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The Canadian Mining Review

CONDUCTED BY - - - B. T. A. BELL

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Vol. IX. MARCH, 1890. No. 3.

The Duty of Mining Machinery.

In another place our readers will find a full report of the recent debate in the House of Commons upon the question of a remission of of the present tariff upon imports of mining machinery. A measure which will ensure the admission free of duty of all mining machinery not manufactured in the Dominion, and which, at the same time, will grant a reasonable protection to those manufacturing interests already established in our midst is eminently desirable, and will do much to further and promote the development of our mines. The subject will be discussed again when the Budget is before the House; and from all we can learn there is every indication that a measure, such as we have indicated, will be adopted.

Some Proposed Changes in the Ontario Mining Laws.

The General Mining Act of Ontario, 1877, has long been a legitimate subject for criticism, having some few good points, some bad ones, but the most very indifferent. It is a matter of notoriety that under the provisions of this Act large areas of valuable mining lands have been sold and are now lying idle, no provision regarding their mineral development having been coupled with the patent given by the Government. It has therefore been with considerable curiosity and some hope that we have examined the two Bills which have been brought forward in the Ontario Legislature this winter, amending or supplementing the General Mining Act.

We may confess to a little disappointment in finding that these Bills cover only two of the many sections or divisions of the Act requiring revision, and that the defect alluded to above has not been included. One of these Bills is entitled "The Mining Claims Act of 1890," and deals only with that portion of the public lands which has not been sold, *i.e.*, vacant Crown lands. To some minor points of this Bill (to which detailed reference is made later) exceptions may honestly be taken, but the bill as a whole is good, its recommendations are many, and it is a decided step forward and in the right direction. The mode of procedure to be followed by a discoverer in order to obtain a mining claim is set forth in a plain, direct and explicit manner, devoid of any technicality not easily understood by the average prospector. In examining this Bill the following points have occurred to us, and we give publicity to them, not in any spirit of adverse criticism, but wishing to help on, if possible, a good work already begun:

To section 5 a provision might be added requiring that a duplicate of the rough sketch accompanying the application should be posted on a board set in a conspicuous place on the claim pending the survey of such claim by a P. L. S., and that when so surveyed a copy of the surveyor's plot and field notes be so posted until a patent for the same has been issued and accepted. This is not an absolutely necessary feature, but we think it strongly advisable that every possible step should be taken at the beginning to prevent the possible clouding of a title, and to prevent or lessen the chances of the same ground or a portion thereof being staked out by a junior claimant; thereby avoiding the risks of conflict and subsequent litigation.

In section 6 some reference might be made as to the provincial land surveyor tying his survey to some natural or permanent monument when in unsurveyed lands. Perhaps a reference to the meridian would be better, but would involve the surveyor's using solar attachment for their instruments. Any measure looking to the fixing of what have been called "floating claims" is most desirable, and will be welcomed in the mining districts.

It is hard for us to see the force of the objection contained in these words in section 7: "But the said lands or any part thereof shall not be re-staked by or on behalf of or for the benefit, directly or indirectly, of the claimant, or anyone claiming or holding through him or them." Why a claim thus forfeited or abandoned, and by that very action reverted back to the domain and possession of the Crown, should not be open to be again staked by anyone whatsoever, even by the delinquent claimant himself, we fail to see. It seems on its face to be a harsh and inequitable provision, and we feel sure it can and will be easily evaded. Circumstances are numerous in almost every prospector's life, whereby a claimant might be unfortunate enough to be unable to comply, within the specified time, with the requirements of the Act. It seems to us better to allow such an one an even chance with others.

Possibly, also, there is room for debate as to the wisdom (sec. 8) of any legislation curtailing the aggregation of mining property into sufficiently large blocks to warrant and induce the investment of capital. We are aware that this section applies only to "mining claims," and not to lands obtained by "purchase or other wise," but the reasoning may be as valid for the one as the other.

The Bill, however, as we have said before, is good and should pass, and we hope sincerely that other Bills, looking to the remedy of other deficiencies and inaccuracies, will be introduced. There are still many sections of the General Mining Act which are defective; for instance, we hope to see the qualifications of the Inspector put upon a higher footing; such officers should be competent, educated and trained mining engineers, as well as petty justices of the peace. A provision also is needed granting (as in the United States and Nova Scotia) a right of way over any and all mining claims or locations, for roads, ditches, canals, tunnels, etc., when required for the working of other mining properties, providing at the same time proper safeguards for the damages occasioned thereby.

Another Bill which has been introduced is called "An Act to regulate mining operations."

This Bill is simply a necessary piece of regulating legislation; it is modelled (in places *verbatim*) upon the "Mines Regulation Chapter" of the Nova Scotia Statutes, but is neither so full nor so effective as the latter. There is need of such an Act, and but little criticism can be made upon its provisions.

Section 11, however, requiring that notice be sent to the Inspector every time a new shaft is commenced, or the working of an old one is discontinued for two months, is entirely unnecessary, excepting in coal mines, and in the Nova Scotia Statutes these provisions are expressly confined to coal mines.

We also think Section 13 too weak; no law can be framed too strongly which prohibits absolutely the holding, by an Inspector, of any interest whatever, however slight or small, direct or indirect, in any mine situated in any district under his jurisdiction; and the penalties cannot be too large or heavy.

We note, also, the omission from this Chapter of any provision for a second or escapement shaft. This is an important omission, and should be remedied.

Iron Ship Building in Nova Scotia.

The Province of Nova Scotia presents an almost continuous line of sea shore, and even the narrow isthmus of Chignecto connecting it with the mainland will soon be crossed by a marine or ship railway, so that it would then be fairly termed an island, as a vessel can make a circuit around it. Its shores do not present long unbroken ranges of inhospitable cliffs, but harbor succeeds harbor, and these open on sheltered bays. This convenience of shelter, and the proximity of large tracts of timber forests, gave rise to a large lumber business. The absence of roads and the accomodating ocean highway at every man's door, invoked a vigorous coasting trade. It is, therefore not to be wondered at that the Nova Scotians, with their natural mechanical ability turned readily to wooden shipbuilding, big ships to carry lumber, and equally big ships to sell to foreigners, smaller ships to carry fish, etc. to the West Indies, and coasters to carry coals to the United States, and to collect fish from every cove of Labrador and Newfoundland for the distributing centres, and a great fleet of schooners and brave little boats for fishing in the rough surges of the shore banks.

Thus grew the graceful procession of vessels, and daily there slid from the sloping ways, the trim schooner, and the stately barque full rigged, and waiting only her cargo to set sail. This went on until some careful compiler of statistics found out that every man, woman and child in the Province owned enough tonnage of shipping to give each a vessel of their own. Finally some hard headed man conceived the idea of making steam compete with sails, and of pitting iron against wood. The barques built in the sunny creeks of the Bay of Fundy from the pleasant grooves of the uplands were confronted by the products of the gloomy iron and coal mines of Glasgow and the Tyne.

Thin of skin, carrying great cargoes, paying few men, disdainful of breezes, the ocean tramps soon secured the shipper's favor. Until at last the sailing vessel close pressed, finds occupation in charters where time and cargo combine to equalise the price of a ton of coal. The coaster finds her freight gone when a sturdy steamer runs from port to port with the regularity of a railway train, and a few tons of coal neutralise a breeze which meant hours of watching for the best built fore-and-after.

This applied to the province means that broadly speaking Othello's occupation is gone, for now when the cordage, iron, canvas, provisions, etc., can be provided at home, the coal shipping harbors and the mercantile ports, instead of the crowds of square rigged vessels of a decade passed, show only a few rusty steamers. These boats, carrying some 2,000 tons, load rapidly, steam away and return to the coal shoots in a few days from Montreal and Quebec. Long and narrow, numerous hatches receive the coal, and a half score of rattling steam winches rapidly discharge the cargo on the wharves. The steamers monopolise the trade of the Gulf. Some return empty to the harbors of Pictou and Sydney, while others readily carry at nominal rates, return cargoes of flour, etc., and in the fall they disappear to engage in the general carrying trade of the world.

The force of the inevitable has been conceded; a steamer is now purchased by the local capitalist, who used to build a schooner in his back yard. The question is "could not the steamer be built here by the sons as profitably as the barque or schooner was by their fathers?" To realise the problem it is necessary to notice the conditions under which the shipbuilding trade has grown abroad. In the chief English ship yards are great stores of iron and steel, and the closer the ship yard is to the iron ore and the coal mine, the cheaper the steamer can be built.

In Canada these favorable conditions exist in Nova Scotia, and Pictou and Sydney can be pointed out as localities well adapted for building iron vessels. At Pictou Harbor immense deposits of iron, coal and limestone lie within a radius of a few miles, in a district traversed by railways, and well cleared and settled. Much has been said of the cheap pig irons of Alabama and Tennessee, but American iron masters have repeatedly predicted that it can be made much cheaper by many a per cent. at this point. The ores are of almost all varieties, adapted for steel, as well as for the cheaper grades used for many industries. At Sydney Harbor the distance between the three requisites is greater, but water and railway communications are favourable enough to neutralise this. Both these points can draw upon the large deposits of iron ore known to exist in Labrador, Newfoundland and Quebec. In brief, it may be said that at no point on the seaboard of the American continent, except perhaps in British Columbia, are the conditions for this business as favourable as in Nova Scotia. The Province resembles Great Britain in this respect, and the eye of the doubter fails to see why the new Scotia may not worthily rival the ship yards of the Clyde.

Conceding the fact that every advantage is offered here for making cheap iron for building ships, their engines, etc., the question arises, what is to become of the fleet of the Golden Hope—where will they sail, who will buy them? At present there is work enough for one ship yard to meet the demand for steamers in Nova Scotia alone. Not only are the old wooden steamers which plied between Prince Edwards Island, Nova Scotia and United States ports being replaced by new iron vessels, but new lines of trade are being opened up. The western and southern shores of Newfoundland, Labrador, Prince Edwards Island, the outports of Nova Scotia, all are being rapidly connected by lines of steamers, and the projectors are finding their pioneer boats too few and too small.

Why should the gulf coal-carrying trade not be in the hands of those who are also shareholders in the Nova Scotia coal mines and factories, and why could not the provincial ship's-husband tend with equal success the freights of this class of vessel, succeeding by the inexorable laws of progress to the more interesting sailing vessel of his youth? Iron barges, propellors, river boats; the great lakes and the St. Lawrence, should absorb many a ton of iron ore and coal, to provide transportation facilities. Along the coast there are required tug boats, launches, and coasting steamers for the lumber and pulp mills, the lobster factories, the fishing stations, the West India trade and all the industries that spring up when assured of regular and cheap transportation. And as even yet sailing vessels find a vocation in certain trades, an iron built or a composite ship will secure a market, or yield a return at least equal to that received from the same class of vessels elsewhere.

Already in the Pictou district there are foundries, forges and shops engaged in the construction of engines, boilers, etc., and very slight changes in plants would permit the construction of an iron steamer of moderate tonnage, the pioneer of a fleet equal in speed, strength and capacity to those now engaged in our waters; but moulded and riveted from provincial iron, smelted from provincial ores, and owned and navigated by the successors of those who built and sailed our wooden fleets.

Natural Gas in Ontario.

At the meeting of the American Institute of Mining Engineers held in Ottawa last October, a paper was read by Mr. Chas. A. Ashburner (since deceased) on "Natural Gas Explorations in the Eastern Ontario Peninsula," by which he meant the Niagara district. This paper contains observations on the relation between petroleum and natural gas, and on petroleum and gas in Western New York, but the part of most interest to us is that referring to explorations for gas west of Niagara river. Mr. Ashburner, having been a leading expert in these matters, and therefore to be considered as, in some sense, a public man, we think we may be entitled to criticise his remarks, notwithstanding that he has unfortunately died since this paper was read. Mr. Ashburner came to the conclusion, among other things, that "little hope can be entertained of finding gas in commercial quantities in the Trenton limestone under the Eastern Ontario (Niagara) Peninsula," also that "it cannot be expected that gas would exist in any of the strata in commercial quantity unless the gas-reservoir stratum is covered with at least 400 feet of superincumbent strata; nor can it be expected that gas will be found in any two or three different strata in the same well." Now, we do not see any ground for the first of these statements. We do not see why gas may not be found in the Trenton group under the Niagara Peninsula as well as in Ohio or anywhere else. Mr. Ashburner shows that in the region in question this group is 677 feet thick, including the "Quebec limestone" which, however, is a formation we do not know anything

about, and it certainly does not exist in Ontario. As to the second of the conclusions referred to, we fail to understand why the author has placed the requisite thickness of superincumbent strata at this particular figure. We should think that more depends on the nature of the strata than on its thickness, and that 400 feet of some kinds of rocks would be more than sufficient, while of others this would be far too little. A comparatively thin band of impervious shale or clay, if firmly compressed by other strata, would be sufficient to hold down the gas.

The St. Catharines well which was sunk for gas to a total depth of 2,200 feet was not a success, but the section thus obtained through the different formations will be of much value for future reference for geological purposes. By combining the results obtained in the wells bored for gas at Buffalo, Port Colborne and St. Catharines, Mr. Ashburner thinks the most likely horizons for finding it are the upper part of the Medina and the lower part of the Salina formations.

Since the time of Mr. Ashburner's visit to this district, Mr. E. Coste is said to have obtained gas in two wells, half a mile apart, about midway between Welland and Fort Erie, but in what quantities we have not been able to ascertain. Early in the present winter Dr. Bell, of the Geological Survey, was consulted as to the prospects for obtaining natural gas by boring at Forest, on the line of the Grand Trunk railway, and just south of Kettle Point on Lake Huron. As this place is underlaid by gas-producing rocks, and lies directly in the line of the Cincinnati anticlinal, he had no hesitation in encouraging the proposal to bore. The result was that gas was struck at a very moderate depth in the first well sunk. At first the pressure was very strong, but we understand it has since diminished considerably. The wells at Kingsville in Essex county are situated upon this same line, which Dr. Bell had laid down distinctly upon Logan's geological map a considerable time before the first well was started at Kingsville, and he had fully described the course of this line in his paper on "The Petroleum Field of Ontario," read before the Royal Society of Canada on the 27th of May, 1887, and published in full in the REVIEW. If, therefore, any credit is to be given for laying down this line it is clearly due to this gentleman.

The Future of Nickel Steel.

Some most remarkable statements, of great interest to the steel trade, were recently made by Mr. S. J. Ritchie, of Akron, Ohio, the well-known head of the Canadian Copper Company owning the celebrated Sudbury mines. It is understood that Mr. Ritchie visited last summer the principal iron and steel works of Great Britain and the Continent, and that the following statements are based on his investigations :—

"Within the last year nickel has come to assume a very important place in metallurgy as an alloy with steel. These results have been obtained in Great Britain, in France and in Germany. In France the cartridge shells are made of an alloy of equal parts of nickel and copper. In Great Britain large guns for the navy are being made of an alloy of nickel and steel. This has also been done in an experimental way in Germany, but heretofore and before the discovery of the nickel deposits in Canada, the supply of nickel was so small and the price so high that it would have been impossible to have supplied any considerable want, even had its utility been known. The Iron and Steel Institute of Great Britain is composed of the most prominent manufacturers of steel both in Great Britain and upon the Continent, and it has at its meetings many American manufacturers. The discussions at its annual meetings represent the best talent and skill in everything pertaining to iron and steel that is to be had in the world, and its conclusions are the highest authority to which we can appeal. About one year ago this institute appointed one of its most competent members, a manager of the Steel Co. of Scotland, to make an extensive series of experiments with this alloy. This he did, and reported the results of his efforts to the meeting of the institute, held in London, May 8, 1889. This report has attracted the attention of steel manufacturers all over the world. No results approaching the high elastic limits and breaking strain of those reported from this alloy had ever before been seen. I myself saw a piece of this steel, made by the house of William Jessop & Sons, of Sheffield, which contained about six per cent. of nickel, and which was one inch inch square, that sustained a weight of 108 tons, and also showed a high elastic limit. These results were so wonderful that parties in Europe, who manufacture guns and armor plates for three principal governments, have offered to contract for our companies' entire production for a period of ten years. The proportions of copper and nickel in the ores belonging to our mines are just about those used by the French Government in the manufacture of cartridge shells. The proportions of iron and nickel are about what are used in nickel-steel, which it is proposed to use in the manufacture of guns and armor plate."

Wire Rope Fastenings.—In a paper read before the American Society of Mechanical Engineers, by Mr. Wm. Hewitt, a description is given of the behaviour of the fastenings which were employed in making tests of wire ropes. When using ordinary spliced-in-thimble it was found that the strain elongated the thimble, forced one end past the other, which cut one or more of the strands so that the rope almost invariably broke in one of the splices. With conical sockets the rope pulled out under a strain, varying from one-half to three-fourths of the breaking load. A cast steel rope, two inches in diameter, was tested wilh socket fastenings prepared in the usual way with the addition of an annular wedge driven in around the core, with the result that the wires pulled out of the socket about three-quarters of an inch, and the rope then broke under a load of 266.250 pounds, being 71½ per cent. of the tensile strength of the individual wires of which it was made. The method of capping ropes in Britain is noticed, and it is suggested that the fastening might be made more secure by employing nuts to force up the rings which surround the joint.

LETTERS TO THE EDITOR.

Public Museum for Ontario.

Toronto, 20th March, 1890.

SIR,—At last Toronto appears to be awakening from its long torpor in relation to popular and practical science. With everything to boast of as to situation, intelligence, wealth and material progress, it is one of the few great cities of the world without even an approach to what is worthy of the name of a museum. The Province of Ontario is rich in minerals. Few countries are so favored. Here in the east we have apatite, marble and iron—to the west are apparently inexhaustible stores of petroleum and salt—at the north lie the richest deposits of nickel that are known to exist anywhere! Not to mention European cities, if we look at those of the United States, Australia, New Zealand, Tasmania, Chili and the Argentine Republic, we find there vast collections of the mineral products of the several countries—even Costa Rica has its national museum; but Toronto has none. Outside of Ottawa, the best geological collection is said to be in the small town of Elora, some fifty or sixty miles west of Toronto. A few specimens collected by the Ontario Mining Commission are on exhibition at the Canadian Institute, but what a paltry display for so great a yield. Toronto requires a first class collection in the interest of education as well as in that of material development; for the student as for the miner; for the tourist as for the prospector; for the citizen as for the foreign capitalist.

The Ontario Government threw away a splendid chance to move along the right line when it sent the beautiful specimens shown at Philadelphia, to an obscure hiding place at the Falls of Niagara—specimens too, which some of those who presented them assure us were given only upon the understanding that Toronto was to be the place of exhibition.

It is now freely acknowledged that the eye is one of the best mediums through which we can receive instruction, and while this holds good relative to other departments of human knowledge also, our plea has reference chiefly to the products of the quarry and the mine. Ontario is proud of her educational system, but here there is a yawning gap.

Again, for utilitarian purposes a museum has no equal. Here should be seen samples of all that is yielded by the country, and in connection with the collection one should be able to procure reliable information regarding location, output, percentages, routes of travel, markets, prices, profits, losses, and the hundreds of other particulars that practical men want to know. It should resemble neither a toy-shop nor a raree show, but ought to be purely and solely an illustrative, industrial mining bureau. Every day that Ontario lacks an institution of this sort, she is losing tens of thousands of dollars, and our only fear now is, that should the present agitation bear fruit, the fruit will be so politically sown as to be unpalatable.

There is no room in an institution of this kind for soft-handed hangers-on, and the head should be a man who knows the country, who knows his business, and who will earn his salary.

Yours, etc.,
"PROSPECTOR."

A Canadian Mint.

MONTREAL, 19th Mar., 1890.

The Editor.

SIR,—I have looked over the reports of the recen debate in the Senate on this subject. The speech of the mover (the Hon. Mr. McInnes) displayed a singular want of acquaintance with the real position, in confounding silver and gold together.

I don't believe the statement that five or six per cent. is lost in sending gold to San Francisco, or that there is a similar loss in sending it from Nova Scotia. Gold dust is not gold, and there are various degrees of fineness which would account for the larger part of the five or six per cent.

Silver is a different matter. The United States have made an enormous profit on silver by what is practically swindling the public, that is, by issuing eighty cents worth of silver and calling it a dollar. They have done this on an immense scale. But things must surely right themselves some day. It would be just as easy to make the same amount of money by issuing eighty cents worth of gold and calling that a dollar. That, however, would be instantly detected and would right itself at once.

The silver fraud is now going on, and the cure of it is a slower operation.

I am rather surprised to find that our own Treasury makes money out of silver. I never heard of this before, and am not acquainted with the circumstances.

I am, yours etc.,
GEO. HAGUE.

[We should say that the Canadian profits derived from silver coined during the year ended 30th June last amounted to $52.774.21. The earnings of the U.S. mints from all sources during the same period aggregated $10,351,701.47, while the expenditure and losses of all kinds amounted to $1,502,665.60, leaving a net profit of $8,849,035.87.—EDIT.]

Phosphate Analysis.

LONDON, Eng., 27th Feb., 1890.

The Editor,

SIR,—Supplementing my preceding letter of Jan. 13th, I call your attention to a printer's error concerning the *ammoniacal solution of the mixed chlorides of magnesium and ammonium* employed in Maret's method of estimating phosphoric acid; where the quantity of carbonate of magnesia should be 80 grammes instead of 8.

The following is the method of estimating iron and alumina in mineral phosphates, and adopted by Maret, of Paris.

The whole of the sample is reduced to a fine powder as in the previously described operation, and 2 grammes, carefully weighed, are introduced into a small flask with 15 cent. cubes of strong hydrochloric acid. (If the sample be rich in iron and alumina, say over 5 per cent., then 1 gramme will be found sufficient.) The contents of matrass are maintained in ebullition for a few minutes, then diluted with about 30 cent. cubes of distilled water, a crystal or two of chlorate of potash added and ebullition continued until the greater part of the free chlorine be eliminated. Filter into a precipitating beaker; the volume of filtrate should not exceed 350 cent. cubes after due washing. When quite cold add 2 cent. cubes of glacial acetic acid, followed by liquid ammonia, drop by drop, and with stirring, until the appearance of a permanent precipitate; a weak solution of ammonia is then added until the whole possesses a distinct, yet faint alkaline reaction; further, add 2 cent. cubes of glacial acetic acid and allow to stand a few hours. The clear liquid is then decanted through a filter, the precipitate follows, and the filter is allowed to drain. Return the precipitated phosphates to the beaker, employing a little dilute hydrochloric acid (water 9 to acid 1) to remove last traces from the filter, and to redissolve the precipitate in the glass. A second precipitation similar to the first is now effected, except that one half a gramme of neutral phosphate of ammonia is added to the liquid previous to the treatment with ammonia. After standing a few hours the whole is filtered on the same filter as employed in the previous operation, and the collected precipitate is duly washed with distilled water, drained, dried, and afterwards calcined at dull red heat. It consists of the mixed phosphates of iron and alumina:—

$$x\ Fe_2\ P_2\ O_8 + x\ Al_2\ P_2\ O_8$$

This residue is treated in the same capsule which served for the calcination, with a few cent. cubes of hydrochloric acid, the excess of which is subsequently evaporated by application of a gentle heat; take up with water and introduce the solution into a small flask to be there reduced to the lowest state of oxidation by pure zinc and sulphuric acid—the titration of the iron is then ascertained by permanganate of potash as usual. The quantity of iron found being calculated into $Fe_2\ P_2\ O_8$, this latter is then deducted from the weight of calcined residue, above mentioned, and the phosphate of alumina thereby ascertained, and from which the weight of the alumina ($Al_2\ O_3$) is deduced. This method is fairly rapid and practical.

I am, etc.,
J. LAINSON-WILLS.

New York, March 7th, 1890.

The Editor,

SIR,—I am very greatly interested in the discussion which has arisen in your columns upon the letter addressed to you on the 17th November last by Capt. R. C. Adams. Will you excuse me if I ask permission to occupy in connection therewith, a small portion of your valuable space?

In the January "REVIEW" Mr. J. L. Wills, after describing what is known as the "Maret" process for determining the phosphoric acid in phosphate ores, says, "I have thoroughly tested this process myself, and find it reliable and expeditious!" In the February "REVIEW," Mr. J. T. Donald, after explaining that the chemists of the world are "*almost a unit*" in using the "Molybdate" process, remarks, "I am surprised to see Mr. J. L. Wills advocating the method of analysis he outlines in the January REVIEW! The method, which is uncertain, and likely to give too high results, has for some years been almost universally discarded in favor of the Molybdate method." In the same issue of your journal, Capt. R. C. Adams returning to the charge, and replying generally to his commentators, observes, on the subject of the analysis, that, "his (Mr. Wills') prescription of Maret's method of analysis is said *by our best authorities* (?) to be defective."

Now, sir, I am very curious indeed to discover, if possible, upon what or whose authority Messrs. Adams and Donald make their sweeping charges against this so-called "Maret's method!" Can they justify it themselves on any truly scientific grounds? Can they point out in the method, properly conducted—any inherent source of error? I do not believe they can!

During the past three weeks the whole of the fertilizers and phosphate rocks sent to this laboratory have been analyzed in duplicate. The determinations of phosphoric acid have been made—simultaneously and with equal care—by the Maret and the Molybdate methods. The following results are selected from our agenda:

Date.	Serial No.	Nature of Material.	Maret's Method.	Molybdate Method.
February	1890	Mixed Fertilizer	13·270	13·247
	1	"	10·111	10·105
	2	"	18·900	18·900
	3	Bone Black	31·130	31·320
	4	"	28·700	28·530
	5	Bone Meal	29·150	28·970
	6	"	28·630	28·640
	7	S. Carolina Rock	26·420	26·310
	1913	Canadian Apatite (ground).	37·000	37·200
	4	"	39·640	39·511
	5	"	32·185	32·300
	6	"	40·320	40·321
	7	Refinery Residue	29·100	29·410
	1923	Acid Phosphate No. 3	13·150	13·200
	4	S. Car. Phosphate (ground)	26·000	25·799
	5	"	27·300	27·270
	1937	Florida Phosphate Rock	32·200	32·600
	8	"	34·190	34·189
	9	" (ground)	16·930	16·900
	1940	"	24·740	24·732

The figures speak for themselves. If they serve no other purpose, they may stimulate the gentlemen I have named to further investigation, and thus teach them the folly of intemperate and ill-considered denunciation.

Yours etc.,
FRANCIS WYATT, PH. D.

The Geological Maps of Nova Scotia.

HALIFAX, March 19th, 1890.

The Editor:

SIR,—At the risk of being thought a "damned insane visionary," as a silver-tongued statesman once called the first miner who proclaimed the discovery of gold in Nova Scotia, may I add to what you say in the CANADIAN MINING REVIEW for November and February another reason for continuing the publication on a larger scale of the Geological maps of Nova Scotia.

That this province, with an area of only 17,500 square miles, one-fifth of which is occupied by lakes and arms of the sea, supports one-tenth of the population of the Dominion, and from mines scattered over every part of its surface yields more than one-fourth of the total annual production of minerals in the Dominion, or ten times that of the neighboring province of New Brunswick, (which has an area of 28,000 square miles), has made it so well known that geological map-making seems to be the best if not the only scientific work which the Geological Survey can find to do.

Its history has been written by Judge Haliburton (Sam Slick), Brown, Murdoch, Campbell, Longfellow and Bourinot, and is the history of the early settlement of North America from Europe. Its geographers are Church and Mackinlay, Gisborne, Mackenzie and Murphy. For the language of its aborigines we have Dr. Rand's Micmac Dictionary; for their folk-lore, Leland's Algonquin Legends. In archæology and ethnology there are books by Patterson, Gilpin and Piers; and the social life and habits of the people may be studied in the novels of Haliburton, Professor De Mille and Cozzens. The game and fish of the forests and streams are described by Hallock and Capt. Hardy; the scenery of the lakes and mountains by Howe and Roberts, Osgood and Morton, Warner and Farnham, whose descriptions are brightened by photographs, sketches and paintings such as those by Mason and others who follow the annual pilgrimage of tourists to the beautiful shores of the Bras d'Or Lake and Bay of Fundy.

And of observers in natural science there are names of eminence and authority. In botany and zoology, Professor Lawson, MacKay and Morrow, Drs. Gilpin and Sommers; in metereology, Allison and Poole; in mineralogy and chemistry, Professors How, Harrington and Marsh, Alger and Jackson and Mr. Gilpin, the head of the department of mines; in palœontology, Sir William Dawson, Professors Hartt, Salter, Owen and Hall, Leidy, Billings, Davidson, Matthew; in general and descriptive geology, Sir William Logan, Sir Charles Lyell, Gesner, Brown, Campbell and Fletcher, Drs. Honeyman, Selwyn, Hunt and Ells; in reports on special mining districts and geological formations, Poole, Gilpin, Rutherford, Hamilton, Hartley, Routledge, Barlow, Barnes, Robb, Heatherington, Professors Hind, Lesley, Chapman, Sillimon, Browne and Lyman. An abstract of many of the conclusions which fill thousands of pages of valuable contributions to science from these and other observers is contained in Dawson's Acadian Geology, a large book of 800 pages.

Since, therefore, the Geological Survey cannot do better what has been done by all these specialists, its aim should be to correlate their work and extend it when done in isolated localities.

To miners, explorers and those engaged in scientific research in a mining district, maps are of the first importance. This was clearly and strongly stated in a report on the gold-fields of Nova Scotia made in 1871, by the present director of the Geological Survey, who, while admitting that the various country maps (usually published on a scale of one mile to an inch) show accurately the course of the roads and the general outline of the streams and lakes in their vicinity, points out that "the want of even approximately correct typographical maps of the gold districts is a serious hindrance to their development . . . . and to the progress of geological investigations . . . . and every dollar expended towards their production eventually becomes an annual saving to the country." In 1881 he began, conjointly with the Provincial Government, a survey of these gold-fields, which comprise nearly one-half of the superficies of the province, to prepare for the use of prospectors a general map for which "after careful consideration a scale of half a mile to one inch was decided upon as the most suitable." Since that time, although the grant from the local government was soon discontinued, the survey has been carried on by Mr. Faribault, who has made a good map of the country east of Halifax which is now to be issued on a scale eight times as small as that decided upon as the most suitable, although, about a year ago, the director recommended that the provincial government "might be asked to assume the extra outlay involved in publishing on the larger scale." This outlay would not of course be nearly as great as the cost of one of the small scale sheets multiplied by the number of sheets on the large scale embraced in it, for the minuteness of detail in the former, requiring greater skill and care on the part of both draughtsman and engraver to make it even approximately correct, would add largely to its cost.

Yours, &c.,
A MINE MANAGER.

Canadian v. Italian Asbestos.—Mr. James Boyd, managing director of the British Asbestos Company, who can speak with an experience of ten years in Italy, writes to the London papers respecting the New Asbestos Company which has been formed to develop certain French and Italian properties as follows: "I have recently heard that a Canadian asbestos property has been acquired by the company holding the greater part of the Italian properties, or by parties interested in it. They could raise hundreds of tons from their Italian properties; and if they do not do so there must be a reason for it, and I believe the reason may be sought for in the fact that, whilst Canadian asbestos fibre can easily be spun into thread fit for manufacturing into rope or cloth, Italian can only be so spun on a commercial scale by the admixture of cotton, or some other material, owing to the want of cohesion amongst its fibres. Owing to the increasing steam pressures used in connection with triple expansion engines, a great increase has taken place in the consumption of packings made of asbestos cloth, and I believe it is practically impossible to make this of pure Italian asbestos. The English Admiralty have, I believe, persistently refused to put Italian asbestos packing on their list, for the reasons above stated. * * The protective tariffs, so called, in France are not so high as to prevent both Italian and also English manufacturers of Canadian asbestos goods from selling their manufactures there; and as a matter of fact, the prices in France are lower than in England."

PHOSPHATE.

In General.

The economical use of the most appropriate turnip manure was the subject of a paper read before the Strathbogie Farmers' Club the other day by Mr. Wm. Scott, Corsiestone, Scot. The author recounted the results of a number of experiments carried out on his farm at the instance of the Highland and Agricultural Society, who supplied the manures. The specific questions which the experimenter sought to settle were: 1st, Should the phosphate be soluble or insoluble? 2d, Should the phosphates consist of bone, mineral phosphates or Thomas slag? 3d, Should nitrogenous manure be soluble or insoluble, or a mixture of these? 4th, What proportion should the phosphates have to the nitrogen? For this experiment the kind and qualities of the different manures used were as follows: (1) Fine bone meal, 50 per cent. phosphates, and 5 per cent. ammonia. (2) Dissolved bones, 16 per cent. soluble phosphates, 21½ per cent. insoluble phosphates, and 3 per cent. ammonia. (3) Ground Charlestone phosphates, 57 per cent. phosphates. (4) Superphosphates, 29 per cent. soluble. (5) Thomas slag, 38 per cent. phosphates. (6) Organic manure, 7 per cent. ammonia. (7) Sulphate ammonia, 24½ per cent. ammonia.

For this experiment 10 plots of land of one-fortieth of an acre were required, as uniform in quality as possible, so that each might get the same chance for a crop. The quantities of manure were so arranged that each plot received the same amount of phosphates and ammonia, viz., 5 lbs. phosphate of lime, and ½ lb. ammonia, *i. e.*, at the rate of 200 lbs. phosphate of lime, and 20 lbs. ammonia per acre. These are the amounts of phosphates and ammonia contained in 400 lbs. bone meal which was applied to plot 1. The manures were used along with about 18 yards good rich dung, and the seed—Sittyton Aberdeen green top yellow—was sown on June 12th, the plants being carefully singled (on which the weight of the crop largely depends) on 20th July at 8 inches apart. Mr. Scott sums up the results of his experiments as follows:

Plot of 1-40th of Acre.	Total Weight of Tops and Bulbs per Acre. T.	C.	Q.	LB.
No. 1—10 lbs. bone meal	31	1	1	20
No. 2—13½ lbs. dissolved bones — 1½ lbs. organic manure	32	17	0	16
No. 3— 9 lbs. ground phosphates — 7 lbs. organic manure	32	1	1	20
No. 4—17 lbs. superphosphate — 7 lbs. organic manure	30	10	0	0
No. 5—13½ lbs. Thomas slag — 7 lbs. organic manure	32	2	3	12
No. 6— 7 lbs. organic manure	30	2	3	12
No. 7—17 lbs. superphosphate — 3½ lbs. organic manure — 1 lb. sulphate ammonia	34	17	0	16
No. 8—17 lbs. superphosphate — 2 lbs. sulphate ammonia	32	10	0	0
No. 9—17 lbs. superphosphate — 1½ lbs. sulphate ammonia	35	1	1	20
No. 10—17 lbs. superphosphate — 1 lb. sulphate ammonia	38	14	1	4
No. 11—18 yards dung and no manure	33	14	1	4
No. 12—18 yards dung and 5 cwts. No. 1 turnip manure per acre	42	14	2	4
No. 13—18 yards dung and 5 cwts. special mixture per acre	43	2	3	12

That soluble phosphates are preferable to insoluble phosphates Mr. Scott considers the experiments have clearly brought out, and he believes it would be much more economical if much less manure were given to the turnip crop at one time, his view being that it would be more desirable not to put in what is necessary for the whole rotation with the turnip crop, but that it would be better to supply the plant food year by year, a very considerable saving being by this means effected.

Some American fertilizer manufacturers formed a pool recently to contest the State's right to impose an annual license tax of $500 on each brand sold in North Carolina. The Farmers' Alliance propose to boycott all firms which refuse to pay the tax unless they do so under protest. This, it was thought, had settled the matter, but now there are new developments. The American Fertilizers Company, of Norfolk, Va., which had refused to pay the tax, and whose goods had been seized by the Department of Agriculture, have entered an action for a mandamus to compel the State Treasurer and Commissioners of Agricultnre to issue licenses to any company, though said company should offer to pay the tax under protest. The position taken by the company is that the tax is unconstitutional, unjust and unequal in its operation, by compelling small manufacturers to pay as much on a single brand as large dealers. The company also claims that a tonnage tax would be the only just one and that manufacturers would not object to it. It proposes to carry the matter to the United States Supreme Court. The State now derives about $40,000 revenue from this tax.

Markets.

An English correspondent writes:—The phosphate market is dull at the moment, as is customary at this time of the year, for manufacturers are busy delivering their fertilizers, and don't want to turn their attention for the moment. Sales, therefore, are not brisk; but prices are well maintained. Somme, 75 % (ground), being 17d. per unit, with ½d. rise and 70% 15d, with rise ex. c.i.f. London, as compared with 11d. and 10d. respectively 26 months ago. In fact, I see no chance of high grades falling in price owing to the small supply and increasing demand; but, on the other hand, I do not think much increase is probable. I should like to call your attention to one fact, viz., that though four years ago, when the market for fertilizers was at about the lowest point, 400,000 tons of Basic Slag and 150,000 tons of Somme phosphate—equivalent to 300,000 tons of super-phosphate—were thrown on the market, yet this enormous increase in the annual supply (700,000 tons) has been more than digested; for, as you know, prices of various phosphates have risen from 25 to 50%, and Basic slag has risen rom 32/— to 52/— per ton. In fact the demands for slag greatly exceeds supply, and the use of this slag on lands where fertilizers had never been used has led to an increase in the use of super-phosphates.

Company promoting has been very slack of late, not owing to the scarcity of money but rather on account of the high bank rate.

Our latest quotations are:—Canadian 80% sold at equal to 16d., with ½ rise basis London delivery—an advance of 40% on last year's prices. Somme, 70 to 75%, selling at equal to 1/3¼. London terms, and 75 to 80%, at 1/5¼, with rise, but little on the market. Belgian scarce, and only a little 40 to 45%, and 45 to 50% available. Aruba and Curaçoa off the market. Cambridge about 50/—, but nothing offering.

Templeton District.

At the McLaurin mine, machinery is being placed, and as soon as the snow is off the ground operations will be begun on three lots. Lately only a few men have been employed, and these principally in making preparations for future work.

At the Blackburn, the owners are taking out phosphate at the rate of 15 tons per day, and expect to do so from this out right along, and better when the dry weather sets in. About 1,300 tons, representing the winter's work, has already been hauled down.

Kingston District.

The probabilities point to a large quantity of phosphate being mined in this district during the coming season, for beside the mines already at work quite a number of new properties will be worked as soon as the weather is settled. The great drawback to the district is poor roads.

The Foxton mine, which lately has been a bit off color, is now yielding as well as ever, for after sinking a few feet a large body of rich ore was struck and operations are now being conducted on a large vein twenty feet in width.

Mr. Webster's mine at Gould Lake is working in a small way, and making an output of from three to four tons per day. The working force will be increased shortly.

At the Hibbert mine, near Sydenham, principally "dead" work has lately been done, but the pits are reported to be looking well and in good shape to mine with rapidity and economy.

Lievres District.

At all the mines on the river mining operations go on much as usual, and there is really nothing of special mention to report. All the pits continue to produce satisfactorily, and when navigation opens there should be an increase on previous years in the quantity of tonnage to go forward.

The new machinery for the Dominion Phosphate Co. (of London) has arrived at the Rapids and will soon be in place and at work.

Mr. P. H. Smith, manager of the High Rock mines, writes to say that the output from his pits, during February, was fully one hundred tons over the average, and that the mines never looked better than they do to-day.

The output from the new pit at Little Rapids, since the beginning of the year, has been sixty tons, with an average force of three men—a very creditable showing indeed.

MINING NOTES.

Nova Scotia.

At the annual meeting of the shareholders of the Inter-Colonial Coal Mining Company tLimited) held a few days ago in Montreal, the following directors were elected for the ensuing year:—Messrs. Gilbert Scott, Henry A. Budden, Peter Redpath, Robert Anderson, James P. Cleghorn, Alexander Gunn, W. M. Ramsay, H. S. MacDougall and Thomas Wilson. At a subsequent meeting of the board, Messrs. Gilbert Scott and Henry A. Budden were re-elected president and vice-president respectively, and Mr. W. J. Nelson reappointed secretary-treasurer of the company.

Darr's Hill District.

It is rumoured that Mr. Geo. W. Stuart has sold all of his interest in the famous Dufferin mine, and will devote his attention this year to the development of his valuable property in Killag district.

Central Rawdon.

Bills to incorporate the "Central Rawdon Mining Co., Limited," and the "Northup Mining Co., Limited," have been passed in the Nova Scotia Assembly. Returns from these companies for February are not yet at hand.

Waverley District.

The cross-cut tunnel which has been driving under Laidlaw's hill the past year has been stopped. It had attained a length of 460 feet and had cut several veins, but none were recognized as the "barrel quartz" vein to prospect which was the object of the tunnel. It is probable that work on the tunnel will be resumed shortly by another syndicate.

The Lake View Mining Co. have decided to proceed immediately with the erection of mill, probably of 20 stamps. The No. 6 vein in this property is enlarging going east, and now has a width of about 18 inches. The "Taylor Twin" Lode keeps its width of 24 to 26 inches. The management are still driving on the lode cut west of the fault, which is believed to be the Dominion lode of West Waverley. This lode has a width of from 10 to 14 inches, and at present is deemed worth $40 per ton.

Mt. Uniacke District.

The Phœnix Co., after thoroughly cleaning up the openings in their mine and testing the dumps, begin this month the mining and crushing of fresh material taken from the stopes. The management are confident that the present year's work will demonstrate the feasibility of working low grade ores at a profit.

Caribou District.

It is rumoured that the Lake Lode Co. are at last going to add five stamps more to their present five-stamp battery. If, as the manager says, their vein is 12 feet wide and worth $10 per ton, such a mincing policy is entirely incomprehensible.

The property of the Truro Gold Mining Co. in this district is looking well, and as soon as the weather will permit, active developing operations will be commenced.

Stormont District.

The old "North Star" lode has been reclaimed by Mr. H. K. Fisher, of the Palgrave Co. The water has been pumped out and the incline retimbered, and mining operations will be carried on there the coming summer. The mine has been equipped with a new boiler and engine, with hoisting and pumping gear, and a large boarding-house built within 100 yards of the mine.

Oldham District.

The sale of the Oldham Gold Co.'s property has been postponed, by order of the Supreme Court, until May 3rd.

Goldenville.

Returns from this district continue to be of a spasmodic character. Nothing more has been heard of the rich strike reported last September as being found in the

eastern part of the district. During February 150 tons were crushed from the western part of the district (on the old Sutherland property), which yielded at the rate of $9.50 per ton. Properties here are held at too high a valuation to induce the investment of capital.

Lake Catcha.

The Oxford mill is again running, with abundance of quartz ahead. The mill has been temporarily shut down to permit the cylinder of the engine to be re-bored and other parts refitted. The management report a very satisfactory saving of fuel as the result of the improvements.

Quebec.

Work in the asbestos region has been pushed with customary vigor during the past month, but the weather has been such as to throw back the production considerably. The miners are, however, looking forward to the opening of spring, and extended operations when the weather permits. As is usual at this time of the year, there is a plentiful supply of labor.

At Thetford, the different mines are working their customary force.

Messrs. King Bros. have placed an order with the Jenckes Machine Co., of Sherbrooke, for a duplicate of the plant supplied by that firm to the United Asbestos Co. (limited), Black Lake; the machinery is to be in position by May 1st. Messrs. King Bros. expect to largely increase their output during the present year.

We are informed that Mr. George R. Smith, now with the Ingersoll Rock Drill Co., has about completed arrangements with Mr. A. H. Murphy for working the property of the Thetford Mining Co. on contract this coming summer. This mine was equipped with boiler and steam hoist last fall, but by the time the machinery was put up the mine was closed for the winter.

Messrs. Lucke and Mitchell, with the other parties interested jointly in the "Wells Lot," have given an order for some machinery, which will be placed early in the spring. They propose enlarging the openings started last summer, and which show a splendid bunch of veins. The work will be in charge of Mr. H. J. Williams, New Rockland.

At Black Lake, the pits are all in operation.

The American Asbestos Co. (limited) have completed their tunnel and rise. The tunnel was driven 160 feet, and the rise is 59 feet high. They are now sinking No. 2 pit, and have no anxiety about water when the spring break-up comes. Mr. Ed. Wertheim, managing director of the company, is on the ground. About 140 men and boys are employed at these pits.

The United Asbestos Co. (limited) have their machinery in operation, and it is giving good satisfaction. At present but two drills are being worked at their pits, but we believe it is their purpose to increase the number as soon as practicable. A third pit is being opened, and derricks are to be put up at once.

The Anglo-Canadian Asbestos Co. (limited) are working their usual force. Some additional machinery will be added to their plant in the spring.

Messrs. Steele, and McDonald Bros. are erecting a building on their Lot.

Prospecting on the Lots of the St. Julie Mining Co. and the Black Lake Mining Co. is being carried on with moderate success. Some nice samples have been taken from the latter.

Mr. John McCaw, of the Brompton Lake Asbestos Co., writes to say that he expects to have all the machinery in place at the mine and ready for work by the end of the month. A small force has been employed since the 22nd January in prospecting operations. Mr. McCaw states that five tons of low grade sent in to the Cyclone mill, at Montreal, yielded 7,682 lbs. of merchantable asbestos; the result of this test is satisfactory, as the company will be able to utilize all the short fibre, which hitherto has been thrown upon the dump and lost.

The price of crude asbestos continues to have an upward tendency, a sale by the Johnstone-Irvine Co. of one hundred tons having lately been made at one hundred and twenty-five dollars per ton. Messrs. King Bros. are also reported to have sold a similar quantity at one hundred and thirty dollars per ton, delivered on the cars at Thetford.

The Wolfestown Mining Company shipped, during last year, one hundred and fifty tons of soapstone.

At the mines of the Bristol Iron Co., Pontiac Co., good work continues to be done under direction of Capt. Symons. The following telegram, under date of 12th inst., from the consignees in Pernsylvania, speaks for itself as to the quality of the shipments being made from the mines: "Your ore is turning out splendidly; twelve cars last sampled and analysed show over 63 per cent. metallic iron and ·005 phosphorus."

Ontario.

The Sydenham Mica and Mining Co. continue active operations on their mica mine. The output, which recently has been somewhat below the average, is improving again, and your correspondent is informed that the turn-out will soon be up to the old standard.

A fair quantity of mica is being produced from the Grant mine, near Sydenham. A cutting-house in connection therewith has been opened at the village.

Madoc District.

The lease of the Powell gold property, in the Township of Marmora, to a Mr. Taylor, manager of the Flinton gold mine, is reported, but at present no work is being done.

The Consolidated mines, at Delora, and the Richardson property, at Eldorado, are at present idle, with no good prospect of being re-worked very soon.

Large contracts have been made by the lessees of the Crookston quarries to supply the city hall, Toronto, and other public buildings with heavy limestone for the foundations and more solid parts. From 100 to 150 men will be employed as soon as the boarding houses are completed.

Port Arthur District.

The vigorous prosecution of the railway into the mining district has brought from the far south not a few American capitalists, who are interesting themselves in investing, and what is better, arranging for the development of recently acquired properties. Many shanties are being built, outcrops uncovered, trails cut, and other preparations are being made for extensive work.

The Board of Trade has been busy urging upon the Government the urgent necessity of a remission of the present onerous tariff on imports of such mining machinery as is not manufactured in the Dominion. A memorial has also been presented to the Local Legislature pressing for the issue of patents for lands surveyed on Hunter's Island, and also to empower local agents to dispose of applications for lands without the tedious delays now incurred in referring such to headquarters.

At the Shuniah Weachu, developments of late have been such that the stock still continues to rise in the English market. It is reported that Capt. Tretheway is about to resign. From his long and intimate acquaintance with some of the most celebrated mines, and his practical knowledge of mining plants, he would be the right man in the right place as Mining Inspector under the new Act—so thinks our ocrrespondent.

The diamond drill at the Beaver has been down 1,600 feet, and is now operating from the surface of the ground where the Beaver vein, when produced, will form a junction with the North Bluff vein. The veins will be tested at various other points. The drill will also make tests from the Beaver vein to the Big Harry vein. Captain Williams is timbering up the stopes, and has eight completed. It is estimated that there are 20,000 tons of milling and shipping ore ready to be stoped. The engineers are pushing the mill, and it will be ready for the spring work. The capacity of the mill is 25 head of stamps; this power is being doubled, and will probably be trebled if matters are as satisfactory as they are believed to be. As soon as the mill starts, 30 tons of ore will be hoisted per hour. There is some 3,000 tons of mill rock on the dump.

On the 20th ulto., the Badger Silver Mining Co. declared a second dividend of twenty-five cents per share (or five per cent.), payable on the fifth day of March. It will be remembered that, about two months ago, this mine declared a dividend of ten per cent., and that, previously to that, they had made an assessment and then returned it, so that inside of six months they have actually paid dividends upon a mining capital of $250,000 to the extent of twenty-five per cent. The mill of the company has been shut down owing to cold weather, but a shipment of ore will be made early this month, which will likely be the last until May, when regular shipments will again commence. From last accounts, the mine is looking as well as ever. The management seem more than pleased with the country; and it is hinted that early in the summer they may take hold of no less than three other large mining enterprises, all in this part of the country.

The West End is working only a small force at present; but there is no diminution in the richness of the ore extracted.

The Crown Point has been doing further development at the west end of their vein. It is reported that an interest has been sold at a big figure, and that the force will shortly be doubled.

Operations at numerous prospects continue active and promising, and the iron deposits along the P. A. D. & M. Railway are being uncovered and tested at numerous points.

The Elgin has 200 feet of sinking, 425 feet of drifting and 75 feet of cross cuts finished. The main vein is four feet wide and will yield all the way from 30 to 600 ounces to the ton. It has not yet been touched except for the purpose of testing the drifts being made alongside of it. A force of men is working in No. 1 end to connect with No. 2 shaft, and it may be said that no piece of property shows better results and prospects for the amount of time and money expended upon it. It is now under the supervision of Capt. Hooper of the Beaver—Mr. James Emmons having charge of the men.

Sudbury District.

It is estimated that there is being daily produced at the Canadian Copper Co.'s mines about 90 pot loaves or matte, each weighing 450 lbs., an output which yields an aggregate of more than 4,000 tons of nickel a year.

Rat Portage District.

At a recent meeting of the stockholders of the Rat Portage Reduction Works Company, held at Winnipeg, Mr. R. T. Riley was appointed trustee for the Winnipeg stockholders, and the appointment of Messrs, Drewry and Riley on the directorate was confirmed. The manager reported that work on the building was progressing favorably.

Mr. R. Sims, president of the Canada Mining and Reduction Company, reports that rapid progress is being made with the construction of the new reduction works at Rat Portage. It is expected that the building will be completed and the machinery in position about the first week in May.

North-West Territories.

Advices from Lethbridge state that there are good prospects of a decided increase in the production of coal from the Galt mines during the coming year. It has been decided to sink an air shaft to connect with No. 1 ventilator, and sink and timber two new shafts down to the coal bed. Two boarding houses, providing for one hundred men, will be ready for use early next month, and if necessary, further accommodation will be provided for a large increase in the working force. The superintendent states that the company has decided to raise the output from the inclined plane to 500 tons, and that from No. 1 shaft to 400 tons per diem. More men are required for work in the mines, and also for the construction of the railway extension.

Mr. E. T. Galt states that the N. W. C. N. R. has leased their railway to the Alberta Railway and Coal

Co., and that work on the extension of the boundary will commence as soon as the frost leaves the ground.

A Special General Meeting of the Canadian Anthracite Coal Company was held at Ottawa on 20th instant. The following directors were present :—Hon. J. G. Thorp, Cambridge, Mass.; Mr. Macleod-Stewart, Ottawa ; Mr. L. Painter, Menomie, Wis.; Mr. A. Pugh, St. Paul, Minn.; Mr. Coffin, Eau Claire, Wis. ; and Messrs. A. Stewart and L. Crannell, Ottawa. The meeting was called to consider certain proposals from an English syndicate to acquire and work the mines of the company at Banff, N.W.T.

The Alberta Railway and Coal Company have assumed the property of the North-Western Coal and Navigation Company, Limited, and extensive preparations are now in progress to increase the colliery output at Lethbridge up to 1,000 tons daily before 1st October next, this being the date when their new railway to Great Falls, Montana, is to be completed. The length of this railway—guage 3 feet—will be about 200 miles, 70 miles being through Canadian territory. The surveys are now well advanced, and the contractors, Messrs. Grant and Ross, are at work on the American side. It is understood that grading will shortly be commenced at the Lethbridge end of the road. Contracts have already been awarded at Lethbridge for the sinking of two additional shafts and air shafts in connection therewith, and building operations for the accommodation of miners are very brisk.

British Columbia.

A letter received by the Vancouver *World* from Barkerville, Cariboo, under date of the 13th inst., speaking of the burning of the Government chlorination works, says the origin of the fire is not known ; but it appears that on Monday the workmen were thawing out some of the pipes, and the supposition is that a smouldering spark did the damage. About 10 o'clock Monday evening, W. C. Price, who was left in charge, and sleeps in the engine-room, went through the building, as was his custom before going to bed, to see that everything was all right, and noticed nothing wrong. About 4.30 the next morning he was awakened by the roaring flames, and tried to get into the chlorinating-room, where the fire appears to have started ; but could not, on account of the flames. He then went to some miners near by to get assistance, but the fire was beyond control, and the whole buildings were completely swept away.

At the adjourned general meeting of the Perry Creek Gold Mining Company, it was decided to issue a $75,000 extension of the capital stock, and a number of the new shares were at once spoken for by the present shareholders. The remainder of the new stock will be placed in the hands of Bourchier, Croft & Mallette for negotiation. Several fine nuggets of Perry Creek gold are at present on exhibition in the cabinets of the firm named.

From the annual report of the Minister of Mines for the year ended 31st December, 1889, we learn that since 1858 the estimated total yield of gold and silver amounted to $52,236,753. Last year's gold product was of a value of $588,923, of which $490.769 were known to have been exported by the banks, leaving some $98,154 as having been carried away in private hands. The estimated yield of silver was $47,873. The number of miners employed was 1,929, their average yearly earnings reaching $330.

The quartz industry of the province has made most gratifying progress during the past year. English and American capital has been attracted into the Kootenay, Cariboo and Yale districts, and a large amount of development work has been done. Smelters for the treatment of ore have been erected at Vancouver and Revelstoke. Kootenay district has received the greatest attention during the year, that section adjacent to the line of the C.P.R. and the Kootenay Lake region in particular. From the Kootenay mines, silver ore of exceedingly rich character has been forwarded to the smelters of Helena and Butte for treatment, with excellent results, though the cost of transportation has been very heavy. Machinery for treating gold quartz has been taken to several mines. With the building of necessary railways and the establishment of rapid and cheap communication with the outer world, Kootenay Lake district gives promise of becoming one of the richest mining regions on the continent.

A Movable Platform for Inclined Planes in Mines.—The object of this arrangement is to make connection between the rails of steep inclined planes, worked by engine power, and those of intermediate level roads which branch off them to each side. It consists of an angle iron frame, having two horizontal top bars, one on each side of the incline rails, and at the same level as the branch road rails. On one of the top bars is hinged a malleable iron plate after the manner of a trap door in a floor. When this plate is in a vertical position, in which it is kept by a counter-balance weight, it blocks the branch road, and the trains on the incline are free to pass up and down. When the plate is lowered to a horizontal position, it rests on both of the top bars, and its upper end touches the incline rails, and so forms a connection between the branch road and the incline.

The Gold Miners' Association.

The second Annual Meeting of the Gold Miners' Association of Nova Scotia was held at Halifax on the afternoon of the 4th inst. Some important changes in the by-laws were ratified, and the following office-bearers elected for the ensuing year: President, Mr. George W. Stuart, Truro ; Vice-president, Mr. J. M. Reid, Oxford Mines, Lake Catcha ; Secretary Treasurer, Mr. T. R. Gue, Halifax. After a short discussion upon the geognosy of the gold fields, and an address from the retiring president, Mr. B. C. Wilson, the meeting was adjourned until the evening, when the annual banquet was held in the Halifax Hotel. A number of the invited guests were present. The following is a copy of the very unique (and horribly indigestible) bill of fare :

ANNUAL BANQUET.

Halifax Hotel, March 4th, 1890.

—MENU—

SOUP.

Nitro-glycerine, with Noodles of Stearine Candles.

FISH.

Boiled Winze. Fillet of Cross-cuts. Fried Skips.

ÉNTREES.

Arsenical Pyrites, a la Frue Vanner.
Amalgamated Plates, Quicksilver Sauce.
Air Drill Croquettes.

REMOVES.

Roast Quartz, stuffed with Nuggets.
Stamp Batteries, with Amalgam Jelly.
Retort Gold, Borax Dressing.
Boiled Bullion, U. S. Mint Sauce.

GAME.

Baked Whin, with Poverty Dressing.
Waverley Tunnel, Barrel Quartz Sauce.

SALADS.

Floured Quick Salad. Assay Office Mayonnaise.

VEGETABLES.

Mashed Fusees, with Damp Caps. Fried Upraises.
Boiled Back Stopes. Sweet Dynamite.

PASTRY.

Jumbo Plum Pudding, Pennyweight Sauce.
Oxford Breaks. Rawdon Bricks. Dufferin Pie.
Wine Harbor Jelly.

Pick Cheese. *Shovel Crackers.*

DESSERT.

Pinched Lodes. Pickled Dies. Candied Tappets. Buckets.
Shoes. Ropes. Sheaves.

Duty Trials of Pumping Engines.

Purchasers of pumping engines often stipulate that they shall give a certain "duty" before they are taken off the contractor's hands, and in cases in which the duty is likely to fall short, disputes sometimes arise between the builders and the experts making the trials as to the allowance to be made for certain things—as to whether the duty is to be calculated on the actual quantity of water delivered or on the plunger displacement; whether any allowance should be made for the friction of water in the pump passages and pipes; and in the case in which the boilers are not supplied by the same contractor, and the evaporation of so many pounds of water is fixed as being equivalent to the combustion of one pound of coal; as to whether the pound of coal is to be taken as the equivalent of the water evaporated from the temperature of the feed water in the pond; also as to whether only dry steam should be charged against the engines, and also to what allowance, if any, should be made for steam consumed by the feed pump engine. The methods of gauging the condition of the fires at the beginning and end of the trials are open to variation in the practice of different individuals, and the reports are not made so that a fair comparison can be instituted between the different engines. "Without doubt," the author concludes, "many of those unsatisfactory features are due to the fact that duty trials are often conducted by civil engineers whose training and experience does not qualify them for expert work of this character, and such tests, while they may be perfectly sincere, cannot be regarded as authoritative.

Concentration of Low-Grade Ores.

(By Henry F. Armitage, Lake City Colo.)

The object of this paper is to give a few useful hints on the concentration of low grade ores. The machines that I shall speak of are Cornish rolls, revolving screens, Hartz jigs, spitz-lutte, and the Linkenbach buddle, (or Roberts's patent buddle as it is called in Colorado). I think the reason why some of them have been discarded in favor of more recent inventions is that they have not been given a fair chance to do their work in a satisfactory manner.

Cornish rolls are usually looked upon as a machine designed simply to crush the ore as a preliminary to sending it to the sizing-screens, beyond which they have nothing to do with dressing the ore. On the contrary the rolls give the key-note to the whole process. It is well known that one class of rock will crush differently from another, and from the result obtained by passing the ore through the rolls, the size of the first revolving screen and the surface required on the jig-screens must be determined. If it is found that the mineral crushes clear from the quartz, a large mesh can be used on the first sizing-screen, and the tailings will not require recrushing ; but if it is found that some of the tailings from the first jig are ragged, (that is, are carrying off particles of mineral sticking on the quartz,) it will be necessary to recrush them. Again, if a large percentage of the tailings carry off mineral, it will be more economical to commence with a finer mesh screen than to recrush the tailings.

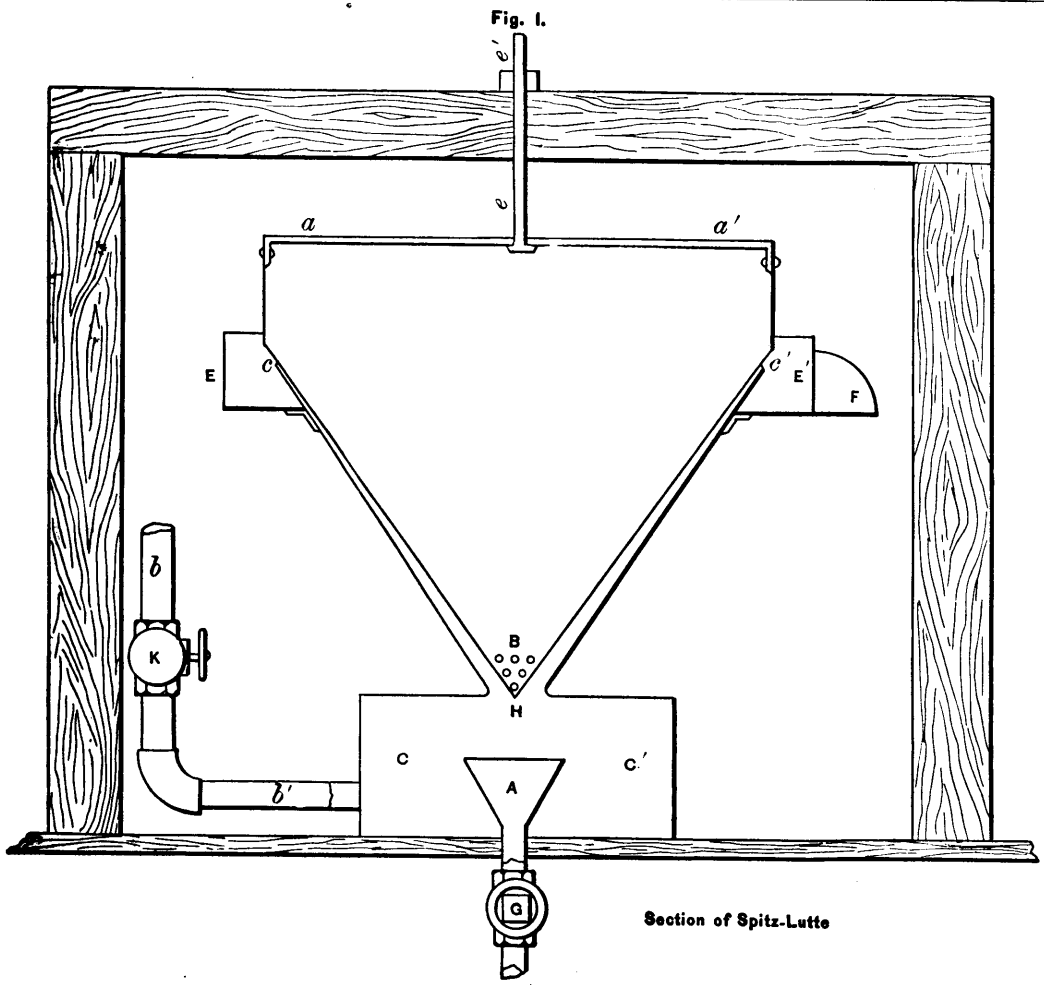
Having determined the best mesh to use on the first sizing-screen, the different sizes on the other screens can be determined from it. I have found for practical purposes that, commencing with a 6-mesh, the next should be 8, then 12, and finally 18. The holes in the jig-screen should be a trifle larger than in the revolving screens. For instance, if the revolving screen is made of No. 14 wire, the corresponding jig-screen should be of No. 16 wire. The jig-screen surface required for each size made depends on the way the ore crushes in passing through the rolls, and this is shown by the quantity of crushed ore passing through each revolving screen. Supposing, fo example, that the sizings are 6, 8, 12 and 18, and it is found that 40 per cent of the crushed ore passes through the 6-mesh screen, 15 per cent through the 8-mesh screen, 15 per cent. through the 12-mesh screen and 30 per cent. through the 18-mesh screen ; then, if three-compartment Hartz jigs are used, it will require two three-compartment jigs to treat the ore from the 6-mesh screen, one three-compartment jig to the eight, and one three-compartment jig to the 12-mesh. The 18-mesh jig catches everything that is fine enough to pass through the 18-mesh revolving screen, and it is necessary to separate the finer slimes from the ore before it is allowed to go on the jig. I have found that a spitz-lutte does this work most satisfactorily. As I have not seen one in any other mill in Colorado, I present a sketch of this very simple machine.

It consists of two inverted cones, one inside of the the other. The inner cone is suspended from a frame by a threaded bolt fastened to a cross-brace, *aa'* on the cone. The outer cone rests on the dead water tank, *cc'*. The ore and slimes after passing through the 18-mesh revolving screen, run into the inner cone and pass through the perforations, *B*, at the bottom, into the space between the two cones. Here they encounter an up-current of water coming from the pipe *bb'*. This pipe is connected with a tank at sufficient height to give the required head. The finer slimes are separated and washed out at the point *cc'* where they run into the trough, *EE'*, surrounding the outer cone and are carried to the buddle-table by the spout *F*. The heavier particles of mineral and quartz fall into the hopper, *A*, and are drawn off by the stop-cock *G*, on to the jig. By raising or lowering the inner cone, by the screw and nut *ee'*, the space at the point of discharge can be increased or decreased. It is essential that this space should be of the same area as the area of the space at the point *H*, so that the up-flow of water will be of uniform velocity from the starting point at *H* to the discharge at *cc'*. This flow is regulated by the valve, *K*, and by it the quantity of slimes sent to the buddle-table can be controlled. The stop-cock *G*, is kept open only sufficiently to let the ore that falls into the hopper *A*, run off to the jig.

This machine will take off all the slimes and let the ore of proper size go to the 18-mesh jig, the quantity being about 20 per cent of the ore crushed. As this ore, being very fine, takes longer to settle and pass through the jig-screen than the coarser sizes, I find it better to increase the number of compartments on this jig. This refers to ores that contain galena, gray copper, yellow copper, and iron pyrites, and from which it is necessary to save and separate these minerals. In doing this on a three compartment jig, I found the copper minerals and pyrites were crowded out at the tail-gate before they had time to settle and pass through the jig-screen. But if the ore has to pass over five or even six compartments before reach-reaching the tail-gate, it has had time to settle through the beds and the tailings will be clean.

The Linkenbach buddle was fully described in a paper by Mr. Richard F. Rothwell, read at the Boston meeting

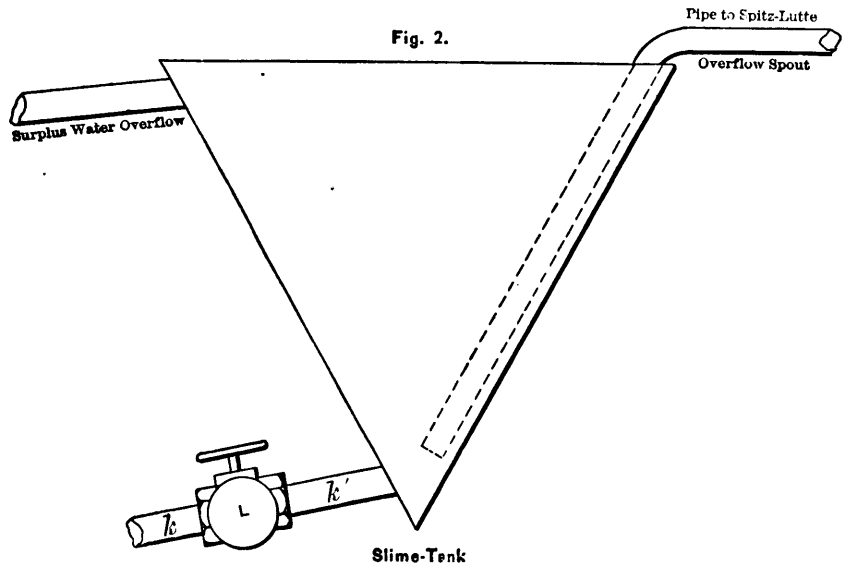
Fig. 1.



Section of Spitz-Lutte

Feb. 1883, (*Trans*, xi. 475). It is a stationery table with rotating water sprays, which I consider an excellent apparatus for treating low-grade slimes, but like jigs, it must receive fair treatment to be able to do its work well. The slimes as they come from the spitz-lutte carry too much water. The whole of the water used on the revolving screens, together with that used in the spitz-lutte for washing out the slimes, would run on the buddle and prevent it from doing its work as it should. To prevent this excess of water from reaching the buddle, I let the slimes run into a hopper-shaped tank and draw them off from this to the buddle. By making the slimes from the spitz-lutte discharge at the bottom of the tank, as shown in the accompanying sketch, very little can rise to the surface of the tank, and get away by the overflow, the slimes being sucked out by the pipe *kk*, as fast as they are delivered. The valve *l*, must be left open sufficiently to allow the slimes to pass to the buddle without accumulating in the tank, the surplus water passsng off at the overflow. The middlings from this table, consisting of the lighter ores, I carry to a Frue vanner.

Fig. 2.



Slime-Tank

The length of stroke given to the jig-plungers is a matter to be determined by experience. No rule can be given, since the difference of fit of the plungers in the jigs would change the effect of any given stroke.

I do not think it is advisable to increase the number of strokes when the stroke is shortened; that is, to run the finer jigs at a higher speed than the coarser ones, as this has a tendency to disturb the bedding, though I believe it is done in many cases.

In bedding the jigs, the best plan is to bed each compartment with the same ore which that compartment is going to handle. In treating an ore containing galena, gray copper and iron pyrites, bed the first compartment with galena, the second with a mixture of galena and gray and yellow copper, and the third with yellow copper and iron pyrites. The bedding of each jig can be obtained from the headings of the preceeding jig. To obtain bedding for the first jig, put into the first sizing-screen a small section of larger screen. If the first screen is 6-mesh, put into the screen a strip of 4-mesh wire-cloth 6 inches wide, which will allow enough ore of the proper size for bedding to pass to the first jig and keep the bed supplied. This will save the time and trouble of having to crush and screen ore to make this bedding.

By close attention to the bedding on the different compartments, a perfect separation of the different minerals can be made. If the headings of the first compartment show any copper, the bed is not heavy enough, and if the headings from the second compartment show galena, the bed on the first compartment is too heavy.

On the jigs use the least possible quantity of water to do the work, but be liberal with water on the revolving screens. The water in the jigs should be perfectly clear. If the jigs are muddy, slime is sticking on the ore, instead of being washed off in the revolving screen and going to its proper place on the buddle table.

DISCUSSION.

RICHARD PEARCE, Argo, Colo.—The subject of the concentration of low-grade ore is one of special importance to Colorado at the present time.

The State has hardly kept pace with other districts in that branch of mining industry. It has been customary for Colorado miners to sell their ores to the smelters in mass, just as it comes from the mine, but now the necessity for cencentration is coming to be more plainly seen especially in the low-grade ores of certain localities, not favoured by cheap facilities for transportation to the smelters. It must be remembered, however, that in some instances concentration is accompanied with heavy loss in gold and silver. In the concentration of a mass of auriferous chalcopyrite in a gangue of quartz in California, only 40 per cent. of the gold was saved, the valuable mineral being finally distributed in the quartz. As an example of the opposite character, the London mine, between Leadville and Alma, may be cited, where. in concentrating from 4 tons to 1, there was a saving of over 90 per cent. of the gold. The gold in this case was contained in the pyrite.

CHARLES J. MOORE, Leadville, Colo.—The results attained by cencentration at Leadville are not entirely satisfactory, and the work is not thought to be good unless 80 per cent. or more of the lead is saved. The ores subjected to concentration are chiefly sulphides—pyrite, galena and blende. The silver occurs most generally in the galena and blende, not in the pyrite, except in those parts of the Leadville district where the ore occurs in fissure-veins, in granite country, or in porphyry dykes, in which cases I have noticed the pyrite often to be the principal silver-vehicle, or, at least, equal to the blende as such, the galena taking the third place both in quantity and relative silver value. In these veins also is found considerable rhodonite or manganese silicate, but, as a rule, this mineral shows little affinity for silver; it is often, however, impregnated with pure pyrite and nearly pure galena, the former in the largest quantity, as we should expect from the frequent association of manganese and iron.

The per centage of saving of silver is less than that of lead, seldom amounting to more than 60 p. c. This is explained by the fact that, owing to the objectionable behaviour of the blende in the furnaces, this mineral, carrying silver with it, is allowed to go into the tailings. The problem is, how to get rid of the blende and not lose the silver it contains; or how to save all the galena with the silver it carries, and not retain so much blende as to effect the cost of smelting unfavorably. If the crushing is extremely fine, silver is lost in the form of a light sulphide that floats on water.

At Aspen there is only one concentrating mill, that at the Molly Gibson mine. The ores contain a large amount of barite, not easily separated from the ore. In some of the Aspen mines there is considerable lead, but the ores are generally dry. The gangue of the ore in Leadville is partly quartz and partly siliceous dolomite; in Aspen the gangue is principally a changed dolomite. in some mines, however, those which carry lead, the gangue is the changed blue limestone, a rock which carries from 80 to 96 per cent of $CaCO_3$.

JOHN M. DESLOGE, St. Louis, Mo.—In connection with the subject of the concentration of low-grade ores, something may perhaps be learned from an account of the German-American practice at the old mill of the Desloge Lead Company at Bonne Terre, Mo. The mill was destroyed by fire in March, 1886, and the mine is at present a part of the St. Joseph Lead Company's property. I must therefore depend considerably on my memory for the facts and figures I am able to give.

The ore yielded on an average about 7 p. c. of a non-argentiferous galena, and 1 per cent. or more of cobalt-and-nickel-bearing pyrites. These minerals occurred in an almost non-siliceous, true dolomite, containing few or no fossils, and belonging geologically to the horizon of the Lower Silurian. The rock was impregnated unevenly throughout a stratum of many feet in thickness. Bodies of ore carrying 20 per cent. of galena were not unfrequently met with, but these richer portions were mixed with the leaner rock, for it was found that better results were obtained when the ore to be concentrated was kept at a nearly uniform standard. The ordinary products of cencentration, aside from the waste, were two in number; one locally called "mineral," containing about 70 per cent. of galena and 15 per cent. of dolomite, with little or no silica, and a middle product, known locally as "sulphide," consisting of about 33 per cent. of galena, 33 per cent. of dolomite, 33 per cent. of pyrite, with something less than 1 per cent. of cobalt and nickel.

The ore came from the mine in ½ ton cars, and was dumped by cradles provided with balance-wheels, by

means of which the empty cars were quietly and quickly righted. The ore fell in front of three 9″ by 15″ Blake crushers; originally, two of them were of the lever pattern and the other eccentric, but, after long use, the eccentric, not having two-thirds the capacity of the others, was replaced by one of a different pattern. In regard to the use of wrought iron jaw-plates, I can say that my attention has been called to an idle crusher fitted with such plates, whose appearance as to usage and wear seems to indicate the practicability of employing that material. The ore was broken so as to go through a 2-inch ring and thence directly to three pairs of 14″ by 30″ Cornish rolls, with chilled tires made of car-wheel iron. These usually wore from four to six months, but, at the time of the fire, there was one pair in fair condition that had been doing an average daily crushing of 80 to 100 tons a day of moderately hard limestone since the starting of the mill, about five years before.

The coarse rolls delivered a product of hazel-nut size, which was taken by a belt-elevator in buckets holding 10 pounds each to three sets of 9 mm. screens, 3′ by 8′. All that was too coarse to pass through the screens returned to the rolls for recrushing. The ore that passed through fell upon three sets of 7 mm. screens, 3′ by 6′. The screen-openings were all round-punched.

The sized ore between 9 mm. and 7 mm. went to three pairs of 2-sieved roughing-jigs with lever slot-motion, the speed being in proportion to the arc travelled. The stroke was ⅞ inches with 100 revolutions a minute. The sieve-wire was No. 8. A Lake Superior Collom roughing-jig was, after some service, abandoned, though its work compared favorably with that of the other jigs.

The ore that passed through the 7 mm. screens went to water-currant classifiers, one for each screen. Here three classes were made: one from 7 mm. to 5 mm; a second from 5 mm. to 3 mm., and a third below 3 mm. The ore of size between 7 mm. and 5 mm. went to twelve roughing-jigs, of the same pattern as those previously mentioned, but with No. 15 sieve-wire instead of No. 8. The stroke was ⅜ of an inch with 120 revolutions a minute. The ore between 5 mm. and 3 mm. went to Hartz, or eccentric-jigs. Of these there were two sets of four each with three sieves of Nos. 15 and No. 20 wire, The stroke was ½ inch, with from 150 to 200 revolutions a minute, according to the ore.

All the jigs in this portion of the mill had the automatic cap-discharge from the sieve. The roughing-jigs had, approximately, a capacity for treating 25 tons in twenty-four hours; the eccentric-jigs a capacity of 12½ tons. The product known as "mineral" was obtained from the first compartment of the jigs, and generally, also, from the first hutch-boxes. The product from the second compartment of the roughing-jigs was usually recrushed, but that from the second compartment of the eccentric-jigs working on the stuff between 5 mm. and 3 mm. constituted the "sulphides." The product of the third compartment was recrushed and subsequently treated in another part of the mill.

The two sets of Cornish rolls for recrushing were of the same pattern as those previously mentioned, but they were run at about double the speed, making 25 revolutions a minute, and crushing 40 tons, more or less, in twenty-four hours. The product of these rolls went to a 3 mm. screen. The part that was too coarse to pass through the screen was returned for recrushing. That which passed through went to two sets, four in a set, of 3-sieve eccentric jigs, from which "sulphide" and some "mineral" were obtained. The tailings or "chats" went to settling-tanks and were thence delivered into side-dumping cars and hauled away by a locomotive running on a track of 3 foot guage. The slimes and tailings were handled in the old mill, where there were a set of rolls, a screen, two roughing and two eccentric-jigs, two Evans and one Coggin table.

These tables were adopted after an exhaustive competition with Rittinger side-bump tables. Their capacity was at least five times that of the Rittinger tables, and they gave nearly as clean a product; they required less power and less attention, used no more water and showed less wear. The tables were used for treating slimes from the settling-tanks. Each table could treat about one ton an hour, making 60 to 80 revolutions an hour. One table was used with fair results, to treat the waste slimes of an old settling-pond. The headings of the tables were clean, and the middlings went to light-bumping tables or vanners for higher concentration.

The rated capacity of the mill was 300 tons of mine-rock in twenty-four hours, and the average work was 250 tons. The water used amounted to 1200 gallons a minute. The mill gave employment to about 33 men, including those needed for loading the tailing-cars, but not the engineers or firemen, who were engaged also for a part of their time on mine work. The approximate cost of milling was 40 cents a ton.

The breakers required the service of about 14 men. From my knowledge of the Gates crnsher I am of the opinion that, for the same capacity, they would not need more than one-quarter the number.

The rolls for recrushing the finer material did not give satisfaction. The loss was about 30 per cent. on a 10 per cent. galena. This loss was due to the presence of dolomite, to which particles of galena adhered, or of fine galena which was washed away in the tailings. There was great need of pulverizers and slime concentrators that would do good work and have large capacity. Several pulverizers were tried but without success. A single-head steam stamp-mill, constructed on the principles of the Rand drill, was tried, but that failed.

For fine grinding, the Heberle mill, used by those who adopt the Lake Superior practice, and for slime concentration, buddles of the Evans pattern, with light-striking tables to take the buddle middlings, seem to me worthy of consideration where such losses like those at Bonne Terre occur. The old mill was started with 15 mm. screens; but in the other mill, where it was planned to discard down to 7 mm., less attention was given to screen-sizing, and more to the work of the roughing-jigs.

In milling our extensive deposits of low-grade ore with a low price of lead, it was commercially important for us to decide on the most economical practice, and to determine whether it were better to treat rapidly a large tonnage, even at a loss of 30 per cent. or more, or to work with a higher per centage of saving on smaller quantities. In the former case, one screen-sizing may be the best, as is the present practice of the St. Joseph Lead Company; but, in my opinion, what these ores require is two screen-sizings, the first to not over 7 mm., and the second to some finer size (unless the screen is replaced by some other modification of sizing apparatus), and good grinding and sliming machinery.

Free Importation of Mining Machinery.

In the House of Commons on 26th ulto:—

Mr. PLATT moved:

That machinery designed for use in mining operations should not be subject to Customs duty when imported into Canada for mining purposes.

He said: I desire to state that it was not at the instance of any party or parties interested in the introduction of mining material, free of duty, into this country, that I placed this motion on the Order paper. I became aware on several occasions last year that efforts were made by parties interested in the importation of mining material, to induce the Government to admit that material free of duty. I also became aware of the fact, which every hon. member I suppose is aware of, that the mining industry, although at present an infant industry in this country, is just about entering upon a period of development far beyond what many of our people realise. The vast, and I may say, illimitable mining resources of this country are becoming more and more apparent to the people, and we are looking forward to the day when the mining industry of Canada will be second in importance only to the agricultural industry. When we look over the geological map of this country, and when we read something of its mineral resources, we cannot but look forward with pleasure to the day when Canada will be *par excellence* the mining country of the world. I believe it is the duty of the Government, particularly at this time, to give every encouragement to those who are trying to develop those vast resources, and it is that view alone which has induced me to place this motion on the paper.

Mr. MARA: I am very glad to see that there are other portions of the Dominion, as well as the Province of British Columbia, which are agitating in favor of the free admission of mining machinery. Last Session, the hon. member for Cariboo (Mr. Barnard) brought this matter before the House and clearly proved that the machinery required to get out our refractory ores is not manufactured in the Dominion. He also clearly showed that the manufacturers would not suffer by the free admission of this machinery, that at present mining machinery is practically barred from entering into the Dominion, and that, if it were admitted for two or three years free of duty, the manufacturers would have a much larger market than they have at present. Since last Session, the attention of the Minister of Customs has been repeatedly called to this question by the Provincial Government, by the different Boards of Trade, and by the press of the Province, which, although divided on every other subject, is united on this. We cannot understand why that gentleman will not yield to the representations which we have made. We consider that, in a matter affecting the tariff, we have a strong claim upon the Dominion Government. We pay a very large sum yearly into the Dominion Treasury. Last year we paid in duties of Customs and Excise, $1,100,000, nearly five times as much as the Province of Prince Edward Island, 50 per cent. more than Manitoba and the North-West Territory combined; and, estimating our population at 100,000, exclusive of Indians, we pay more than twice as much per head as any other Province in the Dominion. In a matter of this kind, affecting an infant industry, we contend that, where we can show that it will not injuriously affect any other industry, the Government ought to yield to so reasonable a request as we have made. Situated as we are, so far from the manufacturing centres of Ontario and Quebec; having to pay a very heavy toll upon all manufactured goods taken into the Province, whether they are from Ontario or from Quebec, from the United States or from England; being, as far as manufactured goods are concerned, consumers rather than producers, the tariff presses heavily upon us. When the National Policy was framed, it was intended to protect every interest and to assist every industry. The farmer of Ontario is protected by the duty on his coarse grains and root crops; the manufacturer of Ontario or Quebec is doubly protected, first, by a high tariff on all goods manufactured into the Dominion, and secondly, by the admission of such raw material as is required for manufacturing purposes and is not the product of Canada; the coal-miner of Nova Scotia is protected by a duty of 50 cents and 75 cents a ton on coal; the iron industry of Nova Scotia is also protected by a bounty; but you will look in vain for any single article which is protected for the benefit of British Columbia, and on the free list there is not a single article intended to foster or encourage any industry in that Province. Since the discovery of gold on the Fraser River, British Columbia has produced over $50,000,000 of gold. Almost the whole of this has been in quartz diggings. The placer mining has not been successful, and the miner has devoted his attention to quartz, which will give more employment and be of greater benefit both to the Province and to the Dominion. In prosecuting his search for quartz, he has, to a large extent, been successful. Large bodies of low grade ore have been found all over the mainland of British Columbia. In the district of Kootenay, along the line of railway, mining development has been retarded, largely owing to the mining belt being practically locked up in a dispute between the two Governments. That, I am happy to say, is settled, and we may soon look for an era of prosperity in that section. But when we take the far-off district of Cariboo, as well as the southern and western district of Kootenay, districts almost inaccessible, far removed from roads and trains, where the cost of transportation is high and living expensive, the miners and prospectors have had many difficulties to contend with. In regard to the southern district of Kootenay, that portion to which I now call the attention of the House, if hon. members will look on the map they will find that it is bounded on the south by the States of Montana, Idaho and Washington, and is only separated by an artificial or imaginary boundary line. These districts are rich in gold, silver, copper and lead; and the large output of coal and silver, chiefly from the States, has contributed greatly to the wealth of the United States during the past few years. The prospectors of quartz, labor under difficulties that the ordinary miner has not to contend with. The miners who are working placer diggings, or hydraulic mines, have, by their own individual efforts, or aided by mining companies, succeeded in working their mines, but with the quartz miner it is different. It takes years of labor and a large outlay to get a quartz mine successfully opened, and even then the capitalists have to step in before any successful working can be done. In that portion of Kootenay bounded by Montana and Idaho, the topographical features are somewhat similar to those of the States I have mentioned. The formation of rock is the same, and, as might have been expected, the miners, in their march northward across this artificial boundary, have discovered large bodies of low grade ore, and mines which will equal any of those in Colorado, Nevada or Idaho. Last year, in visiting that section of the country, I obtained a list or memorandum of shipments of ore from a few of the mines there. To show the state of development of these mines, I will read returns from the different smelting companies of the shipments of ore from that section:

Silver King....	70	230	silver,	20 p. c. copper.
No One.....	146	87	"	
Little Donald..	85	90	"	35 p. c. lead.
Spokane.....	65	40	"	70 "
Della.....	20	120	"	
Sky Line.....	15	225	"	
Krao.....	12	95	"	50 p. c. lead.
Gallagher.....	14	119	"	$14 gold.

Mr. CHARLTON: I suppose these yields are in each case so much per ton?

Mr. MARA: In each case per ton; and I may say they are authentic. Several of the returns I got from the mine owners, and the others were furnished me by the Gold Commissioners. Now, you will see that these returns are not samples from a few ounces of rock, but returns from shipments of hundreds of tons. It may be said, that where the rock will yield such a large return, there should be no difficulty in procuring machinery or capital necessary to work the mines; and so it would be, if these returns represented the whole of the ore extracted from the mines. But this ore, when run out from the tunnel, has to be picked up by hand experts. The freight alone from the Silver King Mine to Butte is $33 per ton, and from the Hot Springs Camp to Helena, $26.50 per ton; so that miners can only ship the higher grade ore, and instead of shipping it away, there is now lying on the dump hundreds of tons of ore that it will not pay to move for want of mining machinery. Here we have hundreds of tons of ore that, in treating, would give em-

ployment to a great number of men, and representing hundreds of thousands of dollars, but it is lying there idle, simply because the rates of transportation are so high, and the Government impose a duty upon mining machinery so high that such machinery cannot be brought into the country. I do not think a stronger argument can be used in favor of the Government yielding to the concession we ask. I visited another mine called the Blue Bell or Hendryx Mine. In that mine, I went down 100 feet below the surface, and traced a vein of ore 87 feet wide. The greater portion of this only yields from 4 oz. to 10 oz. in silver, and one small portion yields 20 oz. in silver and gives 50 per cent. in lead. Several shafts have been sunk on this mine, the ledge has been cut across in several places, and to-day there are thousands of tons of ore exposed to view. That mine can produce more galena and more lead than is to-day consumed in the whole Dominion of Canada; and I was informed by Dr. Hendryx, one of the principal owners of the mine, were the duty taken off mining machinery, their company would be prepared at once to put in a plant that would cost about $200,000, and the machinery alone would cost $100,000, but they are not prepared to pay into the treasury of the Dominion something over $30,000 in shape of duty. In discussing this question with these mine owners, who are chiefly Americans, I said to them: Now, you are Republicans in your own country, you are protectionists; how is it that once across the line you throw your protectionist principles to the wind, and you cry out for free trade? Their reply invariably was: That is not the case. We were protectionists at home, and we are protectionists here. We believe in the policy of America for Americans, and we do not blame you for insisting on a like policy of Canada for the Canadians. But we say this: You do not manufacture in Canada the machinery requisite for the treatment of our ores, and even if you did manufacture that machinery, there is no means of our getting in the Ingersoll rock drill. Steam drills are manufactured in Montreal, but they could not get one in Montreal because they had no means of taking it in from our side, and this rock drill had to go in from the American side and had to pay a duty of 30 per cent. I was informed that, instead of that one drill, there would be a dozen drills in use in Kootenay if they could be taken in free of duty. I met there a very intelligent man from Spokane, a representative of Spokane capitalists, and in conversation with him I learned that the capitalists he represented would also put machinery on the different claims in which they were interested if the duties were removed from mining machinery. He was originally in a bank at Spokane; he is a man who has some knowledge of geology and assaying, and was selected by the Spokane people to select locations for them in the Kootenay country. I asked him to give me the benefit of his views in writing, which he did a short time after, and which, with your permission, Mr. Speaker, I will read to the House. He states:

"In relation to the benefits accruing to this section by the abolition of duties upon mining and reduction machinery, I have to state that were such a measure accomplished, I would within a year have a concentrator of from thirty to a hundred tons here, as well as at least two hoisting plants, and probably a quartz mill and other mining machinery such as machine drills, etc. I am positive that at least two others would do as much more, and I further feel confident that a very large and complete smelting plant would be erected; and, of course, with the advent of these industries the progress of this section would be apparent. At present we cannot obtain these things in the Dominion, and if we could, transportation to this point is at present impossible, and that renders protection in one case a hardship, without any industry being protected, hence nothing is accomplished favorable to any party. Our ores in the main are of such a grade that we must be able to mine and reduce cheaply to insure a profit, and the margin of profit is so small that machinery on any but one or two claims would not be feasible while duties exist and transportation is exorbitant. It is apparent, then, that great things must result with the energetic working of the claims, and a vast amount of industries incidental to extensive mining accompany and follow up the new era of prosperity, and, in my opinion, all it needs to bring on this state of affairs is a little fostering by the Government in the shape of duty rebates and better transportation."

I might say with respect to the question of transportation that that is a difficulty which, I believe, will very shortly be solved. Every northern trans-continental line is now seeking an entrance into Kootenay. The Northern Pacific are about to build a line from Kootenay to Bonner's Ferry, from whence a steamer can be taken to any of the mines on Kootenay Lake. The Spokane and Northern Railway Company has an application for a charter now before the House for a line running from the international boundary near Pew Doreille, and the Canadian Pacific Railway Company are applying for a charter from Sproat's Landing on the Columbia River to Nelson on Kootenay Lake. So the difficulty with respect to transportation will soon be solved, and it only remains now for the Dominion Government to say whether they will assist the mining industry by allowing mining machinery to be admitted free of duty. It may be said by members of the Government that the letter I have read, as well as the information I have furnished, is from American sources. I admit that; but I will say this, that it is only through American enterprise, industry and capital that that section of the country has been opened. However, the same feeling pervades every other part of the province, namely, that unless the duty is taken off mining machinery, very little advance can be made in mining industry for years to come. A few days ago, I read a letter published by a resident of Victoria, a representative of British capital to the extent of $500,000, and the representative of a company which is doing good work in developing the mines of Nicola, in which the matter was put very clearly. I may add that he is a supporter of the Government, and a Conservative, and, being an Englishman, he, John Bull like, goes straight to the point and strikes out from the shoulder. I will read an extract from his letter. After referring to the work done in the Nicola country, he says:

"You might assist that development by more vigorously and persistently pressing for the removal of the practically prohibitory duty levied by the Dominion Government on mining machinery, without which the mines cannot be worked. The situation at present is this: The Province which owns the minerals acts most liberally to those engaged in mining. It gives them away to whoever discovers and prospects them. It makes trails and roads to render mining districts accessible. It does all this without deriving any revenue, except small sums from miners' licenses and record fees, which do not begin to recoup it for its large and generous outlay. The Dominion, which does not own the minerals, but which would gain the lion's share of benefit from a mineral development, through its heavy tariff neutralises the efforts of this Province by prohibiting the working of the mines unless it first receives a toll of 30 per cent. of the value of all machinery necessary to extract the minerals from them.

"To show you how this operates I will instance Nicola, and what applies to that district applies to all others in the Province:

"The ores of Nicola are refractory. They consequently require far more expensive machinery to treat them than free milling gold ores, which, except at and near the surface, have not yet been discovered in British Columbia. This means a large outlay and the payment of about twenty thousand dollars to the Dominion for the privilege of working Provincial mines that the Dominion never owned. I know that outside capitalists look upon this Dominion 30 per cent. tax on mining machinery as little better than a blackmailing operation, and they prefer to invest in semi-barbarous countries, such as South Africa, where they are not plundered of a portion of their capital before they have a chance of investing it, as they are at present if they venture into the Dominion of Canada.

"My opinion is that an output of precious metals from the quartz mines of Nicola and other mining districts of British Columbia will be delayed until the Dominion permits mining machinery to be brought in without the present preposterous duty being levied upon it. Every well-wisher of this Province shou'd energetically protest the continuance of a tax which stops the investment of capital in mines and prevents the development of the greatest natural resource British Columbia possesses."

That is the opinion expressed by nearly every man, miner or otherwise, who has an interest in British Columbia. What we ask is this: that the Dominion Government should take the duty off such machinery as is not at present manufactured in the Dominion; and we contend that the manufacturers, instead of being injured, would be benefited by that measure. We say that such machinery as concentrating machinery, quartz mills, reduction mills, sampling mills, and refining works, are not manufactured here. So our request is a very fair one. We ask that the Government will take the duty off that class of machinery for a short time, and we further ask that they will remove the duty from all machinery, including motive power, in that part of Kootenay at present inaccessible from our own side. I venture to predict that in the district of Kootenay, if that policy be followed, inside of three years you will have a market for more mining machinery than is manufactured in the whole Dominion to-day.

Mr. BARNARD: I have submitted to the Minister of Finance a list of mining machinery which we hope will be admitted free of duty, and the greater part of which is not, I am quite satisfied, manufactured in Canada. I am in hopes, as all the members from British Columbia are, that the Government will be able to place some of these articles, if not all of them, on the free list. In the meantime I will defer making any further remarks on this subject, until the Minister of Finance has announced the changes in the tariff which he proposes.

Mr. CURRAN: I desire to state in regard to some of the remarks which have been made here, that I have been informed by several manufacturers that the statement, that we did not manufacture in Canada all the mining machinery required, is not correct. The manufacturers have assured me, and I have no doubt that they have also assured the Government, that they are perfectly able to manufacture in Montreal, and, I believe, in other large manufacturing centres as well, all kinds of machinery of whatever description it may be, which is required for mining purposes. In the meantime it is perfectly certain that the discussion of to-day must do good, if it does nothing else than to attract the attention of manufacturers to the statements made here, and induce them—if the distance be too far to transport the articles manufactured in either Quebec or Ontario—possibly to establish branches of their industries in that new province, where, if all that we have heard to-day be correct, there will be a very large field for them to reap a rich harvest in the manufacture of this mining machinery.

Mr. DAWSON: I would certainly favor the maintenance of the duty on such machinery as can be manufactured in this country, so as to prevent competition; but the fact is that in these new districts of Algoma and British Columbia (which must depend greatly on mining, and where there are new mines being discovered every day), it is very desirable that, until we can ourselves produce the machinery required in mining, it ought to a certain extent be admitted free of duty. There are certain things, such as diamond drills, and complicated machinery like amalgamators, which are not produced in this country, and which cannot be produced profitably until the mining industry has been much more developed than it is at present. I would not wish that any machinery which can be manfactured in this country should be admitted free, but the Government should take this into their favorable consideration, and see if in some way the demands of certain sections of the country in this respect can be met.

Mr. JONES (Halifax): Perhaps no province in the Dominion is more interested in the mining industry than the province from which I come. Our vast coal fields and gold mining enterprises there, are even now of great value, and are increasing every year. I know it to be a source of complaint among those interested in that industry that they have been compelled to pay duty on a class of machinery which is not made in the Dominion. I remember when, a few years ago, the duty was first placed on coal by the present administration, one of the gentlemen of Halifax, who is supposed to represent the coal interests—who made it a question during the election, and had always advocated that a duty should be placed upon coal—was anything but satisfied when the regulation for the tariff on coal was presented to Parliament. That gentleman, who is recognised as an authority on the subject, said, that while the Government had imposed a duty on coal, they had taken away largely, if not entirely, the advantage which the miners would gain, by imposing heavy duties on machinery and other materials used in mining. The miners have always labored under the disadvantage of being compelled to pay heavy duty on what they required to develop their mines. The hon. member for Montreal centre (Mr. Curran) made the statement that all mining machinery could be manufactured in the Dominion, but that seems to be contradicted by other hon. gentlemen who spoke on the subject. Whether it is manufactured in the Dominion or not is of very little consequence. If it is made in the Dominion, of course it is only sold at the relative value which the machinery would cost, plus the duty if it were imported. There is, therefore, no advantage to the miners of the country that they can purchase machinery in the Dominion, because we know that manufacturers of machinery, like other manufacturers, fix their prices at what it will cost to lay down the foreign article plus the duty. I add my testimony to that of the hon. gentlemen who have spoken, that, in the interests of the coal and gold mining industries of Nova Scotia, it is of the highest importance that the miners should have free access to the markets of the world to purchase their machinery, and in which they can get the best articles at the lowest possible price.

Mr. MULOCK: The hon. member for Yale (Mr. Mara) has furnished us with some useful information as to the workings of this particular feature of the tariff, in regard to the great mining industries of the province from which he comes. We have expended many millions of public money to develop the resources of that province and to add to the material wealth of the whole of Canada, and to day the hon. gentleman has informed us, on the authority of a gentleman whose name he did not give, but whom I understand to be in political sympathy with the party to which he belongs, that the present tariff in its operation, locks up the mining wealth of British Columbia as effectively as nature has ever done. That statement, coming from the source it does, it cannot be said for a moment that the hon. gentleman or his witnesses are animated by anything but the best interests of the country in asking for relief from that state of things, and I cannot understand on what just grounds relief can be denied. Apart from the artificial obstructions offered by the tariff, there are sufficient obstacles presented by nature itself to the development of the mining resources of British Columbia, and certainly, until some change is made in the tarift, which is within the reach of the Government, we need not expect any return from the vast sums we have expended for the development of that province. Could a more forcible attack on the Government come from any source than that which has been disclosed by the correspondence of my hon. friend? He says those great gifts of nature, those great undeveloped laboratories in the bowels of the earth, are locked up and made useless to man, by reason not altogether of natural obstructions, but by reason of the artificial obstructions imposed by the administration and endorsed by the House, and, in a sense, by the country. Under these circumstance I think we are bound as a Parliameat to give the fairest consideration to the proposition, and I think we can do so without impairing the general scheme which hon. gentlemen opposite have supported, and which they deem to call the National Policy. We can, without prejudice to that scheme, provide relief in the present instance. As hon. gentlemen have said, the tariff should not be available to handicap industries established in Canada, when Canada herself does not provide relief. Here we have the exact case to justify the suspension of the operation of the tariff in regard to this particular industry, at all events until manufacturers are found in this country ready to supply the needs of

the mining industry. Therefore, in order to meet the views presented by the hon. gentlemen who have spoken, while not jeopardising this great industry by giving occasion for the cry of the National Policy being in danger, I beg to move the following amendment, which, I think, leaves the National Policy in all its integrity, and is perhaps an argument in favor of its existence, at all events by admission, as it does not suggest an attack upon it :

That the motion be amended by inserting after the word "machinery" the words, "of kinds not manufactured in Canada."

Mr. CHARLTON : A year ago last summer as a member of the Ontario Mining Commission, I came in contact with a great many miners in various parts of the Province. The Commission visited all the mining regions of Ontario, and in the course of its investigat ons, took the evidence of 150 miners and persons connected with mining. Among other things which these miners declared desirable in their interests, for the purpose of securing greater development to the mineral resources of the country, was the introduction, free of duty, of machinery not manufactured in Canada, and the investigations made by the Commission on this point were of the closest and most convincing character. It was found that various kinds of machinery were not produced in Canada, such as for amalgamating work, stamps, diamond drills, &c. It is only reasonable to suppose that in the United States, where the mineral production amounts to $560,000,000, compared with less than $16,000,000 in Canada. the development in machinery and methods for producing ores has been much greater than it has been in Canada. Now this is a matter on which the miners undoubtedly are good judges as to their wants. We visited the copper region in Sudbury, the silver region west of Port Arthur, the mineral regions of all parts of Ontario, and there was no dissent among the miners anywhere as to the desirability of the introduction of mining machinery from the United States, not produced in Canada, free of duty. It was quite evident, from the results of our investigations, that the want of this has been one of the great bars to the development of our mineral resources. Canada unquestionably possesses mineral resources of great extent and importance, both in the precious metals and in copper, iron and the other metals. The mineral resources of Ontario are second to those of no region on this continent, although their development, and consequently their production, is very small, and anything that will tend to develop this industry will be in the general interests of this country. I hope the hon. Minister of Finance will take into account the vast importance of this almost undeveloped industry. Our own mineral resources are probably greater than theirs, except in coal, and the Government should seriously consider what steps may be taken to promote mining in Canada, and no step they could take will have a more direct beneficial effect than the one they are asked to take by the hon. member for North York. Nothing would be more likely to develop the vast mineral resources of Ontario and every section of the Dominion than the passage of this resolution.

Mr. COOK: It is very well known how rapidly the mineral resources of this country are being developed, particularly on the north shore of Georgian Bay, and the Prairie Sound and Algoma districts. There is understood to be nickel there sufficient to supply the world, and nickel is becoming a very important metal, as it can be alloyed with iron. But the proposal of the hon. member for North York does not meet the case. In the first place, if a party wishes to order machinery, such as is required for large establishments as they have at Sudbury, by ordering all that he requires in one or more establishments on the other side, he is placed in a more favorable position as regards prices than if he ordered part in Canada and part in the United States ; and besides, in having a portion of the machinery made in Canada, and a portion in a foreign country, these two portions may not work satisfactorily together. For these considerations I shall vote against the amendment of the hon. member for North York, and for the original motion. I wish to do what is the best practical thing for the interests of this country' and if it is going to ruffle the feelings of any hon. gentleman on the other side or this, it is no matter to me. I do what I consider my duty to my constituents and to the country, and I shall, therefore, vote against the amendment of the hon. member for North York.

Mr. DAVIS (Alberta): Coming, as I do, from the eastern slope of the Rocky Mountains, representing a constituency 600 miles in extent, I shall support this resolution. I think we should be allowed to get all the mining machinery required into that country as cheaply as we can, so that we may get a population there which will make it really a country. Being handicapped by the long haul and the distance we have to take our goods through the mountains afterwards, I think we ought rather to be paid a bounty than to be asked to pay a duty on the machinery which comes into that country.

Mr. CASEY: I do not see any possible objection which protectionists can have to the amendment of my hon. friend from North York, (Mr. Mulock), seeing that it does not propose to interfere with any protection which is now, or which may hereafter be given to the manufacturers of mining machinery in Canada. If such machinery is to be taxed, then protection subsists in regard to it, and in regard to all other kinds of machinery ; no harm is done by their free admission. I believe in encouraging the largest and most productive industries of the country, and the mines are worth vastly more to the country than all the manufacturers of mining machinery who exist now or ever could exist in Canada. The manufacture of mining machinery is only a means to carry on the mines, and I do not consider it is fair to carry on a national protective policy in such a way as to encourage the means at the expense of the object. A national protective policy should encourage the industry of the country, and the only way in which the mining machinery industry can benefit the country is to benefit the mines. Notwithstanding the existence of manufacturers in Hamilton or elsewhere, I intend to vote for the motion of my hon. friend from Prince Edward (Mr. Platt). The object of every patriotic policy must be to obtain the greatest good for the greatest number ; to follow a course which will add to our wealth and standing, and will give employment to the greatest amount of labor.

Mr. MARA : As to the amendment and the motion as they now stand, I put it to my hon. friend from Prince Edward (Mr. Platt) whether it would be to the interest of the miner, or of the mining industry, that the motion should be pressed to a vote to-day. If it were, it might be defeated, and that would mean that the hands of the Government would be strengthened to allow matters to remain as they are. I am satisfied that my hon. friend does not wish that ; neither do I ; and I would suggest whether it is not well to withdraw the motion, or allow it to stand, or, I will propose that the debate be adjourned un il such time as the Government make known to the House their proposed tariff changes. Then we can deal more easily with these matters than we can at present. If, however, the question is then pressed to a vote, I will be with the hon. gentleman. I, therefore, move in amendment to the amendment :

That the debate be adjourned until after the proposed tariff changes are laid before the House by the Government.

I will withdraw that if the hon. gentleman will withdraw his motion.

Hon. G. E. FOSTER : I desire to say a few words on this discussion, which has upon the whole been an interesting and a profitable one. A great many members comparatively have spoken in the course of this debate, and a great many opinions have been given from practical men and persons who are well acquainted with the districts from which they come in reference to the mining resources of different parts of our Dominion. I may say that that which was stated by my hon. friend from Cariboo (Mr. Barnard) is perfectly true. During the past year he has been constant, in season and out of season, in pressing this matter upon the attention of the Government ; not only himself, but other members from British Columbia who have similar interests with him in this respect, have also made strong aud vigorous recommendations to the Government to take off the duty on mining machinery. Persons interested in mining development in Ontario, in the Lake Superior region, and who are anxious to get in mining machinery, have also been pressing the Government to make some modification in the matter of admitting such machinery for the purpose of developing those mines. The same thing has taken place in various other portions of the country where mining development is comparatively new ; the Government have not been idle in the matter, and I may say to the House that there is no one subject in connection with the tariff which has engaged more of our attention during the last few months than the question which is the subject of discussion to-day. But, of course, there are difficulties connected with it. There are three interests which ask to be considered. In the first place, there are those who are interested in putting in mining machinery for the development of new mines at the present time ; they want a modification of the duties. There are those who have, under the National Policy, been investing their money and who have been engaged in developing mines in various sections of the country ; and no person can take a comparative view of the state of the manufacturing industry ten years ago and its state to-day, without seeing the immense strides that our manufacturers have made in the way of producing machinery of almost every description and of excellent quality as well, to be used in mining industries. That matter has to be regarded, and it might well be considered by those who have invested their capital in that way, and who have arrived at a good degree of development in that industry, and were producing machinery of a very extensive character and of good quality, that it would not conduce to the permanency of the best interests of the country in that line, should we agree to the request of my hon. friend from Prince Edward (Mr. Platt), that all mining machinery should be allowed to come in free. His motion is very wide indeed. It would include everything, from the from the most complex and the largest kind of machinery, to the simplest forms of machinery, which are made in Canada just as well and just as cheaply as they can be made anywhere. Then there is another interest to be considered, which is the interest of those miners who, during the last ten, fifteen or twenty years, have gone into mining ventures in this country, who have been at the cost of putting in machinery, having imported it and having paid the duty upon it. New machinery put into new mining industries would compete in a certain way with their own, and involve a competition which this interest look upon as being somewhat unfair to them. So that these three interests have all to be considered, and have been considered by the Government. Then, of those who ask for free mining machinery, there are three different classes. There is one class who want the duty taken off all mining machinery so that it may come in free. That class is represented by my hon. friend the mover of this motion, provided we take the motion as the index of his own views on that subject. I think that motion is wider than the sense of this House or the sense of the country, would approve of. There is another class who want only such machinery to come in free of duty as is not made in Canada. Now, any hon. gentleman who looks at the matter will understand the difficulty of coming to a conclusion as to what machinery can be made in the country and what cannot be made in the country, a much more difficult thing, perhaps, than to come to a conclusion as to what machinery is made in Canada and what is not made. Then there is another class who want mining machinery brought in free for a limited period, machinery of such a class as is not made in Canada. These are the three interests. I could not quite understand what was meant by the hon. member for Yale (Mr. Mara), when he stated that mining machinery could not be taken in there from the east ; that an implement, for instance, from Montreal could not be taken into the Kootenay district, because it had to go through American territory, without paying double duty. I think that cannot be so, because we have, just as they have in the United States, arrangements for bonding by which, on their side, articles can be taken from the United States territory through Canadian territory into the United States again, and *vice versa*, without payment of duty However, these are the conditions of the question. The Government have had them under serious and earnest consideration—we have them under consideration to-day. The duties which are involved, if they were to let mining machinery in free, would be considerable. Although it may be that the Government would have had a right to do that by Order in Council, the matter was so important that, suppose they had decided to take the duty off such machinery, it would scarcely have been wise to do so in view of the fact that Parliament was soon to meet, when the great interests involved in this matter could be taken up and considered by Parliament. It has been announced that the Government intend to make certain tariff changes, and I am in a position to state, as I have stated here, that we are considering this matter with a view to its best possible solution. Under the circumstances, it does not seem necessary to press the matter to a vote. I think my hon. friend who moved the resolution ought to take the assurance that I have given that the Government are carefully considering this matter, and to abide events, at least until the Government's opinion, after mature consideration, is laid before the House, when each hon. member will be at liberty to take such course as he sees fit.

Sir R. CARTWRIGHT : I believe my hon. friend from Prince Edward is moving entirely in the right direction, entirely in the interest of a deserving class in this community, and entirely in the interest of this country, in pressing that all this mining machinery should be admitted free. Further, I think that, as the Government ought to have made up their minds on this question —they have had plenty of time to do it—my hon. friend has nothing to gain by delay in pressing the House to a decision on this motion.

Sir D. A. SMITH : I am in favour of the most liberal protection being given to manufacturers in Canada, but I think this question is open to some exceptions, and this is one of those cases where an exception should be made ; and I am, therefore, in favour of the motion of the hon. member for Prince Edward (Mr. Platt). At the same time, after the representation made by the Minister of Finance, I think it advisable that the amendment of the hon. member for Yale (Mr. Mara) should be adopted now, and I hope that the Government will give their consideration to this motion, and that, without further action on the part of any member of the House, they will be prepared to accede to this request. It is of the greatest importance possible that every encouragement should be given to the development of the industries, mining and otherwise, of British Columbia ; and as the hon. member for Alberta (Mr. Davis) said, the expenses of transport are alone sufficient against that country. So that I certainly think the duties against all importations there, especially when the articles are for developing the great resources of that country, should be made as light as possible.

Mr. PLATT : Had the hon. the Minister of Finance requested the withdrawal of the motion, or that we

should grant an adjournment of the debate without further discussion, upon the ground that he was giving his best and most favourable consideration to the question under discussion, we might have been disposed to grant the request. But he preceded his requests by remarks which led me to believe that he is not at all prepared to accept the principle of the resolution. He has told us plainly that he believes the resolution which I have the honour to place before this House will not meet with the approbation of the House and the approbation of the country. If that be his opinion, I cannot reasonably expect that the principle will be embodied in the new Tariff Bill he proposes to bring down; and if he is not yet convinced that the people of the country are willing, for the purpose of encouraging the mining industry of Canada, to admit mining material free of duty for a limited period, if you like, or for any length of time that may be necessary, this House will be failing in its duty if it does not do its utmost to force its opinion upon the Government. The hon. gentleman tells us of various difficulties that stand in the way. We have heard of those difficulties before. They are difficulties which will meet any Government under the circumstances when they are nursing and cherishing what is known in this country as a protective or National Policy. It is part and parcel of that policy to throw difficulties in the way whenever such questions come before us. The manufacturers, who have had ten years of protection, the hon. gentleman tells us, have arrived at a certain degree of development and prosperity; and it was understood when the policy was adopted that after those industries became established, those other industries which were for the time suffering in consequence of the protection afforded those manufacturers, would in turn receive benefit, and those industries which had been able to get on their legs in this country, would no longer receive the benefit of a protective tariff. Now, mining is an old industry, but as regards its development in this country it is still an infant industry. Manufacturing industries, if they have arrived at the degree of prosperity which the hon. gentleman states they have reached, are no longer infant industries, and I hold that the mining interests of this country are such, that it is the duty of the Government, that those older industries so long supported by the policy of protection shall no longer stand in the way of the advancement of the mining industry. I maintain that the resolution I have submitted is one which will meet with the approbation of the country, because our people are becoming alive to the importance of the mining industry. We know that while in the past many mines in Ontario have remained undeveloped, new processes have been introduced which are likely to be brought into use in Ontario for the refining of the magnetic iron ores, the machinery for which will not be manufactured here for many years. We are aware that these new machines are just being manufactured in the United States and some other countries. Take, for instance, the appliances connected with the Edison process for separating magnetic iron ores, the new inventions for reducing copper and separating the nickel which exists so largely in the ore of the mines east of Prince Arthur, and we possess this class of mines which American capitalists are seeking to develop, and which American ingenuity and industry promise to render profitable. We know that for many, many years past, mines like Coehill and others of magnetic iron ore have remained white elephants on the hands of those who thought it was impossible to remove from the ores the sulphur they contain. Mr. Edison has discovered a method by which he is confident this can be done, and he has already purchased and selected a site in Trenton, and likewise sites in other places, for the erection of works into which he is willing to put his own money, and he has already made offers to different corporations as to what he is willing to do, and wherever his name is mentioned capital will flow into those enterprises. This is just the time for action, and there should not be a moment's delay in publishing what this country is willing to do on behalf of the mining industry, and the Government will not be justified in pursuing the course indicated by the Minister of Finance in yielding to those difficulties which he says are before his eyes at every turn, and in refusing that for which my motion asks. If the whole concession for which I ask cannot be granted, I hope the request embodied in the amendment will be granted; I will be willing to accept that rather than lose all. I suppose the motion for the adjournment of the debate will be carried. I think, however, as the discussion has aroused so much interest, and has been participated in by members on both sides of the House, I will scarcely be justified in taking the question out of the hands of the House, and I will leave it with the House to decide.

Mr. BARNARD: Considering the discussion which has arisen on the subject, it may not be amiss to refer to the fact that a year or two years ago the Government of British Columbia, in order to stimulate mining industries in the section which I represent, lately erected works intended as testing works in the district of Cariboo, at a cost of $15,000 or $16,000. The Government expended that money itself to assist the mining industry in that district, and to promote the introduction of capital there. They made what I deem to have been a justifiable request on the Dominion Government, namely, that a rebate of duties should be allowed in that case. I believe the matter has not been settled yet, but that a discussion has arisen between the Provincial Government and the Dominion Government as to whether machinery of that class was or was not manufactured in Canada. Unfortunately, the whole works were burned down the other night, immediately after their completion, and I would suggest to the Government, if application is made for rebate of duty, as the Provincial Government propose to re-erect the works, it should be granted as applicable not only to the machinery in the works destroyed, but also to the new machinery.

Mr. BLAKE: I submit, Mr. Speaker, that this amendment is not in order. It is a motion to adjourn the debate, and is, therefore, a substantive motion and can not be an amendatory motion.

The Speaker: The motion is not a substantive motion; it is an amendment to the amendment, and, although improperly worded, it is in order as an amendment; but it ought to read: "That all the words in the main motion and in the amendment be struck out, and the following words substituted therefor." As an amendment I hold that it is in order, while if it were a substantive motion I should have to declare that it is out of order, since it specifies an undetermined time that the debate should be adjourned to; instead of being put as all motions for adjournment, either of the debate or of the House, are, purely and simply, that the debate be adjourned now.

House divided on the amendment to the amendment, with the following result: Yeas, 109; Nays, 77.

Amendment to the amendment agreed to.

The question has thus been held over until the proposed Tariff changes are laid by the Government before the House.

Nova Scotia Gold Yield, 1889.

We are indebted to Mr. W. H. Brown, Accountant of Public Works and Mines, Halifax, for the following statement showing the quantity of quartz crushed and yield of gold by months for the year ended 31st December, 1889. Since these figures were compiled, one or two additional returns have been handed in, making the yield 250 ounces greater, or a total for the year of 26,155½ ounces, and increasing the total value of the yield to $496,950.40.

1889.	Quartz Crushed.	Yield of Gold.	Value.
	Tons.	Ozs. Dwts.	$ c.
January	2,560	1,728 14	32,845 30
February	2,979	1,765 2	33,536 90
March	3,373	2,378 12	45,193 40
April	3,536	3,086 15	58,648 25
May	3,363	2,882 5	54,762 75
June	3,193	2,169 6	41,216 70
July	3,572	2,200 5	41,804 75
August	3,276	2,088 4	39,675 80
September	2,932	1,977 2	37,564 90
October	3,578	1,816 17	34,520 15
November	3,650	2,078 10	39,491 50
December	3,001	1,734 ..	32,946 00
Totals	39,013	25,905 12	$492,206 40

RECAPITULATION.

Quartz crushed	39,013 tons.
Yield of gold	25,905½ oz.
Value, at $19	$492,206.40.

The revenue received by the Department from Provincial mines shows a very satisfactory increase, being $167,903.13 as against $152,895.46 in 1888, or a total gain of $15,007.67. The sources from which this substantial income was derived are as follows:

	1888.	1889.
Prospecting licenses	$ 9,571 49	$ 15,358 08
Rents (leases for gold)	4,720 50	6,055 00
Gold royalty	8,612 41	9,959 25
Licenses to search	3,940 00	5,260 00
Licenses to work and leases	1,275 00	2,875 00
Coal royalty	124,776 06	128,395 80
	$152,895 46	$167,903 13

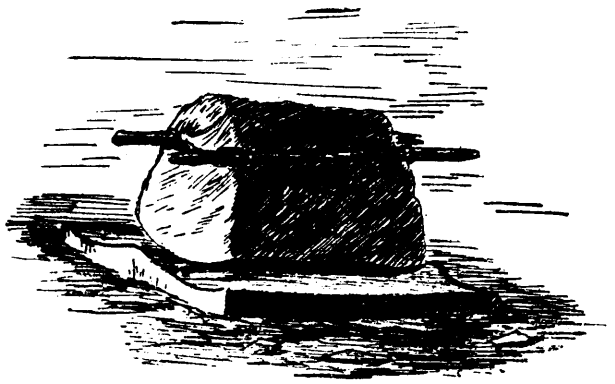
Gold-Mining and Milling in Korea.

(By Willard Ide Pierce, New York.)*

The native method of milling and mining gold-ores in Korea may not present any specially new features, but are chiefly interesting as primitive practices still followed at the present day.

In mining where the rock is hard, wood is piled up near the face of the tunnel or drift and then set on fire. The fire burns for twenty-four hours, after which, three or four days are given for the rocks to cool before the miners go in and extract the loosened material. The only tools in use are a hammer, a steel gad abont five inches long, and a flat spoon-shaped basket. The pay-streak or chute is closely followed, and in place the workings are very small and intricate. Rock not yielding more than $6 per ton is not extracted. The manner of opening a mine is to begin on the outcrop, where the rock pays, sink a shaft or run a tunnel on the vein, and follow the pay-streak and more easily worked ore. When this is exhausted, or the influx of water interferes, the opening is abandoned and operations are begun again at a new spot on the outcrop. The place usually selected is as high up on the mountain as possible, and in no instance is advantage taken of the topography by running a cross-tunnel to tap the vein.

The ore is brought in baskets to the surface, and there placed in sacks, holding about 150 lbs. each, and taken to be crushed. The rock is first crushed between two stones, as shown in Figure 1. The upper stone is oval



and rounded on the bottom, so that it can be readily rocked on the under stone. Two pieces of wood, used for handles are placed, one on each side, in grooves in the upper stone, and held in position by means of straw rope. The lower stone is not smooth on top, but exhibits three elevations running lengthwise, with shallow depressions between them. The middle elevation acts as a fulcrum on which the upper stone may be rocked. From two to ten men, according to the weight and size of the stone used, are employed in rocking. With four men, from 300 to 350 lbs. of rock can be crushed per day, the stone making 50 complete oscillations per minute. The men squat on each side of the stone and move it to and fro by means of the wooden handles. The or eis fed, in pieces up to the size of an egg or even larger, by one of the men. During the crushing one man on each side, as the stone rocks from him, uses a stick or scraper to stir the crushed rock. When the ore is fine enough, it is swept out on a piece of cloth, placed at one side of the stone, the rocking being continued all the time. After a certain amount has been crushed, it is usually put through a horse-hair sieve, and the coarser portion is treated again. An upper stone intended for four men, measured 23 inches in length, 20 inches in width at the base and 15 inches in height. Crushing is usually performed in sheds to prevent the wind from blowing any of the fine stuff away.

The crushed ore is taken to men who rub it between stones until it is very fine; the rubbing is generally done wet. The powered ore is received by other workmen, who pan it and save the free gold. The pan is of one piece of wood, 20 inches in diameter and 5 inches high; and the men who use this instrument are the most expert panners I have ever seen. The pan is not held in the hands, but floats on the surface of the water, one side only being raised or lowered to agitate the contents. As the pulp is very fine, and the gold in the same condition, the top of the water in the pan is frequently sprayed so as to settle any gold that may be floating. The first tailings are washed off directly from the right-hand side of the pan. After this the sulphurets and gold are collected on the right-hand side of the pan, and the tailings on top of the sulphurets are, by a few skilful movements, washed over to the left-hand side. The pan is then half revolved and the tailings are washed off from the right-hand side. The same operation is repeated after the tailings have all been removed, with the sulphurets and gold, the former being saved and again rubbed. No quicksilver is used; but I do not think that there is any loss in free gold.

*Washington meeting, American Institute of Mining Engineers.

The Mining Claims Act.

In the Ontario Legislature on 4th inst:—

Hon. Mr. HARDY moved the second reading of Bill No. 138, entitled "The Mining Claims Act, 1890." He explained that the blocks of 320 acres, or half blocks of 160 or 180 acres, were formerly leased by the Crown Lands Department. The proposition under the bill was that the Government might declare any section of the mining country a mining district where the bill would come into force on the passage of an Order-in-Council. The reason of the change was that the mineral territory was wide in extent, much of it covered with timber, so that the security of the timber and the interests of the explorer were not always one. It might not be found judicious to extend the provisions of the bill to such richly timbered districts. Indeed, it might not be well to throw open too much of the mining territory at once under the provisions of the bill. It should rather work by degrees. The bill provided for the staking off by the explorer of sections of country, after a certificate had been obtained. This certificate, which cost five dollars, permitted the explorer or discoverer, during a period of six months, to test the value of the section with a view to purchase. For an 80 acre lot, if the discoverer had proved that he had done $200 worth of work, and on a 50 acre lot $150 worth, he would be allowed to purchase at the average cost of mineral land in such locality, having made a sworn declaration that the land contained valuable minerals. Should the Act be extended to unsurveyed territory, the old law would govern the operations of the explorer. The law, he contended, was more liberal than that of the United States, in respect that while our explorers would stake out to lease, the United States explorer usually staked out to buy. He claimed that the poor man possessed an advantage under the new Act. When one explorer could lease three lots, two could have five, and three could lease seven if they combined. Although the bill did not go so far as some explorers wanted, he thought it would tend to encourage the development of mineral wealth, and should be looked upon with favor as an experiment.

In reply to Mr. Meredith, Mr. Hardy said that some printed matter on the subject of mining laws in other countries would be laid before the committee when considering the bill.

Mr. MEREDITH said that it would also be interesting if the hon. gentleman or the Government could lay before the House information as to how far or to what extent these mining lands had passed into the hands of speculators or people who were simply waiting for their development by other people.

Hon. Mr. HARDY: Very little.

Mr. MEREDITH thought that the quantity in Muskoka and Algoma must have been enormous. It was most important that the purchasers should be those who would develop the land immediately on lease and in the interests of the country. It was also important, and without claiming the knowledge of an expert, he suggested that an amendment should be made to the Act whereby these lands, if not utilized, might be redeemed by the Crown at proper terms. He also suggested that something should be done in retaining some of the mining land, at least a portion, for the benefit of the whole country. A system of extracting royalties had, on a former occasion, been suggested, but, by the revised statutes, it was abolished. Yet a different feeling regarding these royalties, he ventured to say, was coming over the community, as was illustrated by the example of the Minister of Education, who had stated that he would not part with the fee of the Upper Canada College grounds, the intention being that the province should get the benefit of any increased value arising from the development of the country. It seemed to him a matter that was well worth the attention of the Government, that where millions of dollars were likely to pass into the hands of these people, something should be done, at least to some extent, to give the whole country the benefit of these resources.

Pump Working Under a Heavy Pressure in Nova Scotia Collieries.—In the Pictou coal field the practice is to win the seams by slopes started from the crop, and as there is little water at the higher levels it is allowed to follow down as the slope is prolonged. At Westville, a range of plunger pumps had been extended down 800 yards to the foot of an incline of 1 in 2½. at which point the appliance reached the limit of its capacity, and a duplex compound condensing engine was substituted. The cylinders are pairs of 22 in., and 12 inches in diameter, the four water plungers being 5½ in. in diameter, and the stroke of engines and pumps 2 ft. The column is 800 yards long, with a rise of 977 ft., vertical, and consequently a pressure at the plungers of 424 lbs. per square inch. The loss of steam pressure in a length of 870 yards of covered 4 in. pipes is about 10 lbs. per square inch. These pipes on the slope had a tendency to draw down hill, and instead of ordinary expansion joints, which failed to give relief, bends and circles are put in about every 150 yards. The delivery pipes are of wrought iron, with the ends screwed into thick metal flanges, which are plain faced, but one of each pair has a recess 1-16 in. deep, to hold in position a rubber ring ⅛ in. thick by 1½ in. broad, and this joint, it is stated, has kept perfectly tight. Although there are four plungers throwing a steady stream, yet when started without an air chamber there was a variation of pressure of 160 lbs. per square inch. The addition of an air vessel 4 ft. long and 15 inches in diameter, with proper means of charging, reduced the shock to less than 20 lbs. per square inch. A small hydraulic engine taking power from the rising main, raises the water from the lower sump to the steam engine.

The Phosphate Trust.—As we go to press, advices by last English mail announce that the Phosphate Trust will probably be put to the public on the 22nd or 29th inst. The proposal will be greatly modified, and only good properties will be accepted Sir James Whitehead, ex-Lord Mayor of London, is said to be chairman, and other prominent names are mentioned as being associated with the Board. "The newest method of company promoting," writes our correspondent, "is to have so many founders' shares of £10 each. Each share carries an underwriting liability of 500 ordinary shares, *i.e.*, if the public does not subscribe, these founders have to take up the shares. I hear that over 200 shares (representing a guarantee of £100,000) have already been placed; but I have not seen the list."

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PROVINCE OF NOVA SCOTIA.

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— AND —

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GOLD AND SILVER.

Under the provisions of chap. 7, Revised Statutes, of Mines and Minerals Licenses are issued for prospecting Gold and Silver for a term of six months, which can be extended by renewal for another six months. Mines of Gold and Silver are laid off in areas of 150 by 250 feet, any number of which up to one hundred can be included in one License, provided that the length of the block does not exceed twice its width. Up to ten areas the cost is 50 cents per area, for every area in addition in same application 25 cents. Cost of renewal one half the original fees. Leases of any number of areas are granted for a term of 21 years at $2.00 per area. These leases are forfeitable if not worked, but advantage can be taken of a recent Act by which on payment of 50 cents annually for each area contained in the lease it becomes non-forfeitable if the labor be not performed.

Licenses are issued to owners of quartz crushing mills who are required to pay Royalty on all the Gold they extract at the rate of two per cent. on smelted Gold valued at $19.00 an ounce, and in smelted Gold valued at $18.00 an ounce.

Applications for Licenses or Leases are receivable at the office of the Commissioner of Public Works and Mines each week day from 10 a.m. to 4 p.m., except Saturday, when the hours are from 10 to 1. Licenses are issued in the order of application according to priority. If a person discovers Gold in any part of th Province he may stake out the boundaries of the area he desires to obtain, and ths gives him one week and twenty-four hours for every 15 miles from Halifax in which to make application at the Department for his ground.

MINES OTHER THAN GOLD AND SILVER.

Licenses to search for twelve months are issued, at a cost of twenty dollars, for Minerals other than Gold and Silver, out of which one square mile can be selected for mining under lease. These leases are for four renewable terms of twenty years each. The cost for the first year is fifty dollars, and an annual rental of thirty dollars secures each lease from liability to forfeiture for non-working.

All rentals are refunded if afterwards the areas are worked and pay royalties. All titles, transfers, etc., of minerals are registered by the Mines Department free of charge, and provision is made for lessees and licensees whereby they can acquire promptly either by arrangement with the owner or by arbitration all land required for their mining works.

The Government as a security for the payment of royalties makes the royalties a first lien on the plant and fixtures of the mine.

The unusually generous conditions under which the Government of Nova Scotia grants its minerals have introduced many outside capitalists who have always stated that the Mining Laws of the Province were the best they had had experience of.

The royalties on the remaining minerals are :—Copper, four cents on every unit; Lead, two cents upon every unit; Iron, five cents on every ton; Tin and Precious Stones, five per cent.; Coal, 7½ cents on every ton sold.

The Gold district of the Province extends along its entire Atlantic coast and varies in width from 10 to 40 miles, and embraces an area of over three thousand miles, and is traversed by good roads and accessible at all points by water. Coal is known in the counties of Cumberland, Colchester, Pictou and Antigonish, and at numerous points in the island of Cape Breton. The ores of Iron, Copper, etc., are met at numerous points, and are being rapidly secured by miners and investors.

Copies of the Mining Law and any information can be had on application to

THE HON. C. E. CHURCH,

Commissioner Public Works and Mines,

HALIFAX

NOVA SCOTIA.

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 Ferlizers sold thereafter require to be sold subject to the conditions and restrictions therein contained—the main features of which are as follows:

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

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

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

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

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

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

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

E. MIALL,
Commissioner.

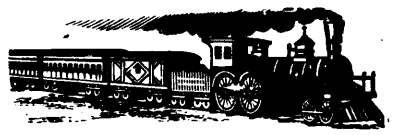
January, 1889.

NOTICE

Is hereby given that all communications in respect to matters affecting the Department of Indian Affairs should be addressed to the Honorable E. Dewdney as Superintendent General of Indian Affairs, and not as Minister of the Interior, or to the undersigned. All Officers of the Department should address their official letters to the undersigned.

L. VANKOUGHNET,
Deputy Superintendent-General of India Affairs.

Department of Indian Affairs,
Ottawa, 11th May, 1889.



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EXPRESS TRAINS leave Montreal and Halifax daily (Sunday excepted) and run through without change between these points in 30 hours.

The Through Express Train cars of the Intercolonial Railway are brilliantly lighted by electricity and heated by steam from the locomotive, thus greatly increasing the comfort and safety of travellers.

New and Elegant Buffet Sleeping and Day Cars are run on all through Express Trains.

CANADIAN EUROPEAN MAIL

AND PASSENGER ROUTE.

Passengers for Great Britain or the Continent by leaving Montreal on Friday morning wil join Outward Mail Steamer at Halifax the same evening.

The attention of shippers is directed to the superior facilities offered by this route for the transport of flour and general merchandise intended for the Eastern Provinces and Newfoundland; also for shipments of grain and produce intended for the European market.

Tickets may be obtained and all information about the route, also Freight and Passenger rates, on application to

G. W. ROBINSON,
Eastern Freight and Passenger Agent,
136½ St. James St., MONTREAL.

E. KING,
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D. POTTINGER,
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Railway Offices, Moncton, N.B
14th November, 1889.

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HAMILTON BRASS MFG. CO.,

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STATIONERY, MARINE, PORTABLE, AND LOCOMOTIVE BOILERS.

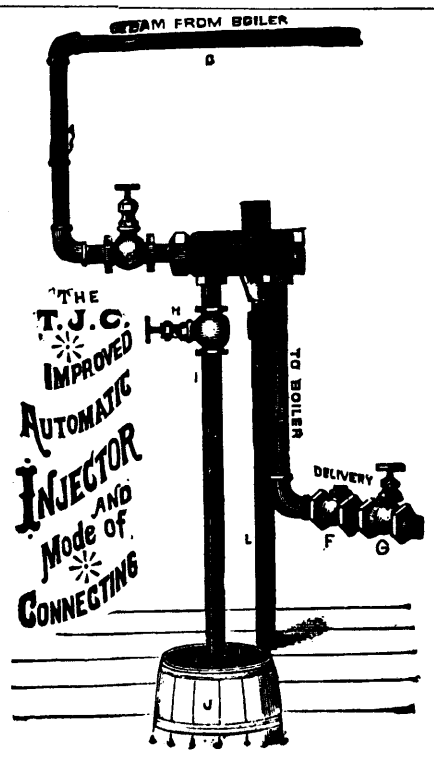
Simple, Reliable and Durable. Every Injector Guaranteed for Two Years.

Range, 25 to 150 lbs., and is the only Automatic Injector in the world that can be operated by opening one valve, and that the overflow. Can have a pipe connected to conduct the overflow to tank or sewer. The only Injector having a Signal Valve to show when the Injector is working; all other boiler feeders not having this cannot be connected to return the overflow to tank or sewer.

OUR PROPOSITION:

As every Injector is tested before it leaves the factory, we know that if properly connected (as in diagram) and instructions are carried out, they cannot fail to work. We therefore offer to **pay the expenses** of any man to come to the factory, and **$25.00 per day while there**, if the Injector does not work, provided it has not been misused.

As the body will last for years, it is only necessary to order working parts to make Injector good as new. Every purchaser can repair his own Injector without sending it to the factory.



NUMBER.	PRICE.	HORSE POWER.
7½	$ 4 50	4 to 8
8¾	6 00	8 to 12
10	7 00	12 to 16
12½	9 00	16 to 28
15	10 50	28 to 40
17½	14 00	40 to 57
20	15 00	57 to 72
22½	21 00	72 to 93
25	22 50	93 to 120
30	27 00	120 to 160
35	30 00	160 to 220
40	35 00	220 to 290
45	38 00	290 to 308

Mining Regulations

TO GOVERN THE DISPOSAL OF

Mineral Lands other than Coal Lands, 1886.

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

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

QUARTZ MINING

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

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

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

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

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

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

IRON.

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

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

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

PLACER MINING.

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

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

The Regulations apply also to

BED-ROCK FLUMES, DRAINAGE OF MINES AND DITCHES.

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

THE SCHEDULE OF MINING REGULATIONS

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

Since the publication, in 1884, of the Mining Regulations to govern the disposal of Dominian 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