feet high, running sometimes for a distance of several hundred yards. These outcrops are a certain indication of the presence of a lode; but as a rule they do not give any information about its richness, since the metallic substances have generally been oxodized and removed in the state of soluble salts, often leaving behind nothing but an ochreous precipitate, from the amount of which, in certain cases, may be inferred the quantity of certain metallic sulphides, such as iron or copper pyrites, which the deposit originally contained. This ochreous precipitate itself is often absent, and the outcrop only shows by a slight accidental discoloration any sign of its original richness in ore. Even if an outcrop contains no ore whatever, it is still worthy of investigation if it exhibits a certain continuous character. Therefore, the first care, after having hit upon some point of an outcrop, should be to make sure whether this continuity exists. In case it is not apparent at the surface, a few pits may be sunk to endeavor to ascertain the strike and dip of the deposit and to infer from these, allowing for the outline of the ground, the approximate position of the line of outcrop. This line should be staked out, and efforts should be made to discover other points of the outcrop by digging trenches at intervals at right angles to its presumed strke, and then down till rock in place is met with. When at least three points of the outcrop, not very far apart, and situated at different levels, have been determined in this way, a plane passing through these three points, in case of a lode or bed, may be taken provisionally, on account of possible disturbances of the deposit between these three points, as representing the position of the deposit of the bosom of the earth; it will also serve as a basis for settling upon the best manner of exploring the deposit in depth. If it is a massive deposit with two comparable horizontal dimensions the preliminary excavations should be carried on so as to circumscribe it in every way.

BOOK NOTICES.

The veteran chemist and mineralogist, Dr. T. Sterry Hunt, presents as Chapter VIII, of his *Mineral Physiology and Physiography* (a second series of "Chemical and Geological Essays,") a treatise on *A Natural System of Mineralogy, with a Classification of Native Silicates.* This treatise has been published in full in the *Transactions* of the Royal Society of Canada, and in abstracts more or less extended in other places. We cannot undertake, within the limits of an article, to give it an adequate critical examination. The best that we can hope to do is to impart to our readers a general notion of its contents.

The essay is in three parts. In the first, which is an historical introduction, the author outlines the systems of classification in the mineral kingdom proposed by Werner, Mohs, Dana, Berzelius, Rammelsberg, and others, and shows that the "natural history" systems of Werner and Mohs (followed with more or less modification by Haidinger, Jameson, Shepard, and, in his earlier editions, Dana) were founded on external characters, such as hardness, specific gravity, and crystalline form, independent of composition, as revealed by chemical analysis. Students of mineralogy under the eminent teachers of the last generation will remember that they taught determinative minerology without recourse to chemistry, and even looked upon the blow-pipe as almost an evil—a thing which the metallurgist might need, but the mineralogist had better do without, save in the last resort. We can bear witness to such a feeling in the case of the venerable Breithaupt, the successor of Mohs at Freiberg; and under his successor, Weisbach, it has not ceased to exist.

Indeed, for certain purposes of instruction, it is the right feeling. Determinative mineralogy should be so taught that the student may become able, in the great majority of instances, to recognise minerals from their physical characters. And since the practical field-mineralogist has more to do with determinative than with analytic mineralogy, it is natural that he should retain the tendency received at school, and that he should become more familiar with hardness, streak, and crystalline than with molecular equivalents. Moreover, the mineralogist is usually a collector, and, as Dr. Hunt acutely remarks, the divorce between physical and chemical characters maintained in the study of mineral species by Werner, Mohs, and their followers, produced a system available for the purposes of determination without the destruction of the individual specimen. The artificial system of Linnæus in botany possessed the same advantage; and that it is for many purposes a practical advantage, the tenacious life of that system, in spite of its scientific absurdity, bears witness. The same will probably continue to be the case with the mineralogical systems which science has more or less outgrown. They will survive in tables and in practice, long after they are shown to be less truly natural than those which take into account the chemical analysis as of paramount importance.

There is, in fact, a general consent among mineralogists that the chemical system, proposed by Berzelius, and perfected by Rammelsberg, Naumann, Dana, and others, presents the truly natural classification. Hardness, specific gravity, crystalline form, optical characters, etc., are rated as secondary in value, and important chiefly as means of determination. But this is to go to the other extreme. A truly natural system should be based on both physical and chemical grounds—if such a thing be possible; and possible it can become only when, to use Dr. Hunt's words, "inherent and necessary relations between the physical characters and the chemical constitution of inorganic bodies" are made known. That such relations exist, our author declares; and in this essay he seeks to establish at least some of them.

The second part of the paper before us reviews at some length the author's progressive treatment of this subject since 1853, when he first declared the possibillity of a physico-chemical classification. We shall not follow this review in detail, but content ourselves with quoting from a paper published in 1867, the following admirable statement of guiding principles:

"In approaching this great problem of classification, we have to examine, first, the physical conditions and relations of each species, considered with relation to gravity, cohesion, light, heat electricity, and magnetism; secondly, the chemical history of the species, in which are to be considered its nature, as elemental or compound, its chemical relation to other species, and these relations as modified by physical conditions and forces. The quantitative relation of one mineral (chemical) species to another is its equivalent weight, and the chemical species, until it attains to individuality in the crystal, is essentially quantitative. It is from all the above data, which would include the whole physical and chemical history of inorganic bodies, that a natural system of mineralogical classification is to be built up. . . . The variable relations to space of the empirical equivalents of non-gaseous species, or, in other words, the varying equivalent volumes (obtained by dividing their empirical equivalent weights by their specific gravity) show that there exist in different species very unlike degrees of condensation. At the same time, we are led to the conclusion that the molecular constitution of gems, spars, and ores is such that those bodies must be represented by formulas not less complex, and with equivalent weights far more elevated, than those usually assigned to the polycyanides, the alkaloids, and the proximate principles of plants."

Following the line thus indicated, Dr. Hunt began by seeking to find in the realm of inorganic chemistry the laws progressive or homologous series and polymerism, already recognized in the chemistry of the hydrocarbons. Already in 1853, he had suggested that "all species crystallizing in the same shape have the same equivalent volume, so that their equivalent weights (as in the case of vapors) are directly as their densities, and the equivalents of similar species are as much more elevated than those of the carbon series as the specific gravities are higher." And this suggestion he had illustrated with instances drawn chiefly from the carbonate spars and the polysilicates. In these and later essays in the same direction, Dr. Hunt indicated, as the principal evidence and measure of the connection between the chemical and the physical characters of species, *the relation of equivalent weight to specific gravity.*

The complete statement of the principles adopted as a basis of classification is now given substantially as follows:

1. The extension to all mineral compounds of the conception of high equivalent or molecular weights like those of the carbon series in so-called organic chemistry.

2. The similar extension of the laws of progressive or homologous series.

3. The attribution of minor variations in the chemical composition of a mineral species not only to its polybasic character (that is, to the replacement of one base by another in varying degrees), but also in certain cases to indefinite admixtures of homœomorphous species.

4. The assumption that for homæmorphous solids, and probably for all solids, the molecular volumes are identical; and the attempt to fix the molecular weights of such compounds as the polysilicates and polycarbonates from their densities, as compared with those of species the minimum molecular weights of which are otherwise determined.

5. The adoption of atomic formulas to represent the composition of mineral species, and the comparision of the volumes of complex species by means of numbers deduced from these formulas. The term *atomic* here used, is distinguished from *molecular;* and Dr. Hunt's atomic weights are derived from the ordinary chemical equivalents, or molecular weights, by multiplying the latter by the numbers representing the atomicities of the respective elements. His symbols are distinguished by the use of small letters instead of capitals. Thus, for the monad elements like sodium, chlorine, and fluorine, the atomic symbols represent the same numbers as the received molecular weights: Na = na = 23; Cl = cl = 35.5; etc. For dyad elements, like oxygen calcium, and ferrosum (that is, iron in ferrou' salts), the molecular weights are divided by 2s

O = 16, o = 8. Ca = 40, ca = 20; Fe = 56, fe = 28. For triads, like aluminium, boron, and ferricum (iron in ferric salts), the divisor is 3: Al = 27, al = 9; B = 11, b = 3.66; Fe = 56, fi = 18.66. For tetrads, like silicon and titanium, the divisor is 4: Si = 28, si = 7; Ti = 50, ti = 12.5. Finally, the pentad, niobium, requires 5 as divisor: Nb = 94, nb = 18.8.

Employing these weights, Dr. Hunt translates the empirical formulas of the received notation into atomic formulas, and these formulas he affects with a modulus or multiplier, to represent the law of polymerism. Thus, the formula of lime-magnesia pyroxene given in Dana's text-book is $CaMgSi_2O_6$. Calcium, magnesium, and oxygen, being dyads, and silicon a tetrad, the atomic formula for this variety would be $ca_2mg_2si_2o_{12}$, or, using the symbol m to represent the interchangeable metallic elements, $m_4si_4o_{12}$. This is the same in proportion as $m_1si_1o_3$; while, as to the molecular weight of the body as a whole, that is, of the species, it can not be determined from an empirical formula derived solely from chemical analysis. It must be either the weight directly shown by the formula, or some multiple of it; that is all we can say so far. Hence, the general atomic formula for the *molecular weight* of pyroxene is written by Dr. Hunt $n(si_1m_1o_3)$, n being the undetermined multiplier. But it is not necessary to know the value of n in order to obtain a number representing the volume of the atomic unit. In the case taken for illustration, the empirical atomic formula $si_1m_1o_3$, in which the one atom of m is one half ca and one half mg; we have a total weight of $(2 \times 7) + (0.5 \times 20) + (0.5 \times 12) + 3\ (8) = 54$. Dividing this by 3, the number of oxygen atoms, we have 18, which represents the weight of the atomic unit of the species, this atomic unit in this case being an oxide. For other combinations than silicates, this atomic weight (the general symbol for which is P) is obtained in a slightly different manner, which we will not here stop to consider. P, being once obtained, is divided by D, the ascertained specific gravity of the species (water = 1.), and the quotient, V, is a number representing the volume of the atomic unit.

5. The fifth principle is that, in related and homologous species, the hardness and the chemical indifference are inversely as the value of V—or, in other words, that they increase with the condensation which has attended the chemical combination. This, we presume, is a sort of check on the foregoing assumptions and calculations. If the values of V are really more closely connected with the characters of hardness and indifference than are the values of D; that is to say, if, by manipulation of the atomic formula after Dr. Hunt's fashion, a series of numbers can be obtained which will tell us more, or tell it more accurately, than the simple series representing specific gravities, then the introduction of chemical elements into the calculation is more or less perfectly vindicated. Otherwise, we might just as well throw it all away (so far as this use is concerned), and content ourselves with the simple old notion that among similar minerals hardness and chemical indifference vary as the specific gravity.

It is difficult to apply a precise test in this case; for we have no numerical measure of chemical indifference, and only a very loose and vague measure of hardness. A casual inspection of Dr. Hunt's tables of the silicates shows that P does not vary greatly among nearly allied minerals, and hence that— $\frac{P}{D} = V$ varies on the whole inversely as D.

The third part of the essay presents a classification of silicates. Here, the first division is on chemical lines. According as the minerals contain protoxide bases, sesquioxide bases, or both, the order Silicate is divided into three sub-orders: Protosilicate, Protopersilicate, and Persilicate. An ingenious and forcible argument is offered, to show that this division is really fundamental in nature—that it lies in the the processes of mineral genesis and sub-aerial decay. In each of these sub-orders, five "tribes" are distinguished on physical and chemical grounds, which correspond in a general way, though not precisely, to the classes of spars, gems, and micas established by Mohs, with the addition of a separate class of amorphous or colloid species, and a further division of the spars into hydrous and anhydrous. The five tribes of Dr. Hunt thus become Hydrospathoid, Spathoid, Adamantoid, Phylloid, and Colloid; and the sub-order is indicated by the appropriate prefix. Thus, we have under the Protosilicates, Hydroprotospathoids, Protospathoids, etc.; under the Protopersilicates, Hydroprotoperspathoids, Protoperspathoids, etc. The longest of these names are replaced in practice by others, referring to typical species. Thus, the Hydroprotoperspathoids are Zeolitoids, comprising the zeolites which do not contain persalts exclusively. The latter (Perzeolithoids) constitute the Hydroperspathoid tribe of the Persilicate order.

Compared with the reigning system of classification; as found in Dana's text-book, this is apparently more symmetrical, logical, and comprehensive. The fundamental division of the former is based on the presence or absence of combined water; and the next rank of subdivision, namely, into bisilicates, unsilicates, and subsilicates, involves a chemical distinction only—a distinction, moreover, which becomes somewhat hazy among the hydrous silicates, which are divided into a "general" section, a "zeolite" section, and a "margarophylite" section. Of course, minerals of very different physical characters are thrown together under this purely chemical classification.

Another scientific advantage in Dr. Hunt's method is, that it is independent of complicated theories as to the arrangement and relations of the atoms or the molecules in chemical combination. The terms *atom* and *molecule*, as employed by him, represent imaginary units, and do not involve the hypothesis of hard particles with void spaces, of bonds and links, to explain chemical affinities. Whether such be or be not the actual constitution of inorganic bodies, is a question which does not affect the relations he has sought to establish.

We have no space to consider his brief suggestion of a scheme covering all mineral species, or his striking discussion of the question of molecular weights. In the latter field, indeed, we feel both least inclined to adopt, and least competent to criticise, his conclusions. Their correctness does not seem to be necessarily implied in his classification of the silicates.—*Engineering and Mining Journal.*

"Mr. Charles Marvin," writes a prominent English authority whose name of late years has, by reason of his writings on Russian affairs, become very familiar to the public, sends us a pamphlet, "The Coming Deluge of Russian Petroleum." On this occasion Mr. Marvin writes on a commercial subject, and he has put together a number of astounding facts as to the wealth of the petroleum springs of Baku. He tells us at the outset that a single well in Russia yields daily more petroleum than all the other oil wells in the world combined, and there are 25,000 wells in America. Three years since a well was reported at Baku to be spouting 3,400 tons of petroleum daily, and the world wondered; but Mr. Marvin tells us that this autumn one well has been spouting 11,000 tons of petroleum daily. The object of Mr. Marvin is to again call the attention of English capitalists to the rich field for enterprise in the development of these Russian oil wells. Development is hardly the word applicable to the wells, for they have a manner of developing themselves, and inundating the surrounding district with oil. Mr. Marvin told of the vast extent and practically inexhaustible character of the wells some years since, but he complains that British capitalists have not come forward to claim their share of the trade. There are 120 firms at Baku having oil refineries and they produced nearly 120 million gallons of refined petroleum. Eight years ago the output was but one and a quarter million gallons, and this marvellous development is attributed to improved means of transport. Formerly the oil had to be barrelled on the spot. In 1879, a steamer fitted wirh oil tanks for conveying petroleum in bulk commenced working on the Caspian sea, and now there are upwards of 100 Russian steamers carrying on the trade. Mr. Marvin explains that the Baku crude petroleum yields, but 30 per cent of "lamp oil," as compared with 70 per cent. in America, but 60 per cent. of the residue called *astatki* can be treated to yield valuable products particularly for lubricating purposes. One well-known London firm Sir Charles Price & Co., is regularly receiving large shipments of this residue, and it is asserted that lubricating oil made from it is of extraordinary quality. As the price at Baku ranges from 4d. to 1s. 4d. per ton, there must be plenty of money to be made in this branch of the trade. Nearly 3½ million gallons of lubricating oil were sent from Baku up the Volga last year, and upwards of 2½ million gallons were despatched by the Batoum railway. Owing to the low cost of the oil refuse it is being largely used for steam generation in the steamers running from Batoum ta Odessa; the Russian fleet on the Caspian has used nothing else since 1874; and the Black Sea Company, owning 76 steamships, will shortly adopt it exclusively. Messrs. Rothchild are largely interested in the trade, and to facilitate transport have placed 250 tank cars on the Transcaucasian Railway. By this line 80,000 tons of maganese ore were carried from the Caucasus last year. Mr. Marvin proves that the great need of the district is a cheap means of bringing the oil to a shipping port. Messrs. Rothschild have applied for a concession to construct a pipe line from Baku to Poti or Batoum, six hundred miles; but they have been refused because they are working oil refineries, and the Russian government stipulates that the pipe line shall be controlled by a company not interested in the advancement of any particular refinery. The estimated cost of the pipe line is £2,000,000, and already at least one English firm has sent representatives to Baku and Batoum to investigate the scheme, and examine into the work necessary. Two of the directors of Messrs. John Russell and Co., limited, of Walsall and Wednesbury, were out last year, and Mr. Marvin states that a representative of the firm is now on the spot. Quite apart from the illuminating oils, the Baku oil wells seem likely to have an important bearing on the "liquid fuel" question which is now being discussed by some of our scientific societies. As to the permanency of the Caucasian oil wells. Mr. Marvin says that the oil bearing character of the district was known 2,500 years ago, and oil has probably been flowing on uninterruptedly ever since.

Mineral Products of the United States.

Advance sheets of the report of the United States Geological Survey have just been received, which show the total production of minerals in this country during 1885, as compared with previous years. Of the metallic minerals produced pig iron appears to have been the most valuable in total production, and platinum appears to have been the scarcest. The total production of pig iron in 1885 was 4,045,525 long tons, valued at $64,712,400 against 4,097,863 tons valued at $73,761,624 in 1884. The total consumption of iron ore was placed at 7,990,786 tons, of which only 390,786 tons were imported. Silver was next to iron in total production, being 39,910,279 ounces, of a coining value of $51,600,000, against 37,774,605 ounces in 1884, valued at $48,800,000. The total gold production was 1,538,376 ounces, valued at $31,801,000 against 1,489,949 ounces, valued at $30,800,000 in 1884. Copper showed a slight increase over the preceeding year, as 172,962,617 pounds, valued at $18,292,999 in New York, were produced in 1885, against 147,805,407 pounds valued at $18,106,162 in 1884. Lead was produced to the extent of 129,412 short tons, valued at $10,469,431, against 139,897 tons in 1884, valued at $10,537,042. The quantity of zinc mined showed an increase, 40,688 short ton, valued at $3,539,856, being produced in 1885, against 38,544 tons, valued at $3,422,707 in 1884. The valuations above given for copper, lead and zinc are those current at New York. The quicksilver production was valued at San Francisco at $979,189, against $936,327 the year before, and the production was 32,073 flasks, against 31,913 flasks in 1884. The production of nickle was much heavier than in 1884, as 277,904 pounds, valued at $191,753, were mined in 1885, against 64,550 pounds, valued at $48,412 in 1884. Crude platinum was produced to the extent of 250 troy ounces, valued at (New York) at $187, against 150 ounces valued at $450 in 1884. Aluminum was produced to the amount of 3,400 troy ounces, valued at Philadelphia at $2,550 against 1,800 ounces, valued at $1,350 in 1884. Of the non-metallic minerals, coal was the most important production, the yield of all kinds of this fuel being 99,969,216 lowg tons, valued at $159,019,596, against 106,906,295 tons, valued at $143,768,578, in 1884. It will be seen from the above figures that while the total production of coal fell off 7,837,079 tons, the value increased $15 251,018, showing an average increase in price of 25c per ton. The above figures include the colliery consumption. The bituminious coal produced amounted to 64,840,608 tons, valued at $82,347,648, against 73,730,539 tons, valued at $77,417,066, while of anthracite 34,228,548 tons were mined, valued at $76,671,948 against 33,175,756 tons, valued at $66,351,512 in 1884. Of petroleum 21,842,041 barrels, valued at $19,193,694 were produced, against 24,089,758 barrels, valued $20,476,294 in 1884. Lime was an important production, 40,000,000 barrels, valued at $20,000,000, being made in 1885, against 37,000,000 barrels, valued at $18,500,000 in 1884. The salt industry was also an important one, 7,038,653 barrels, valued at $4,825,345, being made in 1885, against 6,514,937 barrels, valued at $4,197,734 in 1884. The production of building stone was about the same as in 1884, the total value being $19,000,000. It is worthy of note that 200 tons of "block tin" ore were mined in 1885 at the Etta mine in Dakota. The total value of all the mineral products of the United States in 1885 was $428,511,356, against $413,214,748 in 1884. Of this the value of the metallic products was placed at $181,589,365, against $186,414,074 in 1884, while the non-metallic products were valued at $239,431,991 in 1885, against $219,800,674 in 1884.

Dishonesty and incompetency, writes the *Critic*, have done much to throw discredit on mining, and this distrust will hardly be removed until our leading business men take hold of it and give mining the position it deserves. A few of our merchants dabble in mines, but their money is too often invested secretly and through the agency of some "cute" operator, who often is an adept in all the practices that throw discredit on mining. They shut their eyes and open their mouths, and receive their share of the profits, with no desire to know the details of the transaction, which they easily surmise cannot bear an honest investigation. "There is nothing like a mining speculation to bring the dirt out of a man," said a leading barrister of our city, and the remark is unfortunately too true. Men who would shrink from the slightest suspicion of dishonesty in their usual business transactions, seem to think that, like in love and war, all is fair in mining. The manipulator of a clever mining swindle who spends his money freely, and jokes openly at the expense of his dupes, is pronounced "a jolly good fellow," while his victims are condemned for their folly in going into a mining speculation. While swindlers in any other business would be forced into court, the mining swindler generally goes free, and his immunity from punishment encourages scores of imitators, who flood the market with worthless schemes. These men are the curse of honest miners, who see capital enlisted in puffed and worthless mines, while their modest statements of facts are passed over. We would echo and re-echo these sentiments.

MINING NOTES

Nova Scotia.

An interesting exhibit from the recently discovered deposits of copper and iron ore in North Sydney was on view during the last weeks of the Colonial and Indian Exhibition.

From the Canadian *Gazette* we learn that: "A company in England has, within the last few days, made arrangements with the owners of a number of the Nova Scotian gold mines for the purchase of their 'tailings.' These will be concentrated in Nova Scotia to a certain richness and then shipped to England for further treatment. The Company has had a number of essays of the 'tailings' made, and has found that they contain quite enough gold to warrant treatment in this way."

The owners of the Carlton gold mine, Yarmouth county, have decided to place a Wiswell Crusher to be run by water power, and have made a contract for the erection of steam hoisting and pumping machinery on their property. The lead has been opened in three places in a distance of 750 feet and the ore has been found equally rich in each shaft.

An exchange reports the sanitary condition of Springhill as deplorable, the water bad, and epidemic deseases very prevalent. A great many accidents, some of them fatal, have recently occurred at these coal mines.

The Clementsport *Courier* announces the discovery of gold by prospectors at a place about five miles from that town. Specimens shown to a *Courier* representative are said to indicate a rich find.

Mr. A. A. Hayward, has purchased the Cochrane Hill property, located about eleven miles from Sherbrooke, Enysboro' County. The property, which was sold by the Sheriff, contains a fifteen stamp mill, large boilers, and is also well equipped with hoisting and mining gear.

The same gentleman is also the proprietor of Empress Mine, where he is meeting with great success. The following particulars of the work being done there are gleaned from the *Critic*:

"The main shaft is now down to a depth of 320 feet, and as soon as the large plunger pump, which is now being put up, is in working order, it (the main shaft) will be rapidly sunk upon. There is now over 76,000 feet of stoping ground open, and ore enough at hand to last a 15 stamp mill two years. All the latest labor-saving appliances have been introduced into the mine, and the mining is conducted on scientific principles, guided by great practical experience. No. 5 shaft to the north of the main shaft, has been sunk to a depth of 200 feet and connected with the main shaft and shaft No. 2 by two cross cuts, one at 100 and the other at 200 feet in depth. Good pay ore has been found in the cross cuts and shafts. The Harding mine averaging 71⅔ cents a foot. Shaft No. 5 and drifts to the north, averaging $1.50 per foot. Shaft No. 3, 52¼ cents, and No. 2 level west from shaft No. 3, 50 cents per foot. Overhead stoping is the rule, the detached ore dropping by its own gravity into receptacles, from which it is loaded on the ore cars and raised to the surface without handling. At the surface the ore is dumped automatically, and is soon being crushed under the ponderous stamps of the mill."

We learn that as a result of enquiries made at the Colonial Exhibition, regarding the exhibits of briquettes, a prominent English consulting engineer has been placed in communication with Cape Briton manufacturers, and if sufficient slack coal can be obtained at the different collieries of the province, there seems to be good prospects of extensive works for the manufacture this fuel being erected there. These briquetts contain about nine per cent. of coal tar pitch, and are said to be admirably adapted for steam purposes, particularly for locomotivies.

We learn from the *Engineering and Mining Journal*, that negotiations are in progress at Halifax between the representatives of a New York company and John Grenier for the purchase from the latter of two coal and copper mining properties in Cape Breton; $200,000 is asked. The copper areas begin at George River Mountain, and extend westerly ten miles along the southern side of Little Bras d'Or, being divided into four blocks of five square miles. The coal areas cover fourteen square miles, and are situated between Lingan and Sydney, near the General Mining Association's property.

The *Critic* is our authority for the following item from the Oldham district: "Mr. E. C. McDonnell brought into town a brick of 140 ozs. of gold, the product of 65 tons of quartz, being the result of six weeks' work by 20 men. The ore was taken from the Dumbrack lead, which averages about six inches in thickness, and was mined from a tunnel at the depth of 250 feet. The main shaft has reached a depth of 315 feet,

the quality of the ore steadily improving as the lead is sunk upon. Mr. McDonnell has been mining for over 23 years, 14 of them on his own account, and has probably paid as much money in royalties as any mines in the Province. The mine is equipped with one of Mumford's patent boilers and a good hoisting engine, and has proved a most profitable investment for its owner."

Quebec.

The phosphate property at High Falls has been sold by its owner, Captain Bowie. for $10,000.

Mica is reported to have been discovered on the property of Mr. Lemires at St. Ambroise de Kildares.

Dr. C. Le Neve Foster, H. M., Inspector of Mines for North Wales, who was appointed by the Royal Commission to report upon the minerals and rocks shown at the Colonial Exhibition, has expressed a most favourable opinion of the slate exhibited by the Rockland Slate Co. of Montreal. This gentleman has had under his supervision many of the celebrated Welsh slate quarries and he states that although the slate exhibited does not split as smoothly as the Welsh slates, and therefore does not look as well in a rough state, it is fully equal to the best Welsh slate when planed or otherwise worked. The slabs exhibited by the company are very large and the slate is free from iron pyrites, which are often present in the Welsh slates, and by its decomposition, stains them with spots of iron rust. Dr. Foster, like a number of other gentlemen interested in the slate business who have visited the Canadian section, spoke very highly of the manner in wh.. the slate washtubs sent from Montreal were put together, and thinks that the slate workers of Wales might, in this manner, very profitably take a lesson from their Canadian brethren.

Ontario.

Specimens of copper from the deposits at Sudbury were forwarded to the Colonial and Indian Exhibition.

Copper from this mine is being shipped at the rate of ten cars per week to the smelting works in New Jersey.

The rush of miners and speculators into Sudbury has become so great that prices for food and lodging at that place are exorbitant.

The C.P.R. have constructed a side track from the Algoma branch into the portion of the newly discovered copper mines at Sudbury. They are also laying for the owners of the mines another branch to run to a point at the mines about four miles distant.

THUNDER BAY DISTRICT.

The Silver Mountain mine has been sold to an English company for $175,000. Work will be commenced at once under the supervision of Mr J. Tretheway. The chairman of the new company is Mr. J. A. Tobin, a director of the Liverpool, London & Globe Insurance Co., and on the board of management is the name of Sir Alex. Galt. The capital is placed at $500,000, all paid up, and it is stated that fully $200,000 will be available at once for working expenses. The property was purchased from Messrs. Oliver Dounais, J. Thretheway, R. Thretheway and J. Gifford. The vein, which is located on locations R53, R54, was discovered by an Indian in September, 1884.

In addition to the east end of Silver Mountain the Port Arthur *Sentinel* advises that the company have purchased other mining locations as well as about one thousand acres of land from the Ontario government, so that they now control absolutely over fifteen hundred acres, all of which they expect to use in the development of their mine. Two of the locations purchased from private parties cost the original owners about $100 each, and were purchased by the company for $1,000 and $2,000 cash respectively, after being held only about a year.

The Silver Islet mine is to be pumped out, with a view to again working it.

It is not improbable that work will be suspended for the winter at the Peerless mine.

Valuable silver vein are reported to have been discovered on Arrow Lake, a few miles from Whitefish.

Rice leaf silver is reported to have been struck at the Elgin mine. This property is located near the Beaver mine, and is on the same range.

A fourteen foot shaft has been sunk at the Elgin mine. Four men are working the claim and the indications are said to be good.

Mr. C. J. Johnson has taken patents for a large tract of land some 35 miles east of Port Arthur which is said to contain rich deposits of silver lead.

Operations are temporarily suspended on account of the water at the Silver Falls property. After the water has been pumped out work will be resumed.

Iron is said to have been discovered a short distance west of Lac des Mille Lacs. An exchange informs us that negotiations are now in progress with a Chicago company to operate this deposit.

Writing of these and other iron ore deposits in the Thunder Bay District the *Miner* says:

"We believe that we have some of the largest deposits of iron of any district in America; and if this is the case, we have no fear that we shall be able to find a market for it; for the vast consumption, and rapidly increasing demand for the products of iron ore in the United States, places us in such an advantageous position, that it will become almost imperative that the United States draw their principal supply from us. It is almost pretty generally known that unlimited quantities of iron ore exist on Lake Winnipeg, and in the district between this lake and Hudson Bay; and we have no doubt that in a short time, with proper railroad facilities, this vast district will become the great mineral reservoir, for the whole Dominion of Canada, and probably for the United States."

The Fort William *Echo* gives the following particulars concerning the iron deposit owned by the McKellar Bros. and Graham, Horne & Co., on the Atic Okan river (near the Seine):—

"The rich iron ore occurs in a great lode or belt with one and in places two partings of silicious, chloritic and dioritic schist, 10 to 50 feet in thickness of 100 to 150 feet. The iron lode conforms with the associated strata and dips north at an angle of about 80 degrees to the horizon, and shows the rich body of ore along the strike for a distance of nearly a mile and a half, the ore holding its full size along the middle position for about half this distance. It forms a mountain range along the whole way, that rises to an elevation of about 100 feet above the level of the surrounding plain for a good portion of the distance; so that it presents excellent facilities for extensive and cheap mining."

The quality of the ore as shown by Professor Chapman, the great authority on iron ores in Canada, is second to none. He states, in the certificate of analysis, "so far as regards composition and physical characters, a better ore could not be obtained." He shows the ore to contain 70.06 per cent. metallic iron, no titanic acid, and only a very small amount of sulphur, and phosphorus, practically none, the balance being alumina and silica.

LAKE OF THE WOODS DISTRICT.

A sixth interest in the Gold Hill location has been sold for $500 to Mr. A. Gillis, of Belleville, Ont.

It is rumored that Mr. Dobie has refused $15,000 for a one-sixth interest in the Pine Portage Mine.

The Gold Mining company have been compelled to stop work on their property near Rat Portage by a Mr. Mather, who claims the mineral under his timber lease.

The miners in the vicinity of Rat Portage have taken steps to petition both the Ontario and the Dominion Governments anent the difficulty of securing valid titles to their properties, many of them have been waiting since 1879 for a title to their claims and their patience is becoming exhausted.

Manitoba and N.W.T.

Sir Alexander Galt reports that the coal taken from the mines at Lethbridge improves in quality the further in operations are carried. It is now selling at $6.50 on the cars, and $7.25 delivered. He expects that the output for the winter will increase to 400 tons per day.

The first meeting of the Canadian Anthracite Coal Mining Company held at Winnipeg on the 16th November elected the following as directors: McLeod Stewart, Ottawa, Ont., perside.t; Senator Thorp, Eau Claire, Wis; vice-president; H. Ingram, President of the National Bank, Eau Claire, Wis., treasurer; A. Puge, St. Paul, general manager. Messrs. Dennis Ryan, John Stewart, W. B. Scarthe, E. A. Bronson and Archibald Stewart are also mentioned as directors of the company. The subscribed capital of the new company is $500,000.

This company has been formed to develop the deposit of anthracite coal in the vicinity of the Cascade mountain, 75 miles west of Calgary. It owns 1,360 acres of land containing the whole of the available deposit. The seam or vein has been reported by Dr. Geo. M. Dawson, Assistant Director, Geological Survey, and others, as measuring at the further opening four feet and eight inches in thickness, having increased from its outcrop to this width from four feet. It is five feet and two inches in thickness at the Black Diamond or Hughes mine, nearly three miles distant. The stratum may, therefore, be regarded as having an average thickness of 5 feet with but little, if any variation. From a calculation made by Mr. C. D. Wilber, Inspector of mining properties. In Chicago, it is estimated that every three feet of stratum will give 7,392 tons; and 300 feet will give 100 times as much or 739,000 tons. Reasoning on this basis

the company calculate that at a trifle over 400 feet in depth that there are 1,000,000 tons of anthracite coal.

The Manitoba *Free Press* says that with careful management and having the co-operation of the Canadian Pacific Railway, whose desire it is to foster enterprise, which will build up and develop the mineral resources of the far west, the future of this company is of a promising character. The development has been going on for the past month under Pennsylvania management, the promoters being desirous that the best seams be tunnelled and developed, and the coal properly prepared before placing it on the market.

British Columbia.

A one-fourth interest in the old Channel Company in the Granite creek district was recently sold for $750.

There is a vital necessity for a waggon road from Columbia River to McCulloch Creek in order that supplies and machinery may be brought in.

At the mouth of Curn's Creek (30 miles from Revelstoke) J. H. Cameron has staked a large claim, and is now on the ground making preparations for work next season.

A prospecting party have discovered gold at a creek about eighty miles from Barkerville. The specimens shown are good and miners will go to the new gold field in spring.

A number of parties are prospecting in the vicinity of Slate creek. From latest reports some excitement exists over the reported find of a $215 nugget in the neighborhood.

A fine seam of coal 5½ feet thick has been struck by the East Wellington Colliery. It is also reported that the level running down the valley from No. 3 shaft of the Wellington Collieries has also opened up a splendid seam of superior coal.

A large number of quartz claims have been taken up and prospected in the Big Bend district, 30 miles from Revelstoke, on the Columbia River. Sufficient work has not been done on any of them yet to test their richness, but old miners pronounce the indications as very favorable.

In the same district a short distance from the claim of Messrs. George Platt & Co., a farmer from Manitoba is industriously at work fluming a canyon, an undertaking which is pronounced by those who have seen it, to be one of the greatest exhibitions of pluck and perseverance in the history of mining.

At a meeting of the B. C. Mining Company, held at Victoria on Thursday 21st ult., arrangements were made to extensively prospect their property known as the Cariboo location. The present shaft will be straightened and sunk lower, cross-cutting and drifting in the descent. The estimated cost of the work is placed between five and six thousand dollars.

Rumours of a rich find on Vancouver Island are prevelant in Victoria. A *Colonist* representative states that he has been shown a specimen seamed with gold, which contains as much of the precious metal as quartz. It is he says larger than a man's fist, weighs three pounds four ounces, and is estimated worth over $80 in gold. Some suspicion exists as to the truth of the story.

Specimens of quartz taken from the ledges known as "Senator Jones" and "Governor Perkins," near Lowhee creek, were recently forwarded to the Government Assay office and have netted from $55 to $150 to the ton. The vein is thought to be a continuation of the "Bonanza" ledge owned by the B. C. Mining Company.

As an instance of the recent revival in quartz rock in the vicinity of Richfield, it should be stated that no fewer than 39 registrations of quartz were made during September at the Government office of that place, while applications for mining ground, water privileges, free miner's certificates, new, and renewals, are of daily occurrence.

Recent tests made of the quartz ledge, commonly known as "Perseverance Claim," near Coldstream are thought to be sufficiently good to induce the locators to proceed with the work of prospecting the property. The ledge is one foot thick on the surface, and widens to two feet at a depth of six feet. The locators entertain the belief that it will improve as it is further developed.

Mr. McCullum who has been for the past sixteen months in the mines at the Big Bend district has arrived in Victoria. He reports very favorably of that district. Mr. S. Adler who has arrived in Victoria, Granite Creek, describes it as the worst mining camp he has known since 1850. Those who are remaining are only holding on in the hope of an improvement. If gold is secured in paying quantities it will be found in the hill claims. Some of these latter have paid wages. A house that cost $600 in labor alone was sold for two glasses of whiskey. Another that cost $1,500 was sold for $15 and cut into firewood. Goods are being sacrificed. About forty white men still remain.—*B. C. Colonist.*

A correspondent writing to the *Colonist* regarding the mines at Misquito Creek says that: "The Discovery," last year took out $10,000: but this year they had just struck good pay when the water gave out. They are now bringing in a ditch five miles, and when this is ready it is expected that a continual head of 200 inches will be had. Above this claim is that worked by Flynn Bros., which also suffers from a lack of water, though last year it paid well. They were engaged in cleaning up at the time of our visit and we saw a couple of pans of dirt worked. A couple of shovels of a mixture of mud and gravel were placed in the pan and then worked with water until nothing was left but the gold. It had almost all been washed away and we thought there was not a color, but a minute more disclosed several nuggets which weighed $6 in all. The second pan furnished $3. No wonder there is a resistless charm about the rough labor when from the earth a miner can wash the glittering yellow gold. The gold of Misquito creek is of the finest character found in Cariboo, weighing $19 to the ounce.

Recent events, writes an English financial paper, have made it so thoroughly manifest that the British investor has a liking for gold mines that it is much to be regretted that energy is lacking in the development of the gold-bearing districts of British Columbia. Here is a vast grand sparsely populated region, rich in mineral resources: who will take it in hand? Mr. Koch, from whose report to the gold commissioner of the Cariboo district we recently quoted, points out that as yet there has been nothing like an adequate examination of the gold quartz deposits in that part of Her Majesty's dominions. He makes special reference to Hixon creek, where he superintended operations in the hope of finding a paychute of quartz. "A shaft was sunk, and at a depth of 60 feet a drift was started, and the vein was found at the exact point where it was estimated to be, and no vein in California has truer or better defined walls." Mr. Koch proceeds to admit that it is quite possible a greater depth must be reached before paying quartz in large quantities will be obtained, but he expresses himself satisfied with the results of recent prospecting, and declares his opinion that the gold quartz deposits of the district are not merely local, but that a regular and unbroken formation exists; that this continues for many miles, and that true fissure, and even contract, veins of gold and silver can be found by intelligent prospectors. If this belief be well founded most people will be of opinion that intelligent prospectors had better set to work at once—unless, indeed, they are afraid that the authorities of British Columbia, following the example of the Dogberries of Queensland, are only waiting until English capital has been invested in their mines to give the whole business a gratuitous but official black eye.

Mr. Ames Bowman, M.E., of the Provincial Government geological staff, has expressed a most favorable opinion of the mineral resources of the Cariboo district. He has just returned from the work of occupying a large number of additional triangulation stations for geography, and has been following the formations, and placer mines, and quartz ledges in detail. The principal quartz ledges in the old placer district were visited, to trace, as far as possible, the connection between the ledges and the placers, and particular attention was given to the strike of the rocks containing the auriferous deposits. In this way the gold belt has been traced and segregated from one end of the country to the other. Mr. Bowman states that to the north-eastward there is a newer formation, differing entirely from the slate country of Cariboo, in which mining has been profitably carried on. In this fossils have been found, showing it to be newer than Cariboo, but older than any of the gold-bearing country in California. In the southeastern corner of the field work is a formation newer than the gold-bearing country of California. He advocates the adoption of central chlorination works or leading establishment which would form a market for the products of the mills and to show the necessity for this describes the process as follows: "There are three different kinds of roasting furnaces in general use; first, the reverbatory in which the ore is shovelled from one end to the other as in a bake oven; the cylinder, where the same thing is done mechanically; the Stetefelt furnace in which it is dropped down a shaft, falling from one shelf to another until the sulphur is burned out. The roasted ore, which is now fine dust, is placed in a tank or tub, saturated with chlorine gas and leached out with water; it now being in the form of a red mud is placed in crucibles and converted into bullion. Thus, if the roasting is not done just right, much gold is lost. It is evident these are all expensive appliances and require skill. An immense quantity of ores requiring that treatment are in the Cariboo district and properly managed chlorination works would prove a profitable in-

vestment to all concerned. In case silver occurs with gold a different process of leaching is required, but the method does not vary materially. In the event of chlorination or leaching works being available, people having ledges would merely dress their ores in a form which would bear transportation to a considerable distance, occasionally on horseback with profitable return. Such a custom works would thus allow men of small capital to successfully work ledges, as they would be in a similar position to the farmer who brought his wheat to a grist mill to be ground into flour.

Vertical shafts are preferable to inclined shafts when heavy pumping machinery has to be put up, for pumps and rods are more easily fixed and require fewer repairs when they are arranged vertically. However, many metallic mines may be quoted, especially in England, where large engines, work pumps in inclined shafts or in shafts which have been sunk vertically, when they intersected the deposit and have then been carried on along its dip. This arrangement of inclined shafts is justifiable in working alone when the enclosing rocks are very hard. In this case in fact, an inclined shaft allows the lode to be studied in detail during the sinking itself. If, however, a large output is required the preference should certainly be given to vertical shafts, for, in order to obtain such a result, great loads must be raised, at velocities which are only admissible in vertical shafts, furnished with the best system of guives.

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 boundry shall be four straight lines, the opposite sides of which shall be parallel, except where prior locations would prevent, in which case it may be of such a shape as may be approved of by the Superintendent of Mines.

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

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

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

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

Not more than one mining location shall be granted to any individual claimant upon the same lode or vein.

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

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

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

PLACER MINING.

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

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

The Regulations apply also to

Red-Rock Flumes, Drainage of Mines and Ditches.

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

The Schedule of Mining Regulations

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

Since the publication, in 1884, of the Mining 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.

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At this quarry there is an inexhaustible supply of most beautiful White Marble. Samples to be seen and information obtained at the office of the MINING REVIEW.

DEPARTMENT OF INLAND REVENUE.

An Act respecting Agricultural Fertilizers.

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

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

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

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

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

Every person who sells, or offers or exposes for sale, any fertilizer, in respect of which the provisions of this Act have not been complied with—or who permits a certificate of analysis to be attached to any package, bag or barrel of such fertilizer, or to be produced to the inspector, to accompany the bill of inspection of such inspector, stating that the fertilizer contains a larger percentage of the constituents mentioned in subsection 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 manufacturers' 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 intituled "*An Act to prevent fraud in the manufacture and sale of agricultural fertilizers*," is by this Act repealed, except in regard to any offence committed against it or any prosecution or other act commenced and not concluded or completed, and any payment of money due in respect of any provision thereof.

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

E. MIALL,
Commissioner.

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

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

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

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

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

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

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

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

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

Department of the Interior,
Ottawa, 9th September, 1886.

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