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CIRCULATION

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FOOD PRODUCTION.

Managers of mining properties have it in their power to materially assist in increasing production of food. Many mine employees like to work in gardens. Why not encourage them as much as possible this year?

Given ground to cultivate and a little assistance with the heavier work, the employees of mining companies could spend their spare hours to great advantage. Many of these men have neither the land nor the implements necessary for preparing the land. An effort should be made to provide plots and to do the plowing.

The average miner yearns to do a little gardening. He needs some encouragement at the start. Once the land is prepared and seeded the miner can take care of it in his spare hours.

Every mining camp should this year produce food as well as minerals. The gardens will give pleasure and profit to the workers and will help the world to avert famine.

Our contemporary "Mining and Scientific Press" commenting on the fact that Canadian mining companies are being supplied with cyanide at 15 cents per pound by a British firm, while Americans are paying ridiculous prices—from 30 cents to \$1.30 per pound—says: "If cyanide can be supplied from Glasgow to Ontario at 15 cents why can it not be supplied from New Jersey to Nevada and California at something like the same cost?"

Perhaps if our contemporary would enquire of some of the leading users of cyanide in the United States it would learn that the reason is obvious. The firm on which our American friends depend for their supply is a German firm, which has naturally made no great efforts to meet the demands, though it has made a great pretence of doing so.

THE COAL SHORTAGE.

It probably is not realized that as food shortage is today on every lip, so before long will coal shortage be the common topic of conversation. The reason for coal shortage is not far to seek. The consumption of coal is unprecedented, it has no previous parallel. Coal is the basic munition of this war, and is being used up at a tremendous rate in every country where it can be got at. Accompanying this unparalleled rate of consumption is a diminished production. Nowhere is any large increase in the rate of coal production possible today. During the past three years coal has been produced in smaller quantity than the normal pre-war tonnages. Great Britain has made extraordinary efforts to maintain her coal supply, and considering the enormous enlistment of miners has done excellently

well, but the following figures will show what has taken place.

Output of coal in the United Kingdom

	Tons
1913	287,412,000
1914	265,643,000
1915	253,179,000
1916	255,846,000

On the basis of 1913, it will be seen that there is a decline which over the three years of the war totals nearly 90,000,000 tons of coal. It is not only the shortage today, but the accumulated shortage of three years that is telling on the world's coal supply at the present time.

The production of the United States shows up rather more encouragingly, but nevertheless, on the basis of 1913, there is still a shortage over the period of the war. The production of coal in the United States during the past few years, with 1916 closely estimated, has been as follows:

Output of coal in the United States including both anthracite and bituminous:

	Tons
1913	570,048,125
1914	513,525,477
1915	*530,000,000
1916	*597,000,000

*Estimated

In comparison with these huge totals the Canadian coal production does not seem very important, but from our point of view it is all important. The following figures show a similar tendency during the war period to the figures given for Great Britain and the United States:

Production of coal in Canada

	Short tons
1913	15,012,178
1914	13,637,529
1915	13,267,023
1916	14,461,678

The decrease in Canada is larger than would be assumed from the foregoing figures, because the production of 1913 itself showed a decline over 1912 of 875,000 tons.

Similar reductions have taken place in other countries, notably in France, Belgium, the Central Empires, and in Russia. Possibly Japan may be an exception to the rule, but it is an almost solitary exception.

What are the prospects for the future? It is certain that no great advance is possible in the United Kingdom until the progress of the war will permit of the release of miners from the ranks. By deciding upon the selective draft system it is to be hoped that United States may secure itself against a depletion of the ranks of the coal producers, but because of the large number of men who have already left the mines of the United States to join the armies in Europe, and the

large number of men who have been attracted to munitions work and other employment, it is doubtful whether any marked advance over the production of 1916 is possible. In Canada, some increase may be expected from the Western collieries, but in Nova Scotia there will be a large decrease over 1916 figures. On the whole it is not to be expected that the Canadian production will exceed last year's output.

It seems therefore inevitable that the shortage of coal which was experienced last winter will be repeated next winter in a much more acute form, and this irrespective of whether hostilities cease this year or not. The only palliation possible—the word palliation is used advisedly, because there is no absolute remedy in sight—is to **discontinue entirely all enlistments of miners**, and to institute such economies in the use of coal as are possible. The daylight-saving scheme which proved so successful in European countries last summer, and is being adopted this year at an earlier date, was actuated primarily by a desire to save fuel and light, and it is quite certain that large economies are possible along these lines in North America.

Much more might be said, but sufficient has been detailed to show that the coal shortage is no passing phase, but that it is world-wide and promises to become much more serious than it has yet been. Some rather ingenious suggestions have been made in upper Canadian newspapers, particularly in some of the Toronto papers, that a solution of the difficulties might be found if the Government were to take over the collieries and operate them. It is a vain hope, and the experience of government operation that Canada has so far had is not such as to recommend it to those who daily face the problems of coal production and know the facts. Even were the Canadian coal production restored to its maximum of say 16,000,000 short tons, how infinitesimal is this quantity when viewed in the light of the accumulated coal shortage of the world during the period of the war, and the inevitable shortage that is yet to come.

F. W. G.

THE PRICE OF FOOD.

There appears to be something radically wrong in connection with the increased cost of some staple articles. Mr. Lloyd George announces in the House of Commons that there are 87,000,000 bushels of wheat in Canada "for the fetching." The Canadian Government feel compelled to allow the entrance of wheat into the United States because of the restricted outlet caused by submarine operations and the shortage of ships, and concurrently with this apparent surplus of wheat in Canada, the price of flour jumps in one week from \$12.50 to over \$15.00 per barrel, and it is confidently predicted flour will shortly reach \$20.00 per barrel! The Dominion Coal Company had the courage and foresight to use its purchasing capacity last summer to purchase flour in large quantities, and it is and has been selling flour to its workpeople at from \$3.00 to \$5.00 per barrel below the wholesale price. This

Company is selling potatoes to its workpeople at 85 cents per bushel, while the local farmers are asking \$2.00 a bushel. What is there that makes the same bushel of potatoes worth 75 cents last autumn and \$2.00 today, when the cost of transportation and all other costs play no part in the increase?

If a private corporation can by the exercise of ordinary prudence and foresight control the cost of living in this way where is the Canadian Government? Food shortage there may be, and undoubtedly is, but what is there to justify a raise of \$3.00 a barrel for flour in one week, when admittedly Canada cannot consume or send to Europe her existing stocks of flour?

THAT MEMORANDUM OF THE CIVIL ENGINEERS

In our last issue we called attention to the propaganda of the Canadian Society of Civil Engineers in which the mining societies of Canada are misrepresented. Canada has two mining societies composed largely of technical men; The Canadian Mining Institute and the Mining Society of Nova Scotia. Naturally very few mining men belong to the Society of Civil Engineers. Yet the latter society in advancing its own claims as a society representing the technical men of Canada, has published and distributed a pamphlet which contains such absurd statements as the following:

“There is in Canada one engineering Organization, namely the Canadian Society of Civil Engineers, which embraces all branches of engineering and may be taken to correspond largely to the five great scientific bodies from which the Government of the United States selected the great part of its Naval Consulting Board. There are in addition two other organizations of less magnitude and which include in their membership a number who are also members of the Canadian Society of Civil Engineers. These two are, the Canadian Mining Institute and The Society of Chemical Industry. The Royal Society of Canada may also be considered a scientific society, but the great majority of its members are devoted to philosophy and literature. The accompanying chart indicates the number of fully qualified technical men in each of the organizations named:” The chart misrepresenting the Canadian Mining Institute credits that organization with a total membership of 1017 of whom 817 are “Lay Members” and 200 “Fully qualified Technical men mostly Members of Canadian Society of Civil Engineers.”

The statements made in the memorandum are pure fabrications. The number of qualified technical men in the Canadian Mining Institute is over 800 and less than 5 per cent of these belong to the Society of Civil Engineers.

The Civil Engineers completely ignore the existence of the Mining Society of Nova Scotia. It is perhaps as well. Anything which the Civil Engineers said about it would probably have been bunk.

In spite of the misleading information contained in the memorandum the Society of Civil Engineers seems to be proud of it. They are sending out with copies of the memorandum letters asking that members publish the nonsense as widely as possible.

PREMIER'S SUMMARY REVIEW OF MINING IN B. C.

In the course of his budget speech, delivered in the Legislative Assembly of British Columbia on April 23, Premier Brewster, who is also for the time acting as Minister of Finance for the Province, gave figures among which were the following, showing the estimated value of production in 1916, and, for the purposes of comparison, the corresponding figures for the year 1915:

	1916.	1915.
Products.	(estimated).	
Mines	\$42,300,000	\$29,448,000
Forests.	35,528,000	29,150,000
Agriculture.	32,259,157	31,127,801
Fisheries.	14,538,320	11,515,086

A published report of the Premier's observations relative to mining is as follows:

The total value of the mineral production of the Province for all years to the end of 1916 was roughly \$558,500,000. The value of the output for 1916 was nearly \$42,300,000 an increase of 44 per cent. over that of the preceding year. The output from metalliferous mining in 1915 was valued at nearly \$21,000,000, while in 1916 it was more than \$32,000,000, an increase over the first mentioned year of about \$11,000,000, or 54 per cent., while, as compared with the previous record, which was for the year 1912, the increase was 76 per cent.

While some of this enormous increase in value is undoubtedly due to the higher market value of most of the metals, yet in each of the metals, except gold, there has been a largely increased quantity produced of the more important economic metals, lead, the output of which in 1915 was 46,500,000 lb., was in 1916 nearly 49,000,000 lb., an increase of 2,500,000 lb. of metal produced. Similarly the output of copper increased, from 57,000,000 to nearly 65,500,000 lb., an increase of about 8,500,000 lb., and the quantity of zinc produced increased from about 13,000,000 in 1915 to 37,000,000 lb. in 1916, an increase of 24,000,000 lb., or nearly 200 per cent.

These facts, represented by figures, indicate that the industry as a whole has been enjoying a most profitable and successful year, while there is every reason to expect that such will continue during 1917, the first three months of which year have already expired, and have given such definite indications that it is safe to predict that the mineral output for 1917 will be greater by \$50,000,000.

The tonnage of ore mined in the Province in 1915 was about 2,700,000 tons, while in 1916 it was about 3,200,000 tons. There was no doubt but that this great increase in output was stimulated by the high prices of metals due to war conditions, but it is now practically assured that these high prices will continue for the full year 1917.

Coal mining is largely dependent on other mining for a market, and the increase in metal mining has had its influence on the coal and coke output, which in 1916 was nearly \$2,000,000 higher than the preceding year, while it seems probable that a similar increase will be made in 1917, bringing the gross value of the products of the collieries up to more than \$11,000,000.

CORRESPONDENCE

Those Phosphate Deposits at Banff.

Editor, Canadian Mining Journal, Toronto:

Sir,—Owing to absence from the office, the editorial note appended to my letter in your issue of March 15th, has only come under my notice recently.

In my letter I accused you of making three absolutely untrue statements. By your failure to contradict or disprove my statements, you virtually admit their accuracy.

In your editorial note, instead of acknowledging frankly and manfully that you had been misinformed you aggravate your original offense by vulgar abuse and statements that are devoid of any basis of facts.

(1) You accuse me of making "mis-statements." This statement is an absolute falsehood and that it is not inadvertent is demonstrated by your failure to take issue with even one of the clear cut statements that I made.

(2) You say that the Commission has no "sufficient reason for its existence." This statement, like your original reference to the work of the Commission, is drawn from the unrivalled stock of misinformation which you undoubtedly possess.

(3) You say that we published "reports of the possibilities of imaginary resources, reports that are on a par with a wild-cat prospectus." This statement is absolutely without foundation in either substance or in detail, it is absolutely false and demonstrates that, finding yourself without any case, you resorted to abuse to cover up your discomfiture.

(4) I accuse you of making a statement that is absolutely untrue when you say we were "warned long before" our reports were published. We were not "warned" and it was impossible for any one to "warn" us inasmuch as the area that has been examined is to the unexamined area, less, in proportion, that one word in your issue of March 15th bears to the whole issue.

(5) As an additional specimen of your reckless statements I will cite your statement that we published "voluminous" reports respecting the phosphate discovery. Respecting phosphate we have published, in all some 39 octavo pages which included 4 pages of index. Respecting the work in the Rockies we have published 7 pages! I suggest that you purchase a primer on "Meanings of English Words in Common Use" and thus acquire some slight knowledge of the meaning of the word "voluminous."

(6) At the Ottawa meeting of the Canadian Mining Institute, Dr. Adams read a paper on this Phosphate Discovery and Dr. W. F. Ferrier contributed to the discussion an account of his examinations of the phosphate-bearing beds at various points in the Rockies.

Prof. H. E. Haultain, summing up these addresses, said: "I make the most profound obeisance to these two geologists: Dr. Adams' work represents the most magnificent piece of prospecting of which one has knowledge, and I have no doubt the work of Dr. Ferrier was no less admirable."

In your issue of April 15, the professorial correspondent who hides behind "Observant Reader," informed you that "you have not shown to advantage in this matter."

Yours etc.

Ottawa, April 26, 1917.

JAMES WHITE.

The above characteristic letter from Mr. White speaks for itself to those who are familiar with the facts. It is the kind of letter they would expect him to write.

For the benefit of those who are not familiar with the story of the discovery of phosphate beds in the Rockies we reprint elsewhere in this issue the statement made by Mr. W. F. Ferrier at a meeting of the Canadian Mining Institute held in Ottawa in March, 1916. From this statement it will be evident that the phosphate beds had been very carefully examined by men familiar with the phosphate mining industry before the Commission of Conservation began its search. Mr. Ferrier had fully explored the region and thoroughly tested the phosphate beds and found none of the deposits to be of any commercial value; but had failed to make public the results of his work.

The Commission, apparently in ignorance of the work which had been done, undertook the task of prospecting for phosphate and succeeded in finding a phosphate boulder near the geological horizon at which phosphate beds are known to occur in the western States. They gave out a statement to the daily press reporting their discovery.

Mr. Ferrier, a former officer of the Geological Survey, noting the press report, went to Ottawa and advised one of the Commission's officers that he had carefully prospected the area in question and had discovered not only boulders but beds of phosphate there. He was able to advise this officer that the deposits had been carefully traced, sampled, analyzed and tested by concentration devices and found to be of no value. The beds are too thin and too low grade to be of commercial importance. Mr. Ferrier did not give this information out for publication; but doubtless hoped that the facts he presented would prevent rash statements being made by the Commission regarding the possibility of locating economic deposits of phosphate.

Evidently, however, the Commission thought that the public would not think much of a report on the discovery of phosphate unless it were painted in glowing phrases, and the report issued contained no suggestion of the unpleasant facts.

In view of the facts, Mr. White's denial of the warning given is an indication that he did not believe that the facts were known.

Mr. White complains of our use of the word "voluminous." He says that the 39 page report, which is entitled "Discovery of Phosphate of Lime in the Rocky Mountains" contains only 7 pages respecting the work in the Rockies. There are only 7 pages. In this we agree with Mr. White. Seven pages is quite enough.

Mr. White objects to our comparison of the report with a wild-cat prospectus. Comparing it with such literature one will find many points of similarity. No deposits of importance having been found by the authors of the report, extracts from descriptions of several deposits in the Western States are given. There being no workable deposits in Canada known to the authors, photographs of those in Montana are reproduced and colored geological maps are copied from various old reports. The whole report is calculated to delude Canadians into the belief that the discovery made by the Commission is of economic importance. That the Commission has been successful in fooling the public by this report is evidenced by the statements made by many men during the past winter.

Potash from Feldspar.

Editor, The Canadian Mining Journal:

Sir,—According to "Scientific American," April 7th, 1917, p. 351, quoting a Toronto newspaper, "a company making Portland cement at Durham Ont., is now turning as a by-product from feldspar 12 to 16 tons of potash daily. The cost of manufacturing potash in Canada is so low even now that it is less than the freight charge paid on a ton of the imported German product before the war."

According to "Canadian Mining Journal," March 1st, 1917, p. 114, quoting Dr. H. S. de Schmidt, "it still remains questionable, whether any of the methods proposed can successfully be employed on a commercial scale at a time of normal prices for potash salts."

According to "Revue Generale des Sciences Pures et Appliquees," 15 Mars, 1917, p. 132, "Le feldspath orthose chauffe dans un haut fourneau avec de la pierre a chaux donne un produit contenant de la potasse dont la majorite est sous forme de silicate; nous ne savons que tres peu de chose au sujet de l'utilite des silicates pour la nutrition. . . ."

If some of the writers of the Canadian Mining Journal could throw a ray of light on the question, I would be most grateful.

Yours etc,

P. FONTANEL.

Montreal, April 27, 1917.

GRANBY CO'S COPPER PRODUCTION.

Production of copper by the Granby Consolidated Mining, Smelting and Power Company, Ltd., in March amounted to 3,901,398 lb., compared with 2,580,288 lb. in February, 2,946,476 lb. in January, 3,219,022 lb. in December, 4,151,001 lb. in November, a high record of 4,727,929 lb. in May last, and 3,555,441 lb. in March, 1916.

Of the total for April of this year, 2,814,780 lb. was produced at Anyox, against 1,968,426 lb. in February, 2,319,502 lb. in January, 2,395,810 lb. in December, 3,017,259 lb. in November, 3,383,230 lb. in May, and 2,300,227 lb. in March last year, while at Grand Forks 1,086,618 lb. was produced in April, contrasted with 611,862 lb. in February, 626,974 lb. in January, 823,212 lb. in December, 1,133,742 lb. in November, 1,344,699 lb. in May, and 1,255,184 lb. in March, 1916.

In the course of a speech he made in the Legislative Assembly of British Columbia during the Provincial Budget debate, Mr. John Keen, member for the constituency of Kaslo, West Kootenay, touched on the question of taxation of the mining industry. He said that he hoped whatever levies Premier Brewster made in that direction, he would not kill the goose that was laying the golden eggs. "What we need is a vast and everlasting faith in our country," he said. "If we take care of our mining industry and give it the encouragement which it should receive, the few million dollars of debt this Province may have will soon be paid off."

*Statement made at the March 1916 Meeting of the Canadian Mining Institute.

PHOSPHATE DEPOSITS OF WESTERN UNITED STATES AND CANADA.*

By W. F. Ferrier.

From 1904 to 1908 I was engaged in exploration and development of the phosphate deposits in the Western States to which Dr. Adams has made reference. It was not until 1906 that the United States Geological Survey had parties in the field to investigate these deposits. I was in charge of the work for my principals for four years, and traced the deposits over the States of Utah, Idaho, Wyoming, and Nevada almost to the borders of California.

When in Washington I urged the U. S. Geological Survey to put parties in the field; and eventually Mr. F. B. Weeks was assigned to the work. I had been asked by the Director to write a Bulletin for the U. S. Geological Survey, but as I represented private interests I declined the invitation to undertake the sole authorship of such a report, offering instead to place all the material and facts we had accumulated at the disposal of Mr. Weeks, to give him access to all our plans, sections, and collections of fossils, and to guide him over the ground. The offer was accepted, and in 1906 a report was published by the U. S. Geological Survey, entitled: "Phosphate Deposits in the Western States, by F. B. Weeks and W. F. Ferrier."

The first phosphate was mined and shipped from the Waterloo claim, at Montpelier, Idaho. We were fortunate in the location of that property because the main phosphate bed, which is about five feet thick and very uniform, was covered, over a large area, by a bed of limestone only, about 18 inches thick, very hard, and full of fossils. This bed had protected the underlying phosphate from erosion and by merely stripping it away we were able to obtain many thousand tons of phosphate before we were forced to go underground. The phosphate was so soft at first that we used coal augers and light charges of black powder.

At this time I urged my principals to investigate the occurrences which I felt confident, from a study of the maps and reports of the Canadian Geological Survey, would be found to extend into Canada. My chief reason for doing so was that there were certain difficulties regarding railroad rates for the shipment of phosphate in and from the United States, and it was impossible to get a combined rail and steamship rate. At that time the best field for the phosphate industry lay in the export trade, the amount required for the Western States being very trifling and the rates for shipment to the eastern market prohibitive. We sent shipments to Australia and had enquiries from Germany, Japan, and Honolulu, so that if we had found phosphate in Canada we would not only have had a shorter railroad haul, with the possibility of getting acid at the coast, but also much better facilities for shipments abroad. I had also indicated that some phosphate might be found in Nova Scotia, although aware that the carboniferous rocks there belonged to a lower horizon. I was sent to investigate some copper properties in Nova Scotia; so that my first search for phosphate was made there instead of in British Columbia and Alberta. I intended to go to Alberta the next season, but circumstances prevented and nothing further was done.

When I returned to Canada my thoughts were still on the possibilities of finding the phosphate, but I found it exceedingly difficult to interest anyone in the subject. Finally I succeeded, and the credit belongs chiefly to Sir Edmund Walker, who has always taken a keen interest in geology and is, as is known, a warm friend of

our Geological Survey. He appreciated the situation and it was through him with others that I was enabled to do my first work. Afterwards Mr. C. C. Ray of Ottawa became interested and enabled me to continue the search for commercial deposits.

The first field work I did was in 1912, and the first discovery of phosphate was made on June 11th of that year, at practically the same place where Dr. Adams found it. The float occurred on the old timber slide going up to the divide by Stony Squaw mountain at Banff. I traced it over the divide to Forty-Mile creek. **All over the Banff area I found small beds or layers of phosphate rock, but nothing of sufficient size to be commercially valuable under present conditions.** I tried to obtain permission to publish my results, and when Dr. Adams' find was announced in the papers, made a trip to Ottawa. I was not even permitted to say that I had found phosphate. In fact it was only the day before I left for Ottawa to attend this meeting that I finally received permission by telegraph to make the matter public. Dr. Adams is quite correct in saying that nothing was published on the subject, but I have done detailed work during four seasons and covered ground not only in the Banff area but also in the Yellowhead Pass, the Crowsnest Pass, and south to the International boundary.

I may say that I think the Geological Survey deserves great credit for the excellent maps and sections prepared, some of them as early as 1886, of the districts in which I worked. It was whilst studying those maps and the reports that I became convinced phosphate was to be found in Canada and I found that I could roughly correlate the geological divisions with those of the Western States before I had seen them in the field. Mr. James McEvoy was with me during part of my later work. In 1905, when in the Western States, I had knowledge, through one of my assistants, of the occurrence of phosphate in Montana, but the grade was so much lower than what we had elsewhere—our phosphate beds ran from 70 to 80 per cent tribasic calcium phosphate—and the conditions for development at our principal mine were so nearly ideal that I did not consider it worth while to investigate at the time. With regard to my work in Canada I hope to obtain further permission to publish a paper, because I think all such matters ought to be made public, and I am, personally, quite willing to give all the information I can. During my detailed examinations of the geological sections throughout the country from the Yellowhead Pass to the International boundary many interesting facts were noted, but time will not permit me to discuss them here. The thickness of some of the divisions of the Carboniferous as given in the Geological Survey reports, is, I think, overestimated, and I am convinced that much of the Upper Banff Shale is really Jurassic, possibly in part Triassic. Ammonites were found abundantly in areas mapped as Upper Banff Shale.

There are one or two things I would like to mention in connection with Dr. Adams' published report. With regard to the horizon of the phosphate beds he indicates that somewhere near the contact of the Upper Banff limestone and the Rocky Mountain quartzite is the place to look for them; but in fact what has been found lies high up in the Rocky Mountain quartzite, near the top, and not at the base. **In the Banff area I have found only small beds or layers, not over 12 inches or so in thickness, running up to 22 per cent. or 23 per cent. phosphoric acid, and similar beds with somewhat higher percentages elsewhere.** Some shaly beds overlying the Rocky Mountain quartzite are also strongly phosphatic.

An interesting occurrence of phosphatic nodules and fragments is to be seen in the highly tilted beds which

form the east bank of the Bow river, for a long distance, at Banff. The line of strike of this phosphate horizon extends from the Bow river over to Forty-mile creek, as may be seen by the geological map of this region.

I would suggest that in pointing out to the prospector what to do to identify phosphate rock, a more simple way than the one described is to carry a few crystals of ammonium molybdate and a small bottle of nitric acid. A minute fragment of the ammonium molybdate placed on the rock and moistened with acid will give, in the case of phosphate rock, a bright yellow coloration, varying in intensity according to the percentage of phosphoric acid contained in the rock.

In conclusion, beds of phosphate, though very small, were found in all the sections examined, and I am sorry to say that up to this day nothing has been found to compare with the deposits of the Western States, and nothing that I could conscientiously recommend for the expenditure of capital.

COPPER IN NORTHERN INTERIOR OF B.C.

In his "Notes on the Copper Deposits of the Northern Interior of British Columbia, read at the meeting of the Western Branch of the Canadian Mining Institute, in Vancouver, Mr. John D. Galloway, assistant mineralogist for the Province, made the introductory comment that "Copper mining is now the most important form of mining in British Columbia, and although the last two years has witnessed a steadily increased production of copper, there is little doubt but that the output will continue to be still further augmented in the near future. The Northern Interior portion of the Province has as yet contributed only a small proportion of the yearly copper production of British Columbia, but it must be remembered that it is only within the last three years that railway transportation, by means of the Grand Trunk Pacific railway, has been provided in that region, and this railway serves only a limited area of country on either side of the track."

Prospecting has been in progress along the line of the Grand Trunk Pacific railway for some years, but it is only recently that development may be said to have been commenced. At present the only important copper-producing section of the Northern Interior is the Hazelton-Telkwa district of Omineca mining division, from which the Rocher Deboile mine contributes the greater part of the production.

Along lower Skeena river, in the Babine country, and east of Telkwa along the G. T. P. railway many copper prospects are being developed but production from them so far has been very small. Between the G. T. P. railway and Lillooet district there is a strip of virtually unprospected country in which copper and other minerals may be found; this is along the eastern contact zone of the Pacific Coast range. This range is 1,000 miles long, from the International Boundary line northward through British Columbia into Alaska. It is known to contain commercially valuable orebodies in many places along both its eastern and western contacts. The Britannia mine is an especially good example of a very large low-grade copper-bearing orebody; the Granby Co.'s Hidden Creek mine is another. It should be remembered that often a long time is taken to turn a copper prospect into a largely productive mine, with large expenditures for development work and for equipment for cheap and efficient working.

In the Hazelton-Telkwa district the mineralization embraces ores of gold, silver, lead, and zinc, as well as

copper, the last mentioned being as a rule small to medium-sized deposits as distinguished from large low-grade orebodies in other parts of the province. In the mountains on both sides of Skeena river, below Pacific station, many showings of copper ore have been discovered, but as a rule they are irregular and non-continuous. Further development, however, may disclose the occurrence of large low-grade orebodies. Small quantities of high-grade copper-silver ore are found on Hudson Bay mountain, Howson and Hunter basins, but ore production from them as yet is of only slight importance.

The production of copper from the Hazelton-Telkwa district in 1915 was 2,831,279 lb., of which quantity 2,788,000 lb. was from the Rocher Deboule mine; in 1916 the same mine contributed nearly all of the district total of 1,646,072 lb. This leading copper mine of the district was described at some length by Mr. Galloway, who after mentioning a number of other properties in the same neighborhood, referred to the Cassiar Crown, 18 miles east of Telkwa, and the Santa Maria, now shipping high-grade copper ore, situated in Howson basin.

In conclusion, there seems to be sufficient evidence on which to base a reasonable hope that the Northern Interior of British Columbia will in future years contribute materially to the copper production of the Province. In regard to the Hazelton-Telkwa district proper, many of the orebodies here should prove attractive to small mining syndicates and individual operators, as large amounts of capital are not required to develop and equip these deposits of medium to high-grade ores. Capital is already coming in from Edmonton, Alberta, and Spokane, Washington, and the district appears to offer good opportunities for capital from Vancouver and Victoria.

METAL MELTING.

A special feature of the Spring meeting of the Institute of Metals, held on March 21st and 22nd was a general discussion on metal melting, a subject which hitherto has received very little attention from the scientific societies.

It has assumed great national importance, since vast quantities of fuel—solid, liquid and gaseous—are used in metal melting, particularly for munitions making. Economies in the use of these fuels in the metal industries are generally realized to be possible, but the lack of comparative data has often hindered the adoption of the most efficient means of metal melting.

The Institute of Metals is very fortunate in having as its president, who will preside over the discussion, Sir George Beilby, LL.D., F.R.S., the head of the new Government Board of Fuel Research.

At the meeting a series of six communications were made bearing on all phases of the question of the melting of the non-ferrous metals, whether by high pressure or low pressure, gas, coke, oil fuel, or electricity.

GREAT SULPHIDE.

There is considerable activity in The Pas district, Western Manitoba, this spring and good results are being obtained. The Great Sulphide property at Flin-Flon is being further tested by diamond drilling, and a large additional quantity of ore is already indicated. Mr. W. W. Mein is directing the work. Mr. Scarpe is at the property in charge of exploration work.

PERSONAL

Mr. Thomas Graham, who recently resigned the position of Chief Inspector of Mines for British Columbia, late in April returned to Victoria from the Coal Creek colliery of the Crow's Nest Pass Coal Co., where he had been in company with his successor, Mr. George Wilkinson, to investigate the cause of an explosion that took place last month in one of the coal mines there. He has since assumed his new duties as general superintendent for the Canadian Collieries (Dunsmuir), Limited, with collieries at Extension and Cumberland, on Vancouver island.

Mr. Alex. Smith, of Toronto, who was for years manager of the Surprise silver-lead-zinc mine in the Slocan district of British Columbia, was a recent visitor to the Coast cities of Victoria and Vancouver.

Mr. Andrew G. Larson, who has for years been actively associated with mining in Kootenay district of British Columbia, was in the East lately on a business visit in connection with a proposed amalgamation of gold mining properties situated in Sheep Creek camp, Nelson mining division of that province.

Mr. W. B. Bishop, superintendent of the Granby Consolidated Co.'s big smelting works at Grand Forks, Boundary district of British Columbia, was recently on a business visit to Vancouver, where are the company's headquarters in the Province.

Mr. C. M. Campbell, mine superintendent for the Granby Consolidated Co., at its copper mines in Phoenix camp, Boundary district, B.C., is in southern California, seeking to recuperate after a serious illness.

Mr. R. H. Stewart, formerly general manager for the Consolidated Mining and Smelting Company of Canada, Ltd., was entertained at a valedictory banquet at Rossland, B.C., last month, on the eve of his leaving the Kootenay district for Vancouver, where he intends opening an office as a consulting mining engineer. At the banquet, which was attended by about 250 residents of Rossland and other parts of Kootenay, a presentation of a costly and beautiful silver service and salver was made to Mr. and Mrs. Stewart.

Mr. M. E. Purcell, superintendent of the Consolidated Mining and Smelting Co.'s Centre Star-War Eagle group of mines in Rossland camp, British Columbia, has been spending two or three weeks visiting mining properties in Skeena and Omineca mining divisions, going to them from Prince Rupert.

Mr. E. A. Cleveland, of Vancouver, B.C., is consulting engineer for the company operating the gold property near Surf inlet, Princess Royal island.

Mons. H. Maluin, general manager of the Mines d'Otter, operating a hydraulic placer-gold mine on Otter creek, in Atlin camp, has returned to British Columbia from Paris. He will remain in that province several months and then go back to France.

Mr. W. M. Brewster, M.E., of Victoria, B.C., has prepared for the British Columbia Bureau of Mines a report on the "Iron-ore Deposits of Vancouver and Texada Islands, B.C.," which report has been printed and issued by the B. C. Department of Mines.

Mr. W. J. Barker, of Nelson, B.C., has been appointed superintendent of the Emerald lead mine, situated eight miles from Salmo, in the southern part of Nelson mining division.

Mr. C. W. Nicols, of Detroit, Michigan, has been appointed assayer for the Highland Valley Mining and Development Co., which is engaged in mining and concentrating copper ore in Ashcroft mining division of British Columbia. He arrived at the mine last month.

Mr. J. E. Hammell and Mr. J. W. Callinan are in Toronto. Mr. Callinan will return to The Pas shortly.

Mr. Thomas Morrison of Pittsburg and Charles Hayden of Hayden, Stone & Co., were elected directors to fill unexpired terms of Col. R. M. Thompson and S. H. Pell, resigned. W. T. Graham was elected to executive committee to fill unexpired term of Col. Thompson.

Mr. S. S. Fowler, of Riondel, Kootenay lake, B.C., general manager for the New Canadian Metal Co., owning the Bluebell lead mine, has returned to British Columbia for a holiday vacation spent in southern California.

Mr. Frank B. Smith, of Edmonton, Alberta, has been examining placer-mining property on Government creek, in the Fort George region, northern Cariboo district of British Columbia.

Mr. Geo. W. Clinton has resigned as superintendent of the Comox colliery of the Canadian Collieries (Dunsmuir), Ltd., Vancouver Island, British Columbia, after having been employed there, first with the Dunsmuir interests and latterly, since the mines were acquired by the Canadian Collieries, with that company, over a period of thirty years.

Mr. M. S. Davys, of Kaslo, B.C., was in Victoria at the end of April, on his way back to Kootenay district, after having been in southern California for several weeks. During the winter he suffered from a serious illness with pneumonia, and as soon as he was fit to travel he went South to obtain the benefit of a warmer climate. He is now convalescent and expects to soon be once again busy in connection with mining in the Kootenay.

Mr. C. H. Hitchcock has become a member of the Smith & Travers Diamond Drill Co., Ltd., Sudbury, Ont. Mr. Hitchcock has moved his office from Copper Cliff to Sudbury, and will continue his examination work and search for new properties.

Mr. Anton Gronningsaeter, general manager Kristiansands Nickel Refining Works, Kristiansand, Norway, was in Toronto last week and is now visiting Western mining districts.

SIMILKAMEEN.

Progress is being continued at the big group of copper claims, on which the British Columbia Copper Co., of late years the operating company of the Canada Copper Corporation, of New York City, did much work. Concerning some new equipment, the Similkameen Star, of Princeton, Similkameen, recently printed this information: "For the past week the big pump installed on the Similkameen river by the Canada Copper Corporation to raise water to Copper mountain, has been working successfully. The pump is driven by a large motor and the water is lifted 1700 ft. through a pipe-line 6000 ft. in length. The water is raised at the rate of 5,000 gallons an hour to two 20,000-gallon tanks. On the hill the water has 150 lb. pressure, and at the foot of the hill 750 lb. pressure per square inch. The water is used to supply the 50-

ton experimental mill just being put in operation, in the mine, and for domestic purposes. The pump is of the Gould triplex type, and the pipe-line is composed of 4-inch high-pressure hydraulic pipe.

Mr. Oscar Lachmund, general manager of the Canada Copper Corporation, when in Spokane, on his return journey from New York to British Columbia, after having attended the company's annual meeting, was reported by the Spokesman-Review to have said: "New York and Boston mining engineers confirm our reports as to the estimated quantity and grade of the ore we have developed on Copper mountain, our estimates having been 10,000,000 tons of assured ore and 5,000,000 tons of probable ore, with an excellent possibility of increased tonnage. The ore contains 1.75 per cent copper and twenty cents a ton in recoverable gold and silver. Plans are being formulated to equip the mines for a production of 2,000 tons of ore a day; also for the installation of a power plant and mill, capable of handling that quantity. The plans include houses for men, of whom 600 will ultimately be employed in mines and mill. We hope to shortly begin the installation of the equipment. Results have been up to expectation in the operation of our 50-ton experimental mill, which is running continuously. We hope to make an extraction of 90 per cent from the ores we shall put through the mill.

CROW'S NEST PASS COAL CO.

The annual meeting of shareholders in the Crow's Nest Pass Coal Co. was held in Toronto, on April 13. The report of the directors and the statement of accounts presented showed that the net profits for the year 1916 had been \$340,501, as compared with profits from all sources of \$429,554 for 1915.

The balance at credit of Profit and Loss account when the year opened was \$431,499; adding the profit for 1916, a total of \$772,000 resulted. Deducting the four quarterly dividends paid each of one and one-half per cent and totalling \$372,666, there remained \$399,334. The profits of subsidiary companies for the years 1913, 1914 and 1915, which had been taken up as income, have been written off, and the amount, \$76,854, applied to depreciation account of these companies. This further deduction from the Profit and Loss account balance left at credit of the account a net amount of \$322,480, to be carried forward to the year 1917.

Expenditure during 1916 on improvements and developments, in connection with both the coal company and its subsidiaries, was \$64,549.

The year's gross output of coal from all mines worked, both at Coal Creek and Michel collieries, was 910,889 short tons. Part of this was made into coke, of which a total of 268,989 short tons was made, this quantity being 282 tons less than the output of 1915.

The balance sheet shows liquid assets of cash \$177,312, accounts receivable \$227,071, and value of coal, coke, and stores on hand \$217,424, a total of \$621,807 practically cash assets. Against this amount there are liabilities consisting of accounts payable \$239,084, and unpaid dividends \$42,513.

In addition to the assets mentioned above, there is shown in the balance sheet an amount of \$970,349, value of securities owned by the company, much of which is understood to consist of high-class bonds.

THE IMPORTANCE OF COAL IN WAR.

By D. H. McDougall.

Presidential Address, (Annual Meeting Mining Society of Nova Scotia, April 19th, 1917.)

We have not met in regular annual meeting since April, 1914, which we remember not only as the first meeting at the Sydney headquarters, but as a very successful and inspiring gathering. We little dreamed of what the future held in store.

We are now approaching the close of the third year of the war. In the meantime we have considered, and I believe rightly, that the energies of our members were being expended most usefully and effectively in the daily routine of mining and in the manufacture of munitions of war.

This year we have considered it necessary to hold an annual meeting so that we might not lose sight of our Society's importance, and also that we might prepare for the happy gathering we hope to have when our allies shall be victorious and our enemies definitely and thoroughly defeated.

It has been thought advisable by the Executive to confine our proceedings to one day, and to dispense with the social functions that accompany the annual dinner. This is not any evidence of a loss of interest by our members nor inability to obtain from them a sufficient number of interesting technical papers, but is because of our realization of the importance of their daily work and a natural disinclination towards social functions under existing conditions.

As you will have noticed from the Treasurer's Financial Report, the policy of the Society since the headquarters were moved to Sydney has resulted in our having a snug little sum in the savings bank instead of a debit balance, and this notwithstanding that last year we were able to donate the sum of one hundred dollars to the Red Cross Society. We hope to donate a similar amount to some patriotic object at this meeting.

As I have said, the energies of the members have been for almost three years daily expended in the production of coal, iron, limestone, gold and antimony or in the working up of these raw materials into the finished munitions of war. We have realized as never before our own importance, and the world has realized it also. We have had some facts driven home upon us that we had not previously thought much about or had taken for granted. The fundamental principles of our daily business have been forcibly brought to our attention, and we have been learning new things every day since August, 1914.

As one whom you have honored with the office of President of the Mining Society of Nova Scotia, and speaking in the metropolis of the steel and coal industries of Cape Breton, I believe I need no excuse to enlarge a little on the part played in this war by coal.

To put within the compass of one sentence the importance of coal, I venture to state that **no single department of the machinery of modern warfare can move or act without coal.** This may seem a comprehensive statement, but a little consideration will reveal its accuracy.

Nova Scotia coal at the present time, and throughout the whole course of the war, has been used for war purposes, some of which may be briefly enumerated:

The St. Lawrence patrol and the large auxiliary cruisers in North Atlantic waters have used Nova

Scotia coal, and, in addition, there has been a never-ending stream of trans-Atlantic transports sailing from the various ports of Eastern Canada. The railways from Montreal east, conveying troops and materials for shipment to Europe, have used our coal as their motive power. At the various steel and munitions works in Nova Scotia our coal seams have provided the power for the manufacture of shells of every calibre, wire for entanglements, nails and other steel products used in war, or, it would be more proper to say, used in **this** war. Large quantities of toluol, the base of the most widely used explosive in the war, have been distilled in Nova Scotia. Sulphate of ammonia, a most necessary and valuable article in agriculture, is another of our coal products that has assumed increased importance in these days of food shortage.

It is hardly an exaggeration to say that, with the exception of the domestic use of coal in the Maritime Provinces and Newfoundland, almost the whole of the coal produced in Nova Scotia is being used directly or indirectly for the prosecution of the war.

It has needed this war to demonstrate the value of coal in another way, i. e., as the equivalent of gold as a medium of commercial exchange and as a stabilizer of currency. The financial strength of Great Britain, which is the wonder and admiration of the world, has been much assisted by her ability to export coal, in addition to keeping her own fires burning. It has been a most helpful fact in maintaining British credit and the purchasing value of the pound sterling.

If we follow the course of the war, we shall see that the action of the German and Austrian armies, and later, the action of their Turkish and Bulgarian allies, was directed by a desire on the part of our enemies to obtain control of the coal and iron fields of Europe, and of that other important source of motive power, petroleum. This is a fact so patent and obvious that it is unnecessary for me to do more than mention it. The successful strategy of our own armies is at the present time quite evidently actuated by a determination to recover the coal fields of Northern France.

In the light of these events it is therefore a most serious matter to know that the output of coal from the Nova Scotia collieries during 1917 will be one of the lowest recorded during the past ten years, and will be some two million tons below the capacity of the mines for output. The reason for this decline is a matter of common knowledge. It is due to **the disproportionate enlistment of miners.** In no other coal mining centre in the British Empire have the authorities allowed enlistments to so seriously reduce the production of coal. The damage to the industry is done, and is irreparable for the further duration of the war. No advantage is now to be gained by laboring the point. There is just one thing that can be done, namely, to prohibit further enlistments from among the mine workers of Nova Scotia.

The question of immigration after the war is one that has been given a good deal of attention in the newspapers recently, and there is an impression abroad that the close of the war may see a great influx of emigrants into Canada. Of this I have great doubts, and indeed there are some good grounds for believing that after the war the movement of population will be towards Europe rather than to North America. It may be that the period immediately following the war will see a greater percentage of British-born emigrate into Canada, but there is reason to believe that there will be

not only a cessation of emigration from those countries of South-Eastern Europe which have in the past been the chief source of labor for North America, but a repatriation on a large scale of natives of these countries whose movements have been restricted during the period of the war.

It is a significant fact that the Industrial revival of Canada since the spring of 1915, and the prosperity in manufacturing activities that has since been noticeable, has been experienced in just that portion of Canada which is within the radius of the supply of the bituminous coal of Nova Scotia. The Canadian West has experienced, and is even yet under the influence of, a trade depression.

Unfortunately, the increased demand for coal brought about by the manufacturing activity in Eastern Canada has existed side by side with a coal shortage and a scarcity of steamers caused by Admiralty requisitions, with the result that shipments of coal from Nova Scotia to the Montreal market have fallen from a normal figure of two million tons per annum to a quantity that in 1917 will not exceed two hundred thousand tons.

As a result, Nova Scotia has lost the market which is the natural outlet for the coal mined here in excess of the requirements of the Province. The Montreal trade has been developed by the expenditure of large sums of money and by years of patient work, which, in the face of the strenuous American competition, has allowed only very moderate financial returns. Large sums of money have been expended on the improvement of coal preparation, in the provision of transportation and discharging facilities, and in educating the consumers of Montreal to the excellent qualities of Nova Scotia coal. When conditions again become normal, the recovery of the Montreal market will present no light problem. Apart from the difficulty of displacing our American competitors, we shall be faced by increased costs in every department of coal mining. Wages and materials will, in all probability, assume normal dimensions more slowly than they have increased.

The difficulty of transportation, owing to the loss of tonnage during the war, will persist for a long time into the future. The difficulty of procuring an adequate supply of labor I have already hinted at, and I believe that coal mining will be one of the last industries to recover a sufficient labor supply. The physical difficulties of coal mining in the meantime will have materially increased. Mining operations will be carried on at a greater depth. A very large proportion, almost the whole of the coal produced in Cape Breton, will be won from submarine areas, and while, to some extent, the same conditions will affect our competitors in the United States, we are and always shall be under a constant handicap by reason of the much simpler and less expensive mining operations which are possible in the coal fields of the United States that compete with Nova Scotia coal in the Montreal market.

A large body of earnest men and committees from associated scientific societies of the Empire are devoting their attention to trade after the war and the vast subject usually referred to (and, I think, somewhat misleadingly) as "Industrial Preparedness," which is a new term for the old virtue of efficiency.

As coal is the basis of all modern manufacturing industries it follows that the greatest efficiency of in-

dustries is obtained when they are located in the coal fields, thereby eliminating as a factor of expense unnecessary transportation. Although from the immediate viewpoint of the coal operators, the loss of the Montreal market may present a serious problem, yet from the larger viewpoint of Canada's national efficiency and certainly from the viewpoint of the province of Nova Scotia, there is a good deal to be said for a greater concentration of manufacturing activities within the coal fields of Nova Scotia. The transportation of millions of tons of coal, by water and by rail, to be used in the manufacturing industries of large centres of population, such as Montreal and Boston, is not really an efficient and economically sound proceeding.

These, gentlemen, are some of the problems facing those of us who happen to be engaged in the production of coal in Nova Scotia. The prospects, while their difficulties may stimulate us to still greater endeavor, do not promise a smooth road to travel. If we are to survive and hold our own in Canada, and, I may add, as a factor of world trade, in the days of depressed trade conditions which must inevitably follow the conclusion of the war, sooner or later; it is obvious that we must do two things, we must fully appreciate our difficulties and then proceed to overcome them. Greater difficulties have been overcome in the past in the coal trade of Nova Scotia, by study and concentration and by looking ahead of present conditions, and the road for us to-day is no easier than it was for our predecessors.

As the factor of increased cost is a certainty of the future in coal mining, we shall have to develop more efficient and therefore cheaper methods of mining practice. In such everyday problems as the haulage of coal, the mechanical cutting of coal and the mechanical loading of coal, we shall find opportunities for improvement, and we shall find as we have found in the past that best results follow naturally upon exchange of views among the men who have these problems before them every day.

No better medium for such exchange of thought and experience is to be found than a mining society. The apparent cessation of our activities during the past two years has been due to the greater urgency of our daily work, and I hope and believe that the future of our society will more than fulfil the promise of our first meeting in Sydney.

One lesson we have all learned recently is how to adapt ourselves to changed conditions, and I think we are all more alert and better men as a consequence.

My remarks would be incomplete if I were to conclude without voicing for this Society our appreciation of the honor that is to day reflected upon our profession by the presence on the firing line of more than a full brigade of Nova Scotia coal-miners. Many of these men have already given their lives. They could do no more. Nothing that I have said as to the influence of enlistments on the production of coal is intended in the slightest degree to dim our sense of pride in our own men or to diminish the glory of their patriotism and their achievements already recorded, and others that we have yet to hear of. The miners of Nova Scotia have played in this war the part of brave and generous men. They have given freely of themselves and their sons and their earnings. They have worked steadily in the production of coal, and in years that are to come the knowledge of good work done will be a pleasant remembrance to them, and to ourselves also.

NOVA SCOTIA COAL PRODUCTION.

The production of coal in Nova Scotia is proceeding at the diminished level of the past six months, without any further marked decline, but without any increase or prospect of increase in the rate of production. Some falling-off in outputs may now be anticipated because of the usual exodus of men to farm work and fishing, and because of the general desire to move which is common in the spring.

The production of the Dominion Coal Company's collieries in April was about 330,000 tons, comparing with 370,000 tons in April 1916. The aggregate outputs for the first four months of the year show a decline over the first four months of last year of 210,000 tons.

For the first time since 1913 a certain activity is visible in new work and increased equipment at the collieries. The Dominion Coal Company is installing a 1500 kilowatt turbo-generator to increase the supply of electric power at the Dominion No. 2 Central Power Station, and step-up and step-down transformers are being provided for transmission purposes, the No. 2 Station being in electrical connection with the Waterford Station, distant some ten miles away.

A cross-measure drift is being driven from the Victoria Seam at No. 14 colliery to tap the Barrasois Seam lying above. The new seam will be worked to the same bankhead as the underlying seam. This work is being carried on in preparation for the time when the number of men available will allow increased areas of working to be taken in hand. No. 17 Colliery, also on the Victoria Seam, has been idle for three years, it being all ready to produce coal whenever men are available. Extensive overhauling and improvement of the haulage ways at No. 2 Colliery is also under way, with a view to the winning of the large tract of submarine coal that is tributary to the existing workings of this colliery. Similar work is going on in the Harbour Seam at No. 9 Colliery, which overlies the No. 2 workings on the Phalen Seam.

Unusual interest is being taken at the present time in the opening up of crop areas, abandoned collieries, and other sources which promise a quick production of coal without large capital expenditure and for immediate profit. This is a natural reflex of the high prices prevailing for coal. While in some cases the operation of these small areas may result in profits for those who originate the operations, it is not to be expected that any increase in the aggregate output of coal in the Province will be the result, for the workmen who will be attracted to the new openings will be to a large extent withdrawn from the mines of the larger companies. The small areas now being attacked are chiefly on the outcrop of the coal, and the work to be done is short and easy, particularly for men whose homes are, as is often the case, in the vicinity of the new openings. Also the work is rather more free and easy than in the larger and deeper mines, and the use of naked lights is permitted. These conditions are often more attractive to the miner than higher wages.

Labor matters are in an unsettled state at the Glace Bay collieries, and the Minister of Labor has appointed a Commission to investigate the request of the Provincial Workmen's Association for an increase in wages. The Commission which has been named seems admirably constituted, and it is to be hoped its labors will be effective in keeping the peace. The application

of the Provincial Workmen's Association for a Conciliation Board was refused by the Minister on technical grounds which seem to point to a necessity for some amendment to the Industrial Disputes Act. The P. W. A. in applying for a Board announced that in any case the Association would not sanction a strike under war conditions, and this patriotic and praiseworthy decision is the very thing which, strange as it may seem, defeats the application for a Board, because a Board of Conciliation is supposed to be granted to prevent a strike, and presumes a threat on the part of the dissatisfied party to strike or lock-out, as the case may be. However, the necessity for an increase of wages is not in dispute between the Coal Company and the P. W. A. It is merely a matter of what is the proper amount of the increase. With the steadily rising cost of living, it would appear that no settlement of wages can be more than temporary, and that some provision will have to be made to adjust the curve of wages to the curve of living, as variations become apparent.

COAL BY-PRODUCTS EXPERIMENTS.

The Merritt Herald, Nicola, B. C., recently published the following:

Experiments now being conducted at a plant at Nanaimo, Vancouver island, British Columbia, to determine the by-product contents of coal from the Diamond Vale coal mine in Nicola valley, B. C., are reported as having thus far proved satisfactory. Walter Thomas, owner of the Thomas patent, is making the experiments with the coal for cooking purposes, and Dr. J. G. Davidson, Professor of Chemistry in the University of British Columbia, has charge of the electrical precipitation plant and the handling of the extracted by-products. Dr. Davidson will make a detailed report covering the entire experiment as soon as it shall have been completed.

It is understood, however, that the experiment thus far is checking up nicely with the results of experiments conducted in England on Diamond Vale coal sent there some time ago. The English experiments were conducted by J. Scott Anderson, a noted by-product expert. While as yet exact figures are not available, the volatile content, it is understood, averages close to 37 per cent. the valuable contents being motor spirit, light oils, heavy lubricating oils, paraffin oils (both light and heavy), and tar. A ton of Diamond Vale coal contains about 13 per cent. light oils, or approximately 20 gallons; 12 per cent heavy oils, or about 24 gallons; 4 per cent pitch, and 4.06 per cent sulphur ammonia.

The experiments now being conducted are by the low-temperature distillation process, the object being to recover as much as possible of the oil content of the coal. Coke may be produced either under a high or a low temperature. If, however, the coal is subjected to a heat above a certain temperature, the volatile contents are given off as gas. On the other hand, if the temperature is kept below a certain figure, not much gas is made, and practically the whole of the volatile matter is driven off and employed in the best possible manner for producing oils.

Another point that seems to be very favorable to the Diamond Vale coal as coke and by-product material is the fact that it contains very little sulphur and in the experiments that have been conducted this sulphur is reduced almost to the vanishing point, producing a coke that is valuable for use in steel works. In Sheffield, England, this class of coke is worth about \$8.50 a ton at the ovens. The greater part of the coal

found in British Columbia contains considerable sulphur, one of the notable exceptions being coal from the Diamond Vale seams, and the people who are now interested in the attempt to establish steel works in British Columbia are watching the experiments now being conducted at Nanaimo, for should they prove as successful as is expected, coke for the steel blast furnaces could then be obtained from Diamond Vale coal.

GEOLOGY AND MINING IN NORTHERN ONTARIO.*

By A. R. Whitman.

*From an address to the Cobalt Board of Trade.

To those who dig in the earth for mineral, a knowledge of the earth must be useful; and the more of such knowledge one can apply in his mining, the better he should mine. There is scarcely a prospector or mine operator but uses geological knowledge or theories in his efforts to find ore. Even though he may denounce geology and geologists, nevertheless he continually attempts to apply geology in his daily work, and the practical miner is the most inveterate theorist there is. I say this to vindicate geology, before those who think it too theoretical for use.

Inasmuch as the earth is a maze of geological things, and mining is an attempt to pick the useful things out of it, therefore geology must be vital to mining; and on that assumption I will preface my remarks with a few words about the science of geology.

Science is man's effort to understand the world he lives in. It is not man's knowledge of that world of things and principles, but his effort to understand it. Man has not much real knowledge. Every now and then he finds that something he thought to be knowledge was only a false idea. But man has a great fund of effort for the acquisition of knowledge, and that effort with its earnings constitutes science. The earnings may or may not be knowledge! but the scientific attitude is that even though it may be false, it is intended merely to serve as knowledge until it is shown to be false, or until the truth is learned. In other words, true science is not dogmatic, but is open-minded. All knowledge is tentative.

Thus the scientific method is systematically and candidly to search for the truth of things. How could one get at the truth of things in a better way? Dogmatic assumptions would never get one there. Dogmatism is the great stumbling block to science. People can not know things by intuition. If that were the standard every man would have his own intuition, and they could not all be right. Nine hundred and ninety nine of them would be wrong. We have to prove things.

Scientific proof consists in taking evidence and in making logical deductions from evidence. There is a chance for falsity in the evidence and for fallacy in the deductions, so that our decisions are subject to double error. But this is the best way man has of finding out the truth of things.

I say this to offset the idea that science is a mass of facts and formulae that men can apply to problems and obtain instant and infallible solutions. A scientist is better able to solve problems than a layman, only because he understands better how to apply scientific methods of investigation, and because he is familiar with the experience of others along the same lines.

The earth is a nearly spherical mass of eight thousand miles in diameter, and man has been able to

penetrate into it something less than two miles. All we are familiar with is just the outer shell, which we call the earth's crust. We know the crust has pressure in it as if it were too large for the earth, because of the way it wrinkles up into mountain ranges, and the rocks shift every now and then along some line of fracture. We actually saw this happen in California in 1906 when the rock shifted ten feet on a line two hundred and eighty miles long, causing the earthquake which started the disastrous fire in San Francisco. The cause of this pressure may be subject to dispute, but we know the pressure is there, and that fact is one of the foundation facts of geology.

Another foundation fact is that rivers and streams gradually wear down the mountains and wash the material down onto the lowlands and into the sea, where shells and animal and plant remains become entangled in it, and the whole mass gradually solidifies into rock, making conglomerate, quartzite, greywacke, slate, and other rock.

Still another foundation fact is that vast masses of molten rock come from the interior of the earth up onto the surface, or harden into rock below the surface. When it flows out onto the surface it makes lava, and when it hardens below the surface it makes porphyry, diabase, gabbro, granite, and other crystalline rocks. It seems as if these intrusive rocks, as they are called, must have originally contained the metals, because in ninety-nine cases out of one hundred, igneous rocks are found near ore deposits. The relation is not that ore deposits are found near all intrusive rocks, but that all ore deposits are near intrusive rocks.

Sometimes it seems very certain that the ore deposits were derived from the intrusive rocks, as in the case of our local ore deposits, but I will discuss this later.

We know from mining experience that most everywhere underground, the rocks are full of water. It appears to be in the cracks, but probably that is just where it collects in greatest amount. It has been found by heating rock which appeared to be dry, that it contained a little water all through it. Probably ore deposits are formed by mineral being deposited out of this ground-water in cracks and sometimes in the pores of the rock. And the mineral got into the ground-water by being dissolved out of some nearby igneous rock.

Geology of Cobalt Area.

The geology of Cobalt may briefly be summarized in a few paragraphs.

The Keewatin of which you hear so much is a group of greenish rocks, which are the oldest rocks we know of. We don't know what is under them. They contain old diabases and basalts and felsites and slates and other varieties which are of not much interest to us here. It is sufficient to call the whole set of them Keewatin.

In ancient times the Keewatin was an old land surface. It was eroded down nearly to a flat plane, and then sand and gravel was deposited over it in places to a considerable depth. All this became hardened into the rocks which we know as conglomerate and slate of the Cobalt Series or Huronian period. This was probably a very thick formation; and there must have been other formations above it.

In a later period a great mass of molten rock came slowly up from the interior and ran out horizontally along the bed of slate and conglomerate, under a great mass of rock which extended up to the surface of the earth. This molten rock in some places cut across the conglomerate beds and into the Keewatin. It was

injected along these lines until it finally attained a thickness of from seven hundred to twelve hundred feet. As it hardened it crystallized and made the formation which we now call the diabase sill.

After this, when the sill was pretty well cooled off, the pressure forces in the earth's crust begun to exert themselves in this region, and bent the rock up into big wrinkles or folds. At the same time, the rock was cracked, and here and there blocks of ground moved over one another, making faults. Most of this faulting was on flat faults that lay along the Keewatin-conglomerate contact, and along the diabase contacts, resulting in the production of more slips and joints in the contact regions than anywhere else.

Then came the ore. The ground-water by this time had permeated the diabase and other rocks; and the metals were dissolved out of the diabase and deposited in the conglomerate, and to some extent in the Keewatin within a few hundred feet of the diabase. It was deposited in vertical joints of the larger kind, because the smaller ones were not open at that time. When favorable joints of this sort lay in the diabase itself ore was deposited in them also.

The ore seems to have come mostly along the flat joints and flat faults, and along the contacts, depositing only in the vertical joints. For that reason ore can be expected chiefly near the contacts when they are flat or nearly so, or in places where flat joints and faults are abundant.

I can not go into all the details of where ore was and was not deposited, nor into the full explanation of the reasons for its peculiar selective behavior; but I will say that where small folds were formed on the sides of the large folds, the joints of the kind which the ore was deposited in, formed across the troughs or sags, and along the axes of the swells. This is a general rule, and has many exceptions.

That much has been done in the way of telling just where to look for ore. But it is of more benefit to mines than to prospectors. However, for the benefit of prospectors, I can say that these favorable conditions for finding ore, require that the formations shall be distinctly folded and faulted near the diabase, or that the diabase shall be strongly faulted, and jointed by flat joints which are very strong and closely set.

This does not mean that wherever one finds these conditions, he will find ore; but it means that these conditions are the most favorable.

Conditions at Porcupine.

In the Porcupine district it was found that a quartz porphyry had intruded the Keewatin schists, and that where it had become schistose itself bodies of gold ore lay near its contacts or on them. This ore may have originated in a somewhat similar manner to the Cobalt silver ores; but that is not certain. At any rate it appears that the rule I have stated holds good in a general sense.

Bearing on Mining Future of Ontario.

All these facts that I have stated, bear upon the mining future of Ontario. They mean that gradually a mass of experience is developing which will enable us to mine and explore in this north country to better advantage as time goes on. We are gradually learning what conditions control the occurrences of ore, and how to follow it, and find it again, when we lose it underground. We have learned something useful about Cobalt-silver ore deposits; and I have no doubt that

another Cobalt camp will some day be found in this diabase region. I do not believe the bush has been completely prospected, nor that the small and frequently erratic diggings on prospects that have been found have been altogether conclusive in demonstrating the outlook for ore.

Neither have the lessons of Porcupine been carried afield with sufficient thoroughness, and I confidently look for another Porcupine.

It is significant that Ontario's three greatest mining districts have been discovered on routes of travel. Sudbury and Cobalt were stumbled upon by railway construction; and Porcupine was stumbled upon through the accident of an old Hudson Bay trail crossing over one of the outcrops on the Hollinger property; and when the T. & N. O. Ry. approached near enough to make prospecting easy, then those prospects were opened up. What could be more obvious than that these rich mining districts are samples of Ontario.

But geology again comes to the fore in substantiating this conclusion. Geology says those samples must be representative. And these are the reasons why:

1. The whole region covered by pre-Cambrian rocks including Quebec, Ungava, Eastern Manitoba, Northern Saskatchewan, and the Northwest Territories is a vast mineral field, perhaps mineralized most richly in certain belts which remain to be determined, but nevertheless mineralized, through the medium of old intrusive rocks of various kinds, which lie among schists and ancient sediments. This condition the world over is productive of mineral.

2. Throughout Northern Ontario, these rocks are fractured by deep-seated faults, and more local fractures, and are here and there folded into more or less intense folds. And the world over, this condition, coupled with the other named, promises ore.

I hope I have not been too sanguine, I believe what I have said. And I have said it because I believe the conservative attitude heretofore held regarding the mineral resources of the north country are injurious to its proper development; and it is desirable that the people here and elsewhere should realize that the mining industry has only just begun to scratch its ultimate possibilities.

YUKON MINERAL CLAIMS LEASED.

Two quite important mining deals were closed on April 19 through Mr. Robert Lowe, said the Whitehorse Star. One of them was the taking of the lease, with an option to purchase, on the Fleming group of silver-lead claims in the Conrad district by Messrs. Angus R. McDougall, Carl Gaunt, Angus A. Gillis, and John McKenzie, all of whom were experienced miners and before the shut-down of the Pueblo mine comprised the crew of the diamond drill. There has been a lot of work done on this group and the lessees will resume the development at where it was discontinued when the close down was made. Mr. Fleming came down from Carcross for the purpose of making the necessary arrangements.

The other transaction mentioned was the leasing and bonding of the Retribution copper claim, adjoining the Empress of India, to Messrs. Jas. Hogan, Peter Patterson, Carl E. Anderson, J. L. Thompson, and Owney McFadden, comprising the Empress of India Mining Co. The Retribution is owned by Mr. G. Kydd, banker, of Ottawa, and Mr. G. M. SoRelle, a real estate man of Los Angeles, California.



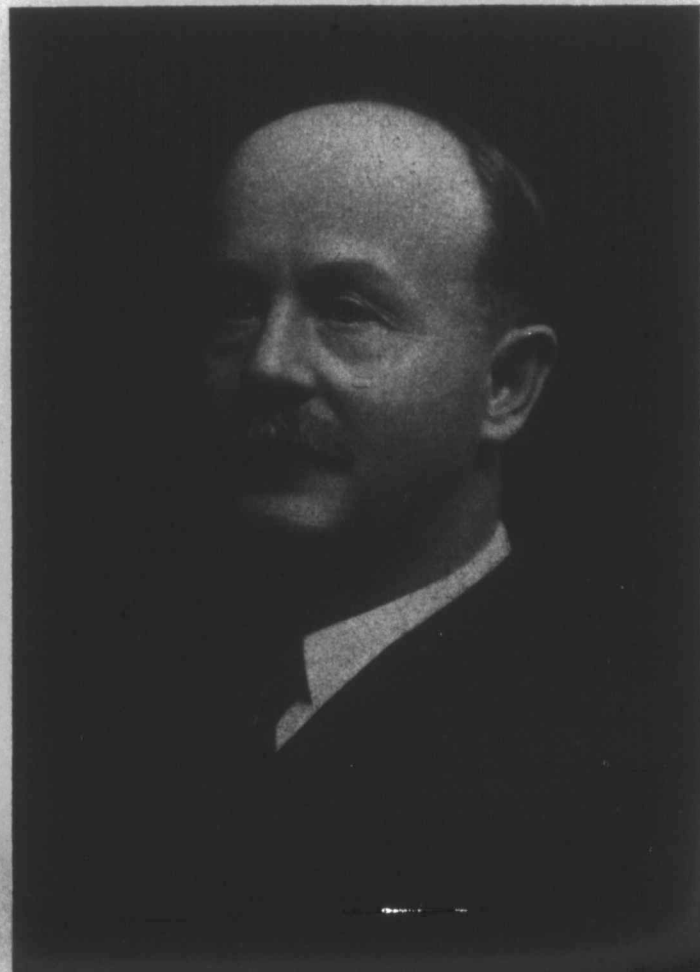
J. A. E. AUDET
Manager B. & A. Asbestos Co., Quebec.



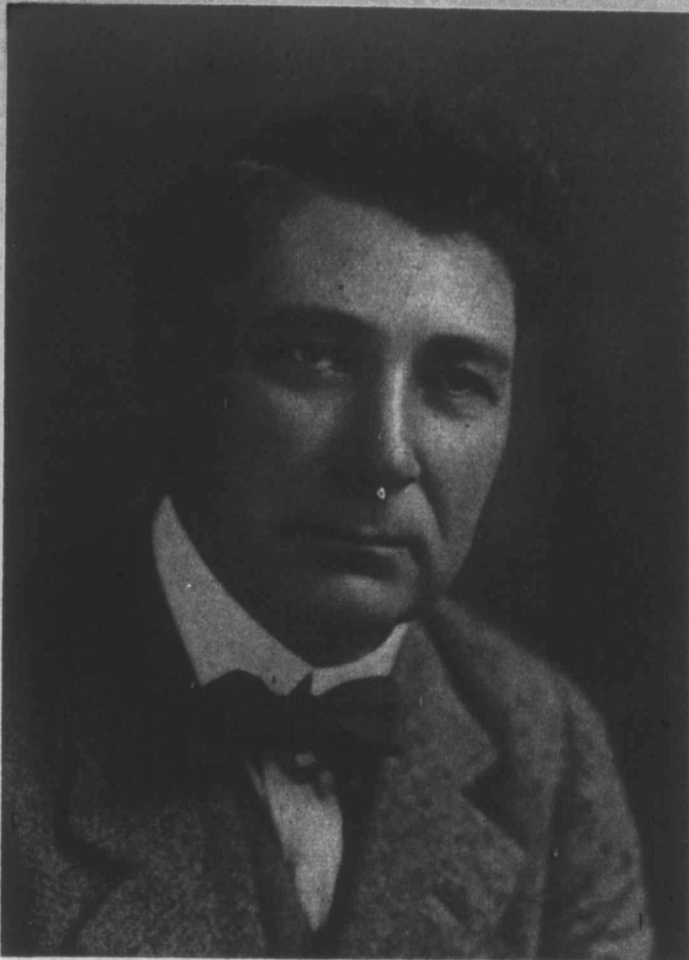
H. H. LAVERY
Superintendent St. Anthony Mine, Ontario.



OLIVER HALL
Superintendent of Mines, Mond Nickel Co.



C. V. CORLESS
Manager Mond Nickel Co., Ontario.



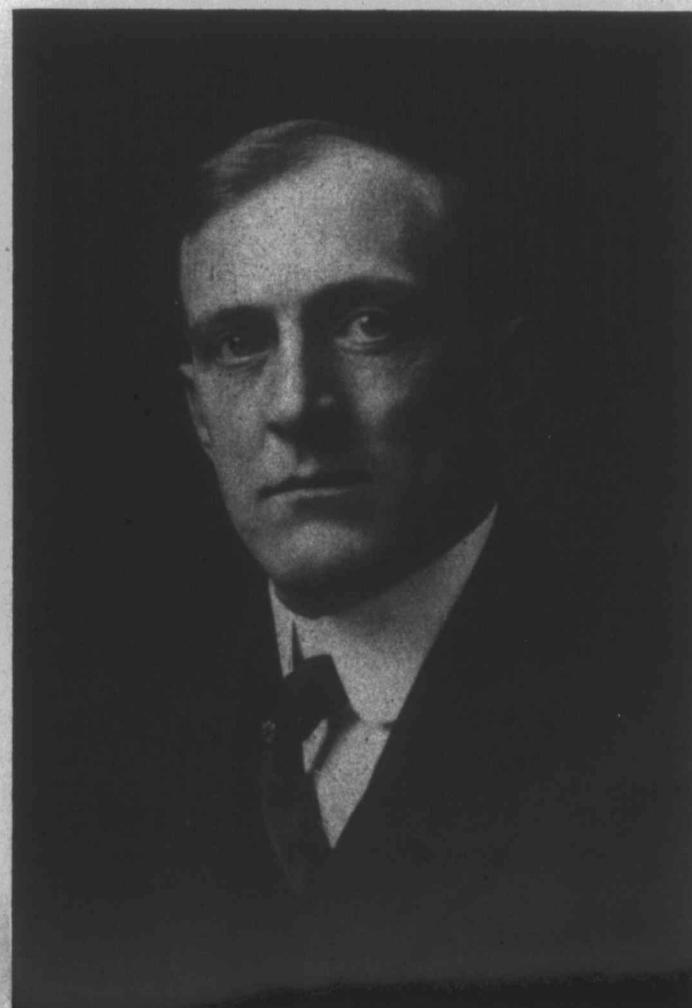
THOS. J. BROWN
General Superintendent N. S. Steel & Coal Co., Ltd.



HENRY C. CARLISLE
Superintendent Mandy Mining Co., Manitoba.



CHARLES SPEARMAN
Manager Renfrew Molybdenite Mines, Ontario.



W. A. WILLIAMS
Superintendent of Smelters, Granby Consolidated
Mining, Smelting & Power Co., B. C.

VOCATIONAL TRAINING FOR CRIPPLED SOLDIERS.*

By F. H. Sexton.

*A paper presented at the annual meeting Mining Society of Nova Scotia.

Every Canadian realizes that the problem of restoring our crippled soldiers to civilian life is one of the most serious tasks confronting the nations today. About 15,000 of these disabled men have come back broken in body and spirit and have been the means of stimulating the wisest provisions for their care, pensions, and employment that the country could develop.

The man who comes back from the front has been through experiences that make Dante's inferno seem like a Sunday school picnic. After the strain of war has been lifted from him, he is left like a man who has come through enormous nervous stress, or a heart-breaking sorrow. He is mentally sluggish and duller to sensation than he was normally. At first it was thought that he needed only a rest with incidental medical care and then he would be ready to take up his old tastes again. This treatment was sufficient for some, but it was soon found that the men deteriorated with idleness and inaction.

A comprehensive system of technical training was then developed, whereby every man in a convalescent home was given some classes for a certain number of hours per day, so that he would be kept occupied. The fact soon became apparent that the men were cured of their ills much more quickly if they were busy. It also became evident that many men could be so developed by vocational training that they would be prepared to go into civilian life better fitted to earn a living than they were before they enlisted. All of the technical education was made supplementary to the medical treatment of the men and was planned and carried out so that it would be as practical as possible.

At the present time classes are held in almost every convalescent home for four or five hours a day. In the district including Quebec, and the Maritime provinces, the following subjects are taught:

English, French, Arithmetic, preparation for civil service examination, Stenography, typewriting, Book-keeping, Mechanical Drawing, Electricity, Machine-tool Operating, Shoe Repairing, Woodworking, Motor Mechanics, Novelty Making, Poultry Raising and Market Gardening. In some cases special correspondence courses have been prepared for men who wished particular subjects which would be helpful to them and which could not be taught by the regular teachers.

In the sanatoria, where tubercular soldiers are treated, there are months of rest in the open air on verandahs, when the weather is not too severe, the men study, embroider, weave, and make baskets. When they have reached a certain point in their recovery they are allowed so many minutes of exercise every day, and go to the workshop and take up woodworking, sign painting, typewriting, motor mechanics and other studies. This is a new departure in the treatment of tuberculosis patients, because the method in most sanatoria has been that of complete rest with graduated exercise.

Many men have benefited themselves materially by vocational training during convalescence. Some have been able to take up positions of responsibility in their old line where they had been only ordinary workers before. A number have doubled their former wage earning capacity. Some soldiers have been able to

change from their former vocations, which they did not like, into more lucrative work into which they could put their whole heart.

Another portion of the vocational work which is more constructive is that which is called technically re-education. France and Belgium have carried this to a very high stage of perfection. In Canada we have followed their example. Any of our soldiers who returns with such wounds or disabilities that prevent him from following his old trade is a candidate for re-education in addition to his pension. He is guided into some calling for which he is fitted, given a thorough training for 6 months or a year free of charge and his dependents as well as he himself maintained at government expense.

This training is really necessary with a voluntary system of recruiting. Many men who had a good income enlisted in the rank and file. The pensions are awarded on the basis of physical disability, without reference to his earning power. Thus an engraver or barber with stiffened fingers from a wound might receive a pension of only \$10 or \$12 a month while he was totally prevented from following his old work. A coal miner with defective hearing might get only a small pension but could never go back to the working force again to ply his trade. The aim of the vocational re-education is always to train the man mentally so that he may be boosted into a higher position in the industry in which he was a worker, where his physical deficiencies do not detract from full earning power. No reduction is ever made in his pension by reason of any proficiency he may develop in his practical training.

Thus it is that the great instrument of technical education is employed to make reparation to the man who has suffered in fighting for the nation and the enlightened efforts are made to preserve each and every soldier as a self-respecting productive, independent citizen so that the great number of crippled men resulting from war shall not become whining, idle alms-mongers and pension hunters.

VAN-ROI MINING COMPANY, LTD.

The report of the directors of the Van-Roi Mining Company, Ltd., prepared for presentation at the eighth annual general meeting of shareholders, convened to be held in London, England, on April 12th, consisted largely of the following: "The directors herewith submit the audited accounts of the company for the year ended September 30th, 1916. After writing off £1,613 8s. 9d. as depreciation on machinery, plant, buildings, etc., the accounts show a balance to the debit of Profit and Loss of £3,367 5s. 1d., which added to the amount brought forward from last year, namely, £5,139 17s 8d., gives a debit balance of £8,507 2s 9d., to be carried forward. Since the last general meeting negotiations have been conducted with various parties with a view to dealing with the company's property. The directors are now able to report that as a result an option has been granted on the property in December last on terms which are regarded as satisfactory under the circumstances.

About the middle of April it was reported from Whitehorse, Southern Yukon, that there was much activity in connection with the shipment of copper ore from Whitehorse district, the Yukon Copper, Ltd., Grafters, War Eagle, Empress of India, and Valerie, having all been generous contributors to a considerable total output.

HERB LAKE AND FLIN-FLON.

The Pas, Man.—E. L. Murray, locator of the Moose Mine at Rice Lake, came into The Pas on Saturday, after an inspection of Herb Lake district. He is much pleased with what he saw in that mining region.

The mining men and prospectors at Herb Lake are sadly in need of proper postal facilities. A petition is being presented to the department at Ottawa to grant an office at that busy mining spot.

Jack Callinan, accompanied by Zar Crittenden and two others, arrived in town from Flin-Flon and Schist lakes on Monday night. The party had quite a difficult time in crossing the lakes, owing to the breaking up of the ice, especially at Reeder lake, where they were held up for a day. Jack says his difficulties at this point in the journey were equalled only by Washington when he crossed the Delaware. Callinan took train for Sudbury, Ont., Wednesday afternoon.

Henry McCafferty has about finished corduroying the road into the lake from the H. B. Ry. line.

Hugh Vickers and Rod. McLeod are doing their assessment work on several Herb Lake and Snow Lake claims, and are making some very good finds of gold at the former and silver at the latter lake.

Mike Hackett and J. R. Campbell have made a rich find of free gold on the Bingo group.

Rex mine shaft is down to eighty-five feet. Latest assays of samples, made about two weeks ago, show values of \$100 to \$110 to the ton.

Dog teams are being used to bring in freight to the Herb Lake mines, as the horse teams are slower and insufficient.—The Pas Herald.

LODE-MINING ON VANCOUVER ISLAND, B.C.

Mr. W. M. Brewer, of Victoria, B.C., in his paper on "Lode Mining Industry on Vancouver Island," read at the meeting of the Western Branch of the Canadian Mining Institute, in Vancouver, B.C., after mentioning that in 1898 there were on the island about 300 prospectors camped in the mountains and along tidewater from Sooke harbor to Quatsino sound, and that during the last 19 years he had examined most of the recorded mineral claims, stated that the metaliferous minerals of economic and commercial value occurring on the Island are gold, copper, silver (associated with copper), iron, and zinc, but only the three first-mentioned have been mined on a commercial scale. Gold-mining on the Island dates back to 1860, when placer-miners worked on Leech river; prospecting for other minerals appears to have been begun in 1896 or 1897. Free gold in quartz was found in Alberni and other divisions, but gold-quartz mining has never been a commercial success on the Island. Outcroppings of copper and iron ores, however, are numerous in several parts, often being closely associated, but in some cases the percentage of copper renders the magnetite useless for iron making, while the copper value is not sufficiently high to give the deposit commercial value as copper ore. Deposits of copper and magnetite are usually found on the west coast of the Island, this type of ore being more numerous than others. Notwithstanding, though, that geological conditions are favorable and many of the outcroppings of copper show the ore to be of high grade, these deposits have not yet been sufficiently developed to produce many commercially valuable mines. There are many dumps containing from a few up to a hundred tons of ore ranging from 4 to 10 per cent. copper, situated

within two or three miles from saltwater. Some of these properties are Crown-granted, but owners not having capital to continue development and provide tramway, bunker, and wharf shipping facilities, mining work has been suspended and purchasers of the properties are being awaited. During 1916, however, there was a distinct revival of interest in the copper-mining industry, and several properties have been reopened and are being operated in a way that promises commercial success.

With regard to magnetite deposits of the contact metamorphic type, they are apparently of considerable extent and are found at several places on the west coast of the Island roughly paralleling the coast line, and usually within a few miles of safe deep-water harbors. It is not intended to here join in discussion, such as recently had taken place, chiefly by laymen, many of whom have never seen and could not find any of the magnetite deposits just mentioned, as to the quantity of iron ore available for immediate shipment if a blast-furnace was built, but the subject of lode-mining would not be done justice to without reference being made to the considerable extent of these occurrences of magnetite. While the writer is not prepared to estimate the tonnage, except in a very rough way, he feels fully justified in expressing the opinion that so far as the quantity of magnetite ore available is concerned there need be no hesitancy in starting a local iron industry provided demand, cost of production, etc., are favorable. The development work done on the various deposits of magnetite has not been such as to determine available tonnage of ore, but only sufficient to enable owners to Crown-grant the mineral claims and await the day, which is bound to come sooner or later, when the iron-ore properties will be in demand.

Copper-ore deposits have heretofore been proved of most commercial value, the Tyee and other Mt. Sicker mines having previous to 1908 produced a grand total of approximately 250,000 tons of ore that averaged 5 per cent. copper, beside 3.5 oz. silver and \$3.50 gold to the ton. Recently the Tyee Copper Co.'s property was acquired by capitalists who are preparing to reopen the smelter at Ladysmith, after enlarging its smelting capacity, installing a copper converter plant, and making other improvements. It is stated, also, that it is proposed to again work the Tyee mine.

There are also the Sooke type of copper ore deposits, as distinguished from the Tyee type. On Mount Maguire, Sooke peninsula, there are several deposits on which development work has been done. From one of these, the Willow Grouse, various shipments of copper ore have been made during the last two years; some of this ore yielded as high as 11 per cent. copper, besides giving small value in gold and silver. This ore is chalcopyrite, with which iron pyrites is occasionally associated. The gangue material is chiefly hornblende. The deposit occurs in a shear zone, having a width of about 80 ft., in which there is an enriched shoot of high-grade chalcopyrite, from which the ore shipped was mined. This oreshoot filled a well-defined fissure in the shear zone, about 7 ft. wide and 150 ft. long. The lessees who since 1915 operated the property made little attempt to prospect beyond the boundaries of the ore shoot, but general conditions appear to be favorable and point to the possibility that by boring with a diamond drill other enriched ore shoots may be discovered as well as otherwise proving the mineralization of the shear zone.

SPECIAL CORRESPONDENCE

NORTHERN ONTARIO.

Gowganda.

It is understood that steps may be taken in the near future to improve the roadway between Gowganda and Elk Lake, which is the nearest point of railway to the Gowganda Camp. Recent developments in the district, notably that at the Miller-Lake O'Brien, where one of the largest silver deposits in the North Country has been developed, together with active operations on other properties has emphasized the great need of better transportation facilities. A number of the important operators in the district propose co-operating in macadamizing the road.

Temiskaming.

Exploration work at the 1600-foot level of the Temiskaming is being energetically carried forward with a view to the thorough exploration of the ground immediately below the contact and also in an endeavor to cut the vein encountered some time ago on the Beaver. The shaft will also be continued to the 1800-foot level, where extensive exploration work will be done.

Nipissing.

The annual report of the Nipissing Mining Company for the year 1916 showed the company to have made net profits of over \$2,000,000, and the ore reserves were estimated at over 9,000,000 ounces. This remarkable result was achieved in spite of the fact that supplies of all kinds have increased considerably in value, and higher wages have been paid the men in the employ of the company. The average price received for silver for the year was 65.661, compared with 49.684 for the preceding year. The cost of producing silver was 24.13c., compared with 19.06c., for 1915. More than \$193,000 was added to the cash surplus of the company, which now amounts to \$1,980,126. The company's insurance and war taxes cost \$111,000 more than in the preceding year. Developments underground were very satisfactory and new ore was opened up to replace all that was extracted from the mine, with the result that the ore reserves are slightly higher than they were at the close of 1915. The outlook for the coming year is considered very bright.

Kerr Lake.

Production at the Kerr Lake during the month of March was the highest for any month since last August, and resulted in the extraction of 219,335 ounces. It would not be surprising if the production for 1917 at the Kerr Lake surpassed that of the preceding year, when it is estimated 2,533,805 ounces of the precious metal was recovered.

Hollinger.

The deepest working at the Hollinger gold mine in Porcupine is 1,250 feet. Nearly fourteen miles of underground work has been done. Over 110 machines are working and 1,100 men are employed on the property. It requires nearly 5,000 horse power to drive the machinery at the mine. The milling capacity is now 1,800 tons per day and within a few months it will probably be between 3,600 and 3,800 tons. The ore reserves are estimated at over \$34,000,000. Owing to the increased cost of supplies and the inefficiency of labor at present employed, it is understood that the costs at the big mine have increased between 75 and 80 cents per ton of ore treated, over pre-war costs. Much energy is being concentrated on development underground to meet the anticipated increase in the amount of ore which will be required to keep the mill

operating to capacity when the new additions are completed.

Hollinger Reserve.

The shaft at the Hollinger Reserve mine in Ogden Township is being sunk from the 300 to the 400-foot level and results obtained to date are said to be very encouraging. The vein in the shaft at the present depth, which is a little over 300 feet, is the full width of the working and is said to contain considerable free gold. To date approximately 2,080 feet of development work has been done underground on the property and a substantial amount of ore has been indicated as well as a large quantity which has been placed on the dumps from development work. A first-class mining plant has been installed and from this time forward the property will be energetically developed. The installation of a small ball mill which was to have taken place this spring, has been postponed for the time being.

Rypan.

A company known as the Rypan Porcupine Mines Limited, is commencing operations on the property in Deloro Township. The claims of the company are located about a mile south of the Coniagas property and comprise 190 acres. The work done so far has been very gratifying, and until the present time has been financed privately. The country rock is Keewatin greenstone and shows a large schisted zone striking east and west, averaging about 150 feet in width. It is in this zone that several veins have been discovered. Quartz bodies parallel each other with the intervening schist, the fractures being filled with secondary quartz. This vein matter is more or less impregnated with iron and copper pyrites. Assays are said to have been encouraging.

Elliott-Kirkland.

A payment of \$25,000 was made on the Elliott-Kirkland property a short time ago at Haileybury by Frank L. Mapes and his associates at Rochester. The property has been quietly but very aggressively developed since it changed hands with the result that a small electrically driven plant has been installed and a shaft sunk to a depth of a little over 100 feet. When the 125-foot level is reached a crosscut will be run for the purpose of encountering the vein of the Kirkland Lake Gold, which it is expected will be located with little difficulty. Where the vein of the Kirkland Lake gold is expected to enter the Elliott-Kirkland property the ground is low and wet, which led to the sinking of the shaft on the high ground between 50 and 100 feet from the strike of the vein.

White Reserve.

The cross-cut on the 140-foot level of the White Reserve property at Elk Lake has already cut two veins, and at shaft 21, at a depth of 40 feet, considerable high-grade ore is in sight. The high-grade is being bagged and a small shipment will be made after the drying up of the roads. At present the snow is still four feet deep in the gullies and wooded areas. The White Reserve is equipped with a 9-drill compressor and two machines and a force of about 20 men are at present employed at the property.

Kowkash.

According to recent reports from the Tashota section of the Kowkash district on the Transcontinental railway, results of development work there during the past winter have proven very favorable, and it is expected that the coming summer will be an active one. About 100 feet of drifting has been done each way on

the vein at the Tash-Orn mine, from the 100-foot level. The vein is the full width of the drift and is said to contain very good values. The plant installed last fall is working smoothly and development work will be continued. A number of prospectors have remained on their holdings in this district all winter and test pits have been sunk on veins, which have been more or less encouraging.

Charlton Power Plant.

The Charlton and Englehart Light and Power Company's plant which help to generate the supply of power for the Kirkland Lake Camp has been taken over by the Northern Ontario Light & Power Company. The plant supplied Charlton and Englehart with light and power and also distributed a quantity to different mining enterprises in the vicinity, having a capacity of 1000 horse power. It will be a valuable acquisition to the already extensive equipment of the N. O. L. & P. Co., which is endeavoring to keep pace with the ever increasing demand for electric energy by the new mining districts of the North.

Hurd.

The Hurd property at Kirkland Lake, under option to the LaRose Mining Company of Cobalt, is being developed with all possible speed. The shaft has reached a depth of 100-feet and while the assays at this point are not so high as at the 60-foot level where free gold was encountered, they are said to be encouraging. The vein is the full width of the shaft and heavily mineralized. Diamond drilling will be commenced on the property at an early date.

Boston Creek.

The O'Donald claim at Boston Creek, which has been held under option for some time by interests closely associated with the Crown Reserve Mine at Cobalt, has reverted to the original owners. It is understood the conditions of the option were not fulfilled regarding the amount of work which was to have been done each month, and the owners notified the company that their option was at an end.

Murray-Mowbridge.

The initial plans for development at the Murray-Mowbridge property at Wolfe Lake, near Bourke's Siding, consist of the sinking of the shaft to the 300-foot level and doing lateral work at this depth. The plant has arrived at the property and is being installed. The old 50 foot shaft has been re-timbered and the work will be continued from this depth.

Kirkland Midas.

Last week a vein was uncovered on the Kirkland Midas Company's property at Kirkland Lake, where exploration work is being carried on. The vein was several feet in width and highly mineralized, although gold values are comparatively low.

Staking in Bisley Township.

About twenty claims have been staked in Bisley township, which is situated between Morrissette and Thackeray. Free gold is reported to have been discovered in Bisley, which led to the staking of the claims. While nothing spectacular has so far been reported, the new find is said to be worthy of attention.

New Find at Croesus.

Another high grade discovery is reported to have been made on the Croesus property in Munro township. The new discovery was made in the west crosscut at the 300-foot level. The vein was in evidence on the surface and while free gold was found in places the values were not consistent. However, at the 500-foot level the ore is said to be high grade, and while not in its free state, being associated with pyrites, it is said to be of much importance. Work on the new mill

is being prosecuted vigorously in an effort to have it completed by the end of the summer. A number of promising prospects in Munro Township and the Painkiller Lake district will see much activity this coming summer.

Silverado.

The mining plant for the Silverado Mine at Gowanda has been taken in and is being installed at the present time, with the intention of pursuing an aggressive development campaign on their property this coming summer. The taking in of the 110-ton boiler gave a good deal of trouble owing to the condition of the roads.

La Belle Kirkland.

The La Belle Kirkland mining company at Kirkland Lake have tested the property by diamond drilling and a contract for 5,000 feet has just been completed. It is understood the results proved so highly satisfactory that it is the intention of the company to let a similar contract immediately. The deepest hole attained a vertical depth of 700 feet, where the main vein was cut and values were found to be consistent with those encountered in the workings of the mine around the 300-foot level. A number of low grade veins of more or less importance were also encountered.

Refining Flotation Concentrates.

Mr. Holt of the Holt-Dern Furnace Co., of Salt Lake City, Utah, has been in the camp, making experimental tests in the refining of the product from the Oil Flotation process, which a large number of the Cobalt mines are now using. It has formerly been necessary for the mines to ship this product out of the country for refining, at a cost which was a serious drawback to the complete success of the method in Cobalt. It is understood that the experiments have proven successful and that there is a possibility that in the near future it may be possible to reduce the product to the bullion form in the camp. The Holt-Dern process consists of a chloridizing roast followed by a salt leach or cyanidation. It is a simple invention and may be operated economically. The experiments are being carried out at the Dominion Reduction and Buffalo mine.

Boston Creek.

The winze on the Boston Creek property in Boston township, has reached a depth of 400-feet, at which point several inches of high-grade and between four and five feet of good grade mill rock is showing in the working. The winze will be continued to deeper levels. The staff of forty-five men are now comfortably quartered in their new buildings. The office and other camp buildings are also completed. According to rumor there is a deal pending which may involve control of the Boston Creek mine.

Wright Claims.

A test shipment of iron pyrite ore was recently made from the Wright property at Bobs Lake, to Ottawa. The sample was taken over a width of 26 feet and 77.1 per cent. of the sulphur content was recovered. The Wright claims are in Whitney Township and consist of six forty-acre claims. Considerable exploration work in the form of tunnelling and open-cutting has been done.

Canadian Kirkland.

A large amount of stripping and trenching has been done on a number of veins on the Canadian Kirkland mining company's property, located a short distance south of the Teck-Hughes and Tough-Oakes in the Kirkland Lake district. Five promising veins have been uncovered and assays ranging from \$2 to \$20 have been obtained, while free gold is also said

to be showing in a number of places on the number four vein. It is on this vein that the test pits will be sunk. The work is under the direction of Mr. George Tough, who is managing director of the company.

National Mines.

The crosscut at the 400-foot level of the National Mines Co., Cobalt, has been carried to the old Silver Cliff property which adjoins it. A number of promising leads have been cut, which will be followed up at a later date. A new 5 x 20 ball mill is to be added to the equipment of the plant at an early date and it is expected that the oil flotation plant will be working to capacity by the first of June. A new classifier and a large sand pump have also been installed recently.

McKinley-Darragh.

If no delays are encountered the new flotation mill to treat the tailings from the McKinley-Darragh, should be in operation by the middle of August. Construction work on the new buildings was commenced last week. Underground work at the McKinley is proving very favorable. The main shaft has been completed to the 400-foot level and it is stated that the grade of ore being obtained on the lower levels of the mine is much higher than that on the upper. At some points the conglomerate, which took an unexpected dip, goes a considerable distance below this level and adds much to the possibilities of the mine. It is expected that the ore reserves of the mine will show a material increase by the end of the present year.

Kirkland Lake Gold.

It is reported that the grade of ore encountered in the main vein of the Kirkland Lake Gold at the 600-foot level is better than that found on any of the levels above. Sinking is being continued to the seven hundred foot level, and it is understood to be the intention of the company to install a hundred ton mill before many months.

McRae Porcupine.

A plant consisting of a 100-h.p. boiler, 3-drill compressor and hoist has been installed at the McRae Porcupine property and mining operations have been resumed with the intention of sinking the shaft to the 150-foot level and doing exploration work at this depth. Besides the large sulphide dyke, four parallel veins will be explored. The property is located in the eastern portion of the township of Deloro, about two miles from Tisdale.

Thompson-Vipond.

With the mill treating around 100 tons daily and heads averaging close to \$10 per ton, the Vipond-N. T. property is being rapidly developed. The main vein was encountered this week at the 600-foot level and was found to be about twenty feet in width, carrying values which compare very favorably with those of other levels of the mine. The management proposes drifting on the vein from the North Thompson side to a point directly under the old Vipond workings when the workings of the two properties will be connected at this depth, providing more efficient ventilation and ore transportation.

Hunton.

Development work will be commenced this week on the Hunton property at Kirkland Lake. The old shaft which is down to a depth of forty feet will be pumped out and work resumed from this depth. Considerable exploration work has been done on the surface of this property from time to time, and about three years ago,

some very spectacular ore was encountered. The company owns approximately 78 acres, which ties onto the Orr claims and is less than half a mile south of the McKane claim of the Kirkland Lake Gold. At the time the war broke out, the Hunton was under option to an English company, but work was discontinued and the option allowed to lapse. Where the vein was tapped at the forty foot level it was found to be lower grade than on the surface, but to have attained a width of three feet.

Dome.

The Dome Mines at Porcupine have been forced to curtail production, owing to the scarcity of labor throughout the North country. With the curtailment of the output of the big mine comes the announcement that the dividend will be cut in half. It is understood that the mill has only been running at about two-thirds capacity since early in April and the net profit has fallen below that required for dividend purposes.

The Wages Question.

The Annual District Convention of Miners assembled here this month did not serve to improve the outlook for a settlement of differences between the mine operators and their employees. As a matter of fact, it would now appear almost certain that the demand for increased wages will be pressed regardless of consequences. Officials of the Union have stated that the plan of procedure decided upon is to write the mine operators in the near future asking for a conference. The mine operators will be given ample time to reply, and if at the expiration of that time, no settlement is reached, further steps will be taken. It was the unanimous opinion of all the members present that individual strife or friction was to be avoided so long as any hope remained for a peaceable settlement. No provocative steps would be countenanced, and if, as a last resort, the mine workers have to make use of the only method at their command, the convention felt confident that the fault will not rest with the employees.

Not a few mine managers have openly stated they will not meet the committee of the Union in conference, and it is the consensus of opinion that they will not deviate from this attitude.

BRITISH COLUMBIA.

The earlier favorable outlook for an uninterrupted continuance of mining activity in the interior mining districts of the Province, is not being realized. On the other hand, the situation appears to be gradually becoming worse, with a prospect of a wages dispute between metalliferous miners and mine operators threatening. Men are leaving Rossland camp, where all mining operations are stated to have been suspended; some have gone to Camp Hedley, Similkameen; others to camps to the eastward of the Columbia river where it flows through West Kootenay, and numbers of others have crossed the International Boundary line on their way to active mining districts in the Northwestern States. So long as the Crow's Nest labor troubles shall remain not settled, the mines of Kootenay and Boundary must of necessity be adversely affected. Apart from this, though, there is trouble being stirred up by the Western Federation of Miners among the miners in West Kootenay.

WEST KOOTENAY.

Ainsworth.—Seven men are now working at the Cork-Provence mine, on the south fork of Kaslo river. It is intended to sink a double-compartment shaft, but

the work of cutting out a station for it has not yet been commenced.

The backward spring is adversely affecting development of mining properties up the South Fork. A report from the Index mine, higher up than the Cork-Province, is that the snow that far up the South Fork valley has not yet commenced to move, while each fresh snow storm piles up a further quantity of snow. No bad slides have yet come down to the wagon road.

Slocan.—Both mining and concentrating silver-lead-zinc ore has been resumed at the Galena Farm mine and mill near Silvertown, Slocan lake, and the prospects are believed to be good for a favorable summer run. There were reports lately of negotiations for the purchase of this property but nothing definite seems to have resulted as yet. The prospective purchasers are reported to be seeking to acquire neighboring mining properties before concluding negotiations for the purchase of the Galena Farm.

Trail.—Last month the Consolidated Mining and Smelting Company of Canada, Ltd., issued a statement to its employees, stated to number nearly 3000 in all at mines and smelting works, regarding the situation in connection with the demands made for an increase in wages. The statement follows:

Trail, B. C., April 17, 1917.

"To all Employees;

"During the past fortnight officials of District 6, Western Federation of Miners, have made demands on behalf of all our employees in District 6 for an increase of 50 cents per day, and also for the check-off system.

"In the past the policy of the company has been to treat with committees at each of our camps regardless of whether or not members of the committee belonged to a union.

"We have told the officials that this policy will be adhered to. We have said that we considered it impracticable for one committee to represent all of the camps, because no two camps work under the same or even similar conditions, and that therefore each camp should select its own committee, which we will be glad to meet at any time.

"In granting the War bonus effective after March 31st, we did more than our profits justify, but we shall welcome a discussion with your committee as to the fairness of our position.

"Mr. J. D. McNiven is here. He represented the Minister of Labor last year when the existing contracts were agreed on. His presence should be taken advantage of to bring about an amicable understanding.

"We sincerely hope that the long-time friendly relations may be continued, especially as our output of metals is so vitally necessary for our men at the front, who are risking everything for our protection."

It is reported in up-country newspapers that all the copper blast furnaces at Trail are inoperative, only the lead furnaces now being in blast. The electrolytic zinc department is still being operated.

BOUNDARY.

News from Phoenix is to the effect that on the evening of April 26th, the Granby Co's mines in that camp were closed for a period of from ten days to two weeks,

or until such time as coke shall begin to again reach the smelting works at Grand Forks.

The comment of the Grand Forks Gazette on April 28 was as follows: "The Granby Co's smelter in this city, which has been operating only three of its eight blast furnaces for the past week, will probably be forced to close the smelter early next week through lack of coke, occasioned by the continued strike of coal-miners in the Crow's Nest Pass. The mines at Phoenix are also temporarily closed. For the same reason the smelter at Trail and the mines at Rossland are now idle. Unsettled labor conditions in the coal mines have seriously interfered with the production of metalliferous minerals, through lack of coke for smelters, for nearly eight months. The outlook at present is not particularly encouraging."

YALE.

Nicola Valley.—The Donohue Mines Corporation recently installed on its property at Stump Lake, in Nicola district, a 30-ton concentrating mill, designed by Mr. Bernard T. de Ulrich, of Seattle, Washington, to treat complex ores of the Tubal Cain, King William, and Joshua mines, the ores of which contain copper, lead, zinc, silver and gold. A "balanced rod" mill is used for grinding and Monarch concentrators. The Joshua and King William mines are developed by shaft, that of the former being 400 ft. deep with levels each 100 feet; the Tubal Cain is opened by tunnel, following the vein for more than 300 feet. Some crude ore has been shipped to smelting works for a bulk test of its valuable contents. Quite recent reports are that concentrate has been made and is awaiting shipment, but for the time being the wagon road is not in good condition for heavy hauling between the mine and the railway. Mr. Frank M. Hawkes is manager of the company, and Mr. James McKieran, superintendent.

From another source it is learned that Dr. E. W. Bridgman, of Vancouver, B. C., one of the directors of the Donohue company, who was at the mine recently, on his return to Vancouver expressed himself as being well pleased with the new concentrating plant recently put in and now operating on the company's property.

Improvements continue to be made at the Diamond Vale No. 3 mine, near Merritt, the latest being a new tippie, which is being erected to facilitate the screening and handling of coal for the local market. The Merritt Collieries, Limited, the company operating the colliery, expected to have this tippie completed by the end of April. Hitherto this mine has only been able to supply mine-run coal to the local market, but hereafter it will be practicable to deliver lump coal as well.

MAGNITUDE OF SUDBURY NICKEL INDUSTRY.

The large bodies of nickel-copper ore in the Sudbury district are, all things considered, the most important and valuable of the mineral deposits yet found in Ontario. Their working requires more labor than the mines of any other branch of the industry. Their number and dimensions are such as to predicate a long life for the nickel business, and to fully warrant the large investments of capital which have been and are still being made for their equipment and operation. The profits realized by nickel mining companies of late years have been large, and were never larger than at the present moment.

MARKETS

SILVER PRICES.

		New York.	London.
		cents.	pence.
April	21	72 $\frac{7}{8}$	37
"	23	74 $\frac{3}{4}$	37 $\frac{1}{2}$
"	24	73 $\frac{1}{4}$	37 $\frac{1}{2}$
"	25	73 $\frac{1}{2}$	37 $\frac{1}{2}$
"	26	73 $\frac{1}{2}$	37 $\frac{1}{2}$
"	27	74 $\frac{1}{8}$	37 $\frac{5}{8}$
"	28	74	37 $\frac{1}{8}$
"	30	74 $\frac{3}{4}$	37 $\frac{1}{2}$
May	1	74 $\frac{3}{8}$	34 $\frac{3}{4}$
"	2	74 $\frac{5}{8}$	37 $\frac{7}{8}$
"	4	75 $\frac{1}{8}$	38 $\frac{1}{8}$
"	5	74 $\frac{7}{8}$	38
"	7	74 $\frac{3}{4}$	37 $\frac{1}{2}$

TORONTO MARKETS.

Cobalt oxide, black, \$1.05 per lb.
 Cobalt oxide, grey, \$1.15 per lb.
 Cobalt metal, \$1.25 to \$1.50 per lb.
 Cobalt anodes, \$1.50 to \$1.75 per lb.
 Nickel metal, 45 to 50 cents per lb.
 White arsenic, 5 $\frac{1}{2}$ to 6 cents per lb.

May 9, 1917—(Quotations from Canada Metal Co., Toronto)
 Spelter, 13 cents per lb.
 Lead, 12 $\frac{3}{4}$ cents per lb.
 Tin, 58 cents per lb.
 Antimony, 30 cents per lb.
 Copper, casting, 34 cents per lb.
 Electrolytic, 36 cents per lb.
 Ingot brass, yellow, 23 cents; red, 25 $\frac{1}{2}$ cents per lb.

May 9, 1917—(Quotations from Elias Rogers Co., Toronto)
 Coal, anthracite, \$9.50 per ton.
 Coal, bituminous, nominal, \$8.50.

NEW YORK MARKETS.

Connellsville Coke—
 Furnace, spot, \$7.25 to \$7.50.
 Furnace, contract, \$8.00.
 Foundry, spot, \$9.50 to \$10.50.
 Foundry, contract, \$8.50 to \$9.25.
 Straits tin, spot, f.o.b. nominal, 59.00 cents.

Copper—
 Prime Lake, nominal, 31.50 to 32.50 cents.
 Electrolytic, nominal, 32.00 to 33.00 cents.
 Casting, nominal, 29.50 to 30.00 cents.

Lead, Trust price, 9.50 cents.
 Lead, outside, nominal, 10.00 to 10.50 cents.
 Spelter, prompt western shipment, 9.30 to 9.42 $\frac{1}{2}$ cents.

Antimony—
 Chinese and Japanese, nominal, 24.00 to 25.00 cents.

Aluminum—nominal.
 No. 1 Virgin, 98-99 per cent., 59.00 to 61.00 cents.
 Pure, 98-99 per cent. remelt, 56.00 to 58.00 cents.
 No. 12 alloy remelt, 40.00 to 42.00 cents.
 Powdered aluminium, 85.00 to 90.00 cents.

STOCK QUOTATIONS.

As of close May 8th, 1917.

(By courtesy of J. P. Bickell & Co., Toronto.)

New York Curb.

	Bid.	Asked.
Boston and Montana	.64	.66
Butte-Detroit Copper	.37	.50
Canada Copper	1.75	1.87
Dome Extension	.16	.18
Hargraves	.11	.12

Inter. Petroleum	13.00	13.25
Kerr Lake	4.50	4.62
La Rose Con.	.43 $\frac{3}{4}$	.50
McIntyre	1.56 $\frac{1}{4}$	1.60
N. Amer. Pulp and Paper	4.75	5.00
Nipissing	7.25	7.50
Superstition	.28	.30
Temiskaming	.38	.40
Vipond	.38	.40

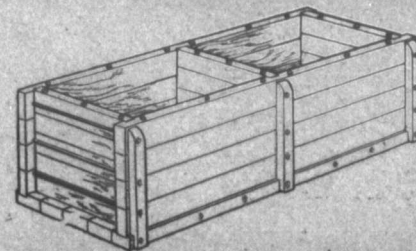
Ontario Gold Stocks.

	Bid.	Asked.
Apex	.06 $\frac{1}{4}$	.06 $\frac{1}{2}$
Boston Creek	.75	.79
Dome Extension	...	.16 $\frac{1}{4}$
Dome Lake	.17 $\frac{1}{2}$	.18 $\frac{1}{2}$
Dome Mines	12.75	13.00
Hollinger Cons.	4.65	4.70
McIntyre	1.54	1.55
Moneta	.11	.12 $\frac{1}{2}$
Newray	.75	.80
Porcupine Crown	...	.60
Porcupine Imperial	.03	.04
Vipond	.36	.39
Preston E. Dome	.04 $\frac{1}{4}$	.04 $\frac{1}{2}$
Schumacher	.41	.49 $\frac{1}{2}$
Teck Hughes	...	.50
West Dome	.20 $\frac{1}{4}$	.20 $\frac{1}{2}$
Thompson Krist	.11 $\frac{1}{2}$	.12 $\frac{1}{2}$

Cobalt.

	Bid.	Asked.
Adanac	.10	.15
Bailey	.03	.04
Beaver Cons.	.33 $\frac{1}{2}$	.36
Buffalo	...	1.40
Chambers-Ferland	.08 $\frac{3}{4}$	.10 $\frac{1}{2}$
Great Northern	.11	.11 $\frac{1}{2}$
Hargraves	.11 $\frac{1}{2}$	.11 $\frac{3}{4}$
Hudson Bay	35.00	...
Kerr Lake	4.40	...
La Rose	.45	.52
McKinley-Darragh-Savage	.51	.52
Nipissing	7.30	7.35
Peterson Lake	.09 $\frac{1}{4}$	.10
Shamrock Cons.	.20	.21
Temiskaming	.38 $\frac{1}{2}$.39
Trethewey	.11	.12
Wettlaufer	.05	.06

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