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Editor

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### WHY THE FICTION?

The Department of Trade and Commerce, Ottawa, reports that during the year ended March 31, 1916, there was exported to the United Kingdom nickel ore, matte, etc., containing 11,610,100 lbs. nickel, valued at \$1,779,801. What is the object in publishing such estimates of value? Is it not known that the figure is ridiculous? If the Department of Trade and Commerce does not know what nickel matte is worth why does it not make an effort to find out? Why does it publish figures which a reader might infer to be correct to the last dollar, when, as a matter of fact, even the number of millions of dollars is not given correctly?

The U. S. Department of Commerce, Washington, in reporting the imports and exports of nickel during 1915, estimates the value of the nickel in the matte at 13.5 cents per pound and the value of the refined nickel at 38 cents, thus giving the confident reader the idea that the 26,418,550 lbs. of nickel exported to Europe was worth \$10,038,514, while the matte imported from Canada, containing 56,352,582 lbs. of nickel, was worth only \$7,615,999. The U. S. officials are evidently as well informed as our own.

Why should Canadian officials seek to minimize the value of our exports? Do they do so knowingly, or do they publish figures which are to be taken as the result of dictation rather than investigation? Who is the dictator?

### TRADING WITH THE ENEMY

The blacklisting of firms controlled by Germans and doing business in neutral countries has naturally aroused considerable criticism, some of those firms listed claiming that they have been unjustly treated. The blacklist is also criticised by some who are not themselves affected, but who regard it as unjust discrimination against citizens of their country. How much of the opposition arises from pro-German propaganda and how much from the more considered judgment of friendly or neutral Americans we are unable to judge. We can only hope that the British and American governments will find time to give it the consideration that the problem deserves.

But there is a phase of this question that more directly affects Canadians, and among them Canadian mining men. How many Canadian companies are trading with houses which are controlled by firms that are on the British blacklist? Why are they doing so? Why does the Canadian Government not advise them that they should not do so?

It is no secret that such business is being carried on. There has been, unfortunately, no attempt to stop it.

Why not? Is it because we depend so much on the British Government that we are slow to take necessary measures ourselves? Is it fair to the Empire or to ourselves to allow traffic with friends of the enemy to be carried on under our noses until the overworked British officials find time to stop it?

### NICKEL PRODUCTION INCREASING

It is reported from New York that the International Nickel Company produced in the month of August 7,600,000 pounds of nickel. This is a great increase over any previous month.

During the year ending June 30, 1916, Canada exported to the United States 52,742 tons nickel-copper matte containing 64,622,286 pounds nickel, and worth about \$16,000,000. The value given in government records is \$8,596,921.

During the same period Canada exported a large quantity of nickel-copper matte to Wales. Figures are not yet available, but the nickel contents of matte shipped to both countries will total about 76,000,000 lbs., worth about \$19,000,000. In addition, the matte contained copper worth in the matte probably \$5,000,000. In other words, there was shipped during the year ended June 30, 1916, from the smelters in Ontario, matte worth about \$24,000,000. The metals in the matte when refined would be worth about \$40,000,000.

### U. S. CONSUMPTION OF NICKEL

In the year ending June 30th, 1916, the United States imported 56,987 tons ore and matte, containing 68,797,238 lbs. nickel. Of this 52,742 tons, containing 64,622,286 lbs. of nickel was from Canada, nearly if not all in the form of matte from the Canadian Copper Company's smelter at Copper Cliff, Ontario.

In the same year the United States exported 25,649,995 lbs. of nickel, nickel oxide and matte, nearly all of it being from the Ontario matte refined in New Jersey.

The U. S. Department of Commerce estimates the value of the 68,797,238 lbs. of nickel in the matte imported at \$9,520,750, and the value of the 25,649,995 lbs. of nickel exported at \$9,876,403.

The figures show that during the past year much less than one-half of the nickel imported was exported as nickel. Most of the nickel was, doubtless, used in the manufacture of nickel steel, of which a considerable part was exported. A further very large part was used in the United States. The figures showing the consumption of nickel steel are not yet available.

In view of the prominence given to consumption of nickel by Germany, it is interesting to note that the difference between U.S. imports and exports of nickel in the one year ending June 30, 1916, was greater than that of Germany for the period of fifteen years immediately preceding the war. As a market for Canadian nickel, the United States has no peer.

### U. S. IMPORTS OF NICKEL IN 1915.

The Bureau of Foreign and Domestic Commerce, Washington, reports imports of nickel in 1913, 1914 and 1915 as follows:—

1913—Nickel ore and matte .....	4,745 tons
Nickel contents .....	47,194,101 lbs.
Value .....	\$6,427,639
1914—Nickel ore and matte .....	29,564 tons.
Nickel contents .....	35,006,770 lbs.
Value .....	\$4,956,448
1915—Nickel ore and matte .....	45,798 tons.
Nickel contents .....	56,352,582 lbs.
Value .....	\$7,615,999

We have no reason to doubt the accuracy of the Bureau's figures in so far as they refer to quantity of nickel. The Bureau's estimate of value is, however, away off. 56,362,582 lbs. of nickel in matte would be worth at least \$14,000,000. Most of the nickel imported was contained in matte from the Canadian Copper Company's smelter at Copper Cliff, Ont.

Exports of nickel, nickel oxide and matte from the U. S. were as follows: 1913, 29,173,088 lbs.; 1914, 27,595,152 lbs.; 1915, 26,418,550 lbs. Thus while output of Canadian nickel has greatly increased, there has thus been little change in the amount of nickel exported from the United States. The records of export of nickel steel manufacturers would tell an interesting story.

### LOCATION OF THE NICKEL REFINERY.

It is announced that the International Nickel Co. is to begin the construction of a nickel refinery at Port Colborne, a site which is, as has been pointed out by Major R. W. Leonard, within long range gun fire of the international boundary. The site has many advantages; but it is strange that such a location has been permitted. The United States is rightly regarded by Canadians as a very friendly country; but that is no sufficient reason for establishing such an industry where it could be promptly wrecked at a time when most needed.

The war is being carried on at tremendous cost of life and money. Are we not even to profit by the lessons it has taught?

### A CORRECTION.

In commenting on the composition of natural gas we referred to the fact that Bulletin 42, U. S. Bureau of Mines, gives a number of analyses nearly all of which show ethane. By a typographical error "ethane" was printed "methane" on page 386 of our August 15 issue, thus nullifying earlier statements in the same paragraph.

### MOLYBDENUM.

The International Molybdenum Company has established at Renfrew, with a capacity of 100 tons per day. The company issues each month a list showing price paid per unit of molybdenite on different grades of ore. These prices will be quoted in The Canadian Mining Journal.

## CORRESPONDENCE

## THE COMPOSITION OF NATURAL GAS.

To the Editor of The Canadian Mining Journal,  
Toronto:

Sir,—I note your editorial in reference to my letter in Coal Age, and as my object is to obtain information I will ask you (1) to define the composition of natural dry gas; (2) the composition of wet gas; (3) the composition of the gas given off by heated crude oil; and (4) whether you consider that natural gas results from crude oil in the earth's crust, or from some other source; and lastly if the latter, then from what source it is created?

Yours, etc.,

JAMES ASHWORTH.

921 Drake St., Vancouver, B.C.,  
Aug. 29, 1916.

In reply to Mr. Ashworth's several questions we have to say that it is clearly impossible to "define the composition of natural 'dry' gas," as it is neither a definite chemical compound as, for instance, water, nor a mechanical mixture of different elements in constant proportions like the atmosphere. It consists of a mixture of several different gases in very widely varying percentages. Thus some reliable analyses are published showing practically no nitrogen, while on the other hand there is one instance on record of a natural gas containing 98 per cent. nitrogen. Part of the Kansas field, for example, yields a gas containing over 40 per cent. nitrogen, and there is no doubt if our information were more complete we would have instances of every per cent. of nitrogen between 0 and 100. Natural gases containing over 80 per cent. nitrogen are incombustible and of no commercial value. With the other constituents there are also great variations. Sometimes methane is present to over 99 per cent. in amount. In the list of analyses given of Ontario dry natural gases (XXIII Report, Bureau of Mines) the lowest methane is 67.8 per cent. and the highest 93.7 per cent. Ethane varies from 3.3 to 18.0 per cent., propane from 0 to 3.5, nitrogen from 2.8 to 15.8, while fractions of a per cent. of carbon dioxide and hydrogen sulphide appear in some cases. Of course a scrutiny of other lists of analyses would extend all these limits given above.

The same thing applies to "wet" gas—it is impossible to define its composition. In general we may say that the higher members of the paraffin series, such as ethane, propane and butane, which do not appear to exist in "dry" gas in large quantities, are increased at the expense of the methane.

With regard to the composition of the gas given off by heated crude oil, it may be stated that in the manufacture of carburetted water gas in which gas oil is used the average composition of the product is approximately as follows: Carbon dioxide 2.9, heavy hydrocarbons or olefines or illuminants 7.5, oxygen 0.2, carbon monoxide 32.5, methane 13.7, hydrogen 36.2 and nitrogen 7.0. If there had not been any oil used in making the carburetted water gas the result would have been about half hydrogen and half carbon monoxide with a small amount of nitrogen, oxygen, etc. It is seen then that the effect of the oil is apparently to introduce heavy hydrocarbons and methane. Heavy hydrocarbons, it may be remarked, are not found in natural gas. Gas oil is crude oil from which the more volatile constituents have been distilled.

Mr. Ashworth's fourth question as to the origin of natural gas we must confess we are unable to answer.

It would take immense space to discuss this. In the volumes of the Canadian Mining Institute will be found very interesting papers and discussions on this subject by Mr. Eugene Coste. It does not appear to us that any progress will be made in solving this question, as long as people are content to propound or accept some theory as to the origin of gas and neglect to find out what it is in our power to ascertain definitely, as for instance the correct composition of natural gas. It is for this reason that we will continue to protest against the acceptance and endless repetition of statements that are now known to be incorrect, such as were contained in the report which we criticized and which Mr. Ashworth defends.

## THE COAL DUST PROBLEM

Editor Canadian Mining Journal, Toronto:

Sir,—Referring to Mr. Jas. Ashworth's notes in your journal, Aug. 1, on the writer's paper on "Coal Dust" which was read at the meeting of the Rocky Mountain branch of the Canadian Mining Institute held at Lethbridge, Alta., in April, 1916, the writer heartily thanks Mr. Ashworth. His notes on the paper are very helpful, and it would have given the writer great pleasure to have had Mr. Ashworth take part in the discussion on the paper when it was presented at Lethbridge.

The writer will endeavor to reply to Mr. Ashworth's notes in the order in which they were presented in your esteemed journal of August 1, 1916.

1.—"Adopt the panel system." The writer did not think it was necessary to present any plans or diagrams on this part of the subject, as the panel system is well known and carried out to some extent in the mines of the Crow's Nest Pass. The advantages the writer claims for this method of work are the few inlets and outlets in each panel section, which assists very materially in isolating one panel section from another. There is a solid barrier of coal between each panel which is only perforated by the main and counter entries at the lower end, and there is also one inlet for the intake air and an outlet for the return air from each panel section. If any panel section becomes dusty with coal dust and it is not practicable to moisten the coal dust in the chutes below what is considered to be the point of explosibility, then it is, the writer considers, a decided advantage to be able to isolate such panel section by means of only three inert dust barriers, one on the outbye side of the intake airway off the main entry, one on the outbye side of the counter entry and another one on the upper side of the return airway from the panel section in question. By the above means inert dust barriers would be erected in all roadways leading from one panel section to another.

A mine may be divided into districts in accordance with the Mines Act, but that does not necessarily mean that each district would be a panel section. Separate districts have been and are arranged by simply installing an arrangement of stoppings between one district and another and splitting the air. Should an explosion occur the stoppings would not offer very much resistance to an explosive force, and consequently the explosion would penetrate to every part of the mine. Mr. Ashworth omitted to state whether any steps had been taken to prevent propagation of an explosion in the South Wales mine that had been divided into panels, also whether the panels were separated by means of solid barriers of coal between each panel or simply by means of stoppings.

2.—“Leave solid barriers of coal between lifts.” This had special reference to pitching seams and means that a solid barrier of coal should be left between each lift on the pitch, for the purpose of keeping each lift separate from another and so prevent the possibility of an explosion spreading from one lift to another.

3. The writer was much pleased to find that Mr. Ashworth agreed with the idea of a dip entry being driven for the intake airway. The advantages of this method are generally conceded, and it is being carried out at some of the mines in the Crow's Nest Pass at the present time.

4.—“The enlarging of crosscuts between chutes.” Mr. Ashworth is fully aware that most of the pitching coal seams in the Crow's Nest Pass range from 10 ft. to 15 ft. thick. The chutes, as a rule, are driven from 10 ft. to 14 ft. wide, and the full thickness of the seam thus giving an area of from 100 sq. ft. to 200 sq. ft. The crosscuts between the chutes are generally driven 6 ft. by 6 ft. to 8 ft. by 8 ft., giving areas of from 36 sq. ft. to 64 sq. ft. The writer claims that a volume of air from 25,000 cu. ft. per minute to 30,000 cu. ft. per minute is too large to put through areas of from 36 sq. ft. to 64 sq. ft.; the velocity of the air would be far too great for a dusty and gaseous mine. Such a velocity of air would raise and hold in suspension the coal dust and convey it to other parts of the mine, and where the air is carrying a fairly high percentage of methane would cause a very dangerous condition which should be avoided at all costs.

The writer fails to understand where the cost of making the area of the crosscuts equal to the area of the chutes and the building and maintenance of the stoppings would be prohibitive. It means that a few more tons of coal would have to be taken out of the crosscuts, a little increase of stopping material and a little longer time to build the stopping. Where the above extra cost is entailed in an effort to save life and property it would not be considered.

We require in the mines of the Crow's Nest Pass large airways and large and slow-moving volumes of air.

6.—“Do not allow the removal of large bodies of gas during the time the majority of the workmen are in the mine, whether or not the mine be dry and dusty.” The writer fails to understand that the provisions of the Mines Regulation Act, General Rule 8, B.C., does cover this suggestion, as stated by Mr. Ashworth. This section of the Act does not prohibit the removal of bodies of gas during the time the majority of the workmen are in the mine. If there is a body of gas in any one working place in any section of a mine, that place would be fenced off; but there is not anything in the Act that prohibits that body of gas being removed during the time the majority of the workmen are in the mine—hence the writer's suggestion on this point. Even if the Mines Act did cover the above suggestion, which, in the writer's opinion, it does not, he fails to understand that there is any harm done in reminding mining men of the danger of such a practice.

7.—“The installation of a water spraying system or, where that is not possible, the installation of inert dust barriers in all roads leading from the dry and dusty section to other sections of the mine.” Mr. Ashworth states that “the writer has shown in the body of his paper that this system is a positive impossibility in the icy cold mines in the Crow's Nest Pass at the time of the year when it is assumed that water in some form would be the most necessary.” The writer does not hold himself responsible for the

correctness or otherwise of Mr. Ashworth's construction of some parts of his paper. What the writer does say is that Mr. Ashworth is wrong in his assumption, as the writer is decidedly not of that opinion and certainly does not convey that meaning in the body of his paper. It is quite practicable and possible for the management of any mine in the Crow's Nest Pass to put in a water spraying system in the parts of the mines that are dusty with coal dust and operate them all the year round, especially in those mines that have adopted the dip entry and panel system. The main object of any spraying system is to moisten the coal dust adhering to the roof, floor and sides, chiefly in the chutes, below the point of explosibility. The temperature in these places, even in the very coldest weather, makes the water spraying system possible and practicable. The only objection to this system of spraying, in the writer's opinion, and one which Mr. Ashworth did not mention, is that the coal lying in the chutes is liable to become moistened or wet and when loaded into the mine cars and taken out of the mine would very likely freeze in the coal bunkers in the tippie. As the object of water spraying in mines that are dusty with coal dust is to protect life and property some plan would have to be devised to overcome the possible freezing of the wet coal in the bunkers. The writer also contends that if the coal dust in a coal mine is moistened below the point of explosibility it not only prevents the possibility of an explosion of coal dust, but it also prevents the suspension of coal dust in the air of the mine, and also from being carried by the air into other parts of the mine, especially where the mine air is carrying a high percentage of methane.

The writer fails to understand how the expressing of the relative humidity of the air entering and leaving these mines in percentages of humidity is misleading. It was the writer's intention to show in a short and striking manner the comparative amount of water carried out of the mines by the mine air in the winter time and the reason why the mines are more dry and dusty in the winter than in the spring and summer seasons. Without splitting hairs on this point it is generally known that the higher the temperature of the air the greater is its capacity to absorb or hold water, and that therefore if the temperature of the return air from any mine is high compared to the temperature of the intake air the amount of water carried out of the mine by the air is very great and the possibility of coal dust in the mine is certain.

For example, we will assume that 100,000 cu. ft. of air per minute enters a mine at a temperature of 35° Fahrenheit; the hygrometer shows a relative humidity of 50 per cent.; the amount of water carried into the mine by the air would be 2,026 gallons per minute, according to the tables given by the United States Bureau of Mines. Supposing the return air from the above intake showed a temperature of 55° Fahrenheit, taking Atkinson's formula the amount of air in the return would be 104,357 cu. ft. per minute; the hygrometer showed a relative humidity of 90 per cent.; the amount of water carried out of the mine would be 7,475 gallons per 100,000 cu. ft. of air. Deducting the amount of water carried into the mine by the intake air from the amount of water carried out of the mine by the return air the total amount of water carried out of the mine in 24 hours would be 8,188,416 gallons. The writer has not presented the above illustration for Mr. Ashworth's benefit, as he is already acquainted with it, but for the benefit of any reader who may be following up this subject.

The writer still maintains that inert dust barriers are designed and installed to try and prevent the propagation of an explosion of coal dust in a mine. He did not state in his paper that they will prevent the propagation of an explosion in any mine.

The writer does not agree with Mr. Ashworth's conclusion that "inert dust barriers" are so called preventatives against the extension of an explosion flame, from whatever cause it originates, and is designed to "make safe" the use of explosives in dusty, gaseous coal mines. The writer does not know of anyone making the above claim for "inert dust barriers," because anyone who would allow shot-firing in a gaseous, dusty mine, even though they used permitted explosives and were protected by inert dust barriers, would be guilty of a serious indiscretion and would expose the workmen and mine to very great danger.

The writer quite agrees with Mr. Ashworth that the gas commonly met with in the mines of the Crow's Nest Pass is not methane only. He has reason to believe that the gas often met with in these mines contains the mixtures mentioned by Mr. Ashworth. If that is the case that makes the conditions of the above mines more serious than he described in his paper.

The writer also heartily agrees with Mr. Ashworth's suggestions concerning main preventatives of explosions, except No. 3. He fails to see the particular danger of high pressure air pipes in these mines, as the parts of the mines in which they are generally installed are wet and almost invariably in the intake airway.

Yours, etc.,

W. SHAW,

District Inspector of Mines, Crow's Nest Pass and  
Pincher Creek Dist., Alberta.  
Blairmore, Alberta, Sept. 4, 1916.

#### NEWRAY.

Reports of the result of recent work at the Newray property, formerly known as the Rea mine and the Connell, indicate that an important discovery has been made. The Connell claim in 1910 appeared to have the makings of an important mine, the surface showing a strong vein carrying good values. A considerable quantity of gold, about \$125,000, was taken from this vein, but development work was disappointing, the orebody proving unexpectedly small. It was thought that further development would prove the existence of more ore shoots, but the work done did not disclose any.

The reorganised company has been more successful in its prospecting work, and if half the statements made concerning the new finds are true the Newray will yet prove to be the mine that the Rea promised to be.

#### KIRKLAND LAKE.

On the Kirkland Lake property, known as the McKane claim, important development work is being carried on. In crosscutting at the 300 ft. level a wide body of good ore was cut. Sinking is to be resumed to test this orebody at a lower depth. Mr. F. C. Culver regards the discovery as a most important one. If there is any considerable quantity of ore like that encountered at the 300 ft. level, the property will certainly be a very profitable one. Beaver Consolidated Mines has an option on the property, and it seems likely that the Beaver company has picked a good one.

#### HOLLINGER.

Hollinger Consolidated Gold Mines, Ltd., reports for the four weeks ending August 11, 1916, gross profits of \$220,357. Profits from operations Jan. 1 to Aug. 11 were \$1,697,423.

During the four weeks ending Aug. 11 there was hoisted 43,387 tons ore. The mill treated 43,355 tons, averaging \$9.61 per ton.

#### NIPISSING.

During the month of August the Nipissing mined ore of an estimated value of \$203,898, and shipped bullion from Nipissing and Customs ore of an estimated net value of \$226,341. The production compares with \$288,577 in July.

Development work on vein 490 at the fifth level was usually satisfactory. The vein in the north drift continued its course on the Nipissing side of the boundary line and also maintained its average width and assay. During most of the month two veins were in the face, having an aggregate width of six inches and assaying as high as 3,500 ounces and as low as a thousand ounces, the mean being about 2,200 ounces. At the end of the month the condition of the two veins continued to be satisfactory.

In the south drift results were good for the first part of the month, the veins aggregating 8 inches in width and assaying about a thousand ounces. During most of the month, however, the vein was too low grade to be treated. During this low grade period the vein has been from 8 to 21 inches wide. Drifting is still continuing. If no improvement in values is met with shortly, a raise will be started, partly for development and partly to obtain suitable ventilation on this level. After this has been attained, crosscutting and further development of vein 490 will be started. The ore shoot on this level is now over 400 ft. in length, with the north face still continuing satisfactory.

At shaft 80 most of the month's work was confined to exploration into hitherto undeveloped and favorable territory at the 315 and 380 ft. levels. This work is proceeding rapidly, but no veins have been encountered to date. At the 200 ft. level some tonnage was withdrawn from the old stopes and some active stoping was done on a branch vein.

At 81 shaft the Cobalt Lake fault was encountered at the 425 and 520 ft. levels, after crosscutting 159 and 232 ft. respectively. At both levels the condition of the fault is practically the same, it having a width of 12 in., contains some calcite, but assays only from four to six ounces in silver. Sixty-seven feet of drifting has since been done at the 425 ft. level and 50 ft. of drifting at the 520 ft. level, without any improvement in the condition of the vein.

At vein 102 some drifting was done at the 155 ft. level. Results from this work were not encouraging. The vein is now being further developed by two raises. Drifting has been started at the 90 ft. level, and better results are looked for. The vein at this level is small, but is usually of sufficient value to send to the low grade mill. A crosscut is also being driven at the 90 ft. level towards vein 96, which shows from one to two inches of ore assaying 2,000 ounces at the tunnel level.

About 90 tons of milling rock per day continue to be sent to the low grade mill from surface dumps at shafts 12, 86 and 127.

The high grade mill treated 152 tons and shipped 306,051 ounces of bullion.

The low grade mill treated 7,254 tons.

The following is an estimate of production for the month of August:

High grade, \$112,065; low grade, \$91,833; total, \$203,898.—Northern Miner.

#### THE THETFORD STRIKE.

The "Journal of Commerce," Montreal, says of the recent strike of employees of asbestos mining companies operating in Quebec::

"It is the general opinion here that the strike was a blunder from the start, as there appears to have been no dispute between the mine-owners and the main body of their employees on the question of wages, and the scale agreed upon in the conference of August 23 was the same which the employers had offered before the trouble, and which was to have gone into force on August 2nd. The whole trouble had its origin in a somewhat bitter rivalry between the local unions and a branch of the Western Federation of Miners recently started here.

"Previous to about a year ago the only labor organization in Thetford was a local one composed almost exclusively of French Catholics with the parish priest, the Rev. Father Proulx, as chaplain. Such a union could not very well include as members all the workers in the mines and an effort was made to organize those on the outside, with the result that a branch of the Western Federation of Miners was established. Within a short time thereafter the mine-owners made some adjustment in the rates paid to cobbers resulting in an increase in the wages of the female workers. The new branch of the International Union took to themselves the whole of the credit for this increase and used it for all it was worth to increase their membership. Early in 1916 the local French Catholic union asked for an increase in the wages of all the miners, which request was readily granted by the mine-owners, and the new scale went into effect on the first of last April. This gave the local union a prestige superior to that created by the claims of the International and the latter, not to be outdone, demanded a further advance of fifty cents a day and a recognition of their union by the mine-owners. The owners ignored these demands, but arranged to put into force on August 2nd a new scale of wages, comprehending a further increase of twenty-five cents a day, which was accepted by the French Catholic union.

"On August 2nd the members of the International struck and to avoid trouble which might result in injury to life and property, the members of the local union were advised to quit until the matter was settled and the mines and mills were consequently closed down. The strikers at once appealed to the Labor Department at Ottawa; but were advised that under section 56 of the Industrial Disputes Investigation Act it was illegal for any employee to go on strike "prior to or during a reference to a Board of Conciliation and Investigation," and that if they desired a recourse to this legislation they would have to go back to work and make application in the regular manner. It was further pointed out to them that their strike was illegal.

"From all accounts this was not the only obstacle the strikers encountered as a result of their hasty action. Their rank and file had been advised that they would not suffer during the strike as they would receive a substantial weekly allowance from the head office of

their union as strike pay. But instead of a remittance they were told that they were not entitled to and would not receive such assistance since they did not first obtain the consent of the strike committee of their union.

"They were thus in a hopeless position. They could not go back to work and apply for a Board of Conciliation and investigation under the provisions of the Industrial Disputes Investigation Act. They were not receiving strike pay, and every day they remained on strike they were liable to a heavy fine. As a result, many of their members left Thetford and sought work elsewhere.

"The leaders were very much chagrined and disappointed, and to prevent violence, restore peace and bring about a settlement the Governor-General in Council, under the provisions of the Inquiries Act R. S. C., Chapter 104 and Amendment 2 George V. chapter 28, appointed a Royal Commission in the person of C. E. A. Blanchet, barrister of Ottawa. Much credit is due to this gentleman, whose wisdom, good judgment and tact maintained the peace, secured the co-operation of all interested parties and brought about a satisfactory settlement without a single act of violence being committed or a dollar's worth of property destroyed. It is a splendid example of how much of the efficiency of any of our laws lies in the tactful administration of them.

"After being closed down for three weeks, all the mines here resumed operation on August 24, as a result of the settlement arrived at in a conference between Mr. C. A. E. Blanchet, Royal Commissioner appointed by the Governor-General in Council, Mr. J. A. Lane, advocate from Quebec City, representing the mine owners, and two representatives from the employees of each of the following mines:: Asbestos Corporation of Canada, Limited; Bells Asbestos Mines; Jacob's Asbestos Manufacturing Company; Johnston's Asbestos Company; Martin-Bennett Asbestos Mines.

#### SPOKANE EXCURSION TO WEST KOOTENAY, B.C.

Announcement was made in Spokane, Washington, on August 29, to the effect that the excursion to Nelson, British Columbia, which the Spokane Mining Men's Club has long planned to take place this autumn, has been arranged for September 29 to October 2. It is intended to leave Spokane on the morning of Friday, September 29, going by the Spokane International Railway to Yakh, B.C., on the Canadian Pacific Railway Co.'s Crowsnest line, and thence westward to Nelson, via Kootenay Landing. The return to Spokane will be made on October 2, by the Great Northern Railway Co.'s Spokane Falls and Northern railway south from Nelson via Northport to Spokane.

A joint meeting of the Spokane and Nelson Mining Men's Clubs will be held in Nelson. It is planned to afterward visit a number of mines near Nelson and in Ainsworth and Slocan districts. When at Northport on the way back to Spokane, a call will be made at the lead-smelting works there.

It was suggested that the Columbia (Spokane) Section of the American Institute of Mining Engineers and the Western Branch of the Canadian Mining Institute, should also meet at Nelson at the same time as the Mining Men's Clubs, but there is little likelihood of the latter falling in with such an arrangement, its autumn meeting having already been decided upon to be held at Trail and Rossland about the second or third week in October.

## MINERAL RESOURCES OF NEWFOUNDLAND

By P. W. Browne.

The recent discovery of copper in Little Bay by Mr. W. A. McKay has caused a sensation in local mining circles; and it will have a stimulating effect on the mining industry generally. Mr. McKay has just uncovered what promises to be one of the richest copper deposits in the country. Cross trenching to date shows a lode 300 ft. in width. The ore is chalcopyrite, and there is evidently a large body of it. An assay made by Mr. Davies, the Government Analyst, gives \$4.80 per ton of gold.

The McKay Company has started operations on the lode; and fifty men are already employed. The location of the mine is but 500 ft. from the waterside, with splendid shipping facilities. A large stream in the rear will provide the necessary power for operations; and a 200-ton concentrator will be installed presently.

This great find is near the location of the "Old Mine" at Little Bay, where operations went on from 1878 to the late 90's, when they were abandoned owing to the high cost of production. At least this was the plea set up by the manager. The "Trade Review" discussing the mining industry some days ago says, however: "There is no doubt in our mind that anyone who seeks for the prime cause in the abandonment of some of our good copper deposits will find it in the fact that they were in charge of representatives of capitalists who were working on salary, and they did not care whether they killed the goose that laid the golden egg' as long as they themselves had enough to live on and could get out of the country."

Time was when Newfoundland was rated among the five great copper producing countries of the world, but within recent years the copper industry has been almost a negligible quantity in our industrial activities.

Copper mining in Newfoundland began in 1864 at Tilt Cove, a small fishing village in Notre Dame Bay; and during the following fifteen years we exported copper ore to the value of \$1,572,154, and nickel ore worth \$32,740. For nearly half a century the output of the Tilt Cove Mine averaged about 50,000 tons of ore annually. Then there came the dwindling process. At present writing there is an indication of a revival of operations; and some 250 men are at work there. A concentration plant with a capacity of 200 tons daily is now being installed.

In 1875 another copper mine was opened at Bett's Cove, about twelve miles south of Tilt Cove. In four years the quantity of ore exported amounted to 122,556 tons, valued at \$2,982,863; and a St. John's journal makes the statement that Mr. Ellershausen, the lessee, is said to have made a scoop of \$300,000 in one year's operations. Bett's Cove, so old miners have informed the writer, was literally "bled to death."

In 1878 a very rich deposit was discovered at Little Bay, some miles to the south-west of Bett's Cove; and was worked very successfully till the late 90's. It is in this region—some 1,000 feet north of the "Old Mine"—that Mr. McKay has made the big find.

### Copper Production of Newfoundland.

It is estimated that these mines, during the years they were in operation, yielded \$20,000,000 worth of copper. Mr. Howley, Director of the Geological Survey, states: "Altogether the statistics of our copper mining up to date (1910) give a total output of 1,319,594 tons of ore, 78,015 tons of regulus, and 5,418 tons of ingot copper. The percentages of metallic copper

contained in these ores have varied considerably, running from 3 to 30 per cent. I cannot obtain an average, but taking it at about 10 per cent. the total yield should be in the vicinity of 140,000 tons of metallic copper."

Many deposits of copper have been found in Notre Dame Bay, on which spasmodic attempts at mining have been made, which are known to be promising propositions if there were people with sufficient capital and competency to develop them. Newfoundland has been unfortunately too often victimized by impetuous speculators, who secure claims without ever being able to develop them. Then we have had the conscienceless "expert" who has played the flimflam game so frequently that foreign investors have been fighting shy of mineral properties, fearing to meet the financial fate of the shareholders of the celebrated Workington Mine, where a manager had undertaken to "serve a rabbit pie without having first caught the rabbit."

Within easy radius of Little Bay (which is now looming so large in local mining circles) are some very good copper properties, "Burton's Pond," "South-west Arm," "Rabbitt's Arm," "Sunday Cove Island," and "Seal Bay." Some good showings have been located further south, in Bonavista, Trinity and Conception Bays; but the great metalliferous zone of the colony is undoubtedly Notre Dame Bay. Here we find an extensive development of the Lauzon series in which serpentines are predominant. The Geological Survey (very incomplete, unfortunately) estimates the serpentines: between Hare and Pistolet Bays, 230 square miles; north from Bonne Bay, 350; south from Hare Bay, 175; south from Bonne Bay, 150; south from Bay of Islands, 182; surrounding Notre Dame Bay and Gander Lake region, 3,700; Bay d'Est, 300 square miles.

These, however, must be regarded only as approximations, for Newfoundland has never had within recent years an organized geological survey. We have been treated to annual feasts of theories; but we have not, except in certain specific instances, got beyond the stage of the "likely" and the "possibly."

We have reaped rich harvests from our copper mines, it is true; but we have done little to protect them from the grasping proclivities of vandalistic speculators.

### Iron Ore.

Our chief mineral product during the decade is hematite iron, which exists in seemingly inexhaustible quantities at Bell Island, in Conception Bay, some ten miles from St. John's. The Dominion Iron and Steel and the Scotia Companies are operating extensively at Wabana, as the mining section is known. The Scotia began mining there in 1895, and in 1899 it sold part of its area to the Dominion Company for \$1,000,000. Both companies are operating now at full capacity, and the output for the year will, it is estimated, total 1,500,000 tons. The chief desideratum on the island at the moment is labor, which is likely to be abundant for the next three or four months owing to the shortage in the fisheries. During the fishing season it is difficult to secure the requisite supply of miners, as the returns from the fishery are usually more profitable than the wage offered by the mining companies.

Other iron properties exist in Conception Bay, at "Snow's Pond" and "Lower Island Cove," outcrops evidently of the Bell Island formation. It is rumored

that an American company will shortly undertake operations at Snow's Pond.

#### The Bell Island Iron Mines.

The famous deposit at Bell Island was discovered some twenty years ago more by accident than by design. It is regarded as one of the greatest iron properties known; and a former manager of the Steel plant in Sydney stated that "at the Bell Island mines the actual price of mining and putting the ore on the cars is less than the traditional contractor's price for the removal of earth; it is capable of being mined as cheap as dirt, and in making steel at Sydney the cost of freight on the assemblage of the raw materials there being: coal, nothing, as the smelters are built over coal beds; limestone, fifteen cents a ton; and ore, forty cents a ton—or fifty-five cents in all; the cost of assemblage is the lowest in the world, and represents a saving of \$2.45 a ton over the assemblage cost in Pittsburg, Pennsylvania."

Of course this statement was made whilst the iron was being worked on the surface; but the cost has increased very largely since then. Freights have advanced; labor is more costly, and the working of the submarine areas involves a large outlay in transportation to the shipping points. These are located about a mile distant, where huge pockets receive the ore, whence it is dumped into the ships by means of big steel traveling buckets on the endless return system operated by electricity generated on the spot.

The Scotia Company delivers the ore from Wabana at North Sydney, where it is loaded into cars and hauled over the company's own line to Sydney Mines, where the coal mines and coke ovens are located. Here the Newfoundland ore is converted into great steel ingots and these are carried to the company's rolling mills at Trenton, near New Glasgow, where the steel is converted into the commodities required by the trade. The ore from the D. I. & S. Co. is conveyed to Whitney Pier, and is there delivered to the Steel plant.

#### Iron Pyrites.

In the 90's large quantities of iron pyrites were shipped from Pilley's Island, in Notre Dame Bay, to the United States; and for some fifteen years the output of the mine averaged 35,000 annually. Pilley's Island is no longer operating, though valuable deposits of pyrites are known to exist there. The quality is all that can be desired, yielding about fifty-two per cent. of sulphur. The Pilley's Island property has had a very checkered career, as many other mining properties in Newfoundland have had during the last quarter of a century.

#### Incompetence and Inefficiency.

Discussing some of the abandoned propositions some time ago with an experienced and competent mining man, the writer asked him what cause must be assigned for the abandonment of some apparently very good commercial propositions. The answer was: "Incompetency and its handmaid, inefficiency." In explanation of this he stated that "the managers in certain instances knew absolutely nothing about mining along modern lines, and they were interested mainly in their monthly cheque." This, without doubt, accounts for the ill-favor of many mining ventures in Newfoundland.

#### Coal.

Though sixty-eight years have elapsed since coal was discovered on our west coast, coal-mining is still in *unbibus*. Jukes discovered a large seam on the south side of St. George's Bay in 1838, and from data obtained he estimated the extent of this small portion

of our "coal basin" at about 25 miles wide by 10 miles in length. Murray, in 1866, mapped out this region and calculated the area at 38 square miles, containing 54,720,000 chaldrons (approximately 80,000,000 tons). In 1873 Howley discovered another seam of coal at Robinson's Brook, in the same region, with a thickness of four feet. A third seam was discovered in the Grand Lake region, some forty miles from the mouth of the Humber.

Recently the Government obtained the services of an English expert, Prof. Dunstan, who made a "report"; but we have not yet gone beyond the theoretical stage, excepting in the Grand Lake region, where the Reid-Newfoundland Company operated a shaft some fifteen years ago. The coal mined by the company was used in their locomotives for a while, and it was found to be of good quality. Why the mining operations were abandoned history sayeth not.

#### Opportunities in Newfoundland.

Newfoundland offers attractive inducements to the mineral seeker; for in addition to coal, iron, copper and pyrites, nickel is known to exist. Antimony has been found in paying quantities at Moreton's Harbor, Notre Dame Bay; galena and lead at Argentic and Lamanche, in Placentia Bay; manganese in Conception Bay; and free gold in quartz veins has been found at Ming's Bight, north of Cape John, and at Sopp's Arm, in White Bay. Asbestos, barytes, gypsum, mica, petroleum, talc and brick clays have been located at various points; and the only thing needed to develop these items is capital. The colony offers a special inducement to copper producers; and the Government provides a bounty of 3½ per cent. for smelting, on a sum not to exceed \$50,000 for any one person or company annually for twenty years.

#### PIONEERS OF THE YUKON.

Dawson City, Aug. 7.—Klondike celebrates to-day her twentieth anniversary. With \$190,000,000 in gold to her credit she well may be proud. The honor of the magnificent yield goes chiefly to those indomitable spirits under whose auspices the day is being celebrated—the Yukon Pioneers. The trail they blazed and the foundations they laid in this realm were but preliminary to the erection of the permanent structure of a great commonwealth.

The task of the pioneers was performed nobly and unflinchingly. They came from all quarters of the globe, and only the most virile could have accomplished the feats they did. The pioneers are passing on, but their vigorous progeny takes up the task of empire building. New blood continues to come. Brawn, brain and capital combine in the Herculean task of conquering the wilderness and converting its latent wealth into assets of world importance.

The opening of surrounding territory, the gradual invasion of the entire northern zone from Hudson Bay to Bering Sea means the reclamation within no great stretch of time of an empire in the hinterland of the North American continent which will rival in wealth that of Siberia and Scandinavia and many a nation farther south.

The eyes of the world are turning this way, and when the fondest dreams of the most sanguine are realized may there remain evergreen in the memory of those who enjoy the accrued benefits and of all generations who may dwell in this favored land an appreciation of the invaluable work of those brave-hearted, indomitable heroes of Yukon's age of gold and romance—the pioneers.—Dawson Daily News.



## NEWFOUNDLAND COAL DEPOSITS

By J. W. McGrath.

In view of the fact that Newfoundland has barely averted the calamity of a coal famine, during the present winter, it should be the duty of the Government and the people to ascertain at the very earliest moment if the country really possesses coal in commercial quantities.

We have been getting supplies of coal from Sydney, C.B., for many years past, never once making a determined and practical effort of ourselves to develop those coal areas which geologists tell us exist within our country. We have gone on reading the story of our coal deposits for a century of years; we have been content in seeing tons of beautiful coal taken from seams from the west coast of the Island and placed on exhibition in our museum. As we pass along the line of railway, we see evidences of coal in many places; we know that in the Codroy Valley the farmers yoke up their teams in the winter time, when the rivers and ponds become frozen, and bring out all the coal they require for domestic use, for those several seams are exposed at the surface. Yet notwithstanding such positive proof of the country possessing vast deposits of coal, we came within a narrow margin of having all our industries closed down this winter for want of coal.

Our coal supplies from Sydney ran short, not because we had not the means to purchase same, but because there were no ships available to bring coal from Sydney. All this inconvenience and trouble could have been avoided, if in the past we had opened up our coal areas, and the large sums of money that we have been sending away year after year for coal supplies could have remained within the colony, to develop an industry which is certainly the greatest agency that any country can possess for its progress, advancement and civilization. It has been fully demonstrated for many years past, that Newfoundland possesses abundance of copper ore. Once our country stood sixth amongst the copper producing countries of the world. The iron mines at Bell Island are amongst the largest and most unique the world has ever known, and with the assured coal supplies which geologists and mining experts tell us we possess, Newfoundland should become the Lancashire of the New World.

Britain owes her supremacy and position as the greatest nation the world has ever known, as much to her coal and iron as to any other agency.

In a report upon the coal areas of Newfoundland, Mr. James P. Howley, F.G.S., says:—"As regards the existence of coal in Newfoundland, I would first ask the question: Why should there not be coal here? The same series of rocks which contain the chief coal deposits of the world are found here, on the western side of our Island in the Codroy Valley, St. George's Bay District, and on the Humber Valley. They contain in abundance, the self same species of fossil trees and shrubs that were shown to have produced coal seams elsewhere. Perfect examples of these are found embedded in the rocks in many places, and most beautiful impressions of the fossil leaves and rootlets are sometimes so abundant as to constitute thick beds of black carbonaceous earthy shale, or impure coal. Some of these beds are literally crowded with fossils. These fossil roots, stem and leaves, are the true index

to coal deposits; they contain the written "testimony of the rocks," holding their historic records. When properly interpreted they tell us the facts as related above. They may be likened to samples of the materials which go to constitute coal seams, which latter are the finished products. Would it not then be a peculiar circumstance should coal deposits not exist? Indeed it would be contrary to the order of nature, or the evident design of the Great Architect of the Universe, but nature makes no mistakes. The undeniable evidence of coal deposits upon investigation has proven that Newfoundland is no exception to the general rule.

"While it may not possess so much coal as other more favored countries, nor yet such extensive and large seams, it has nevertheless been clearly demonstrated that its coal deposits are of no mean order, and it now only requires the application of capital, enterprise and skilled labor to bring about a genuine coal industry in the country.

"We will now pass on to the consideration of our own coal deposits. To begin with, we have in Newfoundland three distinct and separate coal fields. The first is situated in the valley of the Codroy Rivers; the second, inland from the south shore of Bay St. George about ten miles from the sea shore or eight miles from the nearest point of the Reid Railway; whilst the third is on the Humber Valley between the Grand Lake and Sandy Lakes. There may be a few outlying patches elsewhere, but these will be too small to be of much economic importance.

"In the first field, that of the Codroys, but a small section of the coal measures, as the coal bearing portions of the great carboniferous series is called, occurs. Nevertheless, six seams of coal have been uncovered in this section and two of these are the largest yet come across in Newfoundland. One seam at its outcrop showed a thickness of 9½ feet of good clean coal, while another gave 15 feet in total thickness and averaged, so far as examined, 7½ feet. The other four are much smaller. All this coal is of excellent quality, and some of it was used in the locomotives of the Reid Railway, giving every satisfaction as a steam producer. The Messrs. Reid did some mining here, and took about 100 or 150 tons, but the seam decreased in thickness as they proceeded, and the mining was abandoned by them, for the time being. Unfortunately this little coal field was found to be cut off by a great fault or break in the strata, but a small segment of a basin being left, jammed up against the foot hills of the long range of mountains.

"In the second, or Bay St. George area, we have perhaps the most promising, though not the most extensive coal field in the Island. This has been traced in a longitudinal line from W. S. W. to E. N. E. five miles and may extend a few miles further. The best exposures of coal are near the western end of the trough on the Middle Barachois (Barrisway) River. Here it shows a width of about two miles. In the section exposed along the banks of the river there are 12 separate coal seams ranging from a few inches to over 5 feet in thickness. They all incline inland but come to the surface again further up stream, with an opposite inclination, i.e., pointing towards the coast. On Robinson's River, two miles further east,

three seams were uncovered, one of which, the Howley seam, gave a thickness of 4 ft. 2 in. good clean coal.

"Two and a half miles still further east on a tributary of the Robinson River, known as the Northern feeder, four seams were uncovered, one only of them of any importance. Although this was but 1 ft. 2 in. at its outcrop, it was found to increase in thickness when sunk upon for a short distance. This coal, though of such small dimensions, is of superior quality, being bright, clean, and fairly hard, but of a highly bituminous character. It was extremely free from sulphur or other deleterious substances, and should afford a first-class gas coal.

"What the full extent of this most promising coal field may be has never been ascertained. Owing to the fact that it was long held by private parties, no Government felt warranted to investigate it fully under the circumstances. Consequently, a boring drill has never been put upon it with a view to ascertaining its full extent and importance. We know, however, that at least two seams of over 4 ft. thick each, the Jukes and the Howley seams, are well worth working. The coal in them is of first-class quality, and they are so situated, more especially the Jukes, that a large portion of its coal contents could be removed by open quarry work. The only thing required to render this Bay St. George field accessible for profitable working is a short branch rail or tramway to connect it with the Reid system or with the sea coast.

"Together with the Jukes, Howley and Shears seams already referred to, and taking only into account seams of 1 ft. and upwards in thickness, the section contains the following:—

On Middle Barachois River—Murray Seam, 5 ft. 4 in.; Rocky Seam, 1 ft. 5 in.; Clay Seam, 1 ft. 8 in.; Slaty Seam, 1 ft. 4 in.; "18-inch" Seam, 1 ft. 6 in.; Jukes' Seam, 4 ft. 8 in.; Cleary Seam, 2 ft. 2 in.

On Robinson River—Howley Seam, 4 ft. 2 in.

On Northern Feeder—Shears Seam, 1 ft. 2 in.

"The aggregate thickness of all the seams in this trough is 27 ft., which would give about 25,000,000 or 26,000,000 tons for every square mile they may underlay. A small outlying trough on the north side of St. George's Bay contains a few thin seams of little consequence, though possibly there may be others there of larger dimensions and better quality. The third and decidedly most extensive coal field in the Island is that of the Humber or Grand Lake area. The latter lies nearly 100 miles in a straight line N. E. from the Bay St. George trough.

"This Grand Lake area has been the most difficult of all to explore. The country for many miles in every direction is so exceedingly flat, and covered with such a thick mantle of sand, gravel, and boulders, with scarcely an outcrop of the rock formation, as to render its thorough examination one of the most difficult geological problems, perhaps to be found in North America. Nevertheless, after the most careful survey of the territory and a close study of all the facts that could possibly be ascertained, aided by the extensive use of pick and shovel, and finally of the Calyx boring rod, we have learnt sufficient to place beyond question the existence of a large and most important coal field. How large and how important has yet to be determined.

"The work done to date in this region has revealed the existence of one narrow trough of coal measures, which has been traced 11 miles longitudinally, and from all appearances must continue 5 or 6 miles further. A few good sections were uncovered on the

south side of Grand Lake, about a mile from the shore. The first of these on Aldery Brook, exhibited fifteen seams of coal, doubled up almost in the form of the letter U.

"Most of the seams are quite small, but those over a foot in thickness are:—

	Ft.	In.
No. 1 Seam .....	1	6
No. 2 Seam .....	1	8
No. 3 Seam .....	2	0
No. 4 Seam .....	2	6
No. 5 Seam .....	3	0
No. 6 Seam .....	6	6

"The Reid Co. ran a drift along this latter seam for 150 ft., and took out over 100 tons of beautiful bright coal. This with perhaps 50 or 60 tons more from other seams close by, is still lying in the woods, crumbling under the influence of the weather.

"On Coal brook, one and half miles east of Aldery, the section exposed gave:—

	Ft.	In.
No. 1 Seam .....	1	0
No. 2 Seam .....	1	0
No. 3 Seam .....	1	4
No. 4 Seam .....	1	6
No. 5 Seam .....	2	4
No. 6 Seam .....	3	5

"The Messrs. Reid mined some 7,000 tons from the latter seam, and used it on their railway.

"On Kelvin Brook, two and a half miles eastward, and on the same line of strike, but a small section could be reached by pick and shovel, and here again nine seams were uncovered, three of which gave the following dimensions:—

	Ft.	In.
No. 1 Seam .....	2	6
No. 2 Seam .....	3	8
No. 3 Seam .....	6	2

"Three and three-quarters miles eastward of Kelvin Brook, close by the railway track and about a mile beyond Goose Brook, three seams were uncovered some years ago, and one of them was mined to some extent by the Messrs. Reid. After they had abandoned the enterprise, the Calyx boring drill was brought into requisition, and sixteen were put down near Goose Brook, resulting in the locating of a new trough of the Coal Measures, containing thirteen new coal seams. Most of these were again small, but omitting those already mentioned near Goose Brook, we have:—

	Ft.	In.
No. 1 Seam .....	3	0
No. 2 Seam .....	2	6
No. 3 Seam .....	1	0
No. 4 Seam .....	2	4
No. 5 Seam .....	1	0
No. 6 Seam .....	1	6
No. 7 Seam .....	4	4
No. 8 Seam .....	6	0

"I would merely add here that we do not yet know the full extent of any of those coal fields, and it may take many years, if ever, to find out all there is yet to be learned about them. I am quite convinced from what I have seen, that there is yet at least one other trough of coal measures nearer the Grand Lake, of

which we know nothing, as to its extent, and value, or of its coal contents.

"It has taken a long time to beat down the prejudice and remove the indifference displayed about our native coal deposits. Now that happily there seems to be a growing belief in their existence I hope it will not take quite so long to get things in motion.

"In further proof of the existence of coal in Newfoundland in large quantities and of good quality I give the following statements:—Mr. Hugh Fletcher, M.E., visited and inspected the Cleary Coal areas in Bay St. George. Speaking of the Juke's Seam, he says:—'The coal in this seam is bituminous, free from sulphur and of the very best quality.'

"Mr. A. D. Turnbull, M.E., who inspected the Cleary seam in 1910 says of the Juke's seam:—'The seam has been exposed for a length of 102 feet and averages four feet in thickness, the coal is excellent.'

"I append several assays of coal taken from different seams. These assays were made for the Newfoundland Government by William H. Fitton, F.G.S., F.S.Sc., M.E., England:

	From Coal Brook		From Kelvin Brook
	No. 3.	No. 4.	No. 1.
Moisture .....	9.93	5.02	8.44
Volatile Matter .....	24.01	31.25	28.54
Fixed Carbon .....	49.15	54.03	5.07
Ash .....	16.14	8.66	111.53
Sulphur .....	.77	1.04	1.42
Coke in closed vessel.	66.06	63.73	63.92

**From Bay St. George.**

	Clary Seam	Jukes Seam	Howley Seam	Shears Seam
	Moisture .....	3.548	3.036	2.784
Volatile Matter ..	30.897	30.344	29.784	33.12
Fixed Carbon ....	55.229	60.142	54.468	not given
Sulphur .....	3.946	1.963	3.047	0.44
Ash .....	6.380	4.515	10.430	3.16
	100.000	100.000	100.000	Coke 61.371

**From Aldery Brook. Grand Lake.**

	No. 2	No. 6	No. 7	No. 9	No. 15	No. 16	No. 17	No. 20
Moisture .....	10.22	5.80	10.77	13.71	15.78	5.83	4.32	7.41
Volatile Matter ..	24.39	31.44	16.55	26.83	30.30	33.62	16.84	30.73
Fixed Carbon ....	48.51	57.86	33.89	51.06	45.29	55.28	72.66	52.59
Ash .....	15.72	4.08	37.86	7.56	8.08	4.49	5.53	7.71
Sulphur. ....	1.16	.82	.93	.84	.55	.79	.85	.66
	100.000	100.000	100.000				100.000	100.000
Coke, closed vessel	65.39	62.76	72.68	59.56	33.92	60.56	78.84	61.85

**ACTIVITY IN ONTARIO GOLDFIELDS.**

In a review of activities in Ontario gold fields, Homer L. Gibson & Co. say:

The following properties, which were idle a year ago, are now being developed: Jupiter, McIntyre Extension, Success, Newray, Davidson, Dome Extension, West Dome, Premier, Anchorite, Maidens-McDonald, Augarita, and Chisholm Vet. In addition to the above it is probable that arrangements will be completed shortly for resumption of operations at the Apex, Foley-O'Brien, Little Pet, Platt Veteran, Perseverance, and other properties in scattered locations. This gives an indication of the increased interest now being manifested in the camp.

These operations have brought into being a largely increased demand for electrical power. The first installations of power plants by the Northern Canada Power Company, at their two plants at Sandy Falls and Waitan Falls, were thought to be ample for the needs of the camp for years to come, but the demand for power has been so imperative that many additions to the original plants have been necessary.

Surveys of new power sites have been made and plans for the installation of new units are now being considered. In order to conserve the water supply through the dry seasons, large storage dams have been built at different points on the head waters of the Mattagami River. By this method, and by the installation of new plants at several new sites, it is hoped that the demand can be accommodated.

In the Kirkland Lake district preparations are being made for the use of the electrical power which will probably reach the camp during November. Construction of the transmission line is now under way, and as the contractors will be penalized if completion is de-

doubtedly be made to have the "juice" into the camp by that date. Operations at Tough-Oakes are resulting satisfactorily from the standpoint of production and development. During July 3,700 tons of ore of an average value of \$23.80 were milled, resulting in a gross production of over \$80,000. Camp buildings are being erected at the Wright-Hargreaves in preparation for a programme of development during the winter months. Installation of the larger plant at the Lake Shore is about complete, and the mill at the Teck Hughes is ready to run. Developments at the McKane property of the Kirkland Lake Gold Mines, under option to the Beaver Consolidated, make it appear certain that operations will continue there, and lead to the hope that it will become an important producer. The operators are hopeful that a branch line of the T. & N. O. Railway will be constructed, but the advent of cheap power will to a certain extent obviate the necessity of such a line.

In the Boston Creek camp operations are going ahead steadily at the Kenzie claim and R. A. P. Syndicate workings, which are being handled jointly, so far as underground development is concerned. Some very good ore has been opened up in this working, and it is hoped that a little more development will justify the erection of a milling plant. Underground operations have been resumed at the Miller Independence. A shortage of water for the plant caused cessation of underground work some weeks ago, but it is thought that any further difficulty along this line will be avoided. Cross cutting for the vein will be continued. No. 2 vein is stated to be showing up very well in the work so far done, which has consisted of two test pits a few feet in depth. Considerable free gold and tellurides appear in the vein matter.

## THE LAKE SUPERIOR CORPORATION ANNUAL REPORT

The Lake Superior Corporation's report for the year ended June 30, 1916, shows that net earnings of the subsidiary companies amounted to \$3,503,471, from which has been deducted \$331,765 deficiency from the previous year, leaving \$3,171,705. No provision was made for dividends, the earnings being distributed as follows:

Interest on Bonds of Subsidiary Companies and Bank and other Advances, etc. . . . .	\$1,513,539.29
Amount written off in respect of Discount and Expenses of Securities sold, etc. . . . .	206,680.54
Amount set aside for Sinking Fund Payments, etc. . . . .	667,173.16
Appropriated set aside for Sinking Fund Payments, etc. . . . .	667,173.16
Appropriated for Reserves, Depreciation, Renewals, etc. . . . .	425,594.92
Carried forward by all Companies . . . . .	358,717.94

Mr. W. C. Franz reports on the operations of the subsidiary companies as follows:

### Algoma Central and Hudson Bay Railway Company.

A settlement of outstanding questions as between the Algoma Central & Hudson Bay Railway Company, the Algoma Central Terminals Limited and The Lake Superior Corporation has been arrived at which it is believed, will lead to a speedy discharge of the receivers of both the railway company and the terminals company. A bond-holders' committee, representing both railway and terminal bondholders, has been appointed, and in this committee has been vested the outstanding common stock of the railway company for the purpose of exercising all voting and other rights incidental thereto. Of the \$5,000,000 preferred shares issued to and held by the public, \$3,000,000 of a new substituted non-cumulative preference stock will be issued as fully paid to the bondholders' committee for distribution amongst the railway bondholders and terminal bondholders. The corporation are the holders of \$5,000,000 of common stock and subject to the voting trust referred to, will retain this holding intact and in addition will receive in satisfaction of the debt of \$318,800 a like amount of the railway company's second mortgage bonds. Monies representing the unexpended balance of the proceeds of the terminal bonds will be paid over to the bondholders' committee, for the benefit of the railway company in the development of its properties and otherwise. Both the terminal bondholders and the railway bondholders have made certain modifications and concessions as to the payment of their respective interest.

Through the increased activity of the Algoma Steel Corporation, and of the various industries at Sault Ste. Marie, the outlook is much better than it has been for some time. Whilst the railway company's report for the year is not yet to hand, it is understood that earnings, particularly from the steamship line, show a substantial increase.

### The Algoma Eastern Railway Company.

The earnings of this railway show an increase. During the year financial arrangements were made through which the railway has been equipped with additional rolling stock, necessitated through prospective additional traffic.

Patents have been received in respect of the entire land grant lands of the railway, aggregating nearly 700,000 acres. Every effort will be made to deal with

these lands as to bring about all possible benefits to the railway company, especially in a financial direction.

As will be seen from the balance sheet submitted the policy of reducing the bonded indebtedness of the Corporation has been followed as far as circumstances permitted. Directors regret that the revenue of The Lake Superior Corporation is not sufficient to permit of the payment of Interest other than on its First Mortgage Bonds. The Algoma Steel Corporation has undoubtedly strengthened its position, and in the disposition of its earnings has pursued a conservative policy, which will add value to the Steel Corporation as a whole, and consequently to The Lake Superior Corporation's interests therein.

One fact in connection with the Algoma Steel Corporation must be borne in mind, and it is that further finance is necessary in order to put the steel plant on a proper footing in reference to the manufacture of a much more diversified product. As was foreshadowed in the previous report, The Lake Superior Corporation must sooner or later be called upon to consider its present interest in the Steel Corporation in reference to the necessary development of the latter.

Mr. W. S. Stavert has retired from the Presidency, and from the Board, and does not seek re-election. Mr. John T. Terry has also retired from the Board. Mr. T. J. Kennedy, who was elected during the year in place of Mr. Terry, has also been compelled to resign through ill health. Mr. Thomas Gibson has joined the army, and his services in the meantime are not available.

### The Lake Superior Corporation.

Balance Sheet as at 30th June, 1916.

Assets.	
Investments and securities . . . . .	\$47,974,556.33
Real estate . . . . .	98,944.70
Balances due by Subsidiary Companies..	545,403.31
Mortgages held . . . . .	190,071.35
Cash in bank and on hand . . . . .	206,297.22
Cash in bank to meet unpaid interest coupons . . . . .	24,325.00
Funds in Trustees' hands representing proceeds of sale of investments . . . . .	136,356.16
Mineral lands . . . . .	45,978.29
Accrued interest on Algoma Steel Corporation purchase money bonds owned . . . . .	24,166.66
Accrued interest on Mortgages held . . . . .	2,827.70
Miscellaneous assets . . . . .	770.52
Office furniture and fixtures . . . . .	2,643.66
<b>Total Assets . . . . .</b>	<b>\$49,252,340.90</b>

Liabilities.	
Capital Stock, 400,000 shares of \$100 each . . . . .	\$40,000,000.00
First mortgage 5 per cent. bonds . . . . .	5,472,000.00
Income bonds . . . . .	3,000,000.00
Interest coupons unpaid . . . . .	25,900.00
Accrued interest on first mortgage bonds . . . . .	22,800.00
Miscellaneous accounts payable . . . . .	3,036.10
Allied companies voluntary relief association . . . . .	7,125.00
Reserve Account—for depreciation of investments . . . . .	710,953.28
Income Account—Balance at credit . . . . .	10,526.52

Contingent Liabilities—Bonds of Subsidiary Companies guaranteed by the Corporation of which there were issued and outstanding at 30th June, 1916:

Algoma Central & H. B. Ry. . . . .	\$10,080,000.00
Algoma Eastern Ry. Co. . . . .	2,500,000.00
Algoma Central Terminals Ltd. . . . .	4,999,526.66
Algoma Steel Corporation Ltd.—	
First and Refunding Bonds . . . . .	14,000,000.00
Three-year Notes . . . . .	2,432,500.00
<b>Total liabilities . . . . .</b>	<b>\$49,252,340.90</b>

The directors of the company for 1915-1916 were Herbert Coppell, New York; John S. Dale, New York; W. C. Franz, Sault Ste. Marie, Ont.; Thomas Gibson, Toronto; James Hanson, Sault Ste. Marie, Ont.; Frederick McOwen, Philadelphia, Pa.; Alex. Taylor, Toronto; Haryey J. Underhill, South Orange, N. J.; Walter K. Whigham, London, Eng.; A. H. Chitty, Sault Ste. Marie, Ont. The officers were as follows: W. K. Whigham, president; H. Coppell, W. C. Franz, and J. Hanson, vice-presidents; Alex. Taylor, secretary; J. Hanson, treasurer.

#### WAGES AT ROSSLAND AND TRAIL.

Increases in wages at British Columbia mines and smelters have been made during the summer. The wages will vary with the prices of copper and lead. Mr. J. D. McNiven, Vancouver representative of the Department of Labour, has made to full report in regard to the arrangements made in settlement of the disputes, and we reprint the following from the "Labour Gazette":—

The dispute at Trail arose as the result of an agitation in March last among the men employed at the smelter for an increase in wages, their claims being based on the increased cost of living, the high price of metals and the general advances which had been made at other smelters in the province and in the neighboring States. During April a committee from the union waited on the management of the smelter and submitted a wage scale and general agreement which provided for a cumulative increase in pay based in the price of silver and lead, a voluntary check-off and a three-year agreement with the union. The company did not accede to the union's proposal, but on May 1 announced an advance to all employees of 25 cents per day. This offer was submitted to a referendum vote of the union and was respected. Negotiations were continued further, but without result. On June 17, Mr. McNiven, by the Minister's instructions, visited Trail and assisted in bringing about a resumption of negotiations, and finally on June 27 the company submitted a proposal which on the referendum vote of the union was accepted, and which resulted in an increase in wages to all employees in and about the smelter of 40 cents per day. The number of men affected or provided for in the increase is given as 1,520, nearly one-third of whom were employed on the construction of new buildings and equipment. The text of the memorandum of the settlement is as follows:

"On and after July 1, there will be an increase of 15 cents per day to all men employed at or around the

smelter, so long as the Montreal price of lead remains at 8 cents or better, and the Montreal price of copper remains at 25 cents per pound or better; with our guarantee that this additional 15 cents per day will be paid for at least three months from the first of July, 1916, no matter what the current prices of lead and copper may be. We are able to do this through having sold our lead production to the Munitions Board for the first three months at a fixed price.

"This increased rate shall continue so long as lead remains above 8 cents, and copper above 25 cents.

"If and when after the first of October lead falls below 8 cents and copper below 25 cents, but lead is still above 7 cents and copper above 22 cents, the increase will be 10 cents per day instead of 15 cents per day.

"If and when after the first of October, 1916, lead falls below 7 cents and copper below 22 cents, but lead is still above 6 cents and copper above 18 cents, the increase shall be 5 cents per day instead of 15 cents per day.

"If and when the Montreal price of lead is below 6 cents and the Montreal price of copper is below 18 cents, the company reserves the right to revise the wage scale according to conditions prevailing at that time, having special regard to the prices current for necessaries at that time. So long, however, as the Montreal price of lead is 6 cents or better, and the Montreal price of copper is 18 cents or better, the company will pay a minimum wage of \$3 per day to all employees.

"Except as notified by this letter, the scale made effective on the first May, 1916, shall prevail."

Following the settlement of the smeltermen's dispute at Trail, Mr. McNiven proceeded to Rossland where the Rossland Miners' Union had made a demand upon the Consolidated Mining & Smelting Company and Le Roi No. 2, Limited, for a general increase in wages of 25 cents per day and an agreement to include the check-off covering a period of three years. After a number of conferences between the mine managers and a committee from the union, and several propositions and counter-propositions on both sides, the following arrangement was reached on July 16:

When the price of copper shall be below 16 cents per pound the scale of wages shall be the minimum scale.

"When the price of copper shall have been at or above 16 cents per pound for a period of one month, wages underground shall be advanced by 25 cents per day and wages on the surface shall be advanced 15 cents per day.

"When the price of copper shall have been at or above 18 cents per pound for a period of one month, wages underground shall be advanced by a further 25 cents or a total bonus of 50 cents per day, and wages on the surface shall be advanced 10 cents per day, or a total bonus of 25 cents per day.

"Should the price of copper advance to 25 cents per pound or over, and remain at 25 cents for one month or longer, at the next period when the copper reduces to below 18 cents per pound, the 50 cents bonus shall continue to men underground and 25 cents bonus shall continue to men on surface for a period equal to that in which the price of copper remained at 25 cents per pound or over, but should the price of copper reduce to below 16 cents per pound during the aforesaid period, the bonus paid to both underground and surface men shall be 25 cents above the minimum scale for the aforesaid period.

"This agreement shall date from January 1, 1916, and shall continue for a period of three years and thereafter until terminated by two months' notice on either side."

### SULLIVAN MINE, EAST KOOTENAY, B.C.

The Sullivan mine, in Fort Steele division of East Kootenay, British Columbia, has for several recent years been the largest producing lead mine in Canada. An idea of its importance can be obtained from a comparison of the lead production figures for 1915, as shown in the last Annual Report of the Minister of Mines for British Columbia. The total quantity of lead obtained from all the mines of the Province in 1915, was, according to the published official statistics, 46,503,590 lbs.; the proportion from the Sullivan mine was 26,320,307 lbs., or more than one-half. The Consolidated Mining & Smelting Co.'s annual report for the fiscal year ended September 30, 1914, gives the total output of ore from the Sullivan mine up to that date as having been 219,567 tons, containing 108,211,732 lbs. of lead and 2,126,148 ounces of silver, together making a gross value of \$5,244,634. The output from September 30, 1914, to the end of August, 1916, was approximately 112,000 tons of ore, shipments having this year been of zinc as well as lead ore.

The following account of the property, prepared by Mr. John D. Galloway, Assistant Mineralogist for British Columbia, has been taken from the recently issued Annual Report for 1915:

"The Sullivan mine, owned by the Consolidated Mining & Smelting Company of Canada, is situated about two miles and a half from the town of Kimberley. The present mine-workings and buildings are situated on the summit of a low rounded hill rising from Mark creek. The mine was staked in 1895, and in 1896 sold to a Spokane company, which operated it for a time, and later there was built the smelter at Marysville to treat the ore from it. This smelter was unsuccessful, primarily because the ore is not suitable to smelting by itself, but requires to be mixed with other ores and fluxes. In 1908 the smelter, after various remodellings and attempts to run, was finally closed, and in 1910 the mine and smelter sold to the Consolidated Mining & Smelting Company. This company has now practically dismantled the Marysville smelter and all the ore is sent to the company's smelting works at Trail. Since that time the mine has been worked steadily and has made continuous ore shipments.

"The production from the mine for the year 1915 was 44,084 tons, containing 474,253 oz. silver and 26,320,307 lb. lead. The average assay value is therefore about 30 per cent. lead and 10.75 oz. silver to the ton. And the gross value of the ore is about \$33 a ton.

"The oldest existing opening is a shaft with several levels, and from this, together with 'glory-holes' and open stopes, the first ore was extracted. The present main working-level is a tunnel which taps the shaft at 100 ft. below the collar. There is another level 100 ft. lower than this on which there are also extensive drifts and stopes, and from which the ore is hoisted to the upper tunnel and out that way. The last report of the Consolidated Company, for the fiscal year ended September 30th, 1915, gives the total footage of development-work done at the Sullivan mine as being 29,324 ft., or 5.55 miles. The following figures, from the same report, show the work done in that year: Drifting and crosscutting, 2,278.5 ft.; raising, 286 ft.; sinking, 26 ft.; total, 2,590.5 ft. Diamond-drilling, 3,838 ft.

"In June, 1915, a commencement was made to drive a long tunnel from a point on Mark creek about 700 ft. below the upper workings. This tunnel will be 8,000 to 9,000 ft. long and will eventually be the main working-level of the mine. This low-level tunnel was only decided on after extensive diamond-drilling, both from the upper

workings and from various points on the surface, had disclosed the existence of enormous ore reserves. The ore from the upper workings is at present taken down to ore-bins by an aerial tramway; these ore-bins are situated on Mark creek and a railway spur connects directly with them. The new tunnel is situated a short distance from these ore-bins and will have railway connections for handling the ore directly below it. This tunnel is, therefore, for the purpose of handling the ore more efficiently and reducing costs all round, and at the same time it will make possible the handling of a larger daily tonnage.

"An innovation in mining in the Province was the installation at this tunnel of a mucking-machine to do away with mucking by hand-shovelling. The machine is made by the Meyers-Whaley Company, of Knoxville, Tennessee, and is reported to be giving satisfactory service. It consists essentially of a shovel or dipper, very like that on a steam-shovel, but smaller, which is thrust forward into the muck, secures a load and throws it back on to a travelling belt, which elevates the muck and delivers it into a mine-car at the back of the machine. The shovel is very flexible and can be forced into the muck at different angles and from side to side of the tunnel. It consists really of two square box-like shells, the inner of which throws the muck back through the back end on to the belt after the shovel has been drawn out from the pile of muck. For convenience in operating two belts are used, one delivering the muck on to the other, and this latter one delivering into the mine-car which is run in under the discharging end of the belt. These belts run over the body of the machine, the operating mechanism being placed underneath. The whole machine is 30 ft. long, weighs 9½ tons, and is driven by a 12 h.p. direct-current motor situated within the machine. It is mounted on wheels and runs on the mine-track, and can be run in and out as desired by means of its own motor. One man operates the machine, and a sufficient supply of mine-cars to keep it going is ensured by having a double track in the tunnel. It is claimed that this machine will muck out in from-half an hour to an hour what would take two men with shovels a shift of eight hours to do. The obvious advantage of such a machine is that, where it is desirable to rush work on a tunnel, the quicker handling of the broken rock enables drilling at the face to be resumed more quickly, with a resulting increased speed of tunnel-driving.

"At the time of visiting the mine this lower tunnel was in 200 ft.; at the first it had gone through surface wash and sand, but was then in 'hard-pan' that was very hard and studded with boulders, which proved troublesome material to drive through, as it was too hard to pick and had to be drilled, but would not break well. Up to that time the mucking-machine had, therefore, not been given a trial of what it could do working on straight broken rock.

"This tunnel is 8 by 8 ft. in the clear and will be laid with a double-mine track throughout. It is driven below the foot-wall of the ore-body and at intervals crosscuts and raises will be put through to reach the ore-body. With the flat pitch of the vein this tunnel will give about 1,800 ft. of backs above it. When it is considered that the greatest depth attained on the vein as yet is not more than 250 ft., it can be realized what an immense reserve of possible ore this tunnel will open up. It is not known to what depth ore has been proven by means of diamond-drilling, but from the guarded utterances of the mine officials the writer is convinced that the ore reserves in the mine are very great.

"The ore-body, which is vein-like in form, pitches into the hill at an angle of 30 deg. The average stope width is perhaps 20 ft., but runs up to 60 and 80 ft. in many places. The ore is mined by the 'big-stope method,' in which the ore is broken down and left in the stope and the work advanced upward, always leaving in enough ore to enable the men to reach and drill the overhead face. Some ore and waste has to be drawn off as the work proceeds, and the balance is taken off from below when the stope is finished. Pillars are left in places to support the hanging-wall, and in others a cribbing of timber is built up and filled in with waste rock, which thus makes an artificial pillar. Occasionally, square-setting is used, but not as a rule.

"The ore is taken out of the main tunnel by an electric motor and cars and dumped into bins. From here it is fed through a jaw-crusher and on to a picking-belt. When first-class ore is going through, the pickers pick out waste and zinc ore and the galena is allowed to pass on to a bin. When second-class ore is going over the belt, galena and waste are picked out and the zinc passes on to a bin, from which it is run out to a zinc-dump, which already contains many thousands of tons of zinc ore. The galena is in each case run into bins, from which it feeds into the buckets of the Riblet aerial tramway. This tramway is of the usual type, with automatic feed and dump and requiring one man to attend to it. It is 4,000 ft. long, with a drop of 600 ft.

"The power plant for the mine, which is situated beside the railway ore-bins on Mark creek, consists of a 30-drill compressor and alternating-current and direct-current generators. It is run by water-power for part of the year and by steam during the winter months when the water is frozen.

"The 'vein' in the Sullivan mine has been described as a replacement ore-body by Dr. S. J. Schofield, of the Geological Survey of Canada. The following is a quotation from his report:—

"The deposit occurs in the Aldridge formation, which here strikes about north and south, with a dip of 10 to 60 deg. to the east. This formation consists of thin-bedded argillaceous quartzites and heavy-bedded, purer quartzites. The ore-body conforms in dip and strike with the quartzites and cannot be called a true fissure-vein, but a replacement deposit in which the sulphides replaced the fine-grained quartzites. The hanging-wall and foot-wall are not well defined and the ore grades gradually into the country-rock, except when the country-rock consists of thin-bedded slaty quartzites which are evidently difficult to replace. In the upper workings close folding later than the ore-deposition increases the real width of the ore. This was well shown in the glory-hole at the time of the writer's visit. On the 60 ft. level the dip of the ore-body in places approximates 25 deg. and on the 100 ft. level the dip increases to 70 deg., which is also the dip of the surrounding quartzites. As far as exploited, the maximum stope width is 120 ft. and the maximum stope length 325 ft. There are ten levels, the north level being 100 ft. below the surface and forming the entrance to the mine.

"The ore-body is arranged in distinct zones which grade imperceptibly into each other. The centre of the lode is occupied by a fine-grained mixture of galena and zinc-blende in which masses of purer galena occur in large lenses. It is these lenses that constitute the valuable ore-shoots in the mine. They occur either singly or as two parallel shoots separated by one of poorer grade. The gangue in this inner zone is absent, except for a few idiomorphic crystals of a pink manganese-bearing garnet. This inner zone gradually passes exteriorly into a fine-

grained mixture of pyrite, pyrrhotite, and zinc-blende, which contains as a gangue numerous crystals of an almost colourless garnet, with some grains of actinolite or possibly diopside. The sulphides gradually diminish in amount and finally give way, especially on the foot-wall, to a fine-grained chert which is present when the country-rock is a heavy-bedded purer quartzite, and is absent when a more argillaceous slaty member constitutes the wall-rock. No garnets or other gangue minerals were noted in this cherty zone. The chert gradually passes into the normal quartzite, in which, with one exception, all contact minerals, such as garnet, diopside, and actinolite, are absent.

"As mentioned, the ore-deposit as a whole is a conformable replacement of fine-grained argillaceous quartzites by fine-grained galena, zinc-blende, and iron sulphides. Replacement is very well shown in most parts of the deposit, since alternate banding of ore and quartzite is seen near the periphery of the ore-masses where the relative susceptibility to replacement of the laminae of the quartzite is different. Joining these favorable bands are numerous interlacing veinlets of sulphides which representing an intermediate stage in complete replacement of the quartzite. Examined microscopically, the sulphides appear to have entered between the quartz grains of the quartzite and then to have attacked the quartz itself. The sulphides, entering along the favourable laminae, replace the muscovite also. Evidently muscovite has been formed previous to the introduction of the sulphides."

It will be noted from this description that the galena occurs in the centre of the ore-body as large cores or lenses and containing a low percentage of zinc—5 to 10 per cent. Surrounding these galena-lenses are large bodies of zinc and pyrrhotite containing 15 to 30 per cent. of zinc and varying amounts of galena, from 20 per cent. down to none. This zinc-pyrrhotite zone either gradually fades away into unaltered wall-rock or in some cases stops at a well-defined wall. The quantity of this somewhat low-grade zinc ore is considerably greater than that of the galena ore. Much of the ore in the mine has a composition about as follows: Lead, 20 per cent.; zinc, 20 per cent.; iron, 20 per cent. It is evident that such an ore is unsuitable as feed for a lead blast-furnace owing to the high zinc content. Since the Consolidated Company acquired the mine, numerous tests have been made to concentrate this ore in such a way as to separate the lead and zinc and produce a concentrate of each of these minerals that could be profitably treated. Water and magnetic concentration tests of various kinds were tried, but these all proved unsuccessful. The main reason for this difficulty is that the mixture of galena, sphalerite, and pyrrhotite is generally so intimate and fine-grained as to be a microscopic intergrowth of crystals, and it has been found impossible to grind the ore fine enough to separate it into its component minerals. Further, the sphalerite and pyrrhotite are so nearly of the same specific gravity that it is impossible to so separate the pyrrhotite as to make a zinc concentrate of a marketable grade. After exhausting the possibilities of treating the ore by ordinary concentration treatments the company turned its attention to chemical and electrochemical methods of extracting the zinc from the ore, which would leave the residue with only lead and iron contents, together with all the silver value; this residue would then be suitable for the leadblast-furnaces.

After some preliminary experimenting the Consolidated Company entered into an agreement with French's Complex Ore Reduction Company, Limited, whereby a thorough testing of this latter company's zinc process on Sullivan ore was to be made. To this end an experimental

plant was erected at the smelting-works of the Consolidated Company at Trail, and a series of tests made under the supervision of Thomas French, son of Andrew Gordon French, the originator of the French ideas and patents. Apparently some amount of success was obtained in these experiments, as, although the agreement with the French Company was terminated, further experimental work was carried out along the same general principles, but with some modifications in details. This latter work was conducted by F. W. Guernsey, on the Consolidated staff, and under his direction the experimental plant, for some time, made a production of  $\frac{1}{2}$  ton of electrolytic spelter a day.

Having demonstrated that the process was satisfactory, the Consolidated Company in July, 1915, commenced the erection at Trail of a zinc plant designed to produce 25 to 35 tons of spelter a day. This plant is now in operation, and a contract for the entire output of this spelter has been made with the Imperial Munitions Board. This plant is designed solely to treat Sullivan ore, but may be extended later to treat custom zinc ores. The successful operation of this plant will mean a great deal to the Sullivan mine, as it will turn the vast reserves of zinciferous ores into actual instead of potential assets. By extracting the zinc from ore containing 20 per cent. zinc and 20 per cent. lead, not only the zinc is obtained, but the lead content is also made available, which opens up great possibilities for the future life of the Sullivan mine.

#### "SAFETY FIRST" AT GRANBY CO.'S MINES.

The following notice was several weeks ago posted at the Granby Consolidated M. S. and P. Co.'s Hidden Creek mine, near Anyox, Observatory Inlet, British Columbia:

"The heads of all departments have been working together with a view of putting into effect the best organized scheme possible for furthering the important work of the 'Safety First' movement, and it has been decided to appoint separate committees from the underground and surface men, respectively.

"With the object of getting all concerned—which means everybody in camp—interested and working together for 'Safety First,' these committees will only be appointed for a month, when new committees will be chosen in each of the departments named. In this way it is certain that all men interested in the movement, and who have at heart safer and better working conditions for themselves and their fellow employees, will sooner or later be on one or other committee, and be enabled to press forward improvements which come under their notice.

"It is earnestly hoped that any one seeing or knowing of any place at all dangerous and where conditions can be improved, will feel at perfect liberty to without delay to bring the matter to the notice of a member of the committee concerned, and every one in camp is assured that suggestions are eagerly sought, will be welcomed, will receive careful consideration, and, wherever practicable, will be at once carried out.

"The heads of all departments wish to impress upon everyone the fact that they fully realize that a suggestion coming from a man shows that his interest is in his work and the camp, and he may therefore feel sure that his suggestion will be appreciated, whether or not it be one that can be carried out."

The "Safety First" organization established in connection with the Hidden Creek mine has been inaugurated with the full sympathy and zealous co-operation

of the Granby Consolidated Co.'s resident mine superintendent, Mr. E. E. Campbell, and those in charge of the several departments under him. Meetings of both committees, underground and surface, have been held, and much has already been done to improve conditions and lessen working risks. In addition the mine surgeon has arranged to give instruction in "First Aid to the Injured" to four classes, each of ten men, the company finding text books free.

## DEVELOPMENT OF MANITOBA'S MINERAL RESOURCES

Writing in the "Winnipeg Telegram," Mr. Hay Stead, who accompanied Professors Wallace and DeLury on their recent visit to mineral discoveries north of The Pas, Manitoba, says in part:

acted. Men began to drift into the country, casually. For many years tales have been told of the mineral wealth of the north country. Long over a century ago Hearne came back to his employers on the shores of Hudson Bay with marvellous tales of wonderful mines to be found somewhere within the Arctic circle, near the river he names from his discovery, the Coppermine. To-day, an echo of that story of Hearne's comes to us in the reported Stefansson story of the discovery of immense copper deposits on one of those continent-like islands near the mouth of Hearne's river.

Ever since Hearne told his story, men have dreamt of such things, and, on occasion, the dreamers have and in a haphazard sort of way, following their vision with a newly stimulated faith.

These were a new type of men, equipped for the work, educated in the recognition of mineralized rock, familiar with what they sought, and where to seek it. They found what they had sought—gold, and gold in quantity, of a richness in the surface that promised great things for values in depth.

At Beaver Lake, just over the boundary in Saskatchewan, the first gold field of this northland was staked. Later, 150 miles further east, at Herb Lake, or Wekusko, as it is called on the maps, another discovery was made. Scattered finds were made throughout a district some twenty or thirty miles wide from north to south, and over a hundred and fifty miles from east to west, not only of gold, but of all manner of minerals, in traces and in rich quantity; copper, gold, silver, zinc, lead, sulphur, iron and molybdenum. Gold quartz is found at Herb Lake, Little Herb Lake, Island Lake, Cranberry Lake, Reed Lake and Athapapuskow Lake. Sulphide ores, containing gold and copper principally, but with silver, zinc, lead and iron, in various places in varying quantity, are found at Lakes Flin-Flon, Schist, Athapapuskow, Wolverine, Copper, Elbow, Armstrong, Piquitona, Mystic, Big Island, Little Herb, Cranberry and Sandy Lakes, and on the Pineroot River; molybdenite at Crow Duck Bay in Herb Lake, and Phantom Lake. Silver is reported from Nelson House; and a few weeks ago a party of prospectors left The Pas for Split Lake, where a find of silver on Fox River was announced. Bismuth, too, has been found on Athapapuskow Lake.

All these discoveries have been made practically within the past two years—by a handful of prospectors. Their paucity of numbers makes their accomplishment wonderful, though it is, of a necessity, only superficial; from a prospectors' point of view the country is in its infancy. Only the edges of the waterways have been touched. Capital and men are required for anything



like an adequate sounding of resources. Yet sufficient has been found to warrant large expenditures of money, and enormous sums have been offered and paid for single properties.

In the district there is already found, and proved, millions of dollars' worth of valuable ore, while yet the very fringe of it has been examined; and that scarcely examined in the strict sense of the word, but merely skimmed.

The knowledge possessed by the general public on the subject of the mineral resources of Northern Manitoba has, up to date, been somewhat nebulous. It has been confined largely to the suitability of the surface of the country for a railway right-of-way to Hudson Bay. Of the natural resources of that portion of our province the man on the street has known practically nothing; nor, indeed, has he cared very much.

It took outsiders to realize the value of the land thus slighted by the inhabitants. It took American capital and enterprise to develop the mining resources of the Cobalt and the Yukon—and of Sudbury, southern British Columbia, and many other fields of endeavor.

That is exactly what is happening in northern Manitoba to-day. Scarcely a week has gone past this summer that has not found some American mining engineer or scientist passing through The Pas on his way north to look into the resources of the wonderful country of which he has heard, the forerunner of the capitalists to whom he will report on the possibility of getting in on the ground floor. For two years now one big mining company from the other side has had constantly in this section of Manitoba its own expert mineralogist, testing, sampling, reporting, and taking options on all sorts of likely-looking properties. This company to-day has a diamond drill outfit working on one property on Schist Lake, where they have already proved, if report is reliable, the existence of \$8,000,000 worth of ore at the surface running as high as 30 per cent. copper, tons and tons of it.

All summer, there has been up in that country a mining engineer representing an Alaska company which operates one of the largest mines in the world, quietly looking around for something which might prove big enough to tempt his company into the northern Manitoba field.

Again, as the writer came out from the north, he met, on his way in, one of the foremost mineralogists of to-day, an American whose name is a household word among geologists the world over. He also was going to look over the field for some interest or interests unknown. Thus the mining field of northern Manitoba is gradually but surely being alienated from Canadian ownership.

For this, one cannot blame the prospector. The prospector is invariably a poor man; for when a prospector becomes rich he ceases to be a prospector. There is no exception to this rule. The prospector spends years of toil and thousands of dollars—which he has to earn by the sweat of his brow—in scraping the face of the country as it were, knocking off little corners of the scenery in his search, and when he has made a find, he is often totally unfitted for the specialized task of disposing of it to advantage. Is it any wonder, then, that he takes his reward wherever he can find it, and that, in almost every case, he accepts a sum far below the adequate price of his find?

In that northern country to-day there are opportunities untold for the investment of capital. The capital will assuredly be found; it is gradually being found already—south of the 49th parallel.

Northern Manitoba needs two things for its mining development, capital and prospectors; and the greater need of these two is prospectors. Given the prospectors, men of the right stamp, and the discoveries will be made. The country will be covered more thoroughly year by year. Only last fall, within a hundred miles of The Pas, within striking distance of railway traffic, a series of lakes was discovered by a member of the geological survey which had never been heard of before by any white man—traveller, trapper, trader or prospector.

And when the discoveries are made, capital will not be slow to follow. Whether that capital shall be American or Canadian or British depends on the degree of energy and enterprise, the willingness to see an opportunity and to seize it, of the respective nationalities.

The Americans are already in the field. They know the game thoroughly. They have been through it from prospect to shipping mine times without number. The fact that they are there, spending many thousands of dollars in development work, shows that they in their experience have faith in the possibilities of the country. It is a practical proof that the mineral wealth of New Manitoba has a wonderful promise, a promise that only awaits action to bring it to a glorious fruition.

#### HIGHER WAGES.

According to the Department of Labor, 10,980 employees in the mining industry and 4,154 in the metal trades were given increases during the second quarter of 1916.

On May 1 the Cobalt Mine Managers' Association voluntarily increased the wages of all underground workers by 25 cents a shift, and in addition declared they would give a bonus of 25 cents a shift to both underground and surface men, when the price of silver averages over 70 cents per oz. for the previous month. About 1,200 men were affected by the change.

On May 1 an increase of 5 cents per day was granted by the Nova Scotia Steel and Coal Company to 480 coal miners at Sydney Mines, N.S., and on June 1 a further increase of from 5 to 10 per cent. was granted by the same company to 1,600 coal miners and piermen, including those who had received the 5 per cent. increase on May 1.

On May 15 an advance of 20 and 25 cents per day and 8 per cent, on tonnage or kardage was granted to 1,000 coal miners at Stellarton, N.S., by the Acadia Coal Company, in accordance with the findings of a Board under the Industrial Disputes Investigation Act.

On June 1 an advance of 6 per cent was granted in the wages of the employees of the Dominion Steel Company, which affected about 6,700 coal miners and piermen at Glace Bay, N.S., and 4,000 steel workers at Sydney.

#### DELORO SMELTING & REFINING CO., LTD.

The business heretofore carried on by Deloro Mining and Reduction Company Limited has been transferred to Deloro Smelting and Refining Company Limited, under the same management and with the same officers. All contracts, agreements, and liabilities of Deloro Mining and Reduction Company Limited are assumed by Deloro Smelting and Refining Company Limited, and all debts due the former Company shall be payable to Deloro Smelting and Refining Company Limited, when due. S. B. Wright is general manager and F. A. Bapty, secretary.

### KOOTENAY GOLD EXPLORATION CO.

The Kootenay Gold Exploration Co. is the name of the organization that is operating the Granite-Poorman gold mines near Nelson, B.C. For several weeks the name of the Hardscrabble Gold Mining Co. had been used, the Hardscrabble being one of the mines of the group, but it was found that this name was too much like one already registered, so could not be accepted by the provincial registrar of joint stock companies. The organization of the new company was completed in Spokane, Washington, on August 29, with officers and directors as follows: President, H. I. Wilson, of Butte, Montana; vice-president, Andrew G. Larson, of Spokane, Washington; treasurer, John Maginnis, of Butte; secretary, R. A. Carnochan, of Spokane; other directors, T. B. Miller, of Helena, Montana, and W. E. Cullen and Roy C. Lammers, of Spokane.

The company's manager, F. H. Skeels, is reported to have said: During August we operated the 20-stamp mill about 25 days, and our gross income was \$11,000. The employees of the company number 42, and the net income for the month was about \$5,000. During the month the mill feed averaged in value \$15 to \$16 a ton; the ore came mainly from development work on the Hardscrabble vein in workings opened from the winze sunk by the men from whom we took over the property. The ore body shows an average width of 4 feet.

The water supply has of late proved inadequate for our power plant, as it has been found to do in past years during the three summer months, so we have been connected with the electric power company's system. This will enable us to push on with the work of unwatering the Poorman shaft, the water in which is now down to the first level, which leaves 200 ft. of workings to be unwatered before we can commence the crosscut from the Poorman to the Hardscrabble vein. The latter will be cut at a depth giving 300 ft. of backs. The Hardscrabble vein has been proved to extend for a long distance, but as yet an area of only about 100 ft. in length and depth has been stoped.

Crosscuts from the Poorman shaft will be extended to the ore shoot in the Poorman ledge, which rakes so strongly to the south that the upper one is only a short distance into it, while the lower one has not yet reached it. The old Poorman tunnel shows a continuous ore body for 1,100 feet.

It is our intention to eventually open the mine by a deep-level crosscut tunnel from which drifts will be run on the six veins that are known to traverse the property. Meanwhile we will be able to take advantage of much deadwork done by prior owners of the mines, which work has resulted in leaving the property in a condition requiring but little additional development to allow of profitable operation for several years.

When our present plan of development of the Hardscrabble and Poorman veins shall have been accomplished, we shall make changes in the stamp-mill adequate to deal with the ore conditions as disclosed at greater depth. This will undoubtedly include the installation of a flotation unit and making other provision to allow of from 100 to 150 tons of ore being handled daily in the mill.

### McKINLEY-DARRAGH.

It is said that the McKinley-Darragh is sampling the Cooke claims in Skead township.

### NICKEL REFINERY AT PORT COLBORNE.

We are advised that arrangements have been made for the construction of a nickel refinery at Port Colborne for the International Nickel Co. The work will be carried out by the Foundation Company, Ltd., of Montreal and New York.

### GIFFORD.

At the Gifford claim, Cobalt, a winze is being sunk on a vein carrying low silver values. Fifteen men are employed.

### APEX.

It is announced that 500,000 treasury shares of Apex Porcupine Mines, Ltd., will be offered to shareholders at 10 cents.

### U. S. IMPORTS OF NICKEL IN 1915-1916.

U. S. imports of nickel in the past three U. S. fiscal years were:

Year ending June 30th, 1914—36,420 tons ore and matte, containing 43,549,303 lbs. nickel.

Year ending June 30th, 1915—30,801 tons ore and matte, containing 37,995,019 lbs. nickel.

Year ending June 30th, 1916—56,987 tons ore and matte, containing 68,797,238 lbs. nickel.

### U. S. IMPORTS OF NICKEL.

Statistics compiled by the U. S. Bureau of Commerce show the following imports of nickel matte and ore during the fiscal year ended June 30, 1916:

From.	Gross Tons.	Nickel Contents, Pounds.	Values.
France .....	297	514,828	\$ 128,154
Canada .....	52,742	64,622,286	8,596,921
Peru .....	1	118	13
Australia .....	1,329	1,268,084	279,332
French Oceania ..	2,618	2,391,922	516,285

These comprise the entire imports for the year named.

### BRITISH-AMERICAN NICKEL.

The Toronto Globe says: In connection with the granting of a lease to the British-American Nickel Company for the development of power on the Wahnapitae River to be used in connection with their proposed smelting works, it appears that the plans have been filed with the Ontario Government department for consideration. The water powers are said to be comparatively small, and the development is put at 4,000 to 5,000 horsepower. The company at first, it is stated, wished the Hydro to develop, but the Government authorities could not see eye to eye with this as it would entail a considerable capital expenditure in the interests of a private corporation. This point of view is said to have been recognized by the company.

### LABOR INVESTIGATION AT COBALT.

By an order of the Privy Council of Canada, Messrs. E. Coatsworth, E. T. Corkill and Jos. Gibbons were recently appointed a Royal Commission to enquire into the nature and causes of the unrest in the mining industry in the Cobalt district. The commission has been holding sittings at Cobalt, all parties interested being invited to attend and present evidence bearing upon the subject. The commission will report to Hon. T. W. Crothers, Minister of Labor.

## PERSONAL AND GENERAL

Mr. W. E. Segsworth, Toronto, has been elected a member of the Institution of Mining and Metallurgy.

Mr. H. A. Kee, formerly mine superintendent at the Nipissing mine, Cobalt, is now in charge of the Kerr Lake mine.

Mr. P. B. McDonald has resigned from the editorial staff of Mining and Scientific Press.

Mr. J. C. Nichol, of the Canadian Copper Co., and W. W. Mein, of New York, visited the Dome mine recently.

Mr. W. Pellew-Harvey, of London, England, was in British Columbia last month, en route to Australia to examine mining property in that country. He was a resident in Vancouver for some years up till 1901, and was the head of one of the best known assaying firms in British Columbia in the late nineties.

Mr. T. A. Rickard, of San Francisco, California, editor of Mining and Scientific Press, has been spending several weeks in British Columbia, and has visited some of the larger mines and reduction works in Kootenay and Boundary districts and the Britannia mine and concentration plant on the coast.

Mr. W. F. Ferrier, of Toronto, and Prof. J. C. Gwilling, of Kingston, were in British Columbia recently, making investigations for the Dominion Government relative to certain minerals concerning the occurrence and development of which information is required. The former had a trying experience on Vancouver Island, for when on the way to visit some mining property owned by Mr. J. D. Pemberton, of Victoria, the latter, who was one of the party of three, died on the trail from heart disease.

The officials at the Granby Consolidated M. S. and P. Co.'s Hidden Creek mine, near Anyox, Observatory Inlet, British Columbia, are as follows: Mine superintendent, E. E. Campbell; assistant superintendent, J. Tuttle; mine engineer, F. E. Patton; mine foreman, J. Swanson; surface foreman, G. L. Fraser; accountant and timekeeper, W. S. Smith. These, with F. Newton, diamond drill, and C. C. Rhodes, are the general committee of the Safety First organization lately organized at the Hidden Creek mine. Mr. Rhodes is secretary of the committee.

Mr. Geo. T. Holloway, Chairman of the Ontario Nickel Commission, has returned to Canada and is now in Toronto.

Mr. Frank McMillan Stanton, of New York, died on Tuesday, September 12th.

Mr. T. W. Gibson visited Sudbury and Cobalt, with the Dominion's Royal Commission and has returned to Toronto.

Mr. Geo. Watkin Evans is making his first professional visit into the interior of Alaska since the gold rush of 1897.

Mr. J. W. D. Moodie, of Britannia Beach, near Vancouver, B.C., vice-president and general manager of the Britannia Mining and Smelting Co., was at Tacoma, Puget Sound, Washington, about the end of August.

Mr. W. J. Elmendorf, formerly of Victoria, but for some time past making Seattle, Washington, his headquarters, was in Nevada last month, and will shortly pay another visit to Alaska, going this time to the Copper River district.

Mr. O. B. Perry, of New York City, has gone to Dawson, Yukon, on one of his periodical visits to that part of Canada.

Mr. F. S. Norcross, Jun., of Copper Mountain, Similkameen, B.C., mining superintendent for the British Columbia Copper Co., has been visiting relatives in Michigan.

Mr. J. C. Nichol, superintendent of the Canadian Copper Co., Copper Cliff, and Mr. W. W. Mein, consulting engineer to the Dome mine, left this morning after a business trip to the Dome mine.

Messrs. Arthur Lakes, Jun., mining engineer, of Spokane, and F. R. Skeels, resident manager for the company that lately acquired the Granite-Poorman group of gold mines, situated near Nelson, B.C., recently motored from Spokane to Nelson by way of Rossland and Trail, making the trip in quick time, with only 11 hours and 18 minutes actual travelling time. The railway distance between Spokane and Nelson via Rossland is 202 miles, and the train time, if the journey could be made without the usual delay at Rossland, is 11 hours and 10 minutes, so that quick time was made by the motor party which included Messrs. Lakes and Skeels.

Mr. J. W. Boyle, of Dawson, Yukon, "a dredge king of the Klondike," manager of the Canadian Klondike Mining Co., was in London, England, last month. During his absence from the Yukon his son, J. W. Boyle, Jun., has been in charge of the company's gold-dredging operations on the Boyle concessions, Klondike River.

Prof. H. O. Hofman, of the Massachusetts Institute of Technology, has been visiting a number of lead-smelting works, including several in the Northwest.

Messrs. O. L. Holman and Oscar Pierson, of Spokane, Washington, on August 29, met in Nelson, B.C., Mr. R. D. Fetherstonhaugh, mining engineer, of Edmonton, Alberta, and there discussed with him matters connected with a placer-mining enterprise they are considering undertaking, on the upper Peace River, B.C.

Mr. Raleigh P. Trimble, of Portland, Oregon, who has been for several years actively identified with the development of mining properties on Rocher Dedoule mountain and neighboring parts of Omineca mining division of British Columbia, arrived in Seattle, Washington, at the end of August after having been in a hospital at Prince Rupert, B.C., suffering from an injury to one of his ankles.

Mr. Jules Labarthe, of Bradley, Bruff and Labarthe, metallurgical engineers, San Francisco, California, was in Spokane, Washington, on August 30, on his way from Kellogg, Coeur d'Alene district of Idaho, to Homestead, Oregon, Mr. Labarthe is engineer in charge of construction of the lead smeltery the Bunker Hill & Sullivan Mining Co. is building near Kellogg; for several years he was superintendent of the Consolidated Mining and Smelting Co.'s smelting works at Trail, British Columbia. He is reported to have stated in Spokane that good progress is being made with construction work at the site of the new works near Kellogg, grading and foundations being nearly completed. He expected that structural steel for the smeltery buildings would begin to arrive before the middle of September, providing the threatened railway strike did not take place.

### GOWGANDA.

It is reported that a very important strike has been made at the Miller Lake O'Brien property, Gowganda. This and the Millerette property are owned by M. J. O'Brien, owner of the O'Brien mine at Cobalt.

## SPECIAL CORRESPONDENCE

### BRITISH COLUMBIA

Ore receipts at the Consolidated Mining and Smelting Co.'s works at Trail were comparatively large during the period from July 21 to August 21, inclusive, having averaged 1,517 tons a day for the 31 days, which quantity compares with a daily average of 1,349 tons for six months ended June 30 last. The increase was due chiefly to the fact that shipments from the company's Sullivan mine, in East Kootenay, were larger, a record having been made in the week ended August 21 with a total of 4,070 tons for the seven days. Against that increase, though, there was a shortage from Slocan mines, also from mines in the State of Washington, while Ainsworth mines made somewhat larger shipments than in several other recent weeks, and those at Rossland kept their output at about the customary quantity. The quantity of ore reaching Boundary district smelting works is not made public, but it is believed that with the coke supply again up to the ordinary requirements of the reduction plants at Grand Forks and Greenwood, shipments of ore would be about normal.

#### East Kootenay.

In the summer of 1915 Mr. J. D. Galloway spent two weeks examining some of the mining properties situated in Fort Steele mining division of East Kootenay, but it was not until nearly a year afterward that the account of his visit was published. The following general notes have been abstracted from the recently-issued Annual Report of the Minister of Mines for 1915. After having mentioned his visit to "the Sullivan mine, the most important lead-zinc mine in British Columbia or Canada," Mr. Galloway continued:

"Other sections visited were Perry and Wild Horse creeks, and claims on Whitefish and other creeks tributary to St. Mary River. Only placer-mining is being done on Wild Horse creek, while on Perry creek, in addition to placer-mining, some very low-grade gold quartz veins, which have been known of for years, have recently again had attention turned to them.

"Copper deposits on the St. Mary River and tributaries have been known for some time, and on some of these a little development has been carried out. The most important are those on Whitefish creek, owned by the Evans Bros., and these were examined by the writer.

"This district was one of the first prospected and best known in the Interior of British Columbia, and hence no extended description is needed here. It is interesting to note that Wild Horse creek was about the first important gold-placer creek worked by the California miners in their northern stampede in the early sixties.

"Notes and reports on the Fort Steele Division may be found in many of the Annual Reports of B.C. Department of Mines. An exhaustive detail report by the Provincial Mineralogist was included in the Report for the year 1898. Dr. S. J. Scholfield, of the Geological Survey of Canada, spent several seasons in working up the geology and physiographic history of the Cranbrook Map-area, the results of his work being published as Memoir No. 76 of the Survey. This work includes a thorough description of the silver-lead-zinc deposits of the Fort Steele Mining Division, together with a full discussion of their probable origin and hints for future prospecting.

For many years past this division has produced a large proportion of the lead output of the Province, but this has come from only a few mines. At first the North Star and St. Eugene mines made practically the whole production, but now these properties are apparently about worked out, the former having been closed for some years, and the latter now making only an insignificant output. While these properties were declining, however, the Sullivan was being developed to such a point that it has since more than kept up the average annual output for the district.

"The yearly value in lead and silver of the ore produced from the Sullivan mine has, during each of the last three years, been more than \$1,000,000, and, as in the near future the zinc will also be recovered, which has not been done in the past, the annual value of ore production will soon be materially increased.

"The important coal-mines of the Crowsnest district are situated in the southern part of this division. Descriptions of these mines and details of production and development are fully recorded in each annual report of this department under the heading of 'coal.' The Report previously mentioned, for the year 1898, contains a description of the coalfields, their geological features and early development. In the report for this year, as in previous ones, the Mine Inspectors' reports on these coal-mines will be found near the end of the volume under the heading 'Coal-mining in British Columbia.' In a report on the coal resources of Canada, Vol. II. of the 'Coal Resources of the World,' prepared by Dr. D. B. Dowling for the Twelfth International Geological Congress, and issued by the Geological Survey of Canada, will be found an estimate of the coal potentialities, or probable reserves of coal, in this district.

"Memoir 69 of the Geological Survey of Canada, also by Dr. Dowling, which is entitled 'Coalfields of British Columbia,' is a compilation of all known reports on British Columbia coal.

"There are two important towns in the division—Cranbrook, which is a railway divisional point, the centre of a prosperous farming district, and near which logging camps and sawmills are operated on a fairly large scale; and Fernie, which is the centre of the coal-mining industry in the Crowsnest Pass.

"The Crowsnest branch of the Canadian Pacific railway runs through the district and now is such an important line as to be regarded as a main trunk line instead of a branch. The Kootenay Central railway from Golden, on the main line of the Canadian Pacific railway, joins the Crowsnest line at Colvalli, 20 miles east of Cranbrook, and links this section with the main transcontinental line of the Canadian Pacific railway.

"The town of Steele (formerly called Fort Steele) is the oldest town in the district and one of the oldest in the interior of the Province. It is not as important now as in former years, as it has been overshadowed and surpassed by its younger rival, Cranbrook, situated 12 miles to the southward and on the main Crowsnest branch of the Canadian Pacific railway.

"In 1915 the mineral production of this division was as follows: Ore shipped, 44,372 tons, yielding 481,258 oz. of silver and 26,582,050 lb. of lead, coal, exclusive of that made into coke, 459,081 long tons; coke, 240,421

long tons; and building materials to the value of \$7,000."

#### West Kootenay.

**Slocan**—Some time ago arrangements were made for a resumption of work at the Lucky Jim mine under the direction of Mr. A. G. Larson, of Spokane, Washington, who was appointed by the Supreme Court in order to obviate foreclosure at the suit of a mortgagee. The following progress review was lately published in Spokane:

The July report of A. G. Larson, receiver of the Lucky Jim, has been filed with the registrar of the Supreme Court of British Columbia; it sets forth that during July 1,230 tons of ore was treated at the Rosebery mill. Two hundred and fifty tons of concentrate was produced.

Owing to the grade of concentrate, only 60 tons was marketed. One hundred and seventy-five tons of concentrate, being below the grade of zinc and too high in iron to answer smelter requirements, will be re-treated before marketing. The remaining 15 tons of concentrate was of marketable grade and was carried over to August shipments.

In addition to shipment of concentrate, some 160 tons of crude ore was sent to the smelter. On account of the increase of lead in the mill ore, a considerable quantity of middling was stored. Some middling was transferred to the Kaslo plant, as the necessary repairs to the magnetic separator will be completed shortly and this middling will then be treated in it. Detailed report as to the product and its analysis will be submitted later after a test has been made. The receiver stated it was expected to make a small tonnage of lead concentrate in August from ore already broken.

Under the present milling performance only 50 per cent. of the zinc content of the mill ore was saved in the form of a marketable product, and the ore shipped contained a high lime content. These reasons, the receiver states, made it advisable to limit the production to an amount which would only meet expenses until the completion of the improvements to the milling facilities, when, it is believed, a considerable increase in saving and the production of a desirable product will be shown. Unavoidable delays, the report states, have prevented the completion of the improvements as soon as expected, but it is thought the plants will be completed by the end of the month.

It was stated that the Kaslo plant would be in operation by September 1. The Canadian Pacific Railway Co. has notified the receiver that payment has been authorized of a refund of past shipments, an amount which has been carried forward in former reports.

Receipts for the month with the amount of \$80,324.74 reported to June 30, were \$96,194.11. This includes final returns on 19 cars of ore shipped to the Granby Mining and Smelting Co., of St. Louis, Mo., amounting to \$10,455.59, and advance on eight cars of \$4,000 and by amended returns on four cars of \$3.69.

Expenditures made a total of \$7,217.77 and include \$6,504.88 for mining work and \$181.72 for office expenses. The total operating expenses for July were \$6,996.60.

Included in the statement of ore delivered to the smelter for which no returns have been received, are 30 tons of concentrate amounting to \$1,714.50 and 160 tons of crude ore amounting to \$518,840, a total of \$6,902.90. The amount due from smelters for ore shipped prior to July 1 is as follows: From Granby Co., \$3,234.32; from the Kusa Smelter Company,

\$2,117.25, and from the Canadian Pacific for freight advance charges to be refunded \$2,940; the total amount due being \$15,194.47.

#### General Notes.

While for several months the reopening of the Tye Copper Co.'s smelting works at Ladysmith, Vancouver Island, has been hoped for by owners of mining properties in the Coast district, who have been unable to make other arrangements for getting ore smelted, there does not appear to have been anything definite arranged yet. Probably the chief difficulty is that of obtaining a regular and sufficient supply of ore, although the question of converting copper matte also requires consideration, since it is stated that the converters at the Tacoma smeltery are already being operated to their fullest capacity in converting matte produced there. However, the Tye Copper Co.'s officials are seeking to overcome obstacles to their works again being operated; meanwhile small shippers of copper ores, or those who would be under favorable conditions have no alternative but to await developments.

The total quantity of ore received at the smelting works at Trail, West Kootenay, during nearly eight months of 1916, to August 21, inclusive, has been 318,214 tons, of which 265,618 tons was from mines operated by the Consolidated Mining and Smelting Co. and 52,596 tons was of custom ores. The total for the corresponding period of 1915 was approximately 40,000 tons less. It is expected that there will be a substantial addition to the increase during the remaining months of the current year.

An open verdict was brought in by a coroner's jury empanelled to investigate the cause of the death of miners who lost their lives in one of the coal mines at Michel, Crowsnest district, Southeast Kootenay, when an explosion took place there in the night of August 9. All available evidence was taken, but there was nothing that the jury considered threw light on the actual cause of the explosion. Seven bodies have been recovered, but at the end of August there were still five men missing, and it is concluded that their bodies are in parts of the mine not yet accessible to those who have been endeavoring to find them.

#### SUDBURY DISTRICT

The government has appropriated \$4,000 to be used on the new road connecting Sudbury with Copper Cliff. A permanent Tarvia pavement will be put down. Copper Cliff is the smelter town of the Canadian Copper Company. Sudbury and Copper Cliff will appropriate \$5,000 each, the total cost of the road being estimated at \$14,000.

It is rumored that both the Blezzard and Stobie nickel-copper mines will start operation, but the report cannot as yet be confirmed.

There has been considerable activity along the Soo Branch this week. Mr. S. Smythe of the Nichols Copper Co. of New York, and also of the General Chemical Company, has been visiting the various Copper possibilities in the district. The Company has had two engineers in the district for about two weeks and the same men have been in the field all summer. Visits have been made to the Sable River Copper Co. plant, the Hermina mine, the Shakespeare Gold Mine, Copper claims at Espanola, Copper claims at Wiskey Lake, Kelly Copper Mine, and several other claims.

Mr. H. Bent has been visiting claims at Wiskey Lake.

The Mond Nickel Company and its employees have in the past year contributed about \$35,000 to the Patriotic funds.

### NOVA SCOTIA STEEL'S EXHIBIT

A striking exhibit, even among many new things, which the Toronto Exhibition this year brings before the Canadian public is the display of what the Nova Scotia Steel & Coal Company, Limited, of New Glasgow, N.S., is doing to help win the war. Naturally it is shown in the Munitions Building. It stands out there as a tribute of Canadian manufacture and Canadian patriotism.

Prominent in the exhibit is a huge shell stock steel ingot weighing 6,670 pounds. This shows, so to speak, the genesis of the scores of shells in all stages of development, which are the leading feature of the firm's display. These shells run from the comparatively small 18-pounder to the huge eight-inch projectiles which stand when on edge thirty inches high, and are used for high explosives. The 9.2 high explosive shell ready to go into the gun is of a brick-khaki color, and all the scores of parts are shown with the waves which prevent the shell slipping when loaded. Side by side with this is a shrapnel shell in half section exposed to show the 365 bullets they contain, the fuse and the method of detonation. To make these alone takes several hundredweights of metal, while the enormous force of these projectiles is not in any part of the Exhibition better brought out than in the exhibit of the Nova Scotian firm.

There are also samples of ore and of dolomite and limestone flux, besides some of the celebrated Nova Scotian coal from the main seam of the mines which the company has in Cape Breton. The blast furnaces of this company and the head offices are at New Glasgow, N.S., the coal mines at Sydney Mines, C.B., and the iron mines at Wabana, Newfoundland.

"Scotia" manufactures have stood for so long high in the history of Canada that many people will be surprised to know that the development of the firm is something which did not begin until after Confederation. In 1872, it appears, only eight men were employed at the old works in New Glasgow. In its wonderful strides since then the Nova Scotia Steel & Coal Company, Limited, can be compared most nearly with the big Krupp firm in Essen, only they have a cleaner business record than that favored by the Kaiser. The capital and funded debt of the company to-day exceeds \$18,000,000, and it employs more than 5,000 men. New Glasgow and Sydney Mines were of course made by the settlement there of the business.

The Nova Scotia Steel Company, Limited, were the pioneer manufacturers of steel in Canada, and when the purchase of an existing coal company was effected in 1900 the present title was adopted and the firm commenced the making of steel from not only its own ore, but with its own coal. The saving can be imagined. Iron ore deposits were acquired in Bell Island and Conception Bay, and the new port of Wabana was soon a busy place. The estimated contents of the seams, over four feet thick, owned by the firm is put at 2,379,500,000 tons, something too big for the average conception. These areas cover over eighty square miles of land. The output of coal in 1915 was 610,000 tons. This had grown from 243,000 tons in 1900. A feature of the coal is that for metallurgical and general purposes it is one of the best in the world, and it is worth while noting among the many patriotic efforts in Canada since war broke out that this coal has been given a naval test by the

Admiralty, the results of which have so far not been given to the world.

Perhaps the best summary of the activities of the Nova Scotia Steel & Coal Company, Limited, is given as follows:—(1) Coal mines at Sydney, N.S.; (2) Iron ore mines at Wabana, Newfoundland; (3) Blast furnaces and smelting works at Sydney Mines; (4) Engineering works at New Glasgow, N.S.; (5) Car works at New Glasgow.

At one of the annual meetings, the President was able to state that the Newfoundland deposits were being regarded both in Great Britain and in the United States as the most important in the world. In the matter of tonnage owned the company has a larger quantity than the United States Steel Corporation, and the supply is calculated to be enough to last for the enormous term of 3,000 years. An interim report filed by the Dominions Royal Commission—their work was interrupted by the outbreak of war, it will be remembered—states that the Newfoundland hematite deposits, which are practically controlled by the company, are of immense potential importance in the world industries.

These facts are given only to indicate the great size of the company, whose showing of munitions is so prominent in the Canadian National Exhibition this year. The Nova Scotia Steel & Coal Company, Limited, was the very first of the Dominion firms to undertake the supply of shells for this war—a valuable contribution, which shows no sign of diminution. Lest it should be thought that this is only a war activity, it may be mentioned that the year 1913 saw the blast furnaces of the Dominion turn out 1,048,538 tons of steel ingots. What is before this firm, therefore, in the swinging development which is expected on the declaration of peace, can only be guessed at.—The Globe, Toronto.

A School of Mining has been organized in connection with the Calgary Institute of Technology. Mr. W. A. Davidson, M.E., M.Sc., has been appointed head of the mining department. He is a graduate of McGill University and has had practical experience in connection with coal mining in Nova Scotia and Alberta, and occupied the position of mine manager for the International Coal and Coke Co., of Spokane, Washington, operating coal mines and coke ovens at Coleman, Alberta. He will undertake the organization of technical instruction in mining through the medium of classes in the mining centres of the Province.

### COPPER MOUNTAIN.

After four years of diamond drilling on Copper Mountain, in Similkameen district of British Columbia, mine development is in progress. Several tunnels at different levels are to be driven. Power for initial development work is being obtained from the B. C. Portland Cement Co.'s works, 14 miles from Copper Mountain. Current is transformed to 15,000 volts and transmitted to Copper Mountain over a temporary high-tension line of No. 4 galvanized fence-wire; at the mine it is stepped down to 2,200 volts. Compressor plant consists of a Canadian Rand two-stage 10-drill compressor, belt-connected to a 150-h.p. motor, and a Chicago pneumatic 6-drill compressor, belt-connected to a 100-h.p. motor; also a Leyner drill sharpener. The first tunnel, dimensions 9 by 10 ft., was started on the 3945 level; it is now in more than 500 ft., and progress is at the rate of 18 ft. a day.

**MINING IN THE YUKON.**

A press despatch states that Hon. Dr. Roche, Minister of the Interior for Canada, who at the end of August returned to Ottawa from a visit to the Peace River district of Alberta, British Columbia and Yukon Territory, has stated that mining operations are brisk in the Yukon, where the larger gold companies are busy, and that copper mining has been much stimulated as a result of the European war, the output of copper being heavy, with ore-smelting being done in northern British Columbia. In the Peace River district crops are very good and the country is being fast opened up by the Edmonton, Dunvegan & Peace River Railway, which has been built westward as far as the British Columbia boundary. Settlers are going into the district rapidly and much new land is being occupied.

**AMERICAN CAPITAL IN B. C. MINES.**

North-west Mining Truth, published in Spokane, Washington, on the 1st inst. said, editorially: "Mining Truth is delighted to record the fact that the Hon. Lorne A. Campbell, Minister of Mines for British Columbia, has accepted the challenge thrown down by his political opponents and is forcibly reiterating statements made in this city some weeks ago. It will be remembered that he announced at a private dinner party in his honor that the mining industry in British Columbia was looking to Americans to aid in the development of its great opportunities. This was seized upon by the press of opposite political faith as campaign munition, and with due distortion and ungenerous misstatement the attacks were carried to lengths that certainly reflect no credit upon those who directed them. In a recent speech at Slocan, Mr. Campbell pointed to the fact that of twenty-two mines then in operation in the Slocan district, no less than seventeen were financed by American capital and managed by citizens of this country. He also called attention to the very evident fact that Americans have always taken a leading part in the development of other districts of the province. He again expressed his intention of seeking capital wherever it might be found, and said that American centres offered the best avenue to that end. Mr. Campbell might have crawled in approved political style. He has not. His attitude will lose him no friends among mining men of this country or that which he now so ably serves. Mining men are almost invariably broadminded. Petty political methods do not appeal to them. They admire force, directness and aggression."

**TO MANUFACTURE SAND BRICK.**

Galt, Sept. 6.—For the purpose of manufacturing sand brick by a new process, an invention of John T. Jackson of Toronto, the Dominion Building Products, Limited, has been organized, with Dr. David D. Williams, 263 Christie street, Toronto, President; W. J. Heron, Galt, Vice-President; and John T. Jackson, Managing Director. Vice-President Heron announced to-day that the erection of a plant in Galt will be commenced in a few weeks, and other plants will be established at Toronto, Sarnia, Owen Sound, Sudbury and Picton. The headquarters of the concern will be at Galt, where almost unlimited quantities of suitable sand are obtainable on a farm owned by F. S. Scott, M.P., on the northern outskirts of the city. Each plant will have a capacity of 190,000 bricks per day.

**TRETHEWEY.**

A circular to shareholders states that operations since their resumption have resulted in profits of about \$5,000 for June, \$9,500 for July, and \$6,800 for the first half of August. The directors state, however, that these profits are due to the fact that a body of high-grade milling ore was opened up at the junction of B and C stopes, and that such profits cannot be expected to continue. The directors further state that in their opinion the proposed sale of the Trethewey property to the Northern Customs Concentrators, Limited, for a price of \$125,000 is a favorable one for the company.

**QUEBEC MINES BUSY.**

The asbestos, copper-sulphur ore, magnesite and chromite mines of Quebec are making a good record this year. There has been a good demand for asbestos, especially for long fibre, and the price for the best grades is exceptionally high. The Eustis and Weedon mines shipping copper bearing pyrite have profited by the good demand for copper and pyrite. The demand for Canadian chromite and magnesite continues good on account of the cost of ocean freights. The Notre Dame des Agnes zinc property will soon be equipped with a 200-ton concentrator, the construction being well under way.

**THE WAR LOAN.**

Ottawa, Sept. 11.—The Minister of Finance to-day handed to the press the following announcement: The second Canadian war loan is now being offered for public subscription. While the Government is aware that Canadian patriotic sentiment alone could be depended upon to ensure success, strict regard has been had in fixing the terms of the issue to prevailing financial conditions, with the object of making the offering attractive from the purely investment standpoint. The Government is confident that this, the second loan for the purpose of raising funds for Canada's war expenditures, will meet with the same loyal and general response which made the first war loan so strikingly successful.

**FLOTATION AT COBALT.**

The Buffalo flotation plant at Cobalt, designed to recover silver from mill tailings, is now in operation. The Buffalo has piled a large tonnage of sands during the past few years and these will now be treated. In addition tails from the mill will be treated at the rate of about 100 tons per day, the total tonnage being about 600 tons per day.

**SILVER PRICES.**

	New York, London,	
	cents.	pence.
August 22.....	66¼	31 <sup>7</sup> / <sub>8</sub>
" 23.....	66¾	31 <sup>5</sup> / <sub>8</sub>
" 24.....	66¾	31 <sup>5</sup> / <sub>8</sub>
" 25.....	66¼	31 <sup>7</sup> / <sub>8</sub>
" 26.....	66½	31½
Sept. 1.....	68¾	32 <sup>7</sup> / <sub>8</sub>
" 2.....	67¾	32¼
" 4.....	Holiday	32¾
" 5.....	68	32¾
" 6.....	68½	32½
" 7.....	67¾	32 <sup>7</sup> / <sub>8</sub>
" 8.....	68¼	32½

# MARKETS

## TORONTO MARKETS.

Sept. 11—(Quotations from Canada Metal Co., Toronto)—  
 Spelter, 12½ cents per lb.  
 Lead, 8¾ cents per lb.  
 Tin, 44 cents per lb.  
 Antimony, 18 cents per lb.  
 Copper, casting, 28½ cents per lb.  
 Electrolytic, 30 cents per lb.  
 Ingot brass, yellow, 17 cents; red, 20 cents per lb.  
 Sept. 11—(Quotations from Elias Rogers Co., Toronto)—  
 Coal, anthracite, \$8.50 per ton.  
 Coal, bituminous, \$5.60 per ton.

## NEW YORK MARKETS.

Sept. 8, 1916—Connellsville Coke—  
 Furnace, spot, \$2.80 to \$2.90.  
 Furnace, contract, \$2.50 to \$2.75.  
 Foundry, prompt, \$3.25 to \$3.50.  
 Foundry, contract, \$3.25 to \$3.50.  
 Straits tin, f.o.b., 38.62½ cents.  
 Copper—  
 Prime Lake, nominal, 27.25 to 27.75 cents.  
 Electrolytic, nominal, 27.87½ to 28.12½ cents.  
 Casting, nominal, 25.25 to 25.50 cents.  
 Lead, Trust price, 6.50 cents.  
 Lead, outside, 6.60 cents.  
 Spelter, prompt western shipments, 8.80 to 9.05 cents.  
 Antimony—  
 Chinese and Japanese, 12.00 cents.  
 American, nominal.  
 Aluminum—nominal—  
 No. 1 Virgin, 98-99 per cent., 60.00 to 62.00 cents.  
 Pure, 98-99 per cent. remelt, 58.00 to 60.00 cents.  
 No. 12 alloy remelt, 46.00 to 48.00 cents.  
 Powdered aluminum, \$1.00 to \$1.15.  
 Metallic magnesium, 99 per cent. plus, \$3.50 to \$3.75.  
 Nickel, 45.00 to 50.00 cents.  
 Cadmium, nominal, \$1.25 to \$1.50.  
 Quicksilver, nominal, \$76.00.  
 Platinum, nominal, \$60.00.  
 Cobalt (metallic), \$1.25.  
 Silver (official), 68¼ cents.  
 Metal Products.—Following base prices are all f.o.b. mill, but prices are purely nominal:  
 Sheet copper, hot rolled, 37.50 cents.  
 Sheet copper, cold rolled, 38.50 cents.  
 Copper wire, nominal, 33.00 cents.  
 Copper wire, nominal, October, 31.75 cents.  
 High sheet brass, 38.00 to 39.00 cents.  
 Seamless brass tubing, 44.00 to 45.00 cents.  
 Seamless copper tubing, 44.50 to 45.50 cents.  
 Brazed brass tubing, 45.50 to 46.50 cents.  
 Brass wire, 38.00 to 39.00 cents.  
 Brass rods, 38.00 to 39.00 cents.  
 Sheet zinc, f.o.b. smelter, 15.00 cents.

## MOLYBDENITE PRICES.

Schedule of prices per unit (20 lbs.) of Molybdenite in ore delivered at concentrator, Renfrew.  
 Ores carrying between 2% and 3% MoS<sub>2</sub>, \$13.00 per unit.  
 Ores carrying between 3% and 5% MoS<sub>2</sub>, \$14.50 per unit.  
 Ores carrying between 5% and 10% MoS<sub>2</sub>, \$16.00 per unit.  
 Ores carrying between 10% and 15% MoS<sub>2</sub>, \$17.00 per unit.  
 Ores carrying between 15% and 20% MoS<sub>2</sub>, \$18.00 per unit.  
 80% concentrates \$1.00 lb. of MoS<sub>2</sub>.  
 Penalties imposed for copper and bismuth.

No settlement made for any molybdic oxide in ores.  
 Settlement ten days after sampling.  
 Samples of ores to be submitted before any shipment made.

## STOCK QUOTATIONS.

(Courtesy of J. P. Bickell & Co., Toronto.)

As of close September 8th, 1916.

### New York Curb.

	Bid.	Asked.
Atlantic Steel	55.00	62.50
Canada Car	38.00	41.00
Curtiss Aeroplane	10.00	25.00
Can. Copper	1.50	1.75
Cambria Steel	81.00	82.00
Canada Cement	61.00	62.00
Howe Sound	5.25	5.50
International Nickel (New)	43.75	43.87
Steel of Canada	61.50	62.50

### Porcupine Stocks.

	Bid.	Asked.
Apex	.08½	.08¾
Dome Extension	.36	.36¼
Dome Lake	.44½	.45
Dome Mines	.24¼	...
Foley O'Brien	.55	...
Hollinger	6.99	7.00
Jupiter	.31½	.32
McIntyre	1.52	1.53
McIntyre Extension	.45½	.46
Moneta	.15½	.16½
Plenaurium	.60	.70
Porcupine Crown	.76	.77
Porcupine Imperial	.02	.03
Porcupine Tisdale	.01½	.02
Porcupine Vipond	.38	.39
Preston East Dome	.04¾	.05
Rea	.65	.67
Teck Hughes	.39½	.39¾
West Dome	.38¾	.39

### Cobalt Stocks.

	Bid.	Asked.
Adanac	.20	...
Bailey	.08¾	.08¾
Beaver	.41½	.42
Buffalo	.75	1.05
Chambers Ferland	.19	.20
Coniagas	4.55	5.00
Crown Reserve	.40	.47
Foster	.05	.07½
Gifford	.06½	.06¾
Gould	.00¼	.00¾
Great Northern	.04¾	.05
Hargreaves	.03	.03½
Hudson Bay	.60	...
Kerr Lake	...	4.75
La Rose	.60	.65
McKinley	.59	.61
Nipissing	7.35	7.40
Ophir	.09	.09½
Peterson Lake	.21½	.22
Right of Way	.05	.06
Seneca Superior	.26	.30
Shamrock Cons.	.10	.10½
Silver Leaf	.07¾	.02
Temiskaming	.60½	.61½
Trethewey	.18	.18½
Wettlauffer	.13	.15