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## EXPORT OF NICKEL MATTE

According to writers in the daily press, nickel won from ores mined in Ontario is being obtained by the enemy. If this is true the traffic should be immediately stopped.

It is well known that nickel is an important constituent of armor plate. An alloy containing about two per cent. nickel, known as nickel-steel, has especially suitable properties for use in war. All nations are aware of this, and a large portion of the nickel output of the world is used in the manufacture of war materials.

Germany, in preparing for war, has been one of the largest buyers of nickel. We may safely assume that Germany has a large stock on hand. And we may just as safely assume that Germany would like to buy more.

The chief seller of nickel is the International Nickel Company of New Jersey. This company controls the Canadian Copper Company, which is the largest producer of nickel ore in the Sudbury district, Ontario, and controls also the Societe Miniere Caledonienne, which owns nickel deposits in the French penal colony of New Caledonia, 900 miles east of Australia.

Obviously Germany will buy nickel if possible from the International Nickel Company. So far as nickel from New Caledonia deposits is concerned, Canada has no right to interfere. But with the sale to the enemy of nickel obtained from Sudbury ores it is not only Canada's right, but her duty to interfere. Steps should be taken, and are being taken, to determine whether Canadian nickel is reaching the enemy. If such is the case the Canadian Government will have to devise a scheme for prohibiting such business. There is as yet no proof of the statements made in the daily press; but until the statements are disproved Canadians will be uneasy.

The Toronto Star advocates the prohibition of export of nickel ore outside the British Empire. As Canada does not at present export nickel ore the Star's effort suffers somewhat from lack of accuracy in statements. Matte, not ore is probably intended in the following paragraphs from the Star:

"It is a pity there ever was such a trade with Germany, and it ought now to be cut off for good and all, during the war and afterwards. Germany ought not to get an ounce of Canadian nickel. The bulk of the nickel exported is for the protection of warships and the covering of shells, and Canada must not in the smallest degree furnish the materials of war for Germany, directly or indirectly.

"The surest way to bring about the desired result is to forbid the export of the ore to any place outside the British Empire. If the nickel were refined in Canada it



would be comparatively easy to control the export, allowing the nickel to go only to Great Britain, France or Russia. As long as we export the unrefined ore the export should be confined to Great Britain or to places designated by the British authorities.

"The effect of this prohibition upon the industry of getting out the ore is of comparatively small importance. The supreme object is to prevent a necessary munition of war from getting into the hands of the enemy. We might just as well send soldiers to enlist in the German army as nickel to be used for the navy. Canada controls all the nickel in the world except the mines owned by France, and Canada should help France to starve Germany out of this material."

Even when we read "matte" for "ore" in the Star's editorial, the policy seems a ridiculous one. The bulk if not all, of the nickel exported from the United States is going to the Allies and not to the enemy. The Star in an effort to interfere with possible sales to Germany wants to adopt a measure which would certainly be more embarrassing to the Allies than to the enemy.

The Montreal Journal of Commerce had the following editorial in the Nov. 18 issue:

"The nickel question has been brought to public notice from time to time for quite a long period. In the past it has usually been a debatable question. Now it has assumed a form which hardly seems to admit of debate. An export duty on nickel produced in Canada has sometimes been advocated as a measure for obtaining revenue. But export duties for revenue purposes, involving, as they necessarily would, much interference with trade, have not commended themselves to Finance Ministers.

"Export duties on nickel 'matte' have often been advocated as a means of compelling the producers to refine the nickel in Canada. Such a policy would naturally commend itself to high protectionists who argue that all manufacturing shall be done at home. Three years ago much was heard of that kind of policy, the country ringing with the cry, 'Let us keep our raw materials at home,' but to-day one hears it not, and the foreigner remains as free as he was then to take our raw materials away to be manufactured abroad. As a purely commercial and industrial question the propriety of preventing the export of raw or semi-raw materials has always been, to say the least, open to debate. There was room for difference of opinion as to the wisdom of prohibiting the export of nickel in its 'matte' shape. Canada, while a large producer of nickel, had not a monopoly of it. The French island of New Caledonia had nickel. Interference with the export from Canada might close the Canadian industry and give the producers in New Caledonia the control of the business. A large sum of money had been invested in the Canadian nickel mines at Sudbury. It was nominally American capital. But foreign capital invested in good faith in Canada was entitled to the protection of Canadian laws. If prohibitive export duties would, as was alleged, close the operations at Sudbury, and transfer the nickel busi-

ness to another country, such regulations would be unjust to the men who had invested their capital, and to all concerned in the Canadian industry. Whether such would be the result was a debatable question. Those who opposed the suggested restrictions seemed to have some ground for their contention.

"Thus proposals for export duties in the case of nickel, either for revenue purposes or for the development of home manufacturing, came within the field of debatable questions. If proposals that are now being made in the press rested on the same grounds as the earlier ones, they would still be debatable. But they do not. The present proposals respecting nickel rest on an entirely new ground to which the objections of the past do not apply. The strictly economic question must stand aside. The question now is one created by the war.

"Canada's nickel has been going to the United States to be refined and then sold, to a very large extent, to Germany. There are those who will say that such a policy should never have been allowed. It is too late, however, to discuss that policy as respects the past. It is not too late to discuss it and deal with it as respects the present and the future. When the question was a purely economic one, the argument could be used that Canada could not control the nickel industry. Canada alone to-day could not control the industry. But Canada's rival, New Caledonia, is French territory. Canada, as a part of the British Empire, is an ally of France in the war. The Allies, then, can control the nickel industry and prevent Germany receiving this product so necessary to her war measures.

"Since the question was brought prominently to public attention a few weeks ago, a step has been taken at Ottawa which may lead some people to imagine that no further harm can be done. An Order-in-Council has been passed prohibiting the export of nickel from Canada to Germany or the enemy countries. But this order does not meet the case. No nickel has been sent from Canada to Germany. There are no nickel refineries in Germany. The Krupps have their interest in the refinery in New Jersey. The nickel in the 'matte' shape goes from Canada to New Jersey, where the refining takes place, and from the American refinery to Germany, and to any other country wanting it. That has been the course of the business in the past; that is the course now, and the new Order-in-Council, forbidding the export of nickel from Canada to Germany, does not touch the case at all. So far as the public can see, Germany is to-day as free as she ever was to take Canadian nickel and use it in her warfare against the British Empire. We send our soldiers to fight for the Empire, and we send our nickel to help the Germans make war upon us.

"In the past, the convenience of trade, the interests of the workers at Sudbury, the protection of capital invested in Canada, afforded some reason—or at least some excuse—for a policy of non-interference with the nickel business. But these considerations can no longer weigh



in the scale. Nobody would desire interference with business under ordinary conditions. But we no longer have ordinary conditions. The conditions raised by the war are supreme. They demand that Canada shall no longer supply Germany with war material. If adequate guarantees could be had that the material would not find its way to Germany by way of the United States, such might meet the case. But it is not easy to see how such guarantees can be obtained. The engagement of Messrs. Krupp & Co.—the American company—that they will not send any more nickel to the Krupp factories in Germany could hardly be regarded as sufficient. The guarantee of the United States Government, under satisfactory conditions, might meet the difficulty. But it is doubtful if the United States Government would be willing to undertake such a responsibility. Unless some such guarantee can be obtained, the only way seems to be to prohibit the export of nickel in any form to any country outside the British Empire.”

While apparently better informed than the Star, the Journal of Commerce seems also to be of the opinion that extreme measures should be taken to prevent any possibility of nickel reaching Germany. It is very doubtful if the Allies would greet such a proposal very enthusiastically. Is it such an easy matter to deliver cargoes of nickel to Germany? Have the Allies no need of nickel from New Jersey?

Canada exports nickel matte. We have no nickel refinery here, and it would take months to establish one. The prohibition of the export of nickel matte means therefore the cutting off of the chief source of a metal for which there is a great demand. And this is being advocated by our contemporaries without proof that any of the nickel from Canada is being obtained by Germany.

## NICKEL DEPOSITS OF NEW CALEDONIA

The only serious competitor of the Sudbury nickel district is New Caledonia. Nickel was discovered there in 1865 by Mr. Jules Gardner. Mining began in 1875. In 1889 the output was 21,000 tons of ore. In 1902 there was produced 128,653 tons ore, containing about 7,000 tons nickel. For some time the output has, according to Dr. A. P. Coleman, been between 80,000 and 120,000 tons.

Most of the nickel ore mined in New Caledonia has been exported and treated in France, Germany and Scotland in small smelters and refineries operated by the Societe le Nickel. Dr. Coleman reports in his monograph on the Nickel Industry that early attempts at smelting on the island were unsuccessful; but that in 1910 a furnace was operated and 769 tons of matte exported.

According to M. E. Glaser, who reported on the mines for the French Government in 1903, the nickel occurs in veins of hydrated silicates in serpentinized masses of peridotite. The richest silicates are soft green

minerals known as garnierite and noumeaite. The veins are small and many of the deposits have been long since worked out. A large number of small veins are being worked in various parts of the island.

That the deposits are capable of yielding a much larger output than at present is indicated by reports that certain parties have advocated placing a heavy tax on unworked nickel lands on the island, so as to force the owners to work more actively the properties leased from the Government.

Owing to the nature of the deposits and to their location, the New Caledonia ores do not yield as large a profit as the Sudbury ores, although they are richer. If, however, the cost of producing nickel from Sudbury ores is unduly increased by any means, the New Caledonia mines may be expected to be more actively operated.

The recovery in the price of copper from eleven cents to over twelve and one-half cents per pound, which has been recorded in the past two weeks, is of the utmost importance to copper producers. A large amount of copper is produced at a cost of eleven or twelve cents per pound, and the recent rise means success for some companies which could not long operate under the low price of two weeks ago. Even at the new high price several large producers are making little or no profit, owing to the fact that costs have risen on account of the output being curtailed. These companies will, however, welcome the rise, for they have been operating at a loss and now have a chance of breaking even while awaiting a better market.

It is understood that much of the copper recently sold has been for consumption in the United States. This indicates a resumption of business there that has been confidently looked for, but which has been slow in making its appearance.

It is stated also that in spite of the elimination of Germany from the market, European orders are coming in freely. This is undoubtedly due, largely, to the large consumption of copper in the ammunition works in Great Britain, France and Russia. There is as yet, however, no great hope of very high prices for copper.

The price of silver has been disappointingly low during the past month. It is therefore a pleasure to record that the tendency during the past few days has been upwards.

There has been much speculation as to the orders brought back by Mr. Charles M. Schwab after his recent trip to England. Orders of great importance were doubtless booked. One paper says that it has good authority for the statement that Mr. Schwab obtained contracts for \$50,000,000 to be filled by the Bethlehem Steel Company and affiliated companies. Whatever the exact figure may be there is reason to believe that Mr. Schwab has been largely instrumental in obtaining business for United States manufacturers at a time when it is badly needed.



## CORRESPONDENCE

### CENTRIFUGAL COMPRESSORS

To the Editor of The Canadian Mining Journal:—

Sir,—In the issue of Oct. 15th, there appears an article under the head of "Centrifugal Compressors." In the latter part of this article, a comparison is made between centrifugal and reciprocating compressors; but the case of the latter has not been fully presented. In the case of low pressure compressors, or the low pressure cylinder of a multi-stage compressor, where the pressure is about 25 lbs. per sq. in. gauge, and assuming that the machine is of correct design and workmanship for the work it has to do, the clearance will be between 2 and 5 per cent., giving a volumetric efficiency, due to clearance, of from 95 to 98 per cent.

At the end of the stroke the clearance space is filled with air at the compression pressure. This pressure must decrease to atmospheric pressure before any fresh air can be drawn into the cylinder. The expanding air, by its pressure on the piston, returns the power that was used in compressing it; but by preventing the entrance of air from the outside during the interval of expansion it causes a decrease of capacity.

The statement that some designers have attempted to increase the volumetric efficiency, by increasing the velocity of the air at intake, is correct, and it is the regular practice among some of the German manufacturers of gas engines and blowing engines. The air cylinders have Corliss valves, and the air is taken in through a duct or pipe of some length. The air in this pipe undergoes changes in velocity influenced by the variable velocity of the air piston at various points of the stroke. The piston starts with zero velocity, attains maximum velocity at midstroke, and again has zero velocity at the end of the stroke. In the beginning of the suction stroke, there is a tendency to accelerate the column of air moving in the suction pipe, which tends to produce a drop of the pressure below that of the atmosphere during the early portion of the stroke. At some point near midstroke of the compressor the velocity in the suction pipe has attained its maximum, after which a retardation takes place. When the piston has reached the end of the suction stroke, and has stopped, the column of air is still moving, the result being that the pressure of the air in the cylinder rises above that of the atmosphere. If the suction valve can be closed at the moment when this attains its maximum pressure the cylinder will be filled with air at a higher pressure than that of the atmosphere, and thus be enabled to deliver more air than that due to the difference of the piston displacement and the expanded air in the clearance spaces. In other words the volumetric efficiency will be 100 per cent. or higher.

This extra air is not obtained without a corresponding use of power and the cost per cubic foot of air, compressed and delivered from free air at atmospheric pressure and temperature, will be practically the same, whether the compressor has a volumetric efficiency of 95 or of 100 per cent.

A compressor that is designed and built for the economical operation in the particular work it has to do, will hold up its original efficiency during its lifetime with no greater—often less—cost for upkeep than the engine to which it is attached.

There can, however, be no comparison between the above and what may be called the commercial type of compressor, which must be designed and manufactured

cheaply, in order to sell at the low price at which they are offered. Each type of compressor has its own field. A guarantee of the capacity in cubic feet of free air at atmospheric pressure and temperature of any compressor at a given speed, should also include the steam consumption for every 100 cu. ft. of free air, that is compressed and delivered, under the specified conditions.

This gives a definite basis for a comparison of the claims made by the different builders of compressors, in terms of actual cost of operation, which is much more satisfactory to the intending purchaser than a lot of indefinite and bewildering statements regarding "efficiency." A comparison of the horsepower required for the adiabatic compression of a certain quantity of air with the indicated horse power of the steam end of the compressor when compressing the stated quantity of air will show the total, or over all "efficiency" of the compression. In a compressor driven by an electric motor the power imparted to the motor can be compared to the power required for adiabatic compression of the given amount of air, to show the over-all "efficiency."

Yours, etc.,

Hamilton, Ont., Nov. 26, 1914. A. WILLCOCKS.

### ORIGIN OF THE ROCKY MOUNTAINS.

On the evening of November 3, at Nelson, British Columbia, Mr. Stuart J. Schofield, of the Geological Survey of Canada, gave an address before the local University Club and others interested, on the subject of the Origin of the Rocky mountains. The Nelson "Daily News" published a brief synopsis of the address, as follows:

"Mr. Schofield began by placing on the blackboard an outline of the geological timetable from the pre-Cambrian down to recent times and referred the several divisions of the great Cordillera to this as he proceeded with his address.

"The pre-Cambrian nucleus of the mountain system of the Province was, he said, a rolling body of land near the Columbia valley. Bordering this to the east was a shallow sea stretching far across the region now occupied by Eastern British Columbia and the plains. In this sea the sediments from the ancient land were laid down. Long afterwards in Jurassic times the sediments of this sea were elevated in great folds to form the Selkirk and Purcell mountains. The shore line of the great shallow sea then lay near the great trench now occupied by the Kootenay and Columbia rivers. Still again erosion of these great ranges provided further sediments, which in Cretaceous times were crushed and folded upward to produce the Rocky mountains.

"The unfolding of a mountain chain gives rise to streams that destroy it. The ancient rivers met the shore at right angles, while the folds rose slowly across them; so slowly that in many cases the streams were able to maintain their channels. Such is the nature of the Crowsnest pass. New stream valleys lie between the upfolds, as in the case of the great trench of East Kootenay.

"The finishing touches to the mountain scenery have, he said, been given by ice. Glaciers have produced at the head of the streams countless little basins or cirques occupied by small tarns and bordered by sharp ridges. These are among the features of greatest beauty and charm, the richest reward of the tourist and mountaineer."



## FIGHTING FIRE AT THE ALBION MINES, NOVA SCOTIA

Last July a serious fire occurred in the McGregor seam, Albion mines of the Acadia Coal Co., Nova Scotia. The fire gained steadily in spite of attempts to put it out with water; but was finally brought under control by the construction of barriers. In this work oxygen helmets proved indispensable. The courage of the men and the resourcefulness of the management saved the mine from destruction.

The McGregor seam is the lowest of four being worked at the Albion mines. The others in order from surface are the "Ford Pit," "Cage Pit" and "Third." These seams are all quite thick (from 12 to 40 ft). Overlying the Cage Pit Seam is a small seam known as the "Four Foot Seam" and overlying the McGregor Seam is a seam about 3 ft. 6 in. thick called the "Flemming Seam."



No. 1

In order to seal off the west side, the oxygen helmet men were sent down in a small shaft 187 ft. deep which is connected directly to the fans. From the bottom of this shaft the main return airway branches east and west. The oxygen helmet men built a stopping in the west side and the fan was started slowly on July 20th at 6 p.m. During the night the east side of the mine was slowly cleared of gas by a crew of oxygen helmet men who proceeded down the slope, opening and closing the doors on the east side and plastering the stoppings on the west side until they had penetrated practically into the pump room at the bottom of the slope.

The stopping at the foot of the fan shaft could not have been built at all without the oxygen helmets and consequently the reopening of this mine could not



No. 2

### FIRE FIGHTERS AT MCGREGOR MINE, NOVA SCOTIA

The workings in the McGregor Mine immediately underlie the workings in the other seams and are not connected in any way except by boreholes. Hoisting is done by an electric winding engine through the slope and ventilation accomplished by an electric fan, with the old steam fan as a stand by.

Fire was first noticed July 9th in the early evening. After considerable difficulty a place was won from which it could be attacked by water and this attack was kept up from midnight Friday until Sunday morning. The fire gained steadily however, and on Sunday July 12th it was found necessary to withdraw the men and seal up the mine. This was done by building stoppings in the mouth of the slope and by sealing the fans.

The fire was confined entirely to the West side of the mine and after leaving it sealed for one week, it was determined to attempt to close all the west side more tightly and restore partial ventilation in the east side so as to give access to the electric pumps which handled the draining of all four seams.

have been done until the fire had absolutely killed itself.

After the east side of the mine was cleared of gas, the oxygen helmet men constructed a line of stoppings on the west side of the slope above the fire section which completed the sealing off of this section. To-day the east side of the mine is working but the fire section has not been reopened.

This is a mine which has always given trouble from fire. Several years ago it was necessary to seal off and flood a portion of the east side of the mine. This portion was subsequently reopened and is now being worked.

During the time when the fire was being fought with water oxygen helmets were used by the advanced hose men. These men have had considerable experience at this kind of work. In the summer of 1913 there was a very bad fire in the Cage Pit Seam at the same mine. It was an open fire and was attacked with water. Before it was put out, five 2½ in. streams were playing



on it. It was absolutely impossible to approach the fire region except under oxygen. For 16 days and 17 nights the men of this mine fought this fire steadily 24 hours a day, working in 6 hour shifts. The heat was so intense that the oxygen men could only work 15 to 20 minutes at a time. This fire occurred quite close to the return airway at a point where it was absolutely impossible to build stoppings and absolutely fatal to retreat. The distance of only 150 ft. lay between the original seat of the fire and the main return airway from which it was attacked but to cover these 150 ft. required 16 days of what was probably the hardest fire fighting that Nova Scotia has ever seen.

Photograph No. 1 shows the oxygen helmet men dressing just outside the fan house and shows also the discharge from the centrifugal pumps which are located in the McGregor Slope some 5,000 ft. from the surface at a depth of about 1,800 ft. vertical. The new electric fan is in the background.

Photograph No. 2 is a nearer view of one of the oxygen helmet men getting ready to go down.

### GERMAN REPORTS.

A Geneva newspaper, *La Suisse*, makes itself responsible for the following alleged despatch from the German official press bureau:

"Gen. Von Kluck's army captured Paris without noticing it and arrived at Vincennes on Sept. 8, while it still believed it was at Fontainebleau. It marched through the deserted town, all the population having taken refuge in the sewers and subway tunnels, which partly explains Von Kluck's error. On Sept. 10 he occupied the Tuileries. 'Anyway, wherever are we?' the general asked.

"A small Paris gamin, like all the French ever ready to guy any one, replied, 'At Barbizon.'

"At Saint Cloud, on Sept. 12, Gen. Von Kluck received a message from his comrade, Von Buelow, saying in substance that he had moved so rapidly that contact between the two armies might be broken at any minute. Von Kluck decided therefore to move back, not without carrying off much booty, notably the Dome of the Invalides, the Eiffel Tower, the Strasbourg statue from the Place de la Concorde, the wings of the Moulin Rouge, the tail of the Rat-Mort, the floor of the Bal Tabarin, the Vendome column and the soles of Marguery.

"He succeeded in forming a junction with the army of Von Buelow on the evening of Sept. 13, accompanied by 400,000 or 500,000 prisoners.

"A new difficulty then arose. The new 420 millimeter mortars were so powerful that their projectiles passed over Paris and dug holes in the Atlantic ocean. A shell even fell within a few miles of New York. President Wilson having protested against what he fallaciously deemed a violation of national rights, the order was given for the whole German army to perform a strategic retreat until their mortars would be at a suitable distance from the French capital.

"He commenced his withdrawal after taking prisoners all the bootless enemies who ventured imprudently on the plains of the Marne. It is generally believed that the 420 pieces can at last be used from Berlin to annihilate what remains of the pitiable defences of France.

"Lovers of truth are requested to make the foregoing known all around them for the sake of humanity and civilization."

### THE POTASH SITUATION IN U. S.

Conditions governing the potash situation have improved noticeably during the past two weeks. Muriate and sulphate of potash prices from second hands declined \$6 to \$8 per ton in the New York market. These salts have been in urgent request from chemical and pharmaceutical manufacturers since the war began and many sales were made in excess of \$100 per ton.

The drop in values was due partially to the fact that potash salts in some form or other are arriving at various ports in a fair way. In addition arrangements have been made for future shipments and it is believed that the trade can depend on a certain amount of potash at regular intervals hereafter. The arrangement, of course, is to pay for the potash before it leaves Germany in American gold and make the ownership of it so certain that it will not be subject to seizure by war vessels of the belligerent nations.

While it cannot be truthfully stated that the entire trade has taken up this method of securing potash, yet sufficiently large quantities have been transferred to American ownership to make shipments total rather surprising figures, considering the difficulties encountered. Thus during September, 11,836 tons of kainit, 6,737 tons of manure salts, 2,863 tons of muriate of potash and 1,080 tons of sulphate of potash arrived at all American ports.

During the past fortnight one lot of 1,100 tons of manure salts came in at New York, which is not ordinarily a large importer of fertilizer chemical salts, most of this material going to the more southern ports. October shipments from Germany are reported to have reached a fair total, which, however, considering the amount actually needed here, is but a drop in the proverbial bucket. Naturally there is considerable secrecy prevailing in regard to arrangements made to ship from the other side, but no one now attempts to conceal the fact that considerable tonnage has been negotiated for and will undoubtedly be delivered to American consumers in due course.

September imports of all potash salts exceeded 22,000 tons and it is reasonable to presume that as time progresses shipments will become more of a matter of fact, unless the nations at war should suspend traffic in this material. No embargos have been on potash exports from Germany for some time past and the American State Department has expressed the opinion that American-owned goods in neutral bottoms are not subject to seizure.

A very interesting arrival during the past week at the port of New York was a lot of 453 short tons of material invoiced as "salinum potassium" from Genoa. This is the Italian "salino potassico." This is a mixture of alkaline salts extracted by the Italian distilleries by distillation from residue of fermented beet molasses. The residue, when concentrated, is calcined and contains approximately 47.20 per cent.  $K_2O$ . It is sold on the basis of the potassium carbonate content and is, of course, a valuable tobacco fertilizer. The product seems to be quite similar to the German "schlempekohle"—a potash carbonate extracted from beet sugar residue—the total production of which is stated to be 25,000 to 30,000 metric tons annually. No doubt, with sufficient incentive, the beet sugar factories here could produce a considerable tonnage of this product annually.—American Fertilizer.



## COAL MINING IN ALBERTA IN 1913

By John T. Stirling (Chief Inspector of Mines, Alta.).

The total amount of coal produced in Alberta during the year was 4,306,346 short tons, which is an increase of 859,997 tons over the amount produced during the year 1912.

The amount of coal produced per person employed during the year 1913 shows a still further increase over previous years. This is due to a great extent to the increased use of coal-cutting machinery in the lignite field. The number of tons of coal produced per pound of explosive used has increased considerably in the Crow's Nest Pass district, although I regret to note that the number of tons of coal produced per pound of explosive used shows a decrease in the other districts.

The output of coal from the Province for the year 1913 has increased approximately 500 per cent. during the last eight years. The output, however, during the year 1913 would have been considerably larger had it not been for the extremely mild weather which we had during the latter part of the year and in consequence of which, the consumption of domestic coal was considerably reduced. The steam coal market was also reduced as the railway companies have laid off during the year a large number of train crews.

The Coal Mines Act, which had been in force in the Province for several years and which had been amended from time to time at recent sessions of the Legislature, had become rather unwieldy. The Government, therefore, appointed a commission to go thoroughly into the whole question of mining regulations, with the result that a complete new Act was prepared and assented to by the Lieutenant-Governor in Council on March 25th, 1913, and came into force on August 1st of the same year. The Act, which is known as The Mines Act, appears to be working very satisfactorily. On September 17th, 1913, "Rules for the Installation and Use of Electricity in or About Mines" were passed by Order-in-Council and are now in force. These rules are for the purpose of regulating the use of electricity in or about mines, and should do a great deal towards the prevention of accidents from this cause. Among other things, they provide that a qualified electrician shall be appointed at all mines where electricity is used. This electrician is responsible for seeing that the plant, etc., is kept in good repair.

In a number of the mines in the Lethbridge district, where safety lamps are not required, Pellet powder is being used, and I trust that before the end of the present year, most of the mines in this district will be using powder of this nature.

Owing to the presence of gas in the lignite mines, it has been found necessary to install safety lamps in a number of cases. In all cases, the safety lamps installed are of the Wolf type, with the exception of the No. 6 mine, operated by the Department of Natural Resources of the Canadian Pacific Railway Co., near Lethbridge, where electric lamps have been installed.

There is a growing tendency to use gasoline locomotives for haulage purposes, particularly in the Crow's Nest Pass mines, and in order that those locomotives can be operated under as safe conditions as possible, it is my intention to have prepared, some time during the year, rules governing their use. These rules will be put into force at the earliest opportunity.

A large number of accidents have taken place in the smaller mines. Of the 28 fatal accidents which occurred in the Province, six occurred in mines which produced less than 50,000 tons during the year; seven in mines which produced from 50,000 to 100,000 tons; eight in mines which produced from 100,000 to 200,000 tons, and seven in mines which produced over 200,000 tons. This is no doubt due to the fact that the smaller mines are under the charge of men who do not hold First Class certificates, and who are not so conversant with The Mines Act as the persons who are in charge of the larger mines. The inspectors again report that they find considerable difficulty in getting the provisions of The Mines Act complied with at the smaller mines.

A large percentage of accidents, particularly in mines in the Lethbridge field, where mechanical haulage is used, are caused by persons riding on cars. As in most cases this is a contravention of The Mines Act, steps are being taken to have this practice stopped.

Considerable progress has been made during the past year with the installation of telephones in the larger mines. These telephones save a considerable expense in the operation of a mine and are also very useful in obtaining assistance quickly in case of an accident.

There were 72 mines abandoned during the year 1913. A large number of these mines, however, were only opened up for the purpose of prospecting for coal and have been closed up until such time as railway connection has been made with them.

Up to December 31st, 1913, about 40 per cent. of the Town of Frank had been moved from the danger zone under Turtle Mountain. As the Canadian Coal Consolidated, Ltd., which was operating the mines at Frank went into liquidation some time ago, very little moving has been done. I understand, however, that it is the intention to have this company reorganized and to have mining operations commenced again, when it is likely that the remainder of the town will be moved.

In the lignite field, 54.35 per cent. of the total output was mined by machinery. No coal-cutting machinery is used in the bituminous or anthracite coal fields.

The branch line from Edson on the main line of the Grand Trunk Pacific Railway into the mines operated by the Mountain Park Coal Co., Ltd., was completed and is now in operation, so that a much increased output will be obtained from those mines during the present year. The coal obtained from this part of the country is a high grade steam coal and compares favourably with any coal in Western Canada.

The Pembina Coal Co., Ltd., which has connections with the main lines of both the Grand Trunk Pacific Railway and the Canadian Northern Railway has completed a plant during the past year which is capable of producing from 1,000 to 1,200 tons of coal per day. The Gainford Collieries, Ltd., which is situated on the main line of the Grand Trunk Pacific Railway is at present erecting a plant which is capable of producing 1,000 tons per day. These two last mentioned mines are situated about 50 miles west of Edmonton and produce a domestic coal of high quality.

A considerable amount of coal mining has also been done in the neighborhood of Edmonton by means of the stripping process. This process is removing the sur-



face clay by means of a steam shovel, after which the coal is quarried and loaded direct into the railway cars.

The line at present being built from Red Deer into the mines being developed by the Brazeau Collieries, Ltd., will be completed about March 1st, 1914, so that another steam coal field with a large area will be opened up. A modern and up-to-date plant capable of handling 1,500 tons per day is being erected by this company.

A large amount of development has also taken place during the past year in southern Alberta and a number of plants of modern design have been installed.

#### Coal Output of Alberta During 1913.

	Tons.
Lignite Coal .....	1,763,225
Bituminous Coal .....	2,374,401
Anthracite Coal .....	168,720
Coal used in coke production .....	104,012
Coke produced .....	65,167
Briquettes produced .....	130,861

The above table shows there has been an increase in the output of lignite coal 31.44 per cent. over the year 1912, an increase of 23.25 per cent. in the output of bituminous coal, over the year 1912 and a decrease in the output of anthracite coal of 5.52 per cent. under the year 1912.

#### Summary of Statistics for the Year 1913.

Number of mines in operation, 289; number of new mines opened, 45; number of mines abandoned, 72; number of tons of coal mined, 4,306,346; number of tons of coke produced, 65,167; number of tons of briquettes produced, 130,861; average number of persons employed inside mines, 5,837; average number of persons employed outside mines, 2,231; average number of persons employed inside the mines during the month of December, 6,610; average number of persons employed outside the mines during the month of December, 2,253; number of separate accidents causing loss of life, 25; number of deaths caused by accidents inside the mines, 24; number of deaths caused by accidents outside the mines, 4; number of serious accidents outside the mines, 9; number of serious accidents inside the mines, 50; number of slight accidents inside the mines, 71; number of slight accidents outside the mines, 13; number of mine managers certificates issued, 6; number of pit boss certificates issued, 19; number of fire boss certificates issued, 14; number of examiners certificates issued, 7; number of mine rescue certificates issued, 51; number of persons holding first class certificates, 151; number of persons holding second class certificates, 170; number of persons holding third class certificates, 301; number of persons granted Provisional overman's certificates, 103.

On September 17th, 1913, Rules for the Installation and Use of Electricity in or about Mines were passed by Order-in-Council and went into effect on that date. According to the returns received from the different mines electricity was used at 29 mines in 1913. The Crow's Nest Pass was the most active district in this respect during the year.

The Rules for the Installation and Use of Electricity in or about Mines require a return to be made to the Department on or before January 21st of each year, giving the size, type and any other particulars which may be required, of electrical apparatus in use above and below ground in such mines as are governed by the provisions of The Mines Act. A summary of this return as regards the horse-power of electrical apparatus in use in given below:

District.	Above Ground H.P.	Under-ground H.P.	Total H.P.
Crow's Nest Pass.	2,246.5	260	2,506.5
Lethbridge. . . . .	1,235.5	417	1,652.5
Calgary. . . . .	262	...	262
Edmonton. . . . .	485.9	470	955.9

During the year there was only one accident in connection with the use of electricity reported. This accident, which was fatal was due to the attendant in charge of the power plant at the Bellevue mine operated by the West Canadian Collieries, Limited, receiving an electric shock which resulted from a leak on the machine. The accident took place before the rules became effective and could not possibly have occurred if these rules had been in force and had been complied with.

The scale of wages paid in the province during the year 1913 remains the same as it was at the end of the year 1912, and is as follows:

**Outside Wages**—Fire bosses, \$110 to \$115 per month; bottom man, \$2.89 per 10 hour day; slate pickers (boys), \$1.37 per 10 hour day; slate pickers, (men), \$2.47 per 10 hour day; car oilers (men), \$2.47 per 10 hour day; car oilers (boys), \$1.65 per 10 hour day; tally boys, \$1.37 per 10 hour day; teamsters, \$2.89 per 10 hour day; blacksmith, \$3.85 per 10 hour day; blacksmith's helpers, \$2.90 per 10 hour day; power-house engineers, \$3.85 per 12 hour day; power-house engineers, \$3.40 per 8 hour day; fan men, \$2.90 per 12 hour day; hoisting engineers, \$3.20 per 8 hour day; hoisting engineers, \$3.78 per 10 hour day; hoisting engineers, \$4.40 per 12 hour day; tail rope engineers, \$3.63 per 8 hour day; tail rope engineers, \$3.85 per 10 hour day; endless rope engineers, \$3.30 per 10 hour day; box car loader engineer, \$3.40 per 10 hour day; tippie engineer, \$3.40 per 10 hour day; screen engine tender, \$2.65 per 10 hour day; locomotive engineer, \$3.40 per 10 hour day; locomotive switchman, \$3 per 10 hour day; fireman, \$2.89 per 8 hour day; fireman, \$3.85 per 12 hour day; fireman's helper, \$2.65 per 10 hour day; railway car helper, \$2.60 per 10 hour day; tippie dumper (man), \$2.89 per 10 hour day; tippie dumper's helpers, \$2.64 per 10 hour day; tippie dumper (boy), \$1.65 per 10 hour day; top cagers, \$2.64 per 10 hour day; car repairers, \$3.40 per 10 hour day; car repairer's helper, \$2.90 per 10 hour day; breaker engineer, \$3.40 per 10 hour day; fan fireman, \$3.40 per 12 hour day; lampman (depending upon number of lamps and skill of man), \$2.47 to \$2.89 per 8 hour day; lampman (depending upon number of lamps and skill of man), \$2.47 to \$3.40 per 12 hour day; machinists, \$3.40 to \$3.85 per 10 hour day; machinist's helper, \$2.90 per 10 hour day; ashman, \$2.50 per 10 hour day; wiper (man), \$2.89 per 12 hour day; ashman, \$2.89 per 12 hour day; coupler (man), \$2.47 per 10 hour day; coupler (boy), \$1.65 per 10 hour day; breaker oiler, \$2.89 per 11 hour day; washer or tippie oiler, \$2.89 per 11 hour day; breaker picker boss, \$2.89 per 10 hour day; timber framer, \$3.40 per 10 hour day; timber sawyer, \$2.64 per 10 hour day; box car shoveler, \$2.89 per 10 hour day; breaker platform boss, \$2.89 per 10 hour day; breaker platform men, \$2.60 per 10 hour day; breaker screen men, \$2.47 per 10 hour day; rock bank men, \$2.47 per 10 hour day; dirt bank men, \$2.47 per 10 hour day; finisher after box car loader, \$2.47 per 10 hour day; all other outdoor labor, \$2.47 per 10 hour day.

**Bee Hive Coke Ovens.**—Levelling and drawing (6½ ton charge) per oven, \$1; levelling and drawing (5 ton



charge) per oven, 80c.; loading into box or open cars (over 200 tons per month) per ton, 17c.; loading into box or open cars (less than 200 tons per month) per ton, 16c.; steam locomotive engineer, \$3.40 per 10 hour day; motorman, \$3.18 per 10 hour day; larryman, \$2.47 per 10 hour day; plasterers, \$2.47 per 10 hour day; carters and cleaners, \$2.47 per 10 hour day; all other labor, \$2.47 per 10 hour day.

**Belgian Coke Ovens (per 10 hour day).**—Ram engine man, \$3.40; chargers, \$2.89; clayers, \$2.89; drawers, \$2.89; loaders, \$2.60.

**Briquette Plant (per 12 hour day).**—Engineer, \$3.86; briquetter, \$3.97; briquetter's helper, \$3.40; tar melter, \$2.89; laborers, \$2.89.

**Inside Wages (per 8 hour day)**—Shotlighter, \$3.30; bratticeman, \$3.30; bratticeman's helper, \$2.75; timberman, \$3.30; timberman's helper, \$3.75; tracklayers, \$3.30; tracklayer's helper, \$2.75; motorman, \$3.05; motorman's helper, \$2.75; locomotive engineer, \$3.05; locomotive switchman, \$2.75; drivers, \$3.03; drivers (wet places), \$3.30; drivers (spike team), \$3.50; couplers (men), \$2.75; couplers (boys), \$1.65; switch boys, \$1.37 to \$1.65; door boys, \$1.10; rope riders, \$3.03; main and tail rope riders, \$3.30; pushers, \$2.75; buckers, \$2.75; miners, \$3.30; miners (wet places), \$3.75; rock miners, \$3.75; timber handlers, \$3.03; laborers, \$2.75; cagers, slope and incline, \$2.75; cagers, shaft, \$3.30; machine men, \$3.75; machine men's helper, \$3.30; pumpmen, \$2.75; pumpmen (Dept. Nat. Resources C.P.R.), \$3.20; hoistmen, \$3.03 to \$3.30; drivers (boys), \$1.65 to \$2.75; grippers, \$2.75; grippers (boys), \$1.65 to \$1.75; pipe fitter's helpers, \$2.75; pit carriers, \$1.37 to \$2.75; clutchmen, \$3.30; roller men, \$2.75; loaders, \$2.75; miners on contract average from \$3.50 to \$6.00.

This scale of wages is taken from an agreement made with representatives of approximately seventy per cent. of the men employed in mines in the Province and went into force on November 17th, 1911, and will continue until March 31st, 1915.

#### MINERAL EXHIBITS AT PANAMA-PACIFIC EXPOSITION.

The exhibits in mines and metallurgy at the Panama-Pacific International Exposition will be many and diversified. The Palace of Mines and Metallurgy occupies one of the corners of the great central rectangular block of main exhibit palaces of the exposition, and was erected at a cost of \$359,445. It covers an area of 252,000 sq. ft.

The mining exhibit is divided into five separate groups consisting of the equipment and processes of working mines, ore-beds and stone-quarries, minerals and stones and their utilization, mine models, maps and photographs, metallurgy, and literature of mining and metallurgy. Working models will be used to an unusual degree, thus increasing the interest and the educational value of the exhibits.

Equipments and methods of geological surveys, prospecting, assaying, drilling and cutting, explosives, timbering and equipment and processes for underground handling are all demonstrated. Machinery and appliances for draining mines, ventilating, and equipment and methods for mine safety and rescue, make up another group. Minerals and stones are given unusual attention. Building materials, clays, pumices, grindstones, fire-clays, asbestos, and gems and precious stones are shown. Mineral waters and mineral paints also come under observation in this department. Mineral fertilizers, fuels, luminants, including petrol-

eum and its products, asphalt and artificial mineral products are also displayed.

The group devoted to mine models, maps and photographs, will hold especial interest for the layman. Many of these models will be working demonstrations. Under metallurgy is found the equipment, methods and processes used in handling ores, the treatment of the same and their by-products, the manufacture and use of refractory materials for metallurgical purposes. Several classes are devoted to the display of iron-working in all its branches. Smelting, plating, alloying, galvanizing and electroplating are among the processes demonstrated.

Under the heading of literature of mining and metallurgy are statistics relative to geology, mineralogy, paleontology, quarrying, mining, mine accidents, metallurgy, the manipulation of mineral products and the development of water resources.

The exposition as a whole, stands to-day 95 per cent. completed and there can exist not the slightest doubt but that the opening date will find all in readiness. Many of the larger exhibits are now being installed, the forty-three states and forty foreign nations which will be represented at the exposition are rushing the construction of their state buildings and national pavilions. Many of these are already completed and most of those remaining are well under way.

#### INTERNATIONAL ENGINEERING CONGRESS, 1915.

A report having recently been circulated to the effect that the International Engineering Congress was to be abandoned, the committee of management desires to state that this is not correct, but that the Congress will be held in San Francisco as scheduled, from September 20th to 25th, 1915.

In view of the conditions now prevailing in Europe, the governing bodies of the five National Societies under whose auspices the Congress is to be held, have recently given careful consideration to the feasibility of holding the Congress and to the probability of its success, with the result that each body has unanimously confirmed its original pledge to support the Congress. The Committee of Management is actively proceeding with arrangements, which are now well advanced, for meetings on the scheduled dates and for the publications of the transactions.

The Committee of Management is in receipt of a sufficient number of communications from various foreign countries throughout the world, including those located within the war zone, to indicate that a large majority of the papers originally requested for presentation at the sessions of the Congress and publication in its transactions will be handed in on time, and that the Congress will be truly international in character.

A detailed circular of information regarding the publications of the Congress has been prepared by the Committee and will be sent upon application to the Secretary, in the Foxcroft Building, San Francisco, California.

#### GEOLOGICAL SURVEY PUBLICATIONS.

The Geological Survey has issued three memoirs recently: No. 41, The "Fern Ledges" Carboniferous Flora of St. John, N.B., by Marie C. Stopes; No. 51, Geology of the Nanaimo map area by Charles H. Clapp; No. 54, annotated list of flowering plants and ferns of Point Pelee, Ont., and neighboring districts, by C. K. Dodge.



## TRADE UNIONISM AND THE WAR

By F. W. Gray.

Shortly after the outbreak of war, reference was made in these columns to a resolution presented to the Trades and Labor Council of Sydney, Cape Breton, protesting against the formation of a city regiment, because, in the words of the resolution, such a step would lead "to the abuse of militarism." To the credit of the Sydney Council the resolution does not appear to have been adopted, but the significance of the matter is that this idiotic resolution was evolved at a date which coincided with, or immediately followed, the visit to Sydney of the President of the Trades and Labor Congress of Canada.

A meeting of labor men was held in Montreal early in November, and was addressed by J. Sedden, the President of the Trade Union Congress of Great Britain, who claimed, with accuracy, to represent three million British trade unionists. The object of the meeting was to raise funds for the relief of the trade unionists of Belgium, an object sufficiently laudable it might be thought to engage the sympathy of Canadian trade unionists. Mr. Sedden must, therefore, have been rather unpleasantly astonished when the President of the Trades and Labor Council of Canada arose in the meeting and—the writer quotes from the Montreal Star—"made a sweeping arraignment of Sir Edward Grey as being equally guilty with the Kaiser for the war." Fortunately, however, the President of the Trades and Labor Council of Canada is not a Canadian—being, distressing to admit, a Scot from Edinburgh—nor does the clumsily-named and high-sounding organization of which he is President represent Canadian trade unionists.

A prominent Nova Scotian trade unionist, who recently visited Toronto, made the statement that he met four men in Toronto who took an unpatriotic view of Great Britain's attitude in the present war, and each of these men was born in Great Britain. These gentlemen, it may be deduced, left their country for their country's good, but it is a great misfortune that they should have selected Canada as a residence. We also could spare them.

The moment does not seem inopportune to set forth a few candid statements regarding the trend of trade unionism in Canada, particularly that type represented by the Trades and Labor Congress of Canada. This body lays great stress on its international affiliations, that is affiliations with labor unions in the United States. By reason of the extreme disproportion between the membership and wealth of the labor organizations of the United States in comparison with those of Canada, all such "affiliations" must necessarily be of the variety known as "jug-handled", and must be characterized by the dominance of the United States influence. Now a great many of the features of trade unionism across the line are altogether alien to Canadian ideals, having arisen out of unfortunate economic conditions which do not exist in Canada, and which, moreover, cannot exist side by side with British laws and institutions. One of the organizations comprising the Trades and Labor Congress of Canada is responsible for the incredible "labor war" in Colorado, which has required President Wilson's personal intervention. This same organization caused during the recent Vancouver coal strike the worst excesses that ever took

place in a strike in Canada, and, but for the good sense of the local populace, would have caused similar excesses in the Nova Scotia coal strikes of 1909 and 1910. Every endeavor was made to introduce the methods which have characterized every recent coal strike in the United States, amounting actually to a state of civil war deliberately brought about and designedly fostered by the United Mine Workers of America. In almost every U. M. W. A. strike of recent years, both in Canada and the United States, it has been found necessary to call out the militia troops, and in some cases the regular army troops, to fight pitched battles. A brief survey of these happenings will reveal a loss of life and property of astonishing proportions.

With affiliations of this nature, it is not surprising, as the writer has previously pointed out, that the Trades and Labor Congress should object to the militia. The militia, it may be inferred, interferes with their own particular brand of "militarism."

It is, however, disconcerting to discover that the men who purport to lead Canadian trade unionism are disloyal, for any Briton who questions the justice of Britain's attitude, or attempts to impugn the integrity of the Foreign Minister, at the present time, is disloyal. There was a moment, before Germany declared war on Britain, when discussion on this point was permissible, but the man who attempts to-day to weaken the position of our political and military leaders by accusations concerning matters precedent to the outbreak of hostilities, betrays first his ignorance, and then a mean-souled disloyalty which renders him undesirable as a citizen and a danger to the common weal if he holds the office of a labor leader.

There were two possibilities by which Britain might have averted war. The first is a very debatable one, but it has been discussed in the reviews, namely, that war might have been avoided had Britain in the earlier stages of the diplomatic negotiations made it plain that she was ready to go to war. But everyone must agree that in such a case she would have been regarded as the aggressor, and that her attitude might not, even under these circumstances, have prevented the calamity of war. The other possibility was to refuse to intervene in defence of Belgian neutrality, and no honorable man will wish to discuss this possibility. Had the President of the Trades and Labor Congress of Canada occupied the post of Foreign Minister, perhaps the world might have been saved its present agony, and it would be interesting to hear from this hitherto buried statesman how he would have arranged matters.

It is refreshing to turn from the contemplation of disloyalty to the utterances of Mr. Sedden who, doubtless much to his surprise, found it necessary to defend the Foreign Minister against the criticism of a man whose official title would imply that he represented the trade unionists of the Dominion of Canada. Mr. Sedden referred to the manifesto issued by the Parliamentary Committee of the Trade Union Congress of Great Britain, "appealing to the trade unionists to stand united in defence of the liberties won by our forefathers." Mr. Sedden attributed the ready response to the call for recruits in Britain to this manifesto, and it is a tribute, not only to the inborn patriotism of the British workman, but to his hard common



sense also, that he realizes how great are his liberties and privileges under the Union Jack.

The trade unionist in Great Britain has reason to love his country. Not that he would not love her under less favorable circumstances, but where would he find a better country? Look over the record of legislation in recent years. Has there ever been so sustained an attempt at amelioration of the condition of the workers, at equitable representation and taxation, as is represented by the enactments of the British House of Commons in the past ten years? The trend of British legislation has been called socialistic, stigmatized as class legislation, as the crudities of the demagogue and the enthusiastic but impractical social reformer. But these self-same crudities are now accepted and established features in the national life, and the "wicked and socialistic" laws of ten years ago are to-day the sober stuff of national practice and are so woven into the warp and woof of everyday life that they can nevermore be taken out. The pending struggle will show on how solid a foundation the loyalty of Great Britain's masses rests. They know that they themselves, by the power of their parliamentary representation, have largely brought about the legislation which has so increased their happiness, and they realize further that on them also devolves the privilege and the duty of defending their constitutional liberties—and, despite the ravings of men of the type of Kier Hardie, and his feeble imitator, the President of the Trades and Labor Council of Canada, these British workmen will die to a man before they will relinquish their British citizenship and all that goes with it. Many of them have already made that supreme and final sacrifice, and be it remembered that when the workman gives himself to fight his country's battles, he gives his all, and no man can do more than that.

It would be a libel on the trade unionists of Canada to suppose that they differed in this respect from their comrades in the Old Country itself, and there can be little doubt that they will repudiate the leadership of men who by their words and actions prove themselves recreant and disloyal in this, the supremest hour of the British Empire and the Anglo-Saxon race.

There is a sentence in the manifesto of the Parliamentary Committee of the Trade Union Congress of Great Britain which has become historic, because it epitomizes the feeling of intelligent British trade unionism. The sentence reads: "Upon the result of the struggle in which this country is now engaged, rests the preservation and maintenance of free and unfettered democratic government." The words "this country" in the sense in which they are here used mean the British Empire, the unexampled, glorious, God-given heritage of a free people, which the trade unionist, as part of an indissoluble whole, intends shall be handed down unimpaired to his son, and to his son's sons.

#### COMMISSION OF CONSERVATION.

That the conservation movement has made distinct progress during the past year is clearly indicated in the "Fifth Annual Report" of the Commission of Conservation, which has just been issued.

In his annual address, the Chairman of the Commission, Hon. Clifford Sifton, covered the Commission's activities with respect to waters and water-powers, minerals, public health, agriculture, fisheries and fur-bearing animals and forests, indicating clearly and suc-

cinetly a number of the problems that had been grappled with and the advances that had been made in their solution.

With respect to water-powers, lengthy reports are presented covering the work in connection with the water-power surveys carried out in Western Canada. Two volumes will be issued later giving the results of these surveys and will prove of great value to those who are interested in the development of the water-powers of Canada.

The Commission's Committee on Minerals has been further strengthened by selecting as chairman, Dr. Frank D. Adams of McGill University. Dr. Adams is an outstanding authority on the minerals of Canada, and his assistance will be of great value to the Commission. The report contains an excellent review by Mr. W. J. Dick, mining engineer of the Commission, on the "Importance of Bore-hole Records and the Capping of Gas Wells."

Several aspects of the problems of public health are dealt with in the report by well-known authorities. Dr. Hodgetts, in a brief address, summarizes the work of the Committee on Public Health, and, in addition, presents reports on such vital problems as "Infant Mortality," "First Aid to the Injured," and the work of the City Planning Conferences held in Chicago and Boston in 1913. Mr. G. Frank Beer, president of the Toronto Housing Co., develops at some length the housing and city planning question in Canada, with especial reference to the work of the Toronto Housing Co., and Colonel J. H. Burland outlines the legislative requirements for town planning.

The work of the Committee on Lands is described by Mr. F. C. Nunnick, the Commission's Agriculturist, who pays especial attention to the progress of the experiments with the growing of alfalfa in Quebec. Mr. Nunnick also describes in detail the Commission's "Agricultural Survey" for 1913, showing in concise form the farming conditions in the several provinces as ascertained by the Committee's investigators. Dr. James W. Robertson and Mr. John Fixter describe the work of the illustration farms of the Commission.

Mr. J. Walter Jones follows in detail the progress in fur-farming in Canada during the past year. The work of the Committee on Fisheries was confined, during 1913, chiefly to the development of the oyster industry. Hon. A. E. Arsenault describes the new method of leasing oyster beds in Prince Edward Island. This method was advocated by the Commission two years ago and will do much to regenerate the oyster industry in the Maritime Provinces. An exceedingly interesting paper on the "Protection of Migratory Birds" is given by a leading American authority, Mr. W. S. Haskell, who urges Canada to join with the United States in providing sanctuaries for these birds.

Considerable advance has been made in the conservation of forests during the year. The Commission has co-operated with the Board of Railway Commissioners and the several Provincial and Federal forest services concerning the prevention of forest fires, with the result that much has been done to prevent forest fires along railway lines especially in Western Canada. In addition to the report of the chief forester, Mr. Clyde Leavitt, there are addresses on forestry by Dr. B. E. Fernow and Mr. R. H. Campbell.

The report contains a number of splendid illustrations and gives in concise form much information that is of value to all Canadians interested in the conservation of our natural resources.



## REPORT ON HILLCREST DISASTER

The report of the Commission appointed for the investigation and enquiry into the cause and effect of the disaster which took place at the Hillcrest coal mine, in southwestern Alberta on June 19, 1914, has been issued. The single member of the Commission was Mr. Justice Carpenter, who commenced hearing evidence on July 2. In his letter of transmissal the Commissioner states that "all the evidence available was taken, and what might be said to be a fairly thorough inspection of that part of the mine where the explosion was supposed to have occurred was made by the Commission. The report has been delayed owing to not having received the result of the tests of coal dust that were to be made by the United States Bureau of Mines, which tests it was agreed by counsel should be taken into consideration in making this report."

At the time of the explosion there were 235 employees of the company in the mine. Of those, 189 perished.

In the introductory paragraphs of his report the Commissioner observes: "The scope of this enquiry was by the terms of the Commission to determine as far as possible the cause and effect of this disaster. To follow out the objects of the enquiry, the possible causes of an explosion in a mine of this kind have first to be considered. It is then necessary to arrive as far as possible at the actual condition of the mine immediately prior to the explosion both in regard to the ventilation of the mine, the presence of gas, the condition of the mine in regard to dust and the character of that dust as regards explosiveness, and any other conditions that might give rise to or contribute to the cause of the explosion. It is also necessary to consider what care the officials of the mine had exercised prior to the explosion, both in the supervision of their employees and generally in the operation and working of the mine. Finally the nature and seat of the explosion, if possible, must be determined."

The Commissioner, in his comments on the evidence and the circumstances attending the disaster first states that the possibility of a blown-out shot having originated the explosion may be eliminated from the enquiry as a cause. Then, as no naked lights were allowed, there remained the question of a defective safety lamp, having been the cause, which though a possibility was not regarded as a probability. No conclusion could be arrived at regarding a fall of rock having caused sparks. Ignition from the sparking of electric wires or motors was rejected as the cause. Ventilation of the mine was dealt with in greater detail than other matters, and the conclusion was the men who gave evidence were of one opinion, namely, that the ventilation was good so far as their own particular working places were concerned. The presence of gas in the mine was also somewhat fully considered; also that of dust. After having reviewed these various matters the Commissioner proceeds:

"Apart from the matters I have already dealt with, there does not appear to be anything in connection with the management of the mine, nor in the care taken by the company in its operations that could have led or contributed in any way to the disaster,

"The initial cause of the explosion does not appear to be ascertainable. I have, almost at the outset of this report, mentioned the ordinary causes of ignition of gas in a mine. Shot-firing having been eliminated, the explosion must of course have originated from the

ignition of gas, but by what means there has been absolutely no suggestion. Certain of the ordinary causes of ignition have been or may be eliminated here, but there is no means of fixing upon which of the remaining causes it was that started the explosion.

"With one exception, the expert witnesses all were of the opinion that it was a gas explosion augmented by the ignition of dust and that dust played a considerable part if not the greatest part in the explosion. The finding of a very considerable amount of coked coal dust was one of the facts that was relied upon by those who advanced this latter theory and in view of the result of the tests of the dust, I think this view is the most reasonable one to adopt.

"It is impossible also to determine the seat or place of origin of the explosion. In certain parts of the mine it can be said that the explosion did not originate, but apparently the place where it did originate cannot be determined.

"It will be seen from the foregoing portions of this report, that the course adopted by the management of the mine in relation to the ventilation thereof, and other matters closely related to the question of ventilation, was apparently either objectionable or at least open to criticism, but the evidence does not go so far as to show that this was responsible for the disaster.

"The only conclusion therefore, that I can arrive at, as a result of the whole evidence adduced at the enquiry is that the disaster was caused by an explosion of gas, the origin and seat of which is unascertainable; this explosion having been augmented by the ignition of dust through the mine."

The Commissioner made several recommendations "which it is submitted may lessen the extent of the danger that was shown to be attendant upon the operation of this mine." These related to constant direct supervision of mine fans; discontinuance of shot-firing until danger from dust in the mine shall have been considerably reduced, or that the men be withdrawn from the mine during such firing; that the recommendation of the coroner's jury that underground employees be searched at times for matches, pipes, and tobacco be adopted; that a plan of the ventilation system of the mine be provided, and that a definition of a district or split be agreed upon so that no difference of opinion may again arise.

### ALGOMA STEEL.

A meeting of the holders of the first and refunding mortgage 5 per cent. fifty-year sinking fund gold bonds of the Algoma Steel Corporation, Ltd., will be held on November 27, at the offices of the U. S. Mortgage & Trust Co., for the purpose of sanctioning a modification or compromise of the rights of holders by authorizing the company to pay interest on the bonds due October 1 last, April 1, 1915, October 1, 1915, and April 1, 1916, in scrip, exchangeable on or after December 1, 1916, for a like amount of said bonds, with an option to the company to pay interest in cash at any time.

There will also be authorized, through the trust company, an authentication and delivery to the company, upon request \$2,000,000 par value of the \$5,700,000 issue of the bonds in question.

The bondholders will likewise act upon assenting to a change in the deed of trust requisite to the release of the Lake Superior Corporation from its guarantee in respect to the interest on the bonds.



# PRE-CAMBRIAN CORRELATION FROM A LAKE SUPERIOR STANDPOINT\*

By C. K. Keith

(Continued from Last Issue.)

**A. C. Lane** (Boston)—Collins' paper has covered the decade of the introduction of the terms Huronian and Laurentian as divisions of the pre-Cambrian. In the decade between 1860 and 1870, first-class geologists like Credner, Brooks and Pumpelly followed the usage of the introducers of the terms and divided the pre-Cambrian (Vorsilurische, or Eozoic) into Laurentian and Huronian. It is a question of literary taste whether this well fixed usage, taken up by the great textbooks e. g., that of Dana, should be overturned and whether, if new wine be found, it should not be put into new bottles.

In all probability it will be found, if Newberry and Schuchert's theory that periods of geology are marked by world-wide cycles of sedimentation be true, that the Huronian as originally defined and mapped, covering the Animikie, contains three such cycles. In that case the Huronian may be divided into Animikean and two other periods. But why change the use of the term Huronian? This will lead to endless confusion. Give each of the three cycles and periods its own name.

Is it proved that, as Lawson implies, the "original Huronian" near Sault Ste. Marie contains no Animikie? My observations there do not convince me of this. It is also to be noted that the Animikie is more disturbed on the south shore of Lake Superior than the upper part of the "original Huronian."

**A. C. Lawson** (Berkeley, California), replying to Professor C. K. Keith, said that he had not ignored by implication the existing nomenclature and classification of the pre-Cambrian. On the contrary he had printed it in full and discussed it freely, pointing out its defects. The changes were urged not on the basis of short examination of the Rainy Lake district, with detailed mapping only along the water's edge, but after a careful re-study of the district and mapping on a field scale of a quarter-mile to the inch, involving numerous traverses, and after a review of the literature of the Lake Superior geology, to which abundant reference was made in his paper, particularly to the latest statement given in Monograph LIII. of the U. S. Geological Survey. He exhibited a geological map of a portion of Rainy Lake on a scale of half a mile to the inch showing the evidence for his interpretation of the Archaean geology of that district, and stated that his detailed work in 1911 had substantiated the evidence set forth in his report of 1887. He did not claim that the evidence as to the reality and stratigraphic position of the Couthiching was new, but that it was true, that it had never been examined by his critics in the significant sections, and that it must be recognized whether it be new or old.

Mr. Lawson said that the real reason for the denial of the existence of the Couthiching below the Keewatin was the peculiarly dogmatic doctrine, promulgated by the U. S. Geological Survey, that no sediments occurred in the Archaean, that it was wholly igneous. This doctrine has in recent years been abandoned as untenable. Under its influence, however, it was first denied that the Couthiching rocks were metamorphosed sediments, and subsequently, when their sedimentary character could no longer be doubt-

ed, it was asserted that they were above the Keewatin, although the geologists who made this assertion never took the trouble to examine the sections at Bear's Passage and Rice Bay, which were described in the report of 1887 as proving the superposition of the Keewatin upon the Couthiching. Mr. Keith, he said, had advanced several formal reasons for the non-acceptance of the stratigraphic position of the Couthiching, but these were not worth discussing in view of the unchallenged and positive field evidence easily observable at Bear's Passage and Rice Bay. At Bear's Passage the stratification of the Couthiching is not confounded with the schistosity, the strata are not "standing nearly on edge;" they form a well defined anticline with flat lying strata in the axis and steepening dips on the flanks, passing beneath the Keewatin on both sides. On the west side they pass beneath the Keewatin at angles of from 20 to 30 degrees. The section is, moreover, easily accessible, and it is psychologically remarkable, to say the least, that the geologists who deny the relations there revealed should not have visited the section during their different visits to Rainy lake. Mr. Keith's statement that "one of the largest areas described as Couthiching is now admitted to be later than and unconformable upon the Keewatin" is erroneous, as is shown by the map at his side. A relatively small strip of the rocks mapped as Couthiching on Seine river was found to belong to a later series, and the Couthiching remains as mapped in 1887, with but little change.

As to the recognition of the post-Huronian granite batholiths as Algoman, a term co-ordinate with Laurentian, Mr. Keith agrees that it is highly desirable to restrict the term Laurentian to the pre-Huronian granites. But without a definite designation for the post-Huronian Archaean granites, which are now known to be very extensive, this restriction cannot be made, as current usage up to this time clearly shows. The reference for all granites of Archaean age to the Laurentian under the guise of present expediency, when it is positively known that they belong to two widely separated ages, obscures geological history and retards progress. The desirability of restriction of the term Laurentian being conceded, no further argument is necessary.

Mr. Keith's objections to the recognition of the Eparchaean Interval as a dominant fact in the classification of the rocks of the Lake Superior region do not weaken its importance. The fact that there is another profound unconformity at the base of the Huronian, the Epi-Laurentian Interval, is freely recognized in the paper, but emphasis has been laid upon the Eparchaean Interval, owing to the fact that Van Hise, Keith and others habitually slur it over and minimize its significance by making the terms Algonkian and Huronian straddle a great time break. If the Animikie strata, as everybody agrees, were laid down on "a remarkably uniform peneplain—a flat plane beveling alike hard and soft, resistant and non-resistant rocks" in the Mesabi, Animikie and Gogebie districts, it is clear that a large section of geological time unrepresented by sediments is involved, which finds no

\*A paper presented at the Toronto Session International Geological Congress, 1913.



expression in the geological scale if the interval is to be spanned by a systemic name like Algonkian or Huronian. The rocks properly called Huronian are certainly on the far side of that interval and the Animikie on the near side, and the obscurities of the south shore are no warrant for ignoring a large fact which is as clear as day on the north shore of Lake Superior. Mr. Leith's contention that the Epi-Laurentian Interval is of equal importance is agreed to in the paper which he criticizes, but no one has attempted to bridge that interval by a systemic name including rocks on both sides of it, since the Keewatin was segregated from the Huronian. The introduction of the "great confusion into the literature" which Mr. Leith deplores is not due to the recognition of the significance of the Eparchaeon Interval and the taxonomic consequences which flow from it; but is due rather to the unwarranted, unnecessary and vicious imposition of the term Algonkian upon the literature in such a way as to displace the term Huronian as a division of the Archaean, and at the same time blur hopelessly the geological record. The term Algonkian is well enough as a name for a system of pre-Cambrian rocks, but the only system to which it can apply is that embracing the Animikie and the Keweenawan, since on the far side of the Eparchaeon Interval the term Huronian cannot be displaced.

The terms of the standard scale as set forth in his paper, Mr. Lawson claimed are expressions of geological fact. They represent major events in their ascertained sequence. Being the most complete and unequivocal sequence yet formulated, it is proper that it should be erected as a standard for purposes of comparison and correlation. The only debatable question is that of co-ordination, and his own view of that is expressed in the tabulation of the paper.

**Prof. Lane**—Did not Logan then describe these rocks as Cambrian?

**Dr. Lawson** replied that Logan in the *Geology of Canada*, 1863, did not class the Animikie as Huronian, but as a later series.

**C. K. Leith** (Madison, U.S.A.)—Dr. Lawson says he is glad to admit the existence of other unconformities possibly of the Eparchaeon type. This is what we claim. Why then should the unconformity at the base of the Animikie be made the principal basis of classification and nomenclature. Any arguments advanced for the emphasis on one unconformity will apply equally well to the other.

**J. J. Sederholm** (Helsingfors)—The Eparchaeon interval seems to correspond to the great break which exists in some parts of Fenno-Scandia between the Jatulian and its basement. There, as here, we place the upper limit of the Archaean at that break, but since the discovery of great thicknesses of Kalevian rocks, often directly underlying the Jatulian, I think we have less need of such a term as that proposed by Dr. Lawson.

I perfectly understand the reasons which have brought our Canadian colleagues to adopt the present use of the term Laurentian, but I continue to think that it might be better to give it up altogether. Many geologists have thought till lately that there was in the pre-Cambrian of northern Europe an oldest basement complex consisting mainly of gneisses and granites possibly older than all sediments. I once shared that opinion. But now we are aware that many of those gneissose and granitic rocks are younger than certain sedimentary schists of the same region and we

therefore try to map them with different colors according to their ages.

**A. P. Coleman** (Toronto)—The original Huronian was very carefully mapped by Logan and Murray, and was divided into upper and lower subdivisions. The Animikie was not included in it. The error of putting it into the Huronian was due to Irving's belief that the Animikie represented Logan's Huronian.

After careful study of the original Huronian I have not found any granites or gneisses penetrating them. Therefore I cannot agree with Dr. Lawson in defining the Algonman as granites and gneisses penetrating the Huronian.

**A. E. Barlow** (Montreal)—I am rather surprised that Dr. Coleman should maintain that there are no important batholiths later than the Huronian, for in his most recent work, *The Nickel Industry*, he mentions that the nickel eruptive, presumably of Keweenawan age, is cut by dykes of later granite, apophyses from and genetically connected with a batholith which occupies an area of many square miles in the Sudbury district. He further relates that the later olivine-dabase dykes, which the present speaker has always regarded as differentiates of the nickel eruptive, are cut by little dykes of granite. Dr. Coleman also states his belief that "this last eruption probably took place somewhere in Palaeozoic time." May I then ask Dr. Coleman if this is not a fair and proper interpretation of his latest description of the geology of Sudbury district.

**Sir T. H. Holland** (Manchester), pointed out that some misunderstanding appeared to exist as to Logan's views regarding the relation of the Huronian to the rest of the pre-Cambrian of the Great Lakes region. Logan first divided the rocks of the area into five groups, drawing special attention to the great unconformity between the foliated and folded groups 1, 2 and 3 below and the simply folded formations 4 and 5 above. The lowest two groups afterwards became the Laurentian while the more certainly sedimentary formations above became known as the Copper bearing series. For the first ten years after the Survey commenced in 1846, Logan tried to fit the Canadian rocks into the standard scale of Europe and thus relegated the oldest unaltered local sediments to the Cambrian. But in 1857 he felt compelled to separate his group 3 under a separate name, Huronian, limiting the term to the folded sediments below the great unconformity, that is, below what were afterwards named the Animikie. There is no doubt whatever that Logan very clearly distinguished between the Huronian and the "Upper Copper-bearing series" or Animikie. But in summarizing the reports of his assistant, Murray, Logan made the error of referring to the Huronian at the mouth of the Kaministiquia river, instead of at the falls, which are some 20 miles from the shore of Thunder bay. This error became repeated in the *Geology of Canada* published in 1863, and numbers of geologists were consequently misled by supposing that the easily accessible rocks of Thunder bay represented Logan's original Huronian when, as a matter of fact, they belonged to the "Upper Copper-bearing series." Most of the subsequent confusion and controversy can be traced to this simple clerical error, as was pointed out by Dr. G. M. Dawson when the British Association met in Toronto in 1897.

The speaker agreed with Dr. Sederholm in objecting to the use of system names for intrusive batholiths, and he recommended the system introduced by him in India of recognizing by special names well de-



finer petrographical provinces among the Archaean intrusives. The recognition of a petrographical province implied an age as well as an area and they thus had in India the charnockite series, the Sivamalai series, the kodurite series, etc. These might or might not wholly or in part correspond to the Laurentian of Canada; no one could settle such a point, and nothing would be gained by attempting the impossible task of correlating the Archaean intrusives of widely separated areas; analogies could be recognized, but not equivalence of age.

**A. E. Barlow**—Before reaching a decision regarding the formation of any committee on pre-Cambrian classification and nomenclature I would like to make a few remarks. In the first place the geologists invited to join such a committee should be men of wide acquaintance with and interest in the subject. They should preferably have firm convictions, reached after years of critical examination and study in various regions where pre-Cambrian rocks are typically exposed. My experience with men of so-called judicial mind has been that they have no "mind" at all and are most concerned in trying to reach some compromised decision. Truth will not admit of compromise. The men, therefore, who are to compose such a committee should be chosen for fitness only, and not by reason of their official position. I oppose in the strongest manner any abandonment of the use of the term Laurentian at a time when we understand better than in the past its true import. The use of names to designate as "series" certain local developments of these old crystalline rocks, urged by Sir Thomas Holland, seems to me only to add to the complexity of the subject, for we know that the nepheline and other alkali syenites found in the Laurentian massif and which are comparable with Holland's Sivamalai series of India, are a peripheral expression of the more usual or prevalent Laurentian granites and gneisses. I am deeply grateful that Archaean geologists of all countries are in such close agreement on questions of interpretation and classification. At the same time I am in hearty sympathy with Dr. Lawson in his determined stand for world-wide recognition of the importance of batholithic intrusion as representative of time and area in geological history and his emphasis on the great lapse of time represented by the Eparchaean and other intervals.

**G. A. Cole** (Dublin), asked his Canadian colleagues to consider seriously whether, injustice to the original views and definitions of Sir Wm. Logan, the term Laurentian might not be abandoned, except as representing an opinion which profoundly influenced the reading of the Archaean succession all over the world. That reading having, in the progress of research, become greatly modified, the name Laurentian ceased to be desirable, as it could no longer be applied to the ancient stratigraphical horizons for which it was devised. Similarly, the greatly respected term Silurian, owing to various definitions given to it, had been abandoned by several European workers.

Professor Cole also pointed out that Dr. Strahan had naturally based his account of pre-Cambrian rocks in Ireland on Irish publications of the Geological Survey of the British Isles. These, however, were now some 20 years old and the views expressed in them had been departed from in many respects by geologists in Ireland at the present day. The gneiss of the northwest, for instance, was now known to be intrusive in the Lough Foyle (Dalradian) series, and it was to be regretted that the only official statement of this fact occurred, so far,

in two minor publications of the Department of Agriculture for Ireland. He felt that it was the duty of the Irish Survey, and thus his own duty, to rectify these matters at an early date.

**J. Horne** (Midlothian), expressed amazement not only at the divergences of opinion but at the contradictory statements that had been made regarding the facts of North American pre-Cambrian geology. He was of the opinion that names of formations might come to have broader significances than the conditions existent in the original locality would indicate. Thus the term Lewisian is now so used that the rocks in the locality where this name was originally applied are no longer very typical.

**Dr. Lawson** replying to Dr. Horne, said that his statement that the Huronian was cut by granites was based upon Professor Coleman's papers.

**A. P. Coleman**—Dr. Barlow has quoted Prof. Coleman as contradicting Prof. Coleman, and quite correctly. In earlier writings I followed the usual belief as to the Huronian. Since then new light has come, placing the Sudbury series, which is cut by the Laurentian, below the Huronian. This will explain to Dr. Horne the apparent contradiction.

**T. C. Chamberlin** (Chicago), stated briefly the grounds on which the pre-Cambrian is divided into Proterozoic and Archeozoic, to which allusion had been made. A portion of the pre-Cambrian sediments present the products of mature disintegration, while the earlier portions are usually characterized by partial or immature disintegration. The former are best typified by the great beds of quartzite, that imply the complete disintegration of large quantities of quartz-bearing rock and the subsequent assortment and reduction of its quartz particles. The shales and schists imply the same process, but in their metamorphosed condition they are less easily and safely distinguished from pyroclastic and other material of different origin. Mature disintegration implies some restraining agency that held the rock in place while the slow weathering process completed its work; otherwise the products of incomplete disintegration would have mingled with quartz and given an arkose or equivalent product. In the later ages the chief restraining agency was the mantle of vegetation, so that this view favors the existence of a vegetal covering of the land as far back as great terranes of quartzite occur. By hypothesis the classification thus comes to have a semi-organic basis; but this is not essential to the classification which is based on the dominant processes attending the sedimentation. The Proterozoic is thus made to include terranes that bear great quartzite formations. The earlier formations not so characterized are grouped into the Archeozoic.

**L. L. Fermor** (Calcutta, referring to Dr. Horne's paper presented at the morning session, pointed out that Dr. Horne had given a resume of the various opinions held on the Lewisian gneisses, Moine schists and Torridonian sandstones, but that he had omitted to mention what many were probably wishing to hear, namely, the equivalence of the Dalradian schists to the remainder of the Scottish crystallines. He asked Dr. Horne if he would kindly express an opinion on this point.

Dr. Fermor also referred to the interesting discussion on the nomenclature of the North American Pre-Cambrian rocks. He pointed out that the classification of the pre-Cambrian rocks of India advocated by Sir T. H. Holland had been prepared at a time when the classification of the American Pre-Cambrian was in a state of confusion. Since Holland's scheme had been put forward



it had been tested by the Indian Geological Survey and found to be of great use. The majority of officers of that department found that Holland's classification was peculiarly suitable to India. The speaker had never been able to understand why some such similar scheme should not also be applicable to North America. The great stumbling block had been the various statements prevalent as to the relation of the Laurentian to the other members of the Pre-Cambrian complex of North America. Prof. Lawson in his paper had now made these relations perfectly clear by separating the Algoman from the Laurentian batholithic rocks. The speaker thought that Prof. Lawson's paper would be received with great satisfaction by many Indian geologists.

## WORKMENS' COMPENSATION IN ONTARIO

Employers throughout the Province are now beginning to realize what a stupendous task lies before the Workmen's Compensation Board in administering the system which is to go into operation on the 1st of January. There is probably not a single employer in the Province who has not within the last few weeks been obliged to wrestle with one or more of the following questions:—

What about the office staff? Do the stenographers, accountants, etc., come under the Act? What if they are in the same building as the rest of the plant? What if they are on other premises just as dangerous? What if they are on premises not so dangerous? What about the manager? What if he rarely, or never, goes into the plant? What if he does go into the plant? What about the president, directors, etc., of an incorporated company? What if the president, directors, stenographers, office boys, etc., etc., are generally, or sometimes, engaged in work other than "clerical"?

What does "clerical" mean? Does it mean what the dictionary says, namely, "of, pertaining to, or characteristic of, the clergy, or a clergyman; suitable for the clergy; of or relating to a clerk or copyist"?

What about branch establishments? The Act provides that "employment shall include employment in any industry or any part, branch or department of an industry." What if a manufacturer has a wholesale or retail department or branch either on the manufacturing premises or elsewhere? What about branches outside the Province; employees injured outside the Province are in some cases entitled to compensation. Does this support the view that branches or departments outside the Province are under the Act?

As to persons engaged in "clerical" work and not "exposed to the hazards incident to the nature of the work carried on in the employment", it must be observed that the two qualifications must occur before the person is excluded from the Act. The work must not only be "clerical" but the employee must not be exposed to the hazard, and conversely, the employee must not only not be exposed to the hazard but the work must be "clerical."

The meaning of the word "clerical" that is to say, the legislative meaning—the meaning which the legislature (not the Retail Merchants' Association, or the drafting Commissioner or even the Cabinet) intended—is presumed to be the ordinary or dictionary meaning unless the contrary is shown. The root meaning referring to the clergy has been extended to cover matters generally connected with copying or writing, but it would be difficult if not impossible to maintain that a correct use of the word would include the salesmen, saleswomen, floor walkers, office and messenger

boys, porters, janitors, sweepers, scrubwomen and the indefinite variety of persons engaged for instance in a large department store or a wholesale warehouse.

—F. W. Wegenast, in Industrial Canada.

## CROWN RESERVE.

Under date of November 14, 1914, the Crown Reserve Mining Company issued the following notice to shareholders:

"The drainage of Kerr lake and the removal of the mud and clay during the year has demonstrated that the whole bed of the lake on the Crown Reserve property is a long narrow trough, instead of a gradual sloping ledge. The difficulty in removing this mud and clay has made it impossible to prospect the bed of the lake this season, although the work will be vigorously renewed next spring. No new orebodies have been discovered.

"The fall in the price of silver since the commencement of the war has also made it necessary to extract a larger proportion of high grade ore than heretofore to meet the expenses and dividends. The company has earned all requirements for expenses and dividends and assures the shareholders that the same rate of dividend can be earned and will be paid by the company for the balance of the present year, but owing to the foregoing facts it is the intention of the directors to recommend to the incoming board that the present rate of dividend be reduced."

The Kerr Lake Mining Company's portion of the bed of Kerr lake is a gradually sloping ledge, and most of it has been exposed and prospected. Numerous veins of good ore have been laid bare by removing the water and mud and the results are very satisfactory. The Crown Reserve Company's property lies lower and is more deeply covered with mud. Hence, it has not been possible this year to uncover it as the Kerr lake property has been uncovered. The Crown Reserve property being more heavily covered with mud is more costly to explore and takes more time. Not only is exploration costly, but prospects correspondingly poor, for the deeper the mud the thinner the ore-bearing conglomerate and the smaller the profit. However, the property is by no means worked out yet, and there is a considerable area yet unexplored.

## CANADIAN MINING CORPORATION.

Interim dividend for the six months ended September 30, 1914, of 6d. per share, less income tax, payable on the 25th inst. The earnings warrant a larger dividend, but on account of the general financial conditions and the heavy drop in the silver market the board of the Canadian company considers a conservative policy essential.

## MAGNESITE.

The Canada Gazette's announcement makes it clear that the Minister of Customs has been authorized to issue license on behalf of His Majesty permitting manufacturers using magnesite to trade with the enemy in respect of such magnesite, in any case where it is established that the materials are necessary for the maintenance of an important Canadian industry.

## PORCUPINE CROWN.

Poreupine Crown Mines, Ltd., has given notice that a dividend of 3 per cent. for the quarter ending 31st December, 1914, has been declared, payable on the 2nd January, 1915, to shareholders of record the 15th December.



## NATURAL RESOURCES OF PEACE RIVER COUNTRY

The Vancouver Daily Province recently published a lengthy account of the impressions of Mr. Martin J. Ravey, who late in October returned to Vancouver after having been travelling for nearly four months in parts of western Alberta and the Peace River country in British Columbia. Mr. Ravey left Vancouver early in July and first visited the part of Alberta in which prospecting for oil is being done. He says:

"After leaving the oil field I spent seven weeks on foot and raft in the country north-west of Edmonton, covering a distance of about 1,500 miles, going in via Grand Prairie, by way of Edson, through Pouce Coupe, Nose mountain, Pine River pass, on to Fort St. John and Peace River landing, down to Grouard at the head of Lesser Slave lake, and thence to Edmonton. Throughout the trip I took every opportunity of making detours off the main route. The natural resources of that country really surpass imagination. As in many other parts awaiting settlement, the chief thing lacking is means of transportation, but provision of this is practically assured. The lines of four companies coming from the east have already been surveyed and partly constructed, while communication with British Columbia is promised as soon as details shall have been completed in connection with the line that will eventually run from Bella Coola through Pine River pass to the heart of the Peace River country and thence on to Hudson bay. Government surveyors who have reported on the district are agreed that this route will afford the shortest way with the lowest grade for all products of the great North-West, which products will, in a few years, have to find an outlet to the markets of the world via a Pacific Coast port.

"This being practically a virgin country, a traveller naturally has to overcome many obstacles. The Government wagon road between Edson and Grand Prairie, a distance of roughly 240 miles, is fairly good in places, but has suffered from exceptionally heavy freighting between those points. Despite those obstacles, though, the settlers are all highly pleased with the prospects. Being sparsely timbered, none of the land off the main wagon road presents any difficulties as far as clearing goes; in fact, the timber on it will be an advantage to those going in to build up their future homes, much of it being suitable for fencing and for lumber for building, while the remainder will provide fuel for many years to come. . . . Horses and cattle are able to forage for themselves until early in January, and the farmer has no difficulty in getting all the winter feed necessary for the time—ten weeks at most—during which it is necessary to give the stock feed and protection. It is a curious fact that the temperature at this altitude is due to the low passes in the Rocky mountains, which offer little, if any, resistance to the Chinook winds arising from the Japanese current, striking the Pacific coast due west of here."

Mr. Ravey gives much information concerning the natural vegetation growing in profusion, game and fur animals, fish, wild fruits, etc., and adds: "In addition to all these valuable resources awaiting the coming of the settler, there is much mineral wealth. Coal, gas and oil are known to exist. The whole country is underlain with coal measures, and at various places along the banks of the rivers settlers can collect large blocks of float coal, so all they have to do is to haul it to their cabins to provide a fuel supply. During my

journey I took samples of good anthracite, while bituminous and lignitic coals underlie millions of acres of the easterly part of the Peace River country."

Again, Mr. Ravey says: "In addition to the farming prospects, minerals, oil, coal and gas are found here in commercial quantity. Along the stream and river banks outcroppings of lignite and bituminous coal are to be seen, while in the foothills good anthracite has been found and only awaits development. Coal areas have already been secured by several railway companies interested in the district, and I was told that United States capitalists who have received encouraging reports intend spending much money here next year. As to gas, I should say there is far more in the Peace River country than they have in the fields of Alberta. . . . The general conditions for oil are favorable in this part of the country. From geological reports it will be seen that the underlying strata is not so broken as it is in parts farther south, the contention being that at the time of the upheaval of the Rockies the disturbance in these parts was not so violent, consequently the strata running east of those mountains is thrown into undulations suitable for the accumulation of oil."

### ANALYSES OF U. S. COALS.

The United States Bureau of Mines has just issued a small edition of Bulletin 85, "Analyses of Mine and Car Samples of coal collected in the fiscal years 1911 to 1913," by Arno C. Fieldner, Howard I. Smith, Albert H. Fay and Samuel Sanford. The present bulletin presents analyses and descriptions of samples of coal collected from many mines throughout the entire country. In order that the material in this bulletin may be made to supplement that presented in Bulletin 22, "Analyses of Coals in the United States," the same plan of geographical classification has been followed, the analyses and descriptions of the samples being grouped in alphabetical order according to the state, county, and town near which the mines or prospects sampled are situated.

Bulletin 22 was said to be the most comprehensive publication ever issued on the coals of the United States and the new bulletin is an extension of that work. So great was the demand for Bulletin 22 the free edition was exhausted a few weeks after its issuance. At the present time the only way to obtain a copy of Bulletin 22 is through the Superintendent of Documents, Government Printing Office, Washington, D.C., who sells the publication at eighty-five cents.

In Bulletin 85 are chapters on the collection of samples, the method of mine sampling followed by the Bureau of Mines, the relation of mine samples to commercial shipment, methods for the determination of moisture, ash, volatile matter, fixed carbon, and sulphur. Copies of this bulletin may be obtained as long as the free edition remains in stock by addressing the Director of the U. S. Bureau of Mines, Washington, D. C.

### YUKON FROZEN UP.

Fairbanks, Nov. 11.

The Yukon river was frozen over at Tanana yesterday morning. The last boat of the year left here September 25. The freeze-up on Chena Slough took place October 25. The lower Yukon is still open to navigation. The gas schooner Silver Wave left Nome Monday with mail for the States. The weather here is extremely moderate, with no snow.



# THE SAFETY MOVEMENT IN THE LAKE SUPERIOR IRON REGION\*

By Edwin Higgins

It is the purpose of this paper to set forth the relation and functions of the various organizations and institutions engaged in the promotion of safety in the iron mines of the Lake Superior region; also to indicate the value of this work. Ten to 15 years ago there was practically no organized safety work; the accident rate was high, excessively so in some districts, and dangerous practices and conditions existed in many of the mines.

During recent years, however, a gradual change for the better has been made. The chief causes of this change have been (a) public opinion, which has set the stamp of disapproval on the disregard for human life; (b) certain State laws which have made the operators responsible in dollars and cents for injuries to workmen; and (c) the humanitarian attitude of many of the operators, who have always decried the great loss of life in the mines.

To-day the Lake Superior region as a whole stands second to no other metal-mining district in the United States in its efforts to promote the welfare and safety of the miner. Dangerous practices in and about the mines are fast disappearing. The operators are ready and eager to adopt any expedient, rule, or device that holds forth a reasonable promise of reducing the hazard of the miner. To-day the value of a mine captain or shift boss is reckoned, not alone on his ability to "get the ore," but also on his capacity for reducing accidents. While the progress made has been remarkable, there still remains much to be done, for the accident records of the Lake Superior iron mines, while lower than those of the chief metal-mining regions of the United States, still compare unfavorably with those of the metal mines of practically all foreign countries.

## Organizations Engaged in Safety Work.

There are five organizations, or institutions, engaged in safety work in the Lake Superior region, viz.: The mining companies; county mine inspectors; co-operative range committees; Lake Superior Mining Institute; Federal Bureau of Mines.

While each of these bodies covers well-defined features of the work, their activities are correlated to a certain extent. The mining companies, primarily, are concerned with conditions in their respective mines, but they co-operate with and receive aid from the other agencies mentioned. The county mine inspectors, whose duty it is to see that the mines are operated with due regard to the State laws, are of great assistance to the mining companies in suggesting remedies for dangerous conditions or practices. The co-operative range committees, made up as they are of officials and employees of all companies operating within a given radius, are a benefit to the body of operators of their respective ranges. The committee of the Lake Superior Mining Institute on practices for the prevention of accidents, concerns itself chiefly with questions of safety of widespread interest; it of course has the co-operation of the other bodies interested. The Federal Bureau of Mines is chiefly active in training miners in the use and care of rescue apparatus and in first aid to the injured; also, it has conducted special investigations of certain problems having to do with safety and efficiency in the mines.

The unity of ultimate purpose and the strong co-operative spirit which have characterized the work of these five bodies have been important factors in the development of the conditions of to-day.

## The Work of the Mining Companies.

The bulk of the cost of the safety work has been and is still borne by the mining companies. In the main, their work has been to provide protective devices in and about the mines, and to educate the miners, by means of rules and regulations and various other methods, so as to enable them to protect themselves from injury. These objects seem easy of accomplishment, but there are obstacles of various kinds continually arising to hinder progress toward the desired end. Some of the most serious factors, most of which still exist to a greater or less extent, are the prejudice of the old-time miner or boss toward safety regulations; carelessness and lack of interest in safety work on the part of the miners, and even the bosses; and at times the scarcity of labor, which necessitates the employment of less skilled and oftentimes ignorant men.

The greatest problem to-day is not to secure knowledge of how safety work should be conducted, and what protective devices to use, but how to get the miner to use these methods and devices. Probably not 10 per cent. of the miners, if subjected to an examination, would show even a passing knowledge of the contents of the books of rules and regulations. Safety devices, provided at great expense, are often found removed from their places, or disregarded entirely.

The first problem of the mining companies was to provide for an organization to carry on the safety work, then to devise means of protecting the miner and of educating him and securing his co-operation in the prevention of accidents.

**Organization.**—Practically every mining company in the district now has some individual, or organization, whose duties relate solely to safety work. The larger companies have well organized safety departments. The following brief outline of safety organizations will indicate the usual procedure in this connection.

1. The mines covered by this organization are large and are all situated on one of the iron ranges of Michigan. The safety department is in charge of an inspector and it is his duty to inspect all mines as frequently as possible and submit reports and recommendations to the manager. Periodical trips are made in and about the mines by a committee of mine foremen consisting of three members, each of whom is selected from a different mine. The inspector accompanies this committee and incorporates its recommendations in a report. Another committee, having similar duties, is made up of workmen. The activities of this committee, however, are limited to the mine from which it is selected. The members are changed after each inspection, so that in time all employees are given a chance to criticize conditions in and about the mine.

All accident reports and safety recommendations are considered by a committee of mine superintendents, the head mining captain, master mechanic, assistant auditor, secretary of the pension department, safety inspector, and the manager, who acts as an ex-officio

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member. This committee meets once a month and confirms or rejects safety recommendations.

In addition to the above committees, there is one more made up of three mine superintendents. This committee investigates all fatal accidents and makes a report thereon to the manager.

2. The following form of organization is employed by a company operating both large and small mines at various scattered points. The department is under an inspector, who, with the assistance of three experienced miners, inspects each mine of the company at least twice a week. After a mine is examined, a report, including any recommendations thought necessary, is sent to the safety inspector. The safety inspector in turn makes a weekly report to the superintendent, who looks after all recommendations having to do with upkeep. The safety inspector makes a monthly report in triplicate to the manager in which recommendations are submitted for approval. Such recommendations are made out to the head of the department concerned. When approved by the manager, one copy is returned to the safety inspector, to be kept by him until the indicated improvement is made. Two copies go to the superintendent, who keeps one and sends the other to the head of the department concerned. On the completion of the improvement, the head of the department sends the recommendation back to the superintendent, who then destroys his copy and sends the indorsement of completion to the safety inspector. The safety inspector destroys his record and files in its place the report showing that the improvement has been made. This report is in the form of a printed card with blank spaces filled in according to the needs.

All company bosses and first-aid men meet once every two months to discuss all accidents that have occurred during the previous two months. The subjects discussed at these meetings are safety, sanitation, first aid and welfare.

3. A similar organization to that described above is maintained by a company operating small groups of mines at scattered points. A chief inspector is in charge of the safety work at all the mines. The foremen's safety committee, consisting of four foremen from the mines of a certain district, works directly under the chief inspector. This committee makes a trip every three months through all mines of the district. Its personnel is changed after each inspection trip. The committee reports to the inspector, who, in turn, includes this report in his recommendations to the superintendent; a copy of the report also goes to the general manager.

4. This organization operates in connection with one large mine. Inasmuch as the organization was changed after the safety work was well under way, it may be well to point out the various steps in perfecting the organization. An engineer was placed in charge of a department of efficiency and safety. He first made a thorough study of conditions in the mine and determined the principal causes of injury to the men employed. Finding that the greatest number of accidents occurred from falls of rock and ore, and from men falling down unprotected places in the mine, timber inspection was doubled and every place in the mine where it was thought that there was a possible chance for a fall to occur was timbered. All open places were protected by means of doors or gates. This movement effected an immediate and marked falling off in the number of accidents from the causes mentioned.

Finally, three assistants were added to the department and each one of them was given a certain feature of the work to look after. This was necessary on account of the magnitude of the operation. The safety and efficiency work then developed into daily inspection trips by all the members of the department. Reports were made by them to the head of the department, who considered recommendations made and obtained immediate action thereon through consultation with the manager. Lately these daily inspection trips have been abandoned; the members of the organization now average two or three trips a week through the mine.

Daily meetings, attended by the manager, superintendent, head of the efficiency and safety department, and mine captains, are held. Here all matters pertaining to efficiency and safety are discussed. As these meetings are held in the morning, it is possible to hear the reports of the shift bosses to the mine captain. In this way daily happenings and conditions in the mine receive prompt attention.

**Protective Methods and Devices.**—Under the head of protective methods and devices it may be said, in general, that the work proceeds along the following lines:

A study of mining and timbering methods with a view to greater safety.

A study of safe methods in every department of mine work.

The protection of dangerous places in the mine.

Protective coverings for all exposed parts of machinery.

Installation of safety devices in and about the mine.

The provision of such tools and appliances as will result in the maximum safety to the employees.

Installation of devices for protection against fire.

The inspection of all working places, shafts, and machinery at stated intervals.

The method of carrying on the inspection work is indicated in the description of the various types of organizations. Nearly all of the protective methods and devices are suggested through information gained on the inspection trips.

**Welfare and Educational Work.**—It has long been recognized that various measures looking to the welfare of workmen are most desirable from many standpoints. In the study of safety work it has developed that any line of work that will serve to secure the co-operation and confidence of employees is of the greatest value in promoting safety. Without the co-operation of the workmen safety work cannot advance, and in order to gain this co-operation it is necessary first to secure the confidence of the men. Indeed, many students of safety believe that the winning of this confidence and co-operation constitutes almost the entire safety problem. Lake Superior mining companies are spending as much, if not more, money in welfare and educational work than on the actual installation of safety devices.

Among the activities of several of the large companies looking to the welfare of the miner may be mentioned the following:

The provision of a pension fund for workmen who have grown old in the service of the company; erection of club houses where the workmen may spend their idle hours; the building of model towns and houses for the use of workmen; the offering of cash prizes for the best-kept premises, lawns, and flower gardens; the building of expensive and commodious dry or change houses. Practically every iron mine in the Lake Super-



ior region is provided with a dry or change house; some of these are models of cleanliness and perfection in other details.

Among the more important educational features designed to secure the co-operation of the miner, may be mentioned the following:

**Rules and Regulations.**—Practically all of the large companies issue to their workmen books of rules and regulations. In some cases these books are printed in from eight to ten different languages. In general, they cover all departments of mine work. These rule books in the past have contained many regulations that were not enforced, but of recent years there has been a noticeable tightening in this respect and the tendency now is to eliminate many of the useless rules and to be more strict in the enforcement of those retained. There is still room for improvement, however, in the matter of enforcing rules.

**Cash Bonuses.**—The matter of cash bonuses to bosses and others for the prevention of accidents has not, in the past, been given serious consideration. During the last year, however, the managements of several companies have come to the belief that an equitable system of cash bonuses will be of value in reducing accidents. There is only one company that has really put the system into operation. While the method used by this company cannot be termed strictly a bonus system, it is in principle the same thing. By paying to shift bosses salaries that were larger than those paid by other operators, but insisting that these shift bosses be safety enthusiasts, this company has conducted its operations with a minimum percentage of accidents for the district. One large company is preparing to adopt a system of paying large cash prizes to the shift bosses turning in the best records as to the number of men killed or injured while working under their supervision.

**Publicity of Accident Records.**—A method of attracting the attention of the workmen to the hazards of their employment, which has been adopted to a certain extent, is to post placards at various points in and about the mine calling attention to all serious accidents that happen, and pointing out how they might have been prevented. In some cases sketches and photographs are used as illustrations with these placards. At some mines the records of the different shift bosses, as to the number of accidents that happen to the men working under them, are posted in conspicuous places.

**Pay for Safety Suggestions.**—It is the general practice in the district to offer cash rewards for suggestions from workmen that may lead to safer working conditions.

**First Aid and Rescue Instruction.**—Through the activities of the mining companies, in co-operation with the Bureau of Mines, miners have been trained in first-aid and rescue work at practically every mine in the district. This work has not been limited to three or four men at a mine, but in many cases has been continued so that in some cases as many as 20 per cent. of the employees have received first-aid training. Training in rescue work, however, has usually been limited to from five to ten men at a mine, or group of small mines.

#### **Work of the County Mine Inspectors.**

The various counties of the Lake Superior district in which mines are situated, are each provided with a mine inspector. In some cases this inspector is allowed to employ such assistants as may be necessary in

his work. The various counties require that every mine shall be inspected at stated periods. The principal duty of the county mine inspector is to see that the mines are operated in accordance with the laws of the State. He is empowered with authority to cause the closing down of a mine in case the management refuses to comply with his demands. In reality, these inspectors have rendered services in excess of what is demanded of them by law. Through the study of conditions in the mines they gain information that is of common value; such information is disseminated to mine operators in the form of suggestions for the promotion of safety. One inspector has gone so far as to make and keep records of safety devices and methods. These he has communicated to all the operators in his county through the medium of circular letters and blueprints. The efforts of these county mine inspectors and their assistants have gone far toward promoting safety in the mines of the Lake Superior region.

#### **Work of the Co-operative Range Committees.**

There have been organized on the various iron ranges what may be termed co-operative range committees. During the year 1913, five such organizations were perfected. It is believed, however, that only three of them are now holding regular meetings and doing efficient work. These committees are made up of mine superintendents, mine captains, shift bosses, safety inspectors, men in charge of first-aid and rescue work and other mine employees interested in safety work. The committees have the backing of the management of the mines, which stand the bulk of the expense of carrying on their work. The organizations are made up of representatives of practically all companies within a given radius. For instance, the Gogebic Range Mining Association includes in its membership representatives from all companies operating on the Gogebic range. The purposes of this organization, as set forth in its by-laws, are to promote social intercourse and the interchange of ideas on all subjects of mining interest, for the mutual benefit of its members; and to perpetuate efficiency, welfare, safety, mine-rescue work and first aid to the injured in and about the mines. These purposes are accomplished by (a) social meetings; (b) remarks, discussions, and the presentation of papers by members of the organization at different times; (c) occasional visits to the different mines, plants and properties upon invitation of the management of same; and (d) occasional competitive meets for crews trained in mine-rescue work and first aid to the injured.

The greatest good done by these committees has been in disseminating, for the benefit of all the mining companies, information relating to safety, efficiency and other mine work. They have developed in some cases into organizations representing the needs and wishes of entire communities. Their opportunity for the promotion of the general welfare is unlimited.

#### **Work of the Lake Superior Mining Institute.**

The Lake Superior Mining Institute some years ago established a committee on practices for the prevention of accidents. This committee holds special and stated meetings at which are considered important problems relating to safety and mine operation. Among important subjects upon which recommendations have been made may be mentioned the uniformity of mine-accident reports. Under present conditions the mining companies make reports of accidents to several different organizations, all of which require different classifications of accidents. The work thus entail-



ed is enormous. By providing a uniform type of report this undue work may be eliminated. Furthermore, reports of the county mine inspectors, although satisfactory as far as the needs of each county are concerned, are made in such form that it is impossible to make intelligent comparisons of records of the various counties. An effort will be made, through this committee, to standardize all reports.

In addition to other important considerations, a study is now being made of mine rules and regulations, with a view to eliminating unnecessary regulations and including others that appear to be of paramount importance.

This committee recently considered and made recommendations that led to the holding of a first-aid contest at Ishpeming, Mich., during August, 1914. This meet was attended by teams from all over the Lake Superior region.

**Work of the Federal Bureau of Mines.**

The Federal Bureau of Mines has headquarters at Ironwood, Mich., established in November, 1912. It has recently acquired, through lease, a small tract of ground on the right of way of the Chicago & Northwestern Railway, and a spur has been built thereon for the accommodation of the rescue car. Arrangements have been practically perfected under which the operators of the Gogebic range will erect a building containing the necessary office room and housing for the rescue car.

The Bureau's representatives in the district have comprised a district engineer, a foreman miner, and a first-aid miner. The rescue car has been active in training the miners of the entire region in first aid to the injured and rescue work. It has not, however, been continuously engaged in this work owing to lack of available funds. Up to the present time there have been trained in the entire district a total of approximately 700 men in first aid to the injured, and 400 men in the use of oxygen breathing apparatus. These men have trained others and it is estimated that there is now a total of 2,000 men in the district who have received training in first aid to the injured, and 1,000 men who have received training in the use of oxygen breathing apparatus.

In addition to this work of training, the district engineer has visited and examined a large proportion of the mines of the region. These examinations were followed in some cases, at the request of the management, by recommendations for increasing safety in the mines. Special investigations undertaken include those having to do with ventilation, mine fires, organization and conduct of safety work, the use of mine sign boards, and hoisting signals. Papers have been written on these subjects for publication by the Bureau and by various mining institutes. Other educational work carried on

comprised illustrated lectures to the miners in and about the mines visited by the rescue car. The district engineer brought about the organization of the co-operative range committees mentioned on preceding pages.

The activities of the Bureau of Mines have doubtless been instrumental in furthering the work of safety. Its chief function has been in stimulating activity in safety, rescue and first aid work. The moral effect of the presence of the car and its attendants has served to call the attention of the miner to the fact that the subject of safety and first aid is of sufficient interest and importance to cause the government to take an active hand in the work. The Bureau of Mines' representatives have worked in co-operation with the operators and everyone else engaged in safety work in the region, and have been favored with most courteous treatment and co-operation in all their efforts. It might be added here that the writer has, for the past two years, served as district engineer of the Bureau in the Lake Superior region.

**Results of the Safety Movement.**

It is not possible at this time to prepare a statement that will indicate the full measure of benefit derived from the practice of safety work in the Lake Superior region. The safety movement is practically in its infancy, and a period of years must elapse before any fair estimate can be made of the actual good resulting from it. All classes of accidents are steadily decreasing. The next few years should show a proportionate or even greater decrease.

Inquiries as to the reduction of accidents through safety work directed to all the operators of the district were answered, in a majority of cases, by the statement that records are not yet available; there were many indefinite replies stating that accidents had decreased; no replies were received stating that accidents had increased. Personal inquiry by the writer brought forth statements from the most important operators indicating that safety work has caused a material reduction in accidents, and that they are all desirous of continuing the work. In many instances a great deal of enthusiasm was displayed.

No accurate records exist of accidents in the Lake Superior mines for a period of years. The Bureau of Mines only began the collection of accident statistics in metal mines in 1911. However, a compilation showing the fatal accidents for ten years previous to 1911 has been made by O. C. Davidson, General Superintendent, Oliver Iron Mining Co., Iron Mountain, Mich. Mr. Davidson reviewed the county mine inspectors' reports from Sept. 30, 1901, to Sept. 30, 1911. With the data thus obtained, and tonnages based on statements of shipments published by the Iron Trade Review, he was able to prepare this interesting statement. The compilation is submitted herewith.

**Summary of Fatal Accidents in Michigan Iron Mines From Sept. 30, 1901, to Sept. 30, 1911.**

County	Tons Ore Mined 10 Years	Employees 10 years	Fatal Accidents Reported	Tons Produced per Fatal Accident	Fatal Accidents per 1,000 men
Dickinson. . . . .	22,601,474	31,836	84	269,065	2.638
Marquette. . . . .	36,721,389	57,161	248	148,070	4.339
Gogebic. . . . .	29,191,952	42,471	226	129,168	5.321
Iron. . . . .	17,986,380	20,962	158	113,838	7.537
	<hr/> 106,501,195	<hr/> 152,430	<hr/> 716	<hr/> 148,745	<hr/> 4.697



The number of fatal accidents and other data for the years 1911 and 1912 are shown below. It may be noted from this table that Minnesota stands first and Michigan second in the column showing the number of men killed per thousand employed. The other States included in this table comprise the chief metal-mining States of the country.

#### Fatal Accidents in Various Metal-Mining States During the Calendar Years 1911 and 1912.

State.	Operators Reporting		Employees		Killed		Killed per 1,000 Employed	
	1911	1912	1911	1912	1911	1912	1911	1912
Alabama.....	25	20	4,101	4,827	10	33	2.44	6.84
Arizona.....	352	479	12,768	15,591	70	67	5.48	4.30
California.....	855	1,048	10,877	10,312	38	40	3.49	3.88
Colorado.....	660	624	10,404	8,892	43	48	4.13	5.40
Idaho.....	513	639	4,801	6,229	23	29	4.79	4.66
(a) Michigan.....	74	79	31,584	29,469	134	96	4.24	3.26
(b) Minnesota.....	40	43	16,548	16,559	76	50	4.59	3.02
(c) Wisconsin.....	8	11	1,157	2,338	2	9	1.73	3.85
Montana.....	332	405	13,346	13,340	62	50	4.65	3.75
Nevada.....	472	554	6,210	7,547	50	34	8.05	4.51
Utah.....	295	336	7,710	8,458	49	41	6.36	4.85

a In copper mines, 14,893 men employed, 44 killed, 2.95 killed per 1,000 employed. In iron mines, 14,378 men employed, 52 killed 3.62 killed per 1,000 employed. b All iron mines. c All iron mines.

In summing up the beneficial results of the safety movement, it may be said that by far the most valuable accomplishment has been the reduction in the number of deaths, and serious and permanent injuries. This, of course, has been brought about through the improved working conditions in the mines, more vigorous inspection, and the reduction of the hazards to the worker through the use of various safety devices. Bodily suffering has been reduced, the earning power and efficiency of the worker has been increased, and mental suffering and hardship on the part of widows, orphans and other dependents has been lessened.

Not only have beneficial results been forthcoming from a humanitarian standpoint, but also from a financial standpoint. When a miner is injured the money that he can contribute toward the support of his dependents is curtailed in proportion to the seriousness of his injury. If the miner is killed the support of his dependents devolves upon others, thus giving them a double burden to bear. The employer also sustains financial loss, both in hospital expenses and in the payment of compensation. On the Marquette range, when a miner is killed, it has long been a custom for the entire mine force to cease work until the victim of the accident has been buried. The loss caused in this way amounts to approximately \$2.30 per day per man involved, and an average of \$500 in fixed charges to the company for every fatal accident.

Another source of financial loss is that sustained by the tax payers for the maintenance of courts for the trial of damage suits. Investigation discloses that in one Minnesota county \$75,000 per annum has been spent in this manner.

In addition to the reduction in the loss of life, and the saving in money to both the miner and the operator, other benefits have developed. There appears to be a better understanding between employer and employee and the miners are beginning to realize that the safety work is being done for their benefit. Throughout the district a strong spirit of co-operation is noticeable, not only between the miner and employer, but between the officials of the various mining companies and mining districts. Information regarding safety and efficiency work is exchanged between operators with the

utmost freedom, and there is hardly a mine in the region that is not open for inspection as far as safety devices and methods are concerned.

#### Does Safety Work Pay?

Answering the question as to whether or not safety work pays, one may say without hesitation that it pays

enormously from a humanitarian standpoint. There is no argument here. The records of many coal companies and other organizations which have practised safety work for a number of years show undoubtedly that it pays also from a financial standpoint. As to figures on this phase of the question in the Lake Superior district, nothing accurate is possible of compilation. Without the cost of the work as a basis, acceptable figures cannot be submitted.

However, there is a method of arriving at approximate figures, based upon actual conditions in the Lake Superior region. Before going into this, it seems proper to submit some figures regarding the compensation that must be paid to miners for various classes of injuries. The States of Michigan, Minnesota, and Wisconsin all have in force a workman's compensation act. The following information is from the Public Acts of the State of Michigan, the provisions of which differ little from those of Wisconsin and Minnesota.

In case of a fatal injury to an employee, the employer must pay to the dependents of the injured a weekly sum equal to one-half his average weekly wages, but not more than \$10 or less than \$4 a week, for a period of 300 weeks from the date of the injury.

In case of permanent disability resulting from injury, the employer shall pay to the injured a weekly compensation equal to one-half his average weekly wages, but not more than \$10 or less than \$4; in no case shall the period covered by such compensation be greater than 500 weeks, nor shall the total amount of such compensation exceed \$4,000.

Thus it may be seen that a permanent injury may cost the company more than a fatal injury. For injuries resulting in temporary disability, the injured receives a weekly compensation equal to one-half the difference between his average weekly wages before the injury and the average weekly wages which he is able to earn thereafter, but not more than \$10 a week; and in no case shall the period covered by such compensation be greater than 300 weeks from the date of injury.

The above provisions are followed by a long list of payments to be made to the injured in case of the loss of a finger, a hand, a foot, an eye, etc.

In order to show what saving may be effected through the practice of safety work, let us assume an



iron mine employing 1,000 men per day, in which no money is spent for safety work. Past experience has pointed out that a mine of this size, making no attempt to prevent accidents, may easily make the following yearly accident record:

Number of men killed, 6; number of men seriously injured, 40; number of men slightly injured, 250.

A serious injury may be considered as one that incapacitates the workman for more than 20 days; a slight injury one that incapacitates him for less than 20 days. The total cost in compensation for this sum of accidents, based upon the compensation stated above, may be as follows:

Six men killed, at \$2,500 each, \$15,000; two men permanently injured, at \$3,000 each, \$6,000; 13 men, average disability 20 weeks, at \$7 per week, \$1,820; 25 men, average disability 8 weeks, at \$7 per week, \$1,400; 250 men slightly injured, average disability 1 week, at \$7 per week, \$1,750; legal fees, hospital and other casualty expenses, \$15,000; total \$40,970.

This tabulation does not include payments for the loss of hands, feet, etc. In total amount it is below many records that have been noted by the writer.

Now, let us suppose that this company had practised safety work, and that the death rate was three men killed per 1,000 employed (approximately the Minnesota 1912 rate) and the injuries proportionately lower. This would mean a reduction of one-half, or a saving of approximately \$20,000.

Of course the safety work will cost something, but even if it amounted to \$10 per year per man employed, or \$10,000 in this case, there would still be a balance of \$10,000 saved.

#### Conclusions.

It has not been the intention in this paper to convey the idea that the Lake Superior iron ranges comprise the only metal-mining region in the United States where efficient safety work is done. It is acknowledged that there are individual mines elsewhere that can show accident records just as good, and possibly better than those of some of the Lake Superior mines; also that the safety movement is gaining ground throughout the various metal-mining districts of the United States. The operating companies of the Lake Superior region are for the most part large and strong financially and they can well afford to lead the way in work of this nature. In the Western metal-mining States there is a much larger proportion of small operations and prospects, the owners or lessees of which cannot afford to go to great lengths in the matter of safety.

It is hoped that all mine operators, from the insignificant prospector to the wealthy magnate, will eventually recognize the value of safety work. Sufficient records are now available, both from coal and metal-mining districts, to prove that safety work pays from every standpoint. In this connection, it is well to be able to say that safety work pays from a financial as well as a humanitarian standpoint, for it is a sad but true commentary that there are still some operators who cannot be appealed to except by a promise of financial gain.

The writer feels that he has not done justice to the subject matter of this paper, especially that part of it dealing with the vast good that has been accomplished through the lessening of death and suffering. Again, some data concerning other phases of the subject have of necessity been omitted owing to the short time that was available in which to prepare this paper.

## THE COLLIERS' MARCH

By F. W. Gray.

They come, with muscled chests and calloused hands,  
Their limbs enured to toil by pick and spade;  
They come to swell the far-drawn gathering bands  
Pressing to Britain's aid.

They whose stark backs shone ebon in the gleam  
Cast by the safety lamps' uncertain light.  
Their eyes illumined by the patriot's dream,  
Now gird them for the fight.

For they have read how, when the German tramp  
Was heard on Belgian ground, the ruthless Hun  
Forced the swart miner, carrying safety lamp,  
By bayoneted gun,

To walk before the coward host, and shield  
Their craven hides against the flaming ire  
Of freemen, who disdained their hearths to yield.  
And answered fire by fire.

The men who drave the wedge 'twixt coal and thill,  
And swung the pick prone on the damp mine-floor,  
Shall prove in swimming trench their strength and skill,  
When guns are to the fore.

Who daily bores the hole and rams the shot  
And hears the shattering crack reverberate  
Through room and headway, he will falter not,  
To dare the Teuton hate.

The weary march with gun and heavy pack,  
The dank and clammy trench, the long day's end,  
Will find the collier's toil-accustomed back  
Erect and last to bend.

He who through flame and smoke has burst,  
To snatch from fiery death a comrade true,  
Will he not dare the mitrailleuse's worst,  
And "see this business through"?

They come, from far and near, from East and West,  
From York and Lancaster, the "Koylies"\* come;  
Cape Breton's Highlanders, Alberta's, best:  
Follow the sounding drum.

From hills of gallant Wales, Australia,  
New Zealand and Natal, Lanark and Fife;  
From Crow's Nest Pass, and from far India,  
They hear the thrilling fife.

The German hosts his tested arm shall know,  
Shall dread the collier's bayonet and shall rue  
In blood and anguished tears, the coward blow  
At Belgium, leal and true.

\*Note.—The nickname "Koylies" is a play on the initials of the King's Own Yorkshire Light Infantry, and on the fact that the word "coal" is in the Yorkshire dialect pronounced "koll." The K. O. Y. L. I. is composed largely of coal miners. It will be remembered they suffered very severely at Mons. Their regimental flag bears the name of "Minden" where the regiment fought gloriously in the 18th century. Minden is about halfway between Aix-la-Chapelle and Berlin, a good augury.



# MINING IRON ORE\*

By E. S. Dickinson.

Not long after my graduating from the Michigan College of Mines, I was sent to examine and report upon a mine in which my company was interested but which it was not operating. I was requested to report on whether the mine was in shape to produce the amount of ore promised to be delivered that season, and if not, what in my judgment must be done to put the mine in shape to produce the ore. Among the questions asked were the following: How many men are needed to produce the ore? Are there proper accommodations for the men? How many men can be worked to advantage in the mine? Are more working places needed? Are more chutes needed to handle the ore? How many drills are on hand and how many are needed? Are there tram cars enough?

The various questions in regard to hoisting and surface equipment were not so difficult to handle, but for some of the above I found that I had little actual data to guide me. For some of them I even had to depend upon the guess of some practical miner or mining captain.

Within the last few years a lot of data have been published which a few years ago were next to impossible to get. The following data were not taken under

test conditions and do not indicate the best that we could do under special effort. They are taken at random from my notes covering the development and mining of entire blocks of ore, also the mining or stoping of the ore without taking into consideration the development work necessary.

In this work the machine operator had to pick down all loose dirt and make the place safe to work in, set up his machine and drill his holes, get his explosives from the powder house, charge and blast. No effort was made to drill as many feet as possible, the test of efficiency being the amount of ore broken by the machine and the condition the working place was left in. I believe with efficiency methods and expert supervision these results could be increased from 25 to 50 per cent. I find that a great deal depends on the chute men. The miners make it a point of honor to keep the chutes full of ore, and when they are nearly empty will work well to break more ore, while if there is plenty of ore in the chutes they are liable to take it easy.

In the following tables the items represent amounts of work—stopping, drifting, etc.—accomplished in one month.

## Underhand Stopping Into Chutes.

The data include development work and trimming the back, but not the building of chutes and tracks. The ore was in a solid chunk, the east end of it, however, being in solid rock on the level, so that drifts and chutes had to be put through the rock to get to it. Raises were put up and chutes built, a sub-level run at the top of the ore and the ore broken into the chutes by underhand stoping. The trammers trimmed the back. Ore trammed to shaft, an average distance of about 250 ft., and dumped into skips. Ore, medium hard, standing well.

- |  |  |
|--|--|
| 1. Number of drill holes.                | 7. Number of exploders.                              |
| 2. Total feet drilled.                   | 8. Hours work of miners and helpers.                 |
| 3. Sticks of dynamite below 40 per cent. | 9. Number cars ore (1½ tons each).                   |
| 4. Sticks of 40 per cent. dynamite.      | 10. Number cars of rock.                             |
| 5. Sticks of dynamite above 40 per cent. | 11. Hours work of trammers.                          |
| 6. Feet of fuse.                         | 12. Advance in feet of drifts, cross-cuts or raises. |

	1	2	3	4	5	6	7	8	9	10	11	12
Crosscut.....	168	632	127	634	20	1225	173	320	131	...	140	47
Drift.....	56	220	...	255	22	402	58	100	60	...	55	22
Crosscut.....	?	?	20	1466	81	2079	297	600	320	100	305	123
Drift.....	?	?	186	953	77	2212	319	780	298	...	373	138
Raise.....	?	?	85	499	49	1033	148	320	129	...	128	60
Drift.....	?	?	71	137	..	455	65	140	71	58	62	30
Crosscut.....	?	?	9	289	42	693	99	250	121	...	135	87
Drift.....	221	971	...	424	314	2294	242	440	198	...	220	71
Raise.....	162	695	...	232	281	1292	184	380	103	...	118	54
Raise.....	?	?	32	327	116	904	128	300	128	...	134	?
Sub-level.....	?	?	...	125	6	246	38	80	*	...	28	?
Stope.....	?	?	222	582	...	969	139	770	787	...	374	
Stope.....	?	?	81	831	42	1107	167	670	1891	...	445	
Stope.....	?	?	165	2664	221	3287	492	2367	3158	70	1536	
Stope.....	393	3433	497	1968	265	2900	442	2270	4096	...	2255	
Stope.....	497	3976	28	2707	85	3432	518	2525	4044	...	2455	
Stope.....	229	1973	130	1541	...	1618	250	1895	2408	...	1901	
	1778	11900	1663	15654	1498	26150	3759	19007	26917	138	10669	632

\*Dumped in chutes. Pounds of dynamite per ton broken, 0.336. Tons per machine shift, 42. Tons per foot of development, 64. Tons per hour of trammers' labor, 3.8.

\*Extract from M. C. M. Alumnus, Oct., 1914.



**Blasting Down Floor Pillar 30 Ft. Thick.**

One end pitching down to lower level. Ore runs down to a plank sollar from which it is shoveled into 1½ ton tram cars, trammed to shaft and dumped into skips. Trammers at times have to pull dirt and assist it to run to lower level. A little development work is done to enable the men to work in the pillar under cover of ore which is taken down as the work progresses. A large open stope overhead.

1. Number of drill holes.
2. Feet drilled.
3. Sticks of 40 per cent. dynamite.
4. Sticks of 27 per cent. dynamite.
5. Feet of fuse.
6. Number of exploders.
7. Hours labor of miners and helpers.
8. Cars of ore.
9. Hours labor of trammers.
10. Advance in feet.
11. Tons per machine shift.

	1	2	3	4	5	6	7	8	9	10	11
Winze. . . . .	147	614	642	55	1183	158	480	...	117	38	...
Winze. . . . .	25	206	642	...	240	45	200	78	85	...	13.8
Winze. . . . .	...	356	348	55	673	84	300	...	55	20	...
Crosscut. . . . .	...	...	1430	183	887	129	860	...	...	...	...
Crosscut. . . . .	...	...	22	25	234	86	...	634	365	...	26.0
Crosscut. . . . .	...	...	22	6	109	24	...	397	214	...	27.7
Crosscut. . . . .	39	352	309	...	438	97	220	620	380	...	24.0
Crosscut. . . . .	169	1394	1107	173	1579	283	980	1595	850	...	28.1
			4190	324	3020		3020	3324	2067	58	

Tons per machine shift, 53.5. Tons per hour of trammers' labor, 2.41. Pounds of dynamite per ton broken, 0.475.

**Developing and Mining Small Body of Ore, Underhand Stopping.**

Loading from chutes into 1½-ton cars and trammimg approximately 150 ft. to an electric locomotive. No. 3B Rand drills used. Data do not include the building of tracks and chutes. Ore medium hard, standing well, red hematite with yellow ocher seams.

1. Number of drill holes.
2. Feet drilled.
3. Sticks of 80 and 60 per cent. dynamite.
4. Sticks of 40 per cent. dynamite.
5. Sticks of 35 and 27 per cent. dynamite.
6. Feet of fuse.
7. Number of exploders.
8. Hours labor of miners and helpers.
9. Cars of ore.
10. Hours labor of trammers and dirt-pullers.
11. Advance in feet.
12. Tons per machine shift.
13. Tons per shift trammers.

	1	2	3	4	5	6	7	8	9	10	11	12	13
Raise. . . . .	?	?	110	...	130	448	64	200	74	90	40	11.1	12.3
Drift. . . . .	55	253	136	36	27	315	45	140	78	107	29	15.3	11.0
Winze. . . . .	23	94	...	115	...	161	23	120	26	33	15	6.5	11.0
Winze. . . . .	?	?	6	568	242	973	139	510	108	177	73	6.0	8.6
Drift, raise .	195	923	...	179	477	1336	192	480	132	167	90	8.3	11.9
Raise. . . . .	16	80	...	26	27	112	16	40	8	31	...	9.5	6.0
Drift. . . . .	?	?	...	12	306	630	90	200	94	120	51	14.1	11.8
Stope. . . . .	?	?	16	487	323	930	143	560	376	114	...	20.2	49.4
Stope. . . . .	?	?	51	456	132	621	103	460	1019	431	...	66.5	35.4
Stope. . . . .	345	3004	153	1408	824	2468	278	1640	3671	1439	...	67.1	38.2
Stope. . . . .	?	?	87	1211	664	2756	410	1743	2931	1289	...	45.4	34.2
Stope. . . . .	238	1831	208	1127	342	1716	277	1020	2464	1122	...	72.4	32.9
Stope. . . . .	175	1393	...	1232	...	1578	349	680	2432	1326	...	107.5	27.6
			767	6929	3496		7993	13419	6446	298		31.2	

Pounds of dynamite per ton broken, 0.458. Tons per machine shift, 50.3. Tons per hour of trammers' labor, 3.12. Tons per foot development, 67.5.

**Underhand Stopping a Block of Iron Ore.**

This block of ore has been developed by drifts and crosscuts on the bottom level, and by a large open stope on the top; therefore to prepare for mining, it was necessary only to put up required raises and some short drifts. The ore is loaded from chutes and trammed about 200 ft. to shaft. The trammers must pull the dirt to the chutes when it refuses to run by gravity.

1. Sticks of 60 per cent. dynamite.
2. Sticks of 40 per cent. dynamite.
3. Sticks of 27 per cent. dynamite.
4. Sticks of 35 per cent. dynamite.
5. Feet of fuse.
6. Number of exploders.
7. Hours labor of machine runners and helpers.
8. Cars of ore, 1½ tons.
9. Hours labor of trammers.
10. Tons per machine shift.
11. Tons per man, shift trammers.



	1	2	3	4	5	6	7	8	9	10	11
Stoping.....	0	552	248	24	712	129	500	725	559	43.5	19.6
Stoping.....		338	487	2	679	97	400	491	442	36.8	16.6
Stoping.....		74	465	52	503	70	380	516	141	40.7	55.2
Stoping.....		371	279	...	661	95	380	997	422	78.8	35.4
Stoping.....		850	855	...	1586	219	1120	2432	966	65.2	37.8
Stoping.....		363	757	...	1610	241	770	1402	588	54.3	35.7
Stoping.....	25	608	887	...	1635	230	1260	2148	1110	55.6	20.0
Stoping.....	10	906	470	113	1621	258	900	2379	986	79.3	36.2
		83	4062	4448	191		4690	11048	5214		

Pounds of powder per ton broken, 0.435. Tons per hour trammers' labor, 3.

**Data From Various Stopes in Iron Ore.**

- 1. Feet drilled per shaft.
- 2. Tons broken per machine shift.
- 3. Pounds of powder per ton broken, average for three months.

	1	2	3
No. 5 Stope..... Underhand stoping .....	....	121.	....
No. 6 Stope..... Floor pillar dropping into chutes.....	....	106.	....
No. 4 Stope..... Underhand stoping .....	24.	65.6	0.29
S. M. Stope..... Overhand stope .....	....	46.4	0.13
S. M. Stope..... Underhand stope .....	30.6	73.4	0.33
No. 4 Stope..... Cutting down chutes to level.....	18.6	63.0	0.3
S. M. Stope..... Underhand stoping .....	31.8	73.1	0.37
No. 16 Stope..... Underhand stoping .....	34.	80.9	0.37
No. 15 Stope..... Underhand stoping .....	36.	74.6	0.40
No. 19 Stope..... Cutting out stope .....	32.	35.7	0.82
L. Stope..... Cutting out stope .....	29.4	20.5	1.26
No. 16 Stope..... Underhand stoping .....	43.6	54.0	0.603
Breast stope .....	36.4	77.2	0.742
S. M. Stope..... Underhand stoping .....	36.0	79.0	0.41
No. 14 Stope..... Underhand stoping .....	62.4	41.8	0.6

**COBALT SHIPMENTS.**

Nine cars of ore left the Cobalt camp during the week ending Nov. 20, five mines sharing the total tonnage of over three quarters of a million pounds. In addition, Casey appears on the list with two cars, one to Campbell and Deyell, and the other to the American Smelting Co. at Denver. The Colorado smelter also received four cars from the Cobalt camp, two each from the Dominion Reduction and The Townsite. One third of the total tonnage sent out was from the Mining Corporation of Canada, who sent three cars from the Townsite mine, the one previously unaccounted for being consigned to Marmora. There have been no shipments of bullion since last Saturday.

Ore shipments were as follows:

Shipper.	Pounds
McKinley-Darragh . . . . .	83,260
Mining Corp. of Canada, (Townsite Mine). . . . .	252,610
La Rose . . . . .	186,130
O'Brien . . . . .	63,250
Dominion Reduction . . . . .	168,300
<b>Total . . . . .</b>	<b>753,550</b>
Casey Cobalt . . . . .	115,348

**SHALE OIL INDUSTRY OF SCOTLAND.**

The shale oil industry is established in the counties of Mid and West Lothian and North-East Lanarkshire, where it was founded over 60 years ago. The oil shale occurs near the base of the carboniferous formation in the counties of Mid and West Lothian and the North-Eastern corner of Lanarkshire. This shale has been the raw material of the industry during the past half century, and the quantity still available is sufficient to

furnish the present annual output for many generations to come. The industry gives steady employment directly to about 10,000 men, and pays about £1,000,000 per annum in wages, besides giving work indirectly to many men in other industries which supply the coal, chemicals, plant and general stores used in the shale mines and oil works. The chief products of the industry are: Illuminating oils, naphtha and motor spirit, lubricating oils, batching oil, gas and fuel oils, paraffin wax, paraffin candles and sulphate of ammonia. The companies engaged in the shale oil industry are: The Broxburn Oil Company, Ltd., Glasgow; Dalmeny Oil Company, Ltd., Dalmeny; Oakbank Oil Company, Ltd., Glasgow; Pumpherston Oil Company, Ltd., Glasgow; James Ross & Co., Philpstown Oil Works, Linlithgow; Young's Paraffin Light and Mineral Oil Company, Ltd., Glasgow.

**ALEXO NICKEL MINE.**

That the demand for nickel is almost back to normal is shown by the fact that the Alexo mine at Porquis Junction near Porcupine is opening again owing to the fact that there is an increased demand for ore.

The ore from this little property is shipped to the Mond Nickel Company's smelter at Coniston. As the Mond Nickel Company is an English firm it may be surmised that this nickel matte is for the use of the British and the Allies' navy. Soon after the war started the Mond Nickel Company notified the Alexo that they would not require any more outside ore for some time, although they themselves kept running with very little diminution of force. Now they evidently want all the ore they can mine and buy. The Alexo all through the summer has been shipping about a thousand tons a month.



## PERSONAL AND GENERAL

Mr. Robert Flaherty, of Toronto, and Miss Frances Hubbard, of Houghton, were married in New York last week.

Mr. R. R. Wiggins is in Nicaragua for the Riter-Connelly interests.

Mr. R. R. Van Valkenburg is in the employ of the Alaska Gastineau Mining Co., at Juneau Alaska.

Dr. James Douglas has resigned from the Green Consolidated Copper Co and affiliated concerns, both as general manager and vice-president.

Mr. Albert Mendelssohn has been appointed superintendent of the Baltic mine, Michigan, to succeed Mr. W. R. Bolley.

Mr. W. A. Cameron, superintendent of the Consolidated Mining and Smelting Company's mines in Slocan district of British Columbia, has returned to New Denver, B.C., after having spent several weeks on a vacation in Eastern Canada.

Mr. Lorne A. Campbell, of Rossland, B.C., manager of the West Kootenay Power and Light Co. and allied companies, has been in the East on a business visit.

Mr. E. J. Conway, of Vancouver, B.C., was married on November 7 to Miss Mary Linnie, daughter of Captain and Mrs. Conway, also of Vancouver. Mr. Conway graduated B.Sc. from McGill in 1909, and the same year went to the Whitewater mines, Slocan district of British Columbia as assayer. Afterward he was with the Tyee Copper Co., Vancouver Island, for some time, and since that company suspended operations he has been on the engineering staff of the Granby Consolidated Co. at one or other of that company's properties on the coast.

Mr. Howard W. Dubois, of Philadelphia, who has been much in British Columbia in recent years, went to Alaska a short time ago on a professional trip.

Mr. Thomas Graham, chief inspector of mines for British Columbia, who has taken much interest in having miners instructed in mine rescue work and first aid to the injured, has been elected a member of the executive of the British Columbia Council of the Canadian Branch of the St. John Ambulance Association.

Capt. Harry Johns, who, until the suspension of mining operations in that part several months ago by the British Columbia Copper Co., was in charge of the several mines the company had for some time been developing in Nelson and Slocan mining divisions, returned to Nelson, B.C., lately, from a trip to Portland, Oregon.

Mr. I. M. Merrill, of Los Angeles, Cal., president of the Hedley Gold Mining Co., was a visitor last month to the company's property in the Similkameen district of British Columbia.

Mr. G. F. Perks has returned to Vancouver after having spent about three months in the Omineca placer gold field where, on gold-bearing streams; he located ground for dredging purposes.

Mr. Elias Rogers, of Toronto, president of the Crow's Nest Pass Coal Co., has been in British Columbia on one of his periodical visits to the company's collieries in Southeast Kootenay. From the Crowsnest district he went to Victoria, where he spent a few days before returning East.

Mr. L. B. Reynolds, of Nelson, B.C., who went to England with several other mining engineers from Kootenay district as a part of the Canadian contingent for active service in the European war, supplied the Nelson Daily News with an interesting account of the ocean trip between Quebec and England.

Mr. E. H. Sampson, who, prior to the stoppage of mining at the Bluebell mine, Kootenay lake, B.C., owing to the closing of the market for lead, was assayer at that mine, is now filling a similar position at the Jewel gold mine, in Boundary district.

Mr. Stuart J. Schofield, of the Geological Survey of Canada, has finished his 1914 field work in West Kootenay district, British Columbia, and is expected to soon be back in Ottawa.

Mr. Yolen Williams, of Spokane, Washington, for some years superintendent of mines in British Columbia, first at Rossland and later in charge of the development of the Granby Consolidated Co.'s big copper mines at Phoenix, was in Tulameen district, B.C., last month.

M. Beatty & Sons, Welland, formerly represented in Toronto by H. W. Petrie, Ltd., have opened a district office in the Builders' Exchange, 154 Simcoe street, in charge of Mr. K. M. McKee.

Mr. Benjamin Strong, jr., has resigned as a director of the International Nickel Co.

Canadian General Electric Co., Ltd., has issued a bulletin on batteries for storage battery locomotives.

## OBITUARY

Our readers will regret to learn of the death on November 14 of the wife of Dr. D. D. Cairnes, of the Geological Survey.

**J. S. C. Fraser**, manager of the Victoria, B.C., branch of the Bank of Montreal, who died in Toronto on November 4 from ptomaine poisoning, while on a visit to his aged mother in this city, was long closely associated with the development and progress of the mining industry at Rossland, B.C., where he managed the local branch of the same bank for sixteen years. His untimely death at the comparatively early age of 52 is deeply regretted both in Kootenay district, where he came into business contact and enjoyed the friendship and goodwill of many mining men, and in the coast cities, where he was also well known. His body was taken back to British Columbia and interred at Victoria on November 17.

On November 13 the death occurred, at Victoria, B.C., of **Randall Hitchcock Kemp**, who was one of the pioneers of Ainsworth and Slocan districts of British Columbia, to which Province he went from the United States nearly a quarter of a century ago. The late Mr. Kemp was born at Wellsburg, West Virginia, in the early part of 1852, so was in his 63rd year. No particulars of his early connection with mining are available, but it is known that for some time he was assaying in the States. Afterwards he went to Ainsworth (then known as Hot Springs), on Kootenay lake, B.C., and in that camp and in Slocan, when in 1891 and 1892 many of the best known mining properties of that part of West Kootenay were discovered, he was well known among nearly all the pioneer miners and prospectors. For a time he lived at Kemp's Springs, a few miles from Kaslo. In September, 1896, the "British Columbia Mining Record," then finishing its first year of publication, included in its contents for that month an interesting history of the discovery of the Payne and other Slocan properties that afterward became widely known, which account was written by Mr. Kemp. In the late nineties or the earliest years of the present century Mr. Kemp was editor of a mining journal published in Spokane, Washington. After a few years in



that State, divided between mining engineering and journalism, he went to Alaska, where he spent some years in frontier life, still keeping up his connection with publicity work. Eventually he drifted back to West Kootenay, and for a while lived on a small ranch a few miles from Nelson. Then he went to Silverton, Sloean lake, and in that neighborhood was employed at the Standard silver-lead mine until, about the beginning of the present year, cancer of the tongue developed. For some weeks he was treated in the hospital at New Denver, and then last summer he went to Victoria to have the benefit of skilled treatment there. In September he was sanguine of recovery, for his condition seemed to have much improved but had a change for the worse until, before the middle of November, the end came of a life marked by many vicissitudes and adventures such as come to men who spend much of their lives on the outer rim of civilization. Mrs. Kemp, his faithful companion throughout his western life, was with him to the last, and witnessed his burial at Victoria on November 16.

On Sunday afternoon, November 15, **Hon. Wm. Templeman**, the first Minister of Mines of Canada, died at his home in Victoria, B. C., at the age of seventy years. Four months ago his wife died, which bereavement he felt keenly. Shortly afterward he underwent a serious surgical operation and from this he appeared to be slowly recovering, so that he contemplated taking a trip to California in December. Finding his strength returning, he was able during several weeks to give attention to business for a few hours of each day. On the evening of November 13 he was down town and chatted cheerfully with friends, though complaining a little that he was not feeling so well as he had been, but expected that a night's rest would give relief. However, early next morning he became seriously ill, and in the afternoon lost consciousness in which condition he remained until the afternoon, of Sunday, 15th, when he passed quietly away. Mr. Templeman was born of Scottish parents at Pankham, Lanark county, Ontario, on September 29, 1884. He was educated in the schools of his native town, and then served a four years' apprenticeship as a printer. Next he spent two years following his business in the United States, and then, in 1867, returned to his native county and, in company with another, founded the *Almonte Gazette*. He retained the management and control of that publication until early in 1884, when, the paper having meanwhile become a valuable property, he sold out and went travelling for several months. In the autumn of 1884 he arrived in Victoria, British Columbia, and soon took charge of the *Victoria Daily Times*, then but six months old. Eventually he acquired that newspaper, and through the years that have since passed gradually built up for it a large circulation and also made it the leading Liberal newspaper in the province. In November, 1897, Mr. Templeman was summoned to the Senate of Canada, having previously been an unsuccessful candidate for election to the House of Commons. In February, 1902, he became a member of the Laurier administration, but without portfolio until February, 1906 when he was appointed Minister of Inland Revenue. Upon the removal of the Geological Survey and Mines affairs from the Department of the Interior and the creation of the Canada Department of Mines, Mr. Templeman was, on May 3, 1907, appointed Minister of Mines, the first occupant

of that office in the Dominion, which portfolio he held until after the defeat of the Laurier Government in the autumn of 1911. He was active in securing the Government Bounty on lead mined and smelted in Canada, which has since been of so much assistance to lead mining in British Columbia. The work of the Geological Survey was greatly enlarged following Mr. Templeman's becoming Minister of Mines, and, too, that of the Mines Branch. The great assistance he was to the mining industry of the Dominion is not much known, save perhaps to the officials prominently associated with it. He also did good service in other departments of the work connected with his dual offices, but it is in connection with the Mines Department that his efforts were especially beneficial to the Dominion.

### BOOK REVIEW

**ELECTRICITY IN COAL MINING**—By David R. Shearer—McGraw Hill Book Co., New York, 1914—Price \$1.50—For Sale by Book Department, The Canadian Mining Journal.

This little book of 75 pages has been published to fill a demand for a small treatise covering many phases of electrical engineering as applied to coal mining. Methods of procedure are outlined, and information is given concerning the foundations upon which an electrical power plant may be established and operated efficiently.

The contents of the book are indicated by the following Chapter headings: Introduction; Direct-Current Calculations; Alternating-Current Calculations; Bell and Signal Systems; Selection of Power Plant Equipment; Direct-Current Power Plant Design; Alternating-Current Power Plant Design; Prime Movers and Generators; Motors and Haulage Equipment; Coal Cutting Machinery; Electricity for Operating Fans and Pumps; The Repair Shop; Fundamentals of Efficient Operation; Appendix; Tables.

An oft repeated rumor that Russians were being transported through England to France has been variously accounted for. Perhaps an explanation of the beginning of these Russian stories has now been received. England imports normally large quantities of Siberian produce by way of the Baltic, including eggs, which are known in the trade as "Russians." When the Baltic was closed by the war, English importers arranged to have these shipments continue via Archangel, and in confirmation of these plans, the following telegram was received:

"65,000 Russians will arrive at Aberdeen as arranged."

Somebody less familiar with trade than with war stories saw this telegram. Rumor spread it and the whole British Admiralty with a press bureau and official denial is powerless to stop it.

Germany is said to be experiencing a scarcity of petroleum, due in part to loss of supplies from Russia and Austro-Galician oil fields, but mainly to breakdown of arrangements for imports from the other side of the Atlantic.

The boiler house and compressor plant at the Superior Mine, Houghton, Mich., has been destroyed by fire.



## SPECIAL CORRESPONDENCE

### COBALT, GOWGANDA, SOUTH LORRAINE

**Crown Reserve** directors have decided to cut the dividend, probably to one per cent. a month. The pumping of the lake has now ceased and it will not be possible for the Crown Reserve to obtain any further high grade as the result of prospecting until next spring. The low grade from the dump and from development which is being treated at the Dominion Reduction is paying the running expenses of the mine. The stock of the Porcupine Crown, held by the Crown Reserve, will, on its present basis, return to shareholders about 8 per cent. a year. The high grade ore in the Crown Reserve has almost been exhausted, and until results can be obtained from the draining of the lake it is not possible to return the large premiums that Crown Reserve has been paying to its shareholders.

There is a good deal of excellent conglomerate yet to be prospected under the lake, but as it is shallow this cannot be done until the bottom of the lake is quite pumped out, not only of water, but of mud, and this was impossible this year.

The best discovery ever made on the Silver Leaf has been made recently at the 75-ft. level. It was opened up in running a crosscut parallel to the Lawson line, some 600 ft. from the Crown Reserve line. It is an inch wide, of very high grade ore. The Crown Reserve is now entering upon its second period of five years as the lessees of the Silver Leaf, and this is the first discovery they have ever made of any importance. A large vein of cobalt ore was opened up at the 500-ft. level; but it was too low grade to mine at a profit. The Crown Reserve had the right to extend the option of the lease for a period of another five years and decided to do so. A new agreement has now been drawn up relative to conditions between the two companies.

The price of Silver still continues far too low to be of good augury to the silver mining companies. There was a slight rise after the news of the sinking of the Emden became known; but the relief was not permanent. It would not be wisdom to deny that although the situation is not so acute as after the outbreak of the war that it is still critical. Particularly is this so in regard to the low grade properties which are working on a narrow margin of profit per ton. Many of the companies with large surpluses are holding their silver bullion until such time as silver goes up, the belief being almost universal that it will go up and will maintain a high level when it does start to mount.

**Seneca Superior** adhered to the old dividend shorn of its bonus for the December disbursement. This amounts to 10 per cent., or \$47,638. The company has been paying dividends every two months instead of every quarter, and in the short existence has paid back to the original shareholders at par 135 per cent., or \$643,218.

**Cobalt Lake.**—The preliminary work necessary to lowering Cobalt Lake by six and a half ft. is progressing, and the water should be down to the required level by the first of December. The rock is being excavated from the cut at the foot of the lake in order that the shore may be exposed some six ft. and the town trunk sewer laid along it. This work is being done for the town by the Cobalt Lake Company, the town being quite unable to raise the necessary money

at this juncture. Every preparation for the pumping of the lake early next spring has been made. The dams at Short and Pickerel lakes have been completed and the scows upon which the pumps will be placed are now moored on the lake. The scow will be placed directly opposite Cobalt station and the water will be pumped direct to the open cut at the foot of the lake whence it will flow into Mill Creek.

**Shipments of ore** from Cobalt proper last month only showed a slight diminution as compared with the previous month, but the bullion consignments have almost ceased. The October total of ore was 1,280.66 tons contained in 36 cars.

**Mining Corporation of Canada.**—The English merger of the Cobalt Townsite, the Cobalt Lake, and the City of Cobalt made its debut in the shipping list as the Mining Corporation of Canada. The Cobalt Lake ore is being treated in its own mill at the end of the lake and shipped separately, but the City of Cobalt and the Townsite is now despatched jointly. The ore is trammed from the City of Cobalt to the Cobalt Reduction mill, the Townsite is connected directly with the mill. The only shipment of ore on the T. & N. O. Railway outside the Cobalt camp and the Casey range was from the Tough Oakes mine at Kirkland Lake. Shipments of nickel from the Alexo mine have ceased altogether and the property has been closed down.

**Peterson Lake, Cobalt Silver Mining Company** has made declaration of the third dividend payable on December 10. It is of 1¾ per cent., and amounts to \$43,032. The company has now paid 5¼ per cent., or \$126,096. Peterson Lake dividends are now being paid solely out of the royalties from the Seneca Superior and Gould leases, as the company has come to the end of the ore found earlier in the year.

### PORCUPINE AND KIRKLAND LAKE

**Dome.**—For October both the grade of ore milled at the Dome mine and the tonnage treated showed improvement. Yet there was a falling off in the value of the gold produced of between three and four thousand dollars. The comparison between the months of September and October reads as follows:

Tons milled, September 21,940, October 22,500; value gold produced, September \$99,301, October \$95,880; value per ton, September \$4.52, October \$4.70.

**Porcupine Crown.**—Drifts beyond the fault to the south on the Porcupine Crown property continue in good ore which was not altogether anticipated by the management. Below the 500 ft. level the winze that is being put down is in ore although it is not of the same grade nor is the vein as wide as at the upper levels of the mine. The average gross production is about \$65,000 a month.

**McIntyre** production is being maintained at an average of between \$60,000 and \$70,000 a month, and the mill is treating a little less than 8,000 tons a month. Milling costs are now approaching a very satisfactory basis but mining costs owing to the large amount of development necessarily involved and the irregular character of the ore shoots are still high. With the help of a close geological study of the property, however, orebodies are being located with less dead work than formerly, and therefore less cost per ton. The



No. 5 shaft is now down to 300 ft., the No. 4 to 500 ft., and the No. 1 to 300 ft.

**Jupiter.**—There has been considerable activity in the Jupiter stock owing to some extent to the belief that the McKinley-Darragh-Savage Mining Company will take up the option which expires on December 15th. While nothing phenomenal has been discovered, recent developments have been satisfactory to the operators. No definite decision has yet been reached to take up the option. Since taking charge of the property in May the McKinley has opened up ore shoots on the 400 and 475-ft. levels. At the present time the western face on both levels is in a high grade ore shoot running right across the drifts. Three drills are running underground.

**Tough-Oakes.**—Good progress is being made with the new mill at the Tough-Oakes gold mine at Kirkland Lake. The contract for the building stipulated that it should be completed at the end of the year. Such activity has been displayed that it will probably be roofed in at least by the end of the present month. The small mill is now treating an increased tonnage of rock from the dump owing to the installation of a Hardinge mill.

The six-months' extension of exemption of work on mining claims till April 15, granted by the Government, is the logical conclusion of the three-months' extension granted from August. If the ordinary provisions had come into force in this month it would have meant little more than snow shovelling in lieu of work and a good deal of hardship to those prospectors who did intend to do bona fide work. Before April 15 there ought to be some revival in the demand for gold claims, and prospectors would then be more inclined to do their work in the hope of return.

## BRITISH COLUMBIA

Nearly all the mineral specimens from British Columbia intended for inclusion in the Canadian mineral exhibit to be made at the Panama-Pacific Exposition at San Francisco, California, next year have been shipped to that city from Vancouver. It is expected that, similarly to that made by the Dominion at the Alaska-Yukon-Pacific Exposition at Seattle, Washington, in 1909, the Canadian mineral exhibit will be the most comprehensive and regarded from the point of view of being generally illustrative of the mineral resources of the country it represents the best on display at San Francisco. While other natural resources of Canada will also be adequately represented, its minerals will certainly make a showing that should compel attention to the Dominion as well worthy of the careful consideration and enquiry by those prepared to engage in the mining industry in a commercial way. It is particularly fortunate that the Canadian Exhibition Commissioner has in the official in charge of the Mineral section one who has had several years' experience in this department and with all is tireless in his efforts to secure such a full representation of the minerals of Canada as to make the mineral section of especial value. So far as British Columbia is concerned, he has had the assistance and hearty co-operation of a mineral collector peculiarly fitted for that branch of the work, so it is not at all surprising to find that the collection of British Columbia mineral specimens is expected to be the best from this province ever shown at any exposition yet held. It has been announced that the exposition will be opened next February.

## Cariboo.

The placer-mining season is over for this year and hydraulicking operations have been stopped. On the whole, the year's results are believed to have been profitable where gravel-washing was done in considerable quantity. It is understood that while less gravel was handled on properties in the neighborhood of Barkerville than would have been had the water supply been larger, the amount of gold recovered was sufficient to leave a satisfactory margin of profit above the cost of operations, for in places the gold content of the gravel averaged higher than usual. Railway construction work is being continued, so the outlook for the provision of railway transportation facilities for the district is promising. When the Pacific Great Eastern railway from tidewater at the head of Howe sound (less than forty miles by deep water from the City of Vancouver) through Lillooet and Cariboo districts to Fort George, on the Grand Trunk Pacific railway, shall be completed, mining in Cariboo and Quesnel divisions of this district should give employment to a much larger number of men than it has done during recent years. Not only should there be a considerable increase in placer-mining operations, but both lode mining and the exploitation of coal areas should also be undertaken.

## Cassiar.

In this district, as well as in Cariboo, the value of the placer gold won during the 1914 gravel-washing season, will probably be found to be somewhat less than the estimate made at the beginning of the season, the chief reason for this being that less gold was obtained on O'Donnell river and tributary creeks than at the opening of the season was expected would be taken out on those streams. However, the year's total from the various creeks in Atlin division is still expected to be larger than that of 1913 which was \$315,000, in which case it will be the highest in six or seven years. Then Liard and Stikine divisions of the district are also likely to show an increase, with a total for the year of not less than \$10,000 as compared with \$9,000 in 1913, and there may also be small additions from other parts of this extensive district.

## East Kootenay.

Shipment of ore from the Sullivan Group mines is being maintained on a fairly large scale, the quantity received at Trail from that source during five weeks ended November 5 having been 4,562 tons, an average of 912 tons a week. While the average for four weeks ended October 1, was 1,233 tons a week, production during that month was unusually high. For nine months to October 1, the total of Sullivan ore received at Trail was 23,861 tons, an average of 612 tons a week, compared with which average that for October shows an increase of nearly 50 per cent.

On November 15 the Victoria "Daily Colonist" published an interview with Mr. Elias Rogers, of Toronto, president of the Crow's Nest Pass Coal Co., in the course of which occurs the following reference to the company's coal-mining industry in Southeast Kootenay: "Speaking of the position of the Crow Nest Pass Coal Co., Mr. Rogers said the coal mining industry had been hard hit by the war, especially in the matter of coke production. At the commencement of hostilities the large copper-producing properties of the Boundary district had been compelled to close as the metal market was completely demoralized. There was little prospect of an improvement before the close of



the war. The payroll of the company's Crowsnest mines had been approximately \$200,000 a month; now, with the output curtailed to one-half, it is about \$100,000. The present output of coke is only about 600 tons a day."

#### West Kootenay.

**Ainsworth**—Only two mines in this division shipped ore during October, namely the Utica 35 tons and Rettalack & Co.'s Whitewater group 123 tons. The Kaslo "Kootenaian" lately published information concerning the discharge of a mortgage and a settlement of the financial affairs of the Utica company, in connection with which there had previously been difficulties that hindered the progress of development of the Utica mine and the production of ore. The hostile Eastern interests have been acquired by men also interested in other Ainsworth and Slocan properties, so it is expected that from this on good progress will be made and the Utica be developed into a productive mine to a much greater extent that was possible under conditions that have so greatly hampered operations. At the Cork-Province property, too, the outlook for progress has much improved. At the Panama, situated at a high elevation in the mountains above Bear lake, which is on the divide between Kootenay lake to the east and Slocan lake to the west, development work is being continued, supplies for the winter having been packed up to the mine.

**Slocan**—The Rambler-Cariboo was the largest Slocan shipper of ore to Trail during October, 252 tons from that mine having reached Trail during five weeks ended November 5, the Hewitt (Silverton Mines Ltd.) coming next with 132 tons, and then the Ruth-Hope with 83 tons. There were several shippers of smaller quantities. District newspapers state that a contract has been let for hauling 10,000 tons of zinc-lead ore, from the dump at the lower terminal of the aerial tramway from the Surprise mine, to the Ivanhoe concentrator near Sandon. The distance between dump and mill is about two miles; as soon as there is sufficient snow on the ground the hauling will be good. For some time past the owners of the Surprise have been considering how best to deal with the problem of making marketable the considerable quantity of zinc-lead ore opened in their mine, and the decision to try concentrating it at the Ivanhoe mill is a move made with the object of solving that problem. Work has been resumed at the Slocan Star after two or three months' suspension that resulted from the stoppage of purchase of silver-lead ore by Consolidated Co., Trail. No information is available as to whether shipment of silver-lead concentrate to Trail will be undertaken by the Star management under the new conditions imposed by the smelting company, but in any case the zinc ore can be milled and the zinc concentrate made be shipped to the United States. Here, again, there is the difficulty of payment for the silver associated with the zinc, which in most Slocan zinc-lead ores is much more than the mine owners care to lose. Other mines in this division than those already mentioned at which work is being done are the Payne, Noble Five group, Reco, Noonday, Idaho, Standard and several others. Sale of the Muller Creek Mining Co's claims near Three Forks, under a foreclosed mortgage, has been advertised. A Slocan Lake man is authority for the statement that about 200 men are being employed by the Standard Silver-Lead Mining Co., which is operating both mine and concentrating mill near Silverton but for the time

being is shipping only silver-zinc concentrate, storing the silver-lead product until the market conditions shall improve. At the end of October the "Slocan Record" reported that 10 in. of clean galena had been encountered in a drift in the California mine, near New Denver. In Slocan City division the Enterprise, Eastmont and Meteor are among the properties on which work is being continued.

The Nelson "Daily News" a short time ago printed the following information relative to the shipment of zinc ore and concentrate from mines in Ainsworth and Slocan divisions: The increase in zinc shipments from Kootenay mines to zinc smelters in the United States for nine months of 1914, as compared with the corresponding period of 1913, was 6277 tons. Up to the end of September of this year 9141 tons of zinc ore had been shipped, against 2864 tons for the nine months of 1913. The proportions of the several mines that shipped this year were as follows: In Ainsworth division: U. S. 70 tons and Utica 73 tons, both crude ore. Slocan division: Hewitt 2,236 tons, Rambler-Cariboo 698 tons Slocan Star 696 tons, Standard 4,516 tons, Van-Roi 863 tons; all concentrate shipments in October were; Hewitt (Silverton Mines, Ltd.) 278 tons, Rambler-Cariboo 173 tons, Standard 645 tons. The year's total to the end of October is 10,237 tons.

**Nelson**—Ore receipts at Trail from mines in Nelson division for five weeks ended November 5 totalled 450 tons, of which 356 tons was lead ore from the Emerald, H. B., and Zincton mines near Salmo, and the remainder ore and concentrate from three gold mines. There was little change in mining conditions and results during October as compared with September. About two months ago publicity was given to a statement relative to the reported occurrence in the mountains near the southern boundary line of Slocan City division and the northern line of Nelson division of ore giving on assay a gold value in excess of \$4,000 to the ton. After having spent five or six weeks at that high elevation and taken out a few tons of ore, the first reported determination of those most interested to spend the winter up there doing development work seems to have been abandoned; also the high-value talk, for the latter was not repeated when the announcement was printed that work had been stopped for the winter.

**Rossland**—After a longer delay than usual the Le Roi No. 2, Limited, has sent out from its London office its Josie mine reports for the months of August and September, as follows: For August: Shipped 730 tons of ore and 90 tons of concentrate. The receipts from the smeltery were \$23,445, being payment for 1,742 tons of ore, and \$2,038 for 124 tons of concentrate; sundry receipts \$678; total receipts, \$26,161. Estimated working costs for corresponding period were: ore production, \$5,000; milling, \$600; development, \$3,000; expenditure on Capital account, \$800; total, \$9,400. For September: Shipped 1,400 tons of ore and 50 tons of concentrate. Receipts from the smeltery were \$5,939, being payment for 454 tons of ore; sundry receipts, \$2,046; total receipts \$7,985. Estimated working costs for corresponding period were: Ore production, \$4,817; milling, \$423; expenditure on Capital account, \$723; total, \$5,963. The Rossland "Miner" reports that the Phoenix property, in the south belt of Rossland camp, has again been leased. Some good gold-copper ore was mined from the Phoenix by the last lessee, but the development work done was unimportant.



# MARKETS

## STANDARD EXCHANGE.

The minimum scale fixed by the Exchange, and below which no sales are permitted, is as follows:

### Cobalts—

Beaver. . . . .	.17
Buffalo. . . . .	.75
Chambers-Ferland. . . . .	.10
Canadian. . . . .	.05
City of Cobalt . . . . .	.30
Cobalt Lake . . . . .	.30
Coniagas. . . . .	6.00
Crown Reserve . . . . .	1.00
Great Northern . . . . .	.04
Hudson Bay . . . . .	30.00
Kerr Lake. . . . .	4.00
La Rose . . . . .	.70
McKinley-Darragh. . . . .	.40
Nipissing. . . . .	4.75
Peterson Lake . . . . .	.23
Seneca Superior . . . . .	2.00
Timiskaming. . . . .	.07
Trethewey. . . . .	.12
Wetlaufer. . . . .	.04½
York, Ont. . . . .	.07

### Porcupines—

Dome Extension . . . . .	.05
Dome Lake . . . . .	.30
Dome Mines . . . . .	6.50
Foley O'Brien . . . . .	.20
Hollinger. . . . .	16.00
Homestake M. F. . . . .	.20
Jupiter. . . . .	.04
McIntyre. . . . .	.27
Pearl Lake . . . . .	.02
Porcupine Crown . . . . .	.75
Porcupine Peterson . . . . .	.25
Porcupine Vipond . . . . .	.17
Rea Consolidated . . . . .	.10
Teck Hughes . . . . .	.07
West Dome . . . . .	.05

## STANDARD STOCK EXCHANGE.

Cobalt—	Nov. 24, 1914.	
	Ask.	Bid.
Bailey. . . . .	.01¾	.01¾
Beaver Con. . . . .	.23	.21
Buffalo. . . . .	.85	.65
Chambers Ferland . . . . .	.13	.10
Coniagas. . . . .	5.85	5.00
Crown Reserve . . . . .	.80	.75
Foster. . . . .	.05	...
Gould. . . . .	.01	.00¼
Great Northern . . . . .	.04½	.04¾
Hudson Bay . . . . .	45.00	35.00
Kerr Lake . . . . .	5.00	4.75
La Rose . . . . .	.90	.78
McKinley-Darragh-Sav. . . . .	.69	.66
Nipissing. . . . .	5.50	5.20
Peterson Lake . . . . .	.28½	.28
Right of Way . . . . .	...	.02
Seneca Superior . . . . .	3.00	1.00
Silver Lake . . . . .	.02½	.02
Timiskaming. . . . .	.11½	.11
Trethewey. . . . .	...	.15
Wetlaufer. . . . .	...	.03½

### Porcupines—

Apex. . . . .	.02½	.01
Dome Extension . . . . .	.07	.06¾
Dome Lake . . . . .	.40½	.40
Dome Mines . . . . .	7.00	6.45
Foley-O'Brien. . . . .	.20	...
Gold Reef . . . . .	...	.01½
Homestake. . . . .	.20	.15
Hollinger. . . . .	19.00	18.75
Jupiter. . . . .	.12	.11¾
McIntyre. . . . .	.26	.25
Pearl Lake . . . . .	.03½	.02½
Porcupine Crown . . . . .	.90	.70
Porcupine Imperial . . . . .	.01	...
Porcupine Pet . . . . .	.20	.12
Porcupine Vipond. . . . .	.23	.22
P. E. D. . . . .	.02	.01
Rea Mines . . . . .	...	.12
Teck-Hughes. . . . .	.09½	.09½

## TORONTO MARKETS.

Nov. 24—(Quotations from Canada Metal Co., Toronto)—

- Spelter, 5½ cents per lb.
- Lead, 5 cents per lb.
- Tin, 35½ cents per lb.
- Antimony, 16 cents per lb.
- Copper, casting, 13½ cents per lb.
- Electrolytic, 13½ cents per lb.
- Ingot brass, yellow, 10c per lb.; red, 12c per lb.

Nov. 24—Coal—(Quotations from Elias Rogers Co., Toronto)—

- Anthracite, \$8.00 per ton.
- Bituminous, lump, \$5.25 per ton.

## GENERAL MARKETS.

Nov. 23—Connellsville coke (f.o.b. ovens)—

- Furnace coke, prompt, \$1.60 per ton.
- Foundry coke, prompt, \$2.10 to \$2.50 per ton.

Nov. 23—Tin, straits, 33.75 cents.

- Copper, Prime Lake, 12.50 to 12.75 cents.
- Electrolytic copper, 12.37½ to 12.50 cents.
- Copper wire, 13.75 cents.
- Lead, 3.90 to 3.95 cents.
- Spelter, 5.25 to 5.30 cents.
- Sheet zinc (f.o.b. smelter), 8.00 cents.
- Antimony, Cookson's, 17.00 to 17.50 cents.
- Aluminum, 19.00 to 19.50 cents.
- Nickel, 40.00 to 45.00 cents.
- Platinum, hard, 10 per cent., \$48.00 to \$50.00 per ounce.
- Platinum, soft, \$44.00 to \$46.00 per ounce.
- Bismuth, \$2.75 to \$3.00 per pound.
- Quicksilver, \$52.50 per 75-pound flask.

## SILVER PRICES.

November—	New York London	
	cents	pence
10. . . . .	49¾	22¾
11. . . . .	49	22½
12. . . . .	48¼	22⅝
13. . . . .	47⅝	22⅞
14. . . . .	47⅝	22⅞
16. . . . .	48⅞	22⅝
17. . . . .	49	22¾
18. . . . .	49¾	22⅞
19. . . . .	49¼	22⅞
20. . . . .	49¼	22¾
21. . . . .	49¾	22⅞
23. . . . .	47⅞	22¾