

# THE CANADIAN MINING JOURNAL

VOL. XXX.

TORONTO, August 15, 1909

No. 16

## The Canadian Mining Journal

With which is incorporated the  
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the  
**MINES PUBLISHING CO., LIMITED**

*Head Office* . . . Confederation Life Building, Toronto.  
*Branch Offices* Montreal, Halifax, Victoria, and London, Eng.

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**SUBSCRIPTIONS**—Payable in advance, \$2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, \$3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the 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.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

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

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## THE INFLUENCE OF THE RAILROADS OF THE UNITED STATES AND CANADA ON THE MINERAL INDUSTRY.

To that distinguished philosopher, Dr. James Douglas, the mining world acknowledges a large debt. He is one of that small class of thinkers who can infuse life and meaning into the dry bones of statistics. A sane advocate of the conservation of natural resources, his writings are inspiring and illuminating.

In his latest essay, a part of which appears on other pages of this issue, Dr. Douglas dwells instructively upon the inter-relation of railroads and the mineral industry. Many of the facts that he adduces will be new to our readers; his conclusions are momentous.

It is surprising to learn, or to be reminded, that the first transcontinental railroad, that across the Isthmus of Panama, was built to satisfy a mining craze. This line, connecting Navy Bay on the Carribean Sea with Panama, 48 miles in all, constituted a short cut to California, and for a time the road depended almost entirely upon mining traffic.

The extent to which the development of mining in the Western States depended upon railroad building, and the present dependence of many of these railroads upon freight derived from mining, have hardly been recognized until recently. And Dr. Douglas has done more than any other writer to bring about this recognition.

We have referred before to the comparative proportion of freight attributable to mining in the United States and in Canada. These figures are given by Dr. Douglas as 53.09 per cent. of the United States in 1906, and 35.92 per cent. for Canada in 1908. The total mining freight hauled in Canada in 1907 was 56,497,885 tons, and in 1908, 63,019,000 tons. The corresponding figure for the United States (1906) was 435,450,476 tons. In the latter country coal and iron ore are the two most important commodities. Literally, traffic in these articles is the fundament of many thousands of miles of railroads. Conversely, these lines would never have been created but for the industries based upon the manufacture of iron and steel.

Similarly, the metalliferous mines of the United States support largely or in part many individual lines. These facts are pregnant. Dr. Douglas, while referring to the notable work done by such Canadian lines as the C. P. R., the Canadian Northern, and the Quebec Central in developing the mineral resources of Canada, remarks that our railroads have had less influence in this direction than have those of the United States.

There are several causes underlying this condition. One is, obviously, the relatively sparse population of



the Dominion; another, the limited domestic markets. But, added to these is the indisputable fact that our railroad companies are not alive to the supreme present need of exploiting vigorously our mineral lands. Nor is public sentiment yet healthily aroused.

Not only is it imaginable, but it is highly probable that the Intercolonial Railroad will never become a profitable investment until something over fifty per cent. of the total freight moved on that line arises directly and indirectly from mining. This implies, first, the outlay of sufficient money to provide dockage and handling facilities at important shipping points, and, second, the construction of numerous subsidiary lines to mining centres.

The Grand Trunk Pacific must also embrace every opportunity to cater to the mining industry. The fruits of agriculture provide but sporadic freight. Neither manufactures, forests, nor any other class of freight can begin to supply the constant volume that is derived from mining and metallurgical enterprises.

Briefly, railroads and mining are most closely and more vitally interdependent. The growth of mining reflects itself directly upon the railroads. The extension of transportation facilities brings into being mining districts that otherwise could not exist.

The lowering and standardizing of freight rates, the establishment of loading and handling equipment at shipping ports, the concession of the lowest possible rates to mining pioneers, the construction of much-needed lines in old and new mining districts are themes that should occupy far more of the attention of our railroad magnates. They are themes, also, upon which we hope to have something specifically useful to say in the near future.

Meanwhile we urge upon our Canadian readers the desirability of taking to heart the lessons contained in Dr. Douglas' excellent paper.

#### A NEW VANCOUVER COAL MINE.

The Pacific Coast Coal Mines, Ltd., is the name of the company that has recently opened up a coaling port at Boat Harbour, Vancouver Island. Boat Harbour is situated between Nanaimo and Ladysmith, some thirty miles from Vancouver. Here large ocean-going vessels can find ample accommodation. The bunkers are large, and the loading equipment has a capacity of 750 tons per hour.

The collieries are distant seven miles from the harbour. Railroad connection and modern rolling stock are already provided. The company owns 200 acres, and has rights over 5,000 acres in addition.

A large amount of tunnelling has been done already, and production has commenced. The seam at present worked is reported to be from five to twenty feet in thickness. Other underlying seams have been encountered in diamond drilling.

From accounts received it appears probable that the colliery of the Pacific Coast Coal Mines, Ltd., will rapidly become a serious factor in the industries of the Coast. Its equipment is modern, and its product is high-grade.

Competition is needed. We wish the new venture all success. If it can break the prices that citizens of Vancouver and Victoria have to pay for coal, it will have done well.

#### THE SPRINGHILL DECISION AND TWO GLACE BAY INCIDENTS.

The report of the Board of Conciliation appointed to enquire into the complaints of the employees of the Cumberland Coal & Railway Company, Springhill, N.S., was made public on July 24. The chairman of the Board was Judge Longley. Mr. Charles Archibald represented the company, and Mr. E. B. Paul the men.

As regards recognition of unions, the Board's finding is that it should be left to the employers' discretion to decide how far they will recognize organizations having central authority outside of Canada and controlled by interests that may at any moment engage in acute competition with Canadian producers.

The report, temperately and carefully phrased, indicates that the Board does not consider recognition of the U. M. W. A. either necessary or desirable.

As if to lend dramatic force to this report, two incidents occurred in Cape Breton. One was a brutal assault on an old man by the pickets of the U. M. W. A.; the other, an attempt to blow up the house of the manager of one of the Dominion Coal Company's collieries.

For the first incident the U. M. W. A. is directly responsible. As for the second incident it cannot be held guiltless.

We are confident that the U. M. W. A. will not flourish on Canadian soil. The organization proclaims its own unworthiness. Its ways are ways of violence and hate. It glorifies selfishness and is altogether unlovely.

#### "THE MINING LAW OF CANADA."

Elsewhere will be found a review of this latest addition to Canadian mining literature. Here we wish to extend an editorial welcome to Mr. Morine's book.

We are grateful to him for saving us pother and vexation. He has provided a means of choking off importunate enquirers. Heretofore it has been practically impossible to satisfy seekers after light on Canadian law.

Seriously, Mr. Morine has accomplished a large task satisfactorily. His book will become a standard. Mining men need no reminder of the difficulties that the absence of any modern compendium of Canadian mining law has entailed.



### U. M. W. A. METHODS.

The United Mine Workers' Journal, the official organ of the U. M. W. A., is a weekly published in Indianapolis. Its editorial columns are filled with the kind of stuff that incites ignorant men to violence. From casual inspection of its editorials we are led to conclude that its methods are mediaeval.

For instance, in referring to the Glace Bay strike, the U. M. W. Journal of July 22 remarks editorially that the Dominion Coal Company pays a maximum wage of \$1.40 per day. This is so absolutely absurd that it warrants the conclusion that the U. M. W. A. is consciously hard up for an excuse, and that its organ is doing its best to manufacture a colourable story.

Unionism of this kind is not wanted in Canada. As

we suggested in our last issue, deportation of U. M. W. A. agitators is a necessity.

### A CORRECTION.

In our issue of August 1st, page 461, there appeared a statement to the effect that the Cobalt Hydraulic Power Company, Limited, had presumably stopped work at their plant at Ragged Chutes. The Journal has received a communication from the company, in which this report is categorically contradicted, and in which, also, it is stated that work is progressing most satisfactorily.

We are sincerely sorry to have done an inadvertent injustice to any enterprise.

## THE MINERAL EXHIBITS AT THE ALASKA-YUKON-PACIFIC EXPOSITION.

By E. Jacobs, Victoria, B.C.

The mineral department of the Alaska-Yukon-Pacific Exposition, at Seattle, Washington, U.S.A., is on the whole fairly representative of the mining industry of the Pacific Northwest, though it is in a measure disappointing, by reason of the meagreness of the exhibits of some camps that should have made an excellent showing. While this qualification applies to the display of minerals in the Mine Building, it is not applicable to either the Alaskan or the Canadian mineral exhibit, for both these are comprehensive and decidedly creditable to those who had charge of the collection and display of the mineral specimens and associated exhibits gathered together and advantageously arranged in the respective buildings of these countries.

Among the exhibits relating to the mining industry, but not directly connected with the Pacific Northwest, that of the United States Geological Survey naturally occupies a leading position. California and Utah each has in its building a mineral collection worthy of notice, in this respect being unlike Oregon and the several counties of the State of Washington, which have their own separate buildings, but have given little, if any, attention to this section of their natural resources. The only foreign countries other than Canada showing samples of minerals are the South American republics and Japan, and neither of these has a large mineral exhibit.

### Canada's General Exhibit.

As many readers of the Canadian Mining Journal will probably look for prominence being given in this description of the mineral exhibits at the Exposition to those of Canada, these will here have attention. Before dealing with them in particular, though, the general excellence of the whole display of the natural products of Canada will be briefly noticed.

**The Canadian Building.**—An idea of the external appearance of the Canada Building will be conveyed by the accompanying reproduction of a photograph of it. While not centrally situated, it is by no means in an out-of-the-way locality, for it is immediately behind the Music Pavilion, frequent concerts in which consti-

tute one of the more popular attractions of the Exposition. Further, it is in close proximity to two much-frequented walks, one from the south entrance to the grounds, and the other from the steamer landing on Lake Washington.

It will be observed that there are in the Canada Building two main entrance doors. Immediately inside these is the information bureau, while to the right are



CANADA BUILDING.

the women's rest-rooms and to the left the offices of Commissioner Hutchinson and his staff.

**Representative Exhibits.**—Upon entering the exhibit hall, the visitor is impressed by the evident fact that the whole display has been gathered together, placed, and adorned by men who are adepts at their work in this connection. Systematically arranged, attractively displayed, artistically ornamented, and



effectively placarded with terse and cogent statements relative to the staple products of the country, the whole exhibit is a valuable demonstration of the varied natural resources of Canada. In fact, the verdict of the careful observer may, without any exaggeration whatever, be put into words applied by the "Canadian Gazette" to the Canadian exhibit at the Franco-British Exhibition in London, as follows: "As a cleverly thought out advertisement, as an artistic piece of work, as a thoroughly able object lesson in what Canada can do, the exhibition in the handsome white building would be hard to surpass."

A number of alcoves or recesses, some enclosed in glass, occupy the sides of the hall, the central one on each side being much larger than the others. The full length of the far end is taken up by a striking panoramic view showing several stages of progress made by the settler on Western farm lands until he becomes established in a comfortable home; also live stock in grazing country, and rugged mountain scenes. This big picture forms a background for a large group of stuffed Canadian animals and birds, ranging in size from moose and grizzly bears down to small waterfowl. Down the centre of the building are five capacious glass show cases, each 18 feet in length, while arranged along the aisles are 52 glass-covered table cases, these last, as well as some of the larger ones, being filled with minerals.

The interior decorations are chiefly artistic designs in grain on a red ground, these forming a handsome frieze above the exhibits. Numerous transparencies and other coloured pictures show various scenes and phases of life in Canada. Behind the large central recess on one side of the hall is a picture of a river; in front of and across this a representation of a beaver dam has been built, and over the dam a stream of water continuously flows into tanks in which live Canadian beavers are kept as an exhibit of "the earliest known wood-cutters and dam-builders in the world." This very popular scene is flanked by many short logs of pulpwood—spruce, balsam and poplar, arranged in tiers—and by paper and other products manufactured from pulpwood. On the opposite side, the corresponding recess is filled with Canadian fruits, chiefly apples, of which there is a large and attractive display, both fresh and preserved, and having as a background an orchard scene, depicting men gathering apples and placing them in barrels for shipment to market.

A forestry and wood industry exhibit includes Canadian woods in considerable variety—some cut into planks or otherwise fashioned, and stained and polished to show decorative effects for which they are suitable. The fish exhibit consists of many cases of preserved specimens of Canadian fishes, large and small; while the commercial side of the fisheries industry is represented by pyramids of canned fish. Grasses, grains and cereal food products fill two large central cases and four side recesses.

While the sources of the exhibits are indicated by different colours on the labels, showing which provinces the respective exhibits are from, the idea of provincial exhibits is not intruded. On the contrary, the homogeneity and admirable proportion of the whole display is generally well maintained, so that the complete exhibit is essentially a Canadian one, and Commissioner Hutchinson and his staff do not lose sight of this, nor fail to impress visitors with the fact. Said the experienced Canadian Exhibition Commissioner to a newspaper representative: "Just look about this hall and

you will observe that Canada stands out so boldly that no one can be carried away with the idea that this is an exhibition of the products and manufactures of Ontario, Manitoba, British Columbia, or any of the Maritime Provinces. We talk Canada first, and let the rest fall in line." This commendable policy has, however, to some extent been modified as regards the fruit, cereals, and mineral products of Western Canada, for the Exposition being primarily to exploit Western resources, a proper concession has been made to its objects, and the prevailing spirit.

#### The Mineral Exhibits.

The mineral exhibits occupy a total of about 18,000 feet of space, of which more than half has been devoted to those from British Columbia. From its contiguity to the State of Washington, and its consequent nearness to the place where the Exposition is being held, this province, as might be expected, makes by far the largest display in minerals. To detail the numerous mining camps, not to mention individual mines, that have contributed mineral specimens to the Canadian exhibit, would require much more space than is here available. It may be mentioned, however, that not only are the older mining camps—Ainsworth, Slocan, Nelson, Rossland, and Lardeau, in West Kootenay; Fort Steele and other divisions in East Kootenay, and Vancouver Island—generally well represented, but several of those that are comparatively new have gone out of their way to bring to notice through the publicity afforded by the display of samples of minerals at this largely attended Exposition, some of the mineral resources of their respective districts. Among those that have in this way assisted are, Hedley and Princeton, in the big but practically undeveloped Similkameen District; Sheep Creek camp, in Nelson mining division (represented by a large lump of gold-bearing ore from the Nugget mine, information relative to which has lately been much before the public in British Columbia, and the new and promising gold-silver-lead mining camp in Portland Canal District, in the northern part of the province.

Speaking generally, the Canadian mineral exhibit is a very useful object lesson to thousands of residents of the United States who had not previously had opportunity to learn anything from personal observation, of Canada's large and important mineral resources. To many of these the assertion made in connection with the exhibit that "Canada has a greater variety of economic minerals than any other country in the world," appears more likely to be true when supported by such a comprehensive and really excellent exhibit of minerals as that here made. And just at this time it may be permitted to turn aside for a moment to give credit to Exhibition Commissioner Hutchinson and his zealous lieutenant in the mineral section, W. D. Dalglish, for the comprehensive and representative display of Canadian minerals contained in the collection gathered during a series of years by Canada's Exhibition Branch. Much praise is also due to R. L. Broadbent, of the Geological Survey Branch of the Dominion Department of Mines, for his persistence and good judgment in collecting mineral specimens from the many camps and individual mines he has from time to time visited in the performance of this arduous work. Further, it is an important advantage to have two officials so well posted concerning the minerals of Canada in attendance at the Exposition to give reliable information relative to the exhibits in their particular section of Canada's creditable display of its chief products.



Before passing on to deal in more detail with the various minerals exhibited, it may be well to state that in a number of particulars the exhibit as a striking as well as a creditable one. At the Exposition the claim is advanced that Canada has the best and richest deposits of asbestos in the world, and here is made an imposing exhibit of that mineral, manufactured larger, probably, than nine-tenths of the visitors had ever before seen. Again, in support of the assertion that "Canada has the greatest nickel deposits in the world," there are nickel exhibits that must go a long way toward carrying conviction as to the truth of the statement. Similarly, the pronouncement that "Canada's cobalt-nickel arsenides and silver are now attracting the attention of the whole mining world" is received favourably when there is seen at hand a very large and attractive display of the ores thus referred to. And so on throughout the mineral section; important facts are prominently placarded, and nearby are examples of the mineral products of the Dominion in behalf of which they are stated. One more significant fact should be referred to here, namely, that "Canada's mineral production has increased over 500 per cent. in 15 years."

It may possibly be that in two or three other parts of the Exposition there are bigger collections of minerals; it is certain that in the Alaska Building the large and quite unusual display of placer gold is more fascinating to the general public; but for general excellence and practical serviceableness in attaining the main objects in view in taking part in such an Exposition, it may be claimed, without exaggeration or failing to do justice to other mineral exhibits at the A. Y. P. Exposition, that Canada's mineral exhibit, as a whole, stands first. It may be said of the Canadian mineral exhibit at Seattle, as was said by the London Times of that at the Franco-British Exhibition in London: "The mining industry is exceedingly well represented, and the exhibit is a facsimile of that shown by Canada in the great exhibition at St. Louis a few years ago. American geologists from Washington declared at that time that this display of economic minerals was the best that had ever been collected and exhibited by any country. This can readily be understood when it is taken into consideration that from ocean to ocean the Dominion extends 3,500 miles, and from north to south 1,000 miles."

Taking the various minerals separately, the exhibits are noticed in some detail in the following paragraphs:

**Placer Gold.**—One table case contains about 100 1-oz. samples of alluvial or placer gold, each from a separate creek. Three-fourths of these are from Yukon creeks, a few from the Province of Quebec, and the remainder from British Columbia. Together they constitute a representative collection of samples of Canadian placer gold. They are supplemented by models of most of the large placer gold nuggets known to have been found in the Dominion. That of the largest Quebec nugget, known as the "Kilgour," and which weighed 52 oz., is not included, but the one of the "McDonald" nugget, found in 1866 on Gilbert River, Lot 16 of the De Lery concession (weight 45 oz. 12 dwt., value \$851.26), is among those on exhibition. Other models are of several large nuggets from Cariboo and Cassiar, B.C., and still others from Yukon Territory.

**Lode Gold.**—There are many specimens of gold-bearing quartz from Nova Scotia, Ontario, and British Columbia. Of these Nova Scotia has some of the richest and most attractive, one table case, especially, being

full of beautiful specimens from that province. Samples of ore containing gold are most numerous from British Columbia, which province contributes nearly all of the annual lode gold production of the Dominion. Incidentally, it may be mentioned that by far the greater part of the lode gold produced occurs in combination with copper, and is recovered by smelting; that from stamp-milling usually ranges between 5 and 15 per cent. of the total. Of the gold-copper ores, those from Rossland mines merit notice. These include large lumps of ore from the Centre Star group, Le Roi, and Le Roi No. 2, the last-mentioned probably carrying highest average gold values.

**Silver.**—Ores containing silver are exhibited in considerable quantity, but in most instances other metals are associated with it. Cobalt-nickel arsenides, from Temiskaming, niccolite, also with smaltite and native silver, from near Haileybury; native silver from Cobalt, and other Northern Ontario ores in which there is much silver, interest many visitors, while the silver-lead ores of British Columbia also make an excellent showing. Ores from both these provinces are prominent features of the Canadian mineral exhibit, and enquiries concerning them are many. As attractive specimens of silver ore, those from Cobalt and neighbouring districts must be placed first, though there are some British Columbia silver ores (notably a large specimen showing much native silver from the Elkhorn mine, Boundary District) that also engage attention. Big blocks of silver-lead ore from the Slocan District are among the latter. There is, too, a case of galena ores from Lake Temiskaming, Quebec.

**Lead.**—Outside, in front of the Canada Building, two unusually large samples of ore, together about four tons in weight, from the St. Eugene mine, in East Kootenay, B.C., are generally noticed. The St. Eugene, owned by the Consolidated Mining & Smelting Company of Canada, Ltd., is the largest and most productive lead mine in the Dominion. During the last five years more than \$800,000 tons of its ore have been milled, from which about 125,000 tons of concentrates, averaging approximately 66 per cent. lead, have been made. Last year's tonnage was the biggest since the mine was opened, while the current year's output will probably be still larger. There is, however, a peculiar fitness in the biggest lead mine in Canada being represented by the largest sample of ore from one mine in the whole of the Dominion mineral exhibit. Other British Columbia mines producing lead also have large samples of ore on exhibition, these being chiefly from Slocan District mines.

**Copper.**—British Columbia also leads in copper ores, whether those of low-grade from the Boundary District, or having associated with the copper appreciably large values in gold and silver, as in the case of ores from Rossland mines, and others from the Coast district. More than half a ton of bornite ore, from the Marble Bay mine, Texada Island, B.C., makes an exhibit of more than ordinary interest, from the fact that this ore was mined at a depth of between 900 and 1,000 feet. There is at that depth a fine body of it, and geologists and mineralogists are finding it necessary to revise their theories as to the non-occurrence at depth of bornite ore. In the Marble Bay mine the silver associated with the copper has increased in quantity as greater depth has been attained. Other bornite ores are from the Cornet mine, also on Texada Island, and from Whitehorse copper camp, in Southern Yukon. A good exhibit of copper gold ore comes from M. K.



Rodgers' Hidden Creek mine, on Observatory Inlet, Northern British Columbia, which mine is now being developed. In the exhibit of the Canadian Copper Co., of Sudbury, Ontario, there are a number of samples of chalcopyrite ores, and a heap of roasted copper-nickel matte. The Colonial Copper Co. has an exhibit of native copper from Cape D'Or, N.S. Chalcopyrite ores from Ontario and Quebec are also shown.

**Iron.**—The mining of iron ore not yet being an established industry in Western Canada, the exhibits of this mineral are neither numerous nor large. British Columbia iron ore deposits are practically unrepresented. Most of the samples of ore and manufactured iron are from Ontario and Nova Scotia, with a few from Quebec and British Columbia. There is some pyrrhotite, both crude and roasted, from Sudbury, Ontario. Eight pigs of iron are shown with some bog-iron ore from Drummondville, Quebec. The Mines Branch of the Dominion Department of Mines, Ottawa, has on exhibition pig iron produced by the electric-thermic process. There are also some magnetic iron sand and chromite concentrates from Quebec. Sections of heavy steel rails, from Sault Ste. Marie, Ontario, are exhibited by the Algoma Steel Co.

**Zinc.**—Not much zinc ore is shown. Among the comparatively few samples are some from mines in the Slocan District of British Columbia, where zinc blende occurs freely in association with galena. Zinc concentrates, also bars of spelter made in the West, are among the zinc exhibits, and, too, some blende from Quebec.

**Nickel.**—The joint exhibit of the Canadian Copper Co., Sudbury, Ontario, and the International Nickel Co., New York, includes copper-nickel ores and heap roasted matte, standard and bessemerized nickel-copper matte, and other nickel products. Besides nickel shot and plaquettes, there are shown many articles made of pure nickel—wire incoils and spools, strips in coils bound with nickel straps and rivets, rods, tubes, trays, coins of the world, chafing dish, etc. The Mond Nickel Co. is also an exhibitor of nickel products. Niccolite, chiefly from Northern Ontario, is among the ore exhibits.

**Other Metallic Ores.**—Among these are cobalt, from Northern Ontario; cinnabar, from Kamloops mining division, British Columbia; molybdenite, from Ontario, Quebec, and British Columbia; tungsten-wolframite, from British Columbia and Nova Scotia, and scheelite, from Cariboo, B.C., and auriferous antimony ore, from Nova Scotia.

**Metallurgical Products.**—Several smelters and other reduction works have contributed exhibits, some of them comparatively large and of considerable value, of metallurgical products.

The Consolidated Mining & Smelting Company of Canada, Ltd., has sent from its smelting works and electrolytic lead refinery at Trail, B.C., lead concentrate, lead anode and cathode, lead pipe, sulphate of copper (bluestone), and other products.

The exhibits sent by the Granby Consolidated Mining, Smelting & Power Company, of Grand Forks, and the British Columbia Copper Company, of Greenwood, both in the Boundary District of British Columbia, contain copper ores, matte, blister copper from their own converters, etc. The Tyee Copper Company, of Victoria, B.C., has contributed from its works at Ladysmith, Vancouver Island, ores from a number of Coast mines, roasted and raw ore and bricks made from ore fines, matte, blister copper, etc.

The nickel-copper exhibits of the Canadian Copper Company, Sudbury, Ont., have already been mentioned. The Syracuse Smelting Works of Canada, Montreal, Qué., also made a contribution of products to the Canadian exhibit.

**Coal.**—Prominence is given to the coal exhibits, the bulk of which are in a large show case in the centre of the hall, and on which is displayed the statement that "Coal is King." Another published statement is that "Canada's Coal Areas are Estimated at 100,000 Square Miles."

Samples of Western coal are large, those from individual mines weighing from 1,000 to 1,500 lbs. each. Vancouver Island collieries are represented by exhibits sent by the Western Fuel Co., Wellington Colliery Co., and South Wellington Coal Mines, Ltd., the last-named having only lately commenced production of coal on a commercial scale. From the Middlesboro colliery, Nicola District, the Nicola Valley Coal & Coke Co. has sent an exhibit of coal of good quality, while Southeast Kootenay coal fields are represented by pyramids of coal from the mines of the Crow's Nest Pass Coal Co. and the Hosmer Mines, Ltd., respectively. A similar exhibit of coal from the International Coal & Coke Company's mines, at Coleman, Alta., and some coal briquettes from Bankhead, are all that has been received from Alberta. Samples of coal from Nova Scotia are also shown in the fuel exhibit, which includes as well peat in briquettes, from Beaverton, Ont., and bituminous shale, from New Brunswick.

Coke is from the Crow's Nest Pass Coal Co.'s ovens at Fernie; from Hosmer; from Union Bay, Vancouver Island, and from Coleman, Alberta. With the fuel exhibit is a sample of tar sand, from the Athabasca River.

**Asbestos.**—"Canada produces over 90 per cent. of the world's supply of asbestos" is the claim made in connection with the fine exhibit of asbestos made here. It is stated, further, that in 1900 Canada's production of this mineral was valued at about \$748,000; for 1908 it was nearly \$2,485,000. The considerable quantity of asbestos exhibited makes an excellent display, and that much interest is taken in it is manifest from the number of enquiries made about this mineral. The asbestos shown is chiefly from Thetford and Black Lake, Quebec. The end of one of the large central cases is filled with crude mineral and products manufactured from it, and there are two other exhibits nearby, one of good samples of asbestos and the other of products. Covering for steam pipes and elbows, and for boilers; rope and wick packing; board, fibre, and cement, are the chief asbestos manufactured products included in the exhibit, which is an object lesson to many who had never before seen this mineral in its manufactured state.

**Mica.**—Both Ontario and Quebec show in quantity mica from different parts of those provinces, while British Columbia exhibits some from Tette Jaune Cache, where, however, but little has yet been done towards opening the deposits. "Canada's mica mines could supply the world's demand should occasion arise," is stated with a directness of expression characteristic of most of the claims made in connection with Canada's chief mineral resources, and which do not appear to leave room for much doubt as to their correctness.

**Graphite.**—Exhibits are from both Quebec and Ontario. Beside graphite for lubricating, packing, and other industrial purpose, manufactured products are shown, chiefly large crucibles.



**Corundum.**—Other claims made are that "Canada supplies over 85 per cent. of the world's production of corundum," and that "Canadian corundum is well known in Europe, and is being adopted throughout the world by users of abrasives." In evidence of the latter fact, wheels manufactured in Canada, Great Britain, Belgium, France, Germany, Italy, Russia, and the United States are shown. The corundum exhibited not made into wheels is chiefly from Craigmont, Ontario.

**Hydromagnesite.**—From Mavor, Ltd., of London, have been received, and are on exhibition, a number of magnesite products from Canadian hydromagnesite, these comprising bricks, cupels, furnace linings, etc.

**Other Minerals.**—Three table cases contain manganese ores from Bridgeville, Nova Scotia. Miscellaneous exhibits include feldspar and celestite, from Ontario; baryta, phosphate of lime (apatite), and ferrosilicon, from Quebec; mineral paints, from Montreal; a large exhibit of tale, from Madoc, Ontario, and salt in various grades, including table salt in cans as for sale.



GRAND TRUNK RAILWAY BUILDING.

from Windsor, Ontario; pigments, petroleum and products, mineral waters, etc.

In minerals applicable to fine arts and jewellery, and in materials for common and decorative construction, there are some noticeable exhibits. Among these may be mentioned a case of cut and polished stones, chiefly from Nova Scotia, Québec, and Ontario; a large piece of blue sodalite (a beautiful stone for interior decorative purposes), from Dungannon, Ontario; a strikingly ornamental column of jasper conglomerate, from Bruce Mines, Lake Huron, Ontario; a column of polished red and a curling stone of black granite, both from St. George, N.B., and a column of Kingston granite on a black limestone base. There are also a number of cubes of marble, both mottled and cloudy varieties, as yet unpolished, so that their beautiful colours are not as yet apparent. A column of serpentine limestone (resembling Connemara marble), from Grenville, Québec; two large blocks of gypsum (alabaster), from St. George, N.B., and some polished blue marble, from Nootka Sound, Vancouver Island, are also interesting exhibits.

Building materials include some fine stone, among which are many samples of granite, syenite, quartz-andesite, sandstone, limestone, marble (both limestone and lomite), and other rocks, a number of which are from British Columbia coast quarries, though other provinces are also well represented in this division. Fire clay, from Clayburn, B.C., with numbers of fire and other bricks, sections for furnace and coke-oven arches, etc., red brick, cement materials, clays, etc., also in part illustrate the variety of Canada's resources in building and construction materials. Outside the hall a large block of limestone, from Marble Bay, Texas Island, shows the quality of the material there being made into lime in considerable quantity for shipment.

#### Other Canadian Mineral Exhibits.

The Grand Trunk Railway has in its building an excellent display of some of the chief products of Canada, among which minerals supplied by the Canadian Exhibition Branch, are prominent. Some of the prominent features of the mineral section in the Canada building are here duplicated, of course on a much smaller scale, yet the exhibits are attractively arranged and show to advantage. The ornamentation of the interior of this building is also along similar lines to those so successfully employed in the neighboring Canada building, and here, too, transparencies and photographs are used to illustrate Canada, its magnificent scenery and its industrial progress. Notwithstanding that it is necessarily very modest as compared with that made by the Dominion Government, the Grand Trunk System's display together with the building in which it is shown, is a credit to those responsible for it.

The Canadian Pacific Railway Co. has considerable space in an advantageous position in the Exposition Agricultural Building, but since its exhibits are designedly representative of the various districts through which its transcontinental line passes there is little prominence given to minerals. Further, the grains, grasses, and fruits used are more suitable for effective display in small space than commercial minerals. There are, however, some mineral samples shown in the C.P.R. Company's attractive exhibit. Toward the end of July the Vancouver Island Development League placed in this booth a Vancouver Island exhibit, in which there are some minerals. In variety, quantity and importance though, these are insignificant in comparison with mineral exhibits from the Island shown in the Canada building.

#### REPORT ON THE IRON ORES OF NOVA SCOTIA.

The Mines Branch of the Department of Mines, Ottawa, which was organized for the purpose of devoting special attention to the economic features of Canada's mineral resources, has just issued a comprehensive report on the "Iron Deposits of Nova Scotia," prepared by Dr. J. E. Woodman, until recently Professor of Geology at Dalhousie University, Halifax.

This report, which covers very thoroughly the more important iron deposits of the province, consists of 222 pages of text, 63 illustrative photographs, diagrams and maps, and a copious index. The scope and economic importance of the work may be judged from the detailed instructions given to the author, who was requested to give special attention to:—

1. Localities of iron ore deposits so far discovered, and names and addresses of owners.



2. History of development of mines and companies (if any).
3. Geological description.
4. Analyses of ores.
5. In cases of mines which have been worked, output and statistics.
6. Transportation facilities.
7. Limestone in neighbourhood of deposits.
8. State in general terms character of forest in neighbourhood, i.e., whether the supply is sufficient for mining purposes and for the production of charcoal in the event of the introduction of electric smelting.
9. Maps of mines (and drill holes, if any).

The report itself is divided into two main parts:—

Part I. deals with the geographic relations of the deposits, their mineralogy and geology, and questions relating to mining policy, bounties, and mining laws.

Part II. is entitled "Details of Iron Districts," and covers more particularly the ores of the Clementsport Basin, the Nietaux-Torbrook field, the deposits of Hants and Colchester Counties, the ores of the Western Cobequid Mountains and of Arisaig, and the ores of Cape Breton, and is replete with analyses of ores, records of bore-holes and geological sections, and other statistical data.

A second volume, covering iron ore deposits not referred to in Volume I., and devoting special attention to limestones of value for metallurgical purposes, will shortly be issued.

In view of the present condition of the iron ore industry of Canada, and particularly Nova Scotia, where so much imported iron ore is being used, this report should be of special value to mining engineers, investors and others interested in the development of the iron resources of this province.

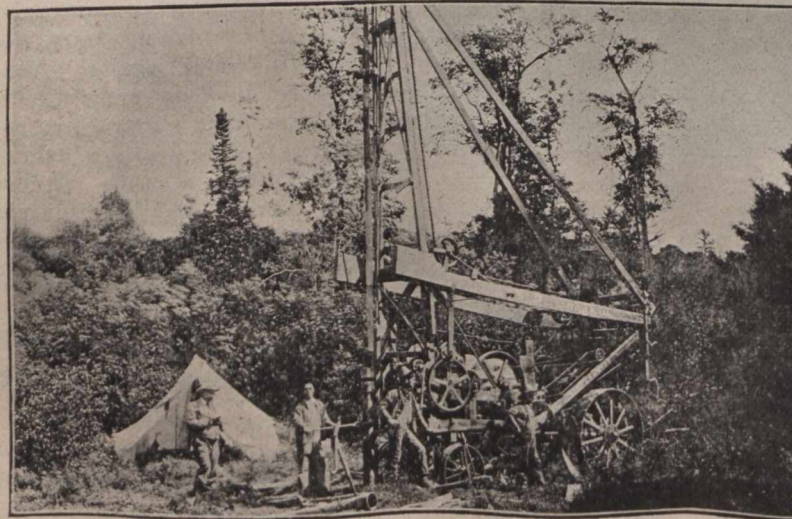
Copies may be obtained on application to Dr. Haanel, Director of Mines, Ottawa.

## MODERN PLACER TESTING.

By G. R. E. Kennedy, Sherbrooke, Quebec.

One method of testing placer ground is the use of the percussion drill. Here, as in sinking for oil, an iron casing, or pipe is driven into the ground by means of a drop weight, working on rope or cable running over a wheel at top of derrick, operated by means of a walking beam and steam or gasoline engine. One driller used by the writer is a Keystone No. 3 traction, driving a 6in. pipe, on the lower end of which is a steel cutting shoe. The machine being placed in position, the pipe is placed in a shallow hole, with earth tramped around it to hold it in place. Then, the drill

core has been drilled to within a few inches of the cutting shoe (in gravel the bit must never be allowed to go below it) the drill is pulled out and the sand pump let in. This, by powerful suction, takes out all the core that has been cut by the drill—in fact, will take out loose gravel without drilling—and this is emptied into a tub and eventually panned, though perhaps first put through a rocker. Then the driving clamps are again put on the bit and pipe driven deeper (new lengths being screwed on as required) and the process repeated until bed-rock is reached, and possibly farther.



bit being screwed on to the drill stem and the driving clamps tightened on to the bit, the latter is lowered into pipe, and length of drop fixed and driving begins. The bit and stem weigh about 800 lbs. and with the Jars, 1,000 and drop 1½ to 2 feet striking around 50 blows per minute. When proper depth is reached, i.e. shortly after pipe gets into gravel, the driving clamps are taken off and the drill let fall inside the pipe, the operator twisting it by hand at each stroke to prevent wedging. This pulverizes the gravel, stones, etc., and cuts through boulders, when encountered. When the

When the hole is finished, a knocking head is put on the pipe (with the drill inside) and pipe is pulled by the exact reverse of the driving process, tools are loaded on to the bed of the machine, and the latter moved to the next position; for the placer has been gone over and laid out in squares, or pests placed to indicate where each hole is to be driven.

Thus, from each hole an accurate test is made. A section of the ground from surface to bed-rock, 6in. in diameter, each 6in. or 12in. as may be, of the core is pumped out or panned, and results entered in the



record book. No slumping in from the sides is possible of rich or poor layers. By putting holes over the entire property, as near together as deemed advisable, say in rows running at right angles to the flow of water, and going from side to side of the placer, and the rows from end to end, the number of cubic yards of gravel is ascertained, the depth of over-burden, the pay-streaks, if such exist, the different lays of gravel, presence of clay, boulders, etc., quality and contour of bed-rock, and average gold values, with a degree of accuracy not possible in any other kind of mining. And from the knowledge of the ground thus obtained, the kind of machinery best adapted can be judged and the cost of extracting the gold content figured on closer than the product of any manufacturing business where market fluctuation introduce an element of uncertainty unknown to the product of the placer gold, the standard of value.

It was the prospecting drill that enabled W. P. Hammon, of Oroville, California, and associates, a dozen years ago, to raise funds for dredges by means of which \$3,500,000 worth of placer gold was extracted from ground, some of it running as low as 12 cents per cu. yd., in one year, 1904. Think of what the cost of testing a large acreage by means of the 49er's shafts would be, and then the uncertainty of figures for same, and the time wasted! There are now between 30 and 40 dredges working around Oroville alone, owned by the Feather River, the Boston and Oroville, Boston Machine Shops, Butte Gold, Lava Beds, Yuba, Cherokee and other companies, some of which have lately consolidated under the management of Mr. Hammon. Probably, had you been offered stock in any of these 12 years ago, you would have smiled a knowing smile and passed by on the other side. Only a few years ago mining investments were looked upon as risky, gambling chances, and to-day a prejudice exists in the minds of those who are not properly informed, especially as to the wonderful improvements in methods and machinery, such as the development of the modern gold dredge from the pan, shovel and sluice.

To-day not a share of these companies' stock can be bought. The ground worked runs as deep as 60 and 70 feet and values from 12 cents to 27 cents per cu. yd.

The returns of a properly equipped dredging enterprise can be predicted with exactness and for years in advance, and this is due to improved prospecting methods.

Its Maker has said that "the earth is full of riches." and who will gainsay it? The rocks of more recent formation contain oil, gas, coal, etc. Older ones contain lead, iron, zinc, etc., and still older ones and their conglomerates carry the precious metals. New and wonderful finds are constantly being made, the world over. No country or section of country has or can have a monopoly of minerals. That some sections seem to have more than others is often because the inhabitants of such localities have the enterprise to investigate and develop the storehouse of wealth under their feet.

And the quickest and cheapest means for such investigation is the core drill, of which there are two kinds, the percussion and the revolving. The percussion drill does not take out a solid core, the other does, (if we except the Empire, of which more later). The revolving core drill is made in different forms, such as the diamond drill, where sharp cornered diamonds are the cutting agency, another with steel or other metal cutting teeth, and another which cuts its channel by revolving the tube upon a layer of chilled steel. But none of these are of use in soft ground, sand, gravel,

etc., and they do not give very good satisfaction in loose, scaly rock, soft coal, etc., though where the ground (rock) is suitable they give excellent results. With the percussion drill, only a perpendicular hole can be made.

The Keystone works very well on ground that it can be run over, but there is a hand prospecting drill, the Empire, that for use on placers, when the ground is soft or not accessible to the more ponderous machine, can be called truly a universal prospecting machine, and the workmanship and finish of it is all that can be desired while on account of its lesser weight, it can be transported to any desired point by man or horse power. The casing that the Empire sinks has a steel cutting shoe, but with teeth, and the casing is revolved by man or horse power, and is therefore, much more easily pulled.

In dredge mining, prospecting has been developed to a science, and the hazard and uncertainty of old methods eliminated, while ground that the 49er would turn up his nose at is made to yield immense returns, even the 49er's abandoned mines and dumps of tailings are worked over and made to pay much better than they did the first time! But in mining, as in many other things, we, in the Province of Quebec are still in 49.

### THE LOST MINE MYTH.

Every mountain range from Maine to Mexico has its mysterious lost mine fable, of which the Pegleg and the Breyfogle in Nevada are perhaps the most famous, for these two are not limited to local liars, but are told by old prospectors and newspaper reporters, from one end of the land to the other, wherever mining items interest. A company has recently been floated, claiming to have recaptured the stray Breyfogle.

Locally, in the Eastern Townships of Quebec, Orford, Stoke and other mountains have their little story, each of a man lost in the hills who picked up a rock to shy at an imaginary wolf, or grabbed a chunk of bed-rock just as he was slipping over a precipice, or uncovered untold wealth under his camp-fire, the melted metal running in tiny rivulets through the ashes (although it would require several degrees more heat than a fire of sticks could produce to melt any of the precious metals, but that is trivial in view of the fact that traces of the fire were afterwards found) but, overtaken by night, got so confused, that, after having found himself, never again could he locate the spot. Or often the exposure and hardships of the night brought on fever and the man died, leaving only his blessing and the story to his family.

In Orford, the find was copper, in Stoke, gold or silver, in Prospect Hill "a nugget as big as the yoke of an egg," strange to say, parted in the middle, half remaining in the ledge and half in the piece broken off. The time and effort spent in the vain endeavor to locate these fairy finds would surprise you. And you might as well argue with a man who thinks a hazel twig has a mysterious affinity to water, when that water is several feet under ground, as to talk sense to one struck with the lost mine mania.

In Emberton, it is the "Lost Stone Mine," and the finder carved an Indian and an arrow on a birch tree, so many paces from a range post. If you doubt the story, for \$5 or perhaps \$50 if you look easy, a native will take you to that post. What better proof do you want of the truths of the tale?



And so round each little mountain range, you will find your old inhabitant with his tale of vanished treasure, which it will be just as well for you to accept, for if you try to use reason, you will find you are up against it.

In one place, a vein of asbestos, with five (5) inch fibre, has crawled into some crevice and pulled the crevice in after it. This was not figured on when the Amalgamated put out its claim to 70 per cent. of known supply, in Quebec.

## The Influence of the Railroads of the United States and Canada on the Mineral Industry.

Abstract of Paper by James Douglas LL.D., Member, to be Read Before the Institution of Mining and Metallurgy.

As our review of the railroads of the continent bears primarily on their influence on mining, it would be interesting to determine whether these combinations affect that industry beneficially or the reverse.

The freight supplied to the railroads by the mines is far in excess of that contributed by any other branch of national activity, as will be seen from the following table:—

Class of Commodity.	1900		1906	
	Tonnage reported as originating on line.	Per ct. of aggregate.	Tonnage reported as originating on line.	Per ct. of aggregate.
Products of animals . . . . .	14,844,837	2.87	19,002,825	2.32
Products of mines . . . . .	271,602,072	52.59	435,450,476	53.09
Products of forests . . . . .	59,956,421	11.61	92,187,351	11.24
Manufactures . . . . .	69,257,145	13.41	121,457,738	14.81
Merchandise . . . . .	21,974,201	4.26	33,319,615	4.06
Miscellaneous . . . . .	25,329,045	4.91	48,543,902	5.92
	516,432,217	100.00	820,164,627	100.00

Mr. Harriman distributes the minerals and metals carried by the railroads of the United States as follows. He says:—

“When we classify the mine products transported on the American railways, measuring the tonnage by that originating on each road, we find that the largest of these products is bituminous coal, of which 206,000,000 tons were transported during 1906. The other products were anthracite coal, nearly 60,000,000 tons; coke, 33,000,000; ores, 69,000,000; stone, sand, and other like articles, approximately 58,000,000; miscellaneous mineral products, more than 9,000,000.

Adding to these the manufactured mineral products we have, petroleum and other oils, 6,500,000 tons; iron, pig and bloom, 21,000,000 tons; other castings and machinery, 13,500,000 tons; bar and sheet metal, 15,000,000 tons; cement, brick, and lime, more than 27,000,000 tons. Besides these, as stated above, the railroads hauled for their own needs more than 100,000,000 tons of fuel and other materials.”

Though the product of the mines constitutes more than half the freight carried by the railroads of the United States, perhaps on that very account—taking the country at large—the rates on that class of freight are very low.

The following extract, from an address I recently gave before the Mining Congress, gives in brief the prevalent rates on coal and minerals in the different sections:—

“In every tariff, coal, coke, and the ores of the commoner metals, which have intrinsically very low value, are carried at very cheap rates. Coal itself is often carried at less than the average cost of transpor-

tation. The Chesapeake & Ohio Railroad reports that its coal rate is slightly over 4 mills per ton mile. The Baltimore & Ohio and the Pennsylvania Railroads, so far as we can gather from their tariff, carry coal at about 3.4 to 3.5 mills per ton mile. The New York Central, whose average freight rate is only a trifle over 6 mills a ton mile, carries coal at between 3 and 4 mills. When we get farther west, where traffic is less dense, rates are slightly higher. In the neighbourhood of Chicago, coal and coke rates are over 4 mills. In the Kansas City region they are about 5 mills. In the Rocky Mountains the cost of transporting coal runs up to between 5 and 7 mills. The same is true of the transportation of ores. Transportation of the iron ores of Lake Superior by rail is somewhere between 4 and 5 mills per mile. In the West, the transportation, I believe, of the ores from Bingham Canon to Salt Lake City, over a very difficult piece of grade, is as high as 7.5 mills per ton mile. But if we take the enormous tonnage which Butte offers to the railroad, we find that the ore is carried for 12c a ton from Butte to Anaconda, a distance of 25 miles (4.6 mills per ton mile), and is carried for just about 4 mills a ton mile from Butte to Great Falls, 176 miles, by the Great Northern. In the southwest we have to charge a little more than that, but railroad transportation on ore from Bisbee to Douglas, a distance of 28 miles, is 20c.”

Mr. E. H. Harriman, in an address before the same American Mining Congress, in Pittsburgh, said:—

“The products of the mines constitute the heaviest freight, and are charged the lowest rate. They are usually non-perishable, and their quick delivery is, as a rule, not urgent, except in a shortage of coal during the winter seasons.

“As a rule, the mine products are more constant in their production than any other large items of freight. As will be seen from the figures given, coal is by far the largest single item; and while the production of coal varies from year to year, only nine times since the beginning of our records of coal mining in the United States (in 1814) has the production of any one year been less than that of the preceding year, the greatest falling off recorded being a drop of 12,000,000 tons in 1894 from the production of 1893.

“On the whole, the increase in production has been so rapid and so marvellous, that on one of the important coal-handling railroads (Baltimore & Ohio) the coal transported during each of the past several decades has equalled the aggregate of that transported by it during all the preceding decades; and the ratio in the increase of production of coal for the entire country has come near following this rule for the past eighty years.



"There has been a correspondingly large increase in the tonnage production of many other important mineral materials, though in some of these the increase has not been so striking as in the case of the coal."

The freight rates on the products of the mines are lower than the average freight rate on all classes, which is computed at .78 of a cent per ton mile, the ton being 2,000 lb. I am connected with a road which runs for 463 miles through New Mexico into El Paso, Texas. It connects a coal field making most of the coke consumed by the copper industries of Southern Arizona, with El Paso, and therefore the proportion of mineral products is above the average, being 63.70 per cent. of the total.

The average freight return is, on all classes, .7253c. On coal and coke, shipped from points east, it receives as its proportion only 5.61 mills. On fuel which originates on its own road, its gross revenue is 6.58 mills.

The inference from these rates would be that a road will receive a higher toll on freight of that description originating on its own road than on the same freight coming from a connecting road. But it enjoys that advantage simply, or only, when and because it is nearer the market, for the market price of such a commodity determines in a measure the cost of carriage.\* The long haul rate is always lower than the short haul.

The long distances over which coal and minerals are carried, illustrates the intimate relation that must exist between mining and transports. Coal from Ohio for consumption at Mesaba Iron Mines must be carried about 800 miles; iron ore from Minnesota to Pittsburgh above 1,000 miles; coal and coke for copper mines in Southern Arizona and Northern Sonora, if from Colorado or New Mexico, is transported 600 to 700 miles; if from the east, 2,000 miles. Copper from Arizona to refineries in New Jersey or Maryland, is subjected to a haul by rail of 2,700 miles; copper from Montana to refineries in the east, to a haul of about the same distance; but British Columbia copper must submit to a journey of 3,000 miles.

The interdependence of the railroad and the mines and the mills on one another, and the great volume of freight carried can best be appreciated by a concrete example. There were nine buildings erected in New York last year into whose skeletons there entered 99,000 to, say, 100,000 tons of structural steel. One of these was the McAdoo Tunnel Terminal, which should be counted as two. If we assume the steel to have been made in Pittsburgh, to make it, 200,000 tons of iron ore were transported from the Mesaba Mines at the extreme western end of Lake Superior—first by railroad, then by steamer—then after a second shipment by rail for 1,000 miles to Pittsburgh. More than 100,000 tons of coal and coke were transported from the Connellsville District to Pittsburgh, and the 100,000 tons of steel were moved first to the construction shops, and thence to the site of the buildings, a distance from Pittsburgh of, say, 300 miles.

These ten buildings, therefore, contributed to traffic in raw material and the finished steel not less than 500,000 tons. The sky-scrapers being erected in every large city of the Union to replace less luxurious and commodious office buildings, and to reconstruct the business portion of San Francisco, account in great measure for the marvellous growth of the iron and steel industry during the last two decades—and a sudden lull in building helps to explain the rapid falling off in the bulk of the traffic.

### Canadian Railroads.

The Canadian railroads have had less influence on the mineral development of the continent than those of the United States, not only by reason of their lower mileage, but of the country through which the first roads were built and the distribution of Canadian mineral deposits. Nevertheless Canada has not been backward in railway building, for, per head of population, she has more miles of railroad than the United States. The population of the United States in 1900 was 76,203,387, and her railroad mileage was 193,345, or one mile to 395 of the population, whereas Canada's population in 1901 was 5,371,315 and her railroad mileage was at that date 18,140, or one mile to 290 per head of population.

The first railroad was a short line of sixteen miles built in 1835 to connect the St Lawrence at Lachine with St. John, and thus secure during the summer months steam communication with New England. This was extended to Rouse's Point in 1850. Other short lines were constructed from inland points to connect with river navigation, making a total mileage in 1852 of only 222. The Great Western, however, in 1852-53 opened its line from Suspension Bridge to London, and in the following year extended it to Windsor. In the same year the Grand Trunk connected Point Levis with Richmond, in Lower Canada, at which point it made connection with its through line from Portland (Maine) to Montreal. The Great Western was subsequently purchased by the Grand Trunk, which thus secured the traffic of the Peninsula—the Garden of Canada.

### The Grand Trunk Railroad.

To-day the Grand Trunk has 3108 miles of single track, and 696 miles of double track; but till the Grand Trunk Pacific was organised and commenced construction, the company never ventured beyond the fertile lands of Quebec and Ontario. The design of the Grand Trunk Pacific therefore bespeaks a complete reversal of the traditional policy of the company, which should make it a worthy competitor of the Canadian Pacific.

A railroad was projected to run from the sea to Quebec, while the boundary between Maine and Canada was in dispute. It even reached the stage of incorporation, for a bill passed the legislature of New Brunswick, authorising the construction of the St. Andrew and Quebec Railroad Company. The settlement of the boundary Dispute by Lord Ashburton ceded to the United States that portion of New Brunswick west of the St. John's River through which the proposed railway would have been built, and through which ran the actual post road for the transportation of the mails between Quebec and St. John and Halifax.

It is, perhaps, not strange that the boundary disputes affecting the extreme north-east and north-west frontiers of the British possessions in North America should have excited the building of railroads and influenced their location. In both instances the disputes were settled in favour of the United States. Ultimately both the railroads were built as originally proposed, but the political motive being removed, their construction awaited the demands of trade.

### The Intercolonial Railroad.

The main line of the Intercolonial, 686 miles in length, with its branches and equipment, cost, when opened to traffic, \$21,500,000, not a heavy capital on which to pay fixed charges. Nevertheless, the railroad, as a commercial enterprise, has never been successful.



Government ownership, at any rate in Canada, is not conducive to economy and strict management. The Intercolonial has been helpful to the coal and iron interests of the Maritime provinces. But they have been less helpful to the railroad than coal or iron districts on the continent, for on both the Island of Cape Breton, and on the main land the ore deposits and the fuel are on or close to the seashore. The coal production of the whole Dominion in 1907 was 10,511,426 tons, of which Nova Scotia alone mined six and a-half millions, all of which can avail itself of water transportation, whether to the Western Provinces, to United States, or the West Indies. Vancouver coal, also, is mined near the Pacific.

It is significant of the unsettled character of much of the country through which Canadian railroads run that, in the same sub-division of traffic, 1,460,019 cords of wood are stated to have been transported. (p. 61 of R. R. Statistics for 1906).

The pig-iron industries of Nova Scotia, as well as her coal mines, contributed but little freight to the railroad. The iron ore from the extensive but superficial deposits on Bell Island in Conception Bay, Newfoundland, is loaded directly on ship board, and discharged without railroad carriage on the docks of the Dominion Iron and Steel Company at Sydney. The Nova Scotia Steel and Coal Company's works at New Glasgow are built on an arm of the sea; and the Londonderry Works are within a few miles of an inlet of the Bay of Fundy. In 1906, Nova Scotia mined 5,750,660 tons of coal, and made in her furnaces 366,455 tons of pig iron; but of this production there was carried by the Intercolonial Railroad (p. 140 of Railroad Statistics), only 1,182,128 tons. Her mines and furnaces, however, on this very account, enjoy greater geographical advantages than any others on the Continent. They are as independent of land transportation facilities as those of Great Britain, whose mining and metallurgical industries, situated on or near the sea, were active before railroads were built.

The Intercolonial through the Province of Quebec, as far as Point Levis, clings to the St. Lawrence, where there are no mining operations, and from Quebec westward, to its junction with the Grand Trunk at St. Rosalie, it runs through low swampy or agricultural land. It gave a winter outlet for the coal and iron of the Lower Provinces to Quebec and Ontario, till the Canadian Pacific, with its shorter route and more vigorous management, entered into competition.

#### The Canadian Pacific Railway.

The Pacific Railroad Act, passed in 1872, provided for the creation of a company to build a railroad from the south shore of Lake Nipissing to the Pacific coast. It was to be commenced before July, 1873, and completed before 20th July 1881. Land grants were made of alternate blocks through Manitoba, British Columbia and the North-West Territories, twenty miles deep, not to exceed 50,000,000 acres. The subsidy in money was \$30,000,000. The cost of the line to Lake Nipissing, which was built by Government, was considered as part of the subsidy.

During the same session a number of companies were incorporated to build the whole or sections of the road, one of which, under the Presidency of Sir Hugh Allan, and under the legal management of the Hon. J. J. C. Abbott, was proved to have contributed largely to the Administrator's electoral fund. As a result the

Conservatives were ousted from power by the Liberals under Mr. A. Mackenzie.

The existing Canadian Pacific Co. was thereupon organised, but the road was not completed without further assistance from Government, which at a critical period lent the Company \$100,000,000. This has been repaid.

The railroad was divided into three natural divisions—that from Lake Nipissing to Port Arthur—600 miles, running for some distance not far from the Height of Land between the Lakes and Hudson Bay, through a comparatively barren and rugged country. Second, a level section built for 400 miles through a swampy, well-wooded district, till it entered the woodless prairie in Manitoba, which extends to the base of the mountains. The length of this second was about 700 miles. And third, the mountain section of about 650 miles across the Rocky Mountains to the Pacific.

The first section completed in 1883, was that from Winnipeg to Port Arthur, to which construction material could be supplied at one end by steamers on the lake, and at the other via the branch to Emerson on the United States boundary by the St. Paul, Minneapolis and Manitoba Railroad. A year afterwards the Eastern Division was opened; but it was three years more before the Rocky Mountain Division was completed.

The Canadian Pacific to-day owns 9155 miles of single track and 1209 miles of double track. It has extended its tracks into the Maritime Provinces to the sea; it purchased from the Quebec Government the North Shore Railroad, to reach Quebec, which is the summer port of its Atlantic line of large boats; it runs into Chicago over the Wabash tracks, and from Moose Junction into St. Paul over its own rails, there to connect with the Soo Branch, which rejoins the main line at Sudbury.

It has crossed the Rocky Mountains by a second line through the Crow's Nest Pass, and has built in southern British Columbia, Manitoba, Saskatchewan and Alberta, about 4000 miles of branches.

Its influence of mining in Ontario and in opening up the mineral resources of the West has been momentous. In this respect its benefits were felt before the road was completed. Although many hundred miles of railroad tunnels have been driven through mountains, and thousands of miles of railroad cuts made through ore-bearing rocks, this enormous amount of exploratory work has seldom resulted in exposing ore—even in Chili, in the Cordilleras of the Andes, or in the Rocky Mountains. A railroad cutting, however, by the Canadian Pacific, at Sudbury, revealed one of the large deposits of nickeliferous ore which, with the mines of New Caledonia, virtually supply the world with nearly three-quarters of its consumption of a metal which has become so useful in the arts of both war and peace, now that these large deposits permit of its cheap production.

Though the Canadian Pacific main line and its Algoma branch run through mineral-bearing rock, in which the old Bruce Mine, managed by John Taylor & Sons, and the famous Silver Islet Mine were worked, no other very large traffic-yielding mineral district except Sudbury has been opened on their main line between the Ottawa and the Rocky Mountains.

But the Timiskaming and Northern Ontario Railway—a road built by the Ontario Government—has aided, if it was not the parent of, the marvellous silver district of Cobalt. When this branch is extended



about 80 miles to Lake Gowganda, it will open up another short strip of the inhospitable country, which may prove the first step towards Labrador. Alaska, Northern British Columbia, and the Yukon were considered worthless, because the farmer denounced them as unfit for agriculture, till the prospector and the miner cultivated them for mineral crops. And the same will probably prove true of that vast forbidding, forested country, the Labrador Peninsula, including the whole ridge between the St. Lawrence water system and Hudson Bay.

But the Canadian Pacific, in supplying the population of the treeless Prairie Provinces with coal, provided the settlers with a commodity as necessary to growth as the land to which it gave them access. British Columbia owes its advancement to the same railroad. There, as everywhere else, the first railroad was hailed as a benefactor, but soon it was cursed as a tyrant, and competition with reduced rates invited. This change of attitude by the customers has been sometimes excusable. But none the less British Columbia owes more than it can now appreciate to the men who built the road at the risk of all they possessed. That it has been successful is due to good management and to the stability of fair rates imposed by the Government of Canada. Under these the mining interests of British Columbia have certainly flourished.

The silver-lead mining commenced in 1886 in the Slocan District, and the first shipments were made in 1887—the year the Canadian Pacific reached the coast. The first shipments of copper were 324,680 lb., in 1894. The shipments in 1907 were 42,900,488 lb. The most productive mines are in the Boundary District, close to the State of Washington. They are making money out of an ore whose average yield is much under 2% of copper, supplemented by a little gold and silver. This has been made possible only through the assistance of the railroad, which to-day is as much a necessary part of a metallurgical establishment as the smelting furnace, for high-grade ores of all the metals, except iron, have become scarce, and the world's demands must be supplied from ores which did not rank as such half a generation ago. The Boundary District is served by both the Canadian Pacific and Hill's Great Northern from across the border. The alternate line of the Canadian Pacific through the Crow's Nest Pass was built to supply the furnaces at Rossland, Nelson and Boundary, with the coal and coke from Fernie and other mines, and ovens in the East Kootenay coal fields.

#### The Canadian Northern Railroad System.

A third trans-continental road, the Canadian Northern, is being built by instalments, and almost without observation. It also has already promoted mining and metallurgy to an eminent degree. It is known as the Mackenzie-Mann Railroad, from the two contractors who originated it by the purchase of a short isolated road in Manitoba, and under whose wise administration it is being expanded as traffic warrants.

The management says:—

“The Canadian Northern is primarily a Western railway. It began in Manitoba and is mainly operating in the Provinces of Manitoba, Saskatchewan and Alberta. Its growth has been phenomenal because the country that has produced it is phenomenal. There was no railway in it before 1880. The total at the end of last year was 6216 miles, of which, after eleven years' existence the Canadian Northern was operating 43 per cent. The growth of other railways in the

prairie provinces averaged 129 miles per annum. The Canadian Northern averaged 246 miles per annum.”

While the original road was built westward from Gladstone, its nucleus, a point on a very fertile district 60 miles north-west of Winnipeg, it was extended eastward from Winnipeg to Port Arthur, in Ontario, by a southern route, and in order to pass south of Rainy Lake it had to run for 67 miles through the United States. It therefore opens up territory on both sides of the Line untouched by the Canadian Pacific which, for military reasons, never left Canadian territory and, therefore, was located to the north of the chain of lakes which define the boundary between the two neighbours. The Canadian Northern road re-entered Canada at Rainy River. A branch leaves the main line at Fort Frances for Duluth.

The main line runs through an iron region, the extension northward of the famous Mesaba iron deposits. It contains great possibilities and at least one actual development, the mines of the Atikokan Iron Co., 142 miles from Port Arthur, whose furnace plant has been erected in Port Arthur. The forests are expected to supplement the local freight supplied by the mine.

The Canadian Northern operates 3390 miles in the north-west, of which only 1265 constitutes the main line from Port Arthur to Edmonton; the balance is in branches. From Edmonton it is proposed to approach the Pacific by following the Brazeau River through the Brazeau River coal fields.

But the ambition of Messrs. Mackenzie and Mann seems to be rather to attain success by developing the resources of the country they traverse than to pose as transcontinental magnates. They look to wheat and lumber as fodder for their Western Canadian Northern, and to lumber and mineral for freightage of their road from Winnipeg to Ottawa if they ever build it through. For instead of attempting to span the continent from sea to sea by a continuous railroad, they have built of the Canadian Northern of Ontario only 367 miles to connect the Iron Mines of Moose Mountain with their shipping docks at Key Harbour, on Georgian Bay, and their furnaces at Toronto, leaving a gap of over 500 miles between Port Arthur and the Moose River Mine, and another gap between that point and Ottawa.

The same policy has been pursued in Quebec, the Canadian Northern Quebec Railroad consisting of a road from Ottawa to Montreal, and thence to Quebec through the Laurentian Forest at a distance from the St. Lawrence. Lumber and wood pulp are as yet the principal freight of this section. Riviere a Pierre the main line joins the Lake St. John and Chicoutimi railroad, which has been absorbed into the system, and by which it enters Quebec. This purchased road depends substantially on lumber and wood pulp for its traffic.

The easternmost section is again a fragment, or rather two fragments—a coal road, the Inverness Railway and Coal Co., a line of 60 miles in Cape Breton, a coast line from Halifax to Yarmouth, and a branch from Lunenburg to Port Wade, under the title of the Halifax and South Western Railroad. When the Quebec Bridge actually spans the St. Lawrence River at Cap Rouge, the long gap between that point and the Atlantic seaboard may be built, but the heart of the continent evidently offers a more tempting field to these enterprising men than its rim.

Unless all signs fail, the section west of Port Arthur, which already nourishes the Atikokan Iron Mines and their furnaces at Port Arthur, will stimulate



the search for, and the development of, other iron deposits. The international boundary line, a mere political fiction, cannot have cut from Canada her share of nature's good gifts.

Meanwhile, the heavy expenditure the Canadian Northern is making on the Georgian Bay at Key Harbour, the lake terminus of their Moose Mountain branch, in ore pockets and docks to handle 8,000 tons of ore a day, express their faith in the extent of the iron deposits at Moose Mountain.

The Sudbury deposits and their known northern extension; the opening of these large iron mines in the interval between Sudbury and Cobalt; the extraordinary wealth of Cobalt; and the discovery of minerals of the same class at Lake Gowganda, must encourage railroad building to the northeast, and give courage to the Government, as builders of the Grand Trunk Pacific, and to the enterprising promoters of the Canadian Northern to run their tracks with all speed through the wilderness north of Lake Nipigon.

The Canadian Northern Company claim for the shipment of ore to the United States a certain triangular traffic advantage which is important if it can be carried out. They say that "there is a remarkable strategic advantage in the location of the Moose Mountain Mines. In the first place, they are over 500 miles nearer Cleveland and Pittsburg than the Minnesota ranges, and vessels trading between Duluth, or Port Arthur, and the coal ports of Lake Erie, can load up with wheat for Key Harbour, pick up ore for Cleveland, and return to Duluth or Port Arthur with coal, thus in one round trip handling three great commodities of commerce, whereas in trading between Duluth and Cleveland, it is impossible to handle more than two."

#### The Quebec Central Railroad.

But one of the longest of the second class roads, the Quebec Central, has the distinction of carrying 85% of the world's supply of asbestos. And the same serpentine rocks which yield the asbestos contain chrome iron, about 6000 tons of which in ore and concentrates were shipped last year to the United States. The same road runs through the beautiful Chaudiere valley, which was the scene of a feeble gold excitement a generation or more ago. And had it been built, it might have reversed the ill-fortune which attended the copper mining operations of the English and Canadian Mining Co., under its various re-organizations. For tributary to the road are very large deposits of low-grade copper ores in slates of the Quebec Group, which may be worked to a profit under better methods, and with cheaper transportation than of yore. If that time ever arrives, the eastern division of the Grand Trunk will also derive some benefits from mining, for these copper-bearing slates are widely distributed through the Eastern Townships of the Province of Quebec.

#### Canadian Railroads and Canadian Mining.

Postponing the consideration of projected roads in the mineral development of Canada, let us try and gauge the influence of existing railroads. The Canadian Railroad statistics for 1908 have been framed on the pattern of those of the Interstate Commerce Commission of the United States, and, therefore, an accurate comparison can be drawn of the operation of the two national systems.

The distribution of freight in the two countries is as follows:

	United States in 1906.		Canada in 1908.	
	Tons.	%	Tons.	%
Products of agriculture..	70,201,720	8.50	9,306,967	14.91
Animals .....	19,002,825	2.32	2,472,358	3.92
Mines .....	435,450,476	53.09	22,626,237	35.92
Forests .....	92,187,351	11.34	12,972,236	20.49
Manufactures .....	121,458,735	14.81	6,655,719	10.56
Merchandise .....	33,319,615	4.86	2,008,267	3.18
Miscellaneous .....	48,543,902	5.92	6,938,135	10.09
	820,164,627	100.00	63,019,900	100.00
United States.....	3,652	tons per mile of railroad.		
Canada.....	2,740	" " "		

The growth of the mining industry may be gauged by comparing the freight statistics of 1908 with those of 1907.

They are as follows:—

	1907.	1908.
	Tons.	Tons.
Anthracite (most of it imported) ....	1,635,128	3,735,141
Bituminous coal .....	11,905,068	12,320,584
Coke .....	547,303	845,767
Ores .....	2,209,860	952,353
Stone and sand .....	2,082,336	2,538,330
Other products .....	178,985	243,004

The total freight of all classes carried during those two years were: In 1907, 56,497,885 tons; in 1908, 63,019,000 tons.

The three roads or rather systems, described above comprise as notable a proportion of the Canadian railway mileage, as do the 15 or 16 groups, which we have classified, of the total United States mileage. If we deduct the 9155 miles of the Canadian Pacific, the 3694 of the Canadian Northern, and the 3569 of the Grand Trunk, excluding the mileage of the Grand Trunk Pacific, and add the 1540 of the Intercolonial, we have a total of 17,953, leaving less than 5000 miles to be distributed among 86 small companies, whose average length of track is, therefore, only 52 miles.

In the year 1906, the two products of the mines which gave to the railroads of the United States this large mineral traffic were coal and iron ore. Unfortunately the distribution of her coal mines places the Dominion at a disadvantage compared with her neighbour, for the manufacturing progress of the United States is largely due to the wide distribution of its coal, and that of the Dominion is hampered by the absence of its own fuel from the more populous Provinces. There is none, and none is likely to be found in Quebec or Ontario, and Manitoba possesses only a small field of lignite, the eastern extension of the Souri Basin, which supplies her domestic fuel.

Further west, in the Province of Saskatchewan, a larger area of the same lignite beds has escaped erosion, and in Alberta, south of Edmonton, lignite underlies a territory at least 100 miles from north to south and 100 miles from east to west. The same is known to extend, though to what distance is doubtful, still further north.

Of this grade of coal there was mined in Saskatchewan, in 1907, 153,900 tons, and in Alberta about 600,000 tons. But of the cretaceous coking coal there was also mined in Alberta 547,623 tons, and of anthracite 235,596 tons. This came from the eastern extension of the British Columbia coal fields. It is to reach these that the Crow's Nest Pass Line of the Canadian Pacific has been built, and they are tapped from across the border by Mr. Hill's Great Northern. The production



of coal from these Rocky Mountain mines and from the coal fields on Vancouver Island, reached in 1907, 2,364,898 tons.

The coal fields of the extreme west of the Dominion will supply the needs of an active mining, metallurgical and manufacturing population, and the coal of Nova Scotia and New Brunswick is more than sufficient to reduce the iron of their known deposits, and to keep busy their manufacturing population. But Ontario, which is the centre of Canadian industry, is 800 miles from the nearest western coal, and 500 miles from the coal beds of the maritime provinces.

On the other hand, that busy hive, New England, is in the same sad plight as Quebec and Ontario. It possesses, outside of a small and worthless deposit of anthracite in Rhode Island, no coal, but is dependent for its fuel on the distant coal-fields of Pennsylvania, Maryland and Virginia; and yet coal is essential to the maintenance of its manufacturing position.

These discrepancies and disadvantages are really political and not natural, for the coal of Cape Breton can reach Boston by sea, without any land transportation, and Ontario is divided from the excellent coking coals of Pennsylvania and Ohio by a narrow strip of land and the waters of Lake Ontario. Reciprocity would remove these political obstacles and restore the natural industrial balance if human selfishness did not interfere and obstruct.

As it is, the coal supplied to the railroads of Quebec and Ontario yields them comparatively little traffic, and they would gain more by the impulse which cheaper fuel would give to metallurgy and manufacturing in Ontario and Quebec than they lose by foregoing the carriage, when navigation is closed, of coal from the maritime provinces.

When we turn to the next mineral product, which constitutes part of the 53% of the total traffic of the United States railroads, viz., iron ore, we find a situation analogous to that in Canada with regard to fuel. 75% of the iron ore which makes the 25,000,000 tons of pig ore is transported nearly a thousand miles from Lake Superior to the coals of Pennsylvania, or about 600 miles to the fuel of Illinois and Lake Michigan. That shipped to Pittsburgh has to submit to a railroad haul of over 50 miles to the head of Lake Superior, to be there transferred to ship, and carried for 700 miles to ports on Lake Erie, where it is again transferred to cars to be hauled to the furnaces at Pittsburgh, which has become the most important manufacturing centre of the United States, simply because of its vicinity to the best coking coals of the Republic.

The iron ores of Canada, as we have shown, through the efforts of the Canadian Northern, can now be exchanged across the Lakes for the Pennsylvania coal which Ontario needs. We have seen that the situation of the iron ores and the coal in the maritime provinces favour the metallurgical industry at the expense of the railroads, but the iron ores of Ontario must submit to a long haul, and should afford a source of heavy freight.

#### The Grand Trunk Pacific.

The Grand Trunk Pacific is being built throughout to open up and develop almost unexplored sections of the Dominion. After crossing the St. Lawrence at Quebec, the road, as in the case of the Canadian Pacific and the Canadian Northern, geographically subdivides itself into three sections—the eastern, the middle and the western; but the Grand Trunk Pacific really recognizes only two divisions, the eastern and

the western, for the following reasons. The Dominion Government has undertaken to build as the Eastern Division the road from Moncton, in New Brunswick, to Winnipeg, in Manitoba, and lease it to the Grand Trunk Pacific Co. for 50 years on a rental of 3% on the cost of construction, the rental not to be payable for three years after final construction, and therefore to be due for only 43 of the 50 years. From Moncton, New Brunswick, the road will use into Halifax the Intercolonial Railroad, and the Grand Trunk Pacific will build a shorter line to the sea coast, terminating in St. John, New Brunswick.

Through New Brunswick and eastern Quebec to the Cap Rouge Bridge, where it will cross the St. Lawrence, the new road, though built by the Federal Government, will parallel for long distances its own road, the Intercolonial. But beyond Quebec it will strike north, running within some 60 or 70 miles of James Bay, an arm of Hudson Bay, thence keeping in its course through Ontario to the north of Lakes Nipissing and Nipigon, and far to the north of Lake Superior. It will reach navigation on the Lakes Ontario and Superior by north and south branches, which the Grand Trunk Pacific, not the Government, will build. It is located more or less parallel with the projected Mackenzie & Mann, the Canadian Northern road, until Lake Nipigon is passed; but thence onward to Winnipeg it will open up a wilderness which it is only reasonable that the Canadian Government should assist in exploring.

From Winnipeg the western division is sub-divided into two sections. The first section, the prairie, extends for 916 miles to Wolf Creek, beyond Edmonton. The mountain section extends thence to Prince Rupert on the Pacific, 840 miles. The prairie section is already built straight into Edmonton across the prairie, while the Canadian Northern makes, in connecting these same two towns, a long curve to the north, in order to reach the valley of the Saskatchewan.

The terminus is near the mouth of the Skeena River, by which the road descends to the sea. The town was laid out on picturesque and sanitary lines, in advance of the advent of the track, on a land-locked arm of the sea, constituting a large and safe harbour.

The Government aids the Company in building the western division by guaranteeing the interest on \$13,000 per mile of the first mortgage bonds on the prairie section, and on three-fourths of the cost of the mountain section wherever that may be. The Grand Trunk guarantees the balance of the bonds.

It is a bold undertaking, but not as hazardous as was the building of the Canadian Pacific, when both the agricultural and mineral resources of the northwest were unknown quantities, and the volume of the Oriental trade which would be deflected to the Canadian routes was problematical. This factor of trans-continental traffic will, however, be effected by the Panama Canal. It already feels the influence of the Tehuantepec route.

#### Possible Mineral Resources of North-Western Canada.

The question of prime interest to us is, what the mineral resources of this large slice of the continent penetrated by the Grand Trunk Pacific really are, and whether they are likely to be reached by its main line or branches. The eastern division now being built by the Dominion Government, after leaving Quebec, as we have said, runs along the height of land, and after crossing the affluence of the Ottawa continues almost



to Winnipeg on the Hudson River slope. The recent discoveries in this comparatively unknown land are encouraging. Near Lake Chibogomo, in the Province of Quebec north of Lake St. John, minerals of the useful metals, in what are believed to be commercial quantities, have been discovered in the Huronian rocks. Of the interval between Chibogomo and the silver regions of Cobalt nothing is known.

The millions which have been taken out of Cobalt, since 1903, certainly encourage prospecting. Cobalt owes its discovery to the approach of the railroad which the Ontario Government, desiring to connect by rail the older parts of Ontario with the new, projected, as the Timiskaming and Northern Ontario Railroad from North Bay towards the north. During the construction of this railway the silver veins of Cobalt were discovered, the first finds being within a few yards of the right of way. Further west, nickel ores are known to extend north of Sudbury into the northern range. Iron deposits have been found north of the Moose Mountain; the rocks of the Keewenaw series north of Lake Nipigon are known to be gold and iron bearing. Therefore this section may add largely to the mineral wealth of the Dominion. But the imagination may with reason be given license to run wild in conceiving what the rocks of the extreme north and west of Canada may have kept in store for us.

The railroad will cut across the same ranges which have enriched Montana and British Columbia; which concealed the riches of the Klondyke, and, which it may be assumed, contain the same ores which are already being actively exploited in Alaska. British Columbia made last year in copper, 60,000,000 lb., and Alaska promises from the mines of the Copper River district to again drench the world with a deluge of

copper. It is not, however, the first time within our recollection that that catastrophe has threatened to overwhelm us. A branch line laid out from Hazelton, on the main line of the mountain division, through northern British Columbia and into the Yukon, terminating in Dawson, will, when completed, open up about five hundred miles of this mountain region.

The resources of the Territories of Mackenzie and Keewatin, as well as those of the great Labrador Peninsula, re-christened "Ungava," have never been taken into account. The area of this inhospitable region is startling, and its resources may prove to be so also.

The areas of these unknown sections of the continent are, of the—

Yukon Territory	.....	196,326 sq. miles.
Mackenzie	.....	532,635 "
Keewatin	.....	456,996 "
Ungava	.....	349,109 "
Franklin, supposed to about		500,000 "

If, when the railroad gives access to Lake Chibogomo in Quebec, the prospects do not prove to be delusive, a branch intersecting Labrador will have to be built. Iron deposits of some magnitude are known to exist on the eastern shores of Hudson Bay, but of the resources of the vast territories of the Yukon, Mackenzie and Keewatin we have only vague rumours. Prospectors who have wandered down the Mackenzie tell of great lead deposits exposed upon its banks. We know with some degree of accuracy of the large extent of the petroleum tar sands, constituting in places banks 200 ft. high, from Dr. Bell's report to the Canadian Geological Survey, and from his papers in the proceedings of the Canadian Naturalist and the Transactions of the American Institute of Mining Engineers.

## IRON ORE DEPOSITS OF NOVA SCOTIA.

Notes from Report by Dr. J. E. Woodman, Issued by the Mines Branch, Department of Mines, Ottawa.

In May, 1906, Dr. J. E. Woodman, at that time professor of geology at Dalhousie University, Halifax, N.S. was instructed by Dr. Haanel, Director of Mines Branch, to make as complete investigation as possible of all important iron ore deposits so far discovered in Nova Scotia. Dr. Woodman was directed to deal first with deposits that are favourably situated as regards transportation.

Instead of attempting a rapid and superficial reconnaissance of the whole province, Dr. Woodman selected a few localities and reported upon these in detail. These localities were chosen as being typical of the various methods of occurrence of the ores, and either of present or prospective economic importance. As not all of these districts could be covered in one season, a second report will deal with those omitted from the first.

Part I., General Considerations, includes chapters on the geographic relations of iron ore deposits, the iron minerals, general geology of iron deposits, mining policy, bounties upon native iron ore production, and titles to iron ore.

Part II. presents details of several iron ore districts in the Clementsport Basin, the Nivtaux-Torbrook Basin, the Treassic trap, the Devonian deposits of Hants and

Colchester, the ores of the Western Cobequids, the partly bedded ores of Arisaig and Malignant Cove, the ores of Whycocomagh and Middle River, and of Barachois.

While we cannot afford space even to enumerate the subjects and individual occurrences touched upon by Dr. Woodman, there are several sections that call for more or less extended notice.

Geographic Relations of Iron Ore Deposits.—“With a long coast line and several remarkable national shipping centres, with no part of the country remote from rail communication or inaccessible through topography, the province is especially well situated, . . . providing the best gateway into Canada from Europe for imports or exports, and acting as a manufacturing centre for the West. . . . From the standpoint of manufacture and transportation, what the Atlantic commonwealths are to the United States, Nova Scotia is to Canada.”

General Distribution of Ore.—Iron ore is widely distributed throughout Nova Scotia.

On the south side of the Bay of Fundy detached small deposits are found all the way from Brier Island to Cape Blomidon, and on the south shore of Cobequid Bay towards Truro. South of this line of deposits are



the more persistent and important ores of the Clements-port and Nictaux-Torbrook fields.

Detached deposits occur eastward through Pictou County, and through Guysborough County north of the granites and gold-measures. On the south flank of the Cobequid hills is a persistent line of ore bodies stretching into Pictou County. In Antigonish County the large Arisaig field occurs on the coast, and to the south are many small deposits.

In Cape Breton many widely separated deposits have been found, some of commercial promise.

Throughout the province the numerous iron ore deposits are either in close proximity to tidewater or can easily be brought into connection with it.

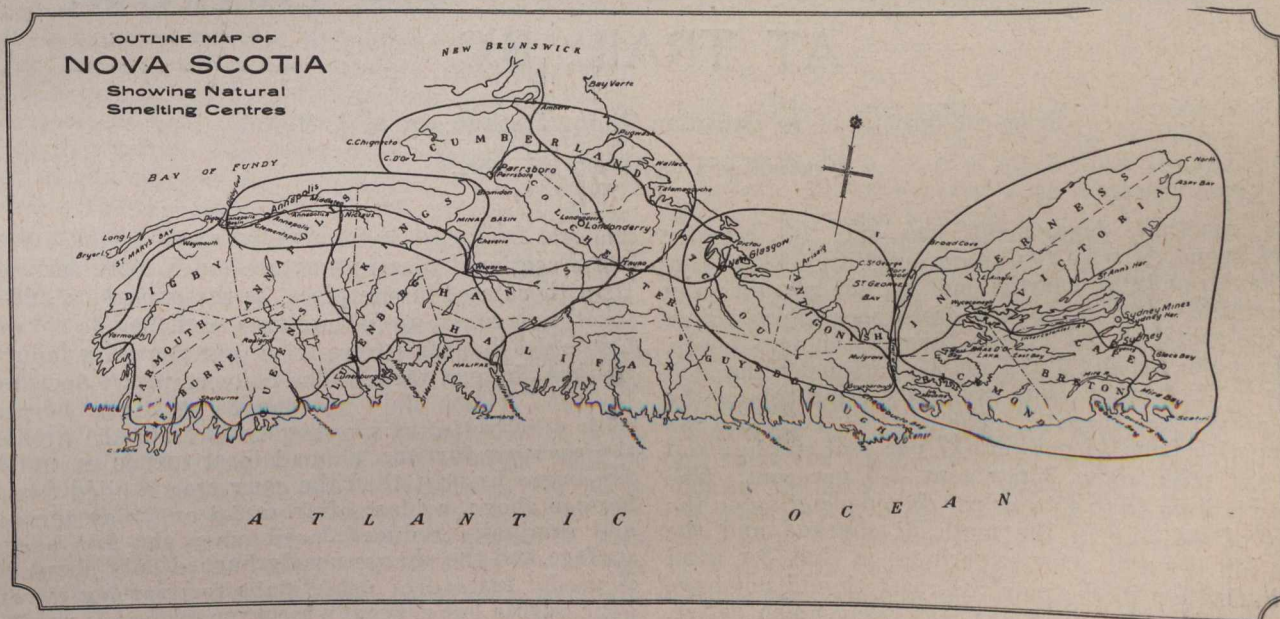
Relation to Fuel.—Like the iron ore, the coal fields of the province are widely distributed, and are capable of supplying fuel at a number of smelting centres. The Sydney and the Glace Bay mines supply the plants of the N. S. Steel & Coal Co., and the Dominion Iron & Steel Co. On the west coast of Cape Breton are the Chimney Corner, Inverness, Mabou, Port Hood, and Richmond fields. In the centre of the province is the

sufficient amount of flux can be obtained for any probable need.

Possible Smelting Centres.—From the standpoint of an adequate supply of suitable iron ore, flux, and fuel, with cheap transportation for all these materials to the furnace, and proper shipping facilities for both incoming and outgoing freight, there are four sections that are favourably situated. The cost of labour is uniform throughout the province, and thus does not require consideration.

These four sections indicated on the accompanying map, are:—

- (1) A western section in Digby and Annapolis Counties, with the town of Annapolis as its industrial centre.
- (2) A west central section, serving Kings, Colchester, and Cumberland Counties, and having Londonderry as a centre.
- (3) An east central section, embracing Pictou, Antigonish, and Guysborough Counties, with a focus somewhere in or near the Pictou coal field.



Pictou field. In the Cumberland County field is a line of small collieries stretching from Joggins Mines, on Chignecto Bay, eastwards. Here also are the Springhill collieries. The Londonderry Iron & Mining Co. obtain their fuel chiefly from Springhill and Pictou.

Relation to Fluxes.—Limestone on the one hand, and dolomite and ankerite on the other, constitute the two groups of fluxes. The first contains little or no magnesia, the second and third are high in that element. In addition, the ankerite carries a considerable percentage of iron.

The limestones are found in the pre-Cambrian and Cambrian, of Cape Breton, and in the Ordovician, Silurian, Devonian, and lower carboniferous throughout the province. The dolomites occur in the pre-Cambrian; and the ankerite, which is practically an iron-bearing dolomite, is found abundantly in the Londonderry district, and in variable quantity throughout the Devonian area in Colchester and Pictou Counties. In Cape Breton, limestone abounds within reach of shipping.

Only a small proportion of the limestones and dolomites are fit for metallurgical use. But even so, a suf-

- (4) An eastern division, including all of Cape Breton, with its centres at Sydney and Sydney Mines.

Relation to Ore and Metal Markets.—There appears to be a possibility that Nova Scotia may yet be able to supply Eastern Canadian demands with her own ores. Every ton of iron or steel that can be made from native ores at a cost to meet existing conditions of trade can be sold. Whether or not iron and steel can be made from native ores for export, there certainly will be room in the near future for all the metal that can be produced for manufacturing purposes in Eastern Canada, especially in the Provinces of Nova Scotia and New Brunswick.

(To be Continued.)

### PEAT FUEL INDUSTRY IN CANADA.

The importance of the peat fuel industry to the central portion of Canada, where coal fuel is non-existent and its importation so comparatively costly, requires no demonstration.

The Mines Branch of the Department of Mines, Ottawa, issued a year ago a report on "Peat and Lig-



nite, Their Manufacture and Uses in Europe," with the object of giving to Canadians as complete a review as possible of this industry in those countries in which it has been most successfully carried on.

This report is now followed by a bulletin entitled "The Investigation of the Peat Bogs and Peat Industry of Canada During the Season of 1908-09," by Erik Nystrom, M.E., Peat Expert. This bulletin comprises 25 pages of text, and includes six large-scale maps of the following peat bogs:—

1. Mer Bleue, near Ottawa.
2. The Alfred Peat Bog, about 40 miles from Ottawa.
3. The Welland Peat Bog, about 6 miles north of Welland.
4. The Newington Bog, on the New York & Ottawa Railway, and about 40 miles from Ottawa.
5. The Perth Bog, a mile and a half from Perth.

6. The Victoria Road Bog, about a mile from Victoria Road station on the Midland Division of the Grand Trunk Railway.

The bulletin contains a descriptive report of each bog, showing the location, area and structure, and giving an estimate of the available supply of peat fuel, with records of analyses, calorific values, etc., and should be of particular interest to those engaged in, or connected with, the development of Canadian peat resources.

A fuel-testing plant is now being erected at Ottawa, in which the value of peat for the production of power gas will be demonstrated, and the Department proposes to carry on a very thorough investigation of this subject.

Copies of the above bulletin and report on peat may be had on application to Dr. Haanel, Director of Mines, Ottawa.

## LEAD SMELTING AND REFINING PRACTICE AT TRAIL, B.C.

From the Bulletin of the Canadian Mining Institute, by A. J. McNab.

(Continued from issue of July 15, 1909.)

The roasting department has six 26' circular H. & H. furnaces, with two more building. These furnaces have revolving hearths, making one revolution in three minutes, and stationary cast-iron rabblers which work the material out of the furnaces in two hours. They have one firebox 6' x 3' on the periphery, the feed coming in the centre, thus gradually approaching the hotter part of the furnace. The material goes into the roasters with from 14 per cent-17 per cent sulphur and comes out with about 8 per cent -8.5 per cent. The capacity is from 38 to 45 tons per day, depending on the amount of sulphur in the material charged and the elimination desired. Our experience is that for good desulphurization in the pots the roast should not have over 9 per cent sulphur, 8 per cent being much better. The temperature of these furnaces must be carefully regulated so that there is heat enough to roast the charge properly though not enough to fuse it, as this will rapidly crust up the furnaces. The roast should consist of small uniform semi-fused globules showing neither lime rock nor ore. The furnaces discharge into the boot of a chain elevator, which drops the roast through a spray of water into a brick bin. This spraying of the roast is a very important part of the process, as it would be impossible to obtain a good product in the pots without doing this, the principal part would then consist of fines which had not fused at all. The function of the moisture (the roast should have about 5 per cent) seems to be a mechanical one, preventing the blast from blowing through too freely, thus making blow holes and localizing the heat. It keeps the heat in the pots until they start to burn uniformly and the temperature gets sufficiently high to insure the fusing of the charge.

The roast is conveyed in cars from the brick bins to iron hoppers over the converters. The lead converting plant consists of 15 converters 8' 8½" in diameter, holding a charge of 10 tons each. The diaphragms used

are cast iron, cast in four sections and bolted together; these sectional diaphragms are much more serviceable than those cast in one piece, as the expansion and contraction is taken up in the joints, and they do not crack. Cast-steel diaphragms were tried, but proved a failure, as the heat bulged them. The converters are operated as follows: A few slabs are thrown into the converters with a shovelful of glowing coals from the firebox of the roasting furnace, a small blast turned on until the fire burns briskly, then the converter is filled from the hopper above, a blast of from 6-8 oz. being turned on and gradually reduced, until when the fire is at the surface and the charge nearly burned only about 2 ozs. is used. Instead of using slabs for starting it can be done with a hot charge, whichever method is preferred. When the charge is burned out, which takes on the average about 8 hours, the converter is dumped and the fused mass falls on a cast-iron cone, which breaks it into several large pieces. These are broken small enough to enter 20 x 20 Blake crusher, which crushes it to a 6" ring. The product is elevated from this crusher and goes direct to the furnace charge bins.

The heat, used in pot roasting is, of course, supplied by the oxidation of the sulphur, iron, etc., in the charge. The reaction between the sulphides, sulphates, and oxides doubtless aids considerably in the elimination of the sulphur, but just to what extent it is difficult even to guess. Some lead is always reduced, the amount varying a good deal, being higher with a high percentage of lead. The function of the lime in the roasting and converting is a much disputed point on which the writer will not venture any opinion. Of course, roasting and converting can be done without any at all. We regularly roast our low grade copper matte with say 15% copper, 27% sulphur, and 56% iron, in an O'Hara or Godfrey furnace, down to 10-12%, and then convert it in H. & H. converters of the usual type, getting a good product carrying from 1-3% sulphur. We also



treat mattes carrying up to 25% lead in the same manner, and obtain a good roast, though the product is more massive and is harder to break. So that if the lime performs any peculiar chemical function it is one that can be performed as well by iron.

The blast furnace plant consists of two furnaces, one 45"x140", with an average capacity of 150 tons of ore per day, one 45"x160", with an average capacity of 170 tons. Another furnace in the process of construction is 45"x215", which we anticipate will put through 240-250 tons of ore daily. In speaking of capacity, we refer to tons of ore, instead of tons of material as is the general practice on this continent. The general practice in this particular, is very misleading, and in fact, conveys very little information, as flux, matte, slag and other by-products might vary anywhere from 15-40% of the charge. For instance, one day our 45"x160" furnace smelted 181 tons of ore, but 261 tons of charge, exclusive of fuel. Another day it made about the same ore tonnage—180—and only made 230 tons of charge. In the first instance the charge carried a lot of by-product, 31%, in the second only 21% with the same ore tonnage. The capacity of the furnace should be figured really on the revenue it produces, and as by-products carry no revenue, they should not be figured.

The furnaces are of the standard type with brick crucibles, and are water jacketed from the crucible to the top of the bosh, above which is a firebrick shaft. The smaller furnace has fourteen 4" tuyères, all in the sides, of the furnace and the larger one has sixteen tuyères. The tuyères are 20" centres; but we are reducing the distance on our new furnace, making it 15 with smaller tuyères. The height of column measured from tuyères to feed floor is 17.5' and the blast used is 32oz. The lead well is of the continuous overflow type and the matte and slag are tapped from the furnace, the matte settling out in a large receiver and the slag overflowing into the granulating launder.

The furnace charge consists principally of H. & H. roast, which is never under 75% and averages 85% of the charge. Besides the roast, the charge carries a small amount of oxidized lead ore and sufficient dry silicious ore and lime rock for the slag desired, also from 100-300 lbs. of furnace slag to keep the charge open and the furnace uniform. The coke averages about 12.5% of the charge, exclusively of slag and easily smelted by-products, varying with the roast and the quality of the coke. The lead in the charge will average about 40%, excluding coke and slag. We have run as high as 45% and with good roast, that is, suitable analysis and low sulphur, no trouble is experienced. But if conditions are imperfect, especially if the sulphur in the roast gets high, trouble begins at once, the slag gets "mushy" and will not run, and if something is not done the furnace will stop. High sulphur is bad at any time, but with a high lead charge it cannot be tolerated, as it is not possible to smelt such a charge economically. For a 40-45% lead charge the sulphur should not exceed 4% and is much better if only 3%. Even with no serious furnace trouble like a threatened freeze-up, the lower the charge in sulphur, the faster it will run for the same analysis, and of course the lower the matte fall, thereby saving money. The difference in speed between a roast of the same analysis, high in sulphur and low in sulphur, is very marked, and a change in the amount of sulphur in the charge, corresponding to a difference of 2% in the matte fall, will easily make a difference of 10-20 tons of ore smelted per day. The sulphur elimination in our blast furnaces,

with a fairly close charge will be from 30-40% due to a considerable extent to reactions between sulphides, sulphates and oxides.

The slag aimed at is a modified  $\frac{3}{4}$  slag, FeO+MnO 24—30%, SiO<sub>2</sub> 31—33%, CaO 18—20%. No attempt is made, however, to follow any definite slag type, as no advantage is apparent from doing so. We try to keep our silica from 31—33%, as we find that by going below 31% we do not gain in speed; in fact, the slag is sticky and does not tap so easily and we can profitably smelt silicious ore to keep it up to this. Above 33%, however, we find it slows up the furnace so that the extra silica is no longer profitable. The FeO may vary anywhere from 25—30%, without varying either the speed of the furnace or the slag loss, the lime between 18 and 20%, though the lead in the slag gets less with the higher lime, but the difference is small. We do not like to run our lime higher than 20%, as the breast gets hard. This is dangerous with a fast running furnace as a little carelessness will slag the tuyères. When the charge gets high in sulphur the lime is reduced at once to 17—18%, as lime accentuates any trouble due to "mushy" slag. Also if the slag gets high in zinc the lime is reduced proportionately. The zinc runs from 7—12% ZnO, giving us little trouble, if not over 12%. Alumina runs from 8—16% with an average of about 11%, when it gets high (13—16%) it seems to make a heavier, less liquid slag and slows the furnace up, but at no time have we had any serious trouble from this element. In values, the slags average about 0.4 oz. silver per ton and 1% lead.

Usually scrap iron to the extent of 1—1.5% of the charge is used, this helping very materially in the reduction. If this is not used the slags are higher in lead, though the silver content is not raised. There is a tendency to higher slags with a faster running furnace, especially higher values in lead. That is, a furnace putting through 125 tons of ore daily will run cleaner slags than the same furnace running 160. That is, provided the roast and other conditions of charge are not so bad as to prevent reduction. High sulphur in the charge will cause slow running but will also cause high slags. This would not be expected since sulphur is a powerful reducing agent. The reason probably is that a high sulphur charge causes the jackets to crust badly and accretions to form higher up the shaft, making the furnace hang and smelt too high up, curtailing the opportunity for reduction. Our furnace campaigns average 6—7 months. Accretions form on the shaft of the furnace, gradually filling it up, generally beginning on the ends and growing towards the centre. In six or seven months time they have usually grown so that while the furnace may be, and usually is, smelting as much if not more ore than at the beginning with good slags, yet the area of the upper part of the shaft is so restricted that the heat comes up very readily if not carefully fed and increases the volatilization loss so that it is more economical to blow them out. About 70 tons of bullion per day is produced by one furnace. This runs from the lead well into steel coolers, two being provided for each furnace with a capacity of about 3 tons each. The bullion is cooled and drossed here, the dross being skimmed off and put back through the furnace, the bullion is tapped into moulds which make pigs of about 90 lbs. weight; these are sampled and sent in railroad cars to the refinery. An average monthly analysis of the bullion is as follows:—Cu. 22%; Fe. tr., Mn. nil; Zn. 0.098%; Sb. 0.32%; As. 0.28%; Ni. nil; Co. nil; Cd. nil; Bi; 0.0133%; Ag. about 100 oz.; Au 1 oz.;



Pb. 98.5%. Arrangements are now being made to cast the anodes for the refinery direct from the cooling kettles, thus saving remelting.

Refining Melting Plant:—The bullion from the smelter is melted in 50 ton steel kettles and pumped by a centrifugal pump into a receiver from which pipes, with plug valves, lead to 10 vertical anode moulds. A 1½" cast iron pump of the ordinary type is used and is driven by a 2 h.p. electric motor. The moulds are filled by opening the valves, the speed of discharge being regulated easily with these. The moulds are of steel, immersed in water to keep them cool, and have a movable head which forms the head of the anode and is lifted out, carrying the anode with it. The head is freed from the anode by the blow of a hammer and reset in the moulds ready for another tap. The anodes are handled from the moulds to cars by a crane; the cars hold ten anodes, set vertically, and are run into the tank room, two cars are placed together, and the 20 anodes lifted off at once by a 10-ton electric crane and placed in the tanks, each tank holding 20 anodes. The cathodes are melted in two 50-ton steel pots; the lead, after skimming, is raised by a centrifugal pump into a receiver, flowing from there by a movable spout into a circle of moulds, making pigs of about 100 lbs. weight. The lead is all moulded into pigs of this size with the exception of that for the Chinese trade, which is made into pigs of a special form, weighing 180 lbs.

The cathode starting sheets are also cast in this building. In the early days of the plant, these sheets were made electrolytically, a thin sheet of lead being deposited on paraffined steel sheets in tanks set aside for this purpose and operated at a low current density. When the deposit of lead was of sufficient thickness, the cathodes were taken out, the sheets stripped off, flattened out, rolled on cathode bars and were ready for use in the tanks. This method was found to be not only costly, but to give weak unsatisfactory sheets. It was found that if lead was poured on an iron or steel plate, with a smooth surface and inclined at an angle, it would chill as it flowed down the plate, giving a nice, uniform sheet, the thickness depending on the temperature of the lead and the angle of inclination of the plate. The starting sheets have now been made on this principle for some years, giving a much cheaper, and a more satisfactory sheet in every way than by the old method. The casting machine is very simple, consisting of a ¾"—steel, surfaced plate the size of the starting sheet, set at an inclination of 1.8 inches per foot. An iron trough of more than sufficient capacity to carry the lead necessary for one sheet is hinged at the other end. Enough lead is ladled from the pot into this trough, which is then turned up so that the lead will flow down the plate, forming the sheet as it flows, the excess spilling over. The sheets are trimmed, very little trimming being necessary, and lifted from the machine on to a car and the machine is ready for the next cast. The sheets are taken into a special room at the south end of the tank department and there straightened and hung on ½"x¾" copper bars by just bending the sheet around the bar once. They are then placed on a car holding 21, sufficient for one tank; of course the sheets are suspended by means of the copper bars from frame work built up on the car so that there will be no danger of them getting bent. These sheet cars are run on tracks between the different rows of tanks and the sheets are put in by hand.

The tank room contains 240 tanks of 3'x8'x3' 6". These are made of 4" coast fir, lined with asphalt and

give very good satisfaction, leaking but little. They are arranged in 6 rows of double tanks, running the length of the tank room, and in three series of cascades; one cascade of nine tanks in length on one side of the pump room launder, and two cascades of six and five tanks in length on the other side. The pump tanks which are near the centre of the building are built of fir, and are asphalt lined, similar to the electrolytic tanks. The solution flows from the last tanks of each cascade in an asphalt lined launder to the lower pump tanks, the pump raising the solution from these into tanks set high enough so that it will have plenty of head to carry it to any part of the building. 1½" hard rubber pipes carry the solution from these tanks to the first tanks of each cascade, ¾" pipes conveying the solution from tank to tank. The circulation enters the tank at the top and leaves it at 7" from the bottom.

Each tank has 20 anodes and 21 cathodes, the latter being a little longer and wider to prevent short circuiting. The tanks are normally operated with a current density of 16 amperes per sq. ft. of cathode area, requiring, with 12% SiF<sub>6</sub> and 5% lead in the solution, a voltage of 0.32 per tank including all contacts. The loss of voltage in the contacts is small, being about 0.02 in all. The anodes are set with 4⅛ inch centres, the cathodes being set midway between. Only one crop of cathodes is taken at present, two having showed no advantage. With a normal current density a tank is worked out in eight days, about 15% of scrap going back to the melting pots. Most of the slime adheres to the anode scrap. This is scraped off in a special tank, the scrap washed and returned to the melting pot. Some slime, of course, falls off in the electrolytic tanks, these being cleaned out once a month. The current efficiency is from 85% to 90%, the losses being due to short circuiting in the tanks, and to floor leakage.

The electrolyte used is, of course, lead fluosilicate with free fluosilicic acid. The average composition will be about 12% SiF<sub>6</sub> and 5% to 6% lead, having a specific gravity of from 1.17 to 1.19. This gives a stable electrolyte, the losses being small. Losses are due to leaks, to solution not worked out of the slimes and to chemical decomposition of the solution, HF and SiO<sub>2</sub> being formed. Some loss is probably also experienced in the evaporation of the wash waters, though H<sub>2</sub>SiF<sub>6</sub> is supposed to concentrate to a high percentage, with no loss at the temperature used. The H<sub>2</sub>SiF<sub>6</sub> used is made at the plant; CaF<sub>2</sub>, H<sub>2</sub>SO<sub>4</sub> and SiO<sub>2</sub> in the proper proportions being mixed and heated in a closely covered, large cast iron pan. The fumes are passed through a series of towers, having at first a spray of water and later dilute acid descending. This H<sub>2</sub>O unites with the fumes forming H<sub>2</sub>SiF<sub>6</sub>, the charge being so proportioned that sufficient HF is generated to dissolve the H<sub>2</sub>SiO<sub>3</sub> formed. The solution is kept circulating until it is of sufficient strength, usually 30% SiF<sub>6</sub>, the little H<sub>2</sub>SO<sub>4</sub> it contains being taken out with lead dross, and the clean acid added to the electrolyte as required.

Under proper conditions, little trouble is experienced in making good lead. An average monthly analysis representing about 2,000 tons is as follows: As., nil; Bi., nil; Zn., .0005%; Ag., 0.0013%; Cu, 0.00075%; Pb., 99.9938%; Fe., 0.00075%; Sn., 0.0001%; Sb., 0.0028. The silver runs from 0.1 to 0.5 oz., attributable to small particles of slimes floating over to the cathode settling on the projections of the latter and being plated in. As a general rule, the smoother the deposit, the freer it is from impurities. The first deposit on the sheet is



usually very smooth, getting rougher as the cathode gets heavier. The smoothness of the deposit varies with the voltage, the lower the voltage, the smoother the deposit; it also depends somewhat on the amount of glue used. From .05 to 1 lb. of glue per ton of lead produced is added to the solution daily. The function of this glue does not seem to be understood beyond that a reducing action is required. If no compound like glue is used, the lead deposited will be spongy, soft, and not coherent. In fact, it would be practically impossible to operate, as the tanks would all short circuit within a very short time.

The slime from the tank room is transferred in copper cars, to the wash tanks, and agitated with hot water, the wash waters resulting from this operation being evaporated in steam coil evaporators to the specific gravity of the electrolyte and returned to the tank room. The slimes are practically washed clean, the loss of electrolyte due to retention being very small. After washing, the slimes are filtered, dried in large cars, by being run into the furnace flue, and charged into a water-jacketed reverberatory furnace, lined with magnesite brick. An analysis of the slimes would be Ag., 35%; Sb., 25%; As., 20%; Cu., 8 per cent; with a small amount of Fe, Bi, SiO<sub>2</sub>, and at times traces of Te and Se. The impurities are oxidized off and doré metal 960-975 fine silver + gold, results. This is ladled into moulds and parted with sulphuric acid, the silver being shipped 999 fine and the gold 995. The blue-stone manufactured as a by-product is 99.5% CuSO<sub>4</sub>, 5H<sub>2</sub>O. At present neither the antimony nor the arsenic are recovered. They were recovered for some months, a year ago, but owing to the fact that the percentage of antimony in the bullion has dropped from 1% to 0.3%, and the price of antimony from 25c. to 7c., it is no longer profitable. However, the plant is arranged that this may be done when conditions require it. The process is as follows: The slimes are boiled

with sodium polysulphide, which extracts from 80% to 90% of the antimony and 50% of the arsenic. The slimes are filtered, the solution electrolyzed in iron tanks having lead sheets as anodes and steel sheets as cathodes using a cathode density of 8 amperes per square foot with a normal voltage of 1.5 per tank. The antimony deposits on the steel sheets and on the tanks, which are also connected as cathode; dense, hard deposits up to 3/4" in thickness being obtained. When the deposit begins to loosen on the sheets, they are lifted out, the antimony scraped off and the sheets returned to the tanks. The antimony contains up to 2% arsenic, which is taken out with alkali fluxes, when it is melted or casting. The solution goes into the tanks with 4.5 grams antimony per 100 cc's, and comes out with from 0.5 to 1 gram. It is then sufficiently concentrated in steam coil evaporators, to make up for any increase of volume of the solution due to the agitation with steam, and used again with the addition of a little more sulphur for treating a fresh batch of slime. During electrolysis some of the Na<sub>2</sub>S is oxidized to sodium thiosulphate; this loss amounts to, about 30 lbs. of 30% Na<sub>2</sub>S per ton of bullion carrying 1% of antimony, if no regeneration is used. Regeneration may easily be effected by crystallizing the sodium salts out of the spent solution and reducing to sulphide with carbon.

The slimes, after treating with Na<sub>2</sub>S, are filtered, roasted in a furnace of the muffle type and treated with 10% H<sub>2</sub>SO<sub>4</sub>, which extracts 90% of the copper and from 10% to 75% of the silver, depending on the thoroughness of the roast. The solution, after filtering, is boiled with copper plates to precipitate the silver, and used again, or if the copper content is sufficiently high, is pumped to the bluestone plant for crystallization and recovery of the copper. The residue is melted in an oxidizing atmosphere with a little coal or silica to break up the PbSO<sub>4</sub>, doré bullion of 505 to 960 fine resulting, which is parted as usual with H<sub>2</sub>SO<sub>4</sub>.

## BOOK REVIEWS.

### A NEW GERMAN WORK ON MINERAL DEPOSITS.

Mineral deposits, and especially ore deposits, have received much attention from writers of books for many years. Comprehensive treatises are to be found in the German, French and English languages. During the last four or five years, for instance, there has been published the well-known book by Dr. Beck, of Freiberg, entitled "The Nature or Ore Deposits." This book has been translated into English by Mr. Harvey Weed. More recently a work of the celebrated economic geologist, the late Professor Stelzner, of Freiberg, entitled "Ore Deposits," was edited and published by Professor Bergeat. These books of Beck and Stelzner can almost be said to be epoch-makers. A third work, entitled "Deposits of Useful Minerals and Rocks, according to form, composition and origin, is now going through the press in Germany.\* It can be considered to be an international work, since its authors are the Director of the Geological Survey at Berlin, and one of the members of his staff, namely, Professors Beyschlag, Krusch and Vogt in their work:—

\*Die Lagerstätten der Nutzbaren Mineralien und Gesteine nach Form, Inhalt und Entstehung.

Norwegian writer on ore deposits, Professor J. H. L. Vogt, of the University of Christiania. This work is to be published in three volumes. The first half of the first volume, entitled "Ore Deposits: General Notes On," has been received. The preface is dated May, 1909.

While this part of the first volume deals only in a general or introductory way with the subject it is of considerable interest. Probably the part of the volume which contains the most original matter is that in which is given the authors' classification of ore deposits. The classifying of ore deposits appears to be always a subject of live interest. Many men have proposed classifications.

The following is the classification to be used by Professors Beyschlag, Grusch and Vogt in their work:—

- I. Deposits of Igneous Origin.
  - A. Oxide ores.
    - (1) Chrome iron ore group.
    - (2) Titaniferous-iron ore group.
    - (3) Iron and apatite-iron ore group.
  - B. Sulphide ores.
    - (1) Nickeliferous-pyrrhotite group.
    - Pyrites group.



- C. Native Metal Group.  
 (1) Nickel-iron group.  
 (2) Platinum group.
- II. Contact Deposits.  
 A. Oxide Ores.  
 (1) Iron ore group.  
 B. Sulphide Ores.  
 (1) Lead-zinc and copper ore group.
- III. Veins, Irregular-shaped Deposits, and Metasomatic Deposits.  
 (1) Tinstone group.  
 (2) Apatite vein group.  
 (3) Mercury-silver ore group.  
 (4) Young gold-silver ore vein group.  
 (5) Old gold ore vein group.  
 (6) Lead-silver-zinc ore vein group.  
 (7) Metasomatic-lead-silver-zinc ore group.  
 (8) Antimony ore group.  
 (9) Iron ore vein group.  
 (10) Metasomatic iron ore group.  
 (11) Manganese ore vein group.  
 (12) Metasomatic-manganese ore group.  
 (13) Copper ore vein group.  
 (14) Metasomatic-copper ore group.  
 (15) Pyrites vein group.  
 (16) Metasomatic-pyrites group.  
 (17) Native-copper group.  
 (18) Nickel-copper-arsenic ore vein group.  
 (19) Nickel-silicate vein group.
- IV. Ore Deposits (especially sediments).  
 A. Iron ore group.  
 (1) Lake and bog-ore deposits.  
 (2) Oolitic-iron ore.  
 (3) Coal and clay-iron-stone.  
 (4) Chamosite and thuringite.  
 (5) Magnetite and hematite.  
 (6) Iron-sand deposits.  
 B. Manganese-ore deposits.  
 C. Copper-schist group.  
 D. Fahlland group.  
 E. Pyrite group.  
 F. Witwatersrand group.  
 G. Sulphide-lead-zinc group.  
 H. Antimony ore group.  
 I. Group of tinstone and noble metal placers.

This book, like most German works, is well printed. It is curious, however, that while in many respects, especially in binding, German books usually far excel those published in America, the illustrations are on the whole much inferior. Reproductions from photographs

in German books are usually poor when compared with those in the similar class of books in this country.

LITHOS.

**The Mining Law of Canada.** By Alfred B. Morine, K.C., LL.B. 737 pages. Price (half calf), \$7.50. Canada Law Book Company, Ltd., 32-34 Toronto Street, Aoronto.

We have frequently wondered at the absence of an up-to-date handbook on the mining law of Canada. The need of such a volume has become more and more apparent.

Mr. Morine's book is comprehensive and thorough. The statistics and regulations of the Dominion, and the statutes of Ontario, British Columbia, and Quebec form an appendix.

The following table of contents conveys a fair idea of the scope of the work:—

Chapter I.—Mining Terms and Phrases.

Chapter II.—Part 1, Laws in Force. Part 2, Dominion Legislation. Part 3, Provincial Legislation. (a) Manitoba, Alberta, Quebec, Nova Scotia and New Brunswick; (b) Ontario; (c) British Columbia.

Chapter III.—Part 1, Crown Lands. (b) Indian Lands; (c) Railway Belt. Part 2, Railways and Highways.

Chapter IV.—Capacity to Work, Sell, Lease or License. Part 1, Extent of Rights. Part 2, Capacity to Lease. Part 3, Partnership and Companies.

Chapter V.—Contracts. Part 1, Making. (a) Statute of Frauds; (b) Part Performance. Part 2, Enforcing. (a) Statute of Limitations; (b) Specific Performance. Part 3, Terminating. (a) Rescission.

Chapter VI.—Mining Licenses and Mining Leases. Part 1, (a) Bare Licenses; (b) Profits a Prendre; (c) Leases. Part 2, (a) Parcels; (b) Term; (c) Covenants; (d) Forfeiture and Re-entry; (e) Reservations and Exceptions.

Chapter VII.—Part 1, Easements. Part 2, Fixtures.

Chapter VIII.—Part 1, Employer's Liability.

Chapter IX.—Wrangful Abstraction. Criminal Offences.

Chapter X.—Part 1, Assessment. Part 2, Registration.

Glossary.—Appendix I.—Statutes and Regulations of the Dominion, and Statutes of Ontario, British Columbia and Quebec. Appendix II.—Working Forms.

## INDUSTRIAL NOTES.

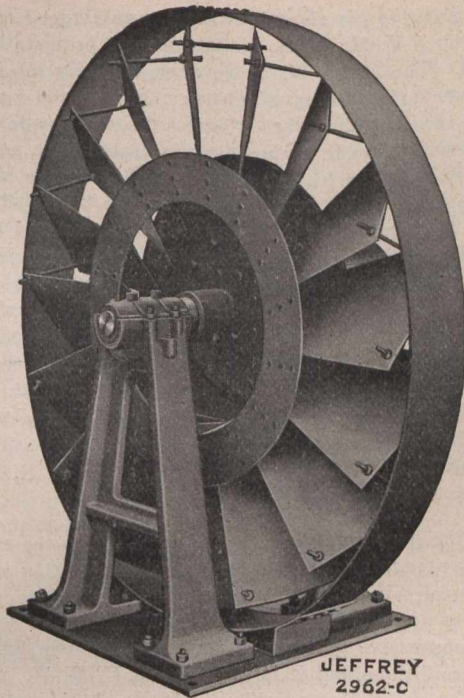
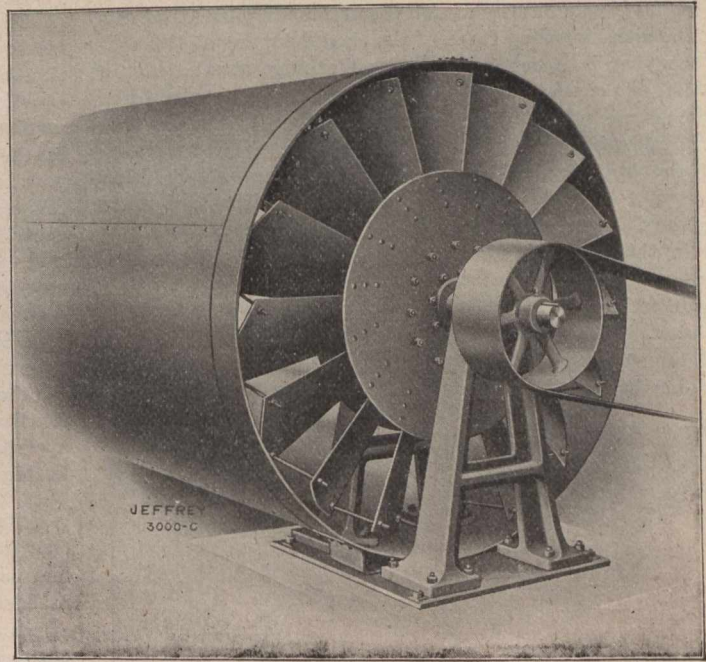
The B. Greening Wire Co., Hamilton, have instructed their architect, Mr. W. A. Edwards, of the same city, to prepare plans for a new Wire Rope Factory. It will be a one-story concrete and brick structure, 124 ft. x 112 ft., with saw-tooth roof construction. The flooring will be solid concrete, so as to withstand the weights of heavy machinery and large reels of cable. It will be an up-to-date factory in every respect. Orders have been placed for additional rope machinery of the very latest design. It is expected the new mill will be completed and machinery installed by 1st November next. The present rope mill will be used as an extension of the Wire-Working Branch of the busi-

ness, and will provide much-needed room for the rapidly growing demand for their Wire Guards, Garden Fencing and Bordering, Factory Lockers, etc.

### JEFFREY PROPELLER MINE FAN.

The Jeffrey Manufacturing Company, since placing upon the market its centrifugal fan for the ventilation of coal mines has received many inquiries for a type of fan suitable for developments that do not justify the installation of a centrifugal fan. This led them to investigate thoroughly the action of the ordinary disc fans commonly used in such cases. A prolonged series



JEFFREY  
2962-CJEFFREY  
3000-C

of tests and experiments, with a disc fan located at Columbus, developed that the present type of disc fan was inefficient when working against considerable pressure, for the reason that the air forced backward by the resistance would re-enter the fan near the centre of rotation, where the velocity of the blades is very slow, as compared to the velocity at, or near the periphery of the wheel. This action would cause a churning of the air through the fan as a large proportion of the air discharged near the periphery of the wheel would merely flow back through its centre.

It will be noticed by reference to the above cuts, that the Jeffrey Propeller fan is provided with a heavy solid driving disc which prevents the air from re-entering after it has been discharged from the blades of the fan. This feature is a decided improvement over the common form of disc fan and the efficiency of the fan is further greatly augmented by the fact that the air on the intake side is given a centrifugal action near the centre, and is then discharged in a horizontal direction

from the spiral deflecting blades. These blades are riveted between two discs at the most efficient angle, and the outer ends of the blades are drawn in to a spiral shape by adjustable stay rods, so that the blades have practically the same pitch at the outer edge as they have at the periphery of the disc and consequently discharge the air at practically the same velocity over the entire discharge surface of the wheel.

The fan wheel is mounted upon heavy cast iron stands which are bolted down upon a steel base making the equipment self-contained. The bearings are of the double ring oiling type, lined with genuine babbitt and provided with large oil reservoirs which necessitates oiling but once a week.

This fan is well adapted for ventilating small operations and most practical for boosting along feeble currents in larger ones. It is fully illustrated in a neat bulletin No. 23, issued by the Jeffrey Mfg. Co., Columbus, Ohio, which will be mailed upon request.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

August 4.—**The Glace Bay Strike.**—At the time of writing the U. M. W. A. strike at Glace Bay enters upon the fifth week of the most uncalled-for, insensate and wanton struggle that has ever disgraced the annals of labor in Cape Breton.

The output of the Dominion Coal Company's mines for July was, in round figures, 136,000 tons, this being 200,000 tons less than it would have been had wiser counsels prevailed. The loss of output involves a loss to the mining community of about \$200,000 in wages, of \$25,000 to the Nova Scotia Government in royalties, and a loss to the shareholders of the Dominion Coal Company of the profit which would have been earned on a turnover of half a million dollars, which in consequence of the strike, will be diverted to another market, and may not easily be recovered. Three cargoes of American coal have been delivered to the Steel Company at their piers, which adjoin the loading piers of the Coal Company. If the strikers needed an object

lesson in the direct result of their actions upon the coal trade of this island, they have no need to travel far from home to see one.

The final fate of the strikers is indicated by the company's outputs, which have risen from 2,700 tons on the second day of the strike to about 7,000—or half the maximum—at the conclusion of the fourth week. Each day records a steady gain, allowing of course for occasional and local dislocations caused by accidents and holidays, and a steady stream of newcomers are reporting at the mines for work, in addition to which there is a slow returning of strikers to their work.

Our previous estimate of the number of adherents in the mines of the company was 1,700 men and boys. This estimate was confirmed by a parade which was held by the strikers on Saturday, the 31st of July. Some 1,900 men and boys walked in this procession, and it included every man the U. M. W. A. could muster. It also included many men who never worked for



the company in their lives, and some of the "born-tireds" and "never-sweats" who usually attach themselves to parades of this kind. The usual working force of the Coal Company at this season of the year is about 7,000 men. Working about and in their mines, the company have at the present time a daily force of 3,000 men, to which must be added another 1,500 men, employed on the railway, in the shops, and other subsidiary operations of the company in Cape Breton. This leaves 2,500 men unaccounted for, and presumably on strike. The difference between the 2,500 men out of employment and the number who paraded in this procession is 600 men, who are the victims of lawlessness and ceaseless intimidation.

The intimidatory methods used by the strikers are new to Cape Breton. One favorite form of intimidation is the terrorizing of the wives and families of men who are at work, and this at times has reached such a pitch that men did not dare to



MILITARY GUARD, WITH MACHINE GUN.

leave their families unprotected or exposed to the tender mercies of the strikers and their families, that are more than cruel. Boycotting has been indulged in, and instructions have been issued by the U. M. W. A. locals to boycott tradesmen whose views are suspected to be opposed to those of the U. M. W. A. Threats have been made to the proprietors of boarding-houses whose boarders were at work, and they have been ordered by the U. M. W. A. to turn out all such objectionable persons. All kinds of secret and unmanly intimidation have been resorted to, and in addition there has been open lawlessness, the use of physical force by pickets, and assaults on workmen going to and from their work. As readers of the Canadian newspapers are aware, there has been one serious attempt to dynamite the house of an official of the company, and two other minor attempts of a similar kind on the houses of workmen. One old man, over 76

years of age, going to his sister's funeral, was slugged into unconsciousness by a U. M. W. A. picket, despite protestations of his sad errand. The U. M. W. A. disclaim officially all connection with these varied forms of outrage, but people comment caustically on the fact that the defence of these people in the magistrate's courts is made by lawyers associated with and paid by the U. M. W. A. The leaders of the U. M. W. have laid the powder-train and fired the bomb; are they not responsible for the results of the explosion? If they call a strike and cannot control the strikers, are they not responsible for the misdeeds of their followers? So far, however, the general public has seen no reason to disconnect the leaders of the U. M. W. A. with the tactics of their followers, and they have seen much to confirm an opposite belief. It is a coincidence, if nothing more, that the happenings which have accompanied strikes of the U. M. W. A. in other parts of this continent should make their appearance for the first time in Cape Breton simultaneously with the calling of a strike by the U. M. W. here, and the presence of U. M. W. leaders in Glace Bay.

As the strike goes along it becomes more than ever evident that it was not a genuine one, but an artificial agitation created and bolstered up by U. M. W. A. money and the trained strike-breeders of this depredatory organization. The strike has not arisen out of oppressive grievances, or out of a dissatisfaction with existing conditions, but it is the child of U. M. W. A. politics, and part of a carefully thought-out plan to obtain control of all the mines of Eastern Canada for the United Mine Workers of America. These U. M. W. gentlemen were wise in their day and in their way. They saw and marked well the inveterate attacks which certain Nova Scotian papers from time to time make upon the coal operators of the province, and they evolved a scheme to detach and break up the membership of the P. W. A. through the medium of party politics. This is a weapon which the U. M. W. A. have used many times before to-day, and in the particular instance under review they have displayed astute generalship, having made unconscious and willing catspaws of certain aspiring members of the Conservative party. Whether in the long run the U. M. W. A. are going to dish these political aspirants, or whether the last-named gentlemen are going to dupe the Americans seems uncertain, but between them both it is certain the strikers are going to be shamefully deceived and led astray. Whether the miners who have obeyed the irade of the U. M. W. A. to strike know it or not they have merely been the pawns in a game of political chess. Unfortunately, however, this game has involved the stability of the industrial fabric of this province, and bids fair to discredit for many years the fair name and financial credit of the Town of Glace Bay. But what is this to men who live in Kansas, U.S.A., or thereabouts?

The only serious argument which the U. M. W. A. have yet used to induce men to join them is the value of a big and strong union as a fighting force, compared with that of a small and weaker union. They have used this argument for all it is worth, with all the embellishments which so readily suggest themselves to the wordy demagogue. But is size the real test of the strength of a union? Is not unity the main source of strength in such organizations? We have all seen the loosely-made giant succumb to the attack of a smaller, but compactly knitted opponent. The U. M. W. A. lacks homogeneity and unity. It is full of warring cliques, and ere long will fall to pieces by reason of its own internal dissensions. The larger portions of the coalfields of the United States are non-unionized, and in many of the coal districts there the U. M. W. A. is a thoroughly discredited and impotent body, if it is in existence at all. It is in itself a confession of weakness when a union that boasts of such a large membership as the U. M. W. A., and of funds reaching into tens of millions of dollars (this is President McCullough's statement, not our own) should desert its own proper sphere, migrate to a remote place such as Cape Breton, and fasten itself upon one devoted corporation. Strong and progressive unions do not attack and attempt to destroy



smaller unions. However that may be, this time the U. M. W. A. have caught a Tartar, as time will prove.

The necessary legal steps were commenced by the Coal Company a week ago to obtain possession of some of the company's houses occupied by men on strike, as these houses were needed to accommodate the new-comers who are replacing the strikers. The Glace Bay "Standard," a paper whose policy is dictated by the Mayor of Glace Bay, has taken the extraordinary attitude of advising the strikers that the company's notices to quit are not worth the paper they are written on, and has further advised the striking tenants to use all necessary force to resist the officers of the law. This inflammatory advice is deluding many of the strikers into the belief that the company will not find it possible to evict them from their houses. These men will have a rude awakening, and if there is violence the "Standard" will be largely to blame. The connection between Mayor Douglas and the "Standard" is well known in Glace Bay, and it is not regarded as becoming or proper that the Chief Magistrate of the town should be so closely identified with a newspaper which is the avowed organ of the U. M. W. A., whose columns are packed with contemptuous statements with reference to every constituted authority in the land, not excepting the courts, which in the present state of public excitement in Glace Bay, are of an incendiary nature.

Nothing definite has been given out by the U. M. W. A. Executive with reference to the Springhill and Sydney Mines situation. To be consistent, a strike should be called at both places. At Sydney Mines the situation is exactly parallel with that which existed before the strike at the mines of the Dominion Coal Company. The U. M. W. A. has been non-suited by the award of a Conciliation Board, which recommended that the union be not recognized. This was regarded as a sufficient cause for a strike at Glace Bay. At Springhill, we understand, conditions are somewhat different. A Conciliation Board there has advised against a strike in the strongest terms possible, and the management of that mine have decided rather to close up than accede to the demands of the U. M. W. A., which as we showed in previous correspondence, were of the most fantastic and extravagant nature. Mr. McCullough, the Vice-President of the U. M. W. A., visited Springhill about the beginning of the first week in August, and he is reported to have threatened a sympathetic strike of the U. M. W. A. at the mines of the Cumberland Coal & Railway Company, and at those of the Nova Scotia Steel & Coal Co., should these companies dare to assist the Dominion Coal Company by supplying their orders. Mr. McCullough has not as yet called a sympathetic strike of the miners in the United States who have recently supplied 20,000 tons of American coal to the Sydney Steel Works. It is not in his power to do this. Yet this gentleman, who is impotent in his own country is allowed to go about Nova Scotia breathing threats against industries which are the very life-blood of our province. This same gentleman, whose business in our country is the destruction of its coal trade, is allowed not only to run his pernicious campaign with impunity, but is able to call upon the civil authorities of this town to afford him protection and to further his nefarious plans. We are a long-suffering people.

Another peculiar feature about this U. M. W. A. strike is the prominence given by the provincial newspapers to the utterances of the leaders, and the mendacious, incendiary, injurious reports with which these papers allow their correspondents to fill their columns. The following sample is from the "Halifax Herald" of the 4th of August, a paper which has several times posed as an accurate and unbiased journal:

"The output of coal is falling back, and it is said that conditions in the mines ARE APPROACHING CHAOS. Men are tearing out coal in any sort of fashion, and gear is SUFFERING FRIGHTFULLY AT THE HANDS OF INEXPERIENCED OPERATORS."

The capitals are a feature of "Herald" journalism with which all its readers are very familiar. The "Herald" lamely adds a saving clause: "This is report only." Reputable news-

papers do not publish "reports." They are supposed to be papers that disseminate news. Imagine, however, the impression which such a paragraph as that we have just quoted, will create in the mind of an untechnical and impressionable public, to whom at any time a coal mine presents itself as a dreadful and noisome hole which covers all kinds of fearful sights. The unfortunate part of yellow journalism is that the circulation of the paper must be considered before truth and decency, or even before the interests of the province.

Newspaper correspondents have not been content with despatching untrue reports, but one of them at least has taken a prominent part in the agitation, has addressed meetings of the strikers and assisted the leaders of the strike in every possible way. After identifying himself in all things with the U. M. W. A. this gentleman presented himself at the company's office and requested as the special correspondent of the "Toronto Star" that the company would favour him with an exclusive interview on the prospects of the strike from the company's standpoint, and further that he might be allowed to conduct "an impartial investigation behind the colliery barricades." This particular journalist should succeed in his profession. He is better acquainted with journalism than he is with mining, or shall we say, fisheries—but that is another story.

#### QUEBEC.

**Sherbrooke.**—Messrs. A. C. Ludlum, president of the New York Engineering Co., one of the foremost builders of gold dredges and placer drillers in America, J. F. McKenzie of Montreal, Wm. Marshall of Toronto, Dr. A. N. Worthington, M.P., G. R. E. Kennedy and Kenneth E. Kennedy spent some time last week on the property of the Compton Gold Dredging Co., at Moose River.

Mr. Ludlum was unable to find any fault with it as a dredging proposition, and expressed chagrin that while looking all over the continent for dredging ground, he should have overlooked such as this, right at hand, and surprise at the apathy and blindness of local capital. Negotiations are now in progress between his company and the Compton Gold Dredging people, and if these and the checking up are satisfactory, Mr. Ludlum says he can put on a dredge by November or December. Otherwise, it will be postponed until spring. Mr. Ludlum also went to Goleonda, and will submit a plan for a small dredge to the Goleonda Gold Mining Co., that may solve the difficulty there, as there is no question about the gold in the gulch.

By the way, it is amusing to note the look of superior wisdom on the average Sherbrooke man's face when, in reply to his own queries, you tell him there is gold in paying quantities in the Townships, if only modern methods are utilized. He knows a long sight better, or he knows more about it than you do, or he thinks you're batty, or that you're trying to do him—think of it—him! Why, your little companies are not dominated by Messrs. the Local Magnates, nor even advised by their oracles! Go to!

One fellow who watched the party panning on Moe's River exclaimed: "Gosh dum it, is that gold? Why, dad, he useter find that yaller stuff 'n we thought 'twas brass, 'cause there wa'n't no gold 'cept in Californy 'n th' banks."

On Friday the party, accompanied by Mr. F. S. McKay and Dr. A. W. G. Wilson, of the Mines Department, Ottawa, went to Ditton to look at the gold placers there, in autos driven by Messrs. J. McCrea and W. S. Downs. Only two pans of gravel were washed, but the estimated value of the gold contents was high, running several dollars to the cubic yard. The short time available did not allow of any extended examination and the best ground on the broader flats could not be gone over. On the return to catch the New York train, the machines hit only the high places, and no remarks were heard from either the U.S. or Old Country contingent about the slowness of Canadian methods.



The chief known deposits of chromite in Quebec are at Coleraine and Black Lake and the production is steadily increasing. The annual output will soon reach 20,000 tons.

The Montreal Chrome and Iron Co., and the American Chrome Co. are two of the principal operators.

Iron ore is now treated chiefly at Drummondville and at Radnor Forges. As there are extensive known deposits in Wolfe, Sherbrooke, Brome and other counties, the erection of a customs smelter near Sherbrooke is much desired.

Three large granite quarries are now in operation in Stanstead, employing 150 hands.

The Dominion Lime Co. produces a considerable quantity of lime at Lime Ridge, in Wolfe County, at the northern terminus of the Maine Central Railway.

The slate quarries at Rockland, in Richmond County, are being worked extensively and profitably.

Dr. A. W. G. Wilson, of the Mines Department, Ottawa, spent Monday at Golconda, and was favorably impressed with the showing on the placer.

He left town Wednesday morning, in company with Mr. John McCaw, to visit the latter's property at Brompton Lake, and also the old nickel mine belonging to Col. Eustis.

Mr. Wm. Marshall, who came from Montreal some ten days ago, to inspect the property of the Compton Gold Dredging Co., at Moe's River, and went from here to Nova Scotia, was obliged to return last week to Montreal in connection with his case against R. G. Leckie, which has been dismissed, and a civil suit is pending.

Mr. Marshall has become interested in the Compton Gold Dredging Co.

#### ONTARIO.

**Cobalt.**—On Friday, July 16th, a discovery of importance was made on the property known as the Cobalt Reserve, which was one of the lots of the Gillies Timber Limit, purchased in the recent sale by Mr. J. H. Waldman, of Montreal. The property was formerly known as Lot No. 22, and is located only one lot distant from the Silver Bar mine. The find was made in the northeast corner of the property and has now been traced for a considerable distance. The vein varies in width up to eight inches, and contains very high silver values, and in many respects it is very similar to the famous surface showings of the Lawson and the Temiskaming & Hudson Bay. Further work on the vein shows that it continues into the adjoining property, owned by O'Brien and Young. This new find has given a great impetus to the work being done on the Limit, and as a consequence the number of men engaged in prospecting has been greatly increased. Another find that is also claiming a great deal of attention is that made recently at the Provincial mine. Up to date the property, which is worked by the government, has made an exceedingly poor showing, and diamond drilling was resorted to in an effort to locate veins. When the hole was down about 120 feet below the surface, high grade ore was encountered. The mineralized area is about three feet wide and in the centre there is a six inch vein carrying high values in native silver.

There is a good deal of active development work going on in the Montreal River Mining Division this summer, and from time to time valuable discoveries are reported. On the diabase ridge that runs from the centre of Smythe Township, several properties have changed hands at a good figure. The most recent sale of importance was the Cleaves claims, which have been purchased by Boston capitalists. The following table, giving the approximate number of boiler and compressor plants, will help to give an idea of the work being done.

	Compressor Capacity Cubic feet Boilers. free air H.P. per minute	
<b>ELK LAKE DISTRICT.</b>		
Ribble Property .....	95	410
Diabase Mining Company .....	30	
Gavin Hamilton .....	80	410
Big Six .....	100	410
Cummings .....	100	330
Elk Lake Discovery .....	110	585
Moose Horn .....	120	330
Elk Lake Cobalt .....	100	585
Toledo Silver .....	60	330
<b>SILVER LAKE DISTRICT.</b>		
Otisse .....	160	825
North American .....	30	
Silver Lake .....	20	
Otisse Currie .....	90	825
<b>MILLER LAKE DISTRICT.</b>		
Big Six .....	80	823
Blackburn .....	120	660
Bonsall .....	100	330
<b>GOWGANDA.</b>		
Bartlett .....	160	1160
Boyd Gordon .....	100	585

It is interesting to note that in the Blackburn mine, which is supposed to be about the best in the district, the values are found in the Conglomerate

The Jumbo mine, near Latchford, is installing a 60 horse-power boiler and a three drill compressor

The Crown Reserve is putting in several more machine drills.

The Trethewey is starting to put in a concentrator, and the ground is being graded preparatory to building. It is reported that the balance of the treasury stock, amounting to about 45,000 shares, will be issued to the stockholders at par, to defray the cost of erection.

Mr. J. Reynolds, of Goldfield, Nevada, is sorting the Right of Way dump on a royalty basis. It is understood that the mine is to get fifty per cent. of the gross value.

A new vein of high grade ore has been found on the Mann property in Gowganda. The vein is only about an inch and a half in width, but carries large quantities of native silver.

The shaft of the Painkiller Lake Gold Mining Co., in Munroe Township, is down 25 feet and the vein is of good width in the bottom of the working. It is expected that this company will put in a stamp mill next winter.

Some good ore is being taken out of the Rochester from the 65-foot level. The lower workings of the mine are not proving satisfactory so far, so the drills were put on the upper level and some good ore was encountered.

The Beaver is putting on more drills since they started their plant running, and they now have three in operation. Their vein periodically pinches out and then widens again, and when it widens, good ore is usually found.

The Station Grounds Mining Company now has three diamond drills at work prospecting their veins at depth, and the future development will be governed largely by the results obtained. Negotiations are under way to obtain one of the shafts of the Nipissing located north of the T. & N. O. Station. The headworks were destroyed by the recent fire, and if the shaft can be obtained, these will be rebuilt.

At the 200-foot level of the Shamrock mine, a two-inch vein of cobalt was discovered.



Mr. S. D. Maddin has disposed of two lots on the Gillies Timber Limit, known as A12 and A13, purchased in the recent sale, to Messrs. A. Waldman and C. Pierce, of Montreal.

The vein found in the crosscut at the 195-foot level of the Cobalt Lake mine, has widened from three to four inches, and consists of calcite carrying high values in silver.

At the Kerr Lake Majestic, which was recently acquired by the Kerr Lake, a shaft is being started near the shore on the west side of the lake. The shaft will be sunk down through the diabase.

A surface find of some importance has been made at the Foster mine. This property is controlled by the Nevins interest of the Cobalt Central.

Two crosscuts have been started from the 110-foot level of the No. 1 shaft of the Nova Scotia to develop some of the veins recently found on the surface. The shaft started a short time ago on the Bilsky vein is down over 25 feet and the vein in the bottom is about six inches wide.

Good progress is being made on the construction of the Temiskaming mill and the crushing end will soon be completed. This is distant about 300 feet from the main part of the mill, and the ore will be carried between the two places by an aerial tram.

A discovery that means a good deal to the camp was made a short time ago at the Buffalo. The drift on the No. 3 vein at the 200-foot level was run past the contact between the conglomerate and the Keewatin into the latter formation. When in about 75 feet, the Keewatin gave place to Huronian slates and the values came back into the vein. The ore consists of cobalt carrying high values in silver, and the vein is from two to five inches in width.

The failure of the directors of the Coniagas to declare the regular dividend came as a surprise to everyone. A statement has been issued giving as the reason that the money is needed for the improvements to the mill and smelter, and for the purpose of buying custom ores. It is felt generally that this is not the real reason. Last November there was a balance of over \$300,000 in the treasury, and since that time the ore production has been greater than ever before. The mill is in good condition and it is probable that there is not another mine in the camp that has such large ore reserves as the Coniagas.

Some good ore was recently encountered at the 200-foot level of the Green-Meehan, and the condition of the mine seems to be much improved.

A general meeting of the shareholders of the John Black Mining Company and the Black Mines, Limited, was held in Montreal, for the purpose of considering a scheme to amalgamate the two companies. The scheme was adopted by the shareholders, and the new company will be known as the Black Mines Consolidated, Limited. The capital is \$3,000,000, with half a million shares in the treasury. The new company will take up the stock of the old companies on a share for share basis, together with all their property, assets, etc. Besides the two properties in Coleman Township, they hold one claim on the Montreal River and seven claims in the Gowganda and Miller Lake districts.

The Keeley mine in South Lorraine has encountered a very rich ore shoot at the 125-foot level. The Wettlauffer mine, in the same district, has also run into good ore at the 60-foot level.

Four hundred feet south of the Bilsky vein of the Nova Scotia mine, a new vein was discovered on July 26th. The ore consists of cobalt with small silver values.

Three drills are now working on the Beaver developing the veins and sinking a winze. The winze was started on the main vein and will be continued for 100 feet. This will be the deepest working of the mine and will have a total depth.

In the drift on the main vein of the Peterson Lake lease of the Little Nipissing, the vein widened from a mere stringer to

between four and eight inches of smaltite and niccolite. The drift is on the 160-foot level and is about 400 feet under the lake.

The concentrating end of the O'Brien mill will soon be in a position to start running. There are only 10 stamps to this end, the remaining 30 being used for the cyaniding. The cyanide plant will not be in operation for some time yet, as there are several parts yet to be finished. When the mill is completed it will be the largest in the camp, and will have a capacity of between 125 and 150 tons per day. This property has a small electric line operating between the mill and the different shafts for the purpose of transporting the ore, and the branch to the No. 1 shaft is already completed. The other branches are already graded and are ready to have the rails laid.

In sinking the shaft of the Ophir Cobalt, a blind vein was cut at the 75-foot level. The vein carries good values in native silver.

An important discovery has been made on the Nipissing property near Shaft No. 54. The vein is about ten inches wide, and through the centre there are six inches of cobalt ore carrying very high values in silver. The vein has now been stripped for a distance of 200 feet.

The mill at the McKinley-Darragh is unable to handle the present tonnage and it is proposed to increase the capacity by the addition of ten stamps and the necessary equipment.

The shaft of the Cobalt Central is to be sunk an additional 50 feet. No. 4 vein, which for some time has been carrying small values, has widened out and now carries high grade ore varying in width up to eight inches.

The Silver Cliff is considering the erection of a concentrator. The main workings of the mine are carried on from two tunnels. No. 1 tunnel is now in 370 feet and has to be driven 100 feet more before they cut No. 3 vein, which will be started about September.

**Gowganda.**—Prospecting has been considerably hampered for the past month or so by the flies. People are, however, flocking in again, now that the fine weather is commencing. Shining Tree and Duncan Lake districts are the centre of the rush at present.

A new strike of ore running 5,000 ounces to the ton has been made on the Gowganda Four.

A syndicate of Montreal men, known as the Everett Silver Cobalt Syndicate, have been doing prospecting work on a group of twenty-five claims in the vicinity of Everett and Miller Lakes, which they have under option until September. Three camps have been established, and a force of 100 men are at work.

The preliminary surveys for a branch line of the Temiskaming & Northern Ontario Railway, from Charlton to Gowganda, have now been completed.

Work on the wagon road from Elk Lake to Gowganda has not been making much headway and it is doubtful if the road will be completed before late in the fall.

#### BRITISH COLUMBIA.

**Rosslund.**—It is not anticipated that there will be any great delay in the resumption of work at the Le Roi mine, now that Managing Director McMillan is again on the ground, having returned from a successful business trip to London. While it is not expected that heavy shipments will be made for some time to come, yet it is welcome news to men interested to hear that the plan of development is about to be put into operation. Men who are acquainted with the conditions of mining here are quite sanguine as to the outcome of the development of the lower levels of the Le Roi, and believe that large quantities of the rich ore of like character to that recently found on the 1,650-ft. level will be located.

In the Centre Star group of the Consolidated Mining & Smelting Co. of Canada good ore is being opened up in all parts



of the property. New lodes have been located on the 500-ft. level of the Centre Star; while the same level in the War Eagle is producing a heavy tonnage of \$16 to \$22 ore, most of this coming from the main vein. A big body of \$14 ore has been opened up on the eighth level of the War Eagle and the two most important Centre Star veins have been located in the depths of the Iron Mask and Idaho claims, and are yielding part of the output of the mine. At a rough calculation, the gross profits of the Centre Group during June were over \$100,000, and the net profit would be approximately one-third of this figure or over. This is figuring on a liberal charge for smelting, etc., the profit on which this concern also derives from the benefit of its own smelter. In reality the net profit on both mining and smelting operations of the Consolidated in this district are a great deal higher than appears when the operations at the mine alone are figured.

At the Trail smelter another new copper furnace has been put in operation, this being found necessary owing to the growing shipments from the company's own mines, as well as increased quantities of custom ore received. This now gives the Trail plant four copper furnaces and a large lead stack—a total capacity of over 2,000 tons per day. The lead furnace, which has just been fitted with mechanical feed, is capable of treating 250 tons of lead ore per day, producing about 130 tons of bullion. The capacity of the lead refinery is now 100 tons per day. It is the intention of the management of the smelter, however, to continue enlarging and improving the plant as the future points to a heavy treatment of company and custom ore.

A car of picked ore was shipped to Trail from the Hattie Brown mine during the past week. Development work, which is progressing steadily on this property, is making good headway and the results are all that could be expected at this stage of the work.

The shareholders of the Le Roi 2, Ltd., have received a second dividend this year of two shillings per share, while it is thought that further dividends of four shillings per share in all will be paid from the earnings of the mine during this year. Some people would wonder how the Le Roi 2, Ltd. could pay dividends of eight shillings per share when so many other mines hereabouts seem to find it almost impossible to work at a profit. While the monthly tonnage is only about 2,200-2,400 tons, still the average ore shipped goes \$22; the mine is operated on an economical scale, and while the plant is ample for all present work, there is no ponderous machinery lying about idle from which depreciation, etc., must be written off. The magic word, "mine economy," seems to be the open sesame to the Le Roi Two dividend vault. It is almost safe to say, furthermore, that there is little doubt but several other Rossland mines could be paying dividends had they not drifted into debt, etc., in the reckless days of the boom in this district.

**Boundary.**—The outlook for mining in this district during the balance of the year is most propitious. The B. C. Copper Co. now has a small force of men at work getting the mines and smelter in shape for the resumption of work next week. The coke supply is about all that is required to start work with and the trouble between the company and the Greenwood Miners' Union has been adjusted, the union having accepted the scale of wages offered by the Copper Company, and the latter corporation giving the union the same recognition as is accorded it by other operating companies in the Boundary. The B. C. Copper Co. is planning the enlargement of its smelting plant, the first step in this direction being the lengthening of the 20 ft. x 56 in. furnace, 10 feet. The two other copper furnaces in this smelter are 46 in. x 20 ft. Now that the Lewisohn interests have become so markedly identified with B. C. Copper affairs, it is likely that some sort of a working arrangement will be made between the New Dominion Copper Co. and the B. C. Copper Co., whereby the mines will be worked under one management and the smelting operations centralized at Greenwood.

Whether this will take the form of a merger or not has not been decided as yet. The arrangement would be a profitable one for both concerns. Even though the B. C. Copper Co. does not ultimately treat the ore from the New Dominion mines, the smelter will be handling a heavier tonnage than heretofore, as railway facilities will soon be built to the company's Wellington and Central camp mines, tapping the Lone Star mine in Washington as well.

The Granby Co. is preparing for heavy shipments from the Monarch claim of its group which lies south of the Gold Drop. An immense body of ore has been developed in the Monarch by diamond drill, etc., and workings are now being driven on this ore from the Gold Drop, the work being done in such a manner that every advantage will be taken of a gravity haul of nearly 3,000 feet to the huge crusher above the railway tracks. The shipments of ore from this district for the week ending July 10th amounted to 17,837 tons, which it is expected will be about as low as they will get again this year, the shipments for the following week showing a gain of over 2,000 tons, and there now being six of the enlarged furnaces in operation at the Granby smelter and the last two expected to be finished in October, the output will gradually climb until the high record of 34,957 tons for the week ending Feb. 13th will be exceeded. The week ending May 22nd holds the low record for the year with 15,680 tons.

A carload of thirty tons of ore was sent to the Grand Forks smelter from the Little Bertha mine during the past week. No shipments were made by the Golden Eagle since the 60-ton shipment in the early part of the month, and the force has been cut down, temporarily, it is stated.

Considerable surface stripping, etc., is being done on the Snowshoe mine of the Consolidated Company, with a view to increased shipments from this time on. It is likely that "glory hole" operations will be carried on at some of the surface showings.

On the Oro Denoro mine, where diamond drill exploration is being carried on, a new body of ore of considerable magnitude has been located.

A contract has been let to drive a tunnel 400 feet on the Le Roi claim, this district. Two ledges will be cut by this adit, which on the surface carry ore of good value.

**Nelson.**—The Fort Steele Mining & Smelting Co., which, it is understood, is a subsidiary company to the Federal Mining & Smelting Co., the principal bondholder in the Sullivan Group Mining Co., bought in all the mines, smelter and supplies of the last named company at sheriff's sale a few days ago. This will mean the winding up of the affairs of the Sullivan Group Mining Co. and it is likely that the shareholders will get very little to show for their white chip. The creditors of the company are to be provided for in a special stock issue which will be redeemable at par. The Federal Company held about \$225,000 bonds in the Sullivan Company. The smelter is said to be worth nearly \$400,000 and there are about 150,000 tons of ore blocked out in the mine, carrying an average of 15 per cent. lead and 6½ oz. silver.

A force of about twenty men is at work opening up the big copper property on Moresby Island, which A. B. W. Hodges, of the Granby, and associates, are interested in. From present appearances, the Moresby copper deposits will far exceed those of the Boundary, the mining conditions being all that could be asked for. The ore is rich in copper and gold, contains enough lime and iron to smelt well, and then there is the advantage of cheap water transportation to the smelter and market.



## GENERAL MINING NEWS.

### NOVA SCOTIA.

**Glace Bay.**—What is said to be the first exhaust steam turbine engine in Canada is shortly to be erected in the Central Electric power house of the Dominion Coal Company at Glace Bay. The plant will consist of one 1,000-kw. generating unit. The turbine will be of the Rateau design, impulse type, and will utilize exhaust steam at about atmospheric pressure, or 15 lbs. absolute.

The text of the report of the board of conciliation in the Springhill mining trouble, given out on July 29, is a blow to the United Mine Workers. Judge Longley, chairman, Charles Archibald, for the company, and E. B. Paul, for the men, constituted the board. Recognition of the union, determination of the standard weight of a box of coal, a schedule of prices and a docking system, were the demands. There are about forty thousand words in the report, the general conclusion of which is favourable to the company. Recognition or non-recognition of unions is left to the company, the board finding that the employers should say how far they will recognize organizations having central authority outside of Canada and controlled by interests that may be in acute competition with those of this country. The demand for schedule rates is refused as involving an increase of forty per cent. to those working underground and twenty-eight per cent. to surface men. The losses of the company on three years are said to have been \$300,000, and under the circumstances the board thinks it unreasonable and impracticable for employees to expect increased rates. Strained relations between the management and the men have resulted in 26 strikes in 22 years, and the board thinks the directors should look into this. While Mr. Paul agrees in the main with the conclusions, he submits a memorandum to the effect that recognition of the United Mine Workers local would allay friction. He thinks also, there should be a rate schedule.

### ONTARIO.

**Ottawa.**—The increased trade development and improved financial conditions are resulting in a greater demand for the coinage of silver and copper at the Royal Mint. Just at present the institution is undergoing repairs, but an unusual amount of activity is promised when it resumes next month. Very little gold so far has been refined, but a contract has been let for a refinery building. When this is completed a bigger gold coinage is expected.

At the Finance Department it is stated that the arrangements are practically completed with the banks for the redemption at 75 per cent. of face value of plugged coins. The Receiver-General will redeem them through the medium of the banks.

**Cobalt.**—The two parallel veins on the Peterson Lake lease of the Kerry Mining Company look well, and good ore is being

taken from them. Seventy feet of drifting has been done on the one and fifty on the other. The shaft on the property is now down 200 feet.

**Sault Ste. Marie.**—A Michipicoten iron ore deposit has been purchased by the Lake Superior Corporation from a group of Michipicoten owners.

### BRITISH COLUMBIA.

**Phoenix.**—The Greenwood-Phoenix tunnel is in 200 feet and advancing three feet per day by hand labor.

**Kaslo.**—Four hundred tons of zinc ore were shipped from Kaslo during the second week of July.

**Nelson.**—The rehabilitation and restoration to the shipping list of the best known silver-lead properties on Kootenay Lake, the Highland and the Buckeye, which have now been amalgamated to be known as the Highland-Buckeye, which made its first shipment for some years past to the Consolidated Company's smelter at Trail last week, means much to the Ainsworth camp and the Kootenay district generally.

The property has only been owned by its present operators, a New York syndicate, of which J. S. Airheart is manager, since June 5th last. Already rapid progress has been made in the way of cleaning things up around the mine and in getting the mill, having a capacity of 200 tons, into readiness for operation.

The mine is situated two miles north of Ainsworth at a height of about 2,000 feet above the lake and about one mile from the shore, where is located the mill, which is connected with the mine by means of an aerial tramway.

Since the property was taken over last month from W. J. Wilson and associates it has been worked to its fullest capacity and is now in a position to make regular shipments. The shipment which will go forward this week will be crude ore, which is expected to run between 60 and 70 per cent. lead and between 25 and 30 ounces of sliver.

A large force of men are employed at the mine and now that shipments have been resumed, the staff will be considerably increased.

The Highland is one of British Columbia's most famous mines, having in 1903 been the largest shipper in the province, while in the following year it was second only to the St. Eugene.

A good showing of ore has recently been located in the No. 2 tunnel, where it had been lost by the previous operators of the property, and good bodies of ore are also being worked in the No. 1 and No. 3 tunnels.

The future development of the Highland-Buckeye will be watched with a good deal of interest by Kootenay mining men generally.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

The Scottish coal owners decided on July 8th to post notices forthwith intimating a reduction of wages by 12½ per cent. on the 1888 basis, dating from July 26th. It is possible that a peaceful solution of the difficulty may yet be reached. In any case it is expected that no sympathetic strike will occur in the Welsh and English fields, in the event of the Scottish Miners' Federation calling out the men.

For the first six months of 1909, the returns of the Welsh coal trade show 12,909,950 tons exported, as compared with 12,272,540 tons in 1908. The figures for June are 2,037,599 tons, as against 1,876,563 tons for June, 1908. The highest price for best Cardiff coal in June, 1908 was 16s. 6d., the lowest, 16s. The corresponding figures for this year are 22s. and 16s. 6d.

The special conference of the Miners' Federation of Great Britain to receive the result of the ballot which has been taken



in the mining districts throughout England, Scotland and Wales as to whether there shall be a general stoppage in the event of the Scottish coal owners persisting in giving notices to their workmen, was held in London on July 28th.

So overwhelming has been the vote for a general stoppage in support of the Scottish miners that the preventing of a strike at practically all the coal mines of Great Britain depends now upon the success of the Board of Trade negotiations for a settlement.

Opinion on that critical point is divided, though the best opinion in the Federation is that a settlement will be effected without a stoppage. It may be stated that the Scottish delegates are not so optimistic as their English colleagues as to the prospect of an immediate settlement. In the opinion of Mr. Smillie, the President of the Scottish Miners' Federation, the outlook is very bad, but this pessimistic view of the situation is not shared by others who have taken part in the joint conferences. There is a reasonable prospect of a settlement. Mr. Askwith, K.C., who presided at the second meeting of the Board of Trade on Friday and at Glasgow on Tuesday, has proved a skilful mediator, smoothing away points of difference and suggesting points of concession and agreement.

The conference began its sitting at two o'clock, and the proceedings lasted for less than an hour and a half. Mr. W. Abraham, M.P., South Wales, presided in the absence through illness of Mr. E. Edwards, and there were present 130 delegates.

The proceedings were private, but at the adjournment Mr. A. Stanley, M.P., presented the following official report:

"The conference is called specially to receive the result of the ballot taken of the members upon the question whether or not the whole of the Federation shall put into operation the twentieth rule and declare a general stoppage in sympathy with the Scottish miners in their determination to resist a demand of the Scottish coal owners for 12½ per cent. reduction in wages. The result showed that 518,361 had voted for a general stoppage and 62,980 against, giving a clear majority for a stoppage of 455,381."

The deputation who had been appointed by the Federation to assist in the negotiations before the Board of Trade and also with the Scottish coal owners on the matter gave a report of these transactions, and the following resolutions were carried unanimously:

"That unless a satisfactory settlement be arrived at tomorrow with regard to the Scottish dispute, notices be given in all districts to terminate contracts to end on the last day of August.

"That in view of the ballot of the Federation being so strongly in favour of a general stoppage, financial support equal to 10s. per week be paid to the Scottish miners during their preliminary stoppage, and that the carrying out of this resolution be delegated to the Executive Council."

The thickest seam of coal proved in Kent was discovered on July 23rd in one of the borings between Canterbury and Dover at a depth of only 1,459 feet from the surface. The seam proved to be 5 feet 9 inches in thickness, some fine samples of clean, bright coal being brought up in the large core barrel. This is the fourth seam discovered in the same boring.

#### UNITED STATES.

On coal the duty has been decreased from 67 cents a ton to 45 cents. Last year from the Maritime Provinces and British Columbia mines there was shipped to the New England and Pacific States markets coal to the value of \$4,041,562. The reduction of the duty on coal is one of the most important features of the new tariff from the Canadian standpoint. The placing of hides on the free list is also likely to be of material benefit to Canadian exporters. Last year Canada exported to the States hides to the value of \$1,308,551.

The reduction in the duty on agricultural implements from 20 per cent. to 15 per cent. is hardly likely to have any effect on

Canada. The American market can be controlled by the American manufacturers in any event. Last year our exports of agricultural implements to the States amounted to only \$15,459.

#### MEXICO.

A gigantic steel plant will be established in Mexico City within the coming year by French and American capital. The initial outlay will be \$50,000,000.

Victor Belanger, of Paris, is the head of the concern. It is understood that a part of the capital will come from Paris and Boston. Coal and iron mines in Buffalo will be acquired later by the company. The steel will be manufactured by a new and secret process.

#### SOUTH AFRICA.

The directors of the City Deep, Ltd., have offered a handsome bonus to the Victoria Falls and Transvaal Power Company, Ltd., to supply power this month, thus accelerating production by some three months ahead of what has been anticipated.

According to official returns, the value of the mineral output of the Transvaal for the half year which ended on 30th June last was £16,723,785, of which gold represented £15,472,409, and diamonds £580,807. The total decrease, as compared with the previous half year, was £114,010, of which gold accounted for £57,403 and diamonds for £133,682. Coal and other minerals showed an increase of £79,348, while silver decreased by £2,268.

#### AUSTRALIA.

The value of the mineral exports from New South Wales for the half year ended 30th June was as follows: Silver, £86,199; silver-lead concentrates, £480,575; lead matte, £91,679; copper, £296,750; tin, £142,049; coal, £1,193,042.

The discovery of rich gold-bearing ore at Ballarat has been officially reported to the Government. The strike runs in a northerly direction, almost under the centre of the city. The fact that most of the operations have hitherto been carried on in a southerly direction enhances the importance of the discovery.

## Company Notes.

The Coniagas, which passed its last dividend, as a matter of policy rather than necessity, has paid the following dividends since its inception:—

Date.	P.C.	Bonus.	
1907—May 1 .....	2		\$80,000
June 1 .....		1	40,000
July 1 .....	2		80,000
September 1 .....	2		80,000
November 1 .....	2		80,000
1908—January 1 .....	2		80,000
March 1 .....	2		80,000
May 1 .....	2		80,000
July 1 .....	2		80,000
November 1 .....	3		120,000
1909—February 1 .....	3		120,000
May 1 .....	3		120,000
Total .....	25	1	\$1,040,000

The Kerr Lake dividend for the third quarter of 1909, announced at 30c per share, brings the total disbursements of that mine up to a total of \$1,320,000, or 38 per cent. on a total capitalization authorized and issued of \$3,000,000. The par value of the shares is \$5.



# STATISTICS AND RETURNS.

The Dominion Coal Co.'s shipments for July totalled 203,982 tons.

The output of coal from the mines of the Nova Scotia Steel & Coal Company for the month of July totals 74,613 tons, and in addition 24,300 tons lifted from the coal bank. This output is considered very good, especially as the days worked for the month numbered only twenty-five, making the average 3,000 tons daily.

Shipments from the collieries of the Cumberland Railway & Coal Co. for the month of July were 29,295 tons.

Shipments of ore from Cobalt camp for the month of July totalled 2,715 tons, as against 3,323.74 tons in the preceding month. There were 21 shippers, and they sent out 106 cars. In the seven months the camp has shipped 18,006.20 tons, which compares with 25,361.10 tons in the whole of 1908. The monthly totals are:—

	Tons.
January .....	2,374.03
February .....	2,113.94
March .....	2,447.90
April .....	2,482.83
May .....	2,508.71
June .....	3,323.74
July .....	2,715.05
	<hr/>
	18,006.20

Consolidated Mining & Smelting Co. of Canada, Ltd., reports the ore receipts at the Trail smelter, in tons, for the week ending July 31st, and year to date, as follows:—

Centre Star .....	3,349	99,091
St. Eugene (Concen.) .....	453	13,971
Snowshoe .....	4,083	70,706
Other mines .....	1,599	25,411
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Total .....	9,484	209,179

## COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending July 21, and those from Jan. 1, 1909, to date:—

	July 31.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Chambers-Ferland .....	60,430	900,070
Cobalt Central .....	40,180	477,804
Coniagas .....	62,520	051,525
Crown Reserve .....	63,000	3,506,379
Kerr Lake .....	60,700	1,298,146
La Rose .....	260,000	7,458,023
McKinley-Daragh .....	57,300	1,115,206
Nipissing .....	187,280	7,936,393
O'Brien .....	64,030	1,482,542
Right of Way .....	123,330	2,032,691
Silver Cliff .....	60,820	60,820

Ore shipments to July 31, 1909, from Jan. 1, are 34,837,962 pounds, or 17,418 tons.

Total shipments for week ending July 31 are 1,039,590 pounds, or 519 tons.

## COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Aug. 7, and those from Jan. 1, 1909, to date:—

	Aug. 7	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Buffalo .....	42,250	748,678
Chambers-Ferland .....	60,940	961,010
City of Cobalt .....		938,522
Cobalt Central .....		477,804
Cobalt Lake .....		79,960
Coniagas .....	91,799	1,043,315
Crown Reserve .....	181,700	3,688,079
Drummond .....		920,000
Kerr Lake .....		1,298,146
King Edward .....		183,740
La Rose .....	258,400	7,716,423
McKinley-Darragh .....		1,115,206
Nipissing .....	128,690	8,065,083
Nova Scotia .....		480,810
Nancy Helen .....		83,400
Peterson Lake .....		241,110
O'Brien .....	83,200	1,565,742
Right of Way .....		2,032,691
Silver Queen .....	175,710	431,045
Silver Cliff .....	63,000	123,820
Temiskaming .....		1,446,820
Trethewey .....	128,860	1,296,698
Temiskaming & Hudson Bay .....	64,000	1,106,260
Muggley Consolidated .....		72,900

Ore shipments to Aug. 7, 1909, from Jan. 1, are 36,116,502 pounds, or 18,058 tons.

Total shipments for week ending Aug. 7, 1909, are 1,278,500 pounds, or 639 tons.

## BRITISH COLUMBIA ORE SHIPMENTS.

For week ending July 31st:—

Boundary—	Week.	Year.
Granby .....	18,763	570,407
Snowshoe .....	4,083	71,706
Golden Eagle .....	60	390
Other mines .....		140,654
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Total .....	22,906	783,157
Rossland—		
Centre Star .....	3,349	99,091
Le Roi No. 2 .....	628	17,732
Le Roi No. 2 (milled) .....	260	7,640
I. X. L. .....	59	74
Other mines .....		9,487
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Total .....	4,296	134,024
Slocan-Kootenay—		
Queen (milled) .....	420	12,390
Granite-Poorman (milled) .....	250	7,350
Whitewater Deep (milled) .....	700	20,000
Kootenay Belle (milled) .....	70	2,070
Second Relief (milled) .....	145	4,280
Nugget (milled) .....	110	3,250
Bluebell (milled) .....	900	26,600
St. Eugene .....	453	12,871



	Week.	Year.
Silver King .....	222	2,228
North Star .....	169	634
Van Roi .....	102	369
Silver Cup .....	45	846
Cork .....	39	164
Second Relief .....	34	175
Granite-Poorman .....	30	288
Yankee Girl .....	22	475
Rambler-Cariboo .....	22	475
Other mines .....		13,060
<b>Total</b> .....	<b>3,738</b>	<b>108,905</b>

The total shipments for the past week were 30,941 tons, and for the year to date 1,026,086 tons.

**SMELTER RECEIPTS.**

Granby, Grand Forks .....	18,763	570,767
Consolidated, Trail .....	9,484	219,680
Le Roi, Northport .....		12,761
B. C. Copper Co., Greenwood ....		140,505
<b>Totals</b> .....	<b>28,247</b>	<b>943,713</b>

For the first six months of 1909 Granby Consolidated has produced in round figures 12,000,000 pounds of copper—a recovery of 24 pounds of copper to the ton upon 495,000 tons of ore treated.

In this six months period Granby has earned a profit of about 3 cents per pound upon this product, which would be equal to about \$2.75 per share.

Granby will place in commission two more of its enlarged furnaces. In a few weeks the entire battery will have been enlarged, and then the Granby will be able to produce 35,000,000 pounds of copper per annum at a 10-cent average cost. Such output and cost would indicate net earnings of \$8 per share on 13-cent copper and \$2.50 per share additional earnings for every 1-cent advance in copper.

**RHODESIAN GOLD OUTPUT.**

The total output of gold from Rhodesia for the month of June is cabled as 51,678 ozs., valued at £217,600, as against 53,467 ozs., valued at £225,032, in the previous month. This is a decrease on the month of £7,432. There were 229 gold producers last month. The output of other minerals for last month was: Silver, 23,049 ozs.; lead, 83 tons; coal, 16,347 tons; copper, 9 tons; chrome ore, 4,207 tons; asbestos, 20 tons.

The following table shows the monthly gold returns in sterling, for six months of 1909:—

January .....	£204,666
February .....	192,497
March .....	202,157
April .....	222,700
May .....	225,032
June .....	217,600
<b>Total</b> .....	<b>1,264,652</b>

**TORONTO MARKETS.**

**Metals.**

Aug. 9.—(Quotations from Canada Metal Co., Toronto.) Spelter, 5¼ to 5½ cents per lb. (Market strong).

Lead, 3.4 to 3.5 cents per lb.  
Antimony, 8 to 9 cents per lb.  
Tin, 30½ cents per lb.

**Copper—**

Casting, 13.5 per lb.  
Electrolytic, 13.75 cents per lb.  
Ingot brass, 9 to 14 cents per lb.

Pig Iron.—Aug. 9.—(Quotations from Drummond, McCall Co.)—

Summerlee, No. 1, \$22 (f.o.b. Toronto).  
Summerlee, No. 2, \$21.50 (f.o.b. Toronto).  
Midland, No. 1, \$19.50 (f.o.b. Toronto).

**Coal—**

Anthracite, \$5.50 to \$6.75.  
Bituminous, \$3.50 to \$4.50 for 1¼ inch lump.

**MARKET REPORTS.**

**Coke.**

Aug. 5.—Connellsville coke, f.o.b. ovens—  
Furnace coke, prompt, \$1.60 to \$1.70 per ton.  
Foundry coke, prompt, \$1.85 to \$1.90 per ton.

**Metals.**

Aug. 5.—Tin, straits, 29.40 cents.  
Copper, prime lake, 13.50 cents.  
Electrolytic copper, 12.90 to 13 cents.  
Copper wire, 15 cents.  
Lead, 4.30 to 4.35 cents.  
Spelter, 5.60 to 5.65 cents.  
Sheet zinc, 7.75 cents.  
Antimony, Cookson's, 8.25 to 8.37½ cents.  
Aluminium, 21 to 24 cents.  
Nickel, 40 to 47 cents.  
Platinum, \$22.50 to \$23.50 per oz.  
Bismuth, \$1.75 per lb.  
Quicksilver, \$43 to \$44 per 75 lb. flask.

**SILVER PRICES.**

	New York Cents.	London. Pence.
July 22 .....	50⅞	23 7-16
" 23 .....	50¾	23¾
" 24 .....	50¾	23¾
" 26 .....	51	23½
" 27 .....	50⅞	23 7-16
" 28 .....	50⅞	23 7-16
" 29 .....	50¾	23¾
" 30 .....	50⅞	23 7-16
" 31 .....	50¾	holiday
Aug. 2 .....	50¾	23 7-16
" 3 .....	51	23 9-16
" 4 .....	50⅞	23½
" 5 .....	50⅞	23½

**PERSONAL AND GENERAL.**

Mr. H. Kilburn Scott has left for Bulgaria on professional business.

Mr. Algernon P. Seymour has been appointed superintendent of the Cobalt Lake Mining Company.

Mr. R. T. Hodgson, M.A., a graduate in the geological department of Queen's University, who has spent the last nine years in the West, has been renewing acquaintances in Toronto. Mr. Hodgson was well known in Eastern Ontario ten or twelve years ago in connection with his work as assistant to W. G. Miller in the corundum field in 1897-8.