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CIRCULATION

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CONTENTS

MINING COPPER ORE IN ONTARIO

There are in Ontario many copper deposits. The most notable ones are the nickel-copper deposits of the Sudbury district, from which there will be taken during 1916 ore containing about 22,000 tons copper, in addition to 40,000 tons nickel. Aside from the nickel-copper mines, however, very little copper has been produced recently in Ontario.

Encouraged by the high price of copper some enterprising gentlemen have during the past year been giving their attention to the possibilities of the country between Sudbury and Sault Ste. Marie. From one property a considerable quantity of good ore has been shipped and development work is meeting with encouraging results. Several other properties along the north shore of Lake Huron are said to be worthy of development.

The development of the copper mining industry in Ontario is retarded by the fact that there is no sale for the ore here. The nickel-copper companies have, of course, their own large smelters and refineries; but those who engage in copper mining on a small scale must necessarily ship their ore to smelters in the United States. The high cost of marketing the product is discouraging and permits of only fairly high grade ore being shipped.

There are few mines that produce enough ore to warrant the erection of a smelter and refinery. From the small mine ore is commonly shipped to a smelter which treats ore from many mines. The producer of copper ore in Ontario is therefore in somewhat the position of the farmer who depends on his neighbor for the threshing of his wheat. Fortunately for the farmer threshing machines are numerous and can be readily brought to his fields. The miner soons learns that smelters are few and far away and that freight and smelter charges are very large items.

It is obvious that the establishment of a copper smelter and refinery in Ontario would lead to the more vigorous development of small copper deposits. It is obvious also that the copper ore now being shipped is not sufficient to support a smelter. There is not, moreover, sufficient information to indicate that enough deposits to keep a smelter busy would be developed if the plant were erected.

There is no doubt that a close investigation of the possibilities of Ontario copper deposits would be helpful. The area north of Lake Huron seems particularly worthy of attention. The high price of copper and the possibility of utilizing the oil flotation process of concentration are features which make the problem of unusual interest just now.

SHIPPING NICKEL TO GERMANY

The United States is the greatest consumer of nickel, but depends almost entirely on Canadian ores for its supply. It can export nickel only by importing from Canada more than it needs for its industries. We have been advised by the Federal Government that satisfactory arrangements for preventing Germany from obtaining Canadian nickel have been made, and we are advised by newspaper despatches that nickel is piled on the Deutschland's pier ready for shipment. The spectacular trip of the submarine has again directed attention to the nickel question and particularly to the various sources of nickel used in the United States.

According to the official report of the United States Geological Survey for 1914, the latest final report available, no nickel ores were mined as such in the United States during that year, but an equivalent of 845,334 pounds of metallic nickel, valued at $313,000, is understood to have been saved as a by-product in the electrolytic refining of copper. A part of this nickel was marketed in the form of sulphate and part as electrolytically deposited metal. Mr. Frank L. Hess, the author of the report, says: "It is impossible to tell how much of this nickel was derived from foreign ores, but a considerable part—possibly one-third to one-half—was produced from domestic ore."

During 1914 there was refined in the United States a small quantity of rich matte imported from Belgium and obtained from the smelting there of New Caledonia ores.

When it is borne in mind that Canada exported to the United States in 1914 matte containing 36,015,642 pounds nickel, the American sources other than Canadian appear almost negligible. The amount of nickel produced from the United States ores, even if it should all come into the hands of German agents, constitutes no great menace.

There are other sources than the refineries that have to be considered, however. It is reasonable to assume that since the war began German agents, experiencing difficulty in purchasing nickel at first hand, would be able to purchase no mean amount from those having on hand stocks of raw and scrap nickel accumulated before the Canadian arrangement went into effect.

The appearance of this nickel on the Deutschland's pier emphasizes the necessity of guarding against leaks. It does not prove, of course, that the agreement with the International Nickel Company is not being lived up to. The episode shows, however, that in spite of the fact that the Canadian Government acted promptly in arranging to keep nickel from the enemy it would be very much to our advantage if the refining of the matte were done in Canada.

The episode also reminds us that many months have elapsed since the nickel company promised to erect a refinery in Canada. It emphasizes also the advisability of having that refinery of sufficient capacity for handling all the matte produced.

There is small comfort in the fact, if it is a fact, that the nickel to be shipped on the Deutschland is not of Canadian origin. There should not be allowed to be shipped to the United States more nickel than is needed there. If any is to be exported to Europe we, the chief producers, should export it ourselves.

Unfortunately we must for the present, since we have no refinery here, be satisfied with shipments being made to the Allies from the New Jersey refinery instead of direct. If, however, the nickel company senses the feeling of Canadians it will not much longer delay the erection of a nickel refinery in Canada and it will look forward to doing all its refining here.

MINING AT GREAT DEPTH

Compared with the temperatures at the surface the temperatures met with in most Canadian mine workings are moderate and fairly uniform. At the depth of a few hundred feet the miner is protected from extremes of cold and heat, and can work efficiently at any time of the year. Experience in many parts of the world has shown that many mines are hot at comparatively small depth and that all very deep mines are hot. Some mines are hot because of purely local conditions, while heat at great depth is common everywhere.

An unusually interesting example of increase in temperature in depth is afforded by the world's deepest mine—the Morro Velho mine, situated in Brazil. An article on the ventilation of the Morro Velho was published in our Aug. 1, 1915, number. Additional information is contained in the recently issued report of the St. John Del Rey Mining Company.

The Morro Velho is a gold mine which is producing nearly $200,000 per month. Most of the ore is coming from a depth of over 4,000 ft. below the surface, and the shafts have reached a depth of 5,826 ft.

The company has made a very careful investigation of conditions at depth. It has been found that the increase in rock temperature in the Morro Velho mine is 1° Fahr. for every 125 ft., while the increase in air temperature, resulting from compression of the air as greater depth is attained, amounts to 1° Fahr. for every 180 ft. At the bottom level during the hottest months of the year the temperature averaged 107 degrees.

Commenting on the temperature in which the miners work at the bottom level, the superintendent, Mr. G. Chalmers, says that the men, being used to high temperatures at surface, do not seem to mind it, and that "they are invariably only too anxious to work overtime if the opportunity is given them." Mr. Chalmers is, however, making many improvements in ventilation and plans to overcome further increase in temperature by cooling and drying the air going into the mine and by drawing off the air after allowing it to pass over only one or two stopes instead of allowing it to pass up through several stopes.

CANADA'S FUTURE*

By David H. Browne.

Down here in New York, when we get together, Canadian, Englishmen and Americans who know Canada, one topic is sure of discussion; that is the future of the Dominion. Upon one thing we are all agreed; that this war has pulled the country together as nothing else could have done. The National Consciousness is self evident. It jumps to the eyes, as the French say. With this feeling of unity to begin with, great progress in organization and large developments in commenrce and industry follow inevitably. At present these rest upon an abnormal condition, and whether these benefits can be retained in normal times is a serious question.

Let us talk it over, as we do here around a lunch table, for many a true word is spoken in jest and it is by such informal conversation that sentiment crystallizes into belief and belief into action.

Our good friend Gilbert Rigg, who has gone to Australia to assist the smelting of zinc and lead in the Commonwealth, is a man of great intellectual penetration. He gave me some very good ideas before he left, and to these I have added some of my own. I will lay the whole before you, in the same spirit of indifference with which the waiter hands you the menu and lets you choose for yourself. My only comment is to inform you that I wrote those parts which strike you as sound and logical. The ideas which are evidently foolish and visionary Rigg must take the blame for. He is on the Pacific now and cannot help himself.

This war has taught us a good many things, but the one thing of all others which it has taught us is to look a fact squarely in the eye without blinking. If we can apply to the future of our industries that same clarity of vision which we apply to the purposes of this war, we may be able to see a path through the wilderness.

In the first place, we can admit at once that men are not all they should be. There would not be such a large percentage of rejections at our recruiting stations, or such a number of men dropped from the paymasters' books every month in our industries, if the average of physical and mental efficiency were satisfactory. All these agencies for doing us good must have some reason for existence.

Yet any recruiting officer can tell you of men, who, once rejected, have made themselves fit and joined the colors; every shop foreman knows of mechanics who made a failure in one position only to make a success in another; and the records of all religious revivals are full of instances of drunkards and wastrels who have become decent, self-respecting citizens.

Evidently, reform is quite possible, but in every case it is to be noted that whatever agency has given the initiative, reform is an effort of the will, in answer to an overpowering conviction. Reform in every case comes from within, and is achieved by the surrender of a man's individuality to some ideal. This possession of some ideal, reasonably attainable and constantly striven for is what distinguishes the man from the human machine.

So in dissecting the ideas of those who propose to make the world better by changing men's natures, we can agree with them that anything which gives man higher ideals is worth while. There is really something in this position that men can be made better, and any agency which attempts this is worthy of encouragement.

So as far as these agencies can create an ideal in men and make them better men, they fill their part.

The main idea of life, however, is to be happy and to make other men happy; and into this happiness enter the conditions we find around us, many of which require to be changed.

Looking back over this preachment, we do not seem to have made much progress, Rigg and I. It is dry reading so far and does not seem to lead anywhere. Light a pipe and read ahead. Give us a chance.

Some while back one of us said that the war has taught us to see clearly. One of the things it has taught us to see is that men will unite, work together, suffer together and die together in order to achieve some common purpose which appeals to them as desirable. They are trying to realize certain conditions which seem to them to be good, and to rectify certain other conditions which they look upon as abhorrent. Further, they do all this on their own initiative as impelled by one purpose.

Admit that a good many enlist "because everybody is doing it." Everybody wouldn't be doing it if there was not some ideal seen by all and more clearly seen by some. Put it into concrete terms, and the argument is somewhat like this: Certain principles are at stake, certain ideals which we believe to be right are menaced. Our national existence and our future welfare depend on what we do now, upon what I do this minute. Plainly then, "it is up to me."

There you have it, the idea of individual service for a common ideal, which is to retain and maintain certain conditions of life.

These conditions of life which appear so highly desirable are summed up for us in one word—Canada. It's our country; it's a white man's country. It's home and mother and wife and children and all that's good. It's a place where a man has a chance, where one can go ahead and make something of himself, and where our children can go further and fare better than we have done. This isn't simply patriotism, it's a fact, a concrete something that we can lay our fingers on.

Now for this fact, in order to perpetuate this fact, men will join the colors and fight and suffer and die. In this service they meet conditions which appeal to them, which are so real and vital to them that when they come home wounded they are anxious to get back to some muddy ditch where they may go through the same experience and do their bit all over again.

What is it they find in this service that calls them in such an irresistible way? The main thing seems to be the common purpose; the feeling that they are getting something done, that must be done and that they alone can do. They feel their own individuality and their own personal worth.

This feeling of individual responsibility, the necessity of giving the best that each has is emphasized by the fact that in the ranks the former distinctions of caste are entirely lost. Eating, sleeping, working together, the laborer, the clerk, the employer, the poor man and the rich man, the scholar and the professor, all thrown together in the same service, come to know each other and to understand each other in a way that is never realized in normal times. The trenches are a

*Extracts from July bulletin of the Canadian Mining Institute.

great school of democracy, and the lessons learned there will never be forgotten in the life of those who take their part there.

Now the question for us is this: How can we preserve for Canada those lessons of devotion to a common cause, this feeling of self-respect which comes from service well rendered, and this mutual understanding and good will? The mere temporary acquisition of these has been worth while, but how much more worth while would it be to perpetuate these qualities not for three years, or for the life of the war, but for thirty years, the life of a generation! Conceive of this concerted action and mutual confidence applied to politics and statecraft, to education, to municipal affairs, to commerce and industry, and to every phase of our national existence, and think what Canada would gain thereby. Surely there must be some way in which this best that has been brought out can be made part of our permanent good.

One thing seems indisputable. All this unanimity of action springs from the feeling of individuality, and any system which seeks to perpetuate it must take into cognizance the human and individual element.

The great thing brought out by this war is that "he does his bit" not because he has to, but because he wants to. He "belongs." It is his: his war, his regiment, his trench.

Now how can we carry that feeling over? Evidently the only way is by making each man feel that he "belongs" just as much in his industry as in his regiment.

Now a great deal may be done by considering what are the causes of industrial discontent. It is not an answer to say that this strike was caused by a demand for higher wages, and that this lockout was brought about by the question of the recognition of the unions. These are only the superficial causes. Back of these are certain mental attitudes which must be clearly understood if we are ever to get at the cause of misunderstandings. Unions are only a concrete expression of individual feelings. Strikes are only a combined effort to remove a personal grievance. If both employer and employee, a company and workmen, boss and laborer, each understood and sympathetically understood the other's ideas, industrial unrest would be reduced to a minimum.

Let us look a little more closely into the things that really count, and let us find out, if possible, what are the things that are wrong in our industries, and see if there is not some way to make them right. Things are not all they should be, for if they were everybody would put the same effort into industrial service and their daily work that they now put into military service and the arts of war.

Yet war is an abnormal condition, and peace is normal. If we could put this same energy we now expend into the every day work of life, our conditions of life would be vastly improved and most of our ideals would be easily realized. The war has made men better simply because it has brought out the best that was already in them. It has shown us certain conditions of life which bring out that best. Can we make this habit of mind and these mutual relations permanent? Can we perpetuate this self respect, this feeling of individual responsibility, this confidence in our fellows, this belief in an attainable ideal, and this willingness to do our best to secure it? That is our problem.

Some loss of enthusiasm is certain. When the "tumult and the shouting dies" it is inevitable that the personal vigor and exaltation, the discipline and unanimity of purpose must suffer. These are collective virtues in which the "mass action" plays its part. Yet the other lessons of self reliance, of mutual confidence, of orderly habit, of personal pride in one's work have been deeply ingrained in the minds of many thousand men. These men will come back to work, bringing these changed personalities to their old tasks. Unless we can meet them half way, see things from their side and get them to see things from the other side, all this good is lost.

Can we not retain some of it? I think we can. Rigg thinks we can. What do you think about it?

PROFESSOR WILLIAM NICOL

It is given to few men to accomplish so much for his university and for his country as has been done by Professor William Nicol, whose state of health has made it necessary for him to retire from the chair of mineralogy in Queen's.

Professor Nicol is one of a small group of men to whose indefatigable and unselfish labors the School of Mining at Queen's owes its very existence. Early in its history he set himself to create for the use of the students a collection of minerals that should represent the mineral industries of Canada, actual and possible, and that should be theirs while they were students of Queen's. As a result of his labors there is now available such a collection for students' use as cannot be duplicated, it is safe to say, in any university in America. Other results of Professor Nicol's activities are the unique large scale specimens of economic minerals—specimens, one may say, on the ton scale—for some of them weigh over a ton. While he has never allowed himself to sacrifice the interests of the students to the display features of a museum, he has nevertheless been able to make the museum of economic minerals in Ontario Hall a place of real beauty and general interest.

Professor Nicol's students are known everywhere for their thorough and extensive knowledge of minerals —a result of his exact scholarship and enthusiasm as a teacher. But they honor him not only as a teacher, but as a sympathetic, generous and true-hearted friend.

For a quarter of a century Professor Nicol has given such service to his university. To this he has added many gifts of a more tangible kind. It is a well-known fact that often when the university purse was empty Professor Nicol has not spared his own pocket, when he saw an opportunity of adding to the mineral collections or otherwise usefully extending the equipment of his department. His name will always be associated with the home of the metallurgy department, Nicol Hall, the building of which was made possible by his generosity.

Professor Nicol's extensive knowledge of minerals, and, one may be permitted to add, his skill in acquiring the choicest specimens of them, have brought him into intimate association with the mining men of Canada and the United tSates. He has always been a welcome guest in the mining camps, where his jollity and good stories are well known. Mining men and all his other hosts of friends will join the Journal in expressing regret that he is obliged to retire from active work and in adding the hope that he may long be spared to enjoy his well-earned leisure.

THE COAL TRADE IN NOVA SCOTIA DURING THE FIRST HALF OF 1916

By F. W. Gray.

Approximate figures of the outputs of the Nova Scotia coal companies during the first half of 1916, with comparative figures for the first six months of the two preceding years, are as follows:

	First Six Months of		
	1914.	1915.	1916.
Dominion Coal Co.—			
Glace Bay Mines...	2,254,000	2,075,000	2,153,000
Springhill Mines	200,000	199,000	189,000
N. S. Steel & Co. ..	396,500	256 300	288.000
Acadia Coal Co.	207,600	144,000	200,000
Inverness C. & Ry. Co.	125,800	103,000	138,000
Intercolonial Coal Co.	170,000	90,000	66,700
Maritime C. & Ry. Co.	73,500	76,000	102,000
Minudie Coal Co. ...	31,000	38,000	32,000
Colonial Coal Co. ...	26,000	20,000	20,000
Cape Breton Coal & Ry. Co.	12,000	6,000	.....
	3,496,400	3,007,300	3,188,700

The situation of the coal-trade at the close of the first half of 1916 is exactly the reverse of what it was at the corresponding date a year ago. At the 30th June, 1915, the output showed a decrease of about 430,000 tons compared with the first six months of 1914, the bulk of the decrease being attributable to depressed conditions during the first quarter of 1915, and it was forecasted that the production of coal would show a marked improvement during the closing half of 1915, as was actually the case. At the 30th June, 1916, the production compared with the first half of 1915, shows an increase of approximately 180,000 tons, the bulk of this increase being to the credit of the first quarter of 1916. It may now be forecasted that the production of the second half of 1916 will show a marked decrease when compared with the last six months of 1915. The figures for 1916 at the end of April showed a much more favorable comparison with 1915, and during May and June a heavy falling off in production took place. For example the production of the Dominion Coal Company's Glace Bay collieries were as follows during May and June in the two years:

	1915.	1916.
May	428,000	353,000
June	448,000	336,000
	876,000	689,000

Decrease: 187,000 tons.

Indications are that the coal production for the year will be at least 500,000 tons below the small ouput of 1915, and may not exceed 6,000,000 tons. That is to say, the production of coal in Nova Scotia during 1916 is going to be 1¼ million tons below the normal capacity of the collieries, and it will be necessary to hark back to 1911 to find so small a provincial coal production as apparently we are to see in 1916.

This is a matter of first rate importance. Some nine months ago, the writer ventured to point out that the question of recruiting among miners was resolving itself into a choice between men and munitions, and in a review of the Nova Scotia coal-trade for 1915, once more emphasised the inevitable tendency towards a serious drop in the production of coal. The fact that the outputs of the first quarter of 1916 were greater than the output in the first quarter of 1915 obscured the true tendency of events, and it was not realised by those who made these comparisons that the prodution of coal during the first quarter of 1915 was at the lowest possible ebb.

Enlistments in the mining district have for some months past been discontinued, but the damage has been done, and outputs cannot now recover until "the boys come home."

The reduction in production is not solely due to recruiting. It is in part due to the requisitioning of the coal-freighting steamers by the Admiralty. This condition has affected the Dominion Coal Co. in particular. During the winter this Company has four large steamers for its winter business, two of which the Admiralty requisitioned. As a consequence of the reduction in carrying capacity it was not possible to take away the full production of the mines, and some idle time resulted. Because of this many of the workmen sought more steady work elsewhere, and this has still further reduced the output capacity.

The awkwardness of the situation so far as it affects the Dominion Coal Company and its workmen is well explained in a resolution passed by the members of the Provincial Workmen's Association and forwarded to the Premier of Canada, the text of which is appended to these notes. This resolution does not, however, cover the serious situation which faces the coal consumer in Montreal and other cities of Eastern Canada and Newfoundland which look to the mines of the Dominion Coal Company for their winter coal stocks. If the shipments of coal from Cape Breton to St. Lawrence ports exceed one-quarter of the normal seasonal tonnage things will have to improve very considerably both in the matter of outputs and of ships to carry the coal to market. The production of the two companies operating in the Joggins field is again worthy of note, the Maritime Coal & Railway Company showing one of the largest percentage increases in the Province. The Inverness Company shows an encouraging increase. The International Coal Company's production has been much decreased by the fire that occurred in November last, which has compelled this Company to abandon its workings in the Drummond Main Seam. Good progress is being made in development of other seams underlying, and larger outputs should be obtained during the last half of the year than have been found possible during the first half.

The Acadia Coal Company has returned almost to the production it had before the explosion in the Allan Shafts. Some coal was lost by a hasty and rather foolish strike on the part of the workmen of this Company. The Nova Scotia Coal & Steel Company also shows an increase, but its production is still very considerably behind the figures of 1914.

The fairly general increases shown in the production of the smaller companies, particularly the small mainland collieries, are a result of the demand for coal, and there is no doubt the increases would be much larger were it not for the shortage of miners. Yet these numerous individual increases, encouraging as they doubtless are to the companies to whose credit they stand, are wiped out and more than nullified by the decrease in the production of the Dominion Coal Company.

A factor that is causing much loss of output is the grave percentage of absenteeism among the mine workmen. After the example which the miners of Nova Scotia have set in the matter of enlistment no one will dare to accuse these men of non-appreciation of the needs of the Empire. They have responded in a manner which will always redound to their honor, but there must be a good many men among those who remain behind who do not realise the miner's part in this fight. It may be safely said the man who digs coal today is doing his bit just as effectually as the soldier who stands in the trenches. Yet when after pay day the production of coal falls down by four and five thousand tons from the previous day's figure it is evident many miners have not grasped the part they are called upon to play today.

Three things have been made the subject of government enquiry in Great Britain and in France also, namely the restriction of enlistment among mine-workers, the reduction of absenteeism, and control of the sale of liquor. Each of these matters possesses proportionate importance in Canada. So far as the mining districts in Nova Scotia are concerned liquor is supposed to be thoroughly controlled. Indeed its sale is prohibited, and there are numerous paid officials whose sole business it is to seek out and prosecute offenders against the prohibition law. Yet probably never in the history of the Province was more liquor vended in the mining and munitions districts of Nova Scotia than today. And such liquor! It is described by one colliery manager as a mixture of "snakes, brains and lightning," and two drinks will set a man crazy.

Following is copy of a resolution dated May 29:

At a special meeting of this Lodge of the Provincial Workmen's Association of Nova Scotia the following resolution was unanimously adopted, namely:—Whereas the Admiralty has requisitioned a large proportion of the chartered shipping tonnage of the Dominion Coal Company, with the following results, to wit:

Reduction of the coal shipments to the St Lawrence ports by two-thirds, causing loss of this market to the Dominion Coal Company.

Large stocks of coal banked at the mines, with the double object of giving work to the employees of the Dominion Coal Company during the past winter months, and of providing against the customary shipments to the St Lawrence upon the opening of navigation, must remain on the ground, with the risk of the banks taking fire. If the limited shipping available is utilised to transport the bank coal, then the collieries must remain idle, which will result in distress among the work-people through idleness and inability to earn daily wages.

The sale of American coal in the Montreal and St Lawrence market on a large scale will displace Nova Scotian coal and permanently injure a market that has been obtained by dint of many years of strenuous competition with United States coal, and will inevitably affect adversely the future employment of the miners here.

Therefore the Provincial Workmen's Association, representing the mine employees of the Dominion Coal Company, seeing their livelihood imperilled, petition the Government of Canada to obtain from the Admiralty the release of sufficient of the chartered vessels of the Dominion Coal Company, now under requisition, to enable the Company to market the coal produced, and thereby avoid idleness at the mines, with resultant distress among our members during the coming summer and winter.

We respectfully draw the attention of the Government to the following facts:

The miners of the Dominion Coal Company have enlisted to the extent of 25 per cent of the total employees of the Company. The production of coal has thereby been decreased by over 100,000 tons monthly at the present time.

The Dominion Coal Company cannot replace the vessels that have been requisitioned by other vessels chartered at current market rates, because the contracts of the Company are for delivered coal, the price at the point of delivery being in many cases less than the cost of freighting alone, at present rate of ship-hire.

The members of this Association are convinced that investigation of the production of coal in Nova Scotia would show a decrease of an alarming nature, shortly to become even more pronounced. The miners consider that seeing the enlistment from among their ranks has exceeded that of any other trade in the Dominion of Canada, the production and the earnings of those who remain behind at work, should not be further imperilled.

We therefore request the Canadian Government to use the most strenuous representations to obtain the release of sufficient of the chartered vessels of the Dominion Coal Company to relieve the present most serious situation.

ATHAPAPUSKOW.

The Pas, June 23.—Kenneth Miller and Henry Borth came into town late last month from Athapapuskow lake, bringing samples of ore taken from claims staked by them in that locality. Miller has been prospecting in that locality for eighteen months, and has kept very quiet about his discovery. Borth fell in with Miller only a short time back, and the latter told him of the discovery. Both men came to town, and Borth proceeded to Winnipeg with the samples. Miller received a report of the assay from Milton Hersey Company, Winnipeg, on Monday last, which states the samples showed values in copper, silver and gold slightly over $16 to the ton.

The vein on the Miller-Borth claim has been stripped to a width of 15 feet, and the hanging wall has not as yet been reached.

The claims are located some eight miles east of the Tonopah properties, near the mouth of Pineroot river. About one mile north of the Miller claims a discovery was made last fall, samples of which assayed over $20 in copper. Miller said he had no doubt his find will equal in value anything yet found in the northland. He went back north on Tuesday by the Ross boat, and will continue development work throughout the summer months.—The Pas Herald.

WEST SHINING TREE.

Some very rich ore has been uncovered recently on the claims in MacMurchy township now being developed by Mr. A. M. Bilsky and associates. Samples brought to Toronto last week show abundant free gold in a quartz gangue.

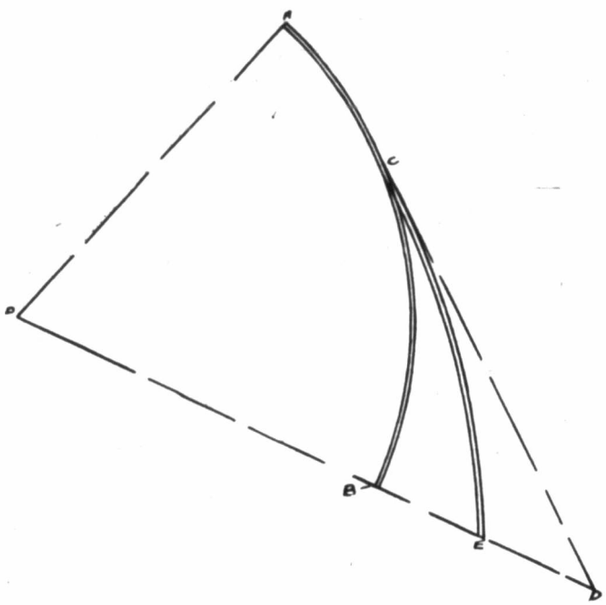
The property being developed by the Bilsky syndicate, of which Mr. Mark Workman, president of the Dominion Steel Co., is a member, was formerly known as the Jefferson claims. Mr. Bilsky reports that there are many promising properties in the neighborhood lying idle owing to lack of capital.

DESIGN FOR A GATE FRONT

By Albert E. Hall.

All those who have used chute gates of the arc type with the convex side of the gate toward the muck have no doubt experienced trouble with the opening of the gate. Where the gate is air operated it is often necessary to work the gate several times before it will finally permit the flow of muck. Where the gate is hand operated in addition to using the gate lever it is sometimes necessary to use a bar under the gate itself to start it opening. The cause of this is the weight of the muck against the gate and in the ordinary gate there is at the point "B" in the diagram a small space where the muck if it be fine can pack under the gate and make the operation very hard. For these reasons the front of the gate has been changed in some of the western mines in the following way and this change has made a big improvement.

If in the diagram the front of the old gate be the arc "ACB" it is changed as follows: At a point two-thirds the way up the gate front at the point "C" a tangent is drawn which will intersect the prolongation of the old gate radius "OB" at the point "D." Bisect the line "BD" which will give us the point "E." Draw in the arc "CE" and the arc "ACE" will be the new line of the gate front. A gate front designed on this principle has been operated very successfully out west and has been applied in other districts with equally good results.



Sketch Showing Gate Front.

AB: arc of old gate.

O: fulcrum of old gate.

C: point ⅔ of arc AB from B.

CD: tangent to AB at C.

BD: prolongation of OB.

E: middle of BD.

AE: arc of new gate.

U. S. GOLD AND SILVER IN 1916

The precious-metal mining industries of the United Stated continued active during the first six months of 1916, practically all important mines and mills operating at full capacity, according to a statement just issued by the United States Geological Survey. Shortage of cyanide supplies, feared in 1915, was obviated by increased output of domestic sodium cyanide, which has practically replaced potassium cyanide in the leaching of precious metals. Flotation has begun to increase saving of gold from tailings. There may have been some decrease in gold prospecting during the last eight or ten months, as many old gold prospectors have been giving attention to deposits of tungsten, antimony, quicksilver, and other mineral products whose value has enhanced since the outbreak of the war. There was also some labor shortage at mines and mills owing to high wages paid in factories making war supplies.

Final figures of the Geological Survey and the Bureau of the Mint give a total domestic production for 1915 of $101,035,700 in gold, and 74,961,075 ounces of silver, valued at $37,397,300, against $94,531,800 in gold and 72,455,100 ounces of silver in 1914. These figures include the gold production of the Philippines, which has been steadily on the increase.

The total output both of gold and silver reported for 1915 was the highest ever recorded under the American flag, but if the Philippine output be eliminated the production of gold in the United States proper was but little above the previous record year of 1909. The output of silver for 1915 was materially above the preceding record yield of 1914. For 1916, from the mid-year point of view, the outpoint of gold which is apparently falling off somewhat compared with 1915, in Colorado, California, Nevada and some other States and increasing possibly in Arizona Oregon, the Philippines, Idaho, Montana, New Mexico, and elsewhere, will probably reach a total somewhat below the high output of 1915. The production of silver, however, will undoubtedly again break all previous records, as the output of silver ores and of the copper, lead and zinc ores which produce silver in notable quantities will exceed that of any preceding year, owing to steady demand and high prices for all metals.

Prices of silver were low in the greater part of 1915. The monthly average commercial price at New York which rose to about 52 cents an ounce in November, however, reached 55 cents in December, and climbed steadily to over 74 cents in May, 1916, but fell to about 65 cents in June. The sharp increase in prices resulted from strong demand for the Far East at the end of 1915 and abnormally large requirements by the belligerent countries for coinage for the troops in the field. These demands found available stocks low, largely because of the great falling off in the Mexican output due to the long continued disturbance there. With the consequent inevitable rise in prices domestic producers of silver profited greatly, notwithstanding the increased cost of labor and of mining supplies. Silver is in demand not only for coinage but also for sterling and other silver wares, as well as for drugs and chemicals. The manufacture of silver sals used in photography, particularly in films for hand cameras and cinematographs, has vastly increased in recent years. The mid-year outlook indicates continued demand for silver, the metal last to benefit by the general domestic prosperity.

UTILIZATION OF ZINC

Zinc is a bluish-white metal, brittle at ordinary temperatures, and having a crystalline fracture when pure. It melts at 420 deg. C. and boils at 930 deg. C.; at a temperature of about 200 deg. C. it can be readily powdered, but at temperatures between 100 and 150 deg. C. it may be rolled or drawn, after which treatment it retains its malleability on cooling. The presence of a small percentage of lead, which is so objectionable in the manufacture of brass, is of considerable assistance in rolling. Zinc tarnishes superficially in moist air.

In the following an account is given of the more important uses of metallic zinc. Many of the compounds of zinc, such as the oxide, chloride, sulphate and carbonate, are employed for a great variety of medicinal and industrial purposes; but in the present article the utilization of such compounds is only considered with reference to the preparation of pigments.

Spelter.

Galvanizing is the most important use to which metallic zinc is put, probably consuming nearly 80 per cent. of the total output. The process, which was discovered in 1837, consists in depositing a very thin coat of the metal on iron in order to protect the latter from oxidation by the atmosphere. It is stated that this zinc coating exerts a greater protective action than tin-plating.

In the process of galvanizing, the iron is freed from scale by immersing it in hydrochloric acid contained in stoneware troughs. The strength of the acid and time of immersion (''pickling'') vary with the nature of the work and the cost of the acid. In the United Kingdom iron sheets are pickled in a 20 per cent. solution of hydrochloric acid, and sometimes undiluted ''muriatic acid,'' which contains from 26 to 30 per cent. of hydrochloric acid, is employed.

Iron wire and tubes are treated with acid of 12 per cent. strength. Using acid of any of the strengths mentioned above, the operation is complete in a few minutes; but on the Continent, where a weaker acid is used for reasons of economy, it is necessary to immerse the articles for several hours, and also to warm the bath slightly. At some works dilute sulphuric acid is used in place of hydrochloric acid.

After pickling, the plates, etc., are well washed, scoured with sand, and immersed in the galvanizing bath, which is contained in a wrought-iron pot, and consists of molten zinc covered with a layer of ammonium chloride. From 2 to 3 per cent. of tin is sometimes added to the bath when it is desired that the finished goods shall have a spangled appearance. Corrugated sheets are often galvanized plain and then passed through the corrugating machine.

The consumption of zinc varies largely with the nature of the article treated, thin wire requiring up to 25 per cent. of its own weight.

The process yields two important by-products: (1) ''hard zinc,'' (2) flux skimmings. The first mentioned is an alloy of zinc and iron, containing from 2 to 5 per cent. of the latter. Flux skimmings consist of chloride and oxide of zinc, together with some ammonium chloride.

The disposal of the waste pickling liquors, which contain about 15 per cent. of hydrochloric acid and 10 per cent. of iron, chiefly as ferrous chloride, has caused considerable trouble in many localities, and special processes have been devised to deal with the matter.

Sherardizing is the name applied to a special method of galvanizing. The cleaned articles are heated to a temperature just below the melting point of zinc in a closed receptacle containing zinc dust. The volatilized zinc slowly combines with the iron, giving a coherent protective coating. The process is specially adapted for coating articles having a pattern or design on the surface which would become filled up and obliterated if the ordinary galvanizing process were employed.

Electro-galvanizing is sometimes employed for special purposes. In this case the zinc is either in the form of a neutral solution of the sulphate or dissolved in excess of caustic soda.

Spelter is largely used for the production of ''slush'' castings for ornamental purposes. In these, the metal is poured back into the ladle as soon as a thin layer of metal has solidified. These hollow castings must be sound, as they are usually required to be subsequently plated. Both lead and cadmium are stated to have detrimental effects in this connection.

Amongst other important uses of spelter must be mentioned its employment in the desilverization of lead. Zinc very readily combines with gold and silver, and the alloy formed can be easily separated from molten lead.

In the Parkes process, the zinc in slabs is stirred into the molten lead, and the alloy of gold, silver, copper and zinc, which rises to the top, is skimmed off. Three or four treatments with zinc are usually sufficient to remove all the silver from the lead except 0.1 oz. per ton. The consumption of zinc varies according to the content of silver; thus, lead containing silver 0.1 per cent. requires 1.4 per cent. of zinc, whilst if 1.0 per cent. silver is present, only 2.5 per cent. of zinc is required. The skimmings are distilled so that a large proportion of the zinc is recovered, whilst the precious metals remain in the non-volatile portion. It is essential that fairly high grade zinc be used for this purpose, as certain impurities, particularly iron, cause a much larger consumption of zinc.

Another use which consumes a large quantity of zinc is that of precipitating gold from cyanide solutions by means of zinc shavings. From 5 oz. to 1 lb. of the metal is used for each ounce of gold recovered. The consumption of zinc in South Africa, chiefly for this purpose, amounted to 4,867 tons in 1914.

Zinc Dust.

When zinc vapor is cooled too rapidly after distillation, or if it becomes too largely diluted with other gases, a bluish-colored impalable powder results. Some of this substance, which is known as ''zinc dust,'' or ''blue powder,'' is always formed during the process of distillation, the amount varying from 3 to 10 per cent. of the total zinc present, when retort smelting is used. With electrothermic processes the quantity may be still larger. This powder, which consists of metallic zinc and 8 to 15 per cent. of zinc oxide, cannot be made to coalesce by ordinary means, and if it is desired to recover the zinc in a coherent form, i.e., as spelter, the powder must be re-distilled. Zinc dust is usually found in the ''prolongs'' beyond the condensers. There is a limited market for the product, and the commercial standard is that it shall pass a 100-mesh sieve and contain not more than 10 per cent. of zinc oxide.

*Extracts from an article published in the Bulletin of the Imperial Institute, London, March, 1916.

Zinc dust is considerably more active chemically than spelter, being subject to more rapid oxidation, and having the power to absorb hydrogen. On this account it finds many uses in chemical industries, being used to discharge locally the color of dyed cotton goods, and in the preparation of synthetic indigo. It has also been used for the recovery of gold from cyanide solutions of the metal, for which purpose it has been stated to be more efficient than zinc shavings.

Zinc Alloys.

Zinc enters into the composition of a number of alloys of considerable industrial importance, such as brass, German silver and antifriction metal.

Zinc and copper alloy in all proportions, the resultant products being of uniform composition throughout, as the metals do not segregate. The addition of small quantities of zinc to copper renders it "red short," that is, incapable of being worked when red hot, but has no appreciable effect on the malleability of the metal when cold. Alloys containing over 80 per cent. of copper are red or reddish-yellow in color. Brass containing 60 per cent. of copper can be rolled hot or cold, but it is less ductile than the alloys containing a larger percentage of copper, although its tensile strength is greater. The alloys containing over 50 per cent. of copper are chiefly employed as "brazing" or "hard" solder. Muntz metal was originally introduced for sheathing wooden ships, but is now chiefly used, under the name of "yellow metal," for the cheaper varieties of brass tube, wire and sheet. When the quantity of copper is reduced to 50 per cent. the resultant zinc alloy cannot be rolled either hot or cold, and as the amount of copper is further decreased the alloys become more fusible, brittle and nearly white in color.

German silver, which is also known under the names of "nickel silver," "electrum" and "white copper," is an alloy containing copper 50 to 60 per cent., zinc 14 to 30 per cent., and the remainder nickel. It is almost white in color, practically unaffected by air, and can be rolled, spun or cast; for the last purpose, however, a small quantity of lead is often added.

The addition of a small quantity of zinc to certain alloys increases their wearing power, and for this reason it is added to bearing metals and to the bronze coinage, which contains about 1 per cent.

The approximate composition of various zinc alloys is shown in the following table:

	Zinc. Zn. p.c.	Copper. Cu. p.c.	Tin. Sn. p.c.	Antimony. Sb. p.c.	Nickel. Ni. p.c.
Antifriction metal	85	5	..	10	..
Foundry pattern metal .	75	..	25	..	..
Brazing solder	50	50	..	..	..
Delta metal*	43	55	..	..	..
Muntz metal	40	60	..	..	..
Stereo metal*	38	60	..	..	..
Naval brass	37	62	1	..	..
Ordinary brass	33	67	..	..	..
Yellow brass	30	70	..	..	..
White metal	22	54	..	..	24
German silver	20	50	..	..	30

*Also contains 1 to 2 per cent. of iron.

As already mentioned, zinc readily alloys with silver and gold, and this property is utilized in the separation of the latter metals from metallic lead.

Zinc Pigments.

The most important zinc pigments are zinc oxide, or "zinc white," and lithopone; zinc-lead oxide and leaded zinc oxide are of less importance.

Zinc white is prepared by a number of methods which may be roughly grouped into those involving production from (a) spelter, (b) the ore, without intermediate separation of the metal.

In the Silesian method, the spelter is heated to its boling point in retorts, and the vaporized metal allowed to burn in air to zinc oxide. As the crude spelter always contains some lead, which in this process would be converted to oxide and impart a yellowish tint to the zinc white, a small quantity of gas containing carbon dioxide is introduced into the retort. The lead is thus converted to carbonate, which is considerably heavier than the zinc white, and therefore settles first in the condensers.

In Belgium the pigment is also made by burning spelter, but the final product is purified by levigation. The spelter used in Belgium contains up to 2 per cent. of lead, and 0.01 to 0.04 per cent. of iron, and the zinc white contains lead 0.002 to 0.2 per cent., iron 0.003 to 0.005 per cent., zinc oxide 99.69 to 99.99 per cent.

It has been claimed that zinc white made direct from the ore is a more durable pigment than that obtained by burning spelter.

One of the best known direct methods is the Wetherill process, which is largely used in the United States. In this process, the oxidized ore is mixed with the quantity of anthracite necessary for its reduction, and then spread upon a bed of anthracite, which is burned on a perforated grate by means of an underdraught. The metal thus produced is volatilized and oxidized by the products of combustion, and the oxide finally drawn away into the flues and collected in muslin bags.

Lithopone is much used as a pigment and filler for rubber goods, linoleum, enamel paints and table oilcloth. It consists of a mixture of zinc sulphide and barium sulphate. As in the case of other white pigments, purity of raw materials is essential, iron compounds being very objectionable. It can be prepared by mixing solutions containing equivalent quantities of barium sulphide and zinc, sulphate about 0.5 to 1.0 per cent. of a mixture of freshly prepared magnesia and common salt being added to the mixture before filtration. The precipitate is collected in a filter press, dried, mixed with 3 per cent. of ammonium chloride, and the whole heated to dull redness. Lithopone darkens when exposed to sunlight, and it is therefore desirable to combine it with other pigments when it is to be used for outside work.

KOWKASH.

A promising discovery was made on June 23 on the Robert Wells claims, 1½ miles southeast of Tashota Station. According to Mr. P. E. Hopkins, who is making a geological map of the area for the Ontario Bureau of Mines, the discovery is an auriferous quartz vein, 2 to 3 ft. wide, which has been traced for 25 ft. It is on claim P.B. 2892, about ¼ mile south of the railway.

There are about 100 prospectors in the district. No work is being done at the Dodds' claims at present, but it is said that work will be resumed there shortly.

PROGRESS IN UNDERGROUND ORE LOADING*

By M. E. Richards

The desire to lower mining costs, coupled of late years in some cases with a scarcity of labor, has fixed the attention of mining men upon mining machinery as one of the import ant means to greater efficiency. Notable advancement has already been made in this field, and the needs of the day are keeping mining men constantly on the alert for still greater progress. Every machine used in mining has been improved, and a special effort has been made to substitute power operation for hand labor. This is particularly true of drilling in mines. The efficiency of drilling machines has been increased so that a greatly increased amount of ground can be broken by one man in an hour; but there is still a great amount of time and money spent in shoveling or mucking, especially at the present time in connection with drifting and tunnelling operations. After the rock and ore is broken, with but a few exceptions, mine operators are still using ancient methods of loading ore by hand methods, which were used over two thousand years ago. Many attempts have been made to eliminate this mucking by hand, which incidentally is the hardest manual labor underground, and several machines have been tried for this purpose. Nearly all of them have failed, however.

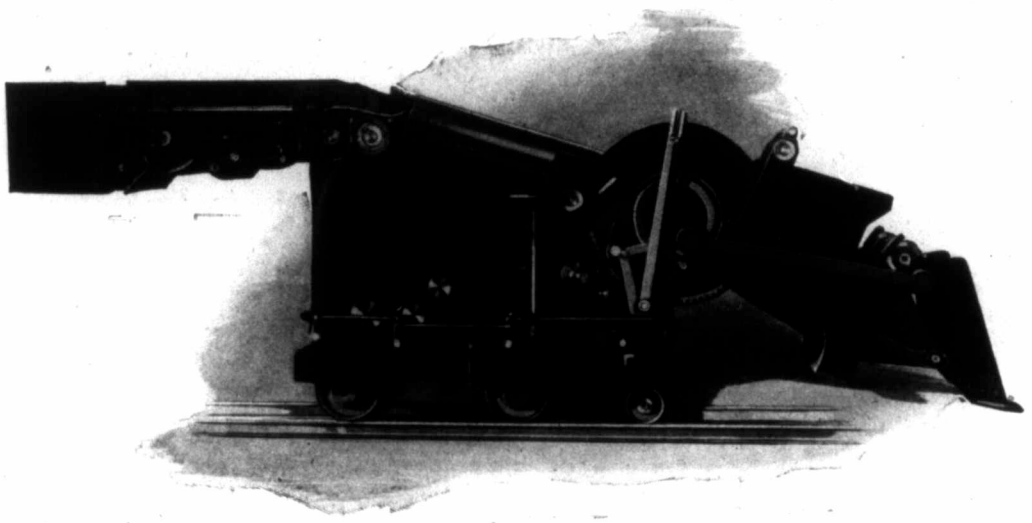
It must be able to handle sticky ore, wet ore, dry ore, chunks weighing from 60 to 100 pounds, and even the larger pieces occasionally encountered. All machinery and working parts must be completely housed and protected from dirt and water.

The motion of the machine must be such that, if a wall or big chunk of ore or other firm objects are struck, the mechanism will not be damaged. It must be able to shovel, convey and dump broken materials.

It must be so designed as to permit of its use in drifts 6 ft. by 6 ft., and at the same time so that it can be taken down through a shaft and through openings considerably smaller. It must also be easy to move to and from the breast of the drift, on its own power if necessary.

To combine all of the above in one machine is no doubt difficult, but actual observation of the several machines now on the market indicates that it has been already accomplished.

Realizing the need for a mechanical shovel that will work underground, urged on by predictions of a labor shortage, individuals in almost every mine organization set their minds to work and evolved ideas for, and in many cases actually set to working out, a practical machine. Such



HALBY SHOVELING MACHINE

The efficiency engineers are at present making time studies of the operations in mucking; there have been careful investigations of late of the advantage of long and short handled shovels; a relay shoveling system has been worked out and applied; car bodies have been lowered to reduce the effort of loading and all of these activities and improvements are bound to produce results. However, after all, it is the mechanical shovel to which we must look for the final solution of the problem. When this comes, the system which has seen no change since mining began, if not completely revolutionized, will at least be greatly improved.

To be successful a mechanical shovel must satisfy the following requirements:

The first cost must be reasonable; there must be no doubt that the investment will yield a good return. This also means that the machine must have sufficient capacity to do the work of several muckers.

The machine must be simple, durable and not liable to break down, and all parts must be readily accessible for removal, adjustment and replacement. It must be a machine which can be handled by miners or handy men, easily guided and controlled, and which is as near foolproof as possible.

activity has not been confined to recent years, for I find on investigation that already about twenty years ago, a conveyor-type loader was tried out at the Fayal mine of the Minnesota Iron Mining Company.

About ten years ago Thompson & Greer tried out a machine of their own design of the conveyor-type at the Newport property. The machine showed some saving in operations, but was out of order a large part of the time.

About four years ago Mr. Nels Flodin of Marquette, started with a drag shovel, the special feature of which was a small drum which pulled an ordinary drag scraper, fastened to a rope, up an incline and dumped it automatically into a car. The scraper had to be pulled back by hand; it was this feature of its operation which probably caused the machine to be abandoned.

During the present year The Cleveland-Cliffs Iron Company has worked out and is using a conveyor-type loader at the North Lake property. It is considered a success and has demonstrated itself to be a labor saver and it has considerably increased the speed in drifting. The output has been increased from 25 to 30 per cent. The arrangement is simple: Men shovel by hand onto the belt of a belt-conveyor, which runs up an incline and discharges into a tram car.

*From a paper read at the 20th Annual Meeting of the Lake Superior Mining Institute, held on the Gogebric and Cuyuna Ranges, Sept. 6-9, 1916

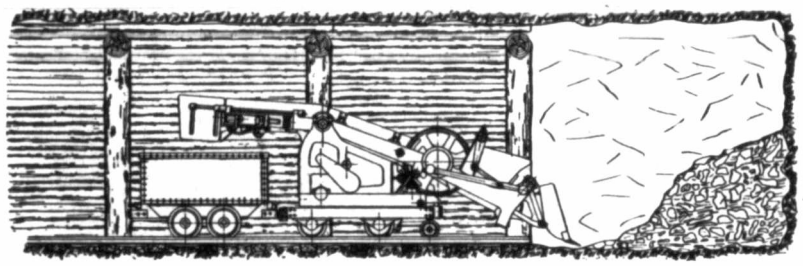
During the present year there has been a loading machine in daily operation in the Morton mine on the Mesaba Range, and it has been giving satisfactory results. It was designed by Billings and Middlemiss of the Morton mine. This machine consists in general of a large hoe which reaches out and drags ore onto an apron, which in turn discharges it onto a belt-conveyor which elevates it into the ore car. The original idea was to adopt the three motions of a steam shovel to a machine for drift use, and this machine has been built around that idea. It consists essentially of three air cylinders; one operating the in-and-out motion of the hoe; one the swinging motion, and the third the tilting motion. A reciprocating air engine drives the conveyor and propelling mechanism. One man can run the loader and operate the hoe; another swings and tilts the conveyor and propelling mechanism from the operator's stand. Some very good results in cleaning up a breast of thirty tons of ore have been obtained, the time required in wet dirt averaging two hours; in dry places this amount of ore has been taken out in an hour.

Another type of loading machine has been worked out by Mr. Sam Hoar of Virginia, Minnesota. Considerable experimental work is being done with this machine, but to my knowledge it has not yet been tried out in practical service. This machine employs an air cylinder which runs a shovel out on a beam, takes a load and drags it back onto the conveyor, which discharges into an ore car.

The machine as marketed to-day has an overall length of 15ft., but it can in a very short time be shortened to an overall length of 10 ft., if conditions necessitate the shorter length. It can be arranged to any gage from 18 in. up to 44, and is designed for operation on curves of 25 and possibly 20 ft. radius. The overall height of the machine is 5 ft. 4 in., and the total width approximately 4 feet. Its total weight is nine thousand pounds.

The machine is arranged for air, gasolene, or electric operation, and requires one man to run it. It is made up in three distinct sections, each of which forms a unit by itself; permiting the machine to be taken down very small shafts. The top or conveyor section contains the working parts for the conveyor and shovel mechanism. The centre or power section contains the motor power, clutches and gear drives. The lower or truck section is the travelling support of the entire machine.

The motion of the Halby shoveling machine corresponds very closely to the motion of a hand mucker with a shovel. A shovel 22 in. wide is actuated by a lever, which gives it a forward movement when at the bottom of its travel. The machine itself in being propelled forward furnishes the power which thrusts the shovel into the pile. To withdraw the shovel, the machine is moved backward; but this is unnecessary, for the shovel will lift itself. When lifted, it takes an incline position at an angle of about 65°, delivering the load onto the conveyor belt which is running



continuously and which carries the ore over the machine and back into the ore car. An automatic deflector delivers the ore into the centre of the car, irrespective of the position of the shovel in the face of the drift.

One man operates the machine by means of levers on a platform placed at the side of the machine. The dipper runs automatically, thrusting into a bank of ore, raising the load up and discharging out of the back of the dipper onto the bottom end of the conveyor-belt, as described above. The shovel runner merely controls the propelling motion of the machine to keep it well up against the bank or swings the shovel from one side of the drift to the other as the pile is loaded, or raises or lowers the beam which holds the dipper, so that it will dig at any elevation required. There are four levers on the platform, two of which are used continuously.

The Halby shoveling machine has been tried out during the present year at the Judson mine on the Menominee Range, and the results have been very satisfactory. The cost of drifting has been reduced to a considerable extent, and it has been found that one man with this machine can do, in the same time, the work which it takes 12 men with shovels to do. This machine is at present loading a 35 cu. ft. car (two tons), in an 8-by 8-ft. drift, in 1½ min. when loading conditions are fair, that is, when there is a fair sized bank of ore in front of the machine. At times the ore bank is smaller and scattered, and under such conditions it takes as high as 4 min. to load a two-ton car. Formerly with hand labor it required 2 men shoveling 20 min. to load a two-ton car under the same conditions that the machine is now working.

The McDermott machine is another type. This, too, is still being worked on at the present time, and to my knowledge is not at present in actual service. This machine as originally conceived, as I understand it, was built around the steam shovel idea with many modifications to fit underground conditions.

There are two machines on the market to-day which are being used in actual mining work. The older of the two is the Meyers-Whaley machine, which is manufactured and used considerably in the south. This machine has been doing very efficient work, cutting down loading costs to a great extent, and is a great labor saver. On the front end of this machine there is a shovel with automatic cam motion, which discharges the ore onto the bottom of the belt conveyor which elevates the ore and discharges it in the rear into a car. The power used for this machine is either electric or compressed air. I understand that this machine is approximately 24 ft. long and weighs about 8½ tons. Its length would probably prevent its general use in the Lake Superior iron ore mines, as it could not be readily moved around our sharp curves and small openings without being dismantled. There is no doubt, however, that under conditions where this machine can be used, it will greatly reduce the cost of drifting and mucking; in fact, this has been proved in the case of the many machines which have been turned out by the Meyers-Whaley Company.

The latest development in a mechanical shovel is the machine known as the Halby shoveling machine, manufactured by the Lake Shore Engine Works of Marquette, Michigan. This machine was first conceived about three years ago, and the first completed machine was shown on the Marquette Range last year.

The cost of operating the machine an 8-hour shift has been estimated as follows:

Power	$3.00
Runner	2.50
Interest on Investment	.40
Repairs	.50
Oils, etc.	.17
Total	$6.57

Figuring 200 tons loaded per 8-hour shift, this is a net cost per ton of .032c with the machine. The labor expense of two men loading by hand for an 8-hour shift would be $5.10. Under similar conditions they would load approximately 30 tons in 8 hours at a cost of 17c per ton.

The experience at the Judson mine has very clearly demonstrated that a mechanical shovel will not only considerably reduce the mucking cost, but will also enable a much more rapid advancement in drifting. I do not desire to give the impression that a mechanical shovel can be used to advantage in mining under all conditions, for this would not be true. These machines would not reduce the cost where the ore is milled down from stopes, and it is not necessary to shovel, as in back-, sub- and block-stoping; but in these mines it can be used to great advantage in development work, by reducing the cost per foot in drifting and by speeding up the development work. A mechanical shoveling machine can be worked to advantage in practically every place where the hand shovel is used in drifting, trenching and developing, and in the slicing and caving system of mining, and in all classes of mining where it is necessary that the ore be shoveled, and in all openings in which the machine will operate.

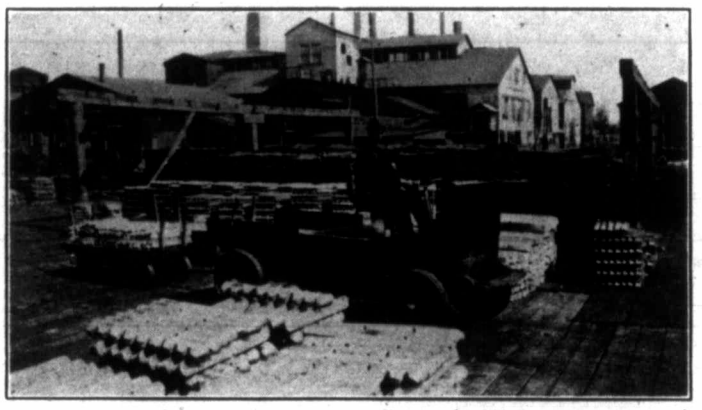
NO CANADIAN NICKEL FOR GERMANY.

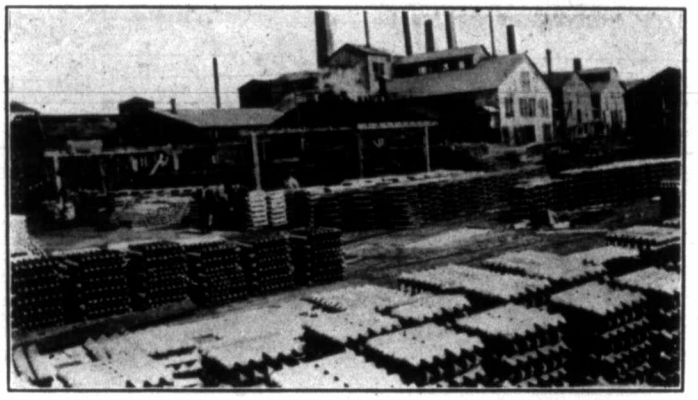
Toronto, July 11.—"There is absolutely no chance of any Canadian nickel getting to Germany either by the Deutschland or in any other way," was the emphatic statement of Hon. G. Howard Ferguson to the "Mail and Empire" last night when referred to the report that the big German undersea boat was to take back nickel in her cargo. "By the arrangement with the International Nickel Company not a pound of nickel can go to Germany, and the best assurance we have that Germany is not getting nickel is the fact that the Imperial authorities are quite satisfied with the condition of affairs.

"The newspaper man—I need not name him—who seeks to give a different impression has committed a grave wrong against the peace of mind of the people, and has done a great deal to hurt recruiting when he says we are furnishing the material to Germany to shoot our own boys. He must know the statement is not true. He knows perfectly, or he should know, of the arrangement with the Imperial Government through the Dominion, with which the Imperial Government is entirely satisfied."

Hon. Mr. Ferguson declared that it would be impossible for Germany to get Canadian nickel even by indirect means. The British through their secret service could trace the destination of every pound of nickel sold in the United States. The Minister stated that there were sources outside of the Canadian mines from which Germany could get some nickel, if she could get it across. There was annually available about 700 to 1,000 tons of nickel as a by-product of the copper mines, and it was known that a considerable amount of this had been accumulated by German interests in the States to await an opportunity to ship it.

Commenting upon the proposals for nickel refining in Ontario, Mr. Ferguson stated that he had every confidence that as a result of the investigations now being carried on by the Nickel Commission, nickel refining in Ontario would become commercially successful.





COPPER INGOTS AT A MICHIGAN SMELTER

In the July bulletin of the Canadian Mining Institute Mr. David H. Browne and Mr. Gilbert Rigg, draw attention to some valuable lessons of the war. They urge that every effort should be made to utilize in peace times what has been emphasized in war, namely, our ability of doing greater things when we get together with a common purpose.

The article, written by Mr. Browne and based on a conversation with Mr. Rigg, deals with men rather than with methods, and is consequently unusually interesting. Elsewhere in this issue we reprint part of it, and commend it to our readers as a thoughtful article conveying ideas well worthy of careful consideration.

The annual report of Mr. A. A. Cole, mining engineer of the Timiskaming and Northern Ontario Railway Commission, has just been issued. Mr. Cole's reports are authoritative records of mining development in the area served by the Ontario Government Railway. Through Mr. Cole the Railway Commission is kept in close touch with the mining industry, a condition which results in better service for the industry and increased business for the railway.

HEINZE APPEAL IS DISMISSED.

Messrs. Gard, Lyell & Co., the legal representatives of the province in London, recently cabled the Premier of British Columbia to the effect that the Heinze petition had been dismissed with costs. This finally disposes of a cause celebre arising from the matter of the taxation of the Columbia & Western Railway lands.

This decision of the Privy Council is of extreme importance in respect to its bearing upon the revenue of the province.

Under the Railway Subsidies Act of 1896, the late F. Augustus Heinze secured a grant of land for the Columbia & Western Railway. In 1898 he sold out to the Canadian Pacific Railway, but retained an individual half-interest in certain blocks of land, amounting to 600,000 acres, it being stipulated that he was to have these lands when he wanted them. The lands he was to receive were taxable in a certain period of time, or when he took his share they would become taxable. If they remained as originally granted to the Columbia & Western, they would become taxable two or three years after the sale to the Canadian Pacific Railway Co.

The Canadian Pacific Railway Co. repeatedly urged upon Mr. Heinze that he should make choice of his share, as they wished to administer the lands. Mr. Heinze declined this invitation and the Canadian Pacific Railway Co. brought action to force him to take his lands.

Lands Become Taxable.

Then, by the effluxion of time, under the terms of the Railway Aid Act of 1896, the lands became taxable; but prior to this period the Canadian Pacific Railway Co. had sold out its holdings to the government.

After the purchase by the government from the Canadian Pacific Railway Co. in 1912, the Columbia & Western lands became liable to taxation. But as Mr. Heinze had never placed any lands in his name, they became registered in the Crown, including Mr. Heinze's one-half interest.

The situation was thus very much complicated, as the government could neither sell nor tax, as they were Crown lands. So, in 1913, the attorney-general of British Columbia brought down an amendment to the Taxation Act, giving the government power to tax and sell lands in such position, without naming Mr. Heinze.

The government thereupon proceeded to assess Mr. Heinze's interest in the lands, which it had title of, and in July, 1914, there was appointed a judge of the court of revision to hear an appeal by Mr. Heinze and on the case being heard judgment was given in favor of the Crown.

Mr. Heinze next appealed to the court of appeal at Victoria, and on July 14th, 1914, Mr. Justice Martin delivered the unanimous judgment dismissing the appeal. Mr. Heinze then appealed to the supreme court of Canada, and Mr. Le Fluer, of Montreal, one of the most brilliant lawyers of the Dominion, appeared for the attorney-general of British Columbia, and on May 4th last judgment was given dismissing the appeal.

FELDSPAR MINE SOLD.

The Richardson feldspar mine, Frontenac Co., Ont., has been purchased by Mr. S. Harry Worth, owner of feldspar mills in New York State. Mr. Worth is president of Seneca-Superior Silver Mines, Ltd. Mr. W. E. Segsworth, one of the chief owners of Seneca-Superior, and consulting engineer for that company, is managing Mr. Worth's feldspar properties.

BOOK REVIEWS.

Practical Geology and Mineralogy, by W. D. Hamman. Published by Way Press, South Pasadena, Calif., 1915.

This is a revised edition of a book which is written with a view to use by those who lack scientific training, but desire to learn something about the elementary principles of geology and mineralogy. The author has used simple language and has avoided technical terms and expressions which would confuse the non-technical reader.

ELEMENTS OF MINERALOGY, by Frank Rutley, revised by H. H. Reid, published by Thomas Murby & Co., London, E. C. Price 3/6. For sale by Book Department Canadian Mining Journal.

This is a new and thoroughly revised edition of Rutley's little book. While much of the original has been conserved, many changes have been made in an endeavor to make the book more useful in determining minerals and assisting the prospector.

Mr. Geo. T. Holloway, chairman of the Ontario Nickel Commission, has written a very interesting introduction, bringing out the business aspect of mineralogy which he says has until recently been almost ignored in colleges and teaching institutions throughout the world. Mr. Holloway says further: "The broad geological aspect of the occurrence and association of minerals can only be gained in the field. . . . A training in economic mineralogy suitable for mining men, among whom, of course, is included the prospector, and with whom is commonly included, although probably wrongly, the ore dresser, can, however, be very efficiently given in our colleges and is one of the most essential, although most neglected parts of a mining man's education. From this point of view, as well as from that of the metallurgist, the training should include, not merely the identification and determination of the nature of the individual minerals which are associated together, but their general physical characteristics and the prospect of being able to separate them either mechanically or by metallurgical means. . . . A knowledge of economic mineralogy is of supreme importance to the mining man as producer and seller, and to the metallurgist as buyer and user."

DETAILS OF PRACTICAL MINING, by the editorial staff of the Engineering and Mining Journal. Published by McGraw-Hill Book Co., New York. Price $5.00. For sale by Book Department Canadian Mining Journal.

This volume is similar to the "Handbook of Mining Details" published in 1912. It is a collection of articles that have appeared during the last two or three years in the Engineering and Mining Journal. The book is full of suggestions for those in charge of operations. The material has been contributed by many authors and does not lend itself readily to classification. The editors have, however, found it possible to group the articles into thirteen chapters headed: Surface plant and operations, explosives, rock drills, shafts and raises, drifting, stoping, timber structures, hoisting, lowering and transporting, shaft conveyances, cars, track, safety and sanitation, and drainage and ventilation. For useful hints on how to do it, we recommend this volume.

BENZOL*

By Geo. Taylor

One of the most important matters at present before the carbonizing world is the recovery and rectification of benzine and its homologues from the gases evolved in the destructive distillation of coal. Knowledge of the formation of benzine in gas is not very conclusive. It has been found that in distilling coal at low temperatures paraffins result, and that on increasing these temperatures a diminution in the amount of paraffins takes place, along with the production of benzols, until at 650 deg. C. the condensable hydro-carbons are almost exclusively those of the benzine series. In coke-oven gas the volume due to the presence of benzol as vapor ranges from about 0.8 to 1.6 per cent. of the total, which corresponds to 2-4 gallons of benzol per ton of coal distilled. The removal of the benzol is, of course, attended by a corresponding diminution in the volume of the gas, a falling off in calorific value of from 32 to 64 B.T.U. per cu. ft. gross, and a considerable loss in illuminating power. In order that little of the benzol shall be removed in tar extraction, it is necessary that this process be carried out at a temperature of not less than 35 deg. C., the gas being suitably cooled for ammonia scrubbing afterwards. In the case of direct processes, where the tar fog is extracted from hot gas, there is no risk of benzol being removed with the tar. Before entering the benzol scrubbers the gas should be freed from water by a trap.

Washing Mediums and Plant. Presuming then that the gas is freed from ammonia, tar, and mechanically-carried moisture, and that its temperature is below 25 deg. C., the next problem is the absorption of the benzol as completely as possible. Two absorbing mediums are in general use—coal-tar creosote and blast-furnace oil. The methods of using these oils being different, it is necessary that they should not be mixed. Considering that the ultimate aim of the process is the production of pure benzine, etc., it is advisable to use oils that contain the smallest possible amounts of matters not helpful to absorption. Such are phenols, phenoloids, basic compounds, naphthalene, and tarry substances. If present, these impurities should be removed from the oil before its use as an absorbent, as by this procedure the life of the oil is prolonged, and the loss in washing the recovered benzols is much reduced; also, the water separates more easily from the oil in the storage tanks.

With regard to the plant necessary for oil washing, tower scrubbers of about the same capacity as those used for ammonia extraction are usual, and oil is circulated through them in a similar manner to that in which liquor is circulated in ammonia scrubbers. There is, however, a growing tendency to adopt rotary scrubbers, usually of the brush type. These scrubbers are highly efficient, and by reason of the more intimate contact of oil with the gas a higher percentage absorption is obtained than is the case with tower scrubbers; also, the plant can be arranged so that the power expended in circulating the oil is less. Another advantage is economy of ground space. A rotary scrubber of 8 ft. internal diameter, with eight to ten washing chambers, is capable of dealing with gas from 200 tons of coal per diem.

According to the quantity of coal carbonized, the circulating stock should be from 40 to 80 tons, and the fresh oil required to make good losses runs from 20 to 35 gallons per 100 gallons of benzol made—unless it is salty, when somewhat more will be used.

Distillation. It is generally admitted that, for economy, an exchange of heat should take place between the incoming rich oil and the hot debenzolized oil from the still. In some cases the rich oil is heated further by steam heaters. This is particularly the case where the still is being worked up to its full capacity and space cannot be afforded to allow the dephlegmatory action of a colder oil. The stills themselves fall into two classes: one in which powerful steam heaters are placed in a chamber at the base of the still, with the intention of drying the effluent oil, and the other which works with wet steam only. In the latter type provision should be made for separating the water from the oil whilst still hot. Vapors of water and benzol leave the still at about 100 deg. to 112 deg. C., and must be partially condensed or dephlegmated in order that a 65 per cent. benzol may be obtained. The fraction which condenses at a temperature of less than 95 deg. C. is the required material. The heavier matters consist of water, naphthalene, light oil, and phenols, and are usually small in quantity. In connection with the condensing of the benzol it is highly important that no back pressure should be thrown in this process. If this is not the case, difficulty will be experienced in denuding the oil of benzol, and losses will take place.

A high saturation of oil, where consistent with a good return gas, is much to be desired; also, the oil should certainly be heated to 110 deg. C. in the still. Should this not be the case, and the effluent oil contains over 0.5 per cent. of benzol, the steam supply should be superheated. From information to hand concerning two plants, the introduction of superheated steam increased the yields of benzol about 5 per cent.

Purification and Fractionation. Basic impurities are easily removed by acid washing, but if it is necessary to remove thiophene also, the acid washing must be repeated and prolonged until the laboratory sample gives a negative result by the isatin test. In any case, the completion of the washing should be ascertained by distilling a sample from the washer and treating the distillate corresponding to 90 per cent. benzol with 10 per cent. of pure sulphuric acid.

The acid washing is followed by a water washing. Here care must be taken to avoid a violent agitation, but the water should rather be used to rinse the sides of the washer, as some benzols have a tendency to emulsify with water and cause large washing loss. The acid washings treated with water separate into solid resinous matter and an acid liquor, from which pyridine may be separated by treatment with ammonia liquor and the resulting sulphate solution used in the sulphate house. The benzol is then washed with an excess of 20 deg. Tw. caustic soda solution which removes the traces of sulphuric and sulphurous acids and any phenols that are present. The caustic solution may be used until spent.

The still employed for "blowing over" the benzol is of 3,000 to 4,000 gallons capacity, has twelve to fifteen trays in the fractionating column, and is provided with direct and indirect steam heating. The charge may be considered as worked off when the distillate boils at 200 deg. C., or when naphthalene becomes evident. The once-run benzol must then be separated into commercial fractions by distillation in a rectifying still. Many types of these have been erected, the following being the essential features:—The body of the still should be of the short horizontal, cylindrical shape, and heat supplied by a large number of steam pipes running through the still and a wet steam coil. The fractionating column should be of ample capacity, the two main varieties now at work being the cap and plate introduced into benzol distillation by Heckmann, and the perforated plate originally adopted in Coffey's still. Differences in detail are found in the size and shape of the caps, depth of seal, position and shape of overflow; also in the number and size of holes in the perforated plate. It is worth noting that whilst newcomers in this field erect complicated plant, with cap-and-plate rectifying columns, benzol distillers of old-standing show a preference for simple plant and perforated plate column. As a number of stills of the latter kind are successfully producing pure benzine and toluene, it would appear that the

*Abstract of a paper read December 18,, before the Coke Oven Managers' Association, England and published in Iron & Coal Trades Review Dec.

opinion prevailing in some quarters that only the cap-and-plate column will produce a pure product is scarcely correct.

The points at which the distillates should be changed into different receivers may be ascertained in two ways. The approximate quantities of each distillate are usually known. If, therefore, the tank into which the distillate is running gives the ccrrect distillation test the receiver should be changed. This necessitates the constant attendance of someone able to make and interpret the tests. Alternatively, a litre sample may be fractionated in the laboratory, and the results being compared with the work results, it is possible to forecast the yields from future distillations with a fair degree of accuracy.

TUNGSTEN PRODUCTION IN U.S. IN 1915

The production of tungsten ores in the United States during 1915 broke the record and was apparently equivalent to about 2,165 short tons of concentrates, carrying 60 per cent of tungsten trioxide (WO_3), and was valued at more than $2,000,000. These figures are based on preliminary returns to the United States Geological Survey. The largest previous output of tungsten ore was in 1910, when 1,821 tons was produced.

Conditions and prices in the tungsten market were unsettled and somewhat anomalous. Although the price in the latter part of 1914 was $9 or more a unit, 60 per cent ore was sold in the early part of 1915 as low as $5.80 a unit, so that tungsten mining did not start very briskly. Early in the summer, however, floods of orders for munitions of war caused a great demand for high-speed steels, to be used in cutting shells, rifle barrels, etc.; an embargo was declared by the British Goverment on the export of tungsten ores from any part of the British possessions, and there was soon a countrywide scramble for tungsten ores. Probably no one foresaw the height to which the price of tungsten would rise, and some operators contracted for ores at prices which in ordinary years would be high, but which were soon exceeded by several hundred percent. Tungsten metal was also contracted for at prices much below those afterward reached. In the fall the prices of tungsten reached un-heard-of heights; $48 per unit was paid for numerous lots, $50 for some, and even higher prices were reported. The prices moved upward so rapidly and unexpectedly that strenuous tungsten prospecting did not follow at once, but early in the fall a large number of men were in the field looking for deposits.

The mining activities are described by Frank L. Hess in some detail. The output of the Boulder (Colorado) field was for various reasons not increased as had been hoped. Many properties had been worked by leasing, so that there was no development of ore bodies, for the ore had been removed as fast as it was exposed, and it is reported that in the Conger mine, whose shaft was sunk below the 800-foot level, ore development was disappointing. Sinking is said to have been continued. The output of the district was estimated by the Boulder County Metal Miners' Association as equivalent to 960 tons of 60 per cent concentrates.

In the Atolia (California) field there were great developments. The Atolia Mining Co. is reported to have employed more than 300 men, and many men worked the desert sands in the vicinity for float scheelite. P. J. Osdick discovered rich ore east of the Atolia Mining Co's. property and made large profits. On and near the Baltic claim a number of men worked the gravel of a shallow gulch for scheelite and the sands on the Sunshine and other claims are also reported to have been worked at a profit. Several gold mines also produced some scheelite. The Consolidated Gold Mines, in Randsburg, had found water at a depth of about 500 feet and this has been piped to the Atolia Mining Co's. mill, about 5 miles distant. Formerly water was hauled on the railroad for a distance of about 50 miles. The company is reported to have erected a new mill to treat its tailings.

Several discoveries of tungsten ores were reported from Gilpin County, Colo., but the most extensive discoveries, as indicated by the number of outcrops, were made in White Pine County, Nev. Veins of scheelite were found at several places between the Minerva district, 30 miles south of Osceola, and Cherry Creek, 50 miles north of the settlement. Some of the veins were formerly prospected for precious metals, but the scheelite was not recognized. The hubnerite mine and mill 12 miles south of Osceola were actively operated toward the close of the season; the mill at Camp Bonita, on the east side of the Snake Range, was operated part of the year, and mills were erected or started by the St. Anthony Mines Co. at Toy (Browns), Humboldt County, by A. R. Shepard and associates in the Reagan district, and by the Doyle Mining Co. in Sacramento Pass, White Pine County. Some hubnerite was dry washed from desert sands at Round Mountain and Spanish Springs, Nev.

The dumps of gold mines at White Oaks, N. Mex., were worked over for hubnerite and yielded a considerable quantity of concentrates, and at Tip Top, Ariz., a mill was under construction to work the tailings and dumps of the old Tip Top silver mine for the wolframite they contained.

Mills were erected by the Primos Chemical Co. at Dragoon and by the National Tungsten Co. at Arivaca, Ariz., for treating the tungsten ores, and tungsten was produced at these places and at Camp Wood, Yucca, Oracle, and other points.

At Lead, S. Dak., the great Homestake gold mine produced wolframite from the claims west of the great open cut and the Wasp No. 2 mine, 2 miles south, produced a considerable quantity of ore. It is erecting a concentration plant. Only a little ore was produced in the southern Black Hills.

Small quantities of tungsten were produced in Idaho and at Silverton, Colo., and a few hundred pounds was saved from the old concentrates of the gold placers at Nome, Alaska.

The wolframite deposits on Tungsten Peak, near Cathedral Peak, 45 miles northwest of Oroville, Wash., became the property of the Tungsten Mines Co. and the new owners produced some ferrotungsten in an electric furnace at Tacoma.

The price of tungsten as metal or ferrotungsten rose from $1 a pound in January to $8 a pound in December. In the same period tungsten steels increased in price from 60 or 75 cents to $3 a pound.

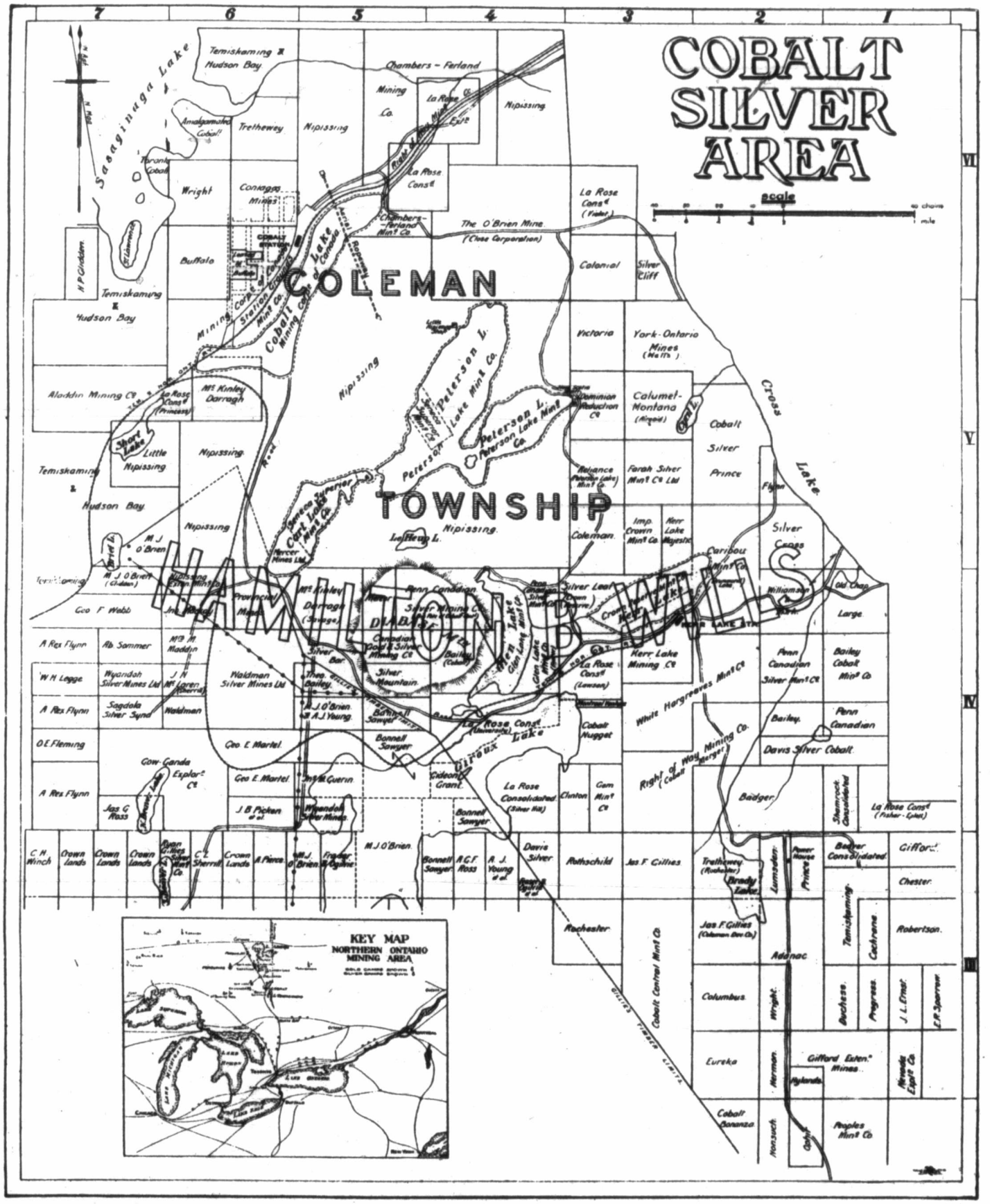
ROAD TO FLINFLON.

Commissioner John A. Campbell informs a Pas Herald representative that the building of a road between Sturgeon and Athapapuskow lakes has been assured by the Government. In a few days an engineer will be sent into the northland to make all the necessary measurements, on the completion of which tenders will be at once called for for the construction of the road.

The production of the Cobalt area is unique in character. Cobalt area is not only the world's greatest producer of silver, but it absolutely controls the market for cobalt, has a large output of arsenic, and is one of the few producers of nickel.

RIGHT OF WAY.

About four cars of ore per week is being shipped by the Right-of-Way Mining Co. to the Northern Customs concentrator at Mileage 104. Practically all of this is coming from the old stopes on the 83-foot and the 142-foot levels. All of it is low grade, however, but can be milled profitably. All operations are being carried on through the north shaft.—Cobalt Nugget.



Map of Cobalt Lake Area, published by H. B. Wills, Toronto. Copies may be obtained free on application to H. B. Wills.

BUREAU OF MINES FIELD PARTIES.

The Ontario Bureau of Mines has a number of men in the field making geological maps and investigating mineral resources. Mr. C. W. Knight is doing some special work in Pre-Cambrian areas. Mr. A. G. Burrows is examining the country along the Canadian Northern Railway from Longue Lac to Lake Nepigon. Mr. P. E. Hopkins is at Tashota mapping the Kowkash area. Mr. Ellis Thompson and Mr. H. B. Ellsworth are examining the Rognon property and neighboring areas. Prof. A. L. Parsons is examining molybdenite properties. Prof. M. B. Baker is studying serpentine areas. Dr. A. Ledoux is collecting mineral specimens for exhibition purposes.

Dr. W. G. Miller, Provincial Geologist, and Mr. T. F. Sutherland, chief inspector of mines, are on the way to New Caledonia to examine the nickel mines there. Mr. E. A. Collins is acting chief inspector of mines.

The Canadian Government will enlarge the mint at Ottawa to meet the great demand for gold caused by the war. A new temporary building will be erected immediately adjoining the present permanent structure, and the output of gold coinage will be considerably increased.

KIRKLAND LAKE.

The construction of the power transmission line from the plant of the Northern Ontario Light and Power Co.'s station at Cobalt to Kirkland Lake is now under way and will, it is expected, be completed within three of four months. The route will be almost due north, the company having obtained right-of-way from the various townships between Cobalt and Kirkland Lake. The line will almost parallel the T. and N. O. Railway, although it is not actually located upon it. The power line will pass through the Boston Creek camp, where there are prospects for a big demand for power in the near future and at Kirkland Lake there are now five operating mines with prospects of others.—Cobalt Nugget.

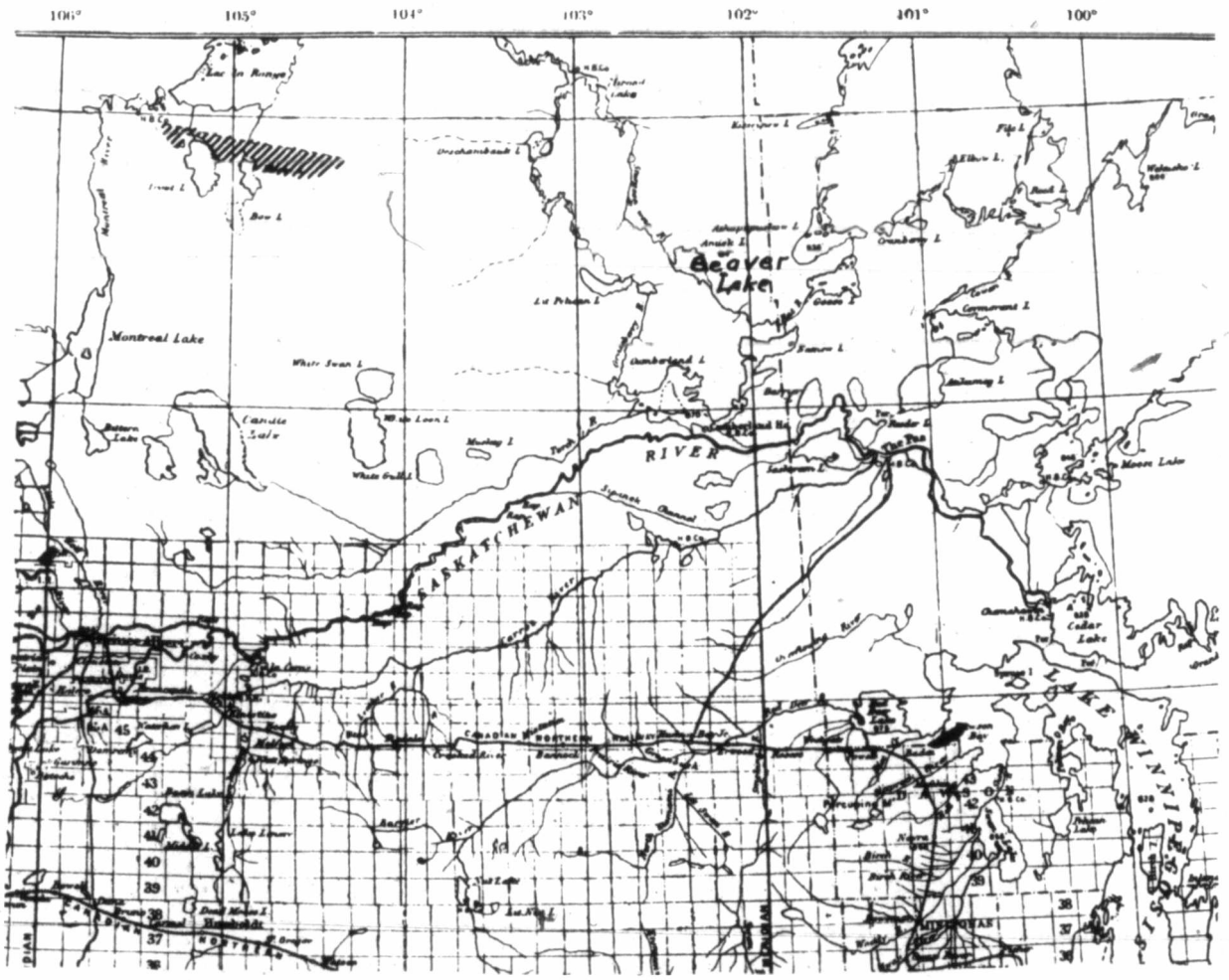
Map of Cobalt Silver District. (From relief map prepared by A. A. Cole).

RED JACKET.

The workings of the old Red Jacket are practically free of water now. The pumps were started up about ten days ago and as the workings are not extensive the job was not a heavy one. The power plant of the old Red Jacket Co. was burned several years ago, but as the hydraulic air line runs close by, the question of power was easily solved by making a connection with it. Mr. Frank Hatch is managing the work for the syndicate operating the property.—Cobalt Nugget.

THE PAS MINING DISTRICT

The Pas, Manitoba, July 7.—The establishment of The Pas mining district has been the subject of much favorable comment during the past week. The government, and particularly the Hon. Dr. Roche, are being commended for their early appreciation of the needs of the mining community. We understand that much outside opposition was brought to bear, but, fortunately for the mining interests of new Manitoba, the government took the proper view of the interests of the man on the ground. The prospectors, who have pioneered the district and brought it into the limelight, at the expense of time and money, are the men who deserve consideration, and this is the view that evidently determined the government to establish a mining district with headquarters at The Pas—the only place that can serve the prospectors.



A portion of the Pas District, and of the Saskatchewan Area to the west.

Hitherto the prospectors have been served by a subagency at The Pas. While this enabled the prospectors to record their claims, it served no other purpose. Complete records of claims recorded were kept at Dauphin and Prince Albert. Some claims were recorded only at the head offices, and consequently the prospector, to ascertain correct information, was forced to visit these places at considerable expense and loss of time. Blanketing claims was thus an easy matter.

The sale of claims was for the same reason unsatisfactory and tedious, as the buyer could not readily secure all the information desired. Prospective buyers have complained very bitterly of this fact.

Under the new arrangement, the office at The Pas will furnish all necessary information. Claim holders, prospectors and buyers will be able to ascertain full information at once. This is as it should be, since the mining area is contiguous to The Pas, and all opposition was, therefore, purely selfish, but nevertheless was strong, and the Hon. Dr. Roche deserves credit for having considered only the needs of the district, and of the men who are responsible for its development.

The mineral bearing area of the Northland lies chiefly in the Province of Manitoba. The western extremity penetrates the Province of Saskatchewan a short distance at Beaver lake. The Beaver lake fields are, therefore, a part and parcel of the Manitoba mineral belt, and can only be reached readily via The Pas. Logically the Beaver lake fields should be included in The Pas mining district, but, unfortunately, the government was not able to say "No" to Saskatchewan demands that the provincial boundary must be recognized. The government cannot be blamed for the handicap thus placed upon or rather not removed from Beaver lake prospectors, and it is now up to those interested in the Beaver lake fields to do their utmost to overcome the selfish opposition that deprives them of the privileges to be enjoyed by their neighbors a few miles across the imaginary fence.

The new district, as established, will be a boon to the mining industry in New Manitoba, and will encourage more energetic efforts to develop the marvellous mineral wealth that has been proven to exist. Not only the mining men, but every resident of the district has every reason to be pleased, and to hope that this evi dence of the good-will of the government is only the beginning of many things that will be done to develop the resources of Northern Manitoba.—The Pas Herald.

A NEW GOLD RUSH.

A number of local prospectors have gone into Allard Portage, a point about 67 miles north as the crow flies, from Amos on the National Transcontinental Railway and about 200 miles east of Cochrane. According to what can be learned at present the first discovery was made by James McDonough, of Haileybury, on a creek leading off the Hurricanaw river. The trip is one hundred miles by canoe. Some time ago McDonough found the lead and brought down some samples that looked very promising, but on assaying these they ran higher than anticipated. The lead is said to be between twenty and thirty feet wide.—Cobalt Nugget.

COBALT STATION IN 1916
Showing tube mills for oil flotation plant

MILLER INDEPENDENCE.

So encouraging have been tests by the Nissen stamp mill that the Miller Independence Mines, Limited, of Boston Creek, has decided to instal a 4½-foot ball mill and maintain a steady production. It is thought that the addition will enable the company to secure a milling capacity of about forty tons a day. As the ore is not free milling, containing gold carrying tellurides, iron and copper pyrites, the concentrates will be shipped. A flotation system may also be used.

The ore shipped to date and the two tons shipped was taken from open cuts along the flat vein over a distance of about a thousand feet. The shaft was sunk 150 feet north of the vein outcropping, and had the vein continued its slight dip would have been cut at fifty feet. Evidences in the shaft point to it having straightened up and a level was established at 75 feet. Some delay has occurred by trouble with the drills and crosscutting handicapped. A second boiler for the mill will be hauled out shortly.—Northern Miner.

ADANAC.

Cobalt, July 8.—The vein on the Adanac property upon which ruby and native silver was found this week at the 800-foot level is about 14 inches in width in some places. The new find is very promising and may prove important. Within the past six months or more several finds have been made on this property, but the high-grade has so far been very patchy, none of the discoveries proving of any consequence. The west winze, in which the discovery was made, is now about 315 feet in depth and the management proposes to continue this to a depth of 400 feet, and from that level crosscut to tap four other veins having the same characteristics as the one in which the ruby silver was found below the 300-ft. level. From the 400-ft. level a raise will be put up to connect with the present shaft.—Cobalt Nugget.

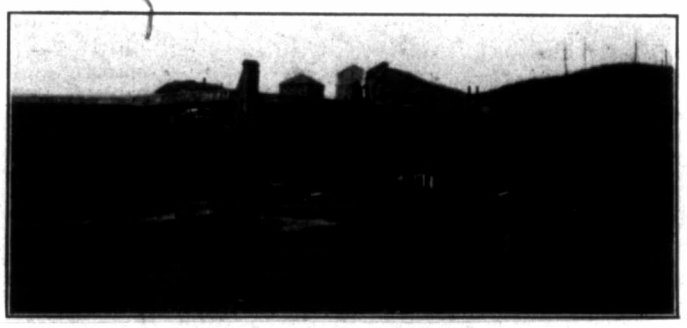
QUAKER CITY.

Arrangements have been made whereby the old Quaker City property will be re-opened and operated. Already pumps are going de-watering the shaft and workings, after which an examination of the property will be made preparatory to the commencement of a program of further exploration. The property is near the Beaver and Temiskaming and its good location leads to the belief that exploration may lead to the finding of ore in paying quantities. The shaft is about 210 feet in depth with 92 feet of drifting at the 110-foot level. The formation is keewatin and granite. The company is controlled by Philadelphia men and is capitalized at $1,000,000 with the shares of a par value of $1 each.—Cobalt Nugget.

KENABECK SILVER.

Cobalt, July 8.—Since the first of the year there has been considerable activity in the Kenabeck district. In Auld township the Kenabeck Silver Mines, Limited, have been doing considerable work on a Veteran claim on 160 acres. This company has been operating since February and good silver values have been obtained from two veins which run parallel to each other across the property. The company has undertaken the exploration and development of these claims in a manner that indicates an extensive plan of operations. A five-drill compressor plant has been installed, driven by two 40 h.p. boilers. On the No. 1 vein one drill is sinking the main shaft and another drill will be put on No. 2 vein this month to drive a tunnel into a high hill, following the vein all the way.

The vein matter contains silver, cobalt and nickelite and the company claims that shipping ore is in sight and now that the air plant has been installed and in operation it is the intention to push development energetically. Mr. W. H. Jeffrey is manager.



McKinley-Darragh Mine, 1916

DOME LAKE.

The Dome Lake is developing what looks to be the best vein found in the mine to date. It was located on a crosscut west of the shaft and besides showing spectacular values is in one place twenty feet wide. The average width along the fifty odd feet it has been proved up so far will average better than twelve feet. Where first cut on the 300-foot level values ran up to ten dollars a ton, but short raises made on it have shown assays across twenty feet of close to fifty dollars a ton, values greatly increasing with the work in the raises.

The new vein promises to raise the average grade of ore treated, though last year with a small mill that has since been doubled, the Dome Lake made a profit. Some directors and large shareholders have been visiting the property lately and are greatly elated over the strike.—Northern Miner.

McINTYRE.

Diamond drilling on the McIntyre from No. 5 shaft on the 500-foot level has indicated an orebody at a depth of 900 feet that shows $36 across 22 feet. The "boundary vein" along the McIntyre Extension line on the 100-foot level has been drifted on the 100 feet into both properties and shows a continuation of both values and width along the length as when the crosscut first went through it. As this was 25 feet of $15.30 ore the importance of the orebody is just becoming known.

The station at the 1,000-foot level has been completed and raising to connect up with No. 5 shaft is about to start. A crosscut will be driven south at this level from the station to cut the contact between the quartz porphyry and basalt. The large vein found on the 700-foot continues to show high values over widths of twenty feet and more.—Northern Miner.

Cobalt Lake Mine 1916

HEDLEY GOLD MINING COMPANY.

During the year 1915, 74,265 tons of ore from the Nickel Plate mine was treated at the company's 40-stamp mill and cyanide plant at Hedley, Similkameen, B.C., yielding 41,857.15 oz. of gold, valued at $865,187.25, or an average of $11.65 a ton. The mining costs a ton were $1.63; development, $0.19; treatment (crushing, concentration, and cyaniding), $2.40; general, $1.61; or a total cost of $5.83 a ton. The extraction was 92 per cent. The total profit, including revenue obtained from all sources, was $392,552.84, or $5.28 a ton. The dividends paid for the year totalled $300,000. It is contemplated to in the near future effect a change in the ore-dressing practice by discarding concentration, and adopting an all-sliming and cyanidation system.

For purposes of comparison, to show the progress made by the company in recent years, the following figures have been taken from the company's printed annual reports:

Lode gold ..	*1,181,713	24,426,009	*1,249,915	25,835,742

Year.	Tons of ore Crushed.	Receipts.	Expenditure.	Net. Profit.
1910	46,828	$527,137.65	$255,369.98	$271,767.67
1911	57,815	688,966.50	370,814.29	318,152.21
1912	70,453	748,133.14	362,253.14	385,880.00
1913	70,796	802,330.40	397,075.51	405,254.89
1914	78,494	797,340.76	409,112.11	388,228.65
Totals ...	324,388	$3,563,908.45	$1,794,825.03	$1,769,283.42

The receipts include interest on moneys in bank, received during the five years, $40,642.90. The yearly averages for the five-year period are as follows: Tons of ore crushed, 64,877; receipts, $712,781.69; expenditure, $358,925; profit, $353,856.69. The total of dividends paid during the five years was $1,488,000, on an issued capital of $1,200,000.

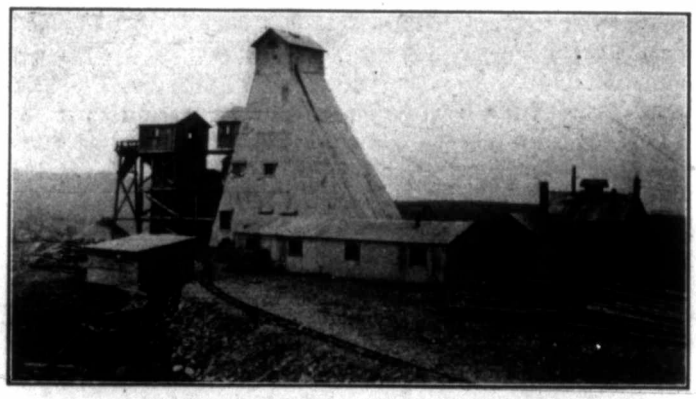
BOOK REVIEW.

COAL MINERS' POCKETBOOK—11th Edition, Revised, Enlarged and Reset—McGraw-Hill Book Co., New York—For sale by Book Department, Canadian Mining Journal.

This book, formerly known as the "Coal and Metal Miners' Pocketbook," contains a wealth of data arranged conveniently for handy reference. The contents are indicated by the following section headings: Weights and Measures; Mathematics; Surveying; Mechanics; Strength of Materials; Concrete; Masonry; Wire Ropes; Power Transmission; Properties of Materials; Hydrostatics; Hydraulics; Heat and Fuels; Boilers; Steam Engines; Compressed Air; Electricity; Internal Combustion Engines; Prospecting; Mining; Explosives; Supporting Excavations; Hoisting; Haulage; Ventilation; Mine Fires; Preparation of Coal; Safety and First Aid; Mine Safety; Tables of Natural Sines, etc.; Logarithmic Tables; Traverse Tables; Glossary of Mining Terms.

The volume is an attractive one of 1,172 pages bound in leather.

On June 6, Mr. Seymour Baker arrived at Ashcroft, B. C., from England, en route to Barkerville, Cariboo. Mr. Baker is continuing to give attention to gold-quartz mining. In the Annual Report of the Minister of Mines for 1914 particulars were given of his work on the Prosperine group, and it was added that "in the operation of the hydraulic mines in the district a small percentage of concentrates as well as the gold is collected in the sluice boxes. These concentrates consist of the typical black sand—mainly magnetite—as well as various sulphides, such as galena, iron pyrites and arsenopyrite and in addition nails, lead shot, pieces of iron, etc. As might be expected, these concentrates contain high



Chambers-Ferland Shaft-house, 1916.

value in gold, which probably occurs partly in the sulphides and partly as 'rusty' gold which will not amalgamate. They are put through a rough treatment by applying cyanide to brighten the gold and then by amalgamation. This treatment is not very efficacious, and, of course, does not extract the value from the sulphides. The residue is thrown away, as, so far, it has not paid the operators to bother with it further.

"For the past five years Seymour Baker has been working out a cyanide scheme to treat these concentrates. He has a lease on the old Government reduction works, a couple of miles below Barkerville, and has put in a small cyanide-leaching system. As yet he has not actually treated any of these concentrates in commercial quantities, but he hopes to be able to do so before long. The whole thing is, however, not of great importance, as the actual quantity of concentrates secured in the hydraulicking operations is small."

PERSONAL AND GENERAL

Prof. Albert Ledoux, of the University of Brussels, is collecting for the Ontario Bureau of Mines mineral specimens for exhibition purposes. Prof. Ledoux, during the past year has been on the staff of the Department of Mineralogy, University of Toronto.

Mr. A. G. Burrows, of the Ontario Bureau of Mines, is making an examination of the country along the C. N. O. Railway, from Longue Lac westerly to Lake Nipigon.

Mr. P. E. Hopkins, with three assistants, is at Tashota, continuing the geological mapping of the Kowkash area.

Mr. Ellis Thompson and Mr. H. B. Ellsworth have been engaged by the Ontario Bureau of Mines to map the Rognon and adjoining properties near Dryden, Ont.

Prof. A. L. Parsons of the University of Toronto, is examining molybdenite properties for the Ontario Bureau of Mines.

Prof. M. B. Baker, of Queen's University, is at Long Lake mine, in the Sudbury district, for the Ontario Bureau of Mines.

Mr. E. A. Collins, one of the inspectors of mines of Ontario, is acting chief inspector during the absence of Mr. T. F. Sutherland, who is en route to New Caledonia.

Mr. J. B. Tyrrell, of Toronto, is spending some time in British Columbia. His address while there will be Vancouver Hotel, Vancouver, B.C.

Mr. F. K. Brunton, formerly assistant superintendent the British Columbia Copper Co's smeltery at Greenwood. B. C., is now on the staff of the A S & R Co's smelting works at Garfield, Utah.

Mr. O. B. Perry, general manager of the Yukon Gold Co., was in San Francisco last month.

Mr. L. P. Robert, of the West Canadian Collieries company's staff, has returned to Blairmore, Alberta, from a trip to Illinois.

Mr. Geo. A. Gordon, superintendent of the Standard Silver-Lead Mining Co's silver-lead-zinc concentrating mill at Silverton, Slocan Lake, B. C., was in Nelson, on June 15, en route to Winnipeg, Manitoba.

Lieut. L. B. Reynolds, of Nelson, B. C., one of a number of Kootenay mining engineers who a few weeks after the outbreak of the European war volunteered for active service and were soon engaged in engineering work on the Continent, was one of several wounded men who returned to Canada last month. Several years ago Lieutenant Reynolds was manager of the Eureka copper mine, at the head of Eagle creek, a few miles west of Nelson.

Mr. T. J. Vaughan-Rhys, for several years associated with various mining enterprises in Portland Canal division and other parts of the northern Coast district of British Columbia, recently took charge of development work at a mine in Cedar Canyon district, on the State of Washington side of the International Boundary line.

Mr. F. T. Hamshaw, formerly operating in Atlin mining camp, in Cassiar district of British Columbia, was in Spokane, Washington, last month.

Mr Bruce Rose, of the Geological Survey of Canada, has resumed geological work in the neighborhood of Blairmore, in Southwest Alberta.

Dr. Alfred W. G. Wilson, of the Mines Branch of the Canada Department of Mines, visited West Kootenay district, British Columbia, last month. He was accompanied by Mr. A. Buisson, also of the Mines Branch.

Mr. Jas. F. Flynn, who is operating a copper mine at Massey, Ont., was in Toronto last week.

Mr. W. Yolen Williams, of Spokane, Washington, who was for years superintendent for the Granby Consolidated Co. during the period in which the chief part of the development of its big copper mines in Boundary District of British Columbia was done, was at the Crescent property, south of Ainsworth, B.C., last month.

Mr. J. J. Warren, of Toronto, managing director of the Consolidated Mining and Smelting Co., has been spending some time at the company's big reduction work at Trail, B. C.

Mr. G. G. S. Scott has returned to Toronto after being some time in the West. Recently he has been examining properties in The Pas mining district.

Dr. J. A. Bancroft, of McGill University, leaves this week to make a reconnaissance survey of that portion of the Trancontinental Railway between La Tuque and Bell River.

Siemens & Co. of Canada, Montreal, have recently supplied to the Canadian Government Department of Public Works, 17¼ knots of deep sea type, submarine cable.

Capt. Jas. G. Ross, who went to France with the 13th Canadian Battalion Royal Highlanders of Canada, and was wounded at Festubert, has returned to Canada and resumed his practice as consulting mining engineer with the Milton Hersey Co., Ltd., Montreal.

OBITUARY

The death occurred in Chicago on June 16 of Mr. Samuel H. Reynolds, of Winnipeg, Manitoba, formerly of Victoria, B. C., at which latter place he was, several years ago, managing director of the Pacific Coast Coal Mines, Ltd, which operated the Fiddick coal mine at South Wellington, Nanaimo district of Vancouver Island, and commenced the development of the Suquash mine, Malcolm island off the northeast coast of Vancouver Island. About October, 1913, being an experienced engineer, he was appointed head of the Greater Winnipeg Water Commission, which has charge of the water supply undertaking now in progress for Winnipeg and surrounding district. He was a member of the Canadian Mining Institute, having joined in 1910. His death was sudden, the result of heart failure. He had been to New York on a business visit and was on his way back to Winnnipeg when he was stricken and died.

Early in June the death occurred of William Teague, a widely-known British Columbia pioneer, who had lived in that province about 58 years. He was a native of St Day, Cornwall, England, and was 81 years of age at the time of his death, which took place at the home of a daughter, Mrs. W. A. Nunan, in Seattle, Washington. He went to British Columbia in the Oregon, the first steamer to make the call at Victoria from San Francisco. Proceeding thence to Hope, on Fraser river, he worked at placer-gold mining on Cornish bar. In 1873 he was appointed Provincial Government Agent at Yale, where he remained twelve years. After leaving the Government service, he resumed mining, but later retired to private life.

SPECIAL CORRESPONDENCE

Mineral production during the latter part of June and the first half of July will be less than had been expected, by reason of the flooded state of mountain streams and the consequent difficulties attending transportation of ore. A late cold spring prevented the usual gradual melting of the snow that during last winter had accumulated on the mountains. About the middle of June summer weather was experienced and the snow melted so rapidly that rivers and creeks soon became torrents and damage to roads, in many gulches constructed on the banks of the streams, was done in numerous places throughout the mountainous districts. Water ditches, flumes and pipe lines were carried out here and there, and in many places where power was being generated direct by the use of waterwheels or in others where there are hydro-electric power installations, trouble resulted, though in most cases the interruption caused to mining and milling operations will not be of long duration.

Among dividends recently declared by metalliferous mining companies operating in the province is that of the Granby Consolidated Co., which will shortly pay a dividend of $2 a share instead of $1.50, which latter had been the amount per share of profit distributions for some time past. The total of the dividend last declared will be $299,970, as compared with previous amounts of $224,977. The total of the three dividends for the year to date will be $749,925.

East Kootenay.

The **Sullivan mine** has been shipping to Trail approximately 1,800 tons of ore a week latterly, but the washing out of a railway bridge will check the output temporarily. Probably there is a sufficiently large reserve of Sullivan ore in the stock pile at the Trail smelting works to keep the lead furnaces going until fresh supplies can be sent from the mine at Kimberley. Ore for the electrolytic zinc plant at Trail is also obtained from the Sullivan, though not in such large quantity as for the lead side of the reduction works.

Reports current are to the effect that there is a **brisk demand for coal and coke** from Crowsnest district mines and coke ovens; larger, in fact, than the collieries can supply with the scarcity of good coal miners that has been experienced lately. The streams flowing in the Elk valley, down which run the railways that transport fuel to Kootenay and Boundary districts, have been in high flood for a week, and traffic has been carried on under difficulties, yet the railway companies are doing all in their power to overcome obstacles to the regular maintenance of a sufficient supply of the coal and coke needed for the mining and smelting industries of the districts above mentioned.

West Kootenay.

Ainsworth.—A great rush of water following the rapid melting of snow at high elevations during a recent spell of summer weather, caused such damage to the water-line to the New Canadian Metal Co.'s power house that a temporary suspension of operations in both the **Bluebell** mine and the concentrating mill at Riondel, Kootenay Lake, has resulted. The dam at the intake, and part of the pipe line, were damaged. Repairs are being effected, and it is hoped that the mine pumps will soon be at work again and that it will be practicable to shortly resume the extraction of ore and get the concentrator in operation once more.

Preparations are being made to start the Cork-Province concentrating mill on its season's run, now that there is plenty of water available for power purposes. During recent weeks there has been only a few men at work in the mine. About two carloads of crude ore of shipping grade is ready for hauling to the K. &. S. railway. Another important shoot of ore has been opened in the mine, so it is expected the ensuing season's results will be profitable. High water in Kaslo creek has caused washouts in several places, so that the running of railway trains has been interrupted, but it is unlikely the delay will last more than a week or ten days longer.

Slocan.—Leaving out of consideration the temporary set-back caused by flood waters, mining matters generally are in a satisfactory condition in this district. The Slocan Star has been shipping silver-lead ore and concentrate in larger quantity during quite recent weeks than for some time past, and the additions being made to mine and mill plant are preparatory to further increasing the output. The construction of a concentrating mill for the Surprise, which last year was one of the larger producers of the district, is in progress. Plans for the further development of the Noble Five, in which good ore was found recently at considerable depth, are having the consideration of the owners. The Ruth-Hope mill has had its water supply facilities improved. The Rambler-Cariboo has been doing well, and its outlook is reported to be most satisfactory. The Lucky Jim operations have been profitable, and notwithstanding that there has been a temporary stoppage of ore shipping, this will not be a serious matter, since transportation conditions will soon be normal again. In Silverton camp both the Standard and Hewitt will have to await repairs of the water line, in the former case, and of the wagon road to Silverton, in the latter, before ore shipment can be resumed. The Galena Farm, however, is so situated that flood waters affect it little if at all, so will continue production as usual. A number of small properties in the district are having development work done on them and some of them are making occasional small shipments of ore, with promise in several instances of improvement.

Nelson.—From the Daily News it is learned that approximately $8,000 was the value of a bar of gold deposited in a local bank on June 15 by one of the lessees of the Granite-Poorman group of gold mines situated within half a dozen miles of the town of Nelson. This was the result of 18 days' mill-run; in addition there was gold left on the plates estimated at $2,000, and a quantity of concentrate from the tables for shipment to the smeltery. Although not a large production, this result is pleasing, since it is from a property formerly operated by a company which was a financial failure and was put into liquidation.

Mr. W. R. Salsbury, of Salmo, has bonded two claims on Bear Creek, a tributary of Sheep creek. It is stated that there is a good showing of silver-lead-zinc ore on the property. Mr. Salsbury for some time operated the Hudson Bay mine under lease, and was so energetic that he shipped between 1,000 and 2,000 tons of oxidized zinc ore to United States reduction works and consequently gave the mine such prominence that it has since been acquired by well-known New York mining men.

Trail.—Ore receipts at the Consolidated Mining and Smelting Co.'s smelting works at Trail during the week ended June 14, totalled 10 826 tons of which 8 874 tons was from the company's own mines and 1,952 tons was of custom ores. The mines operated by the company that shipped ore were the Sullivan, in East Kootenay district; the Centre Star group and Le Roi, in Rossland camp; and the Highland, near Ainsworth.

Total of receipts of ore for the calendar year, to June 14, inclusive, is 224,128 tons, of which 187,343 tons came from mines operated by the Consolidated Company, and 36,785 tons were custom ores. The company's Rossland mines supplied 149,707 tons, or about two-thirds of the total; the next largest shipper was the company's Sullivan mine, at Kimberley, East Kootenay, from which 33,633 tons was received, some of it zinc ore, but the larger proportion lead ore. Of the custom ore, nearly 13,000 tons came from the United States, chiefly from mines in the northern part of the State of Washington.

Boundary.

Work having been resumed on the Big Copper, in Copper camp, five or six miles west of Greenwood, it is expected that shipment of ore to the British Columbia Copper Co.'s smeltery at Greenwood will be commenced shortly. Several carloads of ore will be shipped for a bulk test; it will have to be hauled about three miles over a wagon road to the railway at Deadwood.

It is stated that ore from the Bullwhacker mine at Butte, Monta., is to be treated at the Greenwood smelting works if favorable freight rates shall be secured. The second large blast furnace at these works was blown in last month, which leaves only the smaller one not in operation.

The discovery of a promising vein of copper ore on the Dolphin claim, in Olalla camp, near Keremeos, is reported. The known occurrence of molybdenite ore in the neighborhood has induced prospectors to give attention once again to Olalla camp in which there are some good showings of mineral, but not much development work has been done in the camp in recent years.

Both the Granby Consolidated and the British Columbia Copper Co. are operating to the full extent that conditions will permit. The former is stated to have the whole eight of its blast furnaces at its Grand Forks smelting works running, while the latter has its two large furnaces in operation, leaving only the smaller one idle now.

General Notes.

Much destruction of business premises in the town of Atlin, the distributing centre for the Atlin gold field, in Cassiar district, has resulted from a fire which took place on June 15. The Royal Hotel, a restaurant, half a dozen stores, and a number of smaller buildings were burned. The Provincial Government buildings were saved, also a new hotel in course of erection. On May 23,1914, a similar disaster caused much loss to local property owners.

The Velvet-Portland mine, near Rossland, has been bonded, and further development work has been undertaken.

TRETHEWEY.

The Trethewey Mining Co. is to-day loading two cars for shipment. One is of high-grade and the other of low-grade concentrates. This is the first shipment from the Trethewey since operations were resumed on June 1st last.—Cobalt Nugget.

GENESEE MINING CO.

The shaft of the Genesee Mining Co. is now down a depth of 150 feet. At a depth of 120 feet a narrow stringer came in the shaft and at 150 feet this has widened out to an average of two inches. In some places, pockets 4 inches or more in width have been cut through. This vein comes in between the two original veins showing on the surface, and on the upper levels. Sinking is proceeding at a steady pace and no trouble is being experienced from water troubles. The shaft is now down half of the distance called for by the plan of exploration, from the 300-foot level in the lower strata of conglomerate.—Cobalt Nugget.

AUGARITA.

For the past month a gang of men have been at work putting up buildings, cutting roads and getting things in shape for the carrying out of a system of exploration by diamond drilling at the Augarita Mines Co. property at South Porcupine.

The company controls three claims, approximately 120 acres, in the Dome section of the camp, and according to information received from the gold camp a contract for several thousand feet of diamond drilling will be let. The members of the company are Buffalo people and on Saturday the annual meeting of the company was held in that city and the plan of operations discussed.

McKINLEY-DARRAGH.

Cobalt, July 8.—The next hundred feet of crosscutting on the 400-foot level of the McKinley-Darragh will bring the drill into ground in which important discoveries are expected to be made, as this is well within the zone of proven orebodies. The new 150-ton Callow oil flotation plant is proving a big success, even greater than was anticipated and is making a saving of over $150 per day, or at the rate of $1 more per ton of ore treated, without the mill tonnage being raised. The McKinley-Darragh have had a very successful year to date and it is said that all dividend requirements for this year have already been earned.—Cobalt Nugget.

The editor of The Ledge, Greenwood, B. C., says:—

The holding of crown-granted mineral claims, for an indefinite period without development is a great injury to the mining industries of this province. The holders of such properities should be forced to work them, or relinquish their right, and let somebody else work them. We need workers, not idle speculators.

SILVER PRICES.

June—	New York. cents.	London. pence.
24.	66⅛	31 $\frac{3}{16}$
26.	65¾	31⅜
27.	66	31½
28.	66¼	31⅝
29.	65⅞	31 $\frac{7}{16}$
30.	65	31
July—		
1.	65	Closed
3.	65	31
4.	Holiday	30¾
5	63⅞	30½
6	63⅜	30¼

MARKETS

NEW YORK MARKETS.

July 6, 1916—Connellsville Coke—
Furnace, spot, $2.50 to $2.75.
Contract, $2.50 to $2.75.
Foundry, prompt, $3.25 to $3.50.
Contract, $3.50.
July 6, 1916—Straits Tin, nominal, 39.25 cents.
Copper—
Prime Lake, nominal, 26.00 to 26.50 cents.
Electrolytic, nominal, 25.75 to 26.25 cents.
Casting, nominal, 23 75 to 24.00 cents
Lead, Trust price, 6.50 cents.
Lead outside, 6.40 to 6.50 cents.
Spelter, prompt western shipment, 9.42½ to 9.67½ cents.
Antimony—
Chinese and Japanese, 16.00 cents.
American, 16.00 cents.
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, 47.00 to 49.00 cents.
Nickel, 45.00 to 50.00 cents.
Cadmium, nominal, $1.25 to $1.50.
Quicksilver, nominal, $80.00.
Platinum, nominal, $75.00.
Cobalt (metallic), $1.25.
Silver, 63 3-8 cents.
Metal Products—Following base prices are all f.o.b. mill:
Sheet copper, hot rolled, 37.50 cents.
Sheet copper, cold rolled, 38.50 cents.
Copper wire, nominal, 29.00 to 31.00 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, 17.00 cents.

TORONTO MARKETS.

July 11—(Quotations from Canada Metal Co., Toronto)—
Spelter, 15 cents per lb.
Lead, 8 ¾ cents per lb.
Tin, 45 cents per lb.
Antimony, 25 cents per lb.
Copper, casting, 28½ cents per lb.
Electrolytic, 29½ cents per lb.
Ingot brass, yellow, 16 cents; red, 20 cents per lb.
July 11—(Quotations from Elias Rogers Co., Toronto)—
Coal, anthracite, $8 per ton.
Coal, bituminous, $5.75 per ton.

STOCK QUOTATIONS.

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

As of Close July 10, 1916.

New York Curb.

	Bid.	Asked.
Atla. Cons.	.35	.40
Butte.	5.87½	6.12½
Can Car.	.64	.70
Curtiss Aeroplane	.30	.40
Chevrolet.	2.30	2.35
Can. Copper	1.31	1.56
Cambria Steel	....	.85
Emma Copper	.43	.46
Houston Oil	.14	.17
Howe Sound	4.62	4.87
International Petroleum	10.00	10.25
Inter. Nickel (New)	47.37	47.62
Kennecott Copper	47.62	47.75
Maxim Munitions	5.50	6.00
Midvale Steel	62.75	63.25
Marconi	3.87	4.00
Standard Shipbuilding	5.00	12.00
Submarine Boat	35.00	36.00
Tonopah Extension	5.31	5.43

Porcupine Stocks.

	Bid.	Asked.
Apex.	.06⅓	.06½
Dome Consolidated	....	.12
Dome Extension	.36	.36½
Dome Lake	.31½	.32
Dome Mines	....	26.00
Eldorado.	.00½	....
Foley O'Brien	....	.50
Gold Reef	.01	.02
Hollinger	29.80	29.80
Homestake.	.55	.65
Jupiter.	.31	.32½
McIntyre.	1.55	1.57
McIntyre Extension	.45	.46
Moneta.	.13½	.13¾
Porcupine Crown	.75	.85
Porcupine Imperial	.03⅝	.03⅞
Porcupine Tisdale	.01⅝	.01⅞
Porcupine Vipond	....	.50
Preston East Dome	.04½	.05
New Ray	.40	.41
Teck Hughes	.26¾	.28
West Dome Cons.	.37	.38

Cobalt Stocks.

	Bid.	Asked.
Adanac.	1.80	1.85
Bailey.	.07¼	.07¾
Beaver.	.37	.39
Buffalo	....	1.10
Chambers Ferland	.19	.19½
Coniagas.	4.75	5.00
Crown Reserve	.46	.48
Foster.	....	.09
Gifford.	.05	.05½
Gould.	....	.00½
Great Northern	.04¾	.05¾
Hargraves	.03¾	.04¼
Hudson Bay	50.00	....
Kerr Lake	4.30	4.70
La Rose	.60	.65
McKinley.	.52	.54
Nipissing.	6.85	7.00
Ophir.	.06½	.06¾
Peterson Lake	.24¼	.24¾
Right of Way	.05¼	.05½
Seneca Superior	.40	.45
Shamrock Cons.	....	.11
Temiskaming.	.57	.57½
Trethewey.	.22	.23
Wettlaufer.	.12	.16