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The Canadian Mining Journal

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CIRCULATION.

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CONTENTS.

PROGRESS IN ALASKA

The report of the Mines Inspector for the Territory of Alaska has just been issued. The period covered is the fiscal year ended June 30, 1912.

The figures of production, we note, are carried only to the end of the calendar year 1911.

The total value of the mineral production of Alaska during the year 1911, was $20,650,005. By far the greater proportion of this was gold, which metal was mined to the value of nearly $17,000,000. The production of copper, however, has grown very markedly, its total value reaching the respectable sum of $3,666,-584. The silver production was of relatively small value, and coal practically nothing. As a matter of fact, only 900 tons of coal were produced in Alaska, while practically 90,000 tons were purchased from British Columbia. The production of other minerals, such as marble, gypsum, tin, lead, etc., aggregated a value of $176,942.

Of the gold, approximately $12,500,000 was derived from placers, four and a quarter million from silicious ores, and $86,000 from copper ores. After reaching a maximum value of about $22,000,000 in the year 1906, the gold production of Alaska has fluctuated between a gross value of sixteen and twenty million dollars.

The silver production has gone up from about 50,000 ounces to a present output of nearly half a million ounces. While the copper production took a tremendous leap as between the years 1910 and 1911, in the former year, 1910, the production was four and a quarter million pounds, in 1912 the production was 27,267,871 pounds.

The Yukon basin is still the largest regional source of gold, with the Pacific Coast belt coming next, and the Seward Peninsula third.

It may be noted that the consumption of crude oil and naphtha has increased markedly in the last five years. In 1911 more than 18,000,000 gallons of crude oil, and a million and a quarter gallons of naphtha were shipped from other parts of the United States to Alaska.

It is gratifying to notice that the inspector reports the organization of mine rescue and first aid teams on Douglas Island. The work has also been taken up at a number of lode mines.

Considering all the conditions of work, the scale of wages is relatively low. The miners in the Fairbanks district get from $3.50 to $5.00 a day and board. At Nome the rates are higher, except during the winter. The ten-hour shift predominates. There is little, if any, labour trouble.

The extraordinary short sightedness of one United States federal administration has rendered it impossible to develop the Nome coal resources of Alaska. While this is in itself a vain and foolish thing, and is to be directly attributed to the insane overdoing of the conservation idea, yet it has inured to the benefit of British Columbia coal mines. Our readers may possibly remember that when Mr. Gifford Pinchot, the evangel of conservation, visited Alaska, the inhabitants were reported to have clothed themselves in the darkest mourning, and to have put all the flags at half mast.

Despite a short-sighted Federal Government, there appears to be reason to believe that Alaska will soon come into her own.

THE LEAD BOUNTIES

The Budget speech of Honourable Mr. W. T. White contained the pleasing announcement that the Dominion lead bounties are to be continued. This, of course, will be excellent news for our friends in the West.

The huge surplus of $55,000,000 permits the present Government to deal liberally with such industries as legitimately need assistance.

In the course of the Honourable Mr. White's speech, he devoted considerable attention to the lead bounties. Provision for the payment of these bounties expires on June 30 of this year. The total appropriation set aside in 1903 was $6,000,000. On account of the high market price of lead not all of this was expended. In fact, there will be $600,000 unexpended on July 1st, 1913.

The proposal is to extend these bounties for five years, the necessary appropriation to include the unexpended $600,000. When the price of lead in the London markets exceeds 17 pounds, 8 shillings, 9 pence per ton, the bounty automatically is withdrawn until such time as the price falls.

It is a matter of record that since the inception of the bounties, the Canadian production of lead has increased from about 8,000,000 pounds to 34,000,000 pounds.

Incidentally, we may express our approval of the reduction of the tariff on cement. Slight as this reduction is, it will mean something to the Canadian purchaser.

THE INTERNATIONAL GEOLOGICAL CONGRESS

The third circular of the International Geological Congress has just come to hand. This is to be the last general circular. Further official information will be sent only to actual members of the Congress. As applications to join the excursion are exceeding all expectations, it is decidedly necessary that those who have not applied for membership do so at once. This particularly applies to appointed delegates who have not yet sent in applications, nor designated the excursions in which they desire to participate.

regards excursions. One in particular, excursion A9, will start from Kingston. Another excursion, C1, will be modified so as to eliminate the visit to Munson on Sept. 3. Still another change in excursions CI, and CII will time the visit to the Sudbury nickel copper deposits for the beginning, and not the end of these excursions.

As matters stand now, the date for leaving Montreal for Quebec and the Maritime Provinces is fixed for Sunday, July 13; for leaving Montreal for Sudbury, Cobalt, and Porcupine, Wednesday, July 23; for leaving Montreal for Haliburton and Bancroft, July 24; and the opening day is set for Thursday, Aug. 7th, in Toronto.

Members of the Congress may secure single tickets at half the lowest, one way, first-class fare. Round trip tickets may be secured at the price of the lowest, one-way, first-class fare, provided the same route be followed going and returning. Tickets will be used from July 15th to Oct. 31, 1913, but cannot be used or purchased after the latter date. These arrangements apply only to professional members, non-professional members are, however, granted almost equivalent privileges.

Since the fee for membership is only $5.00, all those desiring to join any of the excursions should apply at once to the secretary, Victoria Museum, Ottawa.

It may be noted here, that the monograph on the coal resources of the world is to be published in the form of three, not two, quarto volumes, and a folio atlas.

All possible arrangements have been made for the convenience of excursionists. On another page will be found a reproduction of part of the third official circular.

A SUGGESTION FROM THE WEST

The British Columbia Mining Association has placed itself on record as appreciating highly the work of Mr. R. F. Green, M.P. for Kootenay, B.C. To his hard work, and to the clear-sightedness of the Honourable Mr. W. T. White, is attributed the continuance of the lead bonus.

At the same meeting the Ottawa Government was again strongly requested to create a separate Portfolio of Mines at Ottawa. To this request was joined the suggestion that Mr. Green be appointed Minister of Mines.

While the suggestion of creating a separate Portfolio of Mines is one in which we thoroughly concur, and one that we have been urging for some years, it is our opinion that the British Columbia Mining Association

has not acted wisely in beclouding the issue by submitting the name of Mr. Green.

Mr. Green's merits or demerits have nothing to do with the case. The chief point is to convince the government that a Portfolio of Mines is a necessity. After that the matter of selecting the Minister will take care of itself.

UNITED STATES COAL MINE ACCIDENTS

The monthly statements of coal mine accidents in the United States show a distinct improvement for the months of January and February, 1913, as compared with the corresponding months for the previous year. In January, 1912, there were 243 fatalities in and about coal mines. In February, 1912, there were 207. In January and February of this year, there were respectively 213 and 197. Thus the total for the two first months of this year is less by 40 than the total for the first two months of last year.

It is apparent that since the very inception of the vigorous campaign for installing life saving apparatus, the deaths per thousand men employed have steadily decreased.

For 1912 the figure was 3.15; for 1909 it was 4. Putting it in another way, for each death 233,000 tons of coal were produced in 1912, while for each death in 1909 only 173,000 tons were produced. Unless some disaster of extraordinary magnitude should occur this year the precautionary measures introduced by the United States Bureau of Mines will certainly have demonstrated their value.

EDITORIAL NOTES

The price of silver is holding most satisfactorily. At the Hollinger mine, Porcupine, the hydro-electric power is again available.

The Crow's Nest Pass Coal Co. reports a decidedly profitable year for 1912. According to their statement net profits of $471,454 are shown.

The Lucky Jim zinc mine of British Columbia has hardly lived up to its name. At present it is reported to be in very serious difficulty owing to an accumulation of debts.

It is reported that the Quebec magnesia deposits have been taken over by a new concern having affiliations with United States investors. The crude material apparently is to be worked up into finished product at Newark, New Jersey.

BOOK REVIEW

AIR COMPRESSION AND TRANSMISSION—By H. J. Thorkelson—Associate Professor Steam and Gas Engineering, University of Wisconsin—207 pages—Illustrated with many diagrams and line cuts—Price $2.00—Published by the McGraw-Hill Book Co., 239 West 39th St., New York, 1913—For sale by The Canadian Mining Journal, Toronto.

There already have been published a number of descriptive text books dealing with the mechanical principles and the actual use of air compression and transmission. In most of these books the attempt has been made to cover the whole subject. Mr. Thorkelson has confined himself to the methods of calculation, whereby the efficiency of any given system may be determined, or the needs of any given mine or other establishment, measured.

After a brief prefatory note in which the author points out that railway men were among the first to appreciate the uses of compressed air in shop and structure work, and that compressed air is used in over sixty different industries at present, the general text commences.

Chapter I. deals with the characteristics of air; Chapter II. with fundamental definitions; Chapter III. with the characteristic and energy equations for air; Chapter IV. with graphical diagrams; Chapter V. with air at pressures below the atmosphere; Chapter V., as indicated by its title, takes up vacuum pumps, the Sprengle air pump, the measurement of vacuums, condenser pumps, etc. The next Chapter has to do with air at low pressures. Under this heading come cupolas, ventilation, measurement of draft, fan efficiency, rotary blowing machines, and other cognate subjects. Chapter VII. is a discussion of piston compressors. Efficiencies and energy compensation form the subject matter of Chapter VIII. Chapter IX. is entitled Multistage Compression. Chapter X. is devoted to the mechanical details of piston air compressors. Chapter XI. touches on the design of turbo-compressors. Chapter XII. which is one of the most interesting in the book, compares the various types of hydraulic air compressors and the general principles involved. We note that the large Cobalt installation is not mentioned here. The effect of altitude on capacity and on power is the topic of Chapter XIII. Chapter XIV. touches the design of receivers, and the measurement and transmission of compressed air.

In the concluding Chapter the selection of compressors and matters pertaining to their general efficiency, are discussed. Three appendices, one a table of Common Logarithms, one a table of Naperian Logarithms, and one a short treatise on Hygrometric, conclude the volume.

REMOVAL NOTICE.

We wish to notify our readers that the offices of the Canadian Mining Journal have been removed from 10 Adelaide Street East, to the second storey of 44-46 Lombard Street, one-half block north, and two blocks east. The present offices will be much more commodious than those we have left.

The Canadian Mining Journal in its new quarters will possess the distinct advantage of having direct access to its own printing plant, which is housed in the basement of the same building. This fact we would request our readers to bear in mind. The plant referred to, is large and completely equipped.

THE "DE RE METALLICA" OF GEORGIUS AGRICOLA*

A REVIEW

(Continued from April 1st Issue.)

The methods of staking mining lands in Germany during the sixteenth century, and the officials that were to be approached, are dealt with in Book IV. The Bergmeister, having satisfied himself as to the discoverer's identity, awarded the "head meer" to him, and the remaining "meers" in order to each successive applicant. The head meer, staked on a fissure vein, measured 42 fathoms by 7 wide, while the ordinary meer was 28 by 7. For other classes of deposits other units obtained. Many restrictions were imposed upon individual operators, and there was quite as much red tape as one finds to-day. These, the duties of the mine manager, the collection of tithes, Agricola explains with care and precision. It appears that in those days the day was divided into three seven-hour shifts—morning, noon, and night. "The Bergmeister" it is noted. "does not allow this third shift to be imposed upon the workmen unless necessity demands it." Truly the height of consideration! When, however, the men were forced to work the third shift Agricola remarks that "they keep their vigil by the night lamps, and..... .....they lighten their long and arduous labours by singing, which is neither wholly untrained nor unpleasing." In some places miners were not allowed to work through two successive shifts, in other places the only limiting factor was his own power of endurance. Saturdays and Sundays were regular holidays—Saturdays devoted to shopping and Sundays to "holy things."

The practical work of mining and the art of surveying from the subject-matter of Book V. The advice given as to sinking shafts is that, first, a separate shaft house be built wherein is placed the windlass. Here, also, are kept the iron tools and other mining implements. It is further recommended that adjoining this structure a dwelling be constructed for the mine foreman and workmen. In a quite casual manner Agricola mentions that "the ore and other things which are dug out" are also to be stored in this edifice. Here is a charming sidelight: "Although some persons build only one house, yet because sometimes boys and other living things fall into the shafts, most miners deliberately place one house apart from the other, or at least separate them by a wall."

General instructions follow and illuminating definitions shine like gems throughout. "A tunnel," says Agricola "is a subterranean ditch driven lengthwise and is nearly twice as high as it is broad, and wide enough that workmen and others may be able to pass and carry their loads. It is usually one and a quarter fathoms high, while its width is about three and three-quarters feet.....Each miner sits upon small boards fixed securely from the footwall to the hanging wall." We wonder if it would conduce to efficiency and peace of mind were modern workmen required to work in a "subterranean ditch," three and three-quarters feet wide.

Our mediaeval friend had evidently paid much attention to the character and modes of occurrence of ore in advising the miner where and how to sink on his vein. He lays special emphasis upon the functions of stringers and main veins, and upon vein intersections generally. He then discusses with some elaboration the actual relationship of characteristic minerals and metals—a strangely interesting bit of empirical paragenesis. Here are typical statements: "A vein which contains a larger proportion of silver than gold is rarely found to be a rich one.....The solidified juices, azure, chrysocolla, orpiment and realgar, also frequently contain gold." As to indications of valuable metals Agricola explains among other things that if the miner comes across "dry earths which contain native or *rudis* metal, that is a good indication; if he comes across yellow, red, black, or some other extraordinary earth, though it is devoid of mineral, it is not a bad indication." Schist of a bluish or blackish colour, and limestone of any colour whatsoever, are good indications of silver. Bismuth and antimony are described as special indications of silver; orpiment as special indication of gold; verdigris, *melanteria,* and vitriol, are taken as indicating copper. It is mentioned that bismuth was called by miners "the roof of silver."

Evently extralateral rights did not obtain in those days, as witness the following: "If it [the vein] descends vertically into the earth, the benefit belongs to that mine in which it is seen first of all; if inclined it benefits the other neighbouring mines. As a result the miner who is not ignorant of geometry can calculate from the other mines the depth at which..... the vein bearing rich metal will wind its way through the rocks into his mine."

The modes of extracting the vein matter are now elucidated. As Agricola wrote before the introduction of explosives into the mine, the principal method of extracting hard ore was by means of fire. A heap of dried logs was placed against the rock and ignited. In many cases this process was not only exceedingly tedious, but it caused distress in neighbouring mines which happened to be connected with that in which fire was being used. Hence permission had to be asked of the owners of neighbouring mines and in the case of arsenical, anitimonial, or sulphurous ores the permission of the "Bergmeister" was necessary. After long calcination the ore was dislodged by means of crowbars and hammers. It was always to be hand sorted in the mine, where fire was not necessary or not permitted the miners had perforce to rely upon purely mechanical means.

The practice of timbering was not, in Agricola's time, as crude as one might expect. Pumping was usually accomplished by hand or by horse power, although mechanical appliances were sometimes used. Surveying, to which the latter part of Book V. is devoted, was practised only in its simplest form. A knowledge of the rudiments of geometry with a touch of trigonometry was the basis of the art.

The sixth book contains descriptions of the tools, vessels and mechanical devices used in the mines. Winding, ventilating and pumping machinery, drills, hammers, picks, are clearly described by text and wood cuts. The barrows and trucks in vogue were exceedingly substantial in design. For baling water small and large wooden buckets fed by means of cumbrous wooden dippers were filled and hoisted by hand to the

* Georgius Agricola De Re Metallica.—Translated from the first Latin edition of 1556 with Biographical Introduction, Annotations, etc., by Herbert Clark Hoover and Lou Henry Hoover.—Published for the Translators by the Mining Magazine, London.—For sale by the Canadian Mining Journal, Toronto, Canada.

surface. These were often replaced by water bags made of ox-hide. "When these water bags have undergone much wear and use, first the hair comes off them and they become bald and shiny. After this they become torn."

The windlass of Agricola's time was essentially a duplicate of many that are to be seen on small prospects to-day. For the deeper shafts, however, a three-man windlass was used, on the barrel of which was fixed a wheel of large diameter which served the purpose of a fly-wheel. While one man turned the crank two other men at the opposite end of the windlass worked upon four straight levers passing through the end of the barrow. "All windlass workers," says Agricola, "whatsoever kind of a machine they may turn, are necessarily robust that they can sustain such great toil."

A third kind of machine was designed to hoist ore from the extraordinary depth of one hundred and eighty feet! This was a vertical two-man hoist. The horse-whim, both single and double, was also in vogue. One illustration shows the rider sitting luxuriously on a cross-beam driving two horses. For transporting the ore from the mine to the furnace all kinds of methods were resorted to. Horses drew rude sledges filled with ore. Pack teams of dogs were common. Where the topography would permit the ore was raw-hided or merely rolled down the mountains. Perhaps the most picturesque method is thus outlined:—Two or three sacks of ore were placed on a small sledge higher in front and lower at the back. "Sitting on these sacks, not without risk of his life, the bold driver guides the sledge as it rushes down the mountain into the valley, with a stick which he carries in his hand."

Pumping was accomplished by various means. Men worked in tread wheels running endless bucket elevators. Hand pumping in various ingenious forms was practised. For greater depths water power was ingeniously applied with sumps established at the different levels. It would be quite impossible to touch upon the quaint designs in use. Suffice it to say every kind of available power was utilized. Not only were men and horses called upon to do their duty, but goats were frequently used in the tread mill.

Rude blowers, fans, and bellows, worked by hand or by horse power provided ventilation or draughts, were induced by ventilating shafts. Water power also was called into service. Means were sometimes taken by structures superimposed on the shaft mouth to catch the wind and divert it down the shaft.

Towards the conclusion of Book VI. Agricola indulges in a little moralizing. Touching on poisonous gases, he remarks on the danger of arsenical poisoning, and mentions that men even in the act of climbing ladders fell back into the shaft when the poison overtakes them. "At such times, no one should descend into the mine or into the neighbouring mines, or if he is in them he should come out quickly." Foremen are adjured to look carefully to the condition of their ladders and the men similarly are advised not to "fall through their own carelessness." Allusion is made to a venomous ant, not found in the mines of which Agricola writes, but in Sardinia. "It creeps unobserved and brings destruction upon those who imprudently sit on it. But.....springs of warm and salubrious waters gush out in certain places, which neutralize the venom inserted by the ants." As if to compensate for the absence of these destructive insects Agricola continues. "In some of our mines, however, though in very few, there are other pernicious pests. These are demons of ferocious aspect.....Demons of this kind are expelled and put to flight by prayer and fasting." As subordinate in importance to these diabolical intruders, the chief causes for abandoning mines were barrenness, over much water, noxious gases, falls of rock, and "military operations."

(To be Continued).

SILVER VEINS IN SOUTH LORRAIN, ONT.

By J. B. TYRRELL.

In the district of South Lorrain, lying sixteen miles south-east of Cobalt, several rich silver-bearing veins have been opened up and worked to a greater or less extent, and as these veins are similar in character and appearance to those in the older and better known Cobalt camp a brief notice of one, at least, of their peculiarities may be interesting to your readers.

As in the country around Cobalt, the rocks consist of Keewatin greenstones with characteristic intrusive dykes of lamprophyre, etc.; conglomerates which have been designated by the geologists of the Ontario Bureau of Mines as of Huronian age, and great intrusive masses of coarse diabase.

Looking at the map published by the Ontario Bureau of Mines it will be noticed that the western edge of the intrusive diabase runs almost in a straight line from north to south. As a general rule the veins, as far as I have seen them, appear to be near this western edge of the diabase, either to the east of it in the diabase itself or to the west of it in the Keewatin greenstones, for in this district the conglomerates do not appear to have been attractive to the silver-bearing solutions.

I do not know whether the diabase is here in the form of a sill as it is in Cobalt or not. In this latter camp it is now generally recognized that the silver-bearing veins have been formed by the diabase, or rather that they have been in the nature of end products deposited around the periphery of the diabase after the main intrusion had ceased and the rock had cooled below the temperature of solidification. In this camp also the upper and lower surfaces of the diabase sill, or intrusive mass, approximate more or less closely to the horizontal and the fissures caused by the cooling of the rock have, as a rule, been normal to these horizontal surfaces and have therefore approximated more or less closely to the vertical. After the fissures were formed, either in the solidified diabase, or in the contiguous rock, whatever it might happen to be, the silver-bearing solutions flowed into them and filled the fissures that extended up and down from the diabase and formed veins in these fissures.

While emanations from the diabase gave rise to the Cobalt silver veins, it was not always necessary that the wider parts of the veins should be directly in contact with the originating rock, for the solutions bearing the vein-forming material would circulate in any open fissures that happened to be at all within reach of, or connected with, the diabase.

Now in South Lorrain the conditions are very similar to those in Cobalt as briefly outlined above, but, in some instances at all events, the attitude of the plane of contact of the western edge of the diabase and the contiguous rock, which in this case is greenstone, is not horizontal, but nearly vertical, and many of the principal veins run east and west, normal to this plane of contact.

As at Cobalt, the diabase contact is the controlling factor, but instead of the veins running up and down from a horizontal contact, they here run outwards, from and at right angles to a vertical contact, and therefore a horizontal section of a vein, as seen on the surface here, represents what might be looked for in a vertical section in Cobalt. The rich ore-bodies, where they occur, are not found directly at the diabase contact, but at some little distance away from it either in the diabase or in the greenstone, beyond which, as the vein is traced farther and farther from the contact, it becomes narrower and breaks up into veinlets which run out and disappear in the adjoining rock.

Whether the greenstone-diabase contact on the western border of the diabase in South Lorrain will continue downwards vertically, or at a high angle, for any great distance or not is as yet uncertain; but if the contact should maintain its vertical attitude to considerable depths it would seem not improbable that these veins and ore-bodies, which have been formed by emanations from the diabase, might have their greatest extension in a vertical direction, in conformity with the attitude of the plane of contact, rather than in a horizontal direction as is the case with the ore-bodies at Cobalt and in its immediate vicinity.

MINING AND THE CANADIAN NORTHERN RAILWAY

(Written for the Canadian Mining Journal.)

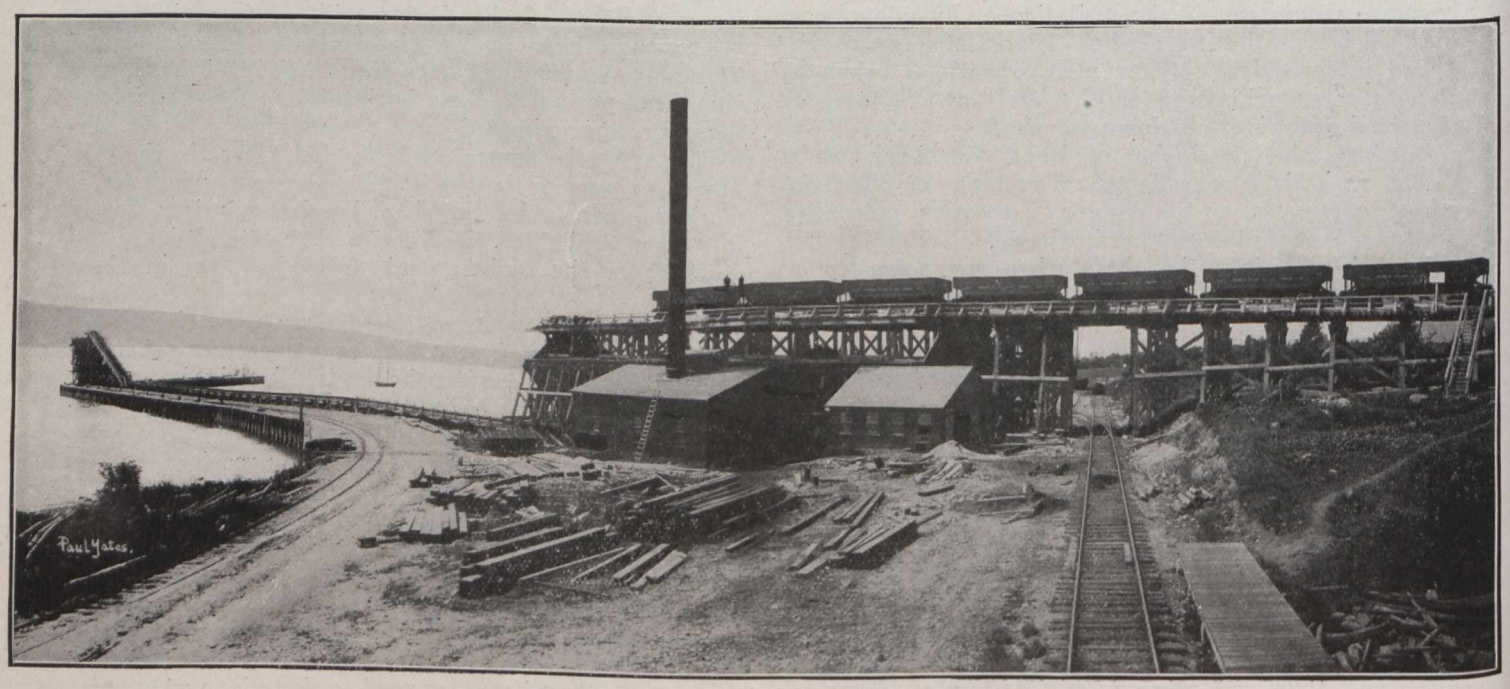
Except for fortunate accidents the general politics pursued by Canadian railway corporations have not untill the last decade or so included any clear cut attitude towards mining. In one sense this is not strange, as our railway magnates have been far too deeply involved in actual construction to attend to anything but immediate necessities. Yet it is beyond argument that had our transportation corporations followed more closely the mining development of the country they would have strengthened their own position decidedly, and would have hastened the inevitable development of mining and other allied industries.

One has but to look over the border at a few of the large railway concerns in the United States to realize what the mine yields in the way of freight traffic. The vast volume of freight that accures to the railways from the coal mines, iron mines, copper mines, and from other mines of all kinds, and the correspondingly large return traffic from the smelters, must be recognized as one of the vital factors in the history of transportation, and in fact, in the prosperity of the whole country.

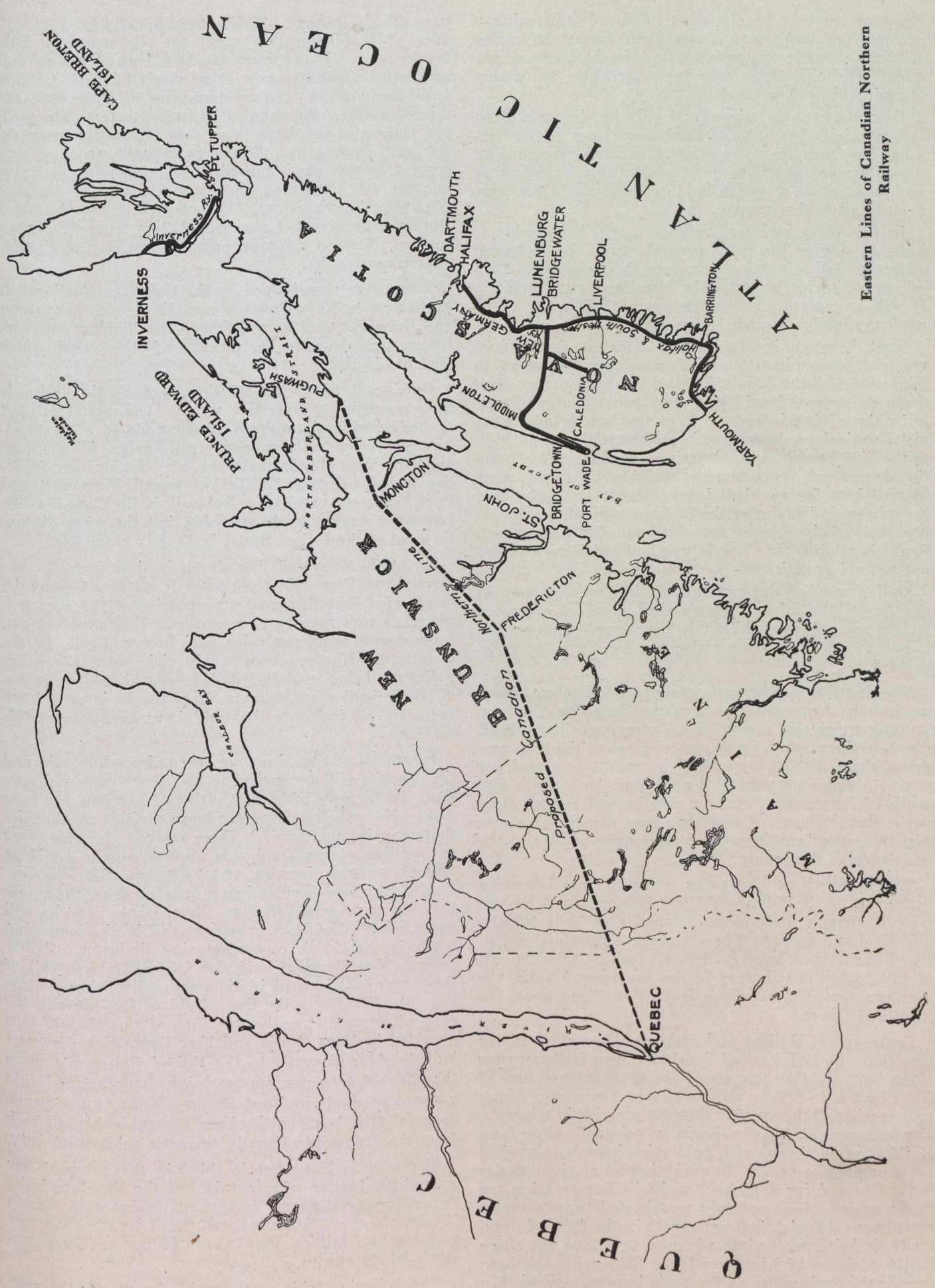
No large railway can subsist on one class of freight traffic. No single industry can be depended upon to yield such a bulk of freight as can mining. On the other hand, the farmer, the manufacturer, and the merchant invariably follow in the wake of the miner. In other words, a country that is opened up for mining purposes will also be opened up for farming and the general activities of civilization. It is a fact that there are few mining regions in Canada that are not within easy reach of good areable land. Thus the miner, as a pioneer, opens up the road for, first, the agricultural industry, and then for others. Communities are established and traffic of all kinds is created.

Whilst in a great many instances the discovery of important ore deposits in Canada has been the accidental result of railway construction, yet in more instances, discovered mines have had to await for years the construction of the railway This is too obvious a truth to require specific illustration

The following series of articles has to do with the relation of mining to the growth of one large railway corporation; namely, the Canadian Northern Railway. The Canadian Northern has from its inception striven to give direct recognition to the mining industry. This, of course, has not been done in any altruistic spirit. The



Port Wade Shipping Pier


ATLANTIC OCEAN
NOVA SCOTIA
NEW BRUNSWICK
QUEBEC
CAPE BRETON ISLAND
St. TUPPER
Inverness R.
INVERNESS
PRINCE EDWARD ISLAND
PUGWASH
NORTHUMBERLAND STRAIT
DARTMOUTH
HALIFAX
LUNENBURG
BRIDGEWATER
LIVERPOOL
BARRINGTON
YARMOUTH
MIDDLETON
CALEDONIA
BRIDGETOWN
PORT WADE
MONCTON
ST. JOHN
FREDERICTON
Northern
Canadian
Proposed
QUEBEC
Eastern Lines of Canadian Northern Railway

company has been keenly aware of the revenue value of ore tonnage, and consequently has deliberately located its lines to pre-empt as much mining business as possible. The object has ever been, therefore, to accelerate mineral production.

Over the country tapped not only by the main lines, but especially by many of the branch lines of the Canadian Northern, there are practically numberless mineral deposits, many of which are of proved commercial value, and many more of which hold out promise to the prospector and to the investor.

In this short series of articles it will be possible to indicate only in the most general way, the geological character and mineral occurrences throughout the Canadian territories traversed by the Canadian Northern. It will be most convenient to start from the East and work gradually through to the West.

First, however, it may be well to make a few general remarks concerning the relation of transportation to mining Of all the freight handled by the Canadian Northern Railway, at least 33 per cent. is contributed directly by the mining industry. This does not include many metallurgical products, but is made up almost entirely of the direct products of the mine. In the United States the figures are proportionately higher. It gives some idea of how far we shall have to grow to realize that the mining industries of the States contribute nearly 60 per cent. of the freight moved there. Until some such figure is attained in Canada we shall not have attained our normal growth.

Unlike most of the products of the farm, or even of the forest, the mine products that form a source of freight are produced the whole year round Hence their importance to any given railway is hardly to be exaggerated

Starting then on the west coast of Cape Breton Island, we find the Inverness branch of the Canadian Northern tapping a rich coal region The Inverness colliery itself, which is the present northerly terminal of the line, produces about 300,000 tons of high grade steam coal per year. A large portion of the country, both north and south of Inverness proper, is rich in coal veins. Here is the first instance of what has been mentioned above. The Inverness branch was built primarily to develop the coal fields of the county.

To the north of Inverness, near the north-western extremity of the Island of Cape Breton, there are extensive, though undeveloped, deposits of gold bearing mispickel and copper. There are also commercial deposits of barite, and large bodies of excellent gypsum. All of this region is tributary to the Inverness branch, the southern terminal of which is at Port Tupper on the Straits of Canso.

Beginning at Halifax and running in a south-westerly direction, the Halifax and South Western Railway runs along the Atlantic shore round the southernmost heel of Nova Scotia, to the flourishing city of Yarmouth. Many square miles of the country thus cut are rich in minerals. For instance, at Chester Basin, a point 40 miles from Halifax, small though rich gold veins have been worked for a number of years. Running inland at right angles to the line, a drive of an hour and a half or so, takes one into a region where not only are tin and tungsten minerals known to exist, but manganese in the form of pyrolusite, is being worked to advantage. Along the shore in the vicinity of Liverpool large flake mica has been found, although never as far as is known, worked. In the County of Yarmouth itself the Cambrian gold measures are extensive. Within a comparatively short disance of Middleton (see map) are the enormous Torbrooke and Nictaux iron deposits, both hematite and magnetite which are now being worked by the Canada Iron Corporation. Large quantities of these ores are mined, milled, and shipped as concentrates. The milling process is simple as it consists essentially in crushing and jigging, yet the ore is brought up to a high tenor. As this ore is phosphatic it makes an admirable mixture for burdening the blast furnace for foundry pig. Here again it may be noted that the Canadian Northern constructed the branch line from Middleton to Port Wade, a shipping point on the Bay of Fundy. (See photograph).

The region thus tapped by the Canadian Northern in south-western Nova Scotia is exceedingly rich in gypsum and limestone, and in addition to the Nictaux and Torbrooke iron deposits, has promise of other considerable iron ore bodies.

One great advantage of the Nova Scotian lines is their accessibility from tide water. The inland shipper of heavy mineral products is often placed at a disadvantage owing to the excessive rail hauls. All the distances in Nova Scotia are short, and the harbour facilities at such points as Halifax, Liverpool, Yarmouth, and Port Wade are excellent. Not only is the Canadian St. Lawrence market made available, but the whole Atlantic coast of the United States is directly accessible.

As to the proposed line shown in dots from Quebec through to Pugwash, the general statement may be vouchsafed that the greater proportion of the area traversed is rich in natural resources. Near Fredericton, for instance, antimony veins have been worked. In the vicinity of Moncton enormously rich natural gas deposits are being exploited and developed, and extensive oil shale bodies are soon to form the basis of a huge industry, an industry that will have countless ramifications.

In process of time, iron, copper, and possibly gold and tin deposits will be opened in the New Brunswick section. So far very little prospecting of any kind has been done. Nevertheless there are large positive possibilities that may be mentioned. These include the quarrying of building stones (and this applies equally to Nova Scotia), gypsum, barytes, and limestone. The distribution of fertilizer (ammonium sulphate), from the works that are to be established on the oil shale deposits will mean much. Not least important will be the increasing traffic in the brick manufacturing industry. Southeastern New Brunswick is rich in brick clay. All of these commodities will in time assuredly bring a large amount of traffic to the line. Taking, for instance, the case of gypsum, we discover that of the 450,000 tons quarried in Nova Scotia and New Brunswick the great bulk is shipped crude to the United States, not more than 20,000 tons per annum being manufactured into gypsum products in Nova Scotia. Much of this crude material after being calcined and ground is shipped back from the States into Canada against a substantial duty.

Not only is Nova Scotia third in the value of her annual production of minerals, but the Province is by far and away the most important producer of coal in the Dominion. The annual output of coal is about six and one-half million tons, about 50 per cent. of Canada's whole output.

The following table gives specific figures for the year ending September 30, 1912.

NOVA SCOTIA MINERAL PRODUCTION.

Year ended September 30th, 1912:

Mineral.	Quantity 1911.	Quantity 1912.
Coal raised (gross tons)	6,208,444	6,802,997
*Iron ore (net tons)	53,595	none
Pig iron made (net tons)	397,615	411,388
Steel ingots made (net tons) ...	438,922	461,392
Limestone quarried (net tons)..	525,286	473,067
Coke made (net tons)	545,619	603,372
Gypsum quarried (net tons)...	333,358	280,000
Building stone quarried (net tons).....	11,226	11,644
Bricks made (number)	23,273,700	22,348,486
Drain pipe and tile made (feet).	1,431,761	984,922
Grindstones quarried (net tons)	380	400
Gold bearing ore mined (net tons	18,320	15,868
Gold produced (ounces)	8,389	4,948
Manganese ore (net tons)	150	233
Antimony concentrates (net tons)	191	none
Moulding sand (net tons)	380	1,190
Tungsten concentrates (net tons)	none	14
Sulphate of Ammonia (gross tons).....	3,971	5,213
Barytes		974

*Iron ore imported 1910-11, 853,904. 1911-12, 880,904 net tons. Operations at Torbrook mill not up to capacity.

The value of the annual mineral production of the Province divided by the number of square miles of territory is about $1,100 per square miles. This works out at nearly $50.00 per capita.

GEOLOGY.

The geology of the regions dealt with in this article can be best described by quoting from a monograph written by Dr. G. A. Young, and published by the Geological Survey of Canada. The following paragraphs are made up of isolated sentences from Dr. Young's text.

The southeastern portion of Quebec, together with the Maritime Provinces, form the northeastern extension of the Appalachian Mountain system. The Appalachian region is characterized by formations, ranging from pre-Cambrian to Carboniferous, that are disturbed and thrown into a succession of folds. Important deposits of coal, iron, and gold are mined in Nova Scotia. Its coal resources have been estimated by the Hon. R. Drummond to be six billion tons.

The gold bearing series of Nova Scotia, together with great instrusive measures of later granites, occupy the whole Atlantic coast of the peninsula extending in the southwest, almost completely across it, and underlying in all an area of some six or seven thousand square miles. This series, consisting of a lower division comprised largely of quartzite, and of an upper one, mainly of dark slates, has yielded a section of over 25,000 feet of sediments. Cutting the sediments are large batholitic bodies of granite of a later age, possibly late Devonian. Along the axes of folding, within the lower quartzite division, is a widespread system of veins of quartz, often gold-bearing. The Carboniferous strata of the Maritime Provinces within which occur the prolific coal seams of Nova Scotia, are of immense volume. They occur along the western portions of Cape Breton, skirting hills of crystalline pre-Cambrian rocks, or penetrating them along the courses of old pre-Carboniferous bays and valleys. Near the Sydney coal fields of Cape Breton there is a combined section of about 13,000 feet, and along the Nova Scotian shores of the Bay of Fundy, the famous Joggins section has a thickness of above 14,500 feet in which over 70 coal seams are exposed. The Carboniferous sediments in New Brunswick occupy about 10,000 square miles, forming an area triangular in shape, bordering the eastern coast and contracting inland between the two elevated districts of the Province. The Carboniferous and overlying measures extend eastward into Nova Scotia, occupying much of the country north of the Bay of Mines, and reaching into Cape Breton.

In the Eastern Townships of Quebec, the rocks of the pre-Cambrian areas appear to be almost entirely volcanic rocks, chiefly basic varieties. In the Gaspé peninsula, the corresponding rocks include other forms of the nature of granites, as well as acid volcanics and possibly sediments. The same is true in the regions in northern New Brunswick, while in southern New Brunswick and Cape Breton, besides large volumes of granitic and gneissic rocks, variously altered acid and basic volcanics are common, and there also occur masses of crystalline limestone as well as schistose rocks of possibly sedimentary origin. In the northeastern portion of the peinsula of Nova Scotia are considerable districts occupied by greatly disturbed formations probably of Ordovician age, consisting of sediments accompanied by large volumes of igneous rocks, some of which may represent the products of contemporaneous volcanoes. In New Brunswick, Ordovician beds partly occupy the broken hilly country stretching northeasterly through the province to Chaleur Bay. In this region, the beds of this system consists of shales and sandstones, or their altered equivalents, often penetrated by large bodies of granite and other igneous rocks. Throughout western and northwestern New Brunswick and the Gaspé peninsula generally, large tracts are floored by great volumes of shales, often Calcareous) sandstones, and limestones of Silurian age, now usually highly folded and faulted. With these beds occur many varieties of igneous rocks, some of which represent the products of contemporaneous volcanoes. In Nova Scotia the Silurian strata are largely confined to the northeastern portion of the province, and at one locality on the shores of Northumberland straits there isa nearly complete section of the whole system represented by about 3,000 feet of sediments. Early Devonian calcarious beds occur in Nova Scotia. In southwestern New Brunswick great volumes of argillaceous and arenaceous strata occur. These have also been assigned to the Devonian. The same conditions are duplicated in Nova Scotia, where at one place occur strata containing tuff-like beds indicative of contemporaneous volcanoes.

Mr. G. B. Wilson is manager of a marble quarry at Marblehead, on the C.P.R. Company's railway line from the head of Kootenay Lake to Trout Lake, B.C.

Mr. J. B. Sword, who has been in Victoria, B.C., during recent months, with associates has again got control of some iron ore claims on Louise Island of the Queen Charlotte group.

Mr. L. B. Reynolds, of Nelson, B.C., is stated by the Daily News to have been ill with typhoid fever at the Hart private hospital, Roxbury, Massachusetts. Mr. Reynolds came East in February, intending to take a trip to Europe. He was at the annual meeting of the Canadian Mining Institute in March.

CONGRESS GEOLOGIQUE INTERNATIONAL

XIIth. Session, Canada, 1913. Third Circular. Special Notices.

Third and Last Circular.

This is the last general circular. Any further information will be sent only to members of the Congress.

Copies of the second circular of the Twelfth International Geological Congress can be obtained from the secretary of any geological society, geological survey, mining society, or from the secretary, Twelfth International Geological Congress, Victoria Memorial Museum, Ottawa, Canada.

Applications to Join Excursions.

Applications to join excursions are being received at a much more rapid rate than was anticipated, therefore, those desiring to join excursions should make no further delay in sending their applications.

Delegates.

Many delegates appointed by various universities and societies have not yet sent in applications for membership nor for participation in excursions. As applications are being received at a rapid rate, delegates are particularly requested to apply at the earliest possible moment for such reservations as they require.

Papers and Proposals.

Every endeavour will be made to print in advance of the meeting such contributions as are received up to June 1st. Though every effort will be made to print contributions received after this date, it is not probable that this will be possible. The attention of authors is respectfully drawn to regulations 7a to 7h, page 6, second circular.

Price of Guide Books.

The price of guide books to persons who are not members of the Congress is seven and one-half dollars for the complete set, the price to members is two and one-half dollars for the complete set. Single guide books will not be sold and only one set at the price of two and one-half dollars will be sold to each member.

Coal Resources of the World.

The monograph on the coal resources of the world will be published in the form of three (not two as originally intimated) quarto volumes and a folio atlas, the price of which to persons who are not members of the Congress will be twenty-five dollars per set. Members of the Congress have the privilege of buying one set at the price of twenty dollars net provided their orders reach the publishers, Messrs. Morang and Company, Limited, Toronto, or the Secretary of the Congress on or before August 15th, 1913.

Remittances.

In case it is not convenient to remit by post office money order, drafts drawn on the Royal Bank of Canada in Ottawa, will be accepted Remittances should be payable to the International Geological Congress and for the exact amount in Canadian dollars and cents, at par, at Ottawa. Cheques can not be accepted.

Payments for Excursions.

The final payments by those participating in excursions should be made in advance of initial date of excursions and as soon as possible after the arrival in Canada of the member or delegate.

Headquarters During Session at Toronto.

The headquarters will be at the University of Toronto where there will be a branch post office open at all hours and at which registered mail may be received or despatched, money orders sent or cashed, etc. A bank will be established at which money may be exchanged. A typewriting service will be maintained, also a telephone service and messenger service. Railway and steamship agents will also be in attendance.

A restaurant service providing luncheon in the middle of the day will be arranged.

CHANGES AND ADDITIONS TO EXCURSIONS

Excursion A.1.—While at Perce on July 16th, a tablet will be unveiled in memory of the late Sir William Logan, the founder and first director of the Geological Survey of Canada. Sir William Logan's name is familiar to all students of geology, and his interpretation of the structure of the Gaspe peninsula was one of his earliest as well as one of his most remarkable achievements.

Excursion A.9.—This excursion starts from Kingston which is at the foot of Lake Ontario and the head of St. Lawrence River, about midway between Montreal and Toronto. Kingston can be reached in a few hours by the Grand Trunk Railway from either Montreal or Toronto or by boat from either place. The combined water and rail route from Montreal as far as Prescott over the Grand Trunk Railway, and from Prescott to Kingston by boat through the Thousand Islands, is especially attractive.

Excursion C.1.—It was announced in the Second Circular that a visit would be paid on September 3rd to the Dinosaurian bone beds near Munson but it is probable that this part of the excursion will have to be cancelled because the railway line to this point may not be completed. If, however, any individuals are very desirous of seeing these deposits and if they will so advise the secretary, an endeavour will be made to arrange for a visit to the locality.

Excursions C.1. and C.2.—A change will be made in the time table of excursion C.1. so that both excursions C.1 and C.2 may meet in Victoria, British Columbia, on August 26th. In consequence of this change the Sudbury nickel-copper deposits will be visited by excursion C.1 at the end of the excursion instead of at the beginning.

Excursion C.5.—Special attention is directed to the character of excursion C.5. The mode of travel by a specially chartered steamer on the Great Lakes, is in itself an attraction. Among the many points of interest may be mentioned, Niagara Falls, the magnificent scenery of the north shore of Lake Huron and the thousands of islands in Georgian Bay. The route traversed presents opportunities for the examination of a Palaeozoic section from the base of the Lowville (Ordovician) to the upper strata of the Devonian. Opportunities will be afforded for collecting fossils in certain localities of world-wide reputation for the profusion of their organic remains. More particularly may be mentioned, Port Colborne, wth its wonderful Onondaga coral reefs; the classic Hamilton localities near

Thedford where nearly 300 species occur; the extremely rich Richmond and Lorraine strata on the shore of Manitoulin island; and the Niagara beds near Manitowaning with an abundance of exquisitely preserved silicified corals.

Students of the pre-Cambrian will be interested in the original Huronian region of the north shore of Lake Huron and in the development of the Grenville series on Parry island.

At Wekwemikong on Grand Manitoulin island a characteristic native "show" is to be given by the Indians. In 1836, by treaty, Grand Manitoulin island was reserved for the various Indian tribes then occupying the islands and adjacent regions of Georgian Bay. The island was to be a haven for all homeless Indians and to-day numerous tribes are represented on Manitoulin.

Excursion C.8.: Juneau—Yakutat Section.—This section of the excursion will be under the guidance of Dr. Lawrence Martin, who has spent a number of years making a special study of the region

Five or six days will be devoted to this section of the C.8 excursion and this length of time should be amply sufficient.

Among other points of interest that will be seen and in many cases examined in detail, are: the Fairweather and St. Elias ranges, 4,878 to 5,487 metres high, covered by snowfields and glaciers including the La Perouse and Malaspina glaciers; the front of the great Piedmont ice sheet of Malaspina glacier, the tidal ice front of the Guyot lobe, the forest-covered terminus of the Marvine lobe; the eastern border of Malaspina glacier in Yakutat Bay; the shrub-covered ablation moraine upon Variegated glacier; streams depositing outwash gravels; the calving of icebergs; cirque vacated by a fallen glacier; beaches, sea cliffs, etc., uplifted 2 to 14.4 metres by earthquakes of 1899, fault scarps 1.3 to 2.4 metres high formed by same earthquakes; the Nunatak glacier, hanging valleys, till-veneered outwash gravels, tidal, land-ending and cascading glaciers, etc., in Russell fiord; moraine and glacio-fluvatile phenomena about the terminus of Hidden glacier (advanced 3.2 kilometres between 1906 and 1909); fiord with submerged hanging valleys, submarine moraines, buried forests; strand lines of former glacier lake; Glacier Bay and Muir glacier (receded over 14 kilometres, 1899 to 1911, vertical ablation of about 366 metres).

During the time devoted to this section of the C.8 excursion an opportunity will be afforded of inspecting the Treadwell mine, one of the largest and most important gold mines of the world.

It is possible that the itinerary of C.8 will be changed in so far that the Juneau—Yakutat portion of the excursion may precede the visit to Dawson.

Special Dates.

Sunday, July 13, Excursion A.1, Quebec and Maritime Provinces, leaves Montreal.

Wednesday, July 23, Excursion A.3, Sudbury-Cobalt-Porcupine (Ontario), leaves Montreal and Toronto.

Thursday, July 24, Excursion A.2, Haliburton-Bancroft (Ontario), leaves Montreal.

Friday, August 1, special day at Ottawa.

Saturday, August 2, special day at Montreal.

Thursday, August 7, opening day of session at Toronto.

Thursday, August 14, last day of session at Toronto, Excursions C.1 and C.2 start.

Tuesday, August 26, special day at Victoria, B.C.

RAILWAY PRIVILEGES IN CANADA

Special Arrangements for Professional Members.

Professional members are defined as members of the Congress who are geologists, mining engineers, geographers and others engaged in the study or application of some branch of geology, (regulation 8a, Second Circular, page 7).

To professional members of the Congress and to dependent members of their families, a special form of certificate will be given. The possession of this certificate will enable the person to whom it is issued to purchase and use during a limited period of time railway tickets at a much reduced cost, to and from any point in Canada at the following rates and under the following conditions.

1. One way (or single tickets) at one-half the lowest one way first class fare.

2. Round trip (or return tickets) at lowest one way first class fare provided the same route is followed going and returning.

3. Circuit tours (or tours in which various points on different railways are visited) at one-half the lowest one way first class fare from point to point via route traversed.

4. Exceptions. There are a few small, privately owned railways and a few steamboat connections to which this plan does not apply but it is not considered necessary to detail them here. Particulars on application.

5. Dates of sale and limits of time of travel. Tickets may be used from June 15th to October 31st, 1913. Tickets cannot be used or purchased after October 31.

6. Stop overs (i.e., permission to break the journey and stay at any place on the route) will be allowed on application to conductor of train or purser of steamboat. It is necessary to make such application before getting off train or steamboat.

The certificate will be sent to the member's home address. If, however, applications for membership are received too late, the certificates can be obtained from the Secretary of the Congress who will meet the members on their arrival at Montreal before excursions A1, A2, and A3 start, or if they arrive at Vancouver or Victoria, certificates can be obtained from the passenger agents of the Canadian Pacific Railway at either of these places.

Special Arrangements for Non-professional Members.

A reduction of single fare plus 25 cents on certificate plan will be granted to all persons travelling directly to and from the sessional meeting at Toronto. Persons attending should purchase one-way first-class full fare tickets (fare for which must not be less than 50 cents) to place of meeting, and secure a certificate to that effect on the standard certificate form.

These certificates must be validated at the meeting and should be presented for that purpose at the secretary's office, University of Toronto, not later than August 12th.

A special agent of the transportation companies will attend the meeting on August 8, 9, 11 and 12, for the purpose of validating the certificates and at that time will collect the 25 cents referred to above. Certificates may then be exchanged for tickets for the return journey without further charge.

Certificates issued at points in Canada, Fort William, Ontario, and east, in connection with tickets good

going August 3 to 9, inclusive, will be honoured for tickets for the return journey until October 31, 1913.

Certificates issued at points in Canada west of Fort William, Ontario, in Ontario, Manitoba, Saskatchewan, and Alberta, in connection with tickets good going July 31 to August 5 inclusive, will be honoured for tickets for the return trip until October 31, 1913.

Further information may be obtained from any ticket agent in Canada or from the secretary.

RAILWAY PRIVILEGES IN UNITED STATES

Special Rates to Members Attending Congress from Certain Points on Pacific Coast in the United States.

Tickets from certain points in California to Toronto and return, may be purchased on certain dates at a reduced rate of $95.70. Such tickets are valid for transportation eastbound for fifteen days from date of sale and are valid for transportation westbound for three months from date of sale, but not beyond October 31, 1913.

Similar tickets will be sold daily from May 28th to September 30th inclusive, at reduced rate of $92.00 from certain points in Washington and Oregon; tickets from this territory will also be valid for transportation eastbound for fifteen days from date of sale, and for return trip not later than October 31st, 1913.

Regular nine months tourist tickets, approximating about one fare and one third for the round trip, are in effect daily from certain points in the States of California, Nevada, Oregon and Washington to Toronto and other Eastern points.

Further information regarding dates of sale, etc., may be obtained from local ticket agents in States named.

LUCKY JIM ZINC MINES, LIMITED

Prior to holding the annual meeting of the Lucky Jim Zinc Mines, Limited, at Kaslo, B.C., on May 1st, the directors issued to the shareholders the following statement of the operations of the company since the last annual meeting:

The operations at the mine, which were being carried on by way of development work in the lower levels, were continued and preparations were made for shipping clean ore as soon as transportation facilities, being provided by the Canadian Pacific Railway Co., were ready. The railway was completed to the mine about August 1st. Prior to that date orebins were constructed at the mine, for shipping purposes, these bins having a capacity of about 150 tons. An aerial tramway, about 600 feet in length, was also constructed, to convey the ore from the portal of No. 5 tunnel to the loading bin above the railway track.

A body of shipping ore of considerable size had been developed in No. 5 tunnel, so, as soon as the railway became available, ore was stoped from between Nos. 5 and 4 levels, and shipment was begun. During the months of August, September, October, and November, about 1,850 tons of ore was stoped and shipped to the smeltery at Depue, Illinois. This practically exhausted the shipping ore from that stope. During the time that stoping was being done, development work was continued in No. 6 level on a likely-looking vein that had been discovered earlier in the year. A small amount of shipping ore was obtained from this vein, but the larger portion of the ore was unsuitable for shipping without concentration.

It has become evident to our engineer and mining superintedent that the vein discovered in No. 6 level is a continuation of the orebody stoped in No. 5 level, and development work has since been done to prove that this is so. While results have been satisfactory, no large body of shipping ore has been opened by this work.

In December, seven or eight more cars of ore was mined and shipped and then heavy snowslides occurred and completely tied up the transportation facilities. The railway company was unable to get the track clear of snow before the middle of March, since which time ore-shipping has been resumed. Present prospects are that the company will be able to mine and ship seven to ten cars of shipping ore per month.

The quantity of ore shipped between August 1 and March 31 was 2.090 tons, gross, and the gross receipts from the smeltery on account of this ore were $77,537. The freight paid thereon was $22,608, and the duty $19,185; together $41,793. This left $35,744 as the amount of net cash received from the sale of 2,090 tons of ore. The figures are subject to slight adjustments in regard to freight and duty, but the difference one way or another will be but small. The average net value of the ore was $17 a ton, which is a high average.

The proceeds received have been applied partly to pay a claim of the smeltery company against this company of about $17,000, which amount, after having been owing more than two years the smeltery company required to be paid. The remainder of the money was used in paying wages and for supplies. On account of there having had to be handled a large quantity of concentrating ore and waste material, receipts were insufficient to pay for all the requirements of the mining done.

Your directors have been obliged to sell part of the treasury stock, in order to raise money to carry on mining operations and to meet other requirements. The company still has available for sale about 150,000 shares of treasury stock, of this the Canadian Pacific Railway Co. holds 100,000 shares as security for a contract made with that company by the former management of the Lucky Jim Co., for the shipping of ore to the smeltery over the railway company's lines.

Your directors found in existence a smelting contract with the Empire Zinc Co., of Denver, Colorado, which so far it has seemed desirable to maintain. During the past year the smeltery company has given every satisfaction by the manner in which it has handled the Lucky Jim ore.

At the present time there is not available in the mine any large body of shipping ore developed. There is, though, some 50,000 tons of concentrating ore, but it will not be possible to realize on this until after a mill shall have been provided for concentrating it. There is not available in British Columbia a suitable custom mill to which the company could send its con-

centrating ore, so it will be necessary to build one. Our mine superintendent's estimate of the value of the above-mentioned concentrating ore is $214,000 net, that is, after payment of all costs of mining, concentrating, freight and duty. The cost of a concentrating mill with a capacity of about 100 tons a day would be about $80,000, which sum would also include the cost of providing the additional power necessary to operate the mill.

The concentrating ore mentioned is partly broken down in the mine, so the quantity can be estimated with near approach to certainty. In addition, there is reasonable expectation of a much larger amount of concentrating material being developed in the future.

It is evident that, by some means, a concentrating mill must be provided at the earliest possible time, in order to secure the profitable operation of the mine. The means to be adopted for its provision is one of the important questions to be considered by the shareholders.

During the past winter the directors found it necessary to instal a steam plant to operate the compressor and electric light plant for the property. This was done at a cost of about $4,000, and the plant is working satisfactorily. With the opening of spring, the water supply will again be available so that, with the steam power as well, the company will have ample power for all purposes required until a concentrator shall be put in.

The directors invite the co-operation of shareholders in connection with the further development of the property. They are of opinion that, with a concentrator built at or near the mine, the operation of the property will result very profitably, and that with sufficient development much larger quantities of ore will be found. They are informed that the quality of the ore in the Lucky Jim mine is unique in America, as regards both clean and concentrating ore. With a concentrator provided, they look for a bright future for the property.

OBITUARY

A few weeks ago the death occurred in British Columbia of Mr. Francis J. Deane, a man who several years ago was most energetic and successful in the publication of mining news of British Columbia. While he had for many years previously been engaged in newspaper work, in the Coast cities of the province and afterwards as publisher and editor of the Kamloops "Inland Sentinel," it was in connection with his valuable work of establishing the Nelson "Daily News" and bringing it up to the position of a newspaper of high character and wide circulation that he was best known throughout the important mining districts of Kootenay and Boundary. He made for the "Daily News" an excellent reputation for the mining news printed in it. He developed the weekly statistical column, showing the ore production of the two most important producing districts in British Columbia, and during the years in which as proprietor and editor he directed that newspaper, accuracy was his first aim, and it was seldom, if ever, the "boomer" of the objectionable and untruthful kind managed to make use of the columns of his newspaper. It was Mr. Deane, too, who first suggested to Mr. E. Jacobs the idea of an annual mining review for a special New Year edition of the "Daily News," and arranged with that mining writer to supply the requisite data for that widely-read review.

Apart from the particular work above outlined and the markedly good service thereby rendered to the mining industry of the province, Mr. Deane was highly esteemed. Mr. Fred C. Moffatt, barrister, of Nelson, long Mr. Deane's right-hand man in the editorial department of the "Daily News," lately contributed to that newspaper the following appreciative tribute to his deceased friend:

"Mr. Deane was of a reticent disposition, but no one who knew him at all intimately could fail to admire and respect him. The man who met him in the ordinary course of business, perhaps, never appreciated the sterling qualities which underlay his retiring manner, but all who had the advantage of close association with him liked him. He had the faculty of so attaching to himself the affection of the members of his staff that there were few who would not have gone to great personal inconvenience to serve him. I think that this was shown by the manner in which 'The Daily News' came through the ordeal in the early years of this century when this country, sparsely populated and suffering from a period of depression, made it necessary for herculean efforts to keep the paper going; to Mr. Deane's splendid personal qualities which caused his staff to put their best efforts into their work on account of their strong personal attachment for him must be attributed largely the fact that the paper was carried hrough the bad times."

THE TRANSMISSION OF POWER BY COTTON ROPES

By E. EDWARD HART, M.A.

A Paper Read Before the Association of Engineers-in-Charge

(Continued from issue of May 15)

(a) In Vol. CXVI of the Minutes of the Proceedings of the Society of Civil Engineers, some tests made by Mons. Fauguier show that belts are 2 per cent. better than ropes. But he used ropes 1 9-16-in. diameter on a pulley 2 ft. 10¼-in. diameter, and ran them at the excessive speed of 5,376 ft. per minute, and could not, therefore, expect to get good results from the ropes.

(b) In the well-known experiments made at Lille in 1894, Manilla ropes 1¾-in. diameter were tested against belts, and at a speed of 4,000 feet per minute it was found that there was less slip with the ropes than with the belts, but that the difference between the efficiency of belt and rope-gearing was inappreciable. Unfortunately, these tests were not as complete as they might have been.

(c) In a more recent test of a 150 h.p. motor, running at 900 revolutions per minute driving spinning frames, the total electrical power developed by the motor was

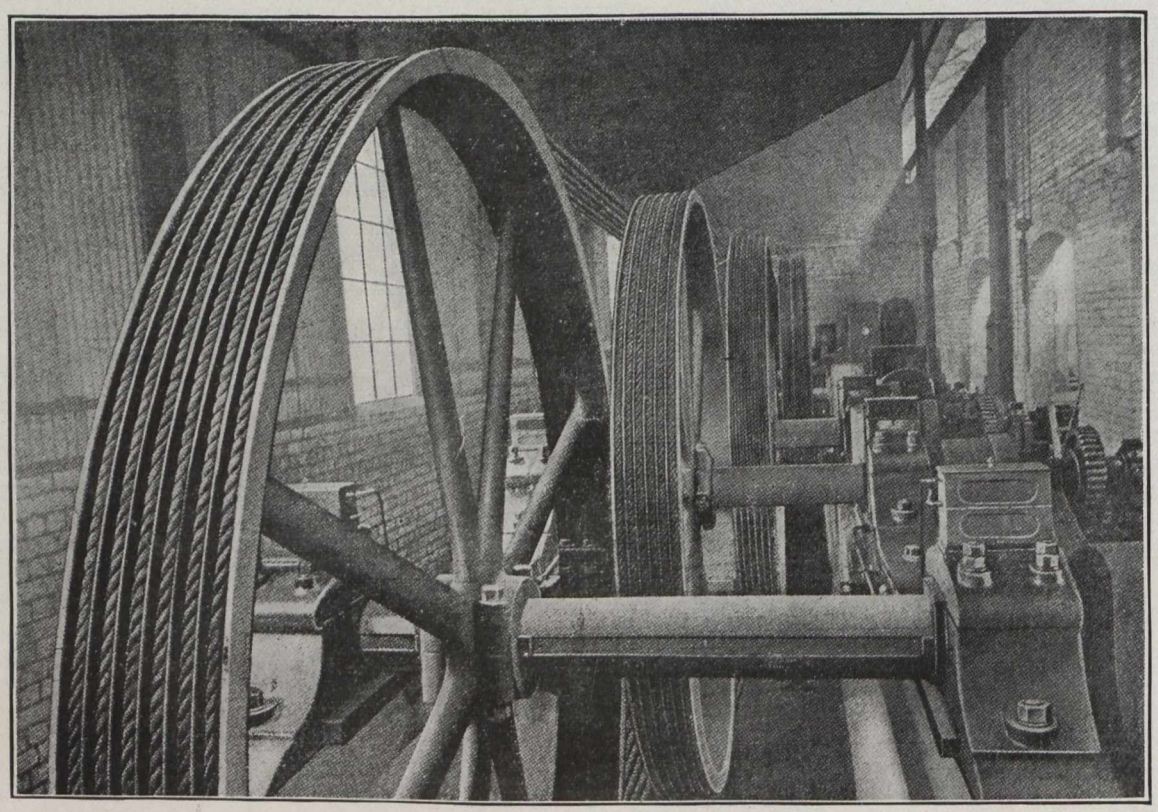
119 h.p. during the period of the test. This was found to be expended as follows:

In motor	12½	h.p.
In main driving ropes	1½	h.p.
In net shaft friction	6	h.p.
In belts to machines	7	h.p.
In machines	92	h.p.

In these three instances, the ropes used were not all made of cotton, though probably they were so in the first and last cases mentioned.

(d) A series of experiments was undertaken a few years ago by Prof. Ewing to ascertain what loss occurs in the transmission of power by ropes through the work which is expended upon the rope itself. The work is spent partly in bending and unbending it, and partly on getting it into and out of the grooves of the pulleys on which the rope runs. The ropes tested were the Lambeth Cotton ropes, four-strand, of 1-in. and 1¼-in. diameters, and they were both run on pairs of 2 ft. 6 in. and 3 ft. 6 in. diameter pulleys. One pulley was slung vertically under the other in a lever frame, so that any desired tension might be set up in the ropes by adding weights to the lever arm. The system was driven by an electric motor set on a cradle dynamometer through a fine endless band, and the resistance R due to the jamming of the rope in and out of the grooves, and also that due to the bending and unbending of the rope, was measured by the weights required to be applied to a lever arm on the cradle dynamometer to prevent it from tilting. A fine and very flexible cord was first substituted for the rope, and a preliminary series of experiments made under various speeds and loads. The readings obtained corresponded to that part of the resistance due to axle friction, air resistance of pulleys, and the imperfect elasticity of the band driving the system from the motor. These values were deducted from those observed when the rope was in action. A series of values of R (the resistance in lbs.) and S (the static tension in the rope) was taken for both diameters of rope on both sets of pulleys. And it was found that when these values were plotted out on squared paper the values of R in relation to S at any one speed were represented by a straight line. The experiments showed that R increases with the speed, by amounts which are proportional to the increase of speed (within the limits tested). Hence it is easy to infer the values of R for higher speeds if we assume the same law to hold good. It was noticed, too, that of the whole work expended on the rope, a large part depended on the tension. This indicates that the work of jamming the rope into the groove and pulling it out again is relatively large, and that this constitutes an important source of loss of power in driving by ropes. The results showed that at any given speed and for any given pair of pulleys, R increases at a uniform rate when the tension is increased. The resistance is made up of two terms, a constant (independent of the tension) and a term proportional to the tension. So that a formula $R = a + b S$ is applicable to all cases (a and b being constants). Further, a and b depend upon the speed, and they both increase in a uniform manner with increase of speed. Further, both a and b are greater for the thicker ropes on the same pulley. They are also greater for the smaller pair of pulleys, when the same rope is tested on pulleys of different diameters.

For a 1-in. diameter rope on a pair of pulleys 3 ft. 6 in. in diameter, at a speed of 4,950 ft. per minute, $R = 0.57 + .0101 S$.



View of a Heavy Service Drive

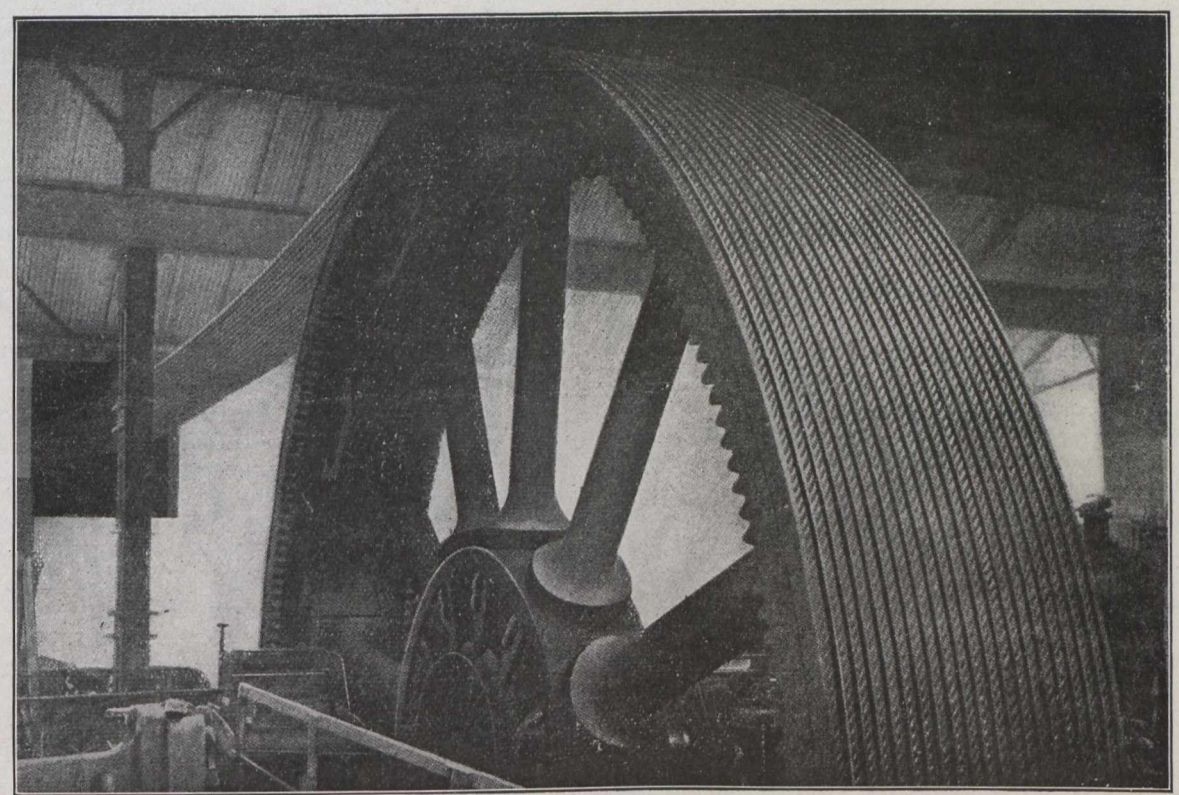
For a 1¼-in. diameter rope under the same conditions as to speed and pulleys, R = 1.16 + .0112 S.

In applying these formulae to practical cases in which the tension is different on the two sides of the rope, Prof. Ewin says, "It appears proper to take S as the greater of the two tensions, for this determines the extent to which jamming of the rope into the groove will take place."

To find the actual percentage of power lost on any given drive. Take, for example, this 1-in. diameter rope running at 4,950 ft. per minute on a pair of pulleys 3 ft. 6 in. in diameter with a static tension S of 100 lbs. Then R = .57 × .0101 × 100 = 1.58 lbs.

To find the gross tension in the rope, we must add the centrifugal tension set up in it at this speed to the static tension, which in this case equals 59 lbs., so that the gross tension would be about 159 lbs. Prof. Ewing goes on to say: "From such data as I have been able to obtain, it appears that a 1-in. diameter rope, under these conditions, will generally transmit an effective driving force of about 70 lbs., corresponding to 10.7 h.p. Hence, the percentage of power lost is $\frac{1.58 \times 100}{70}$ or 2¼ per cent." A similar calculation shows that a -¼-in. diameter rope, under exactly the same conditions as above, loses about 2¾ per cent. of the power transmitted. These results agree reasonably closely with the empirical formula of Prof. J. J. Flather, of Purdue University, for losses due to bending in hemp ropes, which embodies the ideas of Eytelwein and Reulaux on the same subject, viz., that $R = \frac{34}{100} P$, provided that the diameter of the smallest pulley is not less than 30d. For a 1-in. diameter rope, this gives R = 3 per cent. of the driving force.

It will be seen from these results that, provided the pulleys are of reasonable diameter, and the rope is properly constructed, there is no need to take into account any losses of power due to the rope itself. But if, on the contrary, ropes are set to work around very small pulleys in relation to their diameters, or made to work out of their natural position by means of guide pulleys, or turned round corners, or compelled to make reverse bends, the loss of power is very great. The use of small pulleys is in most cases influenced by the velocity ratios required; but it should always be borne in mind that, besides the power lost in each rope by the reduction of the arc of contact on the small pulley, there is also a large percentage of power lost by bending the rope round such a small arc. How severe this bending is may often be seen by the comparison of the interior of a rope that has been working sometimes for only a few hours round a small pulley, with one that has worked for years on a properly-designed drive. Whilst the yarn in the latter is as good as on the day it was put in, the inner strands of the former are broken up into short pieces, cut clean in two as if with a knife. By altering the turns or construction of the rope, it is often possible to considerably improve the life of a rope on such a drive; yet when all has been done that can be done, the state of the rope when it is taken off clearly shows how great an amount of power has been wasted, i.e., expended in destroying the rope, instead of being transmitted to the driven pulley. In many instances, of course, there are insuperable difficulties in the way of a good drive, and the ropemaker has to do his best by careful fitting of the grooves, trying different types of rope, etc., to make the drive a success. But frequently, by a little forethought and "judicious dodging," the engineer-in-charge may change a very awkward drive into a very passable one.



A Drive Showing Twenty Single Strands.

Ideals of a Rope Drive.

Though not always attainable, the following conditions should be aimed at by any one desirous of a satisfactory rope installation. Let the pulleys be not less than 30 times the diameter of the rope used, let them be equal in diameter if possible, and as large in diameter as may be, their ratio not to be greater than 5 to 1. Aim at having a distance of not less than 25 ft. between the pulley faces, and the drive horizontal, with the slack on the top side. Speed to be from 2,000 to 4,000 ft. per minute. Give about 4 to 6 ft. clearance under both sides of the rope, taking great care that the ropes have no chance of rubbing against anything. Allow 2 or 3 inches clearance between the bearing foundations and the sides of the pulleys, so as to leave the rope splicer room to get the ropes on without damaging them. See that the pulleys are in line, true, concentric, and balanced, that their grooves are all exactly alike, and that the ropes are of the same diameter. Do not overload the drive, and see that the engine runs steadily, and that the load is an even one. Avoid, where possible, the introduction of gear wheels between the prime mover and a rope drive. Do not let the ropes get wet, let them be properly lubricated, and do not have them too light. Put all the ropes on at one time, and pull full load on them as soon as reasonably possible after they are fixed. Get an experienced rope-splicer to splice and fix the ropes, and avoid the use of carrier pulleys, rollers, and angular drives as much as possible. Speaking generally, it is possible to comply with all, or nearly all, of these conditions. And where this is the case, the mill engineer often forgets, for many years, all about his ropes, as they give him no trouble. There are drives, however, which present difficulties to those who have to deal with them, and although I do not wish to unduly emphasize them, as they are of comparatively rare occurrence, yet a few hints as to their solution may not be out of place.

(To be continued.)

GRAPHITE

By Edson S. Bastin.

(Advance Chapter from Mineral Resources of the U.S.)

INTRODUCTION.

The origin, properties and uses of graphite were fully discussed in the report on the production of graphite in 1911. As copies of that report may be had on application, this information will not be repeated here. The 1911 report contained also a summary of existing knowledge in regard to the graphite deposits of the island of Ceylon and an index and bibliography of the more important publications dealing with the character, uses and origin of graphite and its occurrence in the United States.

A considerable quantity of material is produced in Bartow County, Ga., which cannot properly be classed as graphite, but is rather a slate carrying from 2 to 15 per cent. of carbon, probably in part graphite. It is ground for use as a filler and drier in fertilizers. In 1909 the production of this material was included in the statistics under the heading "Amorphous graphite," but as it is not adapted for any of the purposes for which higher grades of amorphous graphite are used and as these higher grades are never used as fertilizer filler, it is deemed best not to include this material under the name graphite.

The bulk of the graphite consumed in this country continues to be derived from foreign deposits. In 1912 the quantity of graphite imported into the United States for consumption was 25,643 short tons, valued at $1,709,337. In contrast to this the total domestic production was 2,445 short tons of natural graphite, valued at $207,033, and 6,448 short tons of manufactured graphite, valued at $830,193.

PRODUCTION AND IMPORTS.
NATURAL GRAPHITE.

Production.

In 1912, as in 1911, the total production of crystalline graphite came from Alabama, New York and Pennsylvania. All of this crystalline graphite was of the variety known in the trade as "flake" graphite, that occurs as small flakes disseminated, through crystalline schists, from which it is separted by more or less complicated milling processes. The production of crystalline graphite in the United States has decreased continuously since 1909, as is shown in the accompanying table. This decrease resulted mainly from the closing of numerous graphite properties, very few new properties having begun operation during the same period. The destruction by fire of the mill of the Allen Graphite Co., at Quenelda, Ala., was the cause of a part of the decrease in 1912.

Amorphous graphite was produced during the year by three firms, located in Michigan, Nevada and Wisconsin. The Michigan product is a slate carrying 25 to 30 per cent. of graphite and is all consumed by one firm in the manufacture of paints. The Nevada and Wisconsin products were very small. All the firms reported decreased production as compared with 1911.

Further details in regard to various properties are given in the summary by States and Territories.

Production of Natural Graphite, 1908-1912.

Years.	Amphorous.		Crystalline.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Short tons.		Pounds.		Short tons.	
1908.	1,443	$75,250	2,288,000	$132,840	2,587	$208,090
1909.	*5,096	32,238	6,294,400	313,271	8,243	345,509
1910.	1,407	39,710	5,590,592	295,733	4,202	335,443
1911.	1,223	32,415	4,790,000	256,050	3,618	288,465
1912.	673	19,344	3,543,771	187,689	2,445	207,033

*Includes Georgia graphitic slate.

On account of the small number of producers, figures of production by States cannot be published without revealing individual productions.

Imports.

In 1912 there was a slight increase in the quantity of graphite imported from each of the four countries, Ceylon, Mexico, Canada and Chosen (Korea) (via Japan). The total value of the graphite imported was $1,709,337, as compared with a total value of $1,037,226 for the domestic product, both natural and artificial.

The imports of graphite into the United States in 1911 and 1912 by countries are shown in the following table:

Imports of Graphite for Consumption into the United States, 1912, by Countries, in Short Tons.

Country.	Quantity.	Value.
Ceylon	16,791	$1,379,587
Mexico	3,518	163,107
Canada	2,688	122,216
Japan (Chosen via Japan)	1,574	22,875
Austria-Hungary	473	8,971
Italy	468	7,450
Germany	102	2,669
Other countries	29	2,462
Total	25,643	$1,709,337

The following table shows the imports for consumption of graphite from 1908 to 1912, inclusive:

Imports for Consumption of Graphite Into the United States 1908-1912 in Short Tons.

Years.	Quantity.	Value.
1908	11,456	$ 762,367
1909	21,367	1,854,459
1910	25,235	1,872,592
1911	20,702	1,495,729
1912	25,643	1,709,337

As Ceylon continued to furnish most of the graphite consumed in this country, the following table is given to show the distribution of the Ceylon product. From the early days of the industry up to 1901, Great Britain consumed more Ceylon graphite than any other country. In 1901 the United States assumed the first place, with Great Britain second until 1909, when Germany took second place. The distribution of graphite exports from Ceylon for one year in each of these trade periods is given below:

Exports of Graphite from Ceylon in Short Tons.

Destination	1885*	1902	1912†
Great Britain	7,670	7,586	5,348
United States	3,074	15,244	15,460
Germany	67	3,833	8,057
Belgium	....	1,096	2,874
Other countries	187	453	824
Total	10,998	28,212	32,563

*Figures from Ceylon Government Blue Book.

†Advance figures issued by the Ceylon Chamber of Commerce.

Some importations of flake graphite were received from Canada and of amorphous graphite from Mexico and from Chosen (Korea). As practically all of the Korean output is shipped via Japanese ports, it is reported in the custom house returns as coming from Japan, but so far as can be learned little or no graphite is produced for exportation in Japan proper. The Ceylon deposits and industry were described at some length and the Korean deposits were briefly referred to in the report on the production of graphite in 1911.

Some small shipments of graphite from Madagascar are reported to have been received in this country during the year and some larger shipments are now on their way. The following information in regard to the graphite industry of Madagascar is taken from a report† by James G. Carter, United States Consul at Tamatave:

Exports of graphite from Madagascar, 1909-1912.

	Quantity. Metric tons.	Value.
1909	200	$14,320
1910	554	55,713
1911	1,281	86,188
1912 (first half)	1,121	60,246

†Dail Cons. and Trade Repts. Jan. 29, 1913, pp. 516-517.

WORLD'S PRODUCTION.

The world's production of graphite for the year 1910 was as follows:

World's Production of Graphite, 1910, in Short Tons.*

Country.	Quantity.	Value.
United States	4,202	$335,443
Canada	1,392	74,083
Mexico	2,571	36,207
Russia	....	.....
Germany	8,174	76,404
Austria	36,520	281,220
Norway	882	8,575
Sweden	1,526	1,844
France	606	5,353
Italy	13,790	74,808
Japan	162	5,202
Chosen (Korea)	....	56,719
India	4,761	99,661
Queensland	....	.....
Ceylon	35,310	2,577,600
Madagascar	601	21,218
South Africa	40	6,755

*Mines and quarries: General Report with Statistics, pt. 4. London.

MANUFACTURED GRAPHITE.

The following table shows the production of manufactured graphite by the International Acheson Graphite Co., at Niagara Falls, N.Y., for the years 1908-1912, inclusive:

Production and Value of Manufactured Graphite, 1908-1912.

Years.	Quantity. Pounds.	Value.	Average price per pound. Cents.
1908	7,385,511	$502,667	6.80
1909	6,664,017	480,000	7.20
1910	13,149,100	945,000	7.20
1911	10,144,000	664,000	6.55
1912	12,896,347	830,193	6.44

INDUSTRY BY STATES AND TERRITORIES.

Alabama.—The plant of the Quenelda Graphite Co. (formerly the Allen Graphite Co.), at Quenelda, was destroyed by fire, but is now being rebuilt with a capacity for handling 400 tons of crude material in 10 hours. No production was reported for 1912.

The Ashland Graphite Co.'s plant, about 4½ miles west of Ashland, was idle during 1912. Some of the persons interested in this company are engaged, under

the name of the Alabama Graphite Co., in developing a graphite deposit of similar character in the near vicinity. A mill was erected and began operations in August, 1912.

Alaska.—During the year the Uncle Sam Alaska Mining Syndicate opened a new property in the Kigluaik Mountains, Port Clarence mining district. According to a description obtained through the courtesy of the manager of this company the property comprises nine locations of claims and two mill site locations nearly two miles (10,168 feet) south of Graphite Bay, a branch of the Imuruk Basin. The elevation is about 500 feet above sea level. The graphite occurs associated with schists and gneisses which strike east and west and have steep dips. The richer graphite portions can, it is claimed, be readily separated by hand sorting. Some graphite has been shipped to Everett, Wash., where a small mill is being erected for its treatment.

At the property of the Alaska Graphite Co., also in the Port Clarence district, development work was in progress during the latter part of 1912, but no graphite was shipped.

California.—A company known as the California Graphite Co. was incorporated in January, 1913, to develop a graphite deposit near Saugus, in Los Angeles County. The material is similar in general to some of the graphitic schists of the eastern United States and it is planned to erect a mill at an early date.

Colorado.—Some development work was in progress during 1912 on a new graphite property near the summit of Italian Mountains, in Gunnison County, Colo. The deposits are near the head of Cement Creek and are about 10 miles from the railroad. A company formed for their development is known as the Colorado Graphite Mining and Manufacturing Co, with office in Denver. According to a private report made to this company by S. C. Robinson, mining engineer, there appear to be three parallel "veins" of graphite about 50 feet apart, lying parallel to the inclosing beds of stratified rock, which here stands nearly vertical. The middle "vein" is the largest and has a width of 4 to 6 feet. All development has thus far consisted in open-cut mining. This locality lies either within or just east of the area covered by the Anthracite-Crested Butte folio (No. 9) of the Geologic Atlas of the United States. Within this area coal occurs in the Cretaceous formations. Though normally bituminous, it has locally been altered to anthracite as a result of dynamic metamorphism or of the proximity if igneous rocks. The occurrence of graphite as a result of still more intense alteration is therefore not at all surprising.

The mine of the Federal Graphite Co., near Turret, in Chaffee County, was idle in 1912.

Idaho.—Graphitic schists are known to occur on Salmon River, near Grangeville, Idaho, and analysis of a specimen showed 7.6 per cent. of fixed carbon.

Massachusetts.—Graphite has not been produced in Massachusetts for some years. Mr. F. C. Husbands states that at the famous Sturbridge mine (described in the report on the production of graphite in 1911) the main lode has been prospected for over half a mile west from the shore of Lead Mine Pond, for most of this distance to a depth of 50 to 60 feet. One lump, mostly graphite, taken out about 1904 weighed about 510 pounds.

Michigan.—In Michigan the Detroit Graphite Co., whose mine is near L'Anse, Bargara County, was the only producer. The material is a graphitic slate, which is ground for paint pigment.

Montana.—At the property of the Crystal Graphite Co., near Dillon, Mont., development work was continued during 1912 at the tunnel workings, a new drift being driven on one of the veins and a winze sunk.

Nevada.—The Black Lead Mining Co. continued operations at Carson, Nev., its product being ground, but not refined, and sold for paint pigment and as foundry facings.

Mr. E. Edwin, of Ludwig, Lyon County, reports the discovery of a graphite deposit in that county. He states that the graphite deposit is between 4 and 5 feet thick and is traceable on the surface for several hundred feet. A specimen sent to the Survey was an amorphous graphite of good quality.

New Mexico.—A large body of amorphous graphite occuring in the canyon of Canadian River about seven miles southwest of Raton, in Colfax County, has been described by W. T. Lee.* This graphite has been formed by the metamorphism of coal through the effect of igneous rocks intruded into it.

New York.—In New York the firms operating were the American Graphite Co. (Joseph Dixon Crucible Co.), at Graphite, Warren County; the Empire Graphite Co., at Greenfield, Saratoga County; the Sacandaga Graphite Co., at Conklingville, Saratoga County, and the International Acheson Graphite Co., at Niagara Falls. The Macomb Graphite Co., at Pope's Mills, St. Lawrence County, was idle in 1912, and the Crown Point Graphite Co., at Crown Point, Essex County, has been idle since the fall of 1910.

North Carolina.—A few tons of graphitic schist were mined at Barretts Mountain, in Alexander County, but none was refined or shipped.

Pennsylvania.—The only firms operating in Pennsylvania during the year were Pettinos Bros., at Byers, and the Rock Graphite Mining and Manufacturing Co., at Chester Springs. The Eynon Graphite Co., with mine and mill near Coventryville, which took over the property of the Imperial Graphite Co., continued experimental and development work.

Wisconsin.—The Wisconsin Graphite Co., at Stevens Point, in Portage County, reported a small production. The material is a graphitic slate and is ground for use mainly as a paint pigment.

MARKETS AND PRICES.

The prices paid by crucible makers and others for Ceylon graphite during 1912 were approximately as follows:

Prices of Ceylon Graphite at New York City in 1912.

	Cents per pound.	
Ordinary lump:		
Best	8¼ to 10	
Medium	7	8
Poor	5½	7
Dust:		
Best	3	3½
Medium	2½	2¾
Poor	1⅞	2⅛
Chip:		
Best	5¼	7
Medium	4½	6
Poor	3½	4½
Flying dust:		
Best	2	2¼
Medium	1¾	2
Poor	1¼	1½

In general the range in prices was somewhat greater than in 1911, and during the last half of 1912 there was a notable advance in prices.

*Lee, W. T., Graphite near Raton, N. Mex.; Bull, U.S. Geol. Survey No. 530-L, 1912.

The average price of Korean graphite during the year was about $25 a short ton, c.i.f. New York City. Most of this material is used for stove polish and foundry facings.

Most of the domestic producers of graphite who were operating during the year reported that market conditions were good. The prices for American flake graphite were very variable, but the following table will give some idea of their general range.

Prices of Domestic Flake Graphite in 1912, f.o.b. mills.

	Cents per pound.	
Best crucible flake	5½ to	7½
Medium grade flake	4	6½
Inferior grade flake	2½	4
Dust	¾	3

In general the prices appear to be slightly higher than in 1911.

PERSONAL AND GENERAL

Mr. William Watson, recently returned to British Columbia from New York.

Mr. G. M. Colvocoresses has spent some time in the Sudbury district, aid in the country to the north.

Mr. Kirby Thomas, of New York, was in Toronto about the middle of May.

Mr. A. B. Willmott, of Toronto, has accepted an important consulting position with the Lake Superior Corporation. He will still maintain his office in Toronto.

Mr. Clifford E. Smith, mining engineer, Toronto, recently visited Cobalt and Gowganda.

Mr. C. B. Burchell, formerly manager of the Maritime Coal, Heat and Power Co., Nova Scotia, has accepted a special commission to make certain professional examinations in Europe. Mr. Burchell will be absent for six months.

The Roberts & Shaefer Company, coal machinery engineers and contractors, Chicago, have added to their firm Mr. Willis E. Holloway and Mr. Paul W. Holstein. Both these gentlemen have had extensive experience in designing and installing coal handling equipment and conveying machinery.

Mr. Geo. Watkin Evans, consulting coal mining engineer, Seattle, has been selected to make an examination as to the commercial possibilities of the Matanuska coal fields of Alaska for the United States Bureau of Mines. Mr. Evans left Seattle on May 18th.

Mr. Erich Meurer, mining engineer, of Cologne, Germany, is in Canada looking into the market for Cobalt ores.

Mr. Chas. A. Banks, manager for the Jewel Syndicate, has returned to the Jewel mine, in Boundary district of British Columbia, from a visit to England, where he conferred with his directors relative to the future operations of the syndicate's mine and 15-stamp mill.

Mr. W. F. Best, of Victoria, B.C., is spending the field season in Strathcona Park, a little-known mountainous part of Vancouver Island, in which it is thought probable valuable metalliferous deposits may be found.

Mr. J. W. Brewer has been examining mining property in the Coast district of British Columbia, to report on it for the owners.

Dr. D. D. Cairnes is expected, according to a report published in Vancouver, to visit Silver Creek and vicinity, in Atlin mining division, to ascertain what are the prospects for the opening there of a payable placer gold field.

The Edmonton Bulletin has printed the following among its news items: Hr. Howard D. Cameron, M.E., C.E., formerly superintendent of the War Eagle mine at Rossland, B.C., is back in Edmonton after an extended trip into the Pembina coal fields country, Alberta.

Mr. Chas. Camsell, of the Geological Survey of Canada, during the ensuing field season, will visit what is now known as Leadville camp, formerly Summit camp, on the Tulameen side of the Hope mountains divide.

Mr. James Cronin has retired from the management of the Standard Silver Lead Mining Co.'s mine and concentrating mill in Silverton camp, Slocan Lake District, B. C.

Mr. A. W. Davis, of the Consolidated Mining and Smelting Co.'s mining engineering staff, was lately in Leadville camp, Tulameen district, looking over mineral claims there.

Mr. Ivan de Lashmutt has been appointed manager for the Standard Silver-Lead Mining Co., and will have his headquarters at Silverton, B. C.

Mr. W. B. Dornberg, of Spokane, Washington, manager for the Treasure Mountain Silver-Lead Co., which has during the last two years done a lot of development work on its group of claims in the Tulameen-Hope district, was a recent visitor to the Coast cities —Victoria and Vancouver.

Mr. W. J. Elmendorf, general manager for the Portland Canal Tunnels, Ltd., has gone to Glacier Creek, Portland Canal mining division, to spend the fine-weather season there, superintending the work of driving the 2,300-foot crosscut tunnel his company has in hand. About one-half the distance has been driven since operations were commenced last autumn.

Mr. Evan Evans, one of the Provincial Government mine inspectors, who for the last three months has been relieving Mr. James McGregor, of Nelson, mine inspector for West Kootenay and Boundary districts, has returned to East Kootenay, Mr. McGregor having resumed duty after his vacation.

Mr. A. S. Hamilton, master mechanic for the Western Fuel Company, at Nanaimo, Vancouver Island, is the inventor of the "Nanaimo" safety cap box, for the safe-keeping of dynamite caps in readiness for being affixed to fuse. Two of these boxes—one a locked box and the other a smaller one without lock, the latter suitable for the use of prospectors—were shown and described at the meeting of the Western Branch of the Canadian Mining Institute held at Rossland, B.C., on May 22nd and 23rd.

Mr. Robert R. Hedley has returned to Vancouver from examining mining property on Moresby Island of the Queen Charlotte group, British Columbia. Mr. Hedley is arranging to develop one of the properties on which he saw a promising showing of copper ore.

Mr. A. G. Larson, of Vancouver, B.C., is making a periodical visit of inspection to the Slocan Star, Lucky

Jim, and other mines in Kootenay district, in the capacity of consulting engineer to the companies owning them, respectively.

Mr. R. H. Ley, formerly practising as a custom assayer at Nelson, B.C., and now with the Giant Powder Co., Inc., was recently knocked down and injured by an automobile, in Vancouver.

Mr. Richard Marsh, some years ago connected with mining in Rossland camp, and since then at Spokane and Republic, Washington, has been appointed superintendent of the Yankee Girl gold mine, at Ymir. B.C., in place of Mr. Ivan DeLashmutt who is now manager for the Standard Silver-Lead Mining Company.

Mr. R. G. McConnell, of the Geological Survey of Canada, will shortly visit the Britannia copper mine, near Vancouver, B.C., to obtain data concerning that important mine for the information of the International Geological Congress excursion party to visit the Canadian West next August.

Mr. H. J. C. McDonald, resident superintendent at the Granby Consolidated Company's Hidden Creek mines, Observatory Inlet, has been paying a visit to Phoenix, Boundary District, B.C.

Mr. R. G. McFarlane, of Sudbury, was in Nelson, B.C., last month, visiting with relatives.

Mr. J. M. Turnbull, of the Consolidated Mining and Smelting Company's mining engineering staff, is in the Skeena district, British Columbia, examining mining properties.

Mr. W. J. Watson, manager for the Tyee Copper Company, has arrived in London where he went to discuss with the directors matters in connection with the company's future operations in British Columbia.

Mr. Bruce White is stated to have gone to the Slave Lake country to investigate the mineral resources of that region. He has been mining in British Columbia, chiefly in Slocan and other parts of West Kootenay, for a number of years.

Mr. R. P. Williams, of Vancouver, B.C., for years representative in Western Canada of the Canadian Rand and Jenckes Machine Companies, was recalled to New York recently to consider business offers that may require his removal to that city.

Mr. F. R. Wolfe is manager for the Florence Mining Company, which is operating a small mine in Ainsworth mining division, British Columbia.

Mr. J. A. Whittier, for years mining in Slocan District, has for some time past been resident in Vancouver, B.C.

Mr. H. C. Bellinger, general manager of the Great Cobar, Ltd., left San Francisco, California, on May 6th by the S.S. Ventura on his return to Cobar, New South Wales, Australia. In its April number, The Mining Magazine, London, England, said editorially: "Owing to the interruption to smelting during the Easter holidays, the March returns from Great Cobar are disappointing. So was the special meeting, called to enable Mr. H. C. Bellinger to address the shareholders. He explained the difficulty of obtaining an adequate supply of labour, and confirmed the estimates previously made, but gave no fresh information. In his reticence he was wise. Great Cobar has had enough said and promised about it, and if the performance has repeatedly fallen short of the promise, it is only fair to say that Mr. Bellinger deserves more sympathy than blame. He has proved his technical skill abundantly, and, so it seems to us, also his patience and loyalty, for no mine manager during the last three years has had to face repeatedly so many difficulties, due to no fault of his own. The labour troubles at Great Cobar would have broken the spirit of any ordinary man. We shall be glad to chronicle the success of the enterprise for his sake, as well as that of the proprietors." Mr. Bellinger's many friends in Canada will gladly "second the motion."

PRINCIPLES OF MINE VALUATION

By JAMES R. FINDLAY

(Concluded from last issue.)

It is a curious thing, which anyone can observe by watching stock quotations, that the prices of mining stocks vary almost parallel with the price of the metal itself. When copper metal goes down, copper stocks go down. I always used to think that this was illogical, but I have come to the conclusion now that the public, which bases its valuations on present commercial conditions, has been more logical, on the whole, than the mining engineer, who has laid so much stress upon the life of a mine and the uncertainties of its future.

The question of the life of a mine is not to be overlooked, by any means. In many cases that is the most vital factor, particularly in the case of gold mines, because there fluctuation of price does not enter. Take, for instance, the Goldfield Consolidated. There is a property which has been making a spectacular showing in dividends, but it has always been recognized that its life was uncertain; and now, in spite of the fact that for two years it has been paying very large dividends, the price of the stock has been so low that the dividends have equalled 50 per cent. of its market value. Recently the stock has been selling for $1.75 per share; the actual dividends paid during the past year have been $1.60 per share. Now, if the mine were valued in the way some copper mines are valued, paying dividends, say, at the rate of 6 per cent. of the selling price, the price to be put on Goldfield stock would be $20 per share. In that mine the whole question centers on the length of its life. I speak of it because this is so contrary to usual experience. I do not know of any other case in which the public has been warned, or has become convinced of a mine's exhaustion so long in advance.

On the other hand, there are some mines with an expectation of long life which cannot show any ore reserves at all. Certain mines at Tintic, Utah, which I should be willing to value on an assumed life of five or ten years, do not show ore reserves for even three months. The reason is that those bodies grew in a fashion which prevents the ore reserves from being developed. They occur in an immense mass of limestone, through which mineralizing solutions have gone, and have been diverted by various intersecting fissures. These orebodies are irregular, sometimes small and sometimes swelling up to large size; sometimes they go down vertically four or five hundred feet, forming a pipe, then abruptly go off horizontally for four or five hundred feet, and then up again, then shooting to the right or to the left. If nothing were known about the persistence of those orebodies, one would be justified in being exceedingly skeptical about the future; but the experience of 30 years has shown that those deposits, in spite of their irregularities, are exceedingly persistent. In making his valuation the intelligent engineer will of coures consider this fact a pronounced asset.

SOME CHARACTERISTICS OF THE GOLD BEARING VEINS OF NOVA SCOTIA

By E. PERCY BROWN, Norfolk, N. S.

The accompanying sketch, a cross-section of the workings of the Brookfield Mining Company, Queens Co., N. S., taken from a survey made by the writer in 1898, shows the three distinct classes of veins which occur in Nova Scotia.

These veins are known locally as "Main," "Fissure" and "Angular," and while it is admitted that these designations are indefinite and confusing, yet until a more scientific system of classification has been adopted, the use of the local terms is, perhaps, permissible.

The main veins "A" are usually considered as typical of the gold measures of Nova Scotia and they lie inter-bedded conformably between the slate and quartzite.

The fissure vein "B" cuts the strata both in strike and dip, the strike of the fiussure at this place is about east and west, that of the strata north-east and south-west. The dip of the strata is 69° north, while the vein dips about 63° south. Throughout its course the dip and strike of the vein are almost independent of the rock traversed.

The angular vein "C" lies in the hanging wall of the fissure and by some might be considered a part of it. This is, however, not the case, for it is just as distinct in its characteristics as are the others. It joins the fissure at the point "D" and almost touches it again at "B." This vein changes its direction with each stratum that it crosses as can be seen in the sketch. It traverses the quartzite almost at right angles while it runs with the bedding of the slate. In crossing a large belt of "semi-whin" (i.e. intermediate between slate and quartzite) the course of the vein is intermediate between the angle at which it would cross a belt of slate and that at which it would cross a belt of quartzite.

It can thus be seen how distinct are the characteristics of the three veins. And if we consider the three from a genetic standpoint, it may give us yet a further insight into their distinctive points.

We are all familiar with the idea of the process of gradual folding of the strata during which the main or interbedded veins are supposed to have been formed. During this folding or subsequent to it, we may readily imagine that the rock gave way in certain favourable directions due to powerful stresses set up in the rock by the action of folding or by some independent force shearing the rocks already folded. Thus would the so-called fissure veins be formed.

Probably during the formation of the fissure or perhaps after its formation, but before the crevice had been filled, if that vein point is permissible, a portion of the hanging wall gave way and as it were dropped into or towards the fissure. Thus the angular vein may have been formed.

It may be noted that opposite the position of the angular the fissure vein is small and irregular.

Many will say that the above is an old story and that everyone familiar with gold mining in Nova Scotia recognizes these different veins. Doubtless this is so, but I have noticed that the three classes are continually confused. Only a few weeks ago I read an article in the leading Mining Journal of Canada on the Gold Fields of Nova Scotia wherein the writer stated repeatedly that there were but two kinds of gold-bearing veins in Nova Scotia, interbedded and cross-veins.

I wish to make as sharp a distinction as possible between the fissure and angular veins. Both are "cross-veins" i.e. they cut across the bedding of the strata, but there the similarity ceases. The course of the fissure, as I have shown above, is almost independent of the rock traversed. Several of these veins have been traced for considerable distances. A "gouge," "hulk" or salvage usually occurs on one wall or both.

The course of the angular is extremely irregular and usually extends but a comparatively short distance. As a rule there is no seam between the quartz of these veins and the country rock.

The angulars are usually associated with main or fissure veins and often form a network of quartz frequently connecting one vein with another. They are sometimes quite large and may extend for some distance in a straight line, particularly if the nature of the country rock remain the same. In this case they are usually made up of coarse grained white (bull) quartz.

There will be no need to give examples of main veins as many of these are well known to all interested in the gold fields of Nova Scotia.

Perhaps the best example of the fissure vein is found in the District of Leipsigate, Queens Co., Mr. E. R. Faribault, the painstaking and efficient geologist of Nova Scotia, to whom we owe what tabulated information we possess regarding Nova Scotia gold fields, says, in the Report of the Geological Survey, 1904:

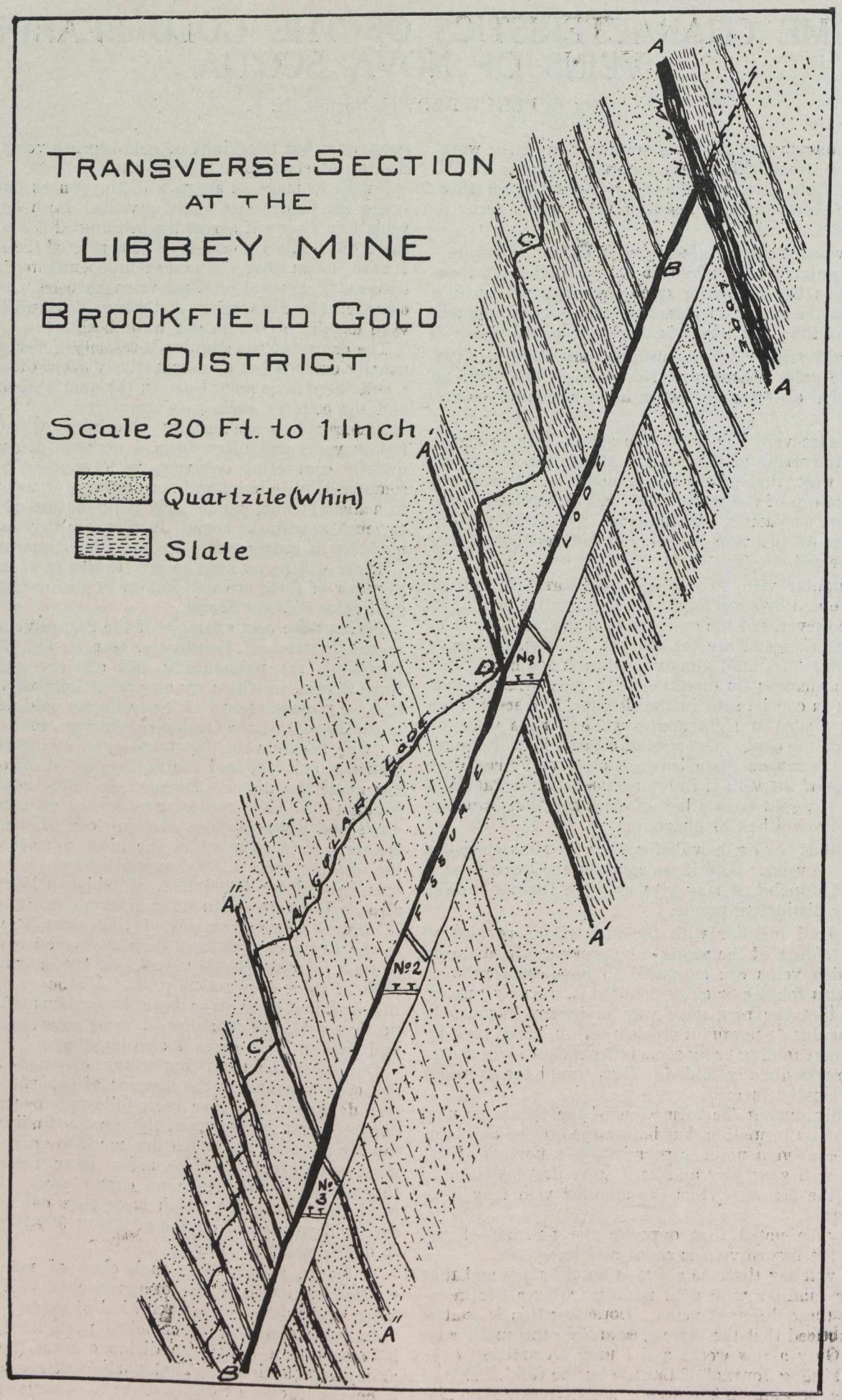
"One fissure vein, the Leipsigate, owing to its permanency and size and the uniformity of its ore values has made the district famous. In many respects it is probably the most typical true fissure vein in the Province and gives promise of being one of the best producers. It is situated in the most southerly part of the district, some 1,200 feet south of the lake, and has been traced for 9,000 feet, of which 4,350 feet have already been opened in three different sections. . . ."

Several other examples of this class of vein exist in the Province and have been developed in two cases at least to considerable extent, but the data bearing on most of these is practically nil. A number of veins of the Angular class have been worked, usually in connection with the working of some interbedded veins, and data in these cases is also lacking.

Doubtless the most important question regarding our gold measures is the location of pay shoots. Some well-defined zones have been followed to considerable depths, 1,000 feet or over, though the finding and following of these was often due more to good luck than good management. How many more there may be throughout the Province we cannot say. How many of the rich outcrops which have been cut on the surface and worked to depths of 200 or 300 feet continue in depth we do not know.

It would appear that each class of vein must be studied by itself as the occurrence of the paystreak seems to be different in each kind of vein.

In some districts the enriched portion of the main lode occurs at a definite distance from the dome or axis of the anticline. That portion of the vein where it begins to curve rapidly or as it is sometimes called


TRANSVERSE SECTION
AT THE
LIBBEY MINE
BROOKFIELD GOLD
DISTRICT
Scale 20 Ft. to 1 Inch.
Quartzite (Whin)
Slate
MAIN LODE
FISSURE
ANGULAR LODE
No 1
No 2
No 3
A
A'
A''
B
B'
C
D

the "shoulder" often contains the highest value. As the apex of the dome pitches in a certain direction the enriched portion continues approximately parallel with it and a pay shoot is formed. In some cases it has been noticed that where the dome broadens the zone of enrichment recedes from the axis and where it narrows the zone approaches the axis.

In other cases the pay zones on the interbedded veins appear to be formed by some irregularity in the folding by which a crumple has been made in the belt. Even when this irregularity is very slight it seems to exert a great influence on the distribution of values. Then again enrichment on these veins occurs where angulars join them, as indeed is often the case, either at a shoulder or in the case of a crumple as described above.

In the case of fissure lodes the presence of angulars also seems to affect the values, but the pay shoots on these veins seem to depend mainly on the intersection of favourable strata. As an example, the pay shoot on the fissure vein shown in the sketch occurred at and just below its junction with the main vein (A) and its accompanying band of slate. This stratum of slate, particularly in the upper levels, was soft, black and well mineralized. Two other main lodes were cut by the fissure at A′ and A″, though these were very small near the surface. The pay-shoot continued for a distance of some 2,000 feet to follow these intersections (vide Map of Brookfield Gold Mining District, E. R. Faribault, Dominion Geological Survey).

The pay streaks on the fissure vein of Leipsigate are well described by Mr. Faribault in the report before referred to (Dominion Geological Survey, 1904). He says, "It has been observed that the ore shoots occur at the intersection of the vein with certain strata of soft rock which are apparently more favourable to fracturing, infiltration and deposition of gold. This important feature, already observed in several other fissure veins, deserves much attention in mining. These intersections are necessarily continuous for great lengths and a succession of them probably recur in depth. It should, therefore, follow that the ore shoots are quite extensive in length and that those already developed are likely to be underlaid by a succession of others. This should encourage development to a much greater extent."

There is an old saying that the worse the wall of the mine, the better the values. This I have found to be remarkably true in many cases of both interbedded and fissure veins.

The enrichment of the angular lodes seems to be more irregular and uncertain usually occurring, however, at the intersection of favourable strata, or where the angular cuts interbedded or fissure lodes.

This question of pay shoots seems to the writer to be a most vital one and it is most important that all available data concerning values and peculiarity of structure met with underground should be carefully recorded from the earliest start of the mine. In a new district this is particularly true and should not be lost sight of.

In Nova Scotia one can see many cases where thousands of dollars could have been saved had such records been kept, and mines which have been ruined by improper development might still have been yielding steady returns.

The late Dr. Henry Yuill Hind, writing on the Waverley Gold District, Nova Scotia, as far back as 1869 (less than ten years after the discovery of gold in Nova Scotia), says:

"It is much to be regretted that no reliable data exist from which diagrams showing the auriferous zones on these leads can be constructed. The circumstance of the quartz from all being mixed before crushing makes it impossible to collect the necessary observations." And, again:

"Plans of all the workings are also essential, showing at least monthly progress. . . . . but if no monthly plan of workings is kept on record, all is confusion. With the single exception of a plan and section made some years ago by Mr. Bell, together with a lithographed plan of the whole district, showing the position of the several properties, I was unable to obtain any plan of surface workings, much less any plan of the underground workings, and the agents of the different companies uniformly informed me that none to their knowledge were in existence."

Had Dr. Hind's advice been followed throughout Nova Scotia the history of gold mining here might have been different. I believe that to-day a careful study and correlation of all data and available information regarding underground workings, structure, values and so forth should be made in the interests of the industry.

MINING DIVIDENDS

Messrs. Thompson, Towle & Co., of New York City, have compiled and published a statement showing the production, estimated earnings, and dividends of the important copper mines of the United States, Mexico, and Canada. Only two companies operating in Canada are included, namely, the British Columbia Copper Co. and the Granby Consolidated M. S. & P. Co., both in British Columbia. The Britannia was either overlooked or the corresponding particulars of operations and results were not obtainable. The published particulars for 1912 follow, with estimated approximate figures for 1913 shown in brackets: British Columbia Copper Co., number of issued shares, 591,709; par value $5; copper produced, 11,146,000 lbs. (12,000,000 lbs.); cost per pound, 12.86 cents (10 cents); earnings per share, 72 cents (with copper at 15 cents a lb., $1.01; earnings each one cent change, 20 cents a share); amount and date of last dividend, 15 cents a share, January 15, 1913. Remarks: Cost in 1912 due principally to lower grade ore treated. Granby Consolidated: Number of issued shares, 149,648; par value, $100; copper produced, 22,630,000 lbs. (22,000,000 lbs,) cost per pound, 9.50 cents(9.50 cents); earnings per share $10.60 (with copper at 15 cents a lb., $8.09; earnings each one cent change, $1.47 a share); amount and date of last dividend, $1.50, March 1, 1913. Remarks: Company owns Hidden Creek property. Has $1,500,000 convertible bonds. Estimated production, cost, and earnings per share when reduction plants shall have been brought up to capacity: Production, 45,000,000 lbs.; cost 9½ cents; earnings per share, with copper at 12 cents, $6.84, at 13 cents, $9.58, at 14 cents, $12.31, at 15 cents, $15.05, at 16 cents $17.78, at 17 cents $20.52.

Metallurgical and Chemical Engineering, New York, printed in its May number a two-page illustrated account of a complimentary dinner given on the evening of April 19 by the chemists of the United States to Dr. William H. Nichols, the president of last year's

International Congress of Applied Chemistry, and to Dr. Bernhard C. Hesse, the secretary of the Congress, as a mark of their appreciation and affection. The dinner was held at the Chemists' Club in New York City, and some 225 men assembled to do honour to their guests. The following excerpt from that journal's account of the proceedings may interest, among others, readers of the Canadian Mining Journal in Canada who are interested in the Granby Consolidated M. S. and P. Co., of which, among his many activities, Dr. Nichols is president:

"Dr. Wilder D. Bancroft, of Cornell University, spoke as past-president of the American Chemical Society, and of the American Electrochemical Society. He spoke exceedingly well, both concisely and to the point. Starting with a funny church collection story, he passed to a review of the success of the Congress—for it was a great success—and of the men who made it such. Morris Loeb lost his life at it. Dr. Rosegarten nearly did. Mr. Matheson produced a surplus and Dr. Hesse gave up a year and a half of his life to produce thirty volumes of transactions and a great many tons of literature. And as to Dr. Nichols' work as president, if we should ever go again through such a Congress in our lifetime (which Heaven forbid) and if we should be forced to get along without Dr. Nichols as president (which Heaven forbid), we might think in poetry:

Twinkle, twinkle, little star,
Riding on a trolley car.
Trolley car went off the track,
Gee, I wish we had our Nickels back."

Among other speakers was Dr. David T. Day, of Washington, D.C., who, in order that Dr. Nichols and Dr. Hesse should take with them into later life the memory of the appreciation and affection of their American fellow chemists, presented in the name of the American chemists, to Dr. Nichols, a counterpart in silver of the desk set in the Royal Treasury in London, and to Dr. Hesse a silver loving cup.

The Traylor Engineering and Manufacturing Company, with works at Allentown, Pennsylvania, U.S.A., announces that it is now building three 50 by 360-in. water jacket copper-smelting furnaces for the Granby Consolidated Mining, Smelting & Power Co., Ltd., these being only a part of a very large order received from that company.

The United States Congress has authorized the expenditure of $2,596,000 for a building to accommodate the Geological Survey, the Bureau of Mines, the Reclamation Service, and the Indian Office, all bureaus of the Interior Department. Plans for construction will go forward at once.

THE DOME ANNUAL REPORT

The annual report of the Dome Mines Company for the period Nov. 30, 1911, to March 31, 1913, was presented by Mr. Ambrose Monell, the president, at a meeting of the shareholders in Toronto on May 27th.

The most important feature of the meeting was the decision to increase the capital from $3,500,000 to $5,000,000 in $10 shares. However, the new shares will be issued only as actually required for increasing the capacity of the mill. The mill at the present time contains only forty stamps. It is proposed to instal sixty more stamps, and to add the necessary subsidiary machinery.

During the period covered by the report the mill handled 101,812 tons of ore. The average gross value of the ore was $10.25 per ton. The net profit per ton was $5,009. As pointed out by Mr. Monell, there is every reason to expect a considerable reduction in operating costs. The labour troubles of the past, and the large proportion of development work being done have necessarily enhanced the expenditure per ton of ore mined and milled. Also, the cost of power has been very considerably cut. Relatively cheap hydro-electric power is now available.

As mentioned above, the tonnage milled was 101,812 tons. The total yield by amalgamation was $460,581.62. The yield by cyanidation was $483,513.31. The total value was $1,043,994.93. The actual percentage of extraction was most creditably high, standing at 95.63 per cent.

The mining and milling costs were made up as follows:—

Mining cost per ton	$1.31
Crushing cost per ton	.24
Milling cost per ton	2.11
General	1.29
Total	$4.95

Altogether 128,015 tons were mined; 102,836 tons were sent to the mill. The difference was waste.

Judging from the tenor of the annual report great pains have been taken not to over-estimate the ore reserves. Where positive assertions are made they have been substantiated with the utmost care. Mr. Mein estimates the ore developed above the 45-foot level, as at March 31, 1913, at 315,528 tons, carrying gold to the value of $7.50 per ton. Added to this quantity there is a further reserve of 250,000 tons between the 45-foot and the 100-foot levels. Mr. Mein has abstained from placing any definite value upon this body. He states that much more work must be done before it can be properly estimated.

The following is a brief tabulation of the total general expenditures and earnings:—

Mining costs	$157,666 27	
Milling	214,788 15	
General works expenses	131,096 72	
		$503,551 14
Gross earnings		$540,443 79
Selling Expenses—		
Bullion, shipping	$1,663 96	
Bullion insurance	1,551 51	
Bullion refining	2,623 07	
		$ 5,838 54

General expenses		24,649 15
Net earnings		509,556 10
Written Off—		
Development	$61,087 20	
General charge	53,516 21	
Fire loss	24,124 47	
		$138,727 88
Transferred to balance sheet		$371,228 22

It is quite worthy of note that 93,581 tons of all the ore milled came from surface "glory-holes."

Harking back to the question of ore reserves, it may be mentioned here that, by horizontal measurement, 46,750 square feet of ore has been exposed on the 100-foot level. Until further work has been done below this level this ore is given no definite place in the reserves.

Certain diamond drilling results were also mentioned in Mr. Mein's report.*

Borehole.*	Length of mineralized ore.	Assay value.
No. 12	57 ft.	$7.18
No. 13	168 ft.	4.15
No. 20	478 ft.	3.69
No. 23	273 ft.	4.56

His own explanation of the inferences to be drawn from these results is as follows:

"Selected portions of these great lengths of core, of course, would show considerably higher results than the foregoing averages. But a classification into higher and lower grade cannot be reasonably attempted until the trend of the zones or lenses to be followed in mining is more fully proven by development in the region of these borehole intersections. For examples: 97 ft. of the 273 ft. of ore in No. 23, averaged $6.41 and 44 ft. of No. 20 assayed $10. Too much weight, however, should not be attached to the assay values of borehole intersections, which are commonly unreliable as samples for valuation, though very important as a guide to development.

"In shaft No. 2 itself the ore body was cut at a depth of 172 ft., which had not been indicated in any of the boreholes. Sampling results averaged $4.87 for a distance of 85 ft., with the bottom of the shaft still in ore at a depth of 257 ft. The strike of the miners interrupted the sinking of the shaft and a crosscut was started south. This crosscut is now in 200 ft. and averages $5.39 throughout its entire length. Including borehole No. 23, which lies above the crosscut on the west side, we have, therefore, in this vertical plane, representing the extension of our declared ore values three sides in ore showing: 85 ft. of the shaft averaging $4.87, 200 ft. of the crosscut averaging $5.39, 97 ft. of borehole averaging $6.41.

"Immediately to the west (200 ft.) borehole No. 20 intersected 478 ft. of ore, averaging $3.69, of which 75 ft. showed $5.15 per ton.

"All new results obtained on the deeper extensions of the famous Dome of rich quartz that marked the outcrop of the veing give us further hope that a longer life with an increasing scale of operations on a lower grade of ore may be confidently anticipated."

For this moderate and careful policy, Mr. Mein deserves all possible credit. He is deliberately taking the risk of misinterpretation. Doubtless there are numberless parasites of the stock market who will be only too glad to interpret his statements in the most depressing manner. Just here a comparison between the Hollinger and the Dome is illuminating.

	Hollinger.	Dome.
Ore reserves, tons	644,540	509,556
Average value, per ton for the 250,000 tons below the 45-foot.	$21 44	$7 53
Apparent net profit per ton	$14 70	$2 58
Apparent net value of ore reserves	9,474,738	1,314,654
Market value of mine, taking Hollinger at $17 a share and at $15 a share	$10,200,000	$5,250,000

None of the Executive officers of the Dome Mines Company receives a salary.

SPECIAL CORRESPONDENCE

NOVA SCOTIA

MINERS' RELIEF SOCIETIES.

There has been discussion in the Nova Scotia Lower House regarding the Provincial Workmen's Compensation Act, and the statement has been made that the miners of the province would be better off under the provisions of the Act than they are under the present system of relief societies. It must be admitted that not every colliery company has placed its house in order in this regard, but the workmen of those companies who have properly constituted relief societies are distinctly better off as they are. In drawing a corollary between European countries and Nova Scotia it must not be forgotten that in the older countries friendly societies exist on a scale of great magnitude, and that there also exists a vast organization of humanitarian institutions, such as hospitals, asylums, and the much maligned and despised "poorhouses" that every European civilization has to maintain. Many of these institutions are richly endowed by benefactions of forgotten centuries. In Nova Scotia, however, conditions up to the present time have fortunately not necessitated public benefaction or state provision on a large scale, but in the large industrial towns of the Province rural conditions are changing to urban conditions, and the presence of the poor and indigent is being forced on the attention of a population which hitherto has not apprehended the meaning of poverty or the stigma attaching to the "workhouse," the "Bastile," as it is bitterly designated in many parts of England. Yet even in England, the operations of the Compensation Act have demonstrated the inadequacy of the hitherto existing provision against sickness, and the Compensation Act was followed by the National Insurance Act. The miners' relief societies in Great Britain have one by one given up the ghost, have wound up their affairs and made final provision for the dependents on the funds.

In Nova Scotia, the relief societies are the only real provision the miner has against sickness. What few friendly societies exist do not welcome the miner into their ranks, and the insurance companies looks askance at him. Both are mistaken in supposing the miner to

be an undesirable risk, but that does not help the miner. The Relief Society affords relief in both sickness and accident, two-thirds of the benefits disbursed being for disability caused by sickness and only one-third for accident. The cost of the present system to the coal companies is greater than the burden they would have to assume under a workmen's compensation act. It must be accepted, from European experience, that the operation of a Compensation Act which places the entire burden on the employer, will also extinguish the relief societies, and will in turn require supplementary legislation to create the provision against sickness, of which the miner will be deprived by the passing of the relief societies now exist, must be prepared to tread a force a compensation act where properly constituted relief societies no wexist, must be prepared to tread a long and devious road leading maybe in a different direction to that imagined.

MINE RESCUE APPARATUS ON THE "FREE LIST."

The changes in the customs tariff announced by the Minister of Finance include "miners' rescue appliances, designed for emergency use in mines, where artificial breathing is necessary in the presence of poisonous gases, and automatic resuscitation apparatus for artificial breathing, to aid in the saving of human life." These are placed on the free list. For some time past the duty on mine rescue apparatus has been rebated upon application, but it is much more satisfactory to have these appliances placed definitely on the free list, as they are in every other country of importance. The provincial laws of several of the Western Provinces compel the provision of rescue appliances at mines, and it may be asked whether the Federal Government could in any case collect customs duties on articles which are required by law to be provided, when such articles are not manufactured in Canada.

DOMINION COAL OUTPUTS.

The Glace Bay mines produced 200,000 tons in the first half of May. The output was a little restricted by absenteeism, not unnatural in the first days of springtime. The output for the month should reach 405,000 tons, which will place the production for the five months ending May 30th approximately 170,000 tons in advance of 1912 over the same period. St. Lawrence shipments obtained a good start through the favourable weather of the latter half of April.

The S.S. "Glace Bay" became a total wreck off Mistaken Point, near Trepassey Bay, Newfoundland, on the 2nd May. Very many stout ships have met their end in this inhospitable vicinity. The "Glace Bay" was a new ship, of 10,000 tons cargo capacity, specially constructed for the coal freighting trade, and was on a long-term charter to the Dominion Coal Company. The loss will be to the owners, but the Coal Company will lose the services of a fine vessel during the coming shipping season. It is worth a question whether that portion of the coast immediately westward of Cape Race could not be protected by submarine bells. The "Glace Bay," like a majority of the Dominion Coal Company's fleet, was fitted with a submarine bell equipment. Lighthouses are helpless in a Newfoundland fog, and fog-horns are notoriously misleading at times, in fact, the "Glace Bay" is stated, on newspaper authority, to have been misled by a locomotive whistle. The Canadian Government maintain the Cape Race Light,

Sorting High-Grade Ore at Foster-Tough—(See Opposite Page.)

and the suggestion just made may be worth consideration.

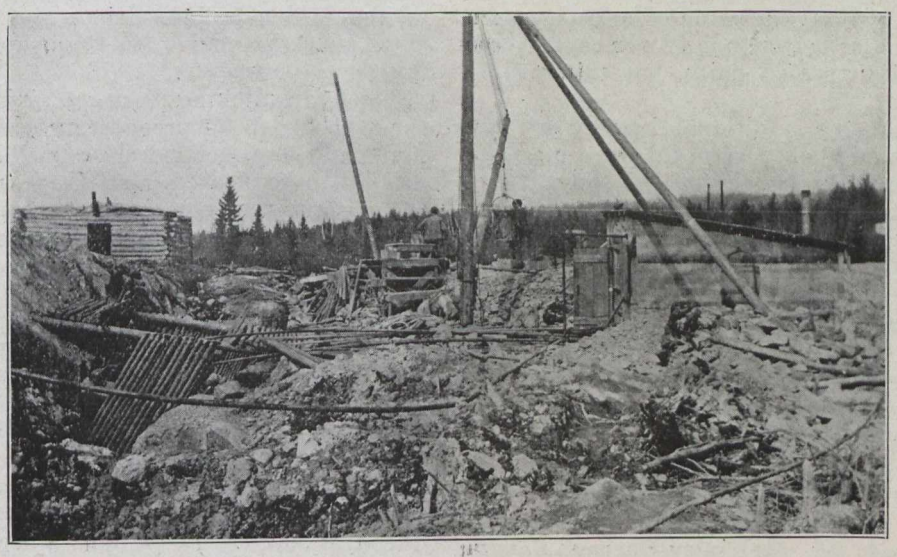
INTERCOLONIAL COAL CO., WESTVILLE, N.S.

There has been a troublesome fire in the Drummond Colliery of the Intercolonial Coal Co. for some weeks past, but it is now stated by the management that it will be only a brief period before the fire will be completely under control.

It is also stated that the company contemplate the re-opening of the old Scott pit, and vigorous development of the workings in the bottom coal in the Drummond Colliery. It is hoped to attain a daily output of 2,000 tons from all sources of supply.

As the workings of the Drummond slope and Acadia slopes have both long since passed through the point where it was supposed there existed a displacement in the strata of 2,600 feet, without any disturbance being actually encountered, some interesting speculations become possible on the structure of the Pictou coalfield. If the Geological Survey could delegate a competent paleontologist to make a systematic study of the coal seams in Nova Scotia, and their adjoining strata, some

knotty points regarding correlation of seams might be cleared up. Discussions as to the relative identity of seams in Nova Scotia coalfields have been going on for fifty years, and the same uncertainty still exists in many cases.



Foster-Tough Claim
Inclined Shaft from which $38,000 has been taken to date

ONTARIO

PORCUPINE, SWASTIKA AND KIRKLAND LAKE.

The fact that one unit of each power plant has been repaired so that it is again running has relieved the situation in the gold camp. After the breakdown of the Sandy Falls plant there was not a kilowatt in camp, and all those without auxiliary steam plants had to shut down. The Hollinger mill was shut down for some time. Now the first unit of the Sandy Falls plant has been repaired, the Hollinger is supplied. The Dome has been running its entire plant with steam, but will benefit by the fact there will now be available 1,500 horse power from Wiawaiten Falls.

At the annual meeting of the Dome Mining Company this month it is anticipated that the announcement will be made that ore reserves warrant the addition of another 60 stamps to the present mill, bringing its daily capacity up to about a thousand tons per day. This will more than double the capacity of the present plant. How this addition will be financed has not yet been made public, but it is probable that it may be undertaken by increasing the capitalization from $3,500,000 to $5,000,000.

The five-stamp mill at the Foster mine at Gull Lake, near Swastika, is now running. The stamps were first dropped on May 12th, and the first run was made on May 14th. On May 15th, the mill commenced to run regularly. The ore is coming from the dump. It is estimated that there are 2,000 tons broken and raised.

The high grade ore will continue to be handpicked and shipped. The little plant will treat 15 tons per day.

No. 3 Vein Foster-Tough Claim, Kirkland Lake

The Lucky Cross mill, of Swastika, commenced actual treatment of ore about May 1st, since which time the mill has been in practically continuous operation.

Assays of the head made by the company's assayer for one week ran $25 to the ton but the ore in this instance came from a rich spot on the 200-foot level, and is too high to be representative. The tailings leaving the mill during the same period gave a value of only 31 cents, showing an extraction of better than 98 per cent. About twenty tons are being treated daily, but this will be gradually increased.

It is expected that the additional battery of five stamps will be operated about the middle of June.

The final payment for the control of the City of Cobalt was made on May 16th. Though negotiations have been conducted through the house of Aemelius Jarvis & Son, in Toronto, it is an open secret that they are buyers for interest associated with the Cobalt Townsite. As the issued capital of the City of Cobalt Mining Company is $1,500,000, and the deal was for 80 per cent. of the stock at 55 cents a share, the whole transaction would represent $660,000. One hundred thousand dollars was paid.

COBALT, SOUTH LORRAIN, GOW GANDA, AND ELK LAKE.

The production of the McKinley-Darragh-Savage mines for the month of April was 171,028 ounces. The mill treated 4,600 tons. While this production is considerably larger than that for the previous month, it is less than the general average for last year. This is explained by the fact that no high grade has been mined for the past two or three months to sweeten the usual milling ore and also that there has been no attempt to keep up the usual amount of silver ore from the Savage. A little more high grade has just been encountered on a stope on the No. 1 Swamp vein. At the 160-foot level it is now showing four or five inches of high grade.

The addition to the McKinley-Darragh mill is running and 75 tons per day is being brought over the aerial tramway from the Savage to the mill. In a few days when a new tube mill is working a further 35 tons of ore will be treated from the McKinley itself, making the daily record of the mill 275 tons. Each bucket on the aerial tramway from the Savage to the McKinley mill has a capacity of 700 pounds, and thus can be transported ten tons an hour. Previously for several years the Savage ore has been jigged in the rock house at the mine, the fines going to the dump. It is estimated that they will run from twenty to fifteen ounces to the ton. There are sixty thousand tons assembled on the dump, and, with the stamps available for the Savage, it will take three years to run the dump alone. The addition to the McKinley mill makes it the second largest in camp.

The Temiskaming and Hudson's Bay Mining Company has just declared another 300 per cent. dividend, payable May 21st. This makes their third disbursement this year. Already this year the company has paid or will have paid on May 21, 900 per cent. on the issued capital of the company, or $69,989.

The only point from which ore was shipped on the T. & N. O. Railway, exclusive of Cobalt, last month, was from Gow Ganda. Both the Mann mine and the Miller Lake-O'Brien shipped high grade to the Deloro Mining & Reduction Company at Marmora. The shipments were as follows:

April 3—Mann	40,000
April 8—Miller Lake-O'Brien.....	50,380

All this ore was teamed from Gow Ganda to Elk Lake and there put on the cars instead of being teamed to Charlton. But since the Gow Ganda-Elk Lake road is still in wretched condition, it is costing $30 a ton to bring out to the steel.

It is understood that there is a deal on for the sale of the Miller Lake-O'Brien, and the Millerett for a large sum of money. An English company is negotiating for the property.

The hydraulicking plant on Nipissing Hill sluicing off the overburden for prospecting will this year be worked night and day, not merely one shift as last year. The ground to be cleared is all first-class prospecting territory. Last year some of the best prospective ground was left in order to fully strip the ground, to be later occupied by the tailings from the low grade mill, and the work has been taken up from this point. The overburden will be removed from a point below the low grade mill to the Chambers-Ferland line, and also between the low grade and the high grade plants. This is 75 per cent. of conglomerate and should yield good results. It has been trenched previously.

During the season 1912, 33.2 acres of ground were cleared, the average depth of the soil was 4.75 feet. In the vicinity of vein 92 one of the discoveries made produced 27,000 ounces by open cutting. The other veins found will be opened up later.

The production from the Casey-Cobalt mine for the week ending May 3rd, was 20,160 ounces. For the week ending May 10, it was 20,300 ounces. This is considerably higher than any of the April weekly records, which ran about 16,000 ounces. The agreement with the Northern Canada Power Company to build a line out to the mine will enable the company to materially reduce their costs. They are at the present time burning wood as the price for hauling coal from New Liskeard is prohibitive. The thousands of cords of wood stored in the yard at the Casey-Cobalt will easily carry the company over this year, and they will thereafter be able to run with electricity.

BRITISH COLUMBIA

Revised statistics of mineral production in British Columbia in 1912 will, when published, show that the preliminary estimate of the Provincial Mineralogist, given out about the middle of January, was within $200,000 or $300,000 of the actual recorded value of the production. Exact figures are not yet available for publication, but it is known that the total is in excess of $32,000,000. The approximate proportions are:—Metalliferous minerals, $18,000,000; non-metalliferous minerals, $14,000,000. In round figures the value of the respective minerals included may be stated as about as follows: Gold (placer and lode), $5,800,000; silver, $1,800,000; lead, $1,800,000; copper, $8,300,000; zinc, $300,000; coal and coke, $10,500,000; building materials, etc., $3,500,000. As already stated, these are not exact, but they are near enough to be accepted as indicating about what the official records may be expected to show when they shall be available for reference.

Placer gold reached the highest total in the four years since 1908. Lode gold was within $11,000 of the highest total on record in the province, namely, that for 1910. Not so favourable is the comparison of total gold—placer and lode together—for in four previous years was the total of 1912 exceeded, as follows: As against a total of less than $5,900,000 in 1912, totals of higher years were—1910, $6,073,380; 1908, $5,929,880; 1905, $5,902,402; and 1902, $6,061,409. Silver is

higher in value than for any other year since 1906, and in quantity since 1905. Lead has the highest figures, both quantity and value, in five years, 1908-1912. Copper figures are the highest on record in all years, as to both quantity and value. In zinc, the comparison is not favourable to last year. Coal shows a value of nearly $600,000 less than in 1910, but it is $1,500,000 higher than the 1911 total, and more than $2,000,000 higher than that of 1909, with earlier years showing a still greater disproportion. The coke total is the highest on record as to value, but not as to quantity, for in 1905 the production was 7,450 tons greater. Taking coal and coke together, there was only one year—1910—when a higher total value was reached, that year having been credited with $321,500 more than was 1912. A considerable reduction was made in the value placed on miscellaneous products, as compared with that shown in the preliminary estimate, thus bringing the total for these below that recorded for 1911. There is much difficulty in arriving at the value of these products, for comparatively few of those directly engaged in their production will make returns. Yet it is believed the value given by the Provincial Mineralogist each year is as near as can be arrived at under the conditions.

Looking at the production returns as a whole, there is certainly good reason for satisfaction with the generally good results achieved in 1912. Lower average prices may affect the 1913 total value to an extent that will result unfavourably in making a comparison between the current year and 1912, when the time shall come for this to be done; again, there will be the effect of fresh labour difficulties on Vancouver Island to adversely affect the result of the 1913 operations, but since the year is still comparatively young, the possible troubles of the future may well be left to take care of themselves when the necessity shall arise for their doing so. Meanwhile, the fact may reasonably be made the most of that the mineral production of British Columbia in 1912 reached a total value in excess of $6,000,000 higher than any other year in the history of mining in the province, with the mining industry continuing to make good progress.

SIMILKAMEEN.

While occasional brief news items that are given publicity tend to show that the usual good progress is being made at the Hedley Gold Mining Co.'s mine and stamp mill ,little detailed information has been received of late. However, it is expected that it will be practicable to shortly ascertain what is being done in connection with that flourishing gold-mining enterprise, and to thereafter have for publication interesting details of operations.

The position is similar in regard to the development work the British Columbia Copper Co. has latterly been doing on Copper mountain and in its vicinity, but here again the expectation is that reliable news will be obtained soon, in which case it is thought best to defer further reference to this subject, especially as various newspapers have printed items that are not similar in their statements of the position in regard to the Voigt group and other groups of claims that have been receiving the attention of the company's development parties.

It has been announced that the British Columbia Cement Co.'s works near Princeton are nearly completed; in fact it has been stated in print that the manufacture of Portland cement would be commenced there early in May. Those chiefly interested in this enterprise are sanguine as to its success, and they expect to show that their confidence is well grounded.

There is little that is new to chronicle concerning coal mining in the Similkameen district. At Princeton the Princeton Coal and Land Co. is continuing its efforts to enlarge the market for its coal and is making the product of its mine as good a fuel as modern screen and other coal-cleaning appliances admit of its doing. Little is heard now-a-days of the operations of the Columbia Coal and Coke Co., but it is known that, with fewer men in its employ than when the long cross-cut tunnel was being driven from the Tulameen river slope of the mountain, development is in progress from the direction of Collins gulch. Although the results from the larger work done in 1911 and the early part of 1912 were disappointing, it is believed the company has some good coal, and it is stated that it is now going the right way about its development. When more coal shall have been made accessible for mining the problem of the best means of getting it down to the V. V. and E. Railway, already constructed in the Tulameen valley below, will be dealt with, and preparations be made for shipping the coal.

Coast District.

The labour troubles, concerning which information was supplied for the last number of the Journal, have become much more serious than was at first thought they would do. The mines of the Western Fuel Co., Pacific Coast Coal Mines, Ltd., and Vancouver-Nanaimo Coal Co. have all been closed. The published statements of prominent U. M. W. of A. men that all the mines on Vancouver Island are closed are untrue, for the Canadian Collieries (Dunsmuir), Limited, cantinues to add to the number of miners it has at work and to increase the output of its mines. The following monthly totals of coal produced tell their own tale: In January, 29,541 long tons; February, 30,036 tons; March, 37,241 tons; April, 39,061 tons. April production gave a daily average of 1,502 tons for the 26 working days of that month. In one week in April three steamers together took from the company's shipping bunkers at Union Bay, Vancouver Island, 10,427 tons, in the following quantities: one took 6,796 tons, another 2,279 tons, and the third 1,352 tons. The largest single day's output was 1,763 tons, on April 30. On May 3 the Fernie "District Ledger," which is the official organ of District 18, United Mine Workers of America, published this misstatement, which was printed right across the page in large black letters: "All Vancouver Island Miners now out on Strike." On May 9 it was ascertained from the company's head office that there had not been any change at the Cumberland mines of the Canadian Collieries (Dunsmuir) Limited, during the expired portion of May, except that the average daily output of coal had been increased to nearly 1,600 tons. It may be stated that in addition to making the above-mentioned production of coal the company has been doing much development work at its Bevan and No. 8 mines, the latter being a new mine now being opened. Further, that the work on the hydro-electric power system is nearing completion, so that it is expected this new system will be in operation before the end of June. The total outlay on plant equipment, railways, and other improvements, provided for in appropriations authorized by the directors, is more than $3,000,000, and of this sum nearly $2,250,000 has already been expended by the company since it acquired the Dunsmuir interests.

STATISTICS AND RETURNS

DOMINION STEEL OUTPUT.

The April output at the several departments of the Dominion Iron and Steel Company shows up very satisfactorily.

Records were made in the pig iron steel ingots and all wire departments, including the wire drawing, wire and galvanized nails, wire mills, all of which showed records.

The total shipments were also very large for the month, being only a shade below the highest record in steel shipments.

The following are the figures in tons of the output in the various departments of the steel plant for April:

Coke	54,010
Pig Iron	32,680
Steel ingots	31,400
Steel blooms	26,550
Steel rails	12,770
Steel billets	7,765
Rods	3,550
Total shipments	32,330

COAL SHIPMENTS APRIL, 1913.

Dominion Coal Co., Ltd.

Output and shipments for April 1913.

Shipments, April, 1913	254,203
Shipments, April, 1912	327,972
Decrease, April, 1913	73,769
Shipments, 4 mos., 1913	997,700
Shipments, 4 mos., 1912	986,848
Increase, 4 mos., 1913	10,852

Springhill.

Shipments, April, 1913	27,489
Shipments, April, 1912	29,941
Decrease, April, 1913	2,452
Shipments, 4 mos., 1913	104,843
Shipments, 4 mos., 1912	118,710
Decrease, 4 mos., 1913	13,867

Acadia Coal Co.

Shipments, April, 1913	39,753
Shipments, April, 1912	30,144
Increase, April, 1913	9,609
Shipments, 4 mos., 1913	151,957
Shipments, 4 mos., 1912	118,636
Increase, 4 mos., 1913	33,321

Nova Scotia Steel & Coal Co.

Shipments, April, 1913	46,018
Shipments, April, 1912	51,109
Decrease, April, 1913	5,091
Shipments, 4 mos., 1913	155,843
Shipments, 4 mos., 1912	153,173
Increase, 4 mos., 1913	2,670

Inverness Railway and Coal Co.

Shipments, April, 1913	23,361
Shipments, April, 1912	21,970
Increase, April, 1913	1,391
Shipments, 4 mos., 1913	82,585
Shipments, 4 mos., 1912	82,918
Decrease, 4 mos., 1913	333

Intercolonial Coal Co.

Shipments, April, 1913	12,643
Shipments, April, 1912	16,476
Decrease, April, 1913	3,833
Shipments, 4 mos., 1913	50,706
Shipments, 4 mos., 1912	71,687
Decrease, 4 mos., 1913	20,981

COBALT ORE SHIPMENTS.

The shipments for the week ending May 17, 1913, are as follows:

Mine.	High.	Low.	Pounds.
Buffalo	1	..	65,900
Penn Canadian	1	..	50,900
McKinley-Darragh	1	..	303,360
Cobalt Lake	1	..	63,686
La Rose	1	..	85,775
York, Ont.	1	..	40,000
O'Brien	1	..	64,930
Nipissing	..	2	127,129
Cobalt Townsite	1	..	81,732
Dom. Red.	1	..	84,000
Kerr Lake	1	..	60,290
	13	2	1,027,702

The shipments from the Cobalt mines to date are:

Mine.	High.	Low.	Tons.
Coniagas	21	..	682.20
Trethewey	5	5	277.77
Nipissing	2	25	828.19
Dom. Red.	8	..	267.81
Hudson Bay	7	..	231.83
Con. Townsite	23	..	835.92
McKinley-Darragh	28	..	974.62
Kerr Lake	9	..	325.28
Beaver	5	..	135.98
La Rose	25	1	1048.12
Peterson Lake (Seneca-Sup.)	3	3	220.40
Temiskaming	8	1	278.61
Crown Reserve	5	..	249.95
Chambers-Ferland	1	4	159.20
Colonial	1	..	21.56
Cobalt Lake	9	..	173.36
Penn Canadian	2	..	57.51
Drummond	8	..	219.59
General Mines	..	0	8.80
O'Brien	5	..	189.21
Silver Queen	..	..	60.34
Bailey	3	1	182.15
Casey Cobalt	3	..	109.72
Right of Way	..	2	62.19
City of Cobalt	3	..	109.50

Silver Bar	1	..	20.00
York, Ont.	1	..	20.00
Buffalo.	1	..	32.95
	183	50	15,445.51

The bullion shippers this week were:

Mine.	Bars.	Ounces.	Values.
Nipissing.	52	63,303.64	$38,298.70
Bank of Com.	6	4,363.60	2,700.00
C. and Deyell	6	4,169.00	2,501.40
	54	72,836.24	$43,499.10

The bullion shipments to date are:—

Mine.	Ounces.	Value.
Nipissing.	1,902,892.80	$1,103,342.94
Bank of Com.	4,363.60	2,700.00
C. and Deyell	4,169.00	2,501.40
Buffalo.	538,584.50	354,308.76
Crown Reserve	146,491.00	95,054.00
Dom. Red.	206,284.40	117,410.55
Townsite.	10,909.00	6,647.00
Miscel.	3,920.00	1,623.00
Temiskaming.	5,970.50	3,434.50
O'Brien.	42,547.77	24,914.40
Wettlaufer.	4,715.00	2,925.00
Miller Lake	1,734.20	970.15
Colonial.	635.00	374.00
Trethewey.	5,007.00	3,223.00
Casey Cobalt	2,394.00	1,520.00
Kerr Lake	7,300.71	4,894.35
	2,886,017.48	$1,725,842.05

B. C. ORE SHIPMENTS.

Ore production in the Kootenay and Boundary districts last week totalled 53,462 tons, surpassing the high figure of two weeks ago. For the year to date the total is 933,231 tons. Smelter receipts for the week ending May 10, 1913, were 47,393 tons and for the year to date 822,727 tons. Ore production in detail:

Nelson.

	Week.	Year.
Yankee Girl	38	1,558
Molly Gibson	2	178
Queen.	37	210
Queen, milled	350	4,025
Mother Lode, milled	500	9,500
Second Relief, milled	200	3,200
Queen Victoria	826	10,434
Otehr mines		5,747
Total.	1,953	34,852

Rossland.

Centre Star	2,794	53,674
Le Roi	993	22,552
Le Roi No. 2	374	8,172
Le Roi No. 2, milled	350	6,650
Other mines		179
Total.	4,511	91,227

East Kootenay.

Sullivan	745	14,213
St. Eugene	138	620
Total.	883	13,839

Lardeau.

Other mines		137

Slocan and Ainsworth.

Standard, milled	500	9,500
Van-Roi, milled	725	11,983
Bluebell, milled	1,200	22,600
Rambler-Cariboo, milled	300	5,700
Standard.	379	5,766
Bluebell.	198	3,078
Rambler-Cariboo.	83	1,138
Silver Hoard	82	336
No. 1	162	925
Other mines		3,097
Total.	3,720	66,023

Boundary.

Nickle Plate, milled	1,500	28,500
Ben Hur	545	3,788
United Copper.	35	1,600
No. 7.	392	2,674
Granby.	27,108	447,026
Mother Lode	6,450	123,780
Rawhide.	5,363	96,515
Napoleon.	560	14,112
Unnamed.	89	2,080
Other mines.		4,297
Total.	42,042	724,372

Zinc Shipments.

Van Roi	62	428
Standard.	282	998
Other mines		355
Total.	344	1,781

Consolidated Co.'s Receipts—Trail, B.C.

Ben Hur.	545	3,788
United Copper	35	1,600
No. 7.	392	2,674
Standard.	379	5,766
Bluebell.	198	3,078
Rambler-Cariboo.	83	1,138
Silver Hoard	82	336
No. 1.	162	925
Yankee Girl	38	1,558
Molly Gibson	2	178
Queen.	37	210
Centre Star	2,794	53,674
Le Roi	993	22,552
Le Roi, No. 2	374	8,172
Sullivan.	745	14,213
St. Eugene	138	626
Other mines		8,302
Total.	6,997	128,780

Granby Smelter Receipts—Grand Forks, B.C.

Granby.	27,108	447,026

B. C. Copper Co.'s Receipts—Greenwood, B.C.

Mother Lode	6,450	123,780
Rawhide.	5,363	96,515
Napoleon.	560	14,112
Queen Victoria	826	10,434
Unnamed.	89	2,080
Total.	13,288	246,921

STOCK MARKETS

(Courtesy of J. P. Bickell Co., Standard Bank Building, Toronto, Ont.)

May 20th, 1913.

New York Curb.

	Bid.	Ask.
British Copper	3.25	3.50
Giroux Copper	1.87½	2.00
Greene Cananea	6.62½	6.87½
Rays Cons.	17.75	18.00
Miami Copper	22.50	23.00
Nevada Cons.	16.37½	16.50
Tonapah Mining	5.50	5.62½
Tonopah Belmont	6.12½	6.37½
Goldfield Con.	1.87½	2.00
Standard Oil of N.J.	355.00	*360.00
Standard Oil New	.....	.....
Standard Oil Subs	700.00	800.00
Braden Copper	7.62½	7.75

*Ex di 5 per cent.

Cobalt Stocks.

	Bid.	Ask.
Bailey.	.09	.09¼
Beaver.	.36	.37
Buffalo	2.00	2.40
Canadian G. & S.	.23	.24
Chambers-Ferland.	.21	.23
City of Cobalt	.47	.51
Cobalt Lake	.68	.72
Coniagas.	7.85	8.05
Crown Reserve	3.80	3.90
Foster.	.08	.10
Gifford.	.05	.06
Great Northern.	.14¼	.15
Green Meehan.	.00¾	.01
Hargraves.	.05	.06
Hudson Bay	65.00	70.00
Kerr Lake	3.20	3.30
La Rose.	2.43	2.48
McKinley-Darragh.	1.86	1.88
Nipissing.	8.90	9.05
Ophir.	.03	.05
Peterson Lake	.23¼	.24
Rochester.	.03½	.04
Right of Way	.05	.06
Silver Leaf	.03½	.04
Silver Queen	.04½	.06
Temiskaming.	.34½	.36
Trethewey.	.32	.34
Wettlaufer.	.13½	.14

Porcupine Stocks.

	Bid.	Ask.
Apex.	.01	.02
Crown Chartered	.00¾	.01
Dome Extension	.07	.07½
Dome Lake	2.30	2.40
Foley-O'Brien	.27	.30
Hollinger.	17.50	18.00
Jupiter.	.46	.48
McIntyre	3.05	3.50
Moneta.	.05	.06
North Dome	.50	.60
Porcupine Gold	.17	.18½
Porcupine Imperial	.03	.03½
Porcupine Tisdale	.01	.02
Porcupine Reserve	.10	.14
Pearl Lake.	.54	.55
Preston E. D.	.03	.03½
Rea Mines.	.25	.35
Swastika.	.06½	.07
West Dome	.20	.24

Sundry.

	Bid.	Ask.
American Marconi	5.00	5.25
Canadian Marconi	3.00	4.00
Island Smelters	.00¾	.01

TORONTO MARKETS.

May 26—(Quotations from Canada Metal Co., Toronto).
Spelter, 6¼ cents per pound.
Lead, 5¼ cents per pound.
Tin, 52 cents per pound.
Antimony, 10 cents per pound.
Copper, casting, 16 cents per pound.
Electrolytic, 16 cents per pound.
Ingot brass, 11 to 15 cents per pound.

May 26—Pig iron (Quotations from Drummond, McCall & Co., Toronto).
Summerlee No. 1, $26.00 ,f.o.b. Toronto).
Summerlee No. 2, $25.00 (f.o.b. Toronto).
Midland No. 1, $20.00 to $20.50 (f.o.b. Toronto).
Midland No. 2, $20.00 to $20.50 (f.o.b. Toronto).

GENERAL MARKETS.

Coal, anthracite, $5.50 to $6.75 per ton.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

May 21—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $2.15 to $2.25 per ton.
Foundry coke, prompt, $2.85 to $3.25 per ton.

May 21—Tin, straits, 48.40 cents.
Copper, Prime Lake, 15.70 to 15.80 cents.
Eelctrolytic copper, 15.60 to 15.70 cents.
Copper wire, 17.00 cents.
Lead, 4.35 to 4.40 cents.
Spelter, 5.40 to 5.50 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.70 cents.
Aluminium, 25.25 to 26.25 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $46.00 per ounce.
Platinum, hard, $51.00 per ounce.
Bismuth, $2.00 to $2.25 per pound.
Quicksilver, $39.00 per 75-lb. flask.

SILVER PRICES.

	New York cents	London pence
May 10	60⅝	28
" 12	60⅝	..
" 13	61	28 3/16
" 14	61	28⅛
" 15	61	28⅛
" 16	60⅞	28 1/16
" 17	60¾	28
" 19	60⅞	28 1/16
" 20	60⅞	28 1/16
" 21	60⅝	27 15/16