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DECEMBER 15, 1916

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# CANADIAN MINING JOURNAL

VOL. XXXVII

TORONTO

No. 24



**THE B. GREENING WIRE CO., LIMITED**  
**HAMILTON, CANADA**

The Canadian Mining Journal, Purman Bldg., 263-265 Adelaide St. West, Toronto, Ont.



# CANADA

## DEPARTMENT OF MINES

HON. P. E. BLONDIN, Minister.

R. G. McCONNELL, Deputy Minister.

### MINES BRANCH

#### Recent Publications

- The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.
- The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.
- Building and Ornamental Stones of Canada (Quebec). Vol. III. Report on, by W. A. Parks, Ph.D.
- The Bituminous Sands of Northern Alberta. Report on, by S. C. Ellis, M.E.
- Peat, Lignite and Coal: their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.
- Annual Report of the Mineral Production of Canada During the Calendar Year 1914 by John McLeish, B.A.
- The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.
- The Salt Industry of Canada. Report on, by L. H. Cole, B.Sc.
- Electro-plating with Cobalt. Report on, by H. T. Kalmus, Ph.D.
- Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.
- Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.Sc.
- The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—
- Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.
- Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.
- Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.
- Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.
- Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.
- Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

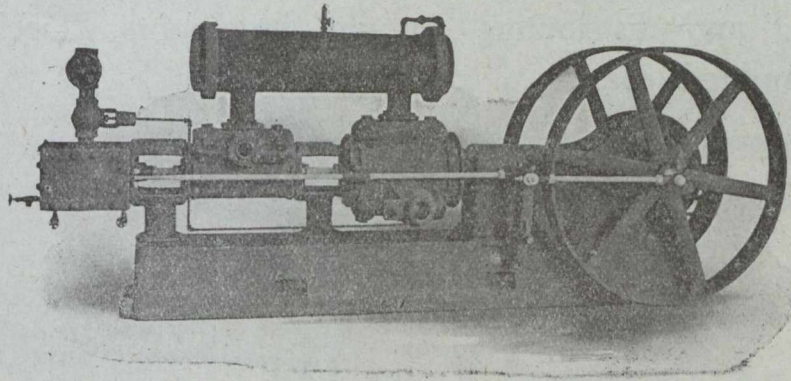
### GEOLOGICAL SURVEY

#### Recent Publications

- Summary Report of the Geological Survey for the Calendar Year 1915.
- Memoir 34. The Devonian of Southwestern Ontario, by Clinton R. Stauffer.
- Memoir 57. Corundum, its Occurrence, Distribution, Exploitation and Uses, by A. E. Barlow.
- Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.
- Memoir 65. Clay and Shale Deposits of the Western Provinces (Part 4), by H. Ries.
- Memoir 66. Clay and Shale Deposits of the Western Provinces (Part 5), by J. Keele.
- Memoir 69. Coal Fields of British Columbia, by D. B. Dowling.
- Memoir 73. The Pleistocene and Recent Deposits of the Island of Montreal, by J. Stansfield.
- Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.
- Memoir 76. Geology of the Cranbrook Map-area, British Columbia, by S. J. Schofield.
- Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.
- Memoir 78. Wabana Iron Ore of Newfoundland, by A. O. Hayes.
- Memoir 81. The Oil and Gas Fields of Ontario and Quebec, by W. Malcolm.
- Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.
- Memoir 84. An Exploration of the Tazin and Taltson Rivers, Northwest Territory, by Charles Camsell.
- Map 59A. Wheaton, Yukon Territory.
- Map 150A. Ponthook Lake Sheet, Nova Scotia.
- Map 160A. Manaimo Sheet, Vancouver Island.
- Applicants for publications not listed above should mention the precise area concerning which information is desired.
- Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.
- The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon. Letters and samples that are of a Departmental nature, addressed to the Director, may be Mailed O.H.M.S. free of postage.
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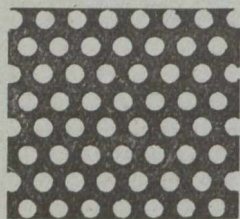
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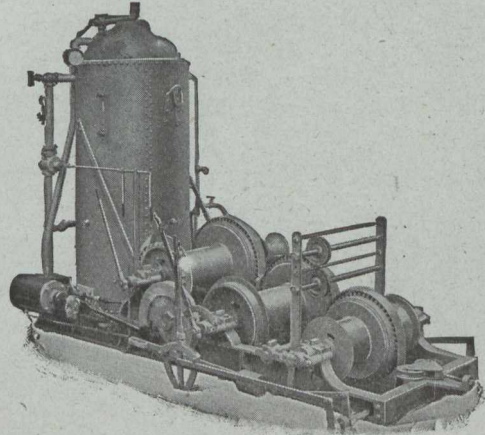
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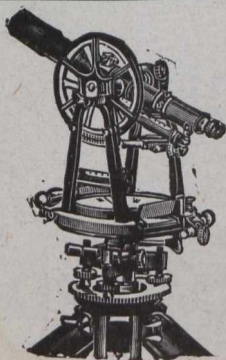
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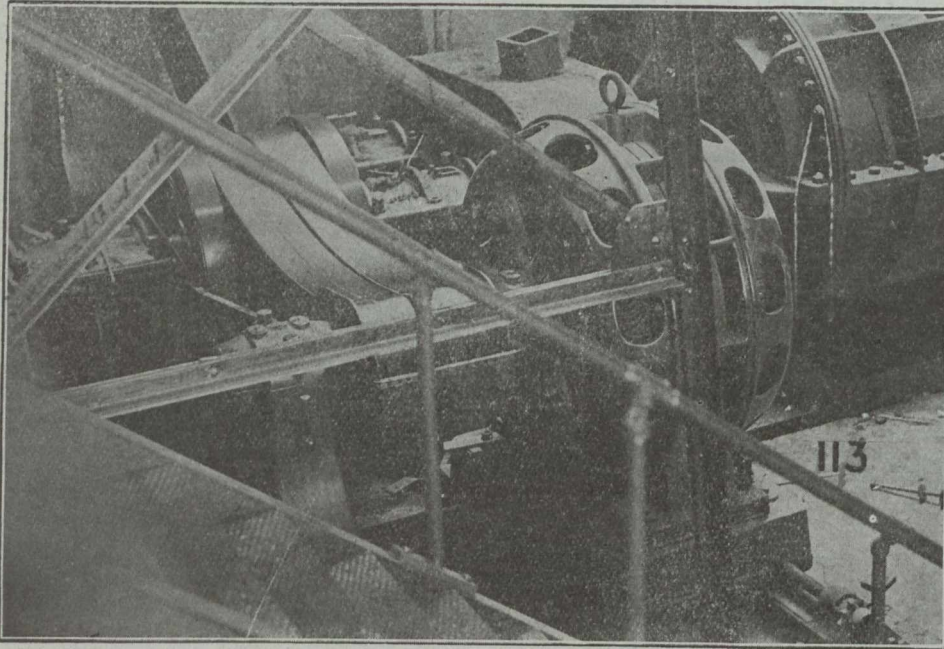
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# THE CANADIAN MINING JOURNAL

VOL. XXXVII.

TORONTO, December 15, 1916.

No. 24

## The Canadian Mining Journal

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Advertising copy should reach the Toronto Office by the 8th, for issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

### CIRCULATION

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd 1879."

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### SCIENTIFIC AND INDUSTRIAL RESEARCH

The impetus given to research by war time necessities has been frequently noted. An excellent example is furnished by the efforts of the Nipissing Mining Company to combat the increasing cost of supplies. In the November issue of the Bulletin of the Canadian Mining Institute, Mr. R. B. Watson says:

"Before the war, aluminum dust cost 33.82c. and caustic soda 2.11c. per pound, laid down at the mine. At the expiration of our contract for aluminum dust in May 1916, the lowest price at which dust could be bought was 90c. per lb. and caustic soda had risen to 5.77 per lb. At these prices, the increased cost for these two chemicals would have amounted to about \$33,000 per year. This was excessive and necessitated the finding of a substitute immediately. The utilization of sodium sulphide as a precipitant appeared to present the most promising solution of the difficulty, and the experiments carried out by J. J. Denny, in charge of the Company's research department, were so satisfactory, that in June, 1916, the process was adopted for the precipitation of all the mill solutions. It would appear, that even when prices of all chemicals used return to normal, sodium sulphide precipitation will be cheaper than the method formerly employed."

In the application of research to industry the Nipissing Mining Company has been signally successful. Mr. Watson and Mr. Denny are to be congratulated on their methods and results. They have made a valuable contribution to the metallurgy of silver and at the same time increased the profits of their company.

Another recent success to be credited to the Cobalt district, and particularly to Mr. Thos. Jones of the Buffalo Mining Company and Mr. A. A. Cole of the T. and N. O. Railway Commission, is the development of a pine oil industry. With the co-operation of the Forestry and Mines Departments a successful process for utilizing red pine stumps has been worked out. Pine oil, one of the chief products of distillation of red pine, is in great demand by those using oil flotation processes for concentrating ores. It is not unlikely that the Cobalt silver district will soon be able to obtain in Ontario all the pine oil required. In fact there is ground for believing that the industry may result in Ontario being an exporter of pine oil.

Another satisfactory development in Ontario is the promising results being obtained at the University of Toronto by Mr. Geo. Guess and his assistants, who are working on the problem of refining nickel. Mr. Guess is working for the Ontario Nickel Commission and is, we understand, meeting with considerable success.



In this connection another interesting series of experiments is being carried on in Toronto by the Moffat Irving Steel Company. Quite recently this company has made nickel steel in Toronto directly from roasted nickel ore.

The application of scientific research to industry is an every day occurrence in mining and metallurgy. The war has created new demands which are being met by renewed efforts.

While recognition of the value of scientific research is no new thing in the mining industry it is new in some industries. During the past year the public has begun to appreciate the fact that closer relations between scientists and business men are desirable. Some of our scientists have not been slow to appreciate the fact that scientific and industrial research is the popular thing. Adopting the methods of a well known Toronto broker, they have recently been taking advantage of every opportunity to shout "I know something." The sequel is seen in the appointment of an advisory council on scientific and industrial research. We cannot congratulate Sir George Foster on his choice. An advisory council made up of men who have had some experience in the application of science to industry might be of great value to the country. So far as the mining industry is concerned we do not expect much help from the council as at present constituted. Nor do we see that other industries are likely to receive very valuable advice from these men.

### AN INVENTORY NEEDED

Elsewhere in this issue we publish extracts from a speech on the nickel problem by Mr. H. H. Dewart. Mr. Dewart points out clearly how Germans have controlled the metal trade of the world. He exposes some of the schemes whereby the citizens of other countries are deceived by the agents of the metal trust. His remarks lead us to expect that if he were not so bound by party ties, Mr. Dewart might do some real service to the country in helping to rid us and the Empire of undesirable German influence. Unfortunately Mr. Dewart, after the manner of most of our politicians, weakens his arguments by charging his political opponents with responsibility for everything that is done wrong and for all unsatisfactory conditions that exist or that he claims exist.

Mr. Dewart continues to make charges against the Provincial and Federal Governments and against the International Nickel Company without presenting very strong evidence to support his charges. The Government continues to deny the charges and so far we have no good reason to believe that Mr. Dewart's remarks concerning Canadian nickel reaching Germany are for other than political effect. We are at a loss to understand however why a politician should make such

charges merely to further the interests of his party. This is no time for such methods.

Ignoring what Mr. Dewart says about his political opponents, there are to be found in his statements some facts that should be known to every Canadian. Only when they are known and appreciated may we hope to rid ourself completely of German influence in the mineral industry.

In order that we may know who controls our industries we should have an inventory.

Every company operating in Canada should be called upon to give an account of itself. We should have on record at Ottawa the name, nationality and extent of the holdings of every shareholder of every company operating in Canada. There should be on record, a statement concerning affiliation with companies outside of Canada. Companies which refuse to give the desired information and those found guilty of giving false information should not be allowed to operate in the country.

### THE LINDSEY EPISODE

As a political stroke, it is likely that most of our readers consider Mr. Dewart's reference to the Lindsey letter anything but a success. Many speak of it as a boomerang, and so it appears to us. It seems likely however that the publicity given to the incident may prove useful to the country even though it has not proven good party material.

In the first place it is well that the public should know that if a Russian company wishes to buy Canadian nickel it cannot obtain it in Canada nor through any Canadian company or agent. It must make its purchases through the firm of Merton & Co. The fact that this firm is now under British control does not wholly satisfy us. Is there no truly British firm in England that could have handled the business? If not, is it because the influence of the German firm was so great that no independent Britisher was able to carry on successfully trade in metals won from British ores?

In the second place it is no credit to Canada that Mr. Lindsey was forced to tell his Russian clients that the Sudbury nickel we brag so much about is not on sale in Canada, but that we only ship out the matte which is refined in other countries by non-Canadian companies and sold by them through a lately-German company.

### IRON AND STEEL.

A bulletin, by John McLeish, on the iron and steel industry of Canada has just been published by the Mines Branch, Ottawa. It contains much useful information concerning progress in 1915, some of which is included in this number of the "Journal."



**NIPISSING.**

The November report of the manager of the Nipissing mine shows that during the month of November the Company mined ore of an estimated value of \$246,629 and made shipments from Nipissing and Customs ores of an estimated net value of \$372,636.

Development work on vein 490 was generally satisfactory during the month. Vertical development, by means of several raises, continued to show ore of good width and assay above the fifth level. Most of the raises are up about 70 ft. and with one exception, the condition of the vein above the fault is about as good as the width and assay below the fault. One raise shows as high as 8 to 10 ft. of ore assaying 1,500 to 1,800 ounces. In addition to the vein itself, the raises are continuing to develop a very good grade of mill rock. A fifth raise has been started at the north end of the ore shoot and is up 30 ft. This end of the vein is more up than the rest and principally produces mill rock of high assay. This raise will be continued to the fourth level and will be one of the main sources of ventilation in future stopes on this vein. The north drift is being continued on a small stringer running parallel with the property line, and will eventually be driven to the vicinity of vein 98, where a faulted extension of that vein is expected to be found. The south drift has been temporarily stopped in order to allow the starting of several new crosscuts. During most of the month, values in this drift have been low, running from 10 to 75 ozs. The face of the drift has occasionally been of high enough value to send to the low grade mill. Four new crosscuts have been started and as the adjoining territory has favorable possibilities, good results are looked for as this work progresses. The usual amount of stoping was done on veins 73 and 98 and their various branches.

At 80 shaft most of the work was confined to cross-cutting at the third and fourth levels. Nothing of a favorable nature was found during the month. At shaft 81, no new ore shoots were found since the one encountered in October. At the 425 ft. level there has been a vein of niccolite and smaltite, having a width of 2 to 6 in. but as a general rule, silver values were low. Occasionally, the vein was of sufficiently high assay to send the entire product to the mill dump. At the 520 ft. level there have been no favorable results outside of occasional amounts of smaltite having a width of 6 in. The second level is now within 60 ft. of the boundary line and the third level still has 200 ft. to go. As soon as this amount of drifting has been completed, some vertical development will be started. The adjoining property had good ore on the same vein at a height of 125 ft. above the 425 ft. level.

Operations in R. L. No. 402 consisted mainly in stoping two veins found by past development and these are producing a good grade of rock for the low grade mill. Some drifting has also been done on one of the veins and during most of the month, results have been fair. The vein is a small one but occasionally it shows as high as 2 in. of 5 000 ounce ore. No new developments were met with on vein 102.

The high grade mill treated 162 tons and shipped 490,782 ounces of fine bullion. The low grade mill treated 6,462 tons. The following is an estimate of production for the month of November.

Washing Plant	Low Grade Mill	Total
\$139,081	\$107,548	\$246,629

**MEMBERS OF STANDARD MINING EXCHANGE VISIT PORCUPINE.**

As guests of Mark Harris & Co., a party of nearly forty spent the American Thanksgiving week-end at Porcupine. Mr. Harris had invited the members of the Standard Mining Exchange to visit the Newray property, in which his company is particularly interested and also the leading producing properties, the Hollinger, Dome and McIntyre.

Two special cars, attached at Toronto to the "Cobalt special" on Wednesday evening, carried the party to Timmins. From Timmins the visitors drove to the Newray mine and spent Friday morning at the property. In the afternoon McIntyre and Hollinger mines were visited. Saturday was spent at the Dome and the party returned to Toronto on Sunday after a very interesting and enjoyable trip.

The Newray property was formerly known as the Rea. In our issue of Nov. 1, 1910, was given some account of early developments at the property, then known as the Connell.

In 1911 a company, Rea Consolidated Mines, Limited, was incorporated to work the property. Development of a very promising vein was for a time quite satisfactory. A small body of good ore was blocked out. Further development was however disappointing, the vein at the third level proving very lean. Efforts to locate another ore shoot on the vein were fruitless.

Development work was then for some time discontinued. The developed ore was mined profitably and then operations were discontinued.

A new company, the Newray Mining Co., is now operating the property. According to the manager, Mr. C. P. Charlebois, this company has had considerable success in its prospecting work. A number of veins have been uncovered and tested by pits and diamond drilling has encountered good ore. The mine is now being unwatered.

Mr. Charlebois and Capt. A. C. Anchor conducted the visitors over the Newray property and explained what had been done and the character of the results obtained.

The party then visited the McIntyre mine where Manager Ennis gave all an opportunity of going underground. At the Hollinger the chief object of interest was the plant for handling and treating the ore. The foundations for the mill addition are completed and by next April the company will be in a position to handle nearly double the present tonnage.

On Saturday, Mr. Jos. Howston, assistant general manager at the Dome, showed the visitors over the Dome property.

The trip to Porcupine cannot fail to leave a good impression on the members of the party. The gold mining industry is playing an important part in the development of Northern Ontario. Everyone who visits Porcupine sees evidence on every hand of big things being done and of good results being obtained.

**INDUSTRIAL RESEARCH IN ENGLAND.**

London, Dec. 1.—The Government has decided to establish a separate Department of Scientific Industrial Research, over which the Marquis of Crewe, Lord President of the Council, will preside. Subject to the consent of Parliament, a large sum will be placed at the disposal of the department for the conduct of researches for the benefit of national industries.



**IRON AND STEEL IN 1915.**

The year 1915, particularly the later months, was marked by a steady renewal of activity in the iron and steel industry, due not so much to industrial demands for Canadian consumption, as to the requirements of steel for munitions and the export demand for billets and wire.

The shipments of iron ore are the largest recorded with the exception of 1902. The production of pig-iron was practically equivalent to that of 1911, having been exceeded only in 1912 and 1913, while the production of steel ingots and castings was exceeded only in 1913.

**SUMMARY OF CANADIAN IRON AND STEEL STATISTICS, 1915.**

Iron ore shipped.....	398 112 tons
Canadian iron ore charged to blast furnaces .....	293,305 "
Imported iron ore charged to blast furnaces .....	1,314,957 "
Iron ore charged to steel furnaces	74 872 "
Pig-iron made .....	913,775 "
Pig-iron and ferro-alloys exported.....	26 545 "
Pig-iron imported .....	47,842 "
Ferro-alloys made .....	10 794 "
Ferro-alloys imported .....	13,758 "
Pig-iron and ferro-alloy consumption .....	959,254 "
Pig-iron used in steel furnaces	747,834 "
Steel ingots and castings made	1,020 336 "
Steel rails made .....	232,411 "
Canadian coke used in iron blast furnaces .....	578 743 "
Imported coke used in iron blast furnaces .....	486,022 "
Iron and steel imported .....	771,007 "
Number of completed blast furnaces	19
Number men employed in blast furnaces	1 004
Wages paid in blast furnaces.....	\$675,453
Value of pig-iron produced .....	\$11,374 199
Value of iron and steel goods exported (c) .....	\$48,268,148
Value of iron and steel goods imported .....	\$74 308,983

Canadian iron blast furnaces continue to be operated largely on imported ores and fuels, only about 17 per cent. of the ore consumption and 54 per cent. of the fuel used in 1915 being of domestic origin.

The imports of iron and steel which reached a maximum in 1913 show a further falling off in 1915 amounting in value to just half that of the former year. The exports, however, continue to increase, the value in 1915 being over three times that of the exports in 1914.

During the earlier months of the year, low prices, a restricted market, and sharp competition pressed heavily upon the operators forcing the marketing of steel at the lowest possible margin. As the year progressed, however, the enormous demand for munitions and war requirements rapidly absorbed available stocks until before the close of the year market requirements could not be met. The installation of new open-hearth furnaces was undertaken at several plants, while a number of small electric furnace units were also constructed and others projected in an attempt to meet the demand.

**CANADIAN IRON MINES.**

Active mining operations were conducted at three iron mines during 1915, viz.: The "Helen" and "Magpie," in the Michipicoten district, and the "Moose Mountain," north of Sudbury. Small shipments were made from stock at two other properties.

The total shipments during the year were 398,112 tons, valued at \$774,427, as compared with 244,854 tons, valued at \$542,041, shipped in 1914. Of the total shipments in 1915, 308,382 tons were sent to blast furnaces in Canada and 89,730 tons to the United States.

The shipments included 205,989 tons of hematite, 132,906 tons of roasted siderite, and 59,217 tons of magnetite (including some ores with an admixture of hematite). Shipments in 1914 included 89,454 tons of hematite; 109,838 tons of roasted siderite, and 45,562 tons of magnetite.

All iron properties in the eastern Provinces of Nova Scotia, New Brunswick, and Quebec were idle throughout 1914 and 1915, although small shipments were made from Bathurst mine stock of 3,683 tons in 1915 and 4,775 tons in 1914. These ores would average about 46 1-2 per cent. iron.

In Quebec, the Manitou Iron Mining Co. opened up their mine at Ivry-on-the-Lake in Terrebonne county on Dec. 4th 1915, and undertook to make considerable shipments of ilmenite during 1916.

In Ontario the "Helen" and "Magpie" mines were operated throughout the year by The Algoma Steel Corporation.

The Moose Mountain mines, at Sellwood, Ont., owned by Moose Mountain, Limited, were operated for less than two months closing down on May 28th 1915.

The mines of the Canada Iron Mines, Limited, "Bessemer" and "Childs" in Mayo township and Coe Hill in Wollaston township as well as the magnetic concentrating plant at Trenton, remained idle throughout 1915, although a small tonnage of concentrates was sold during the year.

**WINDY ARM, SOUTHERN YUKON.**

A correspondent of the Daily Alaskan, published at Skagway, tells of mining at the Venus and other mining properties in the neighborhood of Windy Arm, Southern Yukon, as under:

On November 4th, the ninth and tenth shipments of ore were made from the Venus mine, in Southern Yukon. One lot was shipped to the Granby Consolidated Co's smelting works at Anyox, Observatory Inlet, B.C., and the other to the Consolidated Mining and Smelting Co's smeltery at Trail, B.C. The latter lot of ore contained enough lead to pay railway freight and other charges from tidewater at Vancouver to Trail.

These shipments complete a total of more than 8,000 sacks, amounting to approximately 500 tons of ore shipped from the Venus mine since operations were commenced this season for transporting the ore. The launch Pelican is being used to take the place of the steamer Gleaner, which is being repaired. After the water in the lake shall freeze, horse teams will be used in hauling the ore from the mine landing to Carcross on the White Pass and Yukon railway.

Ice is still being taken out of the shaft of the Montana mine, near the Venus, though a depth of 180 ft. has been reached. The ice is very solid, and it will probably be found to extend to the bottom of the shaft.



## THE IRON AND STEEL INDUSTRY IN NOVA SCOTIA

By F. W. Gray.

The smelting of iron ores and the manufacture of steel in Nova Scotia is an outgrowth of the coal mining industry, and the location of the iron and steel plants has been determined by the proximity of large deposits of bituminous coal. Half a century ago it was popularly supposed that Nova Scotia possessed valuable iron ore resources, and large hopes were based on the supposed juxtaposition of coal and iron deposits. Unfortunately these hopes were not realised, and iron smelting enterprises in Nova Scotia based on a local ore supply have been disappointing failures. If the unique and marvellous deposits of iron-ore in Conception Bay had been unknown, it may be conjectured that the presence of coal in Nova Scotia would have developed an iron and steel industry within the Province on a small scale, just as the English ores were used before the development of modern practice in steel manufacture required an ore supply of greater dimensions than the English deposits could provide. It is interesting to note that the restrictions placed on ore shipments by war conditions have led to a revival of iron-ore mining in Great Britain at the present time, and it may be that the iron deposits of Nova Scotia, meagre as they are believed to be, would have been differently regarded had the Wabana supply not been available.

There has lately been a disposition on the part of the public to awake to the valuable nature of the iron-ore beds of Bell Island. The tardiness of this awakening is surprising, because the potentialities of the combination of the iron ores of Wabana and the coal beds of Cape Breton have not lacked advertising, and with the exception of the prevailing high prices for steel and the insistent demand that has caused this enhancement of prices, there is really nothing new in the situation. The most optimistic view of the steel industry could not hope to outshine the forecast of the original prospectuses of some of the steel companies of Nova Scotia. A survey of the natural advantages possessed by Cape Breton Island in its combination of coal-seams of good quality, with excellent facilities for water transportation, immense beds of limestone and the proximity of the Wabana ore deposits, causes one not so much to wonder at the optimism of those who founded the steel industry there, but rather to wonder why their forecasts have not been fulfilled.

Without going into figures it might be quite safely stated that the iron ore beds of Wabana and the coal areas of Cape Breton are inexhaustible, for the purposes of this generation at any rate. The advantages just enumerated as possessed by Cape Breton may be regarded as permanent, so that the future of the industry is a matter of markets and prices.

Reference is made particularly to Cape Breton, because the only steel works outside of Cape Breton are those of the Nova Scotia Steel & Coal Company at Trenton, and these may be regarded as an extension of the operations in Cape Breton.

The present state of the steel industry is one of insistent demand and production at high pressure. Activity is almost entirely confined to the production of shell steel, and the manufacture of shell bodies. The production of other steel products is reduced, not so much from lack of demand, as because of the necessity for the production of munitions steel. The present activity is of course entirely a reflex of the war, and

presumably the coming of peace will bring with it a lessening of activity. Peace seems, however, to be a remote possibility in these days, and as the months go by the end of the war acts like the end of the rainbow in the fable. The steel companies look like having to be content with busy times for an indefinite period ahead and the knowledge that no matter when the end of the war arrives, they are helping to bring it nearer by concentrating all energies on the production of munitions and munitions steel.

The period preceding the war and the first eight months of the war were times of great trade depression and financial stress. Lack of capital prevented many necessary improvements in the plant, and even the carrying out of necessary repairs, and it may be anticipated that before disbursing profits in dividends to shareholders the directors of the steel companies will see to it that sufficient money is expended to place the steel plants in position to meet the strain of after-war conditions, and the recession of activity that is inevitable at some future date which no man can name.

Extensive plans for improved and enlarged plants are now in contemplation or under way at the several steel plants, including such factors of increased production as additional coke-ovens and new blast furnaces, and a notable step is the commencement of the building of steel ships by the Nova Scotia Steel Company at New Glasgow. It is understood that this company intend not only to build steel ships, but to engine them also, and there seems reason to hope that this is an embryo industry which will persist when after-war times are with us and grow to proportions that will put Nova Scotia once again into a prominent place in the shipbuilding industry.

One interesting development of war conditions is the recovery of benzol and its derivatives from coke-oven gases by the Dominion Steel Corporation. The object of this recovery at the present time is of course to obtain toluene, the base of the high explosive familiarly known as "t.n.t.". After the war it may be anticipated that a market will be found for benzol, and it may be taken for granted that the War Office will in future keep a friendly eye on every possible source of toluene.

The steel industry of Nova Scotia has progressed a long way in the direction of manufacturing finished steel products. The Dominion Iron & Steel Company is now equipped to manufacture large quantities of nails of every conceivable variety, barbed and fencing wire, wire rods, bars, etc. The Nova Scotia Steel Company at Trenton fabricates a considerable variety of forgings, shaftings and commercial shapes, and it cannot be doubted that great advance in the manufacture of more finished iron and steel products will take place in the near future.

Generally speaking, and without particular reference to the iron and steel industry, it may be anticipated that future years will see from Nova Scotia a lessened export of coal as a raw material, and an increased export of manufactured articles; because, after all, the iron and steel industries have their genesis in the presence of coal-seams, and the growth of these industries is but an example of what might be achieved in Nova Scotia in many other branches of manufacture.

As to the future, in so far as it depends on war



conditions, The Earl of Derby has recently said that the man is a fool who will undertake to prophesy. All we know is that peace will come when the Germans are beaten, and in this process the iron and steel industry of Nova Scotia is assisting to the best of its ability. There are, however, certain elements of permanence in the industry that cannot be taken away, and above all, Canada industrially is yet in its infancy. There seems no good reason why the most optimistic forecasts of the future of the industry should not some day be fully realised.

#### SCHWAB AND FISK.

Charles M. Schwab is undoubtedly a wizard on steel and his ability in this line and his unbounded enthusiasm have both contributed to the success that has been attained by the Bethlehem Steel Corporation, of which he is IT, being the company, the board of directors and the stockholders.

The assets value of his enthusiasm is well illustrated by the story that in the early days of Bethlehem Steel, when Mr. Schwab needed money and had made several unsuccessful efforts to raise it, he went to Pliny Fisk.

In Mr. Schwab's inimically enthusiastic manner he told of the wonderful possibilities of Bethlehem Steel, which so impressed Mr. Fisk that he agreed to raise the money but insisted that Mr. Schwab should put all he had just told him on paper. Mr. Schwab immediately returned to his own office and wrote the letter and despatched it by a messenger.

Soon he got a telephone call from Mr. Fisk. The latter expressed great indignation because Mr. Schwab had not included in the letter many of the things he had told him during their interview. Mr. Schwab now very much incensed rushed around to Mr. Fisk's office and proved to him finally that nothing of what he had said was missing from the letter.

"Well," said Mr. Fisk, "you do seem to have it all in but it don't sound right. If you want me to raise that money for you, you will have to talk into a phonograph."

#### WABANA IRON ORE.

The iron ore deposits at Wabana, Newfoundland, are owned and operated by the two Canadian companies operating coal mines and steel plants at Sydney and Sydney Mines, Cape Breton. The shipments from the Wabana mines during 1915 were 868,451 short tons, of which 802,128 tons were shipped to Sydney and 66,323 tons to the United Kingdom. The total shipments from Wabana since the mines were first operated in 1895, have amounted to 15,525,636 short tons, of which 9,726,881 tons were sent to Sydney; 2,078,197 tons to the United States, and 3,720,558 tons to Great Britain and Europe.

#### PIG-IRON IN 1915.

The total Canadian production of pig-iron in 1915 not including the output of ferro-alloys, which is separately tabulated, was 913,775 short tons (815,870 long tons) valued at \$11,374,199, as compared with 783,164 short tons (699,256 long tons), valued at \$10,002,856 in 1914, and 1,128,967 short tons (1,008,006 long tons), valued at \$16,540,012 in 1913. An increase of 16.67 per cent. is shown in the production of pig-iron in 1915, as compared with a decrease of over 30 per cent. in 1914.

Previous to 1896 pig-iron was made entirely from Canadian ores. Since that date, however, increasing quantities of imported ore have been used as well as imported fuels and fluxes, and in 1915 about 83 per

cent. of the ore charged, 46 per cent. of the coke, and a large proportion of the limestone were imported. The iron industry at Sydney and North Sydney has been built up on the basis of the Newfoundland Wabana ores and the local coal supply, while in recent years a portion of the limestone required has also been obtained from Port au Port, Newfoundland. In Ontario large quantities of United States "Lake ores" are used, the imported ores charged being 623,094 tons, and Canadian ores 293,305 tons, in 1915. All the fuel used, with the exception of a small quantity of charcoal, was imported either as coke, or as coal, for charging the by-product coke ovens at Sault Ste. Marie. A portion of the limestone flux is also obtained from quarries situated in the United States.

#### IRON ORE PRICES.

The prices of Canadian iron ores are naturally based on prices current in the United States. "Lake ores," that is, those originating in what is generally known as the Lake Superior iron region, and which contribute about 80 per cent. of the iron and steel requirements of the United States are, by agreement amongst the principal operators, quoted per gross ton delivered at Lake Erie ports. Ore prices and freights are usually fixed at the beginning of each season and the price of any individual ore then depends on its variation from the standard in iron and phosphorus content, etc.

The urgent demand for iron ore by United States blast furnaces during the later months of 1915 resulted in general buying for 1916 delivery early in December, and the fixing of prices for the 1916 season at 75 cents per ton in advance of the 1914 and 1915 quotations, which have been as follows:

	1914 and 1915	1916
Old Range Bessemer	\$3.75	\$4.50
Mesabi Bessemer	3.50	4.20
Old Range Non-Bessemer	3.00	3.75
Mesabi Non-Bessemer	2.85	3.55

The base for Bessemer ores is 55 per cent. iron natural, and .045 per cent. phosphorus dried at 212 degrees Fahrenheit.

The base for Non-Bessemer ores is 51.5 per cent. iron natural.

Since 1900 the price for Old Range Bessemer ores has ranged between a minimum of \$3.00 in 1904 and a maximum of \$6.48 in 1900. Non-Bessemer ores being generally from 50 to 80 cents lower.

Ore prices in eastern United States are generally quoted at a rate per unit delivered eastern Pennsylvania points on tidewater. Thus in 1914 and 1915, Newfoundland, Nova Scotia and New Brunswick ores sold in this market, would bring from 6 to 8 cents per unit, or per cent. of iron. The 1916 prices range from 8 to 8 1-2 cents per unit for 50 per cent. to 65 per cent. ore.

On Nov. 23, 1916, the prices for 1917 were established at \$1.50 above those ruling in 1916. Fifty cents of the advance goes to the lake vessels.

#### TRETHEWEY.

Trethewey shareholders have been advised that a dividend of five per cent., is to be paid on Dec. 22. The disbursement will come in the nature of a Christmas present, as there was little expectation of further dividends for some time to come. The payment will involve the amount of \$50,000 and will aggregate over \$1,110,000 paid to date to shareholders. The property had been closed down for over a year on account of the low price of silver, but was reopened in May when the white metal displayed a soaring tendency.



## IRON AND STEEL CASTINGS

At a meeting of the International Engineering Congress last year, Mr. John H. Hall presented a paper of considerable interest to those who make or use iron and steel castings. He said in part:

Iron and steel castings may be made of steel, malleable iron, or cast iron. Though there are a number of trade names for particular sorts of metal sold in the form of castings, yet all belong to one of these three classes—which have distinctive properties,—are manufactured by different processes, and have different fields of usefulness. We hear, for instance of “semi-steel”, “gun-iron” or “wrought iron” castings; however, these are but special sorts of castings—the first two of grey iron, the last of steel castings.

Steel castings are made of steel, which may be hard or soft, of high or low carbon, with or without special alloys, just as steel forgings or rolled steel shapes are made of different sorts of steel. Cast-iron castings, of course, are composed chiefly of pig-iron, generally remelted, and are distinguished by the comparatively low tensile strength and almost total lack of ductility characteristic of that metal, which is attributable largely to its high content of carbon. In some sorts of iron castings, part or all of the metal is made almost glass-hard by casting it against an iron chill, whereby the carbon is retained in the “combined” state as carbide of iron, an intensely hard substance. But in most cases iron castings are comparatively soft and readily machinable, and at least a considerable part of the carbon is in the form of flakes of graphite, which are distributed through the metal as flakes of mica might be mixed in mortar, destroying its continuity and rendering it weak and brittle.

Malleable iron might be called a mongrel iron. When first cast, the metal throughout its cross-section is very hard and is identical in nature with the chilled portion of a chilled-iron casting. By heating this hard, brittle metal for many hours at a full red heat, it is made soft and quite ductile. The combined carbon is thereby all converted to graphite, which, however, is in the form of globular aggregations of very fine powder and is not in flakes, as in grey iron. The portion of the metal near the surface of the castings, moreover, is made nearly carbonless. Thus the metal is practically dead-soft steel whose continuity is broken up by aggregations of a strengthless material. It is, therefore, quite ductile and has a fair degree of strength, but, naturally, is not as strong or as ductile as dead-soft steel.

From this brief statement of the general nature of the three metals, we see that they have necessarily distinct fields of usefulness. We use steel or malleable-iron castings when we need a metal with a considerable amount of strength and ductility; in most cases, indeed, our reason for using a casting, instead of forming the piece of rolled or forged metal, is that it can not be so made; or because the expense of the rolling, forging, or cold-shaping of steel plate would be prohibitive. Many times the choice between a steel casting and a drop forging, for instance, is dictated simply by the number of pieces we shall require; if we need a great many, we can afford to make dies, and we secure a better, and often cheaper, article; whereas, if there are but a few required, we are constrained to use castings, because of the expense involved in the purchase of forging dies.

When we order cast-iron castings, on the other hand, we generally wish to use them for parts in which great

strength is not required, often because the weight of the piece is of no consequence, or even because a heavy piece is an absolute essential. By using a large piece of comparatively weak and brittle metal we secure the total strength required. The metal, moreover, is very strong against compressive stresses, and is often used to resist such stresses in cases where comparatively heavy sections can be used.

**The choice between steel and malleable-iron castings** is dictated partly by their respective properties, partly by price, and partly by the limitations of the processes by which malleable iron is made. As already stated, steel is, in its nature, a more homogeneous metal, and therefore tougher and stronger than malleable iron. Moreover, castings of malleable iron are somewhat prone to actual porosity or sponginess at the center, especially in certain portions of irregular castings, so that for this reason, also, a steel casting is stronger and more reliable. Finally, malleable iron can be made only into castings of quite light sections; whereas, there is almost no limit to the size and weight of steel castings that can be produced. For uses where only a fair amount of strength and toughness are necessary, and the casting is, therefore, of light section, it often pays to buy malleable castings, because they are cheaper than steel.

**The variations in the properties of steel castings** are due to variations in the composition of the steel, to the annealing or heat treatment to which the steel is subjected, and to the soundness of the casting. The last of these may be summarized in the familiar saying, “a casting is always a casting”—by which the “initiated” mean that it may always contain hidden blow-holes or shrinkage cavities that cause or aid its failure when least expected. The gases that are liberated from solidifying steel, of course, cause blow-holes in ingots as well as in castings, but by the time the ingot is reduced to the rolled or forged shape, these holes are at least closed up, if not partially welded—and they are generally so located as to be least harmful to the finished piece. In the case of castings, the gas from the metal and the steam and gas set free from the sand mould may cause blow-holes that can not be detected by surface inspection of the piece.

Because steel and iron contract in cooling, moreover, there is a tendency toward the formation of a cavity in the upper portion of almost any mass of metal during its cooling from the liquid state to atmospheric temperature. In rolled and forged work we get rid of the hollow part of the ingot simply by not using it. In castings, however, especially steel castings, we provide against these cavities by putting extra portions upon the piece, which are so shaped and located that they, and not the casting itself, shall be hollow. The metal drained from these “sink-heads” feeds the shrinkage of the casting, and they are knocked or cut from the piece after it has grown cold. Failure to properly locate or design these heads will almost certainly give rise to shrinkage cavities of greater or less size in the casting; and if these are so located as not to be discovered and welded up, we have a hidden source of weakness in our casting.

The most important constituent of steel, upon which the nature of the metal largely depends, is carbon. Depending upon the carbon content, ordinary steel castings vary from very soft to dead-hard steel. The carbon content in each class of steel castings is approximately as follows:



Class.	C. Per Cent.	Special Trade Names
Very soft	up to 0.15	"Malleable-Iron Castings"
Soft	0.15 to 0.30	
Medium	0.30 to 0.40	
Hard	0.40 up	"40-Point Steel"

The effect of silicon in steel castings is chiefly to promote soundness and to discourage the formation of blow-holes. The average silicon content of steel castings is from 0.25 to 0.40 per cent, though in "very soft" steel it is sometimes as low as 0.15 or even 0.10 per cent. The silicon content should not be specified by the purchaser but left to the judgment of the maker.

Manganese, in "very soft" steel castings, is sometimes as low as 0.20 per cent., but in the average casting it runs from about 0.40 per cent. to 0.80 per cent., or even higher. As manganese additions are absolutely essential in the manufacture of steel, and in most cases the steel could not be made sound at all without it, the manufacturer is in a position to know how much he should use and should not be hampered by limits imposed in specifications.

The effect of phosphorus in steel is to produce brittleness in the metal when cold. Hence the limits are sharply specified. No steel casting should contain over 0.10 per cent. of phosphorus, and 0.08 per cent. is better. For high-grade castings the upper limit is generally 0.05 per cent.

Sulphur is a harmful impurity in steel, its chief effect being to make the metal "red-short", or weak and brittle when hot. Steel that has to be rolled, forged or quenched from a red heat in hardening, therefore, must contain as little sulphur as possible. As the purchaser of steel castings very seldom forges them at all, or subjects them to hardening processes, many makers of steel castings contend that the sulphur content should not be specified. As they point out, the almost inevitable effect of too much sulphur in their steel is that the castings will crack when hot under the stresses set up during the cooling, so that there is no incentive for the steel maker to take chances on the use of steel of too high a sulphur content. They contend, therefore, that they should be allowed to settle the sulphur content of their steel for themselves, as they will be sure not to allow too high a content and should not be embarrassed by specifications that may call for a much lower sulphur content than is really necessary, at an added expense to them. Most specifications for steel castings, however, contain a maximum limit for sulphur, usually from 0.05 per cent. to .06 per cent.

**The effect of annealing and heat-treatment**, in general, is more marked in high-carbon than in low-carbon steel. One effect, however, that is practically as great in soft as in hard steels, is to relieve the stresses that are set up by the unequal rates of cooling of parts of a casting of varying cross-section. As soft steel contracts more in cooling than does hard steel, the stresses are generally somewhat greater in soft castings. This is offset by the fact that as the steel is tougher it can have more stresses in it without danger of failure; so that the question of stress is nearly as important in a soft as in a hard casting. Able metallurgists have contended that soft-steel castings need no annealing, but the tendency has long been to anneal more, rather than less, often.

Plain annealing, that is, heating the casting to a given temperature, which is maintained for some time, and then cooling it slowly, breaks up the coarse micro-structure characteristic of steel in the cast condition and substitutes for it a much finer and more

uniform structure. The result is to raise the strength and elastic limit of the casting, to a degree that is generally the greater the higher the carbon content of the metal, the strength of very soft castings being raised very little by annealing. The toughness of the metal, as measured by its extension and contraction of area in the tensile test, is also increased, more in high carbon than in low carbon steel. As measured by bending tests, the toughness is also greatly increased; and though hard steels are improved more than soft, yet the difference between an unannealed and an annealed soft-steel casting is usually greater in the bending test than in extension or contraction of area.

Heat treatment, that is, heating the casting to a given temperature for a given time, to relieve cooling stresses and remove the coarse micro-structure of the cast metal; cooling more or less rapidly, to partially or entirely harden the metal; and reheating to relieve the hardening stresses and to "draw" part of the hardness, is, of late, being practised to an increasing extent. Its effect is similar to that of plain annealing, but more marked. The strength and toughness of the steel are greatly increased, the effect upon the lower carbon steels being more marked than is that of plain annealing. This is especially true of the resistance to sudden shock. A dead-soft steel, of so low a carbon content that the effect on the strength of even a drastic heat treatment is hardly noticeable, is made several fold as resistant to shock tests as it is in the annealed condition.

**The method by which the steel is made** influences its properties largely by its effect upon the composition that it is possible to secure, and upon the tendency of the steel to unsoundness. The "basic" processes, by which are meant those in which the slag can be so regulated as to permit the removal of most of the phosphorus and sulphur of the steel, naturally enable the manufacturer to secure low phosphorus and sulphur content, whereby the steel is made tougher when cold and less prone to shrinkage cracks. When the steel is made by "acid" processes, on the other hand, purity must be attained by the use of pure raw materials, at an increased cost. Moreover, lower phosphorus and sulphur content are secured by basic processes than it is possible to attain by acid processes.

Again, the extent to which the steel is subjected to oxidation during its manufacture influences the tendency to unsoundness. It may be said, in general, that the Bessemer process oxidizes the steel to the greatest extent, the open-hearth process to a less degree, the crucible process to a still less degree, and the electric-furnace process least of all.

It is not possible to state dogmatically that one process produces better steel than another, because the raw material used and the skill of the operator vary to a considerable extent. Even with the electric furnace, very poor steel can be produced by the inexperienced men; though, when properly handled, the furnace is capable of producing metal that is as low in phosphorus and sulphur, and as pure and little liable to blow-holes, as any steel the world has seen. Hence the process by which the steel is made is, in many cases, of less importance than the skill and knowledge of the workmen, so that the purchaser is better protected by calling for metal of good properties as exhibited by tests than by buying castings made by some particular process that he supposes to be the best. Even electric furnace steel is subject to this statement. It does not give results, in the ordinary tests,



much better than can be obtained with steel well made by some of the other processes; and the growing use of the electric furnace in steel foundries is due as much to the fact that it possesses certain technical advantages for the manufacture of high-grade small castings, as to the superior excellence of the steel made in it. We know, of course, that electric furnace steel is proving itself superior to other steels, as for instance, in rails subjected to severe winter weather. But the inevitable uncertainties of steel castings prevent our designing them on as close a margin as we do forgings, so that, as yet, the actual properties of the steel in good steel castings are quite as high as the trade desires. In fact it is quite possible to make a much better steel than there is a market for.

The most important special steels used in castings are chrome steel, nickel steel and manganese steel. The chrome steel used is generally of a very hard grade, and is furnished for crushing and grinding parts, such as stamp shoes, cement-mill balls, etc. Nickel steel is used in castings for the same reason that it is used in rolled and forged material, because a metal of high tensile strength and elastic limit and of good ductility is required.

Manganese steel is in a class by itself. It is unmachinable, quite strong, very tough, and extremely resistant to wear. It is used to resist almost all sorts of heavy wear and abrasion in crushing and grinding machinery, steam-shovel and dredge parts, railroad frogs and switches, etc.

The best way to secure satisfactory castings is to prescribe the tests that the metal must meet, such as strength, ability to withstand a certain hydraulic pressure without developing leaks, machinability, etc., and leave the composition to the maker, who can generally be depended upon to choose the composition best suited to the requirements. The maximum sulphur, and sometimes phosphorus, content, may be specified, but the engineer should be careful not to go so far in this line as to unnecessarily embarrass the foundryman.

Electric or blow-pipe welding of blow-holes and shrink-holes in steel castings is now a practice recognized in specifications. If the defect is not so located as manifestly to make the casting unfit for use, and if the defect is properly repaired, a welded casting is perfectly satisfactory. The defect, however, should be really eliminated, not simply plugged. By opening a hole to the bottom with the flame or arc, much as a dentist prepares a cavity in a tooth for filling, and then filling it with metal that is welded to the partially fused walls of the hole, the casting can be made truly sound. The hardening effect of the high temperature and rapid cooling upon the steel adjacent to the weld, especially in medium and hard castings, and the stresses set up by the cooling of large welds, makes it essential, in a great many cases, that the casting be reannealed after welding. This is especially true if the welded face must be machined.

In general, the problem of making satisfactory castings is so intricate that the purchaser should beware lest he impose impossible conditions upon the foundryman. Specifications should be drawn so that they do not specify both the properties to be obtained and the method of obtaining them. Often, too, a casting is asked for that can not be made successfully at all unless the design is altered. The foundryman becomes, through long experience, an expert in the production of sound castings, and the good engineer should endeavor to co-operate with him and modify design (and

often specifications) in accordance with his suggestions. By so doing he will find, in the majority of cases, that he will secure far stronger and more reliable castings than if he gets on his high horse and refuses to listen to the foundryman, with the result that the latter just does the best he can, and turns out what he knows must be an inferior piece of work which he could greatly improve were his knowledge and skill called into consultation.

#### STEEL MAKING IN THE ELECTRIC FURNACE.

Progress in chemistry and metallurgy has kept pace with the world's ever increasing demand for steel, but the instrument with which to apply our knowledge has not always been at hand. At first it was possible to obtain steel-making materials in sufficient quantities and of such purity that steel of fine quality could be made by a simple process requiring little real technical knowledge. As the demand for steel grew, and with it the necessity of lowering the cost, the supply of pure material did not suffice to meet both these conditions. New processes were invented by which steel could be made by the elimination of deleterious elements in the raw material by the use of various chemical reactions. The Acid Bessemer, Acid Open Hearth, Basic Bessemer and Basic Open Hearth processes followed one after the other. Tremendous tonnages were made by these processes, but they did not displace the crucible when the highest grade was required.

All our processes required the application of heat, and all known means of applying heat carried with them oxidizing conditions from which we were not able to protect the material under treatment. We could eliminate objectionable metalloids and we could add alloys giving various striking and beneficial qualities, but our only means of getting rid of oxygen, for which steel has such a greedy appetite was by the introduction of materials which had a still greater affinity for oxygen, but which could never grasp the last traces of oxygen, and which left in the steel certain quantities of their own oxides.

Though the oxides in steel are often more deleterious than moderate quantities of the supposedly more objectionable elements, there has been more or less mystery about them because a ready and practiced every day method of measuring the quantities of these oxides in all the steel we make has not been introduced. But the reason why we did not succeed in making the highest grades of steel in large quantities was because of the lack of an instrument rather than lack of knowledge.

The discovery of the electric furnace gave us the instrument we require to make steel free from all the objectionable elements, including oxygen and sulphur. In this process we use a clean heat. Whether we employ the arc furnace or the induction furnace, the use of kilowatts instead of flame can in no way add oxygen to the metal. Certain elements, as carbon and phosphorus, must first be oxidized before their elimination, and it is necessary to introduce materials, such as iron ore, to give up their oxygen to the elements to be burned. When this is done we can proceed to purify the metal bath from all contaminating oxides, because an overlying slag is supplied which absorbs the oxides, which are in turn broken up, allowing the oxygen to unite with carbon and pass out of the furnace as a gas.

We have in the electric furnace not only a neutral or non-oxidizing condition, but a really reducing con-



dition. We are able to throw sulphur into a basic slag, as in the blast furnace, where the process is one of reduction, but with the conditions existing in the electric furnace we can eliminate the traces of sulphur which cannot be removed in the blast furnace.

Now that the instrument as well as the knowledge has been secured, the use of the electric furnace in steel making must become general unless some still more perfect method is devised, and provided that electric steel can compete with steel made by other processes in cost of production.—J. H. Gray.

#### IRON AND STEEL MARKET.

**Pittsburgh.**—The most important development in the steel trade is the placing of large orders for shell steel, for shipment in second half of 1917, which the steel trade regards as furnishing additional assurance that high prices and intense production are to continue through next year. By itself, the argument would not be conclusive, as the allies cannot take chances and if they needed steel would buy even though there were distinct possibilities of our steel market easing off next year. The continued pressure for steel from domestic buyers, the buying of pig iron for delivery in second half of next year at fancy prices, and various other circumstances tend to support the view that present conditions are not to be altered for the worse for another twelvemonth at least.

#### NICHOLS COPPER CO.

Almost two years to the day from the time it paid its last previous dividend the Nichols Copper Co. has resumed disbursements to stockholders with a declaration of \$4 a share to be paid late this month. Up to December, 1914, not less than \$6 per share was maintained for some time.

#### ORIGIN OF THE OPEN-HEARTH PROCESS.

It was in 1857 that Siemens invented the regenerative furnace, but not until 1861 did he take out a patent for what we now know as the open-hearth; and even then he did not see that a new problem had arisen and that his furnace had almost miraculously appeared just when it was needed, for the Bessemer process had just come into use and large quantities of steel scrap were being produced. Numerous attempts were made to "pile" and weld this scrap, just as always has been done with wrought iron, and schemes of this kind were quite common even in the early eighties; but the welding of Bessemer scrap at that time was out of the question, because practically all the output was rail steel, while a large proportion was too large to be made into any ordinary "bundle."

For a long time after the regenerative furnace had been in operation for heating purposes it was not realized that steel scrap could be melted on an open hearth, and large piles of crop ends and defective blooms accumulated without any practicable method in sight for their utilization. But in 1864 two brothers, named Martin, operated a furnace at Sireuil, in France, and worked out the method, which is so familiar to us to-day, of melting pig iron and scrap together. They obtained patents a year later, and for a long time it was the general custom to speak of the Siemens-Martin or, more briefly, the S. M. process; but to-day we commonly refer to it as the open-hearth. These patents for many years were the subject of litigation in this country, and it was not until after 1880 that the decision was given against the patentees. Pierre Martin died at an advanced age, in an obscure French

village where for many years he had lived in poverty. His last days were made comfortable by money raised by public subscription in Europe.—H. H. Campbell, in "Iron Age."

#### THE DUPLEX PROCESS.

As generally employed in the steel industry the Duplex Process, it is a combination of the acid Bessemer and the basic open-hearth processes. The acid converter oxidizes the silicon, together with the manganese and a certain portion of the carbon, the exact amount depending upon the practice. The blown metal is then transferred to the basic open-hearth furnace where the phosphorus and the remainder of the carbon is removed.

The Duplex process shortens the open-hearth purification by more than five-sixths of the usual period, giving a steel of the same quality as the straight open-hearth process.

The loss in the duplex process is greater than that in the straight open-hearth process, but this is largely due to the elimination of carbon, silicon, etc., in the converter, whereas the scrap in the ordinary open-hearth process has already withstood such a loss in its original conversion. To satisfy the slag in the Bessemer conversion, two per cent. of metallic iron is oxidized in the converter; this together with a small loss in "shot" and "spittings" are the only losses sustained in the duplex process not common to both processes, working with the same materials.—F. F. Lines.

#### ROLE OF ALUMINA IN SLAGS.

There has always been a bias among metallurgists in favor of assigning to alumina the role of base in the composition of the slags. This has been natural, as the textbooks on mineralogy assign to alumina in the composition of the silicate minerals the role of a base, with very few exceptions. Hence, not questioning the correctness of this authoritatively assigned basic function of alumina, expressed as such in all the orthodox formulas of these minerals, it seemed only proper and correct to consider  $Al_2O_3$  as a base in the artificial silicates, the slags. When this view played the mischief with the running of the furnace, this was ascribed to the innate depravity of alumina. You could support a little of it, but you must not allow too much of it, or it would get the better of you. That was about the practical conception in lead and copper smelting, using low furnaces, cold blast, low pressure, and under the necessity of keeping the fuel cost down.

Considering the composition and behavior of a number of slags it seems to me evident that in slags containing larger quantities of alumina, the alumina should be considered as an acid, replacing silica, and not as a base.—C. Henrich in A.I.M.E. Bulletin.

#### MERGER RUMORS.

Gossip is again busy with the projected merger of the Dominion Steel Corporation and the Nova Scotia Steel and Coal Company. It is now suggested that the latter may double its capitalization, and that then an amalgamation might be arranged on a basis of share for share. All along it has been held that the merger, if it came about at all, would be on a ratio of Dominion Steel for one of Nova Scotia. The market position of the stocks in question would appear to bear out this contention.

Sir Henry Pellatt has denied that he gave an option on 30,000 shares of Steel Corporation to the Ross-McKelvie Scotia Syndicate.



### CANTLEY ON SHIP BOUNTIES.

Colonel Cantley addressed the Maritime branch of the C. M. A. on steel shipbuilding. He said that the principle of bounty was practically accepted everywhere, but the method of calculation in Canada is obsolete and the amount too trifling.

"Our opinion is," said Col. Cantley, "that this bounty should be ten dollars per ton deadweight, calculated on say Lloyd's summer freeboard in the case of all sail or steam vessels. While in the case of steamers this should be supplemented by a further bounty of \$2.50 per indicated horse power for the propelling machinery, provided such machinery, viz.: propelling engines and the boilers are the produce of Canadian workshops.

"Among the various systems and methods of assistance to shipbuilding adopted by different maritime nations, it would seem to us that in view of the present situation in Canada, that that of Japan is best calculated to meet our needs, which is practically that suggested above. During a period of twenty years the commercial fleet of Japan has increased from 360,000 to 1,500,000 tons. Practically all the ocean mail boats acquired by Japan in the last five years have been built at home, and these vessels of some 8,000 to 13,500 tons cargo capacity, and are mainly, but not exclusively, engined by machinery constructed in Japanese workshops.

The duration of the bounty should be not less than ten years and fifteen may be necessary, but the period for which the bounty is to apply should be clearly stated and embodied in the act so that prospective shipbuilders would know for a certainty just what bounty payments in the aggregate could be depended upon, and the capital expenditure on plant account that they were warranted in making.

### GRANBY.

An important construction and development program has been mapped out for the coming year by the Granby Consolidated management. One of the chief items will be the addition of a converter to present smelting facilities, which will permit of the constant operation of the existing four furnaces and will further increase smelter capacity to about 100,000 tons of ore monthly. The converter will cost approximately \$300,000.

The new Granby has properties of excellent promise in and around Hidden Creek, its Pacific coast base. Development work on the Hidden Creek mine itself continues to show up very well, with new tonnages being constantly put into sight.

In one property, contiguous to Hidden Creek, at least 3,000,000 tons of ore have been shown up but not yet included in reserves. This ore will be treated by flotation, and experimental tests indicate a recovery of better than 90 per cent. The Midas mine in Alaska, which Granby bought several years ago, now ships from 3,000 to 4,000 tons of ore monthly. This averages 4 per cent. copper and carries about \$3 per ton in precious metals values.

High labor and supply costs have visited Hidden Creek the same as at mines in the United States, and this has had the effect of increasing copper costs from this property alone to a 10-cent per pound average. Eventually, however, the management believes that Hidden Creek will develop into one of the low-cost producers. With the proposed converter in operation a cut of fully three-quarters of a cent per pound is anticipated.

The Grand Forks property, one of the first low-grade mines in America to be profitably operated, is limited in life and dependent to a very large degree upon the continuation of high copper prices. Costs at this section of the Granby property have run up to 17 cents a pound, but it should be borne in mind that copper content of the ore has dropped from around 20 pounds per ton to 13 pounds per ton. Every advantage has been and will continue to be taken of the present high copper metal market to handle every available ton of ore in the Grand Forks property, for with copper above 25 cents a pound handsome profits can still be shown even on this low-grade material.

From its Hidden Creek mine and others along the Pacific coast and its prospective smelting equipment, Granby eventually should be able to produce at least 40,000,000 pounds of copper per annum at a cost of nine cents a pound, even under present high wage scales and extraordinary high prices for supplies of all kinds.—Boston News Bureau.

### ALGOMA STEEL.

In a statement to the shareholders, Alex. Taylor, secretary of the Lake Superior Corporation, says:

"The Algoma Steel Corporation reports that for four months ending October 31, there were reproduced 131,600 tons of ingots and 82,500 tons of finished material. Production has not quite come up to expectations, due to labor difficulties generally. Conditions, however, are improving and the results for the last few weeks have been more satisfactory.

"The output is practically sold up for the ensuing year. At October 31 the Steel company had approximately 380,000 tons unfilled orders on hand, the tonnage preponderating being shell steel and steel rails. Prices are satisfactory but profits on war material cannot be as high as in the States from the fact that heavy duties plus war taxes are payable in Canada, and in addition it must be kept in mind that the price of steel rails has increased but slightly in comparison with other steel products.

"The end of the year should see the finish of the more important construction work. On account of labor conditions, it is doubtful if beyond a third 75-ton open-hearth furnace any attempt will be made to embark upon further new construction; the most formidable of which yet to be undertaken is, of course, the development of the mills."

### FERRO-PRODUCTS.

Ferro-silicon and ferro-phosphorus were produced in Canada in electric smelting plants during 1915, the latter in small quantities only. Ferro-silicon, 50 per cent., 75 per cent., and 85 per cent., was made at Welland, Ont., by the Electro-Metals, Limited, and ferro-phosphorus at Buckingham, Que., by the Electric Reduction Co., Limited.

The total production of ferro-alloys during 1915, was 10,794 tons, valued at \$753,404, as against a production of 7,524 tons, valued at \$478,355 in 1914, and 8,075 tons, valued at \$493,018 in 1913. In 1912 the production was 7,834 short tons, valued at \$465,225, and in 1911, 7,507 short tons valued at \$376,404.

### DEVELOPMENT OF IRON MAKING IN THE UNITED STATES.

A bulletin entitled "The story of iron," which is to present a comprehensive review of the development of iron making in the United States, is nearly completed by J. L. W. Birkinbine, consulting metallurgical engineer. Its issuance in a few months is expected.



### STEEL OF CANADA.

At a regular monthly meeting of the directors of the Steel Company of Canada, Limited, a distribution of 4 per cent. was authorized on the ordinary shares of the company, to be paid out of earnings of the year 1916, on January 1st, 1917, to shareholders of record at the close of business December 16th, 1916.

At their meeting the directors authorized additional plant appropriations and considered the question of extension which will be incumbent upon the company to undertake in order to place it in a position to realize the fullest benefit from the expenditures and extensions already made and also having regard to the necessity of putting the operations of the company on the basis of the lowest possible cost of production to meet the competition which is inevitable when readjustment of trade conditions takes place.

### STEEL RAILS.

The annual production of steel rails in Canada has, since 1905, varied between 200,000 tons and 500,000 tons per annum, the greater part of which has been for home consumption, although during the past two years there has been some export, the quantity not separately recorded.

The annual imports of steel rails from 1895 to 1905 ranged between 50,000 and 212,000 tons, averaging about 125,000 tons. From 1906 to date, however, or since the establishment of rail mills at Sydney and Sault Ste. Marie, the imports have fallen to an annual average of 60,000 tons, the variation being between a minimum of 10,420 tons in 1915 and a maximum of 177,041 tons in 1913.

### DAVIDSON.

Announcement is made that Mr. D. R. Thomas, who has had seventeen years' practical mining experience, has been appointed mine manager of the Davidson Gold Mines, Limited, in Porcupine, and will be in charge of operations at the mine from now on. Mr. Thomas has recently been in the employ of the Moose Mountain, Limited, the big iron mining company at Sellwood, Ont., and is known throughout the Dominion as a very capable mining engineer. Prior to his connection with the iron industry, he was in charge of mining operations in British Columbia, and Mexico, where he had wide experience both in mining and milling of gold, silver and copper ores.

Mr. Frank G. Stevens, the new managing engineer of the Davidson, will divide his time between Toronto and Porcupine, so that he will be in direct touch with both the administrative and mining departments of the company.

### DOMINION MINES.

About two tons of high grade ore, running about twenty-five hundred ounces silver to the ton, have been bagged from the new vein found on surface at the Dominion Mines. The new vein runs east and west, cutting the Bilsky vein that runs north and south. The formation is Keewatin.

The new vein is from 1 to 3 inches in width and the ore shoot has been proved on surface for a length of 150 feet. Four or five other veins have been located, but these do not contain the same high grade ore.

When it becomes impossible to continue surface work the development underground of these and other veins will be undertaken through the old workings.

The Dominion Mines is owned by the Dominion Reduction Company.—Northern Miner.

### DOMINION STEEL.

With net earnings approaching 35 per cent. on the common stock, absolutely out of debt, the complete output for 1917 contracted for at fine prices, and that of 1918 also as good as sold, is the position of the Dominion Steel Corporation, semi-officially given out at the close of meeting of the directors. Although there was no official announcement, one of the directors stated that the chief business to come before the meeting was the announcement of the sale of the entire steel output of the corporation for the year 1917. This means more than the selling of the 1916 output, for the capacity of practically all the mills has been increased, and the increased output, with the enormous increase in steel prices, means that dividends on the common stock are coming rapidly within reach.

That the Steel Corporation is in a position to take full advantage of the general prosperity of the steel industry has been pointed out on several occasions by President Mark Workman, who points to their enormous ore and coal bodies as the real asset of the corporation.

When asked regarding rail business, a director stated that no rails were being manufactured at the present time, but that enquiries were coming in almost daily for rails for 1918E delivery.

### STEEL CO. PROFITS.

The Financial Times of Montreal is authority for the statement that, after a conference between the Canadian and American interests in the Dominion Steel Corporation, it has been practically decided to declare a dividend on the common stock in the course of a few weeks. The dividend, it is said, calls for 6 per cent. or better.

Discussing this phase of the situation, Mr. Workman says: "It is true that there is a good deal of cash available, business is very good, and it would be only fair to allow the shareholders to participate in the prosperity, but just when the directors will see fit to do this I cannot say."

The price of eight steel products across the line now average \$70 per long ton for the first time in the history of the industry. When the average was in the neighborhood of \$60 the ton interests identified with the trade asserted that quotations on various products were at or near the top, but just now there appears to be no steel man who is willing to say that the level will not be shoved still higher. The volume of new business in steel continues of record-breaking proportions in the United States, despite the great advance in prices, with many attractive foreign orders going begging for the reason that it is physically impossible for the mills to accept them.

### THE VISCOSITY OF SLAGS.

The fluidity of blast-furnace slags has for many years been the subject of much speculation and of theoretical deductions by operators and scientists, but no reliable conclusions had been reached because of lack of experimental data. The problem of measuring slag viscosity has been successfully solved, so far as the method, apparatus, and technique of measurement are concerned, through the development by A. L. Feild, junior chemist of the U. S. Bureau of Mines, of a new high-temperature viscosimeter. By means of this apparatus the viscosity of slags can be accurately measured up to a temperature of 2,900 degrees F., which is approximately 900 degrees higher than that used in previous viscosity measurements of any substance.



**ARMSTRONG, WHITWORTH OF CANADA, LTD.**

Armstrong, Whitworth of Canada, Limited started manufacturing of special steels in the latter part of 1914. The crucible steel plant has a capacity of 7 tons every 24 hours. The electric furnace department has a present capacity of 15 to 18 tons of steel every 24 hours. Two 6-ton electric furnaces are being added.

In the electric furnace department are made special alloy steels, including vanadium steel, nickel-chromium, chromium, chromium-vanadium. The steel made from these furnaces is very free from sulphur and phosphorus, and some of the above combinations yield a tensile strength of over 200,000 lbs. per square inch. The uses of these alloy steels are very varied, including: pistons either forged or cast in form; steel for automobile parts; dies, stamps, wire drawing plates, plungers for hot drawing, etc.

Hammers in operation are from 400 weight up to 3 tons capacity. The company is at present installing a 500 ton steam intensifier hydraulic press, also one each of the following: 2,000 ton, 1,000 ton, 600 ton, 200 ton, 100 ton hydraulic presses. These are for the manufacture of locomotive and car wheel tires, rolled steel wheels, heavy forgings, etc.

The rolling mill department will include one 9 inch mill; one 12 inch mill, one 20 inch mill. These mills are primarily for the manufacture of high speed and carbon tool steel.

The small-tool department is the largest and best equipped in Canada. All the tools, cutters, gauges, etc., manufactured are made from steel manufactured by the company, and the range of small tools covers every type either in the United States or abroad.

There will be in operation the middle of next year a new plant for the manufacture of locomotive tires and wheels. The buildings for this new addition are now completed and the installation of special machinery has commenced. This addition will be capable of turning out the largest size locomotive tires and rolled steel wheels suitable for the various railroad and tramway companies.

**HOLLINGER.**

A circular mailed out to shareholders of the Hollinger from the head office in Toronto, says in part:

"In order to make provision for the payment of the indebtedness of \$720,000 due the shareholders of Aeme, Millerton and Canadian Mining and Finance Companies, the directors of Hollinger Consolidated Gold Mines, Limited, have decided to offer to its shareholders 120,000 of the company's treasury shares at \$6.50 per share, the proceeds of which will not only take care of the indebtedness, but leave a substantial amount to apply towards wiping out the present deficit."

A further increase is shown in the production of the Hollinger Consolidated. In the regular four-weekly statement sent out by Mr. Percy Robbins, managing director, it is shown that, during that period, the gross profits were \$241,591.70, as compared with \$241,293.41 for the October period. The costs were \$3.64 per ton, compared with \$3.85 per ton for the preceding period. The mill ran 93.3 per cent. of the possible running time, treating 49,956 tons, compared with 49,770 tons for the October period, and the average value of the ore treated was \$8.62 per ton, compared with \$9.07. The milling costs were \$1.061 per ton compared with \$1.064. The greatest amount of ore was taken from the 200-foot level.

**FUTURE OF THE STEEL INDUSTRY.**

Elbert H. Gary, president of the United States Steel Corporation, in an address before the American Iron & Steel Institute, had something to say about the present business, and the future prospects of the steel business. He said in part:

It is well known that the steel business in America is better than ever before. Our concern is only for the future. Many believe there will be a continuance of large business for many months or years after the war closes, others think there will be a material recession. No one can certainly foretell. Obviously the wise man will husband his resources, keep within safe limits and avoid over-extension.

**NOVA SCOTIA STEEL.**

A despatch from New Glasgow, N.S., says that the Nova Scotia Steel and Coal Company has received a request from a large British shipbuilding company to supply it with its entire requirements of plates to enter into the construction of its ships. Before the war, these plates were secured largely from Germany, and were laid down on the English coast at a much lower price than they could be secured from either the United States or Canada. With so much business offering to the shipbuilding companies, many of them are anxious to effect arrangements that will result in their requirements being met at all times, and it is understood that this is one of the chief objects of the present visit of Col. Cantley to London. Roughly speaking, it is stated that this order would alone use up more steel than the Scotia Company is now using in all its undertakings for munitions work.

**TRETHEWEY.**

The Trethewey Mining Company, which owns ninety per cent. of the stock of the Rochester mine, and which has also a long lease on the property, has been working through the shaft on the old Lumsden property. Most of this work has been done on the 290-foot level. Some narrow but promising veins were found, and some of them developed with varying results. The one upon which most attention is being given now is over an inch in width and near the contact some ore running 2,000 ounces to the ton was taken out, and about two waggon-loads shipped. At the original property near the town the mill is running and ore is being recovered from the old veins and stopes. The company had an option on the Lucky Cross property at Swastika, but after considerable exploration had been done dropped the option.

**SCHUMACHER.**

According to F. L. Culver the Schumacher mine produced in November \$8,295.60. Working costs amounted to about \$15,000, leaving a small surplus. The heavy costs were due to the fact that a big development campaign is being carried out, including the sinking of the new shaft. During the month the shaft was sunk 63 feet to the 200 foot level. A station is being cut here and crosscuts will be started both north and south. The north crosscut is expected to cut a vein 40 feet from the shaft and to the south there is a vein about 60 feet away.

In the 115 drift on the 100 foot level the east face shows five feet of ore and on slashing the walls some excellent ore has been obtained.



## MR. DEWART ON GERMAN CONTROL OF METALS

At Belleville, Ont., on Dec. 6, Mr. H. H. Dewart, addressing the District Liberal Conference, made some interesting statements concerning German control of the metal industry, and the failure of Canada to prevent nickel from reaching the enemy. He said in part:

On Feb. 29, Mr. Meighen, as solicitor-general, from his place in the house of commons, stated: "I can categorically say to the house that not one pound of Canadian nickel has reached the enemy since the war began."

We know, and can prove to-day that this is not true.

What is the charge that we make, and how is it met?

1. We charge that the Deutschland has carried one cargo of Canadian nickel to Germany in August, and was loaded with another in November of this year, purchased in the United States "since the war began."

2. We charge that the Canadian and provincial authorities could have, and should have, taken measures to control our nickel output at Sudbury, from which the Deutschland's shipments came, and to secure its refining in Canada, as a Canadian industry.

3. We charge that the International Nickel Co. is an alien concern, with German affiliations and connections, and that the Merton firm in London, England, who are its export agents, are a firm with German and enemy affiliations, who should not now control, and never should have controlled the output and sale of our Canadian nickel.

4. We charge that the real reason for the failure to do anything in this crisis, which so imperatively called, and still calls, for action, lies in the close and sinister political connection, primarily of the Hon. Frank Cochrane, and secondarily of the Cochrane-Hearst-Ferguson combination with the International Nickel Co. We say it is evidenced by the fact that its subsidiary company, the Canadian Copper Co., has been allowed to escape without payment of an approximate \$2,000,000 of taxation which it justly owes to the Province of Ontario under the Mines Taxation Act, and which the Hearst-Ferguson-Lucas-McGarry-Hannapayne government has not only failed, but refused to collect.

There was no effort made to establish the refining of Canadian nickel in Canada which could have been enforced by the transfer of a unit of the New Jersey industry to Ontario within nine months after the war began by proper negotiation and pressure unless the International Nickel Company controlled the government.

The trouble was that the hands of the government were tied. They were relying upon the "friendly consent" and "friendly co-operation" of this alien corporation. There has not been one reason suggested by any apologist for the government for the nickel not being refined to the extent of our full Ontario output entirely in Great Britain and Ontario to-day.

Then we are told by Mr. Meighen that our nickel matte does not leave Canada without the license of the Canadian government. What good is the license of the government before the matte is exported when the control over it is lost as soon as it reaches the United States? It is not suggested that with this control there has been the least restriction placed upon the export of any portion of the nickel matte of the International Nickel Company to their own re-

finery in the United States or that one ton of it has been refined somewhere else than at the company's refinery in New Jersey.

What Mr. Meighen means by saying that the entire output of the International Nickel Company is under the control of the British Government's "Committee on Enemy Supplies" is something that will require a great deal of explanation as well as his suggestion of the approval of the British Admiralty and of the British Government.

Mr. Meighen's explanations now do not jibe with what Sir Robert Borden said last February in the house. It was the Canadian arrangements that had received the unqualified approval of the British authorities, according to him. In the same debate, according to Mr. Meighen, it was our arrangement with the International Nickel Company that was the effective safeguard upon which he relied. When Lord Cecil's earlier interview of the 14th October caused alarm it would be interesting to know what cable was sent to him to which he replied on the 22nd October, "That the British Government was perfectly satisfied with the precautions taken and arrangements made by the Canadian Government with respect to nickel." But another cablegram was thought necessary and the reply from the Hon. Bonar Law was received at Ottawa on the 29th November to Sir Robert Borden, through the governor-general, that the British Government had approved from the first of the arrangement made by the Dominion Government for refined nickel to American plants.

So the arrangement is not a British arrangement. The control is not British control. It is not the British Government's Committee on "Enemy Supplies" that is acting. The "arrangements" that are approved are those made in Canada, those referred to by Mr. Meighen in the house of commons last spring, and the only arrangements of which we have had any evidence were the inspection of the books by Mr. Graham Bell of the railway department at Ottawa over which the Hon. Frank Cochrane presides, his inspection being made with the "friendly consent" of the International Nickel Company.

The people are not satisfied with the "friendly consent" and "friendly co-operation" of the International Nickel Company, that has existed since the beginning of the war. Dr. Heinrich Albert, the fiscal agent of the German Government in the United States, was able to rely upon the same "friendly co-operation" when he was able, through German-Americans, to purchase in November of 1914 the nickel which went on the Deutschland in August last and the 360 tons with which it is now loaded on its way to Germany. We have been cursed both in Great Britain, in the United States and Canada with this "friendly co-operation" and "friendly consent" of alien enemies.

Mr. Meighen tells us that there has been a considerable import from the French penal colony of New Caledonia into the United States and that there is an American output as a by-product of copper ores in the United States, yielding approximately 100 tons a month. My information is that with the care that the French Government has taken when ever its resources are concerned, any New Caledonia ore that finds its way to the United States (formerly refined in Belgium) is refined by the United States Nickel Refining Company in New Jersey and goes to France, Russia and Italy. It is not refined by the International Nickel Company, nor is the nickel which is the by-product of the United States plants refined by the International



Nickel Co. The nickel or nickel matte refined by the International Company is our Sudbury ore. It is the ore of the International Nickel Company that was sold by that company to the fiscal agent for the German Government and that was loaded on the Deutschland. There can be no evasion, it was the product of our Sudbury mines. The indictment of The Providence Journal cannot be met by any flimsy alibi.

#### The Merton Company.

And now I come to the consideration of the Merton Company. "Can the Ethiopian change his skin or the leopard his spots?" Mr. Meighen thinks that he can. Let us see: The enemy firm of Merton & Company has undergone a change. The shares formerly held by German subjects are now held by British subjects. There is no doubt that changes have been made, that an attempt at reconstruction has been made, that the conditions in Great Britain may have led to the acceptance of this reconstructed firm for a lack of a better medium, but it is not a British firm even yet, and I shall give you reasons why no reliance should be placed in it by Canada, from authorities who will not be accused of being partisan:

No sooner had Mr. Meighen spoken in Toronto than we had a series of boiler-plate articles in The Telegram, The Star and The News, evidently paid for, each in the same strain, each contained the same information dished up in a slightly different form. One was from a gentleman who had two brothers at the front. Then The Telegram had an interview with "one intimately in touch with the nickel situation." But the Cochrane organ had its interview with a gentleman "well informed as to the facts in connection with the control of the Canadian nickel and the supervision exercised, etc." It was the same interview wherever you found it, but even before The Toronto Star published it, good Simple Simon as it is, it had editorially stated that:

"The explanation of the whole situation, as given in a speech by Hon. Arthur Meighen, will probably satisfy most people, whose interest in the matter is not partisan, that the Federal Government has been in full consultation with the Imperial government in regard to the nickel policy followed during the war, that the policy followed is, in fact, Britain's policy which the administration assists in applying."

Now "this inspired" interview tells us in each case before the war Merton & Co. was controlled by German shareholders to the extent of 55 per cent. It bemoans the action of the prize court which "doomed Merton & Co. to suffer loss on these shipments of \$1,500,000."

But we are told that the "British authorities" had to choose between maintaining the efficiency of the Merton & Co. organization for its own benefit or allowing that organization to disintegrate. The British Government decided to maintain the Merton & Co. organization. The kindly disposed British Government put in auditors to establish the value of the German holdings, our enemies were paid off on the basis of \$1,000 for every \$500 of par value in the shares that constituted the 55 per cent. of German ownership in the company. So that despite the laws against trading with the enemy the British Government permitted the German shareholders in Merton & Co. to get \$2 for every \$1 that they had invested.

Is the Australian Government satisfied in 1916 to renew relationships with Merton & Co.? Let us see. On the same occasion on which Mr. Richard Reid, the Agent-General for Ontario, spoke on the 4th March,

1916, Hon. J. G. Jenkins, who was from 1905 to 1908 the Agent-General for South Australia in Great Britain, and formerly a member of the cabinet in Australia, spoke for Australia. He spoke as an imperialist of the school of Joseph Chamberlain, and said:

Hon. J. G. Jenkins: Reverting to the mineral trade that went to Germany, I may tell you that the government there saw practically what had been done, that contracts had been entered into with different companies in Australia, binding them for a certain number of years, and to suspend operations in case war broke out. In that they showed that they anticipated war. It was a very clever contract. But our Australian politicians said: "If these contracts are not illegal, we will make them illegal." And they passed an act of parliament to cancel them, root and branch. Have our people cancelled them here yet? Not yet. They are considering it. They are waiting to see. They are too good to be hurried, some of them. They want to be so exceedingly just and upright. They don't want to hurt the feelings of these pious German spelter manufacturers and bomb dropers. "We must look at it very cautiously," they say, "and we must do nothing which would create any impression that we are doing an injustice to these people. I do not believe for a moment that there is any injustice in endeavoring to do justice, which is what we want to do, and I hope there will be sufficient force brought to bear on our government to compel it to see the necessity of absolutely doing away with these unfair agreements with enemy countries.

I have a further witness to call. I call the Hon. W. M. Hughes, the Premier of Australia. He delivered a speech in the house of commons at a luncheon given by the United Kingdom of the Empire Parliamentary Association, the Hon. Bonar Law, secretary of state for the colonies, presiding. There have been such frantic appeals for the endorsement of Mr. Bonar Law recently that it is interesting to know what Mr. Hughes said in his presence with reference to this firm of Merton & Co., and the whole German situation. I make no apology for quoting his pregnant words in their entirety from The Empire Review, April 1916:

"Well, when war broke out, and Australia, in common with the rest of the Empire, rallied to the standard, it was found that the great metal industry of Australia, the source to which the Empire might have looked for a supply adequate even for its abnormal needs, was so completely dominated by German capital and German influence, that the choice seemed to be only between complete paralysis of the industry, shutting down of the mines, the throwing out of employment of thousands of workmen, or supplying these metals to those agencies of Germany through whom alone the Australian companies were permitted by their contracts to sell their products, and through whom alone Britain could buy them.

"The German agencies of whom I speak were not situated in Germany, but in London! They were legally considered, British firms. Actually, they were, for all practical purposes, German. Under the cloak of naturalization, our enemies were within the very heart of our citadel. For it is literally true, although it has been questioned, that for nearly twelve months after we were at war with Germany, the British Government could only buy Australian lead, or any other, from a German firm! It may be said that it was an English firm. Legally, it was and is so. In essence



it was German. It was a tentacle of that great German metal octopus that, with its heart at Frankfurt-on-Main, the headquarters of the Merton group, had got the earth in its grip. I am not concerned with the precise nature of the relations between the heart of the Frankfurt octopus and its London tentacles. They are immaterial. I am not concerned with appearance, but with reality.

"That in the great German commercial and industrial conquest of the earth, the way of the German was that of the serpent and the dove, I know very well they cooed soothingly, but wormed themselves into the heart of our citadels. They always assumed the nationality of the country they intended to despoil and betray. It was such a ridiculously easy thing to impose upon the generous hospitality which we extended to all the nations of the earth. In England, the Frankfurt group is represented by an "English" firm; in the United States, the octopus calls itself the American Metal Company, in Africa, the African Metal Company; and, in Australia, the Australian Metal Company. What is in a name? Nothing. Or in an oath? Nothing. They took the name best suited to serve their purpose and the oath of naturalization as lightly as other men say "Good-bye." The certificate of naturalization was to them a scrap of paper.

"I have mentioned lead and zinc but only because they are typical. When war broke out, German influence controlled all copper interests; it owned or controlled the spelter works in Great Britain. And this German taint ran like a cancer throughout the fair body of British trade and commerce. And it was daily spreading. What an intolerable insult to our pride as British citizens it was and is, that Germany should have such a hold over our trade, that we should have actually been compelled to buy the raw material for munitions from German agencies at prices practically fixed by them, and that we should have had to pay £90 to £100 for spelter in America, while Germany was able to get it at £30, and this spelter which she got at £30 was largely from Australian ores. To kill Englishmen and Australians too, with ammunition made from Australian ores, and at the same time to compel the British Government to buy its ammunition through German agencies at three times the normal price, was admittedly a master-stroke.

"Well, what are we going to do about it? To bewail the past is futile, but not to learn wisdom from the past is criminal."

The premier of Australia had a right to speak. He had acted and had acted promptly. He had shown himself keenly alive to the necessity of preserving Australian lead and zinc for Imperial use. But we did nothing with the vastly more important nickel that we should have controlled in Canada. In Australia, the power of the German metal trust was utterly broken.

Let me quote from The Montreal Daily Star of Nov. 2, 1916, from a special report by its Australian correspondent.

"The attack on the German metal octopus, which was first made by Prime Minister Hughes of Australia, has excited eager attention all over the world. It is not too much to say that the manner in which this campaign was instituted and carried out and pushed, in spite of tremendous obstacles, to a successful conclusion, first revealed the strength of the Australian prime minister, and no doubt introduced him to the world at large.

"It would take up too much space here to deal with all that Australia has done in ousting Germany from the metal industry, but some of the bigger details are briefly stated here. Following quickly upon the heels of the unmasking of Germany's position came in rapid succession a number of parliamentary acts which completely cut the industry out of the hand of Germany. And it is not too much to say that as far as Britain is concerned, never again will Germany control the metal market of the world."

Realize what this means. Our great sister dominion over the seas, the Commonwealth of Australia, took the lead and the over-burdened British Government was keenly appreciative of the relief that Australia gave her in the great emergency. What were the methods that Australia adopted? They included the cancellation of all mineral and metal contracts with enemy companies and firms, the dissolution of the lead and zinc combines in Australia that were controlled by Germany and the destruction of all enemy agencies controlling tin and all other metals.

It was a master stroke, for the previous German control had "affected not only the producer and the consumer in Britain and elsewhere, but by fixing the world's price for the metals and limiting output, it directly controlled and affected employment and wages." Such is the testimony of an impartial witness. What Australia did Canada could have done and should have done.

What was the result? Hon. Mr. Hughes was able to enforce a comprehensive scheme, covering the whole of Australia, whereby Great Britain became a buyer for at least ten years of all Australia's essential mineral products. Mr. Hughes did not ask the British Government to protect Australia. He protected Australia and the British Government, and in so doing rendered a magnificent service to the empire.

Has the Australian Government resented its action? Does it desire to return to the kindly care of the re-earned Merton firm? The Toronto World, which has blazed the trail in this whole nickel investigation, published on Saturday last, the 2nd day of December, an extract from Lord Northcliffe's paper, The London Daily Mail, of important significance as to this very firm.

A question was raised in the house of commons on Nov. 8, 1916, regarding the status of the Merton Company. "with its two naturalized British subjects" who had changed their names from Langebach and Schwartz to Lang and Staton. The London Daily Mail cabled for Premier Hughes' view and the reply came in a cable message from Sydney, N.S.W.

The text is as follows:

Sydney, Saturday, Nov. 11.

With reference to Mr. Pretyman's answer in the house of commons on Tuesday regarding the application of Messrs. H. R. Merton & Company, metal brokers, for reinstatement on the ground that the German interest had been eliminated, Mr. Hughes, the premier, says:

"Messrs. Langebach and Schwartz are still enemy subjects, except for the cloak of naturalization. I do not hesitate to say that Merton's is an enemy firm, the naturalization being a shallow artifice deceiving nobody who is not anxious to be deceived. The commonwealth government refuses to recognize them."

Mr. Hughes added that one condition of the zinc contract with Britain was that only British-born subjects should handle Australian metals and that therefore Mertons were clearly ineligible for reinstatement.



The inert Canadian Government must have learned that Australia would have no Merton dealings.

So it was necessary to get a certificate of character for this firm in Great Britain. Premier Borden appears to have sent an urgent message. The reply comes from the Hon. Bonar Law, who had presided, without comment, when Premier Hughes delivered his telling speech in London last spring. Let Sir Robert Borden take such comfort from the reply as he can. This is what Bonar Law now says, on the 29th of November:

"Mertons have eliminated the enemy holding in the company, with the approval of the board of trade. His majesty's government, therefore, utilized the services of this company, which have assisted in securing government control of metals. Such control, owing to pre-war conditions, could hardly have been secured without their help.

"(Signed) Bonar Law."

"Such control, owing to pre-war conditions, could hardly have been secured without their help." But the Gordian knot could and should have been cut here in Canada for we are in control of the situation. It was to Canada that Great Britain looked. Of course, our "arrangements" were approved. So were those that Australia adopted. But why did Canada not submit the same measures for adoption that Australia did? The way was made clear for us by Australia. Only a political reason can possibly account for Canadian impotence and inactivity.

There are others besides the Premier of Australia who will not tolerate the German Merton firm, or any other enemy firm with an English veneer. Men in public life in England speak out. Criticism is not considered a badge of disloyalty there. Men do not hang on to the government benches and defy public opinion. The present political crisis there is due to insistence that things shall be done right. It is not Liberal leaders, such as political flag-wavers like Mr. McNaught profess to despise, but the ultra-Unionists who are speaking out there, as we are speaking out here.

There is a great deal of feeling about the laxity of the government in eliminating German and enemy influence in this country. Let us not care about what was done in peace time. We have had our eyes opened now. Let us do what is necessary.

In the face of this mass of testimony, Sir Robert Borden must stop apologizing for the Merton firm, with the International Nickel alliance. It is not loyal enough for Australia. It bears the taint that Sir Edward Carson has exposed. "The unseen hand of the Hun" is now made visible to the people of Canada. The defence must be abandoned.

The clear evidence of The Providence Journal, tracing the nickel of the Deutschland's cargo to the International Nickel Company, and to our mines at Sudbury, stands unimpeached. Until they disprove or displace this testimony, there can be and there will be no confidence placed in either the Borden-Cochrane or Hearst-Ferguson government in their alleged "control" of the nickel situation.

This is no alarmist cry for partisan effect or advantage. We owe a duty to the men at the front. While they are fighting our battles at the front, we can at least protect their interests here. They will have a right to demand from us an account of our stewardship when they return. It is not even now too late to make tardy amends for past mistakes. As Sir Edward Carson says: "We have had our eyes opened now. Let us do what is necessary."

#### GOLD MINES OF KIRKLAND LAKE DISTRICT.

The December 2nd number of the "Northern Miner" has a special article on "Northern Ontario's Second Gold Camp, Kirkland Lake." Some extracts from this follow:

There is now one dividend paying mine in Kirkland Lake, the Tough Oakes. The Tough Oakes was placed on a dividend basis a year ago and has already paid \$260,750.

The biggest handicap to Kirkland Lake has been inability to secure sufficient electric power. The Kirkland Lake district is close to the height of land and therefore any water power developments in the vicinity must be small. A few months ago the Northern Ontario Light and Power Company started construction on a transmission line from Cobalt, where the company has a surplus. This line will be completed by February when the needs of the camp will be completely met.

Until the development of the Tough Oakes got well under way, there were many skeptics regarding Kirkland Lake, more than on Porcupine in its same stage. The camp is essentially different from Porcupine and probably most other gold camps. The veins are narrow as far as quartz goes, values running sometimes several feet into the country rock, though the developments on the 300 foot level of the Kirkland Lake Gold Mines, where a body running about forty-five feet wide was cut, would indicate that the narrow quartz leads cannot be considered a rule. Practically all the veins found though have shown very little quartz, a large percentage of gold being in the country rock. The ore shoots are as a rule exceedingly rich. Some fine specimens showing free gold.

The Tough Oakes mill treats about 120 tons of ore a day. This ore averages around twenty three dollars per ton, or considerably over twice the average value of ore treated in Porcupine. On the other hand costs are considerably higher because of the selective mining policy that has necessarily been adopted. When more power is available in February, and auxiliary power developed by steam fuel costs about \$100 per horse power, a big development program will be launched. More drills have been put in operation on development work recently, but considerably more will be in commission then.

The present development of the Tough Oakes is to a depth of 500 feet. The Sylvanite, adjoining the Tough Oakes, will be in operation shortly. The Wright Hargraves, further west started up a short time ago and work to date has been very encouraging. The main vein was uncovered on surface and is showing up exceedingly well. The actual development of the property will be started shortly.

The Lake Shore, which up to recently was financed almost entirely by private capital, has developed a considerable quantity of ore. The mine was closed down in the summer to install a larger surface plant. Shortly before closing down an ore shoot of spectacularly rich ore was found on the 300 foot level. This is now being developed by a raise, which work is steadily adding to ore reserves.

The Lake Shore is one of the companies planning to build a mill in the Spring. It will probably be of about the same capacity as the Tough Oakes.

Adjoining the Lake Shore is the Teek-Hughes. Some time ago the Nipissing Mines took an option on the property but abandoned it, supposedly because of what was considered a high purchasing price. Since then directors and others interested in the Buffalo



Mines of Cobalt have accumulated considerable of the company's stock; bonds have been issued and a mill constructed. The mill will probably treat about sixty tons a day, though increased production was allowed for in its construction. While awaiting electric energy from Cobalt, the Teck-Hughes management has been steadily developing the property, connecting up different workings, and now quite a quantity of ore is ready for the mill. Most of the development work has been done on the 200 foot level.

Less than a year ago the Beaver Consolidated of Cobalt took an option on the Kirkland Lake Gold Mines. At that time a shaft was down about 75 feet. This shaft was continued, cross-cutting and drifting to a depth of 400 feet. On the 300 foot level a remarkably large body of ore was encountered. In the cross-cut it shows about forty-five feet of ore running around nine and ten dollars to the ton. This vein was also cut on the 400 foot level, and while it is hardly known yet what the vein will amount to at that depth, it has been broken into for several feet. So encouraged has the Beaver been by the result of its work that it is understood that the option will be taken up and a mill erected next summer.

Another Cobalt company, the La Rose, has optioned the Hurd claims south-east of the Lake Shore, and is preparing to test out the properties. A short distance to the west of that group, camps have been built by the recent purchasers, Rochester interests, on the Minaker claims.

The sale of the Elliott Bagshaw group to the same interest has been announced. These claims adjoin the Kirkland Lake Gold Mines. A plant will be taken in and the development of the property undertaken.

Further north the La Belle Kirkland Mines has been steadily developing its property at Goodfish Lake. That section is somewhat different from Kirkland Lake in that the veins are considerably wider. The development work carried on by the company has blocked out considerable ore and diamond drilling will be carried on during this winter. If diamond drill results at depth are as satisfactory as those met with in workings to a depth of about 300 feet, a mill will be built on the property next year. The gold is usually found in narrow stringers in sufficient quantities to make the whole milling ore of a good grade.

#### MURRAY MOWGRIDGE.

A force of men have been at work for some time on the Murray-Mowgridge property at Wolf Lake. A road has been cut in from the railway for taking in machinery and supplies and timbers for the new head-frame are being taken out and framed.

Plans are being outlined for the development of this splendid property on a big scale, which includes the deepening of the present shafts and developing from greater depth. Already there is a large body of ore assaying \$10.05 developed on three sides. The veins will be proved to depth, after which it is proposed, as is the usual method of procedure, to erect a mill. It is probable however, that for sampling and testing purposes only a small 5 stamp mill will be erected on the property.

The property is situated on the shore of the lake so that an adequate water supply will always be available. The property is between three and four miles from the station at Bourke's and can be reached by boat from the railway.—Cobalt Nugget.

## PERSONAL AND GENERAL

Mr. J. E. Spurr and Mr. George R. Bancroft of the staff of the Tonopah Mining Co. Engineers, were in Telkwa, B.C., in the Omineca mining district, in November.

Mr. H. C. Carlisle of the staff of the Tonopah Co's Engineers, at The Pas, Manitoba, is taking a holiday in New York and Philadelphia.

Professor Wallace and De Sury of the Geological Department of Manitoba University will deliver a series of lectures on Geology and Mining in the Pas during December.

Mr. M. W. Summerhays, manager of the Porcupine Crown mine, examined the Tash-Orn property in the Kowkash district recently.

Mr. J. B. Tyrrell left Toronto Dec. 8 on a professional trip to the East Kootenay district, B.C.

Mr. J. G. Sipprell is at New Glasgow in the employ of the Munitions Board.

Mr. Geo. Guess is working on a nickel refining process at the University of Toronto. He has had considerable success. The work is for the Ontario Nickel Commission.

President A. A. Cole of Cobalt, Mr. D. B. Dowling of Ottawa, Mr. T. C. Denis of Quebec, Mr. J. C. Dresser and Secretary H. Mortimer-Lamb of Montreal, were in Toronto on Dec. 18 for a meeting of the Council of the Canadian Mining Institute.

Mr. D. R. Thomas has been appointed manager of the Davidson Gold Mine, Porcupine.

Mr. A. A. Cole, president of the Canadian Mining Institute, addressed a meeting of the Empire Club in Toronto on Thursday, Dec. 21, on the "Importance of the Mining Industry."

Mr. H. E. T. Haultain is spending a few days in the Ontario corundum district starting a corundum concentrator.

Mr. Wm. Motherwell, a flotation engineer, after making investigations in Kootenay district of British Columbia, early last month left that province for Baker City, Oregon.

Mr. L. W. Oughtred, for some time past assayer at the Consolidated Mining and Smelting Co's Highland concentrator, at Ainsworth, B.C., is now superintendent, succeeding Mr. A. G. Monkhouse, who has returned to Moyie, East Kootenay, to again take charge at the St. Eugene, where the concentrating plant is being put in order for a resumption of milling operations after a long period of idleness.

Mr. J. D. Galloway, assistant mineralogist for British Columbia, is back in Victoria after having spent several months in the field, making investigations into mining conditions in country situated between the western part of Omineca mining division and the Lillooet district.

Mr. Alex. Robinson, formerly operating the Carmi mine, near Beaverdell, in Greenwood mining division of the Boundary district, British Columbia, and now manager of the Columbia Turk mine, 38 miles from Davenport, Washington, was in Trail, B.C., last month, in connection with the smelting of ore being shipped from Davenport to the Consolidated Mining and Smelting Company's works, at Trail.

Mr. A. W. McCune, of Salt Lake City, Utah, who is developing several mining properties in Ainsworth and Sloean mining divisions of West Kootenay, was in



those districts in November on one of his periodical visits to British Columbia.

Mr. Wm. Gardner, of London, secretary of the Tye Copper Co., left Victoria, B.C., early in December on his return to England, after having been on Vancouver island two or three months negotiating for either the sale of the company's smelting works at Ladysmith, V.I., or sale to United States men. It is understood the latter alternative has been accomplished.

Mr. W. J. Elmendorf, of Seattle, Washington, was in Victoria in the latter part of November advising the managing director of a mining company operating a promising mining property, situated in Portland Canal division of British Columbia, relative to its further development.

Mr. Paul W. Greyer, general manager, and Mr. Frank Breeze, superintendent, for the Columbian Mines Company, operating hydraulic placer-gold mines on Pine creek, Atlin camp, British Columbia left Atlin several weeks ago to spend the winter "on the outside," B.C.

Mr. Thos. R. Stockett, of Nanaimo, B.C., general manager for the Western Fuel Co., operating some of the most important coal mines on Vancouver island, went to San Francisco, California, late in November, on a business visit at the company's headquarters there.

Mr. J. H. Cunningham, of Ladysmith, Vancouver Island, B.C., who only recently returned from a visit to Nova Scotia, has resigned as manager of the Extension colliery of the Canadian Collieries (Dunsmuir) Limited, and has been appointed superintendent of the coal mines of the Nova Scotia Steel and Coal Co. He left Ladysmith for the East early in December. He has been succeeded at Extension by Mr. T. A. Spruston, who has been manager of the same company's No. 7 mine, Comox colliery, V.I.

Mr. Ferd R. Wolfe, of Spokane, Washington, manager of the Florence Mining Co., operating a silver-lead mine near Ainsworth, British Columbia, was at the mine last month. With the further development of the mine in progress and the construction and equipment of the company's concentrating mill nearing completion, the approach of a period of profitable production is hailed with confident expectation.

Mr. M. H. Sullivan, for the last four or five years assistant superintendent of the Consolidated Mining and Smelting Co.'s smelting works at Trail, B.C., has resigned that position to become superintendent of the Bunker Hill & Sullivan Co.'s new smelting works at Kellogg, Idaho, for which place he left Trail in the latter part of November. Before leaving he was the recipient of presentations made by respectively, those who were his associates on the Consolidated Co.'s staff, and residents of the town of Trail. The former gave Mr. and Mrs. Sullivan a solid silver coffee and tea service and the latter a gold locket to Mr. Sullivan. Mr. George Murray has succeeded Mr. Sullivan as assistant superintendent at the Trail smeltery.

Mr. Wm. Sloan, of Nanaimo, Vancouver island, has been made Minister of Mines for British Columbia, taking that portfolio in the new Provincial Government which Mr. H. C. Brewster, Premier, has formed. The term of office of Mr. L. A. Campbell, of Rossland, as Provincial Minister of Mines, though not lengthy, was marked by much activity.

Dr. Henry Mace Payne, consulting engineer to the Consolidated Gold Fields of South Africa, at the end of November, gave an illustrated lecture on "Gravel

Mining in the Klondike and Siberia," to a large audience in Spokane, Washington, under the auspices of the Northwest Mining Association.

Mr. Raleigh P. Trimble, who for several years has been actively associated with the development of mining properties in Omineca division, British Columbia, early last month left Prince Rupert, B.C., on his way south to spend a short time in Portland, Oregon.

Mr. B. A. Stimmel, testing engineer for the Consolidated Mining and Smelting Co., Trail, B.C., has gone to Chicago to watch the company's interests in connection with the treatment there of a quantity of lead bullion.

Mr. J. H. Rose, of Trail B.C., has been appointed metallurgist for the Mason Valley Mining Co. at its smelting works at Thompson, Nevada, for which place he left Trail early in December.

Mr. Henry S. Fleming, of New York, chairman of the executive committee of the Canadian Collieries (Dunsmuir) Limited, was at the company's offices in Victoria, B.C., during several days at the end of November.

Mr. Wm. Fleet Robertson, Provincial Mineralogist, and Mr. Thos. Graham, Chief Inspector of Mines, left Victoria, B.C., on November 30 for Fernie, Crow's Nest district, Southeast Kootenay, where they were to be joined by Mr. G. S. Rice, of the United States Bureau of Mines, who, with the consent of the Director, Mr. Van H. Manning, will conduct investigations in connection with the "bumps" that have occurred in the Crow's Nest Pass Coal Co.'s Coal Creek mines, with a view to making recommendations to the British Columbia Department of Mines as to what part, if any, of the disturbed area, may be worked again in coal mining without risk of disaster and possible loss of life.

Mr. Fred B. Ely, for some time a field engineer for Gunn-Thompson Co., was recently in New York city whence he went to Vancouver, B.C.

Mr. Frederick K. Brunton, metallurgical engineer, who years ago was assistant superintendent at the British Columbia Copper Co.'s smelting works at Greenwood, B.C., and afterward went to Cripple Creek, Colorado, has resigned from the staff of the American Smelting and Refining Co. at Garfield, Utah, to become assistant superintendent for the Consolidated Arizona Smelting Co., at Humboldt, Arizona.

Mr. John V. N. Dorr has been awarded the John Scott medal by the City of Philadelphia, acting on the advice of the Franklin Institute, for the invention of his classifier, thickener, and agitator. Mr. Dorr is president of The Dorr Company, hydrometallurgical and wet chemical engineers, of New York city, and Denver, Colorado.

Mr. Frederic R. Weekes, who during the earlier period of exploration of the group of mineral claims situated on Copper mountain, Similkameen, B.C., now being extensively developed by the British Columbia Copper Company, was resident mining engineer directing operations, has returned to New York city after having recently been engaged in professional work in British Columbia and California.

Mr. Bernard MacDonald, at one time in charge of important mines in Rossland camp, British Columbia, and since then actively associated with large mining enterprises in Mexico, is reported with other prominent mining men to have left Parral, Chihuahua, Mexico, for the Pacific coast, to escape Villa bandits, at whose hands they did not expect any consideration if caught by them.



## SPECIAL CORRESPONDENCE

### BRITISH COLUMBIA

While production operations continue to be adversely affected by a lack of sufficient coke, in Kootenay and Boundary districts, and by a shortage of power in the upper Coast district, it is still to be expected that both in quantities and total value of the minerals produced, the results for 1916 will show record figures, especially as regards value since there have again been increases in prices of some of the metals. The coal and coke totals will be unfavorably affected by the continued shortage of labor, both in the Interior and in the Coast coal fields, but the latter are making a good showing notwithstanding this drawback.

There is also good cause for satisfaction at the number of small mining properties on which development work is being done. In several of the older mining districts this change for the better is especially noticeable, and it may be expected that a result will be an increasing number of shippers of ore next year, as it shall be found practicable at more properties to transport ore to a railway for shipment to reduction works.

### EAST KOOTENAY.

It is stated that the Consolidated Mining and Smelting Co. has about 275 men working at its Sullivan lead-zinc mine, near Kimberley, Fort Steele mining division. In addition, the company is employing men at its St. Eugene mine and concentrator near Moyie, in the same division.

The threatened strike of coal-mine workers in the Crowsnest district of British Columbia and at most of the coal mines in Alberta where the mine employees are members of the United Mine Workers of America, took place on the night of November 26. At two mines, namely, at Corbin in British Columbia and at Drumheller, in Alberta, there was a probability of an interruption to mining coal being avoided. Corbin is said to be a non-union camp; beside, much of the coal mined there is handled by steam-shovel in open workings, there being a large deposit of coal occurring near the surface with very little cover. Telegraphed advices from Ottawa on November 30th indicated that work would soon be resumed, representatives of the mine operators and workmen, respectively, in conference with some of the Federal ministers and officials at Ottawa having come to an agreement under which the miners would resume work until the matters in dispute shall be arranged between the operators and employees.

### WEST KOOTENAY.

**Ainsworth.**—The Kaslo Kootenaiian states that mining, or rather quarrying of ore at the Comfort mine, which is situated on the Bluebell peninsula, across Kootenay lake from the town of Ainsworth, is being continued with no diminishing of the extent or value of the ore body. Mr. A. D. Wheeler is well satisfied with the result of the work so far. Results from diamond drilling, already arranged for, will be a guide in determining the best means to be adopted for further working, and will, it is expected, indicate whether or not the erection and equipment of a concentrating mill will be warranted. As only handsorted ore is shipped to the smeltery, there is an increasing accumulation of milling ore on the dump. The Comfort and the neighboring Kootenay Chief claim are owned by the Ainsworth estate, and Mr. Wheeler has a contingent interest.

The Florence Mining Company's mill building at Princess creek, between the Highland mill and Woodbury creek, is almost completed and installation of the concentrating plant is in progress. The concentration department of the plant at Kaslo is now being operated, as well as the magnetic separation part which was started several weeks earlier. Good results have already been obtained from the latter and it is expected that a high-percentage recovery will be made by the concentrated machinery that has been installed.

**Slocan.**—About 30 men are working at the mine of the Consolidated Noble Five Company, above Cody, where a fine shoot of ore has been opened by a long adit to the vein and then a drift, at a depth of nearly 3,000 feet from the outcrop of the vein on the mountain above.

The new concentrating mill put in by the owners of the Surprise mine on the site of the old Ivanhoe mill, destroyed by fire in the summer of 1915, is reported to be operating. In 1915 the Surprise output of silver-lead and zinc ore was of a gross value of approximately \$500,000. For about a year, though, there has not since been any production, mine operation having been restricted to further development pending erection and equipment of the concentrating mill.

The Norman Mines Co., a Spokane, Washington, syndicate, has taken under lease and option of purchase the Madison group, on Reco mountain, above Cody. The group consists of the Madison, Argenta, Great Eastern, and Mardon Fraction claims. No work has been done on these claims for a number of years, but when they were being worked there was shipped 400 to 500 tons of ore, stated to have averaged about 200 oz. silver to the ton and between 20 and 30 per cent. lead. There are five adits on the property, which is opened to 300 feet in depth. Cleaning out the old workings has been commenced.

**Nelson.**—Several weeks ago the manager of the Yankee Girl mine, near Ymir, gave the following information concerning that property. Another 100 ft. of work will probably open the vein in the granite at a depth of 1,300 ft. on the dip. This vein in the upper levels yielded ore containing an ounce of gold to the ton and a little lead and zinc. The quantity of lead was occasionally sufficient to be paid for by the smeltery. A stringer of ore cut recently contains 17 per cent. lead in addition to the gold. The mine has been opened at four levels. A shoot of ore having an average width of 5 ft. was intersected by a 1,400 ft. cross-cut adit; it was followed in a slate formation for 450 ft.; its gold value varied from \$6 to \$7 a ton. Mill runs have shown that this ore will yield readily to an inexpensive method of treatment with cyanid.

At the Foghorn mine, situated about nine miles east of Ymir, a diamond drill is being operated from the face of a 1,100 ft. cross-cut adit in the Foghorn mine. It is estimated that the vein will be reached at about 900 ft. from the face of the adit, and two-thirds of that distance had been drilled by the middle of November. The drilling is costing \$4 a foot. The ore occurring on the Foghorn contains gold, similar in character to that in the neighboring Wilcox mine, on which much development was done two or three years ago.

**Trail.**—The Trail News says: When the electrolytic copper refinery of the Consolidated Mining and Smelting Co. at Trail was completed a short time ago, with



a capacity of producing about 10 tons of refined copper a day, it was thought to be ample for all present requirements. Already, however, the decision has been reached to enlarge the refinery, now the only one in Canada—and it will at once be made approximately 50 per cent. larger. The present copper refinery building is a steel and fireproof structure about 200 ft. long by 67 ft. wide. The length will now be added to sufficiently to allow of the copper-refining capacity being increased to about 15 tons of refined copper daily. Steel for the addition to the building is being prepared by the contractor, and the erection of the supplementary structure will soon be under way. It was found that with the product of the British Columbia Copper Co's smelting works at Greenwood, in Boundary district coming to Trail for refining, and more copper ore being received from across the International Boundary line for smelting, it would be well to have sufficient refining capacity to provide for whatever should come to Trail for treatment, additional to the copper output of the company's mines at Rossland. The British Columbia Copper Co's product is blister copper, about 98 per cent. fine and containing gold and silver as well. The electrolytic refining process at Trail separates these metals and gives refined copper, the gold and silver being parted from the residue.

#### VANCOUVER ISLAND.

Considerable development in copper mining in Cowichan district, which lies about midway between the Nanaimo coal field and the southern end of Vancouver island, may be looked for before very long, according to the Cowichan Leader, published at Duncan, the chief town of Cowichan district.

Ore has been shipped to the Granby Co's smeltery at Anyox from the Finlay property, situated about six miles west of Cowichan station which is on the railway between Victoria and Nanaimo, and being worked under lease by an Italian miner, Joe Galli. The shaft has been sunk to nearly 100 ft. in depth, and the showing of copper ore has improved to such an extent that it is proposed to employ more men at getting out ore, and to improve the shipping facilities at Cowichan bay, to which place the ore has to be hauled by horse teams eight or nine miles.

Near the Finlay claims are the Bluebell group, owned by an English company, and the King Solomon, which some years ago was acquired by Philadelphia men. Both these properties have lain idle for several years, following development that did not open any considerable quantity of ore. It is stated that an adit on the King Solomon, already in 700 ft., will during the ensuing winter be extended to a distance of 1,000 ft. from its portal, with the expectation of finding ore before the additional 300 ft. to be driven shall be completed. There are at the King Solomon a compressor, saw mill, and mine buildings for the accommodation of manager and men.

#### GENERAL NOTES.

News from the Lardeau is that many mining men have visited that district during the season now closing, with the result that several properties have been taken over and are now being developed. Lack of transportation facilities is a great misfortune, though since it prevents attention being given to anything but high-grade ores.

The Granby Consolidated Co's copper production in October was greater than in either September or August, having been 4,346,099 lbs. as compared with 3,440,-

035 in September and 3,218,847 in August. For the ten expired months of the year the total production has been 37,432,131 lbs.

As the silver cups offered by the Provincial Department of Mines for competition in the Kootenay and Boundary districts are only open to miners' first-aid teams, the Consolidated Mining and Smelting Co. has decided to offer suitable prizes for competition among all classes of men employed at its reduction and refining works. Particulars will be announced later; at present only a preliminary announcement is being made. The company some time ago facilitated the organization of Safety Committees at its Trail works and its Rossland mines. Now it will provide for similar first-aid competitions for its Trail employees as have already taken place between miners' teams at Rossland, and at which a team from its Le Roi mine won the silver cup offered by the B. C. Department of Mines for annual competition among mine employees.

#### THE McINTYRE MERGER

President A. M. Hay, in a letter to shareholders of McIntyre Porcupine Mines, Limited, says in part:

After prolonged negotiations, your directors have secured options in favor of this company for the purchase of all the property, plant and assets of the McIntyre Extension Mines, Limited, and for the McIntyre Jupiter Mines, Limited.

When the purchase of a controlling interest in the McIntyre Extension property was effected, its value for mining purposes was considered problematical. The immediate object in purchasing control was to secure the right of operating through the Extension (Main) shaft for the deeper development of the McIntyre property on the north side of Pearl Lake, which shaft had then already been sunk to a depth of 665 feet, and was furnished with all the requisite equipment for operating to a depth of 1,000 feet.

The operations carried on since then through this shaft have proven the existence of large and valuable ore bodies at a depth of 1,000 feet, not only on the property of the McIntyre company, but also on the property of the Extension company.

To deal with these ore bodies to the best advantage without bringing the companies into conflict on the policy of development, mining and milling, it is obvious that these operations should be combined in one company.

The purchase of a controlling interest in the McIntyre Jupiter Company was made on very favorable terms at a time when the Jupiter Mines, Limited, (the former owner) was not in a position to finance the undertaking. When the deal was made, the value of the ore in sight on the Jupiter property, thus rendered available for treatment in the McIntyre Mill, justified the purchase, apart from the possibilities of further ore development.

Recent operations on the Jupiter property to a depth of 475 feet, and on the Extension property to the west of the Jupiter boundary, at a depth of 1,000 feet, indicate that the ore bodies on Jupiter ground will be found to extend through its entire length in or near the contact between quartz porphyry and basalt, which extends from East to West for a distance of more than 2,500 feet on the Jupiter property.

Mr. R. J. Ennis, Manager of the McIntyre company, has been very desirous for some time of having a



consolidation of all three companies brought about, in order to prosecute a comprehensive and economical scheme of development and operation, which can only be carried out to the best advantage by operating the three properties as one. The difficulties incident to the proper apportionment of costs and receipts when ore is hoisted from more than one mine through the same shaft and treated in one mill must be apparent to all.

The directors of all three companies visited the properties during the past Summer, and came to the conclusion that consolidation was very desirable provided satisfactory arrangements could be reached. The matter was the subject of several conferences which followed, and it was finally decided that an examination should be made by an independent engineer with the object of arriving at a basis for further consideration.

Mr. C. D. Kaeding, Managing Director of Dome Mines, Limited, whose ability and experience, particularly in recent years in the Porcupine Camp, eminently qualify him for the task involved, was entrusted with the examination. Mr. Kaeding has submitted an exhaustive report, which, together with recommendations subsequently made by him at a joint meeting of Directors, has been used as the basis for the proposed consolidation:

An option has been secured from the McIntyre Extension Company to purchase that company's property and assets of every kind for 294,000 shares of McIntyre Porcupine Mines, Limited, being equivalent to one share for every 3-1-4 shares of McIntyre Extension Mines, Limited, in respect of 955,501 fully paid shares, issued and outstanding in shareholders, other than McIntyre Porcupine Mines, Limited.

An option has also been secured from the McIntyre-Jupiter Mines, Limited, to purchase that company's property and assets for 316,298 shares of McIntyre Porcupine Mines, Limited, being equivalent to one share for every three shares of McIntyre-Jupiter Mines, Limited, in respect of 948,893 fully paid shares, issued and outstanding in shareholders other than McIntyre Porcupine Mines, Limited.

Special general meetings of the shareholders of these companies have been called for the purpose of considering, and, if approved, ratifying the options, and will be held prior to the special general meeting of shareholders of this company, which has been called to pass upon the options above mentioned.

In the event of these options being exercised by the McIntyre company it will receive the full benefit of all operations of the subsidiary companies from their inception down to the date of transfer, and all agreements and obligations existing between the companies will be cancelled.

In the case of the Extension company, an immediate revenue will be obtained from the valuable ore now being developed on the 1,000 foot level which will become available when the equipment and transportation facilities now being installed, are completed about the end of the present month.

In the case of the McIntyre Jupiter company, all profits earned from the beginning of operations will become the property of the McIntyre company, while its obligations to furnish further working capital for the separate operation of the Jupiter property will cease.

The share capital of the three companies presently existing is as follows:

	Authorized.	Issued.
McIntyre Porcupine Mines, Limited.....	\$3,000,000	\$2,999,985
McIntyre Extension Mines, Limited.. . .	2,500,000	2,500,000
McIntyre Jupiter Mines, Limited.. . . .	2,000,000	1,898,893
	<u>\$7,500,000</u>	<u>\$7,398,878</u>

In the event of the company electing to exercise the options, its authorized share capital will be increased by one million dollars, of which 610,298 shares will be issued to complete the proposed purchases, leaving unissued 389,717 treasury shares, out of a total authorized capital of four million shares of the par value of one dollar each.

Your directors are satisfied that consolidation would not only facilitate the operation and administration of the properties, but would also materially increase their combined earning power, greatly to the advantage of the present shareholders in the McIntyre company.

The operating profits of the three companies for the months of October and November amount to over \$140,000, from a daily average of 413 tons of ore milled. After the first of January, when the new aerial tramway from the main shaft to the mill should be completed and in operation, sufficient ore will be available from the McIntyre and Extension properties to supply the mill to its recently increased capacity. Later on, when the ore bodies on the north side of Pearl Lake have been developed to greater depths, and when the Jupiter workings have been connected up with the main shaft, the production of ore will undoubtedly warrant a further commensurate increase in milling capacity.

I have pleasure in stating that conditions at the mine and the financial position of the company are now such as to justify the payment of dividends in the near future, and it is the intention of your directors to declare a dividend in January next, whether consolidation is effected or not. In the event of consolidation being effected, out of the profits earned by the subsidiary companies, the proportion which would otherwise accrue to the minority interests therein, will more than provide for the proportion of dividend applicable to the stock proposed to be issued for the purchase of these interests.

In a letter just received from Mr. Kaeding, dated Reno, Nevada, 28th Nov., acknowledging one advising him the lines on which the directors had finally agreed, he writes:

"I consider the arrangement to be a most excellent one, which is in every way equitable and highly desirable. From the standpoint of the McIntyre company it will give them a property with a very large area known to be mineral bearing and situated in the highest grade section of the camp. The properties are so situated that the required plant can be centrally located and the minimum amount of development done to secure a maximum result. I feel so optimistic about the future of the McIntyre Consolidated company that I urge your shareholders to ratify this arrangement without loss of time, thereby enabling the mine management to lay out a clear cut programme for the future."



**COLUMBIA SECTION, A.I.M.E.**

The Columbia Section of the American Institute of Mining Engineers, members of which are scattered over a wide extent of country covering Eastern Washington, Northern Idaho, and Kootenay and Boundary districts of British Columbia, held its annual meeting in Spokane, Washington, on November 25, when Mr. W. H. Linney, of Spokane, was elected chairman for the ensuing year; Mr. Oscar Lachmund, of Greenwood, B.C., vice-chairman; and Mr. L. K. Armstrong, Spokane (re-elected), secretary-treasurer. The retiring chairman, Mr. Stanley A. Easton, of Kellogg, Idaho, remains on the executive, to which Professor Selon Shedd, of the State College of Washington, Pullman, was also appointed. Messrs. Armstrong, Easton, and J. Cleveland Haas were appointed the committee on papers. Mr. C. G. Warfel, assistant professor of mining at the State College of Washington, read a paper relative to the electrical reduction of iron ore occurring in Washington and Idaho. Among other subjects discussed, flotation concentration had attention.

**OBITUARY.**

The following obituary notice on the father of Mr. T. A. Rickard, of San Francisco, California, editor of Mining and Scientific Press, was printed in that journal on November 11: Thomas Rickard died on November 2nd at Wimbledon, London, at the age of 85. He was a son of Capt. James Rickard, who came to California for John Taylor & Sons in 1850 to examine the Mariposa grant. As the senior member of the firm of Rickard Bros. he will be remembered by the older generation. A Cornishman by birth, a keen observer, a remarkable linguist, and an engineer of world-wide experience he played a leading part in the profession thirty years ago. Before practising as consulting engineer he was manager of important mining enterprises in Italy, Spain, Russia, and South Africa. The older engineers will recall his fine presence and courteous manner, as well as his wide fund of information. To them the news of his death will come like a regretful echo from days now far in the background of events. He was the last and the eldest of five brothers, William Henry, Richard, Reuben, and Alfred, all of whom played a notable part in mining, in our West as well as in other regions. He is survived by three sons, T. A., Forbes, and Herbert, and by three daughters, one of them the wife of F. W. Baker.

**MINING ON VANCOUVER ISLAND, B.C.**

Mr. S. I. Silverman, of Seattle, Washington, is now working two mines on the west coast of Vancouver Island, B.C., namely, the Jumbo, on Deer creek, and the Indian Chief, on Sidney inlet, both in Clayoquot mining division. Twenty-five men are employed and between 20 and 30 tons of ore is being taken down to bunkers daily. The ore on the Indian Chief contains bornite; the property was held for years by the late Hon. Edgar Dewdney, and was at one time under option of purchase to the Tye Copper Co., which did a lot of development work on it.

Numerous other properties on the west coast are also being further developed, among them the Monitor, on Alberni canal, which had long been idle, and the Yreka and June group, both in the neighborhood of Quatsino Sound. The Merry Widow and Old Sport groups, situated in the Elk Lake region, Quatsino mining division, were under bond in 1913 to a Spokane syndicate, at the head of which were Messrs. Conrad and F. R. Wolfe, of that city. Later the bond was transferred to representatives of the Stewart Mining Co. Quite

lately the Coast Copper Co. was incorporated to acquire these properties; it is understood that the controlling interest is now held by the Consolidated Mining and Smelting Company of Canada, Ltd., and that included in the plans for operating these properties is the provision of transportation facilities by the construction of a railway or surface tramway to tidewater.

In 1914 much work was done in road-making to allow of machinery being taken to the property, a 5-drill compressor was installed, and a lot of diamond drilling was done, there having been about 30 men employed.

The local mining record reported for 1915 that "the work done this year at the Old Sport mine, owned by the Quatsino Copper Company, Ltd., consists of driving a 500-ft. tunnel, which cut through a 25-ft. ledge of low grade copper ore at a depth of 135 ft. Stripping and crosscutting on surface exposes the ledge to the extent of more than 3,000 ft. The property shows up well under development, but, owing to some financial troubles, the company decided to suspend work in August." The Consolidated M. and S. Co.'s engineers have examined the property, so that it is evident they think well of it, since the company has since become interested in it, as above stated.

Numerous prospectors are working on the west coast, and some good showings of ore have been opened, but there is great need of miners for the development of properties where there is money available for doing this work.

**TORONTO MARKETS.**

- Cobalt oxide, black, \$1.05 per lb.
  - Cobalt oxide, grey, \$1.15 per lb.
  - Cobalt metal, \$1.25 to \$1.50 per lb.
  - Cobalt anodes, \$1.50 to \$1.75 per lb.
  - Nickel metal, 45 to 50 cents per lb.
  - White arsenic, 5½ to 6 cents per lb.
- Dec. 11.—(Quotations from Canada Metal Co., Toronto)—
- Spelter, 15 cents per lb.
  - Lead, 9½ cents per lb.
  - Tin, 48 cents per lb.
  - Antimony, 18 cents per lb.
  - Copper, casting, 36½ cents per lb.
  - Electrolytic, 38½ cents per lb.
  - Ingot brass, yellow, 22 cents; red, 24 cents per lb.
- Dec. 11.—(Quotations from Elias Rogers Co., Toronto)—
- Coal, anthracite, \$9.00 per ton.
  - Coal, bituminous, \$10.00 per ton.

**SILVER PRICES.**

		New York, cents.	London, pence.
November	23.....	73¼	34½
"	24.....	73¼	34½
"	25.....	73½	35½
"	27.....	74	35½
"	28.....	73¾	35½
"	29.....	74¾	35½
"	30.....	....	35½
December	1.....	75¼	35¾
"	2.....	75¼	36
"	4.....	75	35½
"	5.....	75½	36½
"	6.....	75½	36½

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CANADA



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22. If not, why?.....			
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