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CIRCULATION.

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

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AN ENGLISH ENGINEER'S ADVICE.

Under date of January 11th, 1909, Mr. William Frecheville, whose name is familiar to all Canadian mining men, wrote a letter of thanks to the Secretary of the Canadian Mining Institute. Summing up the impressions that he received during last summer's excursion, Mr. Frecheville emphasizes his opinion that large expansion is in store for the Canadian mining industry, both in established enterprises and in new fields.

To account for the small participation of English capital in Canadian mining, Mr. Frecheville cites the following reasons:—"Firstly, the results obtained by enterprises launched in England to work mines in Canada have not, as a rule, been encouraging. Secondly, the distance from the Canadian and American centres of capital to the Canadian mines is so much less than the distance from England, that the enterprising and alert Canadian or American gets there before the man from over the water has even a look in."

It would have brought out the truth more fully had Mr. Frecheville added that "the enterprising and alert Canadian or American" is not to be blamed for the undoubted lack of success on the part of English investors. English investments have been unsuccessful mainly because they have been blunderingly conducted. Instance after instance has occurred where capitalists from the Motherland have proved easy victims for promoters discredited in Canada. Time and again good British guineas have been squandered by a wasteful and incompetent management. Neither Canada nor Canadians can be blamed for this. The English investor needs, above all else, experienced and responsible mining engineers to guide him; men, indeed, of Mr. Frecheville's class.

"As matters now stand," concludes Mr. Frecheville, "the best procedure for English capitalists who contemplate interesting themselves in mines in Canada, would seem to be to have a resident agent there, who would keep them in touch with what is going on, . . . otherwise I am afraid that history will repeat itself, and what is brought over to London will by no means be 'the pick of the basket.'" Continuing, he recommends that only prospects that are at least promisingly developed, or mines already proved payable, be brought to the attention of London capitalists.

The general tone of Mr. Frecheville's letter is distinctly appreciative of Canadian mining. His good opinion counts for not a little, and his advice, simply and directly expressed, is worth more than pages of superlatives.

GRAPHITE CONCENTRATION.

Mr. H. P. H. Brumell has for years constituted himself the champion of Canadian graphite. A long and discouraging fight was necessary before the Canadian product was granted a place on the world's markets. Also the problems that surrounded the separation of this mineral from its gangue were peculiarly difficult. To removing both the commercial and the technical obstacles Mr. Brumell has given his undivided attention. His paper, appearing on other pages of this issue, gives the reader a brief view of the history of the graphite industry in Quebec and Ontario, with especial reference to ore treatment.

The disseminated graphite ores of Labelle County, Quebec, and of Renfrew and Lanark, Ontario, are essentially graphite schists, in which quartz and feldspar predominate largely over other minerals. The small difference that exists between the specific gravities of these two minerals and that of graphite gives but little leeway for mechanical separation. Wet concentration formerly obtained altogether. The old stationary buddles, following wet stamping, gave a concentrate assaying 60 per cent., from a 10 per cent. ore. Among other devices, the Brumell separator replaced the buddles. Next the concentrates from the Brumell separator were dried and treated on Hooper tables. Now, at the mill of the Buckingham Graphite Company, the whole system is one of dry concentration.

Mr. Brumell characterizes this mill as being, to the best of his belief, the only one producing graphite commercially from disseminated ore. He further states that in such a plant ore carrying about 12 per cent. of graphite is concentrated up to from 75 to 86 per cent., and the concentrates finished to stocks assaying from 70 per cent. to 96.5 per cent.

The paper, "Graphite Concentration," is a worthy contribution to the literature published by the Canadian Mining Institute.

THE COAL AND IRON-ORE SUPPLIES OF THE UNITED STATES.

Utilizing all available statistics and data, competent specialists have calculated that all the easily accessible coal known to exist in the United States will be exhausted by the middle of next century. The supply of high-grade iron ores now available will diminish to the vanishing point before 1950.

These statements, if even approximately correct, carry a tremendous lesson. Canada's iron ore resources are hardly touched. Her coal supplies, especially in the West, are sufficient for many decades. Yet neither commodity exists in exhaustless quantity. Canada will probably reach the highest development when our neighbour's annual outputs shall have begun to decrease. It is inevitable that we shall be called upon to supply both iron ore and coal for the greater part of

the continent. We shall be a richer and a greater people if, instead of crude iron ore, we sell iron and steel. To this end we must, to some extent at least, provide for retaining control of our fuel resources.

The thought that Canada, through her mineral industries, must ultimately dominate the continent, savours of arrogance—so not seldom does destiny.

AN INVALUABLE INDEX.

The public has long been indebted to the American Institute of Mining Engineers for enriching the literature of mining with large numbers of monographs, essays, scientific discussions and descriptive papers of all kinds. These assume permanent form in the shape of large and costly annual volumes. Not many persons are lucky enough to possess, or to be able to purchase, a complete set of these volumes. They are accessible, however, in numerous public and reference libraries.

Scattered throughout these volumes are numberless special papers, allusions to processes, and all manner of material that is occasionally of vital interest to individuals.

Lately the Institute has published a General Alphabetical and Analytical Index, covering all the Transactions from Volume I. (1871) to Volume XXXV. (1904). The labour and expense entailed in compiling this 700-page index must have been enormous. The end justifies the time and expenditure lavished upon it.

To those who own sets of the Transactions, the Index opens up every page, and saves an infinity of time. For those who do not possess the annual volumes, the Index is the only possible substitute.

IMPERIAL FEDERATION.

Seeking the co-operation of sister societies in Australia, Canada, and South Africa, the Institution of Mining and Metallurgy resolved to invite the Presidents of these respective bodies to accept, *ex officio*, election as Honorary Members and Corresponding Members of Council of the Institution. The invitation was extended to the Australasian Institute of Mining Engineers, the Canadian Mining Institute, and the Chemical, Metallurgical and Mining Society of South Africa. It was readily accepted.

It may be noted that Corresponding Members of Council have the privilege of attending and voting at Council meetings.

This federation, loose though it may be, is certain to produce beneficent results. Membership in the Institution of Mining and Metallurgy gives definitive and honourable standing. Closer connection between the mining societies of the four principal sections of the British Empire will brighten and benefit each and all.

To us this seems to be the healthiest combination of Imperial sentiment and Imperial brains.

THE LIFE OF A MINE.

There are several vital questions touched upon in a paper that appears in this issue, "The Valuation of Mining Areas on the Rand." The writer characterizes the practice of working rich reefs and poor reefs together on average grade as being financially unsound. To get the highest value out of a mine, it is necessary, in his opinion, that the grade in the early part of the mine's life should be higher than in the later years. This should be done, theoretically at least, in such a manner as to reserve the lower grade ore for future operations. In many mines such a course is impossible. But the principle has much to commend it. Mr. Wilkinson's paper should be read carefully.

It is unfair to isolate paragraphs from their context. Therefore we shall not quote farther. But we wish to direct particular attention to Mr. Wilkinson's remarks on the most profitable life of a mine.

SAMPLES—NOT SPECIMENS.

A departure has been made in arranging the mineral exhibits at the Alaska-Yukon-Pacific Exposition which is shortly to open at Seattle. Heretofore it has been the custom to exhibit the finest picked specimens; a misleading and unconsciously dishonest proceeding. At the Seattle Exposition samples of from one hundred to four hundred pounds of ore will be displayed. Only legitimate mining concerns will be asked or permitted to exhibit. Along with each parcel of ore will be seen samples from the vein walls.

We hope that this will ring the knell of the spectacularly fine ore exhibit that represents, not the average ore of any mine, but the carefully hand picked specimen. Specimens are interesting enough mineralogically; but commercially they are mischievous.

NOVA SCOTIA'S GOLD MINES.

In our last issue we published without comment a communication from Mr. T. A. Rickard, editor of Mining and Scientific Press. Mr. Rickard has taken exception to the attitude of the Government of Nova Scotia in regard to a special report written by him in 1905. Although written at the request of the Government,

this report has never been made public. In Mr. Rickard's opinion, this has done him an injustice.

More light is thrown on the subject in this number of the Canadian Mining Journal. We hope that our readers will follow the discussion closely. There are usually two sides to every question. Our own opinions will not be expressed until the matter is more fully threshed out.

EDITORIAL NOTES.

An especially complete and excellent map of Rossland has just been issued by the Geological Survey of Canada. Director R. W. Brock is responsible for the economic geology, Dr. G. A. Young for the areal geology, and Mr. W. H. Boyd for the topography. The geological and cultural legends are particularly perfect.

The Geological Survey of Canada has also issued a geological map of Gowganda Mining District, the work of Mr. W. H. Collins. The diabase, conglomerate, granite, and Keewatin areas are approximately delimited. The geology, and there necessarily is but a scanty amount, has been worked out by Mr. Collins and Dr. W. G. Miller.

The mines of the Slocan district, British Columbia, have in the past made total dividend payments amounting to over four and one-quarter million dollars. The old Payne holds the local record—\$1,420,000. Next comes the Slocan Star, with \$575,000 to its credit. Six other mines have distributed total dividends ranging from \$400,000 to \$125,000. The district is attracting renewed attention this spring.

The Hon. Robert Drummond, in a speech before the Legislature of Nova Scotia, advocated the appointment of a Provincial Geologist. We heartily endorse this suggestion. Until such an official is appointed, Nova Scotia's mining administration will continue to be incomplete. The further recommendation, that the Government erect public stamp mills for the benefit of small operators, is sanctioned by usage in Australia and otherwheres.

MINING AROUND KASLO, BRITISH COLUMBIA.

By E. Jacobs, Victoria, B.C.

Kaslo is the most important town in Ainsworth mining division, in which are situated a number of productive mines. It is on the west side Kootenay Lake, where Kaslo River enters the lake, and is the shipping terminus of the Kaslo-Slocan Railway.

Ainsworth was the pioneer mining district of West Kootenay, for, in 1889, the late Dr. George M. Dawson found mining being actively carried on at Ainsworth (or "Hot Springs," as it was also called in earlier

years), which is situated a few miles lower down the lake than Kaslo.

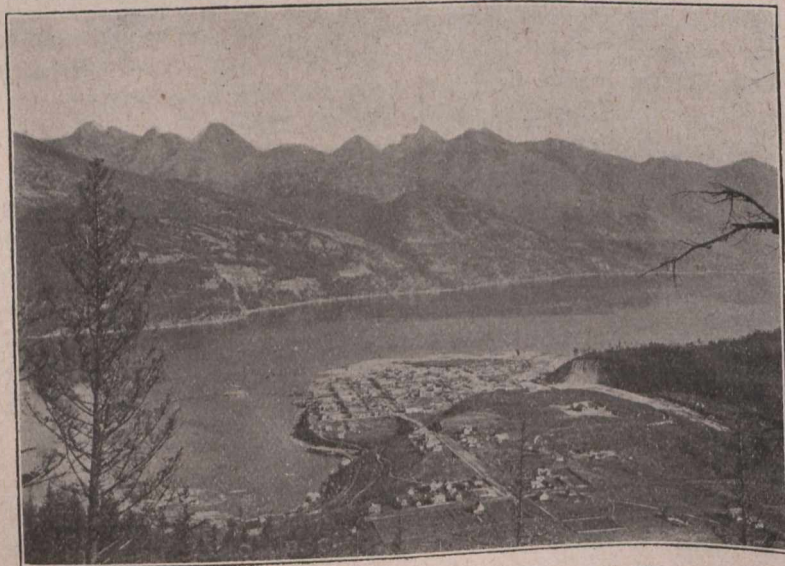
Early accounts state that about 1890 hardy prospectors pushed their way up Kaslo River as far as Bear and Fish Lakes, on the summit of the divide, and searched for minerals on the adjacent mountain sides. In that year mineral claims were located by John (Lardo) McDonald and John Allen, who were hunting and trapping on what was known as Blue Ridge Creek,

ten miles west of Kaslo, but little was known of the value of these claims until after they had been visited in August, 1891, by Andrew Jardine, who returned to Ainsworth with samples of ore which assayed up to 171 oz. per ton in silver. Following this many prospectors examined the hills of the Kaslo slope, and passed thence over the divide to the Slocan slope where, on September 2nd, the Payne was located by John L. Seaton and Eli Carpenter. The finding of high grade silver ore here resulted in a genuine, old-fashioned mining stampede.

In his "West Kootenay Reminiscences," Mr. G. O. Buchanan, now and for years a resident at Kaslo, mentioned the plotting of Kaslo townsite in 1891, the forcing in to the heart of Slocan of wagon roads from Kaslo and Nakusp "by monumental energy;" the taking out to Tacoma of 10 tons of ore from the Dardenelles mine by Mr. E. E. Coy, who "brought back \$5,000 in gold coin;" the finding of "a big boulder containing 100 tons of galena," and the building, in 1895, of the Kaslo and Slocan Railway, this "giving an easy outlet to Kootenay Lake."

Coming down to the present, the following summary, while necessarily omitting records of much ma-

of California (father of the present owner of the Hearst newspapers) erected a small open-hearth furnace on the property and reduced some of the ore to bullion, but the low grade of the product and the difficulties of marketing it led him to abandon his enterprise. As the years passed it had other owners, including the Ainsworths, of Portland, Oregon. In the nineties it passed into the possession of Dr. W. Hendryx and his associates—Minnesota and Connecticut capitalists—who developed the mine and erected smelting works at Pilot Bay, eight miles lower down the lake. Failure followed, and for years the mine and smelter were held by the Bank of Montreal, until, in 1895, they were purchased by the Canadian Metal Company. Since then development, on a fairly large scale has been carried out, and ore, estimated at 300,000 tons, has been made available for stoping. Last year the erection and equipment of 200-ton concentrating mill was completed. During the latter half of the year approximately 18,000 tons of ore were milled and the product, some 2,200 tons of lead concentrate, was shipped to the smelter at Trail. The mill, which was designed by Mr. S. S. Fowler, general manager of the Canadian Metal Company, continues to do effective and economical



Bird's-eye View of Kaslo, B.C.—Distributing Centre of the Slocan.

terial progress and considerable productiveness during the years that have intervened since shipment of silver and lead ores in large quantity was commenced, will give some information of the progress made to date and present conditions.

The larger mines of Ainsworth mining division now producing ore are the Blue Bell, Cork, Whitewater and Deep, Lucky Jim, and Rambler-Cariboo. The mines of Ainsworth camp proper will not be included in this summary.

The Blue Bell.

While not on the Kaslo slope of the Slocan, the Blue Bell is in Ainsworth division, across the lake from and a few miles south of Kaslo.

This mine possesses historic interest in British Columbia. The big mineral outcrop was discovered in 1825 by David Douglas, a Scottish botanist, who, in that year, was engaged in making an examination of the flora and fauna in the vicinity of Kootenay Lake. Hudson's Bay Company men afterwards obtained lead here for bullets for their rifles. In 1864 George Hearst,

work, and the production of zinc, as well as lead, concentrate has been provided for. It is stated that notwithstanding the small silver content of the ore and the low price of lead, the mine and mill are being operated at a satisfactory profit.

South Fork of Kaslo Creek.

This part of the Kaslo district is reached by the Kaslo and Slocan Railway and thence by a good wagon road.

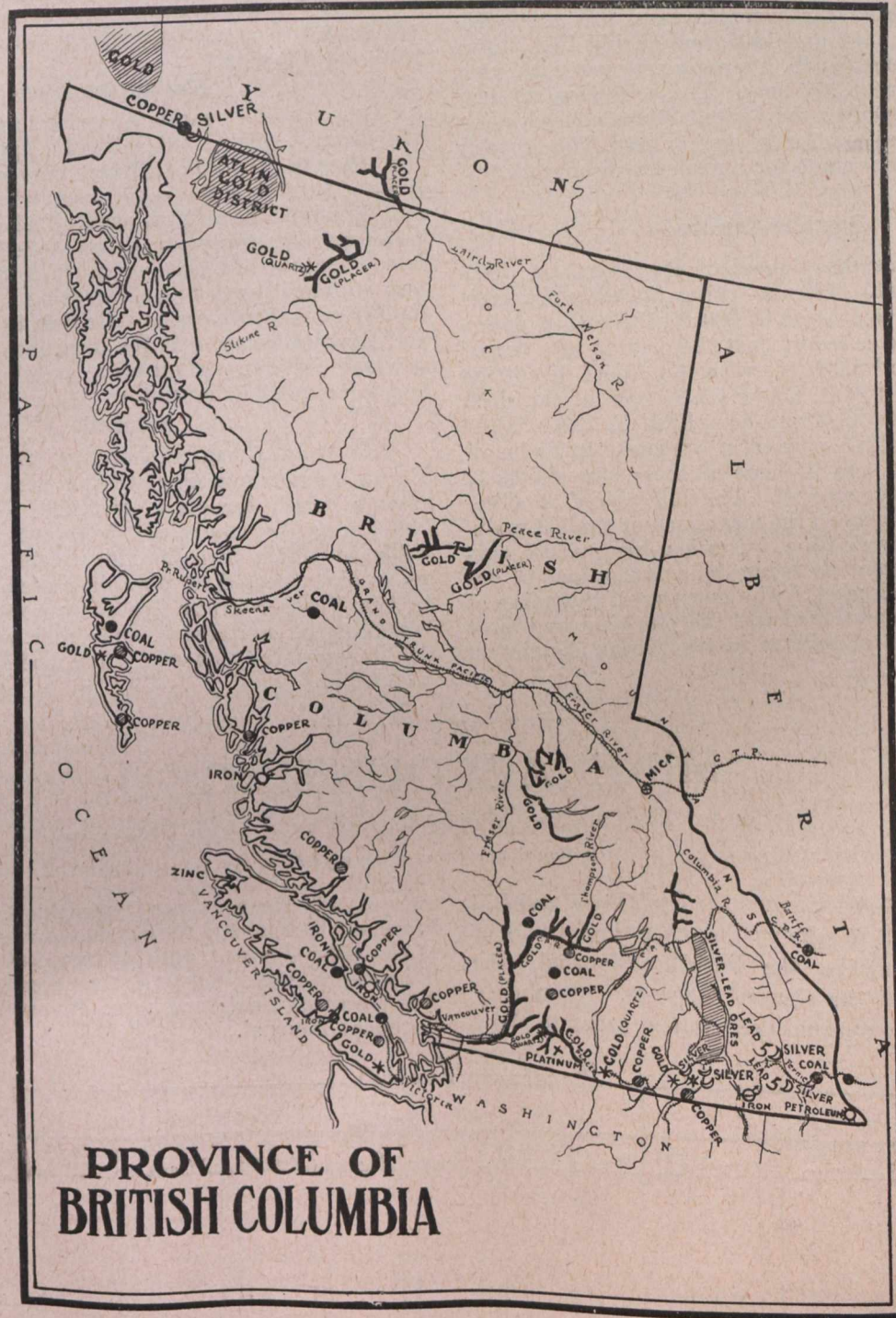
Among the mines on this creek, which have for years been ore shippers, and on which much development work has been done, are the Cork, Province, Montezuma, and Bismark. Other properties are the Revenue, Flint, Index, Black Fox, Bell group, Gibson, Silver Bell, Nome, Sturgis group, Pbs, St. Francis and Vera.

The Province and Montezuma were operated together by Kaslo men for a while, until last year, when a fire destroyed the Montezuma concentrator and lower terminal of its aerial tramway. Afterwards Nelson

men, well known in the Slocan as experienced mine operators, leased the Province mine, and further developed it by extending the tunnel from the adjoining Cork mine and raising 125 ft. in ore. The ore taken out was put through the Cork concentrator. Work was suspended for the winter, but this season 20 to 25 men will be employed in mine and mill. More de-

velopment work will also be done on the Cork property, which is owned by a French company. **Whitewater and Whitewater Deep.** These mines, the largest in Whitewater camp, are being worked under lease by J. L. Retallack, S. S. Fowler, and W. E. Koch, all well-known men who have been operating in Slocan district for years. White-

water camp is connected with Kaslo by railway, and last year the combined output of the Whitewater and Deep mines was about 2,300 tons of lead-silver concentrate and 8,000 tons zinc. Of the latter some 3,000 tons was made in 1907 and stored awaiting a suitable market. After a very successful year in 1908, the lessees arranged for work on a more extended scale in



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of the vein and 600 ft. lower than any previously existing working of the mine. The driving of this tunnel was in progress during last winter. Important results are expected from this deep-level development.

Lucky Jim.

In the Lucky Jim mine, also along the Kaslo and Slocan Railway, has been developed the largest tonnage of pure zinc ore of any mine in the North-West. After having been closed for several years, this mine was worked in 1903, 1904 and 1905, and during that period shipments of zinc blende, averaging 54 per cent. zinc, aggregated about 5,300 tons. The collection of duty on zinc ore shipped to the United States caused a suspension of operations for a year or two, but recently arrangements were made for a resumption of work and production.

Rambler-Cariboo.

This mine was the pioneer of the Slocan in deep-level development. After working the mine by shaft and levels down to a depth of 800 ft., the cost of pumping water became so heavy that the driving of a tunnel between 4,000 and 5,000 ft., with the object of cutting the lead at some 600 ft. below the bottom of the shaft was undertaken in 1904 and completed in 1906. Since then levels have been opened at various depths below the old workings, and in some of these new shoots of ore have been encountered. The low prices of silver and lead have influenced the management against maintaining a large production, but whenever market conditions shall warrant its being done, the output of ore will be largely increased. The opening of this mine at the depth above-mentioned was the pluckiest and most creditable feature of mining in the Slocan district in recent years.

Ore-Sampling Works at Kaslo.

The Kootenay Ore Company, Ltd., established ore-sampling works at Kaslo in 1896. Since then additional plant and machinery have from time to time been installed, bringing the equipment up to present day requirements. Magnetic separating machinery, for enriching zinc ores, was added in 1904-5. Much of the zinc ore and concentrate from Slocan and Ainsworth mines and concentrators has been treated at these works, which are continuing to ship ores as well as lead concentrates.

Marble Quarries.

Two valuable marble quarries have been opened in the district, one at the lakeside, opposite Kaslo, and the other a few miles above the head of Kootenay Lake. Several large government buildings at Nelson and Rossland have been erected chiefly of Kootenay Lake marble, while in other substantial structures Lardo marble has been used. The latter quarry has also supplied much finished marble for the interior of buildings in south-eastern British Columbia, Alberta, and Saskatchewan, and for monuments. This marble-working industry is steadily growing in importance and in value of its output.

General.

The Gold Commissioner for the Ainsworth and Slocan districts has his office at Kaslo. His jurisdiction extends north for some distance beyond Kootenay Lake, including the country known as the Duncan slope, in which direction important mining developments are expected to take place ere long, particularly on the Wagner group (recently bonded to Spokane, Washington, capitalists), and other promising properties in its vicinity on which ore bodes have also been discovered.

MINE ACCOUNTING.

Written for The Canadian Mining Journal, by John G. Grant, B.A.*

(Continued from issue of April 1st.)

In the last article I examined the Cash Book and Bill Book and have still to take up the other three books of original entry, namely, the Purchase Journal, the Sales Journal, and the General Journal. Originally there was only one Journal used, but in order to show

more clearly the accounts chargeable in the case of the Purchase Journal and the accounts to be credited in case of the Sales Journal, and for purposes of classification it has been found convenient to break up the Journal into the three mentioned here. Below is a ruling of the Purchase Journal.

Purchase Journal

Credits					Debits						
Folio	Name	Folio	Amount	Folio	Stores	Timber	Coal	Power	Freight	Wages	etc

All invoices coming in are entered in this book, the name of the firm in the column headed "Name," the amount of the invoice less any trade discounts in the

column headed "Amount," and the folio on which the personal account appears in the Ledger in the folio column of the amount of the invoice is entered in the debit column showing the proper heading, which must

* Chartered Accountant, Toronto, Ontario.

be the same as the Ledger Account chargeable with that particular expenditure. At the end of each month, the debit columns are all totalled, the total of each column being posted to the debit of the proper Purchase Account or Expense Account in the Ledger. The sum of all the debits, obtained by cross addition of the totals posted, must equal the total of the amount column. The invoices entered should be numbered consecutively and fyled in the same order, and not as is very commonly done, fyled under the companies'

names. The number of debit columns may be very large, some Purchase Journals having a separate debit column for every working account in the Ledger.

The Sales Journal, unlike the Purchase Journal, has the debit columns on the left hand side, and the credit column on the right hand side.

The following is a simple form of a Sales Journal for a Cobalt silver mine. For use at other mines, the headings of the Credit column will have to be changed to suit the character of the product:

Sales Journal													
Debits							Credits						
Date	No.	Name	Qty.	Weight	Rate	Amount	Silver		Cobalt		Arsenic		Power
							Weight	Amount	Weight	Amount	Weight	Amount	Amount

The name of the purchaser and the amount are entered in their proper columns and each item is posted to the debit of the personal account in the Ledger. The corresponding amount is placed in one of the credit columns and at the end of the month the totals of the credit columns are posted to the credit of the different Sales Accounts, Silver Sales, Cobalt Sales, etc. The total of the credit postings must equal the total of the amount columns each month.

The General Journal is for all items that do not find their way into any of the other books. All cash transactions are taken care of in the Cash Book, all bills in the Bill Book, all incoming invoices in the Purchase Journal, and all outgoing invoices in the Sales Journal. Adjustments between accounts, opening and closing entries, sales of plant and stores, are all recorded in the General Journal.

At the end of the year inventories of stores, stationery, charges paid in advance, accrued charges, ore on hand, etc., are taken under careful supervision, all money values being at cost price. The accounts charged during the year with the purchases of any class of goods, is credited at the end of the year with the inventory of those goods on hand. The ore on hand is credited to the Sales Account. A new account is opened called "Inventory Account" to receive the debit for the total stock on hand. These entries are, of course, made through the General Journal.

After all adjustments have been made for the inventories the nominal accounts are all closed for the year into the "Profit and Loss Account." The form for making up this account differs with nearly every company. I would suggest a form as below; but it is almost impossible to make a hard and fast rule to follow in the formation of this account. However, I think some effort should be made to draw up a standard form showing the main features common to all. Blank spaces could be left to contain any additional items which the company insisted on showing in the Profit

and Loss Account. The same may be said of "Balance Sheets."

PROFIT AND LOSS ACCOUNT FOR YEAR ENDED.....

CHARGES.	EARNINGS.
Mining Charges:	Shipments of Ore,
Operating,	Less freight, etc.
Repairs,	Mill Sales,
General.	Less freight, etc.
Milling Charges:	Ore in transit this year,
Operating,	Royalties,
Repairs,	Sundry Sales
General.	(Power, etc.)
Ore in transit last year:	
Sampling and Assaying,	
Sundry and Selling	
Expenses.	
Depreciation,	
Profit from Operation.	
Development,	Profit from Operation,
Management Expenses,	Sundry items of revenue,
Net Profit available for	
dividends,	
Dividends,	Net Profit.
Balance undivided profits.	

In the Balance Sheet are shown all the Real and Personal Accounts, the latter class being shown in two items, namely, "Accounts Receivable" and "Accounts Payable." Below is shown a good form for the prep-

aration of the Balance Sheet designed to show as clearly as possible the actual state of affairs.

BALANCE SHEET.

ASSETS.	LIABILITIES.
Permanent,	To the Shareholders,
Cost of Property,	Paid up Capital,
" Buildings,	Undivided Profits,
" Plant,	From last year,
" Furniture Fix- tures,	" this year.
_____	Reserves for deprecia- tions.
Floating,	To others,
Ore in transit,	Bills Payable,
Inventory,	Accounts Payable,
Accounts Receivable,	Accrued Charges.
Stock in other Com- panies,	
Cash on hand,	
" in bank,	
_____	_____

SUB-MARINE COAL MINING IN NOVA SCOTIA.

The question of sub-marine coal mining was legislated upon about thirty-two years ago by the Nova Scotian Government. Mr. H. S. Poole, then Chief Inspector of Mines for the Province, formulated the regulations which now are comprised under Section 54 of the Coal Mines Regulation Act. Mr. Foster, an English coal specialist, reported recently upon this section of the Act. He pointed out that the lapse of time has provided much additional experience and has brought about some changes of views. Hence, in some respects, the present regulations might be improved.

For instance, Sub-section (1) a, provides that no undersea workings shall be carried on with a less depth than 180 feet of solid cover. The lessee may, however, drive passage-ways for the purpose of mining the deposit only, under a cover of not less than 100 feet. Commenting upon this, Mr. Foster remarks that, having regard to the general nature of the beds overlying the seams in the districts adjoining the seaboard in Nova Scotia, it would not be advisable to alter this regulation. The exact thickness of the solid measures cannot be ascertained accurately in any case. Hence a considerable margin of safety should be provided.

Sub-section (1) b, provides that "a barrier of not less than 50 yards, 25 yards on both sides of the boundary lines of every lease, shall be left unwrought be-

tween the workings of each submarine seam." The same regulation, more clearly expressed, appears in Section 208, of "The Mines Act," 1892. A clause in the latter provides that a barrier of 25 yards is to be left "within and along each of the boundary lines" of any sub-marine lease. Mr. Foster recommends that this phrasing be substituted for the former. He remarks that with deeper mining, wider barriers may be required, and that possibly power should be granted the Commissioner to require such extensions when considered necessary.

Clauses (c), (d), (e), and (f) are next discussed. (c) Provides that, where there is less than 500 ft. of solid cover over the seam worked, the workings shall be laid out in districts of an area not greater than half a square mile, each district being enclosed by a barrier not less than 30 yards in thickness, which shall not be pierced by more than four passage-ways of a sectional area not greater than 4 feet wide by 6 feet high. The inspector may, if he thinks it necessary, permit the cross-section of the passage-ways to be increased to 60 square feet. (d) Restricts to one mile the length of any district when parallel to the general trend of the shore line. (e) Requires the approval of the inspector for any proposed system of working, also his sanction to any change in the approved system. (f) Provides that the opening of a new lift or level in a mine already working shall be deemed the commencement of a new winning within the meaning of the section.

The first two regulations provide for the application, between the lines of 180 and 500 feet of cover, of a system known as the "panel system," under which the area to be worked is divided into districts or "panels" surrounded by barriers through which as few holdings are made as may be considered absolutely necessary. The restricted dimensions of individual workings are designed as a safeguard against general flooding. Mr. Foster disapproves of the above restrictions. They cause great inconvenience in haulage and ventilation. He states that it is better to rely upon well proportioned pillars and careful regulation of the width of the working places and disposition of the same.

In general it is recommended that provisions (c), (d), (e), and (f) be eliminated, and that the conduct of undersea workings be regulated, not by hard and fast rules, but by a careful consideration of each set of circumstances.

Incidentally, Mr. Foster mentions the necessity of making surveys and levellings every three months. Soundings should also be taken at reasonable distances.

THE VALUATION OF MINING AREAS ON THE RAND.

By W. Fischer Wilkinson, Member.

Paper read before the Institution of Mining and Metallurgy, London.

During recent years it has become the practice on the Rand, when forming new mining companies, to include a much larger area of ground than was the custom formerly, while several mines already formed into companies, have secured larger areas by amalgamation with neighbouring properties.

In laying out the first row of mines below the outcrop mines the area selected used to be about 200

claims (294 acres) for each mine with a milling plant of 200 stamps, the depth of the workings being from 1,000 to 3,000 ft. The standard adopted was a stamp claim, the stamp being equivalent to an output of five tons per day. This area is now considered too small, and companies with 1,000 claims and upwards have been formed.

These changes in the areas selected make it of in-

terest to consider the factors that decide the size of a mine and the principles upon which valuations should be founded.

As regards the question of size, it may be stated generally that the larger the area the less will be the capital expenditure on equipment and the less the working costs per ton. It is obvious that a large area lends itself to more economical development than a small one. Administration and general expenses, being spread over a larger tonnage, are proportionately reduced, while a great saving in capital expenditure is obtained by concentrating the reduction and power plant instead of having a number of small units.

The statistics of the Rand mining companies illustrate very forcibly the advantages of large units. The writer has compiled from the August, 1908, sheet of the Transvaal Chamber of Mines the following table, which shows the effect of large outputs as compared with small. The figures relate to 53 out of 63 mines in the Witwatersrand district. The 10 mines omitted are either small producers or mines which do not report working costs.

**Results of 53 Milling Companies on the Rand,
August, 1908.**

Tonnage treated. Tons.	Com- panies.	Yield per ton milled. s.	Costs per ton milled. s.	Profit per ton milled s.
Under 10,000	10	33.4	23.4	10.0
10,000 to 20,000	13	29.6	20.0	9.6
20,000 to 30,000	13	28.8	17.0	11.8
30,000 to 40,000	10	31.0	17.0	14.0
40,000 and upwards	7*	32.6	14.8	17.8

With regard to this table, it is advisable to mention, in order to prevent any misunderstanding, that the costs and profits shown are what are known as costs and profits on working account. Profit tax, depreciation and sundry expenditure, are not included. There is generally a difference of about 30 per cent. between the working profits shown and the profits distributed as dividends, that is, the dividends are 70 per cent. of the working profits.

The effect, therefore, of working on a large scale is to reduce working costs, and it is clearly an advantage to have a large area and to make the output as large as possible, paying due regard to capital expenditure and life.

In calculating the most suitable rate of working for any given area it is necessary, in the first place, to make an estimate of the probable tonnage and of the value of the ore. The Rand ore deposits are of such a character that fairly reliable estimates can be made, the reliability depending on the situation, size, amount of development, and records of neighbouring mines. Granting that calculations of this sort have been made, and that definite figures have been arrived at as to the amount of gold that the mine contains, the problem that then needs solution is the rate at which it may be most profitably extracted. The elements of the calculation are:—

1. Capital expenditure required for a given production.
2. The available tonnage and its value.
3. The cost of working.
4. The rate of interest required.

*Included in this class is the East Rand Proprietary Company, which is rather a group of mines than one unit. If the figures of this Company are omitted the averages for mines milling over 40,000 tons per month would be six companies, yield 33.4s., costs 13.8s., profit 19.6s.

In mine valuations of this class it is time that is the important factor. As long as the gold is left in the ground, there is a loss of interest going on and, after a certain period, this loss of interest will exceed the cost of new shafts and equipment. An example will make this point clear. Suppose a property contains 1,000 claims and a tonnage of 20,000,000 tons estimated to give a net profit of 10s. per ton, and suppose the equipment is equivalent to an output of 400,000 tons per annum; the life would be 50 years and the annual income £200,000.

The present value of an income or annuity of £200,000 for 50 years, assuming that 6 per cent. interest is demanded and that a sinking fund to redeem capital was invested at 3 per cent., would be worth 14.5¹ years' purchase, or £2,900,000. If, however, the ground had been divided into two mines, or if the output had been doubled by increasing the reduction plant, the annual profits would have been £400,000 for 25 years.

The present value of this income is worth 11.5 years' purchase, or £4,600,000. There is therefore an increased value by doubling the rate of production of £1,700,000, which would far exceed the capital expenditure necessary to secure this increased rate.

This example indicates that in order to obtain the greatest value from any mining area containing definite values, as on the Rand, it is possible to calculate with some precision the most profitable rate of working.

The formulae necessary for calculating the most profitable life from a theoretical point of view have been given by Mr. Hellman,² Mr. Ross Browne,³ Mr. R. N. Kotze,⁴ and others.

According to Mr. Kotze, the most suitable life for a mine giving a 20s. profit per ton is about 11 years, and that for a mine with ore yielding a profit of 10s. a ton, 16 years. The definition that he gives of the most profitable life is that at which the ratio of increase of present value of profits to increase of working capital becomes unity. This would be the most profitable life theoretically. In practice, however, the life should be extended somewhat, and the ratio taken higher than unity. Mr. Kotze also comes to the conclusion that the larger the profit per ton the shorter would be the more profitable life if other conditions remained the same.

No doubt the calculations given in his paper would have to be modified to suit present conditions, the capital expenditure required for a given production being now less than at the time the paper was written. But as the effect of a decrease in the capital expenditure for a given output would be to decrease the, theoretically, most profitable life, the ideal life, on a 10s. per ton profit basis, may be taken to be under 16 years.

Mr. Ross E. Browne, who has also made calculations as to what is the most profitable life, arrives at the conclusion that 10 years is the ideal life.⁵

These calculations go to show that the life must be kept within bounds to obtain the greatest value out of a given area. The author wishes to emphasize this point because in recent amalgamations a long length of life has been put forward as a favourable feature.

It is no doubt a good thing for a mine to be worked on a large scale, but it does not follow that its life should extend beyond certain limits, which, as shown above, can be calculated.

¹Inwood's Tables, p. 121a, 28th edit.

²Trans. Inst. of Min. and Met., vol. vi.

³Proc. S.A. Assoc. Eng., 1907.

⁴Trans. S.A. Assoc. Eng., vol. x., 1904 5.

⁵Trans. S.A. Assoc. of Eng., 1907.

The author does not wish it to be understood that he advocates the working of a mine strictly on the theoretical standard. In practice, it would, in his opinion, be unwise to go to the extreme limit. Even on the Rand there must be uncertainty as to the total tonnage by financial and labour considerations, factors which are variable and uncertain.

The safest course in practice would be to lay out the mine at the start for a production below the ideal production, but the aim should be to work ultimately to the scale of operations that calculations of total profits and total expenditure indicate as the most profitable.

In coming to the decision as to what is the best scale of operations, an important point to be considered is that of the most profitable grade to work to. The ore deposits of the Rand are such that the engineer can vary his grade within wide limits. He can increase his tonnage and lower his costs by including low-grade ore, that is, ore on which there is only a small margin of profit. Low costs and large tonnages do not, however, necessarily mean that the mine is being worked to the greatest profit.

To determine the most profitable grade it is necessary to calculate the present value of the total profits expected.

To illustrate this, the author will suppose that a mine has 1,000,000 tons which will give a profit of 20s. per ton, and that, by leaving some of the poorer ore in the mine, a production of 800,000 tons, giving a profit of 25s. per ton, can be obtained.

The question arises which is the more profitable grade to work, the high grade and the smaller tonnage, or the low grade and the larger tonnage. Assuming that the reduction plant will treat 200,000 tons per annum, the life will be either five years or four and the annual profits either £200,000 or £250,000. Calculating the present value of these profits on the annuity principle and assuming that 6 per cent. interest is required and that a sinking fund for the redemption of capital is invested at 3 per cent., the low-grade policy will show a present value of £806,000, and the high-grade £835,000. Consequently the high-grade is the more profitable grade to work to.

It will be observed that in all calculations as regards life or grade one of the most important factors is time; and it is this factor that carries great weight in valuations of deep level claims, which may be proposed for amalgamation with an adjoining property.

Some examples of the sort of valuation required may now be considered. Taking a simple case, that of the amalgamation of two undeveloped areas, each too small to be worked separately, but which together would give an area of suitable size for a mine, the valuation of the ground would depend on the Present Value of the profits to be derived on an assumed rate of working. It is usual to assume that the profit to be derived from the deepest ground would be less than that from the more shallow, partly on account of the profit being deferred and partly due to the assumption that working costs increase and consequently profits decrease with the depth of working. That is what is known on the Rand as the zone basis of valuation.

For convenience the ground is divided up into belts or zones parallel with the strike, and a value is calculated for each zone. The author believes in this system of valuation provided it is not carried to extremes. If carried too far, the value of the deeper claims is unduly

depreciated. The profits are discounted over too long a period, and a fairer way to value such claims would be to assume that they could be made productive earlier—which might be the case if a new shaft was put down—than if they had to wait for the exhaustion of all the ground above them. The relational value of claims has received considerable attention in South Africa, and those who wish to study this subject are recommended to read the paper by Mr. G. A. Denny, read before the S. A. Association of Engineers,¹ and the discussion that followed.

Another case that may be considered is that of the amalgamation of deep level claims with those of a producing and profit-earning mine. In this case the value of the deep claims to the producing mine will depend on the amount of tonnage still available in its own property—in other words on its life—unless the development of the deep ground can be taken in hand before the exhaustion of the upper ground.

The value of the deep level claims to the producing mine is the Present Value of the estimated profits at the time when the upper claims are exhausted. If the producing mine has still a long life before it, the value of the deep claims will be small, because the profits to be derived from the deep claims will be so long deferred.

It must also be borne in mind, when valuing claims, that there is a liability attached to them in the way of claim license, amounting to £3 per annum. The capitalized value of the claim licenses must be deducted from the capitalized value of the profits expected in the future. The factor time here again exercises an important influence, and if the realization of the profits is to be long postponed, the value of the claims will be small and may, in fact, be a minus quantity.

A third and somewhat more complicated case may now be considered.

As a rule, when an amalgamation of a producing mine with deep level claims is effected, an increase in production is arranged for, and the owners of the deep claims frequently contribute capital for this purpose. In making a valuation of the different interests in such a case, it would be necessary to calculate the Present Values of the estimated profits to be derived from different claims put in, and also to assess separately the value of the other assets, such as equipment, development and cash.

Both sides benefit by amalgamation owing to the speedier realization of the profits, and the case differs from that previously given in that the producing mine has here to consider the value of the extra profit that will accrue owing to the increased scale of operations which the capital of the deep block allows of, whereas, when no increase of production takes place, the producing mine has merely to decide whether the price put upon the present profits of the deep ground is sufficiently attractive.

There is one other point of great importance relating to mine valuation to which the author wishes to draw attention. It is well known that on the Rand there are rich reefs and poor reefs, as well as great variations in values in the reefs themselves. It is usual to work out the ore at an average grade, taking each reef out in its proper proportion. This system is financially sound.

Theoretically, to get the most value out of a mine, the grade in the early part of the mine's life should be higher than in the later years. In practice it is of

¹Trans. S.A. Assoc. Eng., vol. 1, 1902-3.

course not possible to mine all the rich ore first and then return to the poor. Stopes or levels cannot be kept open indefinitely without great expense. At the same time the author thinks that some selection is possible, and that if the richest reefs and the richest sec-

tions of the poorer reefs were attacked first, a higher grade than the average could be obtained during the early years of the mine's life. A considerable appreciation in value would result from the adoption of this policy.

GRAPHITE CONCENTRATION.

By H. P. H. Brumell, Buckingham, Que.

(Journal of the Canadian Mining Institute. Part of Vol. XII.)

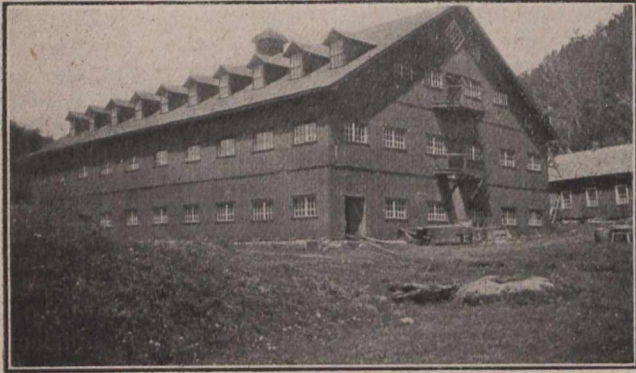
Apparently simple, the solution of the problem of the concentration of the graphite contents of disseminated ore has proved extremely difficult, and it is only after many years of assiduous endeavour that we have arrived at the present modicum of success. As early as 1860 efforts were made to market Canadian graphite, and in 1867 the first mill for the dressing of the ore of Labelle County was begun in the Township of Buckingham. Since this initial effort, however, several mills have been erected, each, in succession, embodying some new feature and showing a gradual advancement from the early and crude method of buddling to a system of dry separation, now conceded to be the only logical method of treating so fugacious a mineral as graphite.

In the following brief resumé of the work done in Canada, reference is made only to that ore so abundantly found in the County of Labelle, in the Province of Quebec, and sparingly in the counties of Renfrew and Lanark, in Ontario. This ore is essentially a graphitic schist or gneiss carrying the graphite in more or less small lenticular particles and consists, in Labelle Co., of quartz, feldspar (usually orthoclase) and hornblende, with smaller quantities of pyroxene, sillimanite and pyrite. The major portion of the gangue material is made up of quartz and feldspar, both having a specific gravity of about 2.5, while the gravity of Canadian crystalline graphite is 2.26, which leaves a very small margin on which to work. The remaining minerals are somewhat heavier, the specific gravity of hornblende being about 3, pyroxene 3.3 and sillimanite 3.2. Pyrite, with a gravity of about 5, is a negligible consideration, both on account of its greater weight and, the usually very small percentage in the ore.

The earlier attempts at concentration were all made with stationary buddles of an uniform type, the vat being about 16 feet in diameter, with a depth of 3 feet, the floor having a slope of 3 inches from the centre post to the edge. After being crushed in ordinary jaw crushers, the ore was stamped wet and fed to the buddles, with a considerable stream of water, entering them through short pipes from a revolving pan fixed to the lower end of the shaft, to which, also, was attached two adjustable sweeps. These sweeps gave to the water and accompanying ore a gentle centrifugal motion, sufficient to carry away the lighter particles of graphite, which were deposited around the edge of the buddle, the heavier minerals being deposited near the centre, while the superfluous water escaped through a sluiceway at the side, control of which was effected by means of small swinging stops. When a buddle was filled it was allowed to drain and the material taken out by hand, the outer zone being of concentrates followed by a ring of seconds or middlings, the innermost portion consisting of tailings. These seconds were re-buddled a second and, sometimes, a third time. By the foregoing

method a very coarse separation was made, the concentrates rarely assaying 60 per cent., from a 10 per cent. ore. On drying, however, and passing the dried product over a series of screens, considerable quantities of the coarser sized flakes were obtained. Mills equipped in this way were erected and spasmodically operated at Oliver's Ferry in Ontario, and in Buckingham and Lochaber Townships in Quebec, but were unsuccessful; the non-success, as proved by later development, being entirely due to the system of disintegration and concentration. The ore, while soft and lubricious, is a peculiarly tough one and difficult to stamp, the stamps at times working the crushed wet ore into the shape of a cylinder with smooth polished sides, in which the stamp moved freely and ineffectively. As to capacity the best result obtained was about one ton per day per stamp (850 lbs.) and, as the buddles were emptied by hand, no practical mechanical means having been found, the entire process was found to be slow and much too costly. At several of the early mills keeves were used with but slight success. Experiments carried on at the mill of the North American Graphite Company in 1899 resulted in the replacing of the buddles by the so-called Brumell separator which, although a vast improvement on the buddles, soon gave way to pneumatic separators, the type first used being the Hooper concentrator. After the installation, at this mill, of the latter a fairly economical system was adopted and the ore was rolled dry. After crushing, the ore was dried in a revolving fuel dryer after which it passed through two pair of rolls, the overs of a 20 cloth being returned, and the resultant material sized in revolving screens. The sized material was then treated on the Hooper tables, the concentrates going to the finishing plant, while the seconds went to the Brumell separators, the concentrates of which were then dried and sent with those from the Hoopers to be finished. The foregoing has been superseded at the mill of the Buckingham Graphite Company, by the adoption of a system of dry concentration throughout, involving the abolition of the Brumell concentrator. The ore, after crushing, drying and rolling is brought by an impact screen to a certain degree of fineness, after which it is sized in a dry ore sizer; certain sizes being treated on a new type of pneumatic concentrator, other sizes going to the Hooper tables, while the finer ones are treated on a barrel concentrator. This mill is believed to be the only one commercially producing graphite from disseminated ore. While concentration has been the chief difficulty, there is another important feature in the manufacture of graphite, viz.:—finishing and grading to suit the various trades using the mineral. In a graphite mill there are three distinct departments for crushing, concentrating and finishing. In the former every endeavor is made to bring the ore to a

size wherein the particle is "freed" from its matrix without reducing its size, as in the markets a large sized flake commands a much higher price than the smaller ones, flakes coarser than 70 mesh being most in demand. The desirable condition is brought about, in a marked degree, by the use of rolls set in sequence of increasing pressure and the material scalped off as it is rolled to the desired mesh. In practice it has been found that a series of rolls bringing the ore to a maximum mesh of 20 gave the best results when, with proper care and manipulation, 80 per cent. of the material would be of a size between 20 and 80 mesh, 10 per



Buckingham Graphite Company's Mill, Buckingham, Que.

cent. between 80 and 150, and 10 per cent. allowed to go to the waste dump as too fine for economical treatment. After concentration the treatment accorded the material is continued with millstones of various materials, and revolving flour mill screens. In this treatment, as in rolling, care is taken to reduce the size of particle as little as possible, the object being to grind and reduce to a powder the associated foreign, and mainly silicious, materials, separation from which is effected by a system of scalping and the milling and screening is carried on until the residual material is a fine ground graphite, suitable for stove polish, foundry facings and paint, assaying from 25 to 75 per cent. With the plant as installed at the Buckingham Graphite Company's mill, the ore, carrying about 12 per cent. of graphite, is concentrated up to from 75 per cent. to 86 per cent. according to size, and the concentrates, in turn, finished, the finished or marketable stocks assaying from 70 per cent. to 96.5 per cent.

The following brief descriptions of the various plants in Ontario and Quebec, other than that of the Buckingham Graphite Company already described, embody all that the various owners have allowed to be known and are, in consequence, not strictly accurate as to detail.

The Buckingham Company.

This mill, which must not be confounded with that of the Buckingham Graphite Company, is situated on lot 26, range VI, township of Buckingham. The ore after a preliminary drying, was crushed and rolled with one Dodge crusher and one set of Krom rolls, after which it passed to screens and buhrstones. The entire product of the rolls, without any attempt at classification or concentration, was then run through buhrstones, reducing much of the gangue to a proper degree of fineness, after which it was run over silk bolting cloths, the graphite particles, which escaped the grinding operations, tailing over. This process was found to be so wasteful of the graphite contents of the ore that the business was closed down and the mill has now been idle for about ten years.

Anglo-Canadian Graphite Syndicate, Limited.

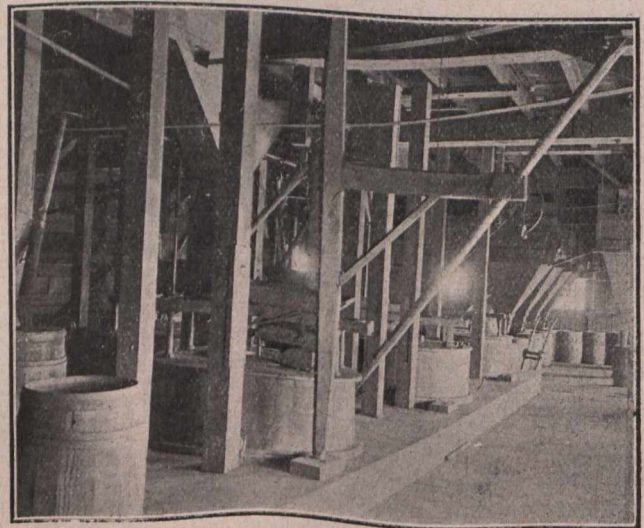
The works of this late company, formerly the North American Graphite Company, are situated on lot 28, range VI, township of Buckingham, about one mile to the north-west of the foregoing and were operated on a part dry and part wet principle. The ore was crushed, then dried in a revolving fuel dryer, passing thence to two pair of rolls, the overs of a 20-screen being returned and re-rolled. From the rolls the crushed ore passed to a battery of revolving screens, making four sizes which were then treated on Hooper concentrators, the middlings going to two Brumell separators, the concentrates from the latter dried in a revolving steam dryer. The concentrates from both these sources were then finished with buhrstones and reels clothed with silk bolting cloths. These works were closed down about four years ago and have remained idle since.

The Diamond Graphite Company.

This mill is located on lot 14, range X, township of Buckingham, and is, at the time of writing, in process of reconstruction. The system first adopted was similar to that at the Buckingham Company's plant, no attempt at concentration being made. The ore, after drying, was crushed and rolled, going thence to flouing rolls instead of buhrstones, after which a system of screens was supposed to complete the operation. This method was found to be very wasteful and the management decided to replace the flouing rolls with Krom pneumatic jigs, and the change is now being made. No attempt at finishing the concentrates beyond screening is, apparently, contemplated.

The Bell Mines.

This mill is situated on lot 2, range V, township of Buckingham, and is the only one in Canada employing



Part of Finishing Plant, Buckingham Graphite Company, Buckingham, Que.

a wet method throughout. The ore, after crushing, is reduced, with a heavy stream of water, in a Williams disintegrator to about 10 mesh, after which it is classified with wet screens and treated in Kendall separators. As far as is known no further treatment is accorded the concentrates.

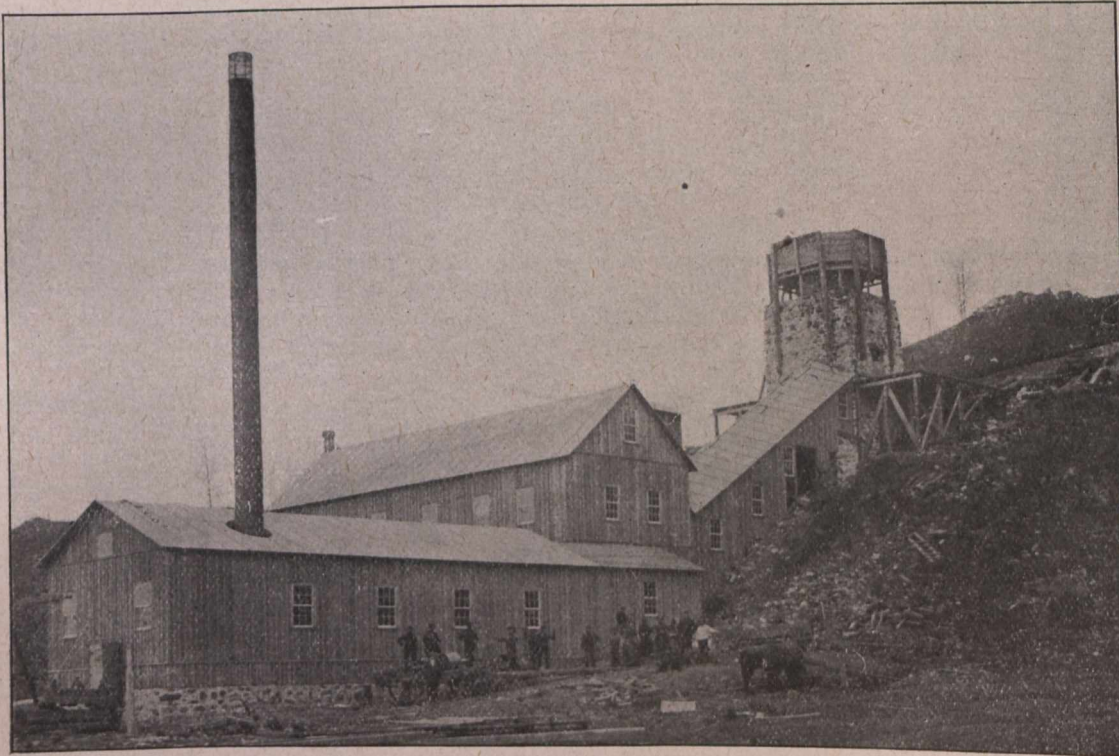
The development of this mill, which is the newest in the district, is being watched with interest on account of the methods employed. Some of the concentrates obtained during the trying out of the plant were particularly good.

The Calumet Graphite Mining and Milling Company.

The works of this company are located on lot 16, range II, township of Grenville. In this mill no attempt, apparently, was made at concentration, though but little is known of the methods employed. It is understood that no shipments of finished stock were made, the total production consisting of a quantity of ground ore, not sufficiently pure for even the lower uses to which graphite is put. The finished material referred to was the product of a pebble mill, installed for the avowed purpose, according to the monograph on "Graphite," published by the Mines Branch of the Department of Mines, of "cleaning and polishing of the graphite flakes." This method of "cleaning and polishing" would appear to have cleaned and polished the graphite to a vanishing point, as the resultant material was a grey, lack-lustre powder consisting of ground limestone and associated minerals, and graphite, of no commercial value. This

that in Germany and Austria, where the concentration extent, nearly all the mills operate on wet principle and in the United States on a combination of both wet and dry.

In the following brief descriptions of the various concentrators and methods of graphite ore dressing in Canada it is not thought necessary to enter into details as to the various types of crushers and rolls. The latter may be of any good type but should not be differential, while for the preliminary rough crushing all types of crushers have been used, the best service, in jaw crushers, being obtained with those of the Dodge type. On account, however, of the slippery character of the ore, particularly if it have a high graphite content, it has been found that better results were obtained when a rotary crusher was used, of which there are several types all equally suited to the work.



DIAMOND GRAPHITE COMPANY'S MILL, BUCKINGHAM, QUE.

View from South-East.

mill is not now in operation. Reference to the use of pebble mills will be made further on.

Globe Refining Company.

This mill, located at Port Elmsley, Lanark county, Ontario, was operated spasmodically until 1905, since when it is believed to have been idle. The ore, after crushing, was dried on a stationary sloping floor dryer and after being rolled was classified with revolving screens, from whence it went for treatment on Krom jigs after which it was milled on millstones and their accompanying screens. In practice the Krom jigs were not found to be satisfactory and in consequence taken out and the finished product made by flouing rolls and reels, similarly to the process until lately prevailing at the Diamond Graphite Company's mill in Buckingham.

For the purpose of this paper it is not thought necessary to enter into descriptions of the various concentrating methods in vogue outside of Canada, except to say

The following, in brief, are the various concentrators which have been, or are being, used in Canada.

Wet Separators.

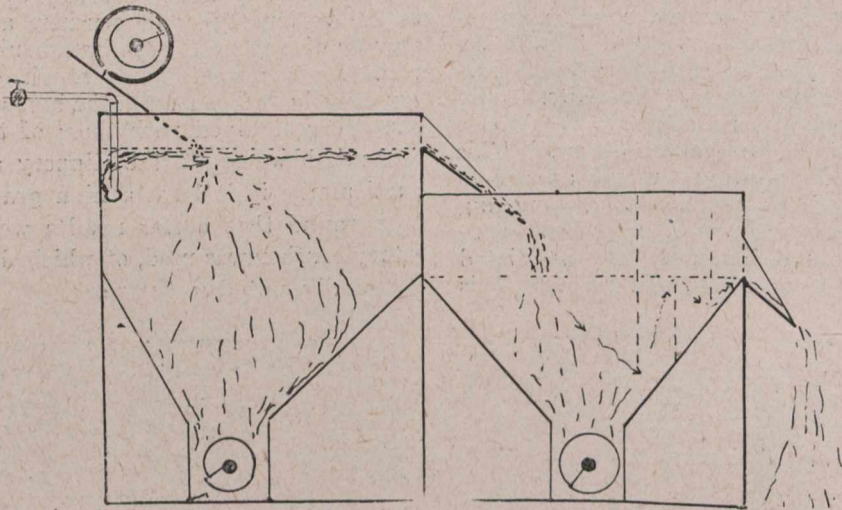
Buddles.—Already described.

Keeves.—Tubs, usually, of three or four feet in depth, by three feet in diameter with removable sweeps attached, at right angles, to a vertical shaft in the centre. The ore, usually fines, was fed, with a sufficiency of water, until the tub was filled, a strong centrifugal motion being imparted by the sweeps. When the charge was completed the sweeps were elevated and while the contents were settling the tub was knocked on the outside, the slight jarring effect keeping the lighter graphite in suspension longer than the heavier gangue minerals. The operation lasted about three hours, when the water was drained off and the sediments removed by hand. In a three foot keeve there was usually a deposition of about fifteen inches, the graphite, in a fair state of con-

centration, being found uppermost. The operation was slow and, requiring hand labour, was expensive and was never adopted to any great extent.

Brumell Separator.—This is a method, rather than a machine, and relies upon the floatability of graphite, when dry, upon, rather than beneath, the surface of

over into a settling tank, hopped to the centre, where it is wetted, and drops through an opening into a spiral steel conveyer enclosed in a tube and inclined at an angle of 45° from whence it is fed automatically to a revolving steam dryer. The water passes under and over several stops and eventually escapes through a screen at the op-



BRUMELL SEPARATOR.

water. The apparatus employed is a square wooden box, twenty feet in length by four feet wide and five feet deep, filled with water and with a surface current extending across its width, obtained by jets projected against the side at an upward angle of 45° and about nine inches below the surface. This box is hopped along the sides, the cants throwing the tailings into a worm conveyer which, in turn, conveys the refuse to an elevator with perforated bucket, the chain of which

posite side. This apparatus, while very economical as to power and capacity and entirely automatic, is, at best, only a rough concentrator rarely bringing a 10 per cent. ore up to 65 per cent., and in consequence is not now in use.

Kendall Separator.—This machine, patented in 1902, is the invention of Mr. C. Kendall and is now in use at the Bell mine in Buckingham township where it is being practically tested. In principle it relies on the affinity

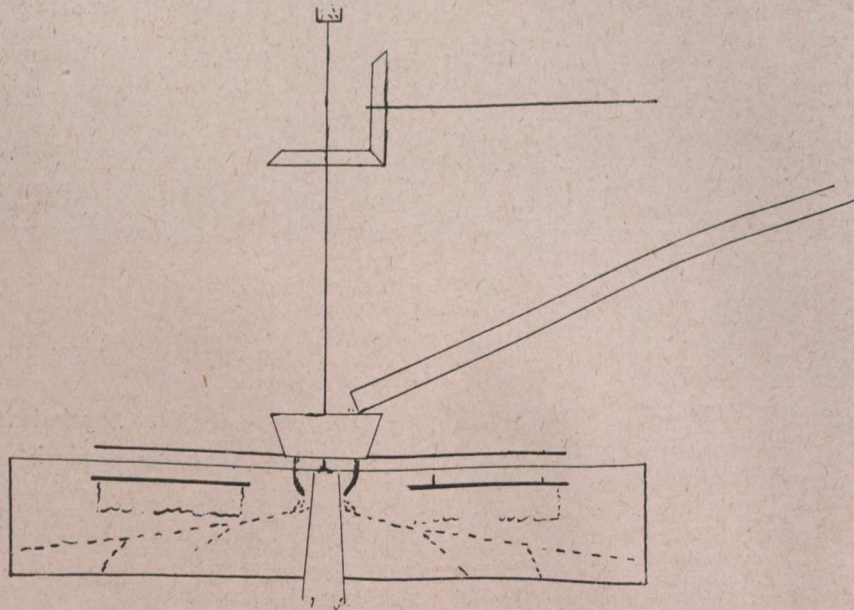


DIAGRAM OF BUDDLE.

actuates the conveyer. The dried ore is fed to the surface near the side over the jets by means of a spiral steel conveyer enclosed in a tube with a longitudinal slot the entire length, and, passing over a glance board, is dropped about one half an inch in a thin curtain to the water. The graphite which remains floating is carried

of oil for graphite and consists of a vertical cylinder terminated at the base with an inverted cone. The ore is thoroughly mixed with a superabundance of water and before entering the separator is again mechanically mixed with a heavy gravity mineral oil. The whole, while in an agitated state, is fed down to near the base

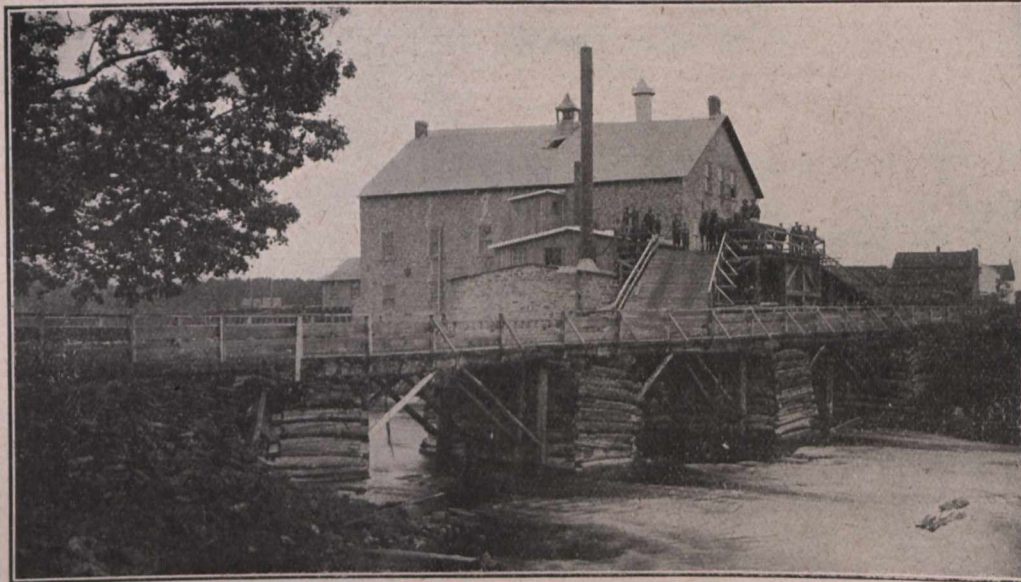
of the machine by an inner tube which extends to a height of about ten feet above the cylinder. The graphite, with its adhering particles of oil, rises to the surface and flows in a thin film over the edge of the cylinder to a launder which carries the pulp off to a settling tank from which the oil is syphoned to be used again. At the bottom of the cone is a swinging gate valve, which allows the water and tails to escape and acts, at the same time, as a regulator to the thin film of oil and graphite flowing over the lip of the cylinder. In principle this method is undoubtedly good but time will tell as to its practicability. Great difficulty will, no doubt, be encountered in keeping a regular height on the continuous charge in the cylinder and the problem of entirely ridding the graphite of the oil will, probably, be difficult to solve.

Dry Separators.

Labouglie Separator.—In 1876 a patent was issued to Joseph Labouglie, of Buckingham, which covered the adaptation of an ordinary fanning mill. The dried ore was dropped before the blast of a fan, similar to a grain winnowing fan, and the lighter graphite was

their respective bins, the finer smaller particles from the uppermost and the heaviest from those near the bottom of the shaft. Needless to say this method was not a success.

Krom Pneumatic Jig.—This was probably the first pneumatic machine to be used in Canada and has been found, while good in principle, to be somewhat too delicate in operation for practical work. It consists of a chest containing a swinging door blower giving rapid pulsations of air which is carried to tubes of silk bolting cloth arranged close together to form a bed whereon the concentration is made and as the continuous charge of ore is carried forward in strata a knife edge adjustable tail board is supposed to skim off the graphite, allowing the tails to drop under or behind. There are many details as to arrangement of feed and delivery of heads and tails which need not be gone into here. With an uniform ore and an absolutely steady power the machine would, no doubt, be very satisfactory, but these are conditions difficult to obtain. The monograph on "Graphite," already referred to, thus naively refers to the machine: "The apparatus, when



GLOBE REFINING COMPANY'S MILL, PORT ELSLEY, ONT.

View from South-East.

supposed to be projected further than the heavier gangue minerals and receptacles were arranged at increasing distances for the collection of the various products. It is not necessary to say that the machine was never adopted and mention is only made here to illustrate the early date at which efforts were directed towards dry separation.

Nappenburg Separator.—This apparatus was installed at the mill later owned by the Buckingham company, but at the time of its installation was owned by Messrs. Pew and Weart. In principle it was similar to the separator just described but much more elaborate and consisted of a deep shaft or well about two feet by one foot with blasts arranged at various points directed horizontally from the wider side across to screens of various mesh. The dried ore was fed in a curtain from the top, dropping down in front of the blasts, which were supposed to project the lighter graphite across to and through the screens. These blasts were arranged in increasing strength from top to bottom and the various screens had sprouts which were supposed to, but unfortunately never did, convey the concentrates to

carefully watched, works satisfactorily, but it has no power of self regulation. This causes the machine, if fed more rapidly than normal, to contaminate the concentrates, the flakes with the tailings, and if fed less rapidly to lose concentrates in the tailings. And, further, if the feed be regular in quantity but the percentage of graphite variable, then the rise in percentage will enrich the tailings and the fall in percentage will contaminate the heads."

Hooper Pneumatic Concentrator.—This machine consists of a flat chest containing a diaphragm actuated by eccentrics on a driven shaft running horizontally beneath the chest, and this chest, in turn, is surmounted with a movable deck of a peculiar design, the two separate parts being connected with a hollow ball and socket joint. The eccentrics, which are adjustable, act upon the diaphragm causing pulsations of air to pass up through the ball and socket joint and through a second diaphragm immediately below the deck which consists of a cast iron grating covered with broadcloth. Over this grating is the concentrating top, consisting of a cast iron frame with parallel strips

of sheet brass extending diagonally from side to side, and these in turn are surmounted by another set of parallel strips diagonally in the other direction. The ball and socket joint permits of the top being set at any vertical or lateral inclination. The ore is fed to the upper end of the concentrating top and is aided in its travel to the lower end by the rapid pulsations of air which pass up through the broadcloth effecting at the same time a concentration according to gravity. The lower brass strips, or riffles, carry the heavier portions to the lower side of the deck while the upper brasses or channels carry the lighter or top stratum diagonally to the upper side. At the discharge end of the deck are finger pieces which guide the various products to their respective receptacles. These machines require very accurate sizing of material and when once set as to eccentric throw, speed and vertical and lateral inclination, require no further care beyond cleaning the broadcloth bed which should be done about every five hours.

Barrel Concentrator.—This machine has given excellent results as a rough concentrator and consists of a

either two, four or six and the object is, presumably, to crush to a dust the foreign material and to trust to luck that the particles of graphite slip through untouched. In practice it has been found that a very large proportion of the graphite was ground, as well as the gangue material, and that it was not possible to obtain a particularly high grade of graphite by this method.

Pebble or Tube Mills.—Probably the most erroneous idea prevalent among inexperienced graphite producers is that these mills can be used for the cleaning of graphite from the gangue and for the polishing of the graphite flakes. In the monograph on "Graphite," already referred to, appears the following very misleading statement: "This mill on account of its great efficiency and smooth action has found its way into graphite mills of recent date; it is used for polishing and grinding graphite flakes and can be so adjusted that the latter are freed from sand; it replaces effectually the old buhrstone mill, while other mills either crush, twist or cut the material."

No more misleading statement could possibly have



NORTH AMERICAN GRAPHITE COMPANY'S MILL, BUCKINGHAM, QUE.

View from West.

revolving cylinder set with a slight downward inclination and having straight narrow flanges extending throughout its length. The discharge end is open while the feed end fits, as snugly as possible, into a square stationary chest to the opposite side of which is connected the suction pipe of an ordinary exhaust fan. The ore is fed into the upper end of the cylinder and, by means of the flanges, is carried up and dropped across the exhaust draft in the cylinder, the inclination finally discharging the tails at the lower end. From the fan the concentrates are blown into a dust collector or bag house for further treatment. It is unnecessary to state that for this treatment it is essential that the ore be very carefully sized.

Someone has written somewhere that "separation without classification is damnation" and this certainly is the case where pneumatic concentrators of any type are used.

Flour Mill Rolls.—This treatment of graphite should not properly be classed as concentration as the operation consists merely in rolling with smooth rolls set with a slight differential. These rolls are in sets of

been made as these mills are used only for fine pulverization and are usually equipped with an exhaust, with dust collector, which draws off the material when ground to the required degree of fineness. In point of fact these mills have replaced all other fine grinders in the various larger works in the United States where it is required to "kill the flake," a not very simple matter, and certainly not a desideratum with producers of flake.

RESCUE APPARATUS IN AUSTRIAN MINES.

The Austrian Mining Board has recently issued an interesting regulation relative to the use of rescue apparatus in mines.

Some approved form of rescue apparatus shall be kept in working order, and in a readily accessible place, at all mines. In order to keep the valves and fittings from being attacked by rust, the oxygen bottles must be perfectly dry inside, and recharged with dry oxygen by a dry pump. In the most dangerous class of mines five sets of rescue apparatus must be kept when not

more than 200 men are at work per shift, 10 sets for shifts of from 200 to 400 men, and 15 for shifts of over 400 men. Each apparatus must be capable of supplying oxygen for 1½ hours. In non-fiery mines the number of apparatus is fixed at five, irrespective of the number of men per shift, except that where there are below 200 an apparatus supplying oxygen to last one hour is permitted.

Where a number of dangerous mines, employing over 200 men per shift are situated close together, all the apparatus in excess of the five sets necessary to equip one corps of rescuers may be kept at a central station of easy access. Rescue stations must be furnished with a duplicate source of oxygen bottles and a number of safety lamps of some permitted type; one oil lamp for testing the presence of fire damp is necessary when the other lamps are electric. A trained man must be placed in charge of the station and made responsible for the good order and maintenance of the equipment. The men trained for rescue parties must be medically examined, and each corps must use the apparatus at least every six months.—Eng. and Min. Journal.

THE RECENT ASBESTOS MERGER.

The Amalgamated Asbestos Corporation, Ltd., has been granted a charter under the laws of the Dominion of Canada to acquire, control and operate various asbestos producing properties situated on the line of the Quebec Central Railway, in the Province of Quebec.

Capitalization.

The capitalization of the merger is \$25,000,000, made up as follows:—

Bonds—

Authorized	\$15,000,000
Reserved for future require- ments	7,500,000
To be issued	\$7,500,000

Stock—

Preferred stock entitled to cumulative dividends at the rate of 7 per cent. per annum on and after Jan. 1, 1910. This stock takes precedence over all other classes of stock in the event of liquidation, either voluntarily or otherwise, and is convertible share for share into the common stock of the company at any time at the option of the holder.

Par value \$100	\$1,875,000
Common stock. Par value \$100	8,125,000

There are enough asbestos producers in the merger to give the corporation control of at least 70 per cent. of the world's supply. The producing companies of the province during the year 1908 were:—

Keasbey and Mattison (Bell)	Thetford
British-Canadian (American)	Black Lake
Standard Asbestos Company	Black Lake
Dominion Asbestos Company	Black Lake
Union Asbestos Co. (British-Canadian)	Black Lake
King Asbestos Mines	Thetford
Johnson Asbestos Company	Thetford
Beaver Asbestos Company	Thetford
Broughton Asbestos Fibre Company	East Broughton
Quebec Asbestos Company	East Broughton
Eastern Townships Asbestos Company	East Broughton

Boston Asbestos Mining Company	East Broughton
Frontenac Asbestos Mining Company (erecting mill)	East Broughton
Asbestos Mining and Manufacturing Company (now shut down)	Chrysotile
Thetford Asbestos Company (undergoing reor- ganization)	Thetford

Of the companies named above those amalgamated are:—

- The British-Canadian Asbestos Company.
- The Standard Asbestos Company.
- The Dominion Asbestos Company.
- The Union Asbestos Company.
- King Asbestos Mines.
- The Beaver Asbestos Company.

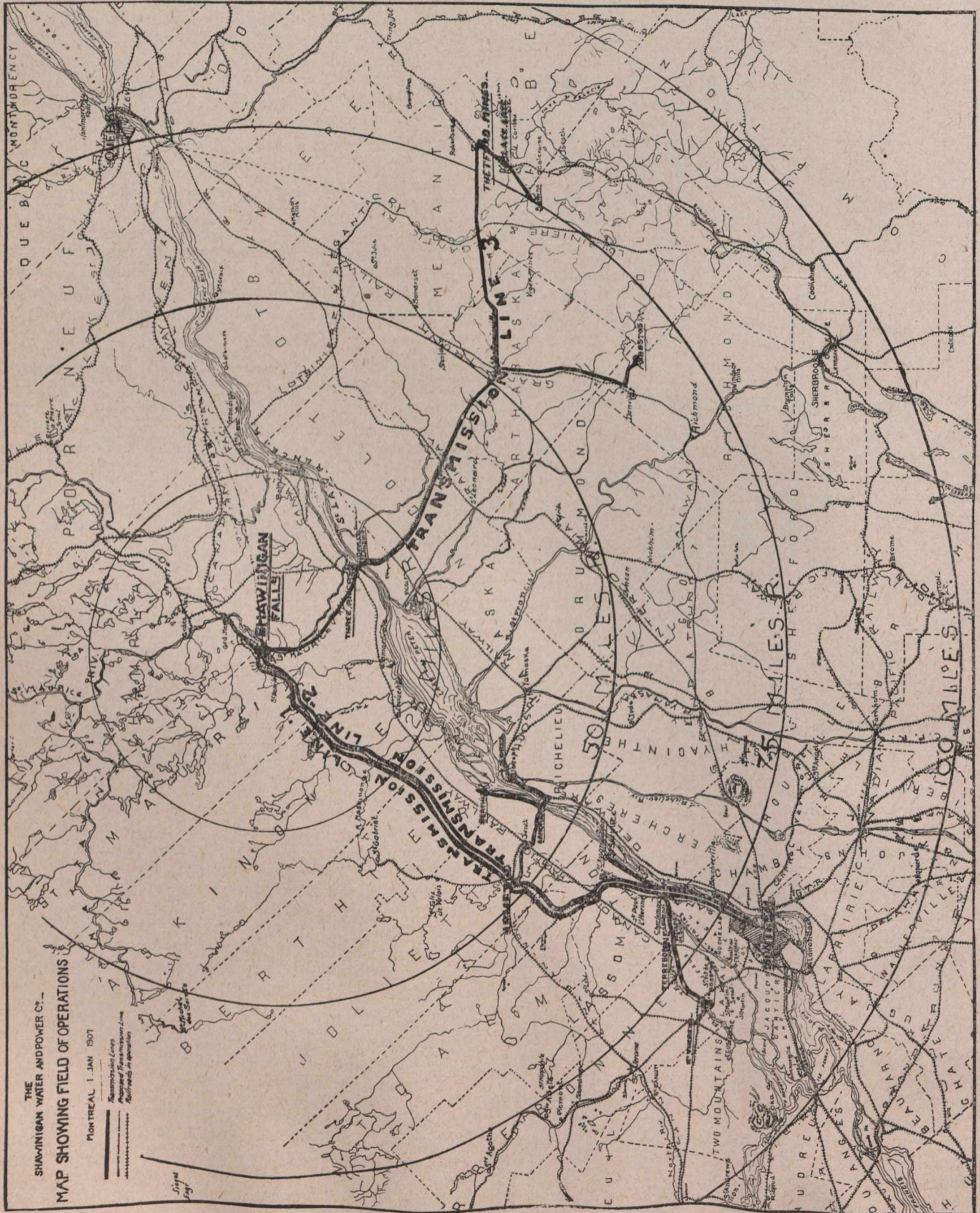
And the Bell Asbestos Mines by a contract for the entire production over and above the requirements of the Keasbey and Mattison Company, manufacturers of asbestos products, and the affiliated companies controlled by Dr. R. V. Mattison.

Board of Directors.

The following named gentlemen have consented to serve as directors; Henry M. Whitney, Boston, president, the British-Canadian Asbestos Company, Ltd.; Hon. Robert Mackay, Montreal, director Canadian Pacific Railway Co., Bank of Montreal, the Royal Trust Co., and Bell Telephone Co. of Canada; Howard Ellery Mitchell, Philadelphia, of Cramp, Mitchell & Shober, bankers; Richard V. Mattison, M.D., Ambler, Pa., president Bell Asbestos Mines, Keasbey & Mattison Co., Asbestos Shingle, Slate & Sheathing Co., Asbestos Manufacturing Co. of Lachine, Canada and the First National Bank of Ambler, Pa.; E. B. Greenshields, Montreal, director Bank of Montreal, Grand Trunk Pacific Railway Co., the Royal Trust Co., and the Standard Life Insurance Co.; president Greenshields, Ltd.; Harry A. Berwind, Philadelphia, Berwind-White Coal Mining Co.; Thomas McDougall, Quebec, director and chairman of the Board of Directors, Quebec Bank; director and vice-president, the Shawinigan Water & Power Co.; Theodore W. Cramp, Philadelphia, of Cramp, Mitchell & Shober, bankers; Hon. James M. Beck, New York, ex-Assistant United States Attorney-General; trustee Mutual Life Insurance Co. of New York; director National Copper Bank of New York; William McMaster, Montreal, vice-president and managing director Montreal Rolling Mills, director Montreal Telegraph Co. and the Dominion Iron & Steel Co.; R. H. Martin, New York, president Kings Asbestos Mines; Hugh A. Allan, Montreal, president Montreal Telegraph Co., director Allan Line Steamship Co., Ltd., Merchants' Bank of Canada, Grand Trunk Pacific Railway Co.; C. Hartman Kuhn, Philadelphia, director Girard Trust Co. and Insurance Co. of North America; H. H. Melville, Boston, vice-president Canadian Northern Quebec Railway Co., director Shawinigan Water & Power Co.

Production.

Asbestos mining is now the most important mineral industry in the Province of Quebec. The presence of asbestos in the Eastern Townships has been known since 1847, but it was not till 1877, thirty years later, that the deposits were worked. During the last thirty years the aggregate production has had a value of more than twenty million dollars, and at the present time the Province of Quebec produces between 85 and 90 per cent. of the world's supply.



The following returns indicate the growth of the industry. The production of low-grade material was greatly increased by the introduction of mechanical concentration in 1892-3-4:—

Year.	—Asbestos—		—Asbestic—	
	Short tons.	Value.	Short tons.	Value.
1880.....	380	\$24,700	.....	.....
1881.....	540	35,100	.....	.....
1882.....	810	52,650	.....	.....
1883.....	955	68,750	.....	.....
1884.....	1,141	75,097	.....	.....
1885.....	2,440	142,441	.....	.....
1886.....	3,458	206,251	.....	.....
1887.....	4,619	226,976	.....	.....
1888.....	4,404	255,007	.....	.....
1889.....	6,113	426,554	.....	.....
1890.....	9,860	1,260,240	.....	.....
1891.....	9,279	999,878	.....	.....
1892.....	6,082	390,462	.....	.....
1893.....	6,331	310,156	.....	.....
1894.....	7,630	420,825	.....	.....
1895.....	8,756	368,175	.....	.....
1896.....	10,892	423,066	1,358	6,790
1897.....	13,202	399,528	17,240	45,840
1898.....	16,124	475,131	7,661	16,066
1899.....	17,790	468,635	7,746	17,214
1900.....	31,621	729,886	7,520	18,545
1901.....	32,892	1,248,645	7,325	11,114
1902.....	30,219	1,126,688	10,197	21,631
1903.....	31,129	915,888	10,548	13,869
1904.....	35,611	1,213,502	12,854	12,850
1905.....	50,669	1,486,359	17,594	16,900
1906.....	60,761	2,036,428	21,424	23,715
1907.....	62,241	2,484,768	28,296	20,275
1908.....	65,156	2,551,596	25,239	25,829
Totals	541,105	\$20,823,382	175,002	\$250,638

The prevailing prices of the product have been as follows:—

	Crude No. 1.	Crude No. 2.	No. 1 Fibre.	No. 2 Fibre.	No. 3 Fibre.
1901.....	\$125.00	\$80.00	\$50.00	\$30.00	\$16.00
1902.....	150.00	90.00	55.00	35.00	18.00
1903.....	175.00	100.00	60.00	37.50	20.00
1904.....	225.00	110.00	75.00	40.00	22.50
1905.....	225.00	125.00	85.00	45.00	25.00
1906.....	250.00	150.00	100.00	50.00	27.50
1907.....	275.00	175.00	110.00	55.00	30.00
1908.....	275.00	175.00	110.00	55.00	30.00

During the year 1908 the companies included in this consolidation supplied over 65 per cent. of the world's production and about 73 per cent. of the production of Canada.

The amalgamated properties are fully equipped with modern quarrying and milling plants of most substantial character. The mills, most of which are new, have a daily capacity of about 4,500 tons of mill rock. Over five miles of railway owned by the company and equipped with eight locomotives and 220 cars and other equipment, connect the quarries with each other and with the mills. A considerable portion of the towns of Thetford and Black Lake are built on land belonging to the company, and many of the dwellings used by employees are owned by the company.

According to Mr. Obalski, of the Quebec Department of Mines, of the total quantity of asbestos exported,

United States takes 78 per cent., Great Britain 13, and Germany 8.41.

The engineers who reported upon the properties and the proposed consolidation were Mr. E. C. Bacon, C.E., of New York, and Mr. Fritz Cirkel, M.E., of Montreal. Mr. Bacon built the first asbestos mill in 1891, on the old Glasgow-Montreal property at Black Lake. His forte is mechanical engineering. Mr. Cirkel has specialized in asbestos for years. He has written a valuable monograph on the subject, and is now about to bring out a second monograph. His work for the Federal Mines Branch has given him a national reputation.

BOOK REVIEW.

General Alphabetical and Analytical Index—Transactions of the American Institute of Mining Engineers. volumes I.-XXXV. (1871-1904), 700 pages. New York, N.Y. American Institute of Mining Engineers, 1907.

This volume, an octavo of 700 pages, is now ready for delivery. By its aid, any subject treated or alluded to in the Transactions can be instantly tracked. The names of persons, mines, works, towns, etc., have been included; and abundant cross-references and classified sub-headings have been added to facilitate rapid consultation. Thus, the student remembering the name but not the locality, or the locality but not the name, or neither the name nor the precise locality of a gold mine, can find it under "Gold Mines," or under either of the other heads. For a more extended statement of the nature and use of this Index, which is intended specially for the benefit of those who do not possess complete sets of the Transactions, and who consult the Library by correspondence, see the Bi-Monthly Bulletin for September, 1907. The price of the Index bound in cloth is \$5, delivery charges prepaid. Half-morocco binding costs \$1 extra.

EXCHANGES.

The Iron and Coal Trades Review, April 16, 1909.—The Review, glancing over the world's iron ore trade, has this to say about Canadian enterprises in Brazil: "Brazil is still undeveloped, but when the time comes for more active exploitation of the fields it will be found that the best deposits have been picked up and are no longer available at tempting prices. It is fortunate, however, that the Brazil deposits have largely passed into Canadian or English hands." Reference might have been made by the Review to New Brunswick, Nova Scotia, Ontario, and British Columbia as future sources of iron ore supply.

The Engineering and Mining Journal, April 24, 1909.—Referring editorially to the general subject of conservation of natural resources, our contemporary dwells upon the function of government officials in this direction. "The Government (United States) itself has an excellent opportunity to lead and show the way by reducing extravagances in its own affairs. Among minor matters it might cease undertaking to teach us how to gasify coal, operate gas engines, and burn coal under boilers without smoke, and otherwise, multiplying unnecessarily the standard, but long-existing, literature of engineering. The matter of economy in production may safely be left to the engineers of the

country. Government officials can no more show them how to improve their methods of mining and smelting, extracting coal, etc., than they can teach their grandmothers to suck eggs."

The South African Mining Journal, March 20, 1909.

—In this number is a report of the Stope Drill Elimination Trials. The surface elimination trials, the first competitive test to which all entries were subjected, lasted for four weeks. Drills were entered from nearly all the chief mining countries of the world. The object is to determine the best stoping drill for Rand conditions. In average inches drilled per minute, average cubic feet free air used per minute, and average cubic feet free air used per foot drilled, reciprocating machines won the highest place. But hammer-drills ran a close second, and displayed some advantages that may overbalance the slight disadvantage in efficiency.

Throughout the trials it was evident that a jet of water through hollow steel makes the best dust allayer. Only two machines drilled over $2\frac{1}{2}$ inches per minute of total time.

Mining and Scientific Press, April 17, 1909.—Legislation limiting a day's labour to eight hours is making headway in the Western States. Our contemporary has something to say on the point that the movement is based, not upon the merits of a shorter day's labour, but upon false reasoning that attributes to mining and metallurgic work exceptional unhealthfulness. "Personally," says the Mining and Scientific Press, "we do not believe that the peril of silicosis in a gold mine is greater than the danger of infection by many diseases from the street dust we complacently tolerate in our cities; we would prefer the risk of the miner to that of the motorman or city teamster. . . . The real question is a shorter day's labour for the workingman, but it were wiser to fight it out fairly on its merits, or else to construct police regulations operating equitably on a basis not limited to single industries."

PERSONAL AND GENERAL.

Dr. A. E. Barlow, after giving evidence before the Mining Committee, spent a day in Toronto.

Mr. Joseph Houston, of the Right of Way mine, has been appointed consulting engineer for the Nipissing Mining Co.

Mr. Bruce R. Warden, engineer to the Nicola Valley Coal and Coke Company, has returned from a trip to England.

Mr. J. W. Bryant, one of the Tye Copper Company's engineers, has returned to Victoria, B.C., from a trip to Mexico.

Mr. Selwyn G. Blaylock, superintendent of the St. Eugene mine, East Kootenay, B.C., is back from a trip to the Province of Quebec.

At Lake George, York County, New Brunswick, an antimony smelter has started operations. The Lake George ore is first subjected to concentration.

Mr. J. D. Hurd, of Fernie, B.C., general manager of the Crow's Nest Pass Coal Company, is on a business visit to Chicago, St. Paul and other places.

Mr. Frank A. Ross, manager for the Daly Reduction Co., Hedley, B.C., has returned to the property from New York City, where he was on company business.

Mr. Chas. Emmerson, manager of the mines of the West Canadian Collieries, Ltd., recently left Bellevue, Alberta, for a three months' trip to the Old Country.

Mr. H. E. West, who has spent the winter at Cobalt, is leaving for El Oro, Mexico, to rejoin the staff of R. M. Raymond, general manager of El Oro Company.

Mr. R. E. Harris, president of the Nova Scotia Steel and Coal Company, sailed for Europe in connection with the financial reorganization of the company.

Mr. J. M. Ruffner, manager of the North Columbia Gold Mining Company, of Cincinnati, Ohio, has gone north to operate the company's hydraulic gold mines in Atlin, B.C., for the ensuing season.

Mr. J. J. Harpell has returned to Toronto after an extended tour through Great Britain and Europe. Mr. Harpell's mission was to investigate the trans-Atlantic mineral markets, especially to discover the probable demand for the products of Canadian mines.

Mr. G. A. McCarthy resigned recently his position as chief engineer of the Temiskaming and Northern Ontario Railway to become superintendent of construction of a new power company, which will supply electric power to the Cobalt mines.

A committee representing the Canadian Mining Institute appeared before the Commons Committee on Mines and Minerals, April 21st. They suggested that the administration of all mineral lands be transferred from the Department of the Interior to the Department of Mines. Surface rights, they argued, should be separated from mining rights. The members of the committee were Dr. A. E. Barlow and Messrs. B. A. C. Craig, J. M. Clark, and J. B. Tyrrell.

The Mining Committee of the Federal House is composed of the following members:—Messrs. Blondin, Boyce, Burrell, Chisholm (Antigonish), Congdon, Conmee (Chairman), Devlin, Goodeve, Herron, Lanctat (Richelieu), Loggie, Lortie, Macdonald, McCarthy, McCoig, McIntyre (Strathcona), McMillan, Maddin, Prowse, Rhodes, Smith (Nanaimo), Smyth, Stratton, Templeton, and Turriff.

Travellers will find the new form of Travellers' Cheque now being sold by The Canadian Bank of Commerce a great convenience for obtaining money away from home or in foreign countries. They can be bought at any office of the Bank for sums of \$10, \$20, \$50, or \$100 as may suit the purchaser. Hotels and banks everywhere in the civilized world will cash them, and no dispute can arise as to identification or the amount of money which the traveller may expect to obtain for them. On the face is printed the sum in the principal European currencies which the holder is entitled to receive, and in Canada and the United States they pass everywhere at par.

At the regular April meeting of Council of the Canadian Mining Institute the following gentlemen were elected to membership:—Members—Barney, Wm. G., Latchford, Ont.; Bourne, F. J., Cobalt, Ont.; Glendinning, Geo., 142 Dowling Ave., Toronto, Ont.; Neelands, E. V., Hargrave Silver Mines, Ltd., Cobalt, Ont.; Vance, J. F. C. B., 411 Nelson St., Vancouver, B.C. Associates—Barthe, L. H., Cobalt, Ont.; Campbell, Amos, Quebec, Ont.; Drury, Chas. LeB., 122 Wellington St. West, Ottawa, Ont.; Machin, H. A. C., Kenora, Ont.; Morrison, G. F., 401 Traders Bank Bldg., Toronto, Ont.; Pellatt, Sir Henry M., A.D.C., Toronto, Ont.; Perreault, Ovila S., 900 St. Antoine St., Montreal, Que.

On Monday evening, April 19th, a small mining boom occurred in the neighbourhood of Elm Avenue, Rosedale, Toronto. A number of mining men had received a week's notification that certain conditions would have to be met before claims could be staked.

Twelve prospectors succeeded in staking and recording one claim each. The assessment work was varied. Much moisture was encountered on several of the claims. Only one valuable discovery was made, and that one disappeared before April 20th.

CORRESPONDENCE.

To the Editor of the Canadian Mining Journal.

Dear Sir,—In your issue of March 15th I read with great interest your preliminary note on the electric smelting experiments conducted by J. W. Evans, and am surprised to find—

“Mr. Evans built a 2,000 Kilowatt Alternating Current Generator and Exciter, the power supplied to run them being furnished by a 5 h.p. gasoline engine.”

Probably the reader's surprise was no greater than that of our friend, Mr. Evans, who has never, so far as we know, sought distinction in the field of electrical engineering and construction.

Mr. Evans' friends have all been looking forward to remarkable results from his researches, and had implicit confidence that he would add much to our knowledge of this work, but we were astonished to learn—as he must also have been—that during the past winter a 2,000 kilowatt, or approximately 2,700 horse power generator, had been constructed in his laboratory.

While this in itself would have been an engineering achievement of much note, it loses interest beside the fact that we see he has been able to transcend so far what we have heretofore considered natural laws that he has driven this huge machine with a 5 h.p. gasoline engine. Such results would be most gratifying if you have correctly reported the situation, and apparently the power field may be revolutionized at any time.

The Journal has always been the exponent of conservatism in figures, but this time it looks as if some one on the staff must have been listening to prospectors who have sold their claims for so many millions that figures lost all significance to a dazed mind.

Just what was the Journal trying to say that Mr. Evans did do.

Yours truly,

H. R. KIRKPATRICK.

Toronto, April 16th, 1909.

RECIPROCITY IN COAL.

To the Editor of the Canadian Mining Journal,
Toronto, Canada.

Dear Sir,—On both sides of the line the question has been revived in an acute form, of interchange between the two neighboring countries of the most important article of commerce—coal. I expressed my views upon the subject in an address which I gave last year to the students of the Kingston Mining School. I said:

“On our continent the railroad has proved the greatest nation building instrument, provided there by a vigorous and honest human force to use it. This has been abundantly proven in the United States, and the history of the Canadian Pacific is a further confirmation of it. Without the railroad running from ocean to ocean, the Confederation would have been a hopeless failure, and the North-West would have been still a great buffalo range.

“When we look upon the railroad from a miner's point of view, it is one of the greatest forces for na-

tional unity that exists. Statistics express this. If you take the different classes of freight carried by the railroads of the United States you will find that while the volume of each differs slightly in different sections, the average is as follows:—

Products of Agriculture.....	8.56%
Products of Animals	2.32%
Products of Mines	53.09%
Products of Forests	11.34%
Manufactures	14.81%
Merchandise	4.06%
Miscellaneous	5.92%

“This means that the products of the mines are necessary to support the railroads, and that, on the other hand, the mines could not possibly exist without the aid of the railroads. They are, therefore, mutually dependent one on the other. But when we look into the movement of the principal article carried, namely, coal, of which there were mined in the United States last year 470 million tons, we recognize the political importance as much as the industrial importance of this branch of national industry. Before the war the country was divided into two bitterly hostile camps of protectionists and anti-protectionists. The South demanded free trade, in order to feed and clothe her slaves cheaply. New England, being then the only manufacturing section, as vehemently demanded high protection. At that time the West consisted of the states, now composing the easternmost section of the Middle West, devoted to farming alone. With the development of coal mining and the expansion of the railroad system, all this has changed. The South is manufacturing its own cotton, and turning cotton seed into oil and other by-products, as well as creating the second largest centre of the iron manufacture on the continent. And the West, with Chicago in the lead, is rapidly outstripping New England, and its manufacturing energy is almost exceeding its agricultural activity. New England is, in fact, making less progress than any other section of the country, and why? Because she has no coal. Transportation cost has been so reduced that she can supply herself from Pennsylvania—400 to 500 miles distant—with this indispensable commodity. But coal lies nearer to her hand than Pennsylvania, and this fact is influencing her political position towards this country, and creating in New England alone a strong reciprocity sentiment. When we look at home we find that two provinces—Ontario and Quebec—the most populous and the richest members of the Confederation, suffer from the same complaint—lack of fuel; and yet across the lake in Pennsylvania and Ohio there is such abundance of this very life blood of industry that in order to reach it 30,000,000 tons of iron ore are brought to their coal fields from mines to the west of distant Lake Superior. In fact, Ontario is nearer fuel than the seaboard of Pennsylvania itself; but is cut off from this indispensable agent to the full development of her industrial life by a political line

drawn through the centre of the St. Lawrence, and of Lakes Ontario, and Erie. If more reasonable international trade policies were adopted, and the continent's resources as a whole were utilized by its people as a whole, certain industrial disabilities on both sides of the political line would immediately disappear. Nova Scotia would supply New England by cheap ocean navigation alone; and Pennsylvania and Ohio coal would be transported across the lakes to Ontario. Montana, Idaho and Dakota, especially Montana and Idaho, for their smelting operations, need coke, which the Crow's Nest coal fields of British Columbia can supply in full abundance; while the Pacific Coast States must draw their coke from coal fields 2,000 miles distant, either across the mountains, or by boat from Vancouver, unless they prefer to import it from New South Wales.

"It seems almost incredible that two industrious peoples should set at defiance the first laws of economic science, and allow sectional political interests and prejudices to stand in the way of what is so conspicuously to the interest of both."

The coal deposits of Cape Breton and Nova Scotia enjoy the unique advantage of being actually on the seashore, and, therefore, being able to use the ocean and the river as the great highway for the distribution of their products. The effect of the reciprocity treaty of 1854 showed what a beneficial influence the removal of trade restrictions in the United States had upon the coal mining industry of Nova Scotia by raising the output from an insignificant figure to 500,000 tons a year. The present output of 6,000,000 tons is small when compared with the geographical position which the maritime coal fields hold to the markets of the northern section of the Atlantic seaboard. Were trade restrictions removed, I have no doubt whatever that the output would increase by leaps and bounds—not in hundreds or thousands—but in millions of tons. It cannot be doubted but the beneficial effect upon every industry in Ontario of the free importation of Pennsylvania and Ohio coal would be incalculable. There may seem to be some good selfish reason why the coal miners of Pennsylvania and Ohio should object to the introduction of Nova Scotia coal to New England factories; but it is strange short-sightedness on the part of the coal miners of Nova Scotia to refuse to exchange the limited market which they have on the St. Lawrence for the unlimited market which the North Atlantic seaboard states would offer them.

Yours truly,

JAMES DOUGLAS.

99 John Street, New York, April 6, 1909.

THE LUMBER SITUATION IN GOW GANDA.

To the Editor of the Canadian Mining Journal.

One of the most important requisites, in the development of a mining camp, is plenty of lumber. Now, Gow Ganda has been most abundantly provided, by nature, with the best of the forest trees, pine and spruce, yet man has decreed that, in regard to cheap lumber, it shall be no better off than an inaccessible desert region devoid of forest growth.

Gow Ganda is in an extensive timber reserve, called the Temagami Forest Reserve. In this area the white pine is reserved in perpetuity. The pulpwood, spruce, balsam and other timber belongs to J. R. Booth & Co., having been bought from the Ontario Government many years ago at a low price.

During January of this year, a man named Knowles took a complete saw-mill outfit into Gow Ganda and started cutting timber. This green, rough lumber found an immediate sale at \$45 to \$55 per thousand feet. A week or two after starting operations, orders came that all cutting of timber must stop, and building operations were at a standstill in Gow Ganda till about March 10th. Then the mill started up again, although the cutting of timber for cabins was prohibited. Now, however, \$60 to \$75 per thousand feet was charged for the different grades of lumber, and it developed that Knowles was not allowed to cut any spruce by the J. R. Booth Co., and was charged the exorbitant amount of \$18 per thousand board feet, on the stump, by the Government for the pine.

Now conditions and expenses of running a saw-mill at Charlton and Gow Ganda are practically identical, if anything conditions favor Gow Ganda, as even the slabs and sawdust find an immediate sale at good prices. Yet at Charlton the mill owners can cut and sell, presumably at a profit, lumber for \$17 per thousand. At Gow Ganda the same grade costs \$70. The cost of transportation between Charlton and Gow Ganda by sleigh is about \$50 per thousand feet.

One can hardly blame the Gow Ganda mill-owner for charging a good price for his lumber, but the action of the Government is inexcusable. Besides charging a reasonable stumpage fee, they should expropriate some of the holdings of the J. R. Booth Co., whose refusal to sell is hampering the development of the country. This may seem to be an unwarrantable interference with vested interests, yet under the circumstances it is justifiable. The only difficulty is that the Government has shown such an example of greed, in its dealings with Gow Ganda interests, that it would be hypocrisy on its part to dispossess private citizens for the same fault.

One can only regret the terrible forest fires which are inevitable in that district this summer. Prospectors should realize the wicked waste they are guilty of in setting fire to large areas of fine timber, under the fallacious idea that it helps prospecting. The fire rangers in the district will have more than their hands full coping with fires due to accident and carelessness, but when fires are deliberately set out their efforts will be useless, and instead of a forest reserve there will be a desolate brule.

JAMES D. CUMMING.

113 Bedford Road, Toronto.

A REPLY TO MR. T. A. RICKARD.

To the Editor of the Canadian Mining Journal.

Sir,—I have read with great interest Mr. Rickard's letter, in your last issue, concerning his report on Gold Mining in Nova Scotia, which was made by him on behalf of the Nova Scotian Government.

I happen to have been a member of the committee of the Mining Society of Nova Scotia referred to by Mr. Rickard. I was unable to take any active part in selecting a mining engineer to make the investigation, having been absent from the Province, both when Mr. Rickard was selected, and during the period of his investigation. At a later time I had the privilege of reading Mr. Rickard's report. I am unable to speak as to the official attitude regarding this report, and as to views of other members of the committee, and, therefore, am only stating my own personal opinion.

I was very much surprised to see that Mr. Rickard had either misunderstood, or had gone beyond the scope of what I had supposed were the original bounds of his investigation, as first discussed. As I personally originated the movement for this investigation, I may be allowed to speak as to its purpose.

It was intended that the Nova Scotian goldfields should be looked over, all data bearing on supposed similarity to Bendigo gold occurrence noted, as also the dissimilarities, and suggestions and advice given as to future developments. This part of report was ably carried out. The points to which I personally take exception, and which, in my opinion, rendered it impossible to publish the report, at least in the form in which it was submitted by Mr. Rickard, were the almost personal criticism of individual resident man-

agers, and the opinion stated with regard to a gold mine that was in active operation. Mr. Rickard had a perfect right—as a private individual—to form his own judgment on any mining operation coming under his view, but placed, as he was, in a semi-public position, such an opinion could hardly fairly be published.

I think Mr. Rickard will agree that a government official (even a temporary official) is not expected to express opinions for publication as to methods, values, or in any way directly affecting the status of a mining company, particularly a going concern.

I have no doubt that other members more conversant with the whole matter will more ably state their side of this question.

Yours faithfully,
 GEORGE H. GILLESPIE.

Madoc, Ont., April 22, 1909.

INDUSTRIAL PAGE.

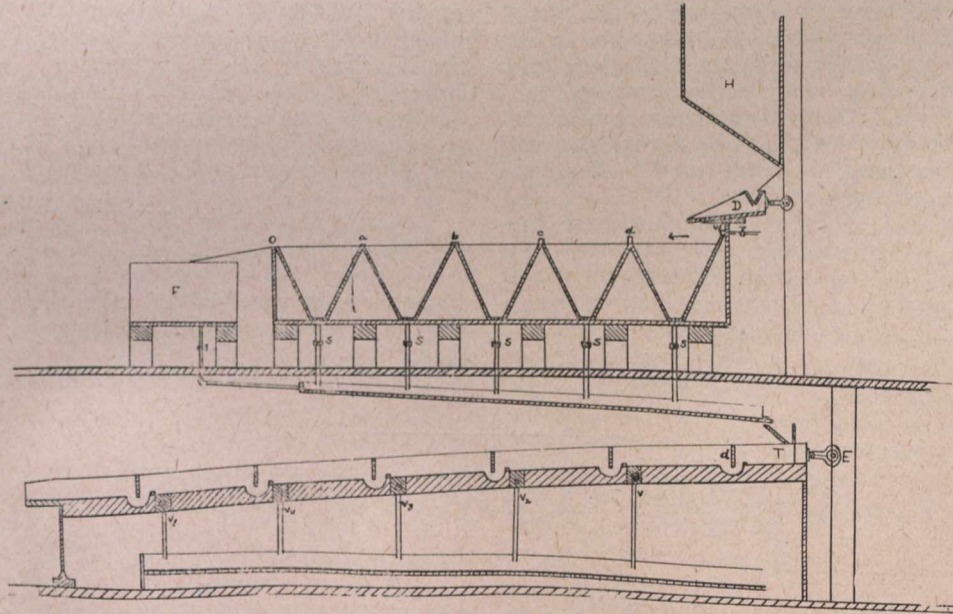
THE BEHREND WET FLOTATION AND CONCENTRATING SYSTEM.

I.

In the concentration of ores by the ordinary wet methods, it is an accepted fact that the losses that take place with many ores are due mainly to the nature of the mineral constituents being flaky and scaly and characterized as sectile which float upon the surface of the water. This float, due to its scaly nature, does not become thoroughly wet and is, therefore, irrecoverably

After many years of careful experimentation, Mr. Samuel K. Behrend, the inventor of the Behrend Dry System of Concentration, has evolved and invented a most complete method for the economical treatment and handling of these ores.

In this method of treatment, which consists essentially of feeding dry crushed ore upon a current of water, floating away the fine rich mineral, recovering same by filtration or some similar method and reconcentrating the tailings on a shaking table or trough of special construction, the losses are reduced to a



Wet Flotation and Concentrating Table—Behrend System.

lost by being carried away in the drain. Among the ores that this is particularly true of are graphite, galena, stibnite, chalcopryrite, tetrahedrite, sylvanite, molybdenite, argentite, stephanite and native silver. In the concentration of these ores, losses vary from 35 per cent. to 65 per cent. of the original mineral constituent.

Many methods and devices have been proposed and tried in the endeavor to overcome and cut down these losses, but up to the present, all have been unsuccessful.

minimum; in most cases a recovery of over 90 per cent. being readily secured at extremely low cost of operating.

By referring to the sketch, it is seen that the ore is fed from the hopper H on the distributor D, which delivers a steady stream of ore upon the surface of the water introduced at W in the tank below and travels in the direction shown by the arrows. At the same time a downward current is induced by having the spigots S open to such an extent as to allow the tailings to be discharged, and permit a minimum of

water to be discharged at O into the settler or filter F.

Owing to the nature of the material, the gangue, together with granulated mineral constituents sink, while the scaly, flaky mineral, is carried forward, meeting obstructions at a, b, c, d, which tear the surface and permits the water to act upon the floating mineral, cleansing the mineral from its impurities and delivering it in practically a pure state to the filter.

The tailings are discharged through the spigots at the bottom into a common launder L, which feeds into the head of the concentrating trough T.

This trough is made up of a series of small compartments, each of which is a concentrating table in itself, equipped with a riffled surface and a valve of special construction. Between each section is placed a ducker (d), which compels every particle of ore to become thoroughly wet. The trough is equipped with an adjustable eccentric E, which imparts to it a rapid reciprocating motion. Means are provided to increase or decrease the pitch of the trough at both ends. The rapid motion of the table stratifies the mineral and permits it to be discharged continuously from the valves v^1 , v^2 , v^3 , v^4 , v^5 , while the tailings are carried along with the rush of water and discharged from the end of the trough, clean of mineral.

The riffles covering the floor of the trough, are placed on canvas with 1" centres, running from a feather edge at their upper portion to $\frac{1}{2}$ " high placed across the trough and just in front of the ducker. This permits of a bedding of mineral to be carried at all times, the valves being set so as to permit the discharge of clean mineral only.

As can be readily seen, any mineral escaping the first compartment, is caught in the second; that which escapes the second is caught in the third, and so on down. When the material reaches the discharge end, it must be absolutely clean and free from values.

The first two, three or four compartments will produce shipping concentrates, while the remainder will form a middlings product, to be returned to the head of the table to be reconcentrated.

It is evident that a machine of such simple construction requiring so little power to operate, and having so great a capacity, can be readily adapted to the concentration of mill tailings, it being merely necessary—in most cases—to attach the trough to the tailings launder. A recovery of a large portion of the present losses may be confidentially expected.

Allis-Chalmers Company.—This company's Bulletin No. 1433 describes the Allis-Chalmers Prospecting Mill, for free gold ores. The mill consists of a three-stamp battery complete with all framework and equipped with power. It constitutes a light, compact, easily transportable plant. The stamps weigh 250-lb. each. The mill is arranged to be operated in one battery by belt from stamp countershaft. The equipment includes:—

- 1 high mortar, weight 1,000 lb., arranged for copper amalgamation plates in front and back, screen frame seat planed and foundation holes drilled to templet.
- 1 wood screen frame fitted to mortar.
- 2 wrought iron keys.
- 1 steel screen—3 steel shoes—3 steel dies—3 cast-iron heads—3 stems of mild steel—3 tappets—3 double seams—1 heavy hammered iron cam shaft—2 wrought iron collars—2 heavy corner cam shaft boxes—1 cam shaft pulley—1 jack shaft—2 jack shaft boxes—3 iron sockets—3 finger pieces—1 set of wrod guides, and complete frame shafting, water pipes, copper plates, etc.

The power usually furnished consists of 1 three-horse-power combined vertical engine and boiler.

We are pleased to note that one of our advertisers, Messrs. Belliss & Morcon, of Birmingham, England, has just obtained a contract for what we understand is the largest single ventilating fan set in Great Britain. The combination consists of a Belliss triple expansion engine of 1000 B.H.P., running at about 200 r.p.m., and coupled direct to one of Messrs. Davidson & Co.'s sirocco fans of 154-inch diameter. This plant will be installed at the Cambrian Collieries' Mines in South Wales; the engine being similar to two 750-K.W. electric sets put in some months ago in the same collieries for general power and electric work.

Messrs. Laurie & Lamb, Montreal, Canadian agents for Messrs. Belliss & Morcon, Birmingham, England, have recently received an order from the Toronto University for a Belliss Engine for use in the Hydraulic Laboratory of the University. This engine will operate a couple of centrifugal pumps by belt.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, April 19.—The Opening of the 1909 Season.—The Department of Marine at the end of the second week in April reports the Gulf as practically clear of ice, and it looks as if navigation would open quite early. Sydney harbor has been clear of ice for some time past, and a number of the season's charter vessels are arriving in port. The Dominion Coal Company will probably send the first steamer to Montreal about the 20th of April. The prospects are for an average season, and it is not probable that the St. Lawrence shipments from any of the Nova Scotian collieries will exceed those of previous years. The aggregate output of the Nova Scotian coal companies will in all probability be slightly below those of 1908.

The output of the Dominion Coal Company to the end of March amounted to 663,454 tons, which compares with 946,286

tons during the first quarter of 1908, being a decrease of 282,000 tons.

The slackness in trade was alone responsible for the decreased production, and all the other coal companies have been affected in like manner. The thing that has most materially affected the coal sales for this season has been the general feeling of uncertainty as to the actions of the United Mine Workers of America. This uncertainty, coupled with the persistent competition which has been waged against Nova Scotian coals in the Upper Provinces by United States coal operators, has rendered it more difficult for the sales agents of the Nova Scotian coal companies to negotiate their contracts than was ever the case before.

In the present very depressed state of the bituminous coal trade in the United States many of the operators have been

willing, and even glad, to send coal into Canada at a price which has netted them a loss, in order that their mines should not stand idle. Coal sales have been made at prices which net the operators under 90 cents at the pit mouth. It is hardly to be expected that the leaders of the United Mine Workers of America in Pennsylvania will raise any very strenuous objections to an agitation in Cape Breton which enables the Pennsylvania sales agent to push his sales, and provides that energetic gentleman with so useful an argument at the season when contracts are usually renewed. In fact, the disturbance of confidence which has resulted from the agitation raised in Cape Breton by the paid delegates of the United Mine Workers of America has so admirably suited the purposes of the United States coal sales agent in Canada as to bear a distinct resemblance which exists between the effect and the cause. The leaders of the U. M. W. A. are men of sufficient foresight to anticipate the possibility of strained relations between their as yet unrecognized union and the anthracite operators. It is hardly necessary to point out the advantage which would accrue to the U. M. W. A. in the event of a strike in the anthracite country if they were able to put an embargo on Nova Scotia coal shipments to the disaffected region, for in such a case it cannot be doubted that the leaders of the U. M. W. A. would consider that "it would conserve the best interests of the U. M. W. A." to call out the miners in Nova Scotia.

As previously remarked, the reflex of this unfortunate agitation, even if nothing more serious should grow out of it, will be felt when the tonnages for 1909 come to be reckoned up and compared with previous years.

The "Black Diamond," a leading organ of the United States coal trade, commences in its issue of the 10th of April a series of four articles on the "Resources and Characteristics of Canadian Consumers," written by E. B. Osborn, an English writer, who has written a volume on Canada, after close personal investigation. The first article is titled "The Garden of Canada," and is an eloquent appreciation of the wealth and possibilities of Southern Ontario. The remarks with which the editor of the "Black Diamond" prefaces the first article are of very pertinent interest to all who are interested in the development of our Canadian coal trade, and have a weighty bearing on the future prospects of the Nova Scotian. To quote: "With the changes in tariff schedules, and especially with the introduction of reciprocity, more of that coal from Pennsylvania, West Virginia and Ohio is going into the markets of Ontario and Central Canada. It is sure that Canada is awakening industrially, and that her factories and homes will be big consumers of coal before long. The wide-awake coal man will go into that field and lay his foundations for business on the rising tide of our neighbors' prosperity." The metaphor of the last sentence we have quoted may excite amusement, but the meaning of the writer is clear. To use an idiom that needs no explanation, what the writer intends to convey is that the American coal man should "get in on the ground floor." In other words, as we have previously remarked in these columns, the American is awakening to the possibilities of Canada's coal resources, and he is fully aware that unless he can introduce the product of his coal fields into Canada very shortly, the tables will be turned. As yet Canada's coal industry is in the puppy stage, and the American coal man knows it. It is a pity that Canadians are not so fully awake to the wealth of their mineral resources as are their very wide-awake neighbors below the line.

Writing on the general question of tariff laws, an editorial in the Montreal Star refers to the treatment that Canada has received in past years from the United States, and the changed attitude of our neighbors under the altering economic conditions. The Star writer does not think that this country will ever go to the lengths of the McKinley or the Dingley tariffs, and states "All that Canada will do will be to protect her own industries

from submersion and her own natural resources from depletion. And the latter part of this manifest duty she cannot take up any too soon." We think the writer of this editorial correctly interprets the feelings of every intelligent and far-sighted citizen of Canada. Our heritage is vast, but it is not exhaustless. We have not in this Dominion the almost immeasurable wealth that was once comprised in that portion of the North American continent which lies between the 45th parallel and the Isthmus of Panama, and for the sake of our posterity and the mighty nation that is arising in this Dominion of Canada, we should see to it that the shameless waste of national resources which has gone on to the south of us is not repeated here.

Two Conciliation Boards.—It was our duty about this time last year to detail the course of events which led up to the appointment of a Board of Conciliation to enquire into a dispute between the Provincial Workmen's Association and the workmen of the Dominion Coal Company, and to chronicle the successful settlement of the dispute through the labors of this Board, under the able chairmanship of Prof. Adam Shortt. Both sides accepted the award of the Board and a contract for two years was arranged between the two parties to the dispute. The general satisfaction which the settlement gave was shown by the numerous addresses of congratulation which were showered upon the Board, and in the Labour Gazette the Deputy Minister of Labour referred to the result as a complete vindication of the Lemieux Act and the policy of the Department of Labour. It was felt that for two years at least industrial peace was assured, and everybody felt that there was good cause for congratulation.

No sooner, however, had the award been accepted than an attempt was commenced to dissipate this general satisfaction, and a local newspaper opened its columns to a series of letters signed "Shotlighter" which stated that the workmen had been duped by their acceptance of the award, and that had the P. W. A. been a stronger and more aggressive organization much better terms might have been wrung from the Dominion Coal Company. These letters made many vague allegations, and were ingeniously calculated to foster a spirit of useless discontent with the terms of the award and more especially with the leaders of the P.W.A. who had executed the two years' agreement. There was a modicum of truth in these letters, inasmuch as the leaders of the P.W.A. had not obtained the best terms possible. Under the terms of what was known as Schedule No. 2 the Company offered their workmen higher wages than were actually granted under the award of the Board of Conciliation, but this schedule was refused by the P.W.A. leaders, who acted under instructions from their lodges. Apart from this, however, there was not the slightest justification for the attempt which was made to rouse discontent with the settlement of March, 1908. It was remarked at the time that the publication of the letters referred to served no useful purpose and would certainly result in future trouble, a prediction which events have fully justified.

It has now become known that these letters were written by persons who have since become prominent adherents of the United Mine Workers of America, and since that time this organization has been endeavoring by every means in its power to spread abroad a spirit of discontent with the present conditions at the mines in Nova Scotia, but more particularly to discredit the Provincial Workmen's Association, and to supplant it by the United Mine Workers of America. During the year just past a heated warfare, embittered by much personal feeling and spite, has been carried on between the adherents of the two rival organizations, which has resulted so far in nothing more useful than an enrichment of the members of the local legal profession. Up to the end of 1908 the Dominion Coal Company were not concerned in the fratricidal warfare of the two unions, in which they would have been acting foolishly to interfere, but at the beginning of this year the

U. M. W. A. induced several subordinate officials of the Coal Company to become members of their union. In doing this they were fully aware of the rule which obtains in all reputable British corporations, namely, that no official can belong to a labor union and retain his official position. This rule is not so rigidly observed in the United States, and indeed it is a part of the constitution of the U. M. W. A. that all workers in or about a coal mine shall belong to the union, with the single exception of the manager, and the "top-boss," whoever that elegantly named individual may be.

The coal company took the ground that no official could be allowed to belong to a labor union and retain his official position, and the option of leaving the U. M. W. A. or of vacating their official position was given to those officials who had become members of that union. Several of these men refused to withdraw from the Union and they were summarily dismissed. Other men were asked to fill the places of the dismissed officials, but they refused, and in several instances large numbers of men were laid idle owing to the impossibility of getting men to fill the vacant places. This is the discrimination complained of by the U. M. W. A. and it is the essential point on which that organization has taken issue with the Coal Company.

A Board of Conciliation was appointed by the Department of Labor to enquire into this matter. Reference was made in previous correspondence to the peculiar nature of the constitution of the Board, inasmuch as one of the members was the local president of the U. M. W. A. We venture the opinion that the repetition of an appointment of this character will bring the Industrial Disputes Act into a well-deserved disrepute. The essential principle laid down by this act is the constitution of an independent and fair-minded tribunal, which shall bring the dispassionate and detached viewpoint of an uninterested third party to the consideration of a dispute between two parties. Neither of the parties to a dispute are usually capable of an unbiased view of the matter in dispute, particularly when the disagreement arises between such supposedly antagonistic forces as capital and labor. That capital and labor are antagonistic we do not admit, but it is a popular delusion that they are. It has been found in the working of the Lemieux Act that even in the most bitter disputes there have been found possibilities of conciliation, and it has also been found that the frank discussion of matters in public before a semi-judicial tribunal has allowed a much needed escape-valve, and has in many cases resulted in increased respect of the opponents for one another. Before these boards many a workman has found that his master was not half so black as he was painted, and many an employer has been compelled to respect the manner in which his workmen presented their arguments. But this desirable state of affairs can only be brought about where the Board is composed of men entirely separated from any connection or interest in the matter under discussion.

In the case of the present Board of Conciliation two members of the Board have filed a report, in which they find that the evidence placed before them did not prove any discrimination against the United Mine Workers by the Dominion Coal Company as was alleged by the U. M. W. A. in their application for the Board, and the majority report further states that under the existing contract with the Provincial Workmen's Association the coal company could not have done otherwise than refuse to recognize the U. M. W. A. The finding is in fact a complete vindication and support of the position which has been consistently maintained by the Coal Company.

Mr. MacDougall, the third member of the Board, and the local president of the U. M. W. A., has filed a minority report disagreeing with the other two members of the Board. How could it be otherwise? As president of the U. M. W. A., Mr. MacDougall could not very well pass a practical vote of censure on the actions of his own organization. In a word, the

position of Mr. MacDougall as a member of the Board of Conciliation appointed to enquire into an alleged dispute between the Dominion Coal Company, and the U. M. W. A. was not compatible with his position as the president of that Union in his district.

Mr. MacDougall's acceptance of a position on the Board is also not in consonance with the policy of his organization. At the recent convention of the United Mine Workers at Indianapolis, a resolution was passed condemning utterly the principle of the Canada Industrial Disputes Act. The resolution stated that on the advice of Canadian members of the Union the U. M. W. A. should resist with all their power any attempt at similar legislation in the United States. The Canadian brethren informed the delegates that the reports which had been sent abroad of the beneficial effects of this Act, were false and misleading. The Convention pledged itself to resist any proposed legislation based on the Lemieux Act, and expressed itself as being utterly opposed to any law which would take away from the workmen the right of strike, or which sought to impose any restrictions on the methods of calling a strike.

In the face of this resolution, the action of the Department of Labor in appointing the president of a U. M. W. A. local as a member of a Board of Conciliation under the Lemieux Act, to adjudge a situation brought about by the actions of that same union, is not without humor, especially when it is realized that the mission of this Union in Nova Scotia so far has been to attempt to destroy and disrupt a Canadian organization of 30 years' standing, to injure the coal trade in no small degree, to destroy the effects of the Board of Conciliation of 1908, and to aid the American operators in obtaining possession of markets which are ours by law and by right.

ONTARIO.

Cobalt.—Mr. H. D. Simms, who has the contract for constructing the plant of the Hydraulic Compressed Air Co. at Ragged Chutes, has 310 men at work. Part of this force is being used to complete the electric power installation below the compressed air plant, while the rest are getting ready the transmission poles, and pipe line and carrying on the underground work. About half a mile of the pipe line has been welded and the right of way for the pipe and transmission lines has been cut. There are two intake shafts which will be 330 feet deep and 8½ feet in diameter. These will be cement lined. The outlet shaft distant a thousand feet from the intakes is twenty-four feet square and 298 feet deep. The difference in elevation between the collars of the intake and outlet shafts is 54 feet. The tunnel connecting the shafts will be approximately 10 feet square with enough space above the water line to hold 100,000 cubic feet of air. A small incline shaft at an angle of 45 degrees will be run from the top of the tunnel at the lower end to the outlet shaft. This will carry the air to the 20-inch main which will be cemented into the upper end of the incline shaft. The company expects to supply power in July.

Work at the Buffalo is being carried on steadily and excellent progress is being made. The underground workings are being pushed and large amounts of ore blocked out. The concentrating plant erected on the property is treating about 35 tons of ore a day and the extraction is said to be 85 per cent. of the silver contents. A cyanide plant to be run in connection with the present mill has been erected and it is expected that when the plant is in operation the percentage of extraction will be naturally increased.

The Amalgamated has started work again with a small force of men.

Active development work is being carried on by the Nipissing on their different properties. About 400 feet of drifting has been done on the Kendall vein at the south end of the lake,

and the vein shows up well in the shaft at a depth of 145 feet. The big vein recently discovered in the No. 64 shaft, near the Temiscaming & Hudson Bay is being drifted on. The ore body appears to be in the form of a chimney and dips off to the west. The shaft will be sunk another hundred feet before much drifting is done. On the Fourth of July vein a station is being cut at the 200 foot level preparatory to stoping. The shaft on the Meyer vein is down over 80 feet and considerable development work has been done at this level. The company has never been in a better position financially and the amount of ore reserves is large.

A large force of men are at work on the La Rose and a great deal of development work is being done. The finding of values between the 100 and 200 foot levels on the No. 1 vein will add considerably to the ore reserves. At the 100-foot level a large amount of drifting has been done and the vein found to be very constant. While drifting on the 200-foot level the vein was encountered and it shows good values. A raise has been started from the lower level and will be continued to the 100-foot level.

Later developments have proved that the new vein discovered on the surface near the No. 16 shaft of the O'Brien Mine, is the same as is being worked from the crosscut at the 110 foot level. It has been opened up at several places on the surface and high-grade ore found at all points. This block of ore will add largely to the reserves of the mine. It is expected that the big new concentrator will be ready to start some time in June. As there are a number of shafts located at some distance from one another an electric road will be put in to handle the ore for the mill. A cyanide plant will be used in conjunction with the concentrating plant and it is expected that a saving of 95 per cent. of the silver values will be effected. Electric power will be used to run the mill.

About 110 men are employed in the mine and mill of the McKinley-Darragh. During the coming summer the No. 7 shaft will probably be sunk to greater depth. The shaft on the Lake vein has been sunk to a depth of 250 feet. This summer the No. 2 shaft will be put in shape and sinking will be resumed. The concentrating mill is running steadily and putting through 65 tons of ore daily.

The new shaft sunk by the La Rose on the University property is now down 105 feet, and a station will probably be cut at this level. The vein at the bottom of the shaft has split up into several small stringers but the wall rock is well mineralized.

About sixteen men are working the Silver Leaf Mine. Recently while drifting toward the Foster property a small vein carrying good silver values was discovered. This new find is being developed.

The management of the Alexandria Mine, which adjoins the Bailey on the west, intend to install a diamond drill to be operated at the 170-foot level of the shaft. It is expected that one hole will cut the Bailey No. 2 vein, which lies about 60 feet to the west of the shaft. The new compressor which has been ordered will not be installed until the roads are in better shape. A new 6-inch vein of calcite was discovered on the surface on April 12th.

A contract has been let by the Bailey Mining Co. for sinking a 200-foot shaft, and 200 feet of drifting. The management also intends to let a contract for several thousand feet of diamond drilling. This property was formerly worked by the Cobalt Central under a lease which expired on April 1st. The Cobalt Central developed two good veins on the Bailey, and the latter property will undoubtedly become an independent shipper in a short time.

It is interesting to note that the workings of the Big Pete Mine, of the Cobalt Central have gone through the diabase into the lower Huronian slates, and they have already encountered two strong veins in the latter formation. This will have

an important bearing on all the properties on Diabase Mountain, notably the Silver Mountain, Alexandria and the Bailey.

The Green-Meehan Mining Co. will be taken over by the Consolidated Silver Cobalt Mines Co., which has a capital of 3,000,000 shares of a par value of \$1.00. The shareholders of the Green-Meehan will receive 1,500,000 shares of the capital stock of the new company. Work will be started as soon as possible.

A diamond drill is to be installed at the Victoria Mine, adjoining the Watts property. Holes at an angle of twenty-five degrees will be bored from the 150-foot level of the No. 4 shaft.

The Silver Cross Mining Co. will issue 15,000 shares of the treasury stock to pay for the installation of the plant and to provide for future developments.

A station is being cut at the 120-foot level of the shaft at the Cochrane Mine.

A meeting was held in Buffalo on April 14th for the purpose of organizing a new company to take over eleven properties in South Lorraine. The properties to be included in the merger are known as the Hill Claim No. 7323. Eshelman claims Nos. 10234 and 9934, Eckerson claim No. 10968, Ross claims Nos. 7305, 9153 and 9154, Lapey claim No. 10612, Heling claim No. 10957, Hill claim No. 10644 and Stowe claim No. 11257. The new company will probably be known as the South Lorraine Mines, Limited, with a capitalization of 1,500,000 shares of a par value of \$1.00 each, 400,000 shares of which will remain in the treasury.

Mr. Joseph Houston, of the Right-of-Way Mine, has been appointed consulting engineer for the Nipissing Mining Co.

The United States Steel Corporation whose engineers have been testing the iron ore deposits on the west side of the Temagami Lake, have stopped their work in that locality.

The shaft of the Moosehorn Mine in James Township is now down 100 feet and will be continued to the 125 foot level, at which depth the vein will be drifted on and cross-cuts run to tap the veins which have been discovered by surface prospecting. The sinking of the shaft to the 125 foot level will be done on contract and when that is completed the work will be taken over by the company.

A plant has been ordered for the O'Brien Mine in the Miller Lake District by Mr. J. B. Woodworth, consulting engineer for Mr. M. J. O'Brien. It will consist of boilers and a six-drill Rand compressor.

Good progress is being made in the development work of the White property at Maple Mountain, situated about 30 miles to the northwest of Cobalt. This property is largely owned by the Canadian Ores Co. whose shares are largely held in England. A plant consisting of a 9-drill Rand compressor, a 12 x 16 hoist, boilers, dynamo, etc., has been installed and will probably be in operation before the end of April. A shaft has been sunk to a depth of 150 feet between two veins which show good silver values at the surface. At the 75-foot level, cross-cuts were run to tap the veins which showed up well at this depth. An open cut has been started on one of the veins and is 20 feet deep and good silver values are found. A carload of ore has been sacked ready for shipment. Active development work is being undertaken by the mines in this locality and the district is likely to have a good future before it. Good showings have been located by the Darby Mountain Mine and Le Roy Claims. A plant has been installed by the Maple Mountain Mining Co..

The plant of the Wettlaufer Mine in South Lorraine will hardly be in operation before the end of July. The cost of installation will be about \$15,000 while the camp buildings will cost an additional \$6,000. The shaft is down 40 feet on the vein which showed native silver at the surface. At the bottom of the shaft the vein is of good width and carries good values while the wall rock is also well mineralized. About \$5,000 worth of ore was taken out while sinking the shaft the first 30 feet.

A line of motor boats will be put on the Montreal River this spring to operate between Latchford and Elk Lake City. The

operating concern is the Richardson Navigation Company of Toronto. The boats will be 40 feet long, lighted by electricity and fitted up in the most commodious manner. It is expected that they will make two trips a day between the two towns.

The winter road to Gowganda is now practically impassable and the new districts will be cut off from communication with the outside world for the next few weeks. The slush on the lakes is knee deep and going in on foot is attended by considerable danger.

BRITISH COLUMBIA.

Boundary.—The Greenwood Miners' Union has made application for the appointment of a Conciliation Board, to work under the Lemieux Act in adjusting some difference which they say exists between themselves and the British Columbia Copper Company. It seems that some friction has arisen in regard to the laying off of several men; there also seems to be a difference of opinion anent the proposed reduction of 10 per cent. in the wage scale. The district officers of the Miners' Union claim that no such offer was made with proper authority. If the coal strike in Southern Alberta continues, however, they will all get a chance to sit down and think the matter over, as the British Columbia Copper Company gets its coke supply from Coleman, Alberta, and already the regular supply is shut off, making it necessary to cut in on the reserve supply, which cannot possibly last more than ten days or a couple of weeks. Even if the coal strike were settled almost immediately, it would take about two weeks to get in another supply of coke, so it would seem that a short shut-down is inevitable for the Copper Company.

It is not likely that the Snowshoe mine or the Trail smelter will be affected, as the Consolidated Company is securing its coke from the Crow's Nest Pass Coal Company, who have signed a satisfactory agreement with their men. The Snowshoe shipments for the week ending April 10th amounted to 2,950 tons, which was the heaviest output for some time.

The outlook in the Grand Forks district is exceptionally good, and there is a large amount of development work going on. Quite a number of transfers have also been made during the last week or so. The Golden Eagle, on the North Fork, is getting out regular shipments of ore, having sent out 60 tons during the past week. A party of mining men have been looking over the Yankee Girl, on Hardy Mountain, which is a high-grade property. The property has not been worked for about nine years, when it was last operated by Major Leckie.

At the Granby smelter 16,420 tons of ore was treated during the week with six furnaces, two more now undergoing the enlarging process. The two furnaces that have been enlarged are giving good results, and the work of so fitting up the balance of the battery will be rushed through as soon as possible. The Granby, in addition to treating the ores of its own mines, is smelting ore from the Republic, Surprise, Lone Pine in Washington and the Golden Eagle on the North Fork of Kettle River. The ore from most of these mines runs from \$30 to \$40 per ton, with the exception of the Republic, from which some fairly rich ore has been taken, but in small quantities, comparatively speaking.

Despite the many drawbacks that the mining industry seems doomed to contend with, it is evident that the output of the Boundary mines for the present year is going to exceed that of 1908; at any rate, this has been the case so far this year, the shipments showing an increase of about 137,000 tons, or nearly 50 per cent. over the output for 1908 during the same time. The Granby, of course, while it shipped heavily, was practically the only shipper last year, and while their output has fallen off a little during the the same time this year, still the output of the Oro Denoro, Snowshoe and other mines has more than made up for this difference and the increase as well.

The citizens of Greenwood passed the bonusing arrangement with the promoters of the tunnel-tramway enterprise by a heavy majority, and as a consequence work has already been started in the way of putting in the seven-drill air compressing plant, blacksmith shop, etc., at the site of the mouth of the proposed adit, which will be on the Strathmore claim, on which several very rich veins of gold-silver ore have been worked to some depth. It is estimated that in the first section of 6,000 feet this bore will pierce 17 high-grade veins of ore of varying width. Over 8,000 tons of ore has been shipped from this locality that has averaged over \$100 per ton, but as it has cost over \$40 per ton to mine most of this and about \$15 for freight and smelter charges, there has not been very much in it for the owners, working without co-operation, as they have been. The present move, however, more on a basis of co-operation, will no doubt prove of benefit to all of these nascent mines, among which may be named the Strathmore, Defiance, Yellowstone, Don Pedro, Idola, and Crescent. The lode in the latter claim will be cut in the vicinity of 6,000 feet into the hill at a depth of approximately 1,300 feet. The No. 1 vein of the Strathmore will be tapped at 800 feet into the hill. It is expected that this consolidation will be able to reduce the cost of mining here to about \$10 per ton and haulage and treatment to \$7 or \$8 per ton, so that it will be possible for the combined organization to make a good profit on their venture. The tramway-tunnel will be made large enough to take out 10,000 tons per day, if necessary, which, of course, it will be when the shipping of Phoenix ore begins—if the tunnel ever gets in that far. And the chances are good now that work has actually been commenced.

The Crescent mine has been leased by J. Finlay & Sons, who will shortly begin work. This property has already produced over \$20,000 of high-grade ore.

Nelson District.—Shipments have once more been resumed from the Silver King mine, 303 tons having been sent to Trail smelter last week. This property is now unwatered to the seventh level, and there are forty men at work in the mine. It is not the intention to unwater the three lower levels to the 1,00-foot level just now, but there is no doubt that if the showing warrants, the entire mine will be opened up this season.

Some activity has been shown in the Poplar Creek section during the past winter. At the mine of J. Mobbs, of Gerrard, considerable work was done, with good results. The Calumet and Hecla has been bonded by G. Merrill from the owners, Capt. Fitzsimmons, A. P. Garrett and others. Development work will be carried on at this property during the present season. Work is to be started on the Quinne property at Ferguson, also on the Nettie L. There is a nice shoot of ore on the Nettie L., but as far as it has been developed it is found narrow. Better things are expected at depth. The men who had the True Fissure under lease have thrown it up, after taking out about 100 tons of ore. It seems that the royalty of 20 per cent. and the development work were too great a handicap, and they could not make the venture pay as well as they had anticipated.

The Wild Horse Creek district is apt to be a lively placer "diggings" again soon, if indications go for anything. Over 15 applications for leases have recently been filed with the Gold Commissioner.

The zinc miners are feeling a little glum again now that it is known that the new tariff bill will carry a provision for a duty of one cent per pound on zinc in ore entering the United States. This, coming after the decision of the Supreme Court that zinc would be admitted free, kind of shatters the hopes of the owners of the mines who have zinc ore on hand for shipment, and which, as yet, cannot be handled by the Nelson zinc smelter.

There is a deal on, it is said, for the Alice mine, near Creston. The property was recently gone over by Ed. Ehrenberg and Wm. Bradley, of Spokane. The Creston mine and concen-

trator have been shut down for some time, and when the property did cease operations it came as a mild surprise, as it was generally understood there was a large body of ore blocked out.

A bond has been taken on the Golden Bell, Sheep Creek district, by Eastern capitalists. There is good vein on the property, which, however, will require development.

The largest gold brick that has yet been sent in from the Nugget was shipped last week, valued at \$7,000. The property is looking well.

It seems that President Sherman, of District 18, United Mine Workers, in declaring a strike, has once more acted in a manner not approved by officials above him and many of the men whom

he represents. It would now appear that a speedy settlement will be made of the matter by T. L. Lewis, president of the Workers, when he arrives on the scene.

Vancouver.—Over \$100,000 of the securities of the Portland Canal Mining Company have been underwritten in the East. With the funds derived from this issue the company is going to install an up-to-date power plant, consisting of boilers, air compressor, etc., an aerial tramway of approved type and concentrator that will give the best results for their ore. This equipment will cost in the neighborhood of \$75,000. The property comprises 12 claims on Glacier Creek, and tunnel work can be done advantageously.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Hon. Mr. Chisholm has introduced several amendments to the Coal Mines Regulation Act. Every check weigher must send to the commissioner monthly returns of all coal weighed by him. All coal sold by retail by the owner of any mine shall be weighed at the mine and every mine owner selling by retail must furnish facilities for weighing the coal so sold. The quarterly returns must contain the number of tons so sold, giving separately the number of tons supplied to workmen, or in mining operations or on the coal wharves of the owner, and the number of tons supplied to persons other than such workmen.

Another section provides that every mine examiner shall, while in discharge of his duty, use a locked safety lamp.

Borings for coal by the Canadian Consolidated Coal Co. will shortly be commenced at Lower River Inhabitants, Richmond Co. The drill to be employed is the big government drill No. 6, capable of going a depth of 3,000 feet.

Gold mining seems to be on the point of a revival in Nova Scotia. A number of mines which have been abandoned for some time are being unwatered. Among those expected to start work shortly are the Ecum Secum Goldfields Co., the Ponhook Mining Co., Malaga; and the Sydney Gold Mining Co.

Sydney.—The Dominion Iron & Steel Co.'s plant made a record output during March in two of the most important items of production, namely, blooms and billets, and also in the matter of shipments, leaving far behind all previous figures. The total shipments were 30,000 tons.

ONTARIO.

Cobalt.—The power house of the Beaver Mine was burnt down on April 4th. Arrangements have been made for power from the Temiskaming and operations are again in full blast.

The plant of the Wettlaufer mine in South Lorraine is now on the property all except the boilers. The boilers are expected to arrive at Temagami any time. The plant consists of a five drill compressor two 60 h.p. boilers, a 120 light dynamo and engine, pumps, drills, etc. The shaft is being put down to the 100 foot level. The vein is about 12 inches in width of smaltite and native silver.

Diamond drilling on the Pan Silver has resulted in several veins being cut. The most promising is a calcite vein, having a width of two feet, which was cut at the 60-foot level. The drill has been shifted so as to tap this vein and prove its values at a depth of 250 feet. The main shaft is to be continued to a depth of 200 feet, when a cross-cut will be driven to No. 2 vein.

The important developments on Nipissing during the month of March included the striking of ore at the 175-foot level of No. 64, the cutting of veins No. 89 and 67 from the 60-foot level at the Kendall, and the increased showing of ore in vein No. 26 below the 110-foot level.

There are 275 men and the 27 drills at work on the La Rose. This is the largest force in camp, and nearly double the number of drills in operation upon any other property.

Considerable development is being done on the Nova Scotia. The sixth or 240-foot level is being opened, and it is intended to sink another hundred feet and make a seventh level at 340 feet. The mine at present employs 124 men. Fourteen drills are running at present, all in development work.

Work in the No. 1 shaft of Chambers-Ferland has been greatly hindered owing to the water coming in from the surface. An extra pump had to be installed to cope with the water. As a result very little drifting has been done on the large vein on the 150-foot level. The north drift has been driven 42 feet, and the south drift 38 feet.

Since the discovery of the new vein in the Cobalt Lake property, carrying native silver in quantity, drifting at a depth of 135 feet has been pushed along the vein, which averages about five inches of high-grade ore.

Elk Lake.—The Otisse-Curie have drifted 50 feet on their big vein at the 65-foot level, and a cross-cut has been started. They propose sinking till the 150-foot level is reached and cross-cutting again at this level.

Gowganda.—Two hundred town lots were offered at the April sale, and 119 were sold. The 119 lots brought a total of \$18,507.40, averaging \$152.95 per lot. The tenders ranged from \$10 to \$1,010.

Sault Ste. Marie.—The month of March was the best for business that the Algoma Steel Company has had since the Lake Superior Corporation commenced the manufacture of steel rails in 1902. Several conditions assisted in making the output heavy. The operation of the plant has been continuous, including the blast furnaces.

ALBERTA.

Lethbridge.—Lethbridge miners, on the advice of President Frank Sherman, quit work on April 1st. All the camps in district No. 18, covering Eastern British Columbia and Alberta, are affected by the strike, with the exception of the camps of the Crow's Nest Pass Coal Company at Fernie, Michel and Carbonado, the Maple Leaf Company at Bellevue, and the Canada West at Taber.

Medicine Hat.—One of the municipal gas wells has been sunk to a depth of 165 feet, and a flow of 3,000,000 cubic feet per day has been developed.

Coleman.—A scale committee consisting of seven members of the Western Coal Operators' Association and seven members of District No. 18, United Mine Workers of America, at a conference in MacLeod extending over a large portion of March, arrived at an agreement, which agreement was to be referred to the miners, and if voted favorably upon it was arranged that both sides would meet with their attorneys to draw up the enact-

ing clause and sign the agreement for two years ending March 31st, 1911.

The referendum vote of the miners showed a majority of 209 in favor of it, and at the meeting arranged for at Macleod, March 31st, for the purpose of executing the agreement, at which the attorneys of both sides were present, F. H. Sherman, President of the Miners' Union, stated that as he had meanwhile secured what he claimed was a better agreement with the Crow's Nest Pass Coal Company, Limited, he would not sign our agreement, and if we would not sign a similar agreement to that of the Crow's Nest Pass Coal Company, Limited, it was "good-day," and thereupon left the meeting. This was followed up by his calling out the men and all of the mines comprised in the Western Coal Operators' Association are now idle. The Western Coal Operators' Association consists of the following companies:

The Alberta Railway & Irrigation Company, Limited.
 The Royal Collieries, Limited.
 The Leitch Collieries, Limited. ?
 The West Canadian Collieries, Limited.
 The International Coal & Coke Company, Limited.
 The Hosmer Mines, Limited.
 The H. W. McNeill Company, Limited.
 The Bankhead Mines, Limited.
 The Hillcrest Coal & Coke Company, Limited.

which are by far the largest majority of the operators of the district, and mining in round figures over 1,500,000 out of the 2,500,000 tons mined last year. As several of the mines in the Association are new mines that have not yet begun shipments or are only beginning to, it will be seen that the Western Coal Operators' Association not only are the largest as to numbers but as to tonnage and prospective tonnage.

Attempts have been made to re-open negotiations, but the operators remain firm in their position that the agreement arrived at in Macleod and ratified by a majority of the men in a referendum vote must be signed and put into effect.

BRITISH COLUMBIA.

Nelson.—The Silver King has been unwatered as far as the seventh level, and 40 men are being employed. The Silver King has been worked to a depth of 1,000 feet, but it is not intended to pump out the water below the seventh level at present.

Grand Forks.—No. 2 furnace of the Granby smelter has been blown in. This is the second furnace which has been enlarged 25 per cent. from its former capacity. The settlement for another year of the differences between the Crow's Nest Pass Coal Company and the miners assures the Granby Company a sufficient supply of coke and coal. The smelter treatment for the present year should show a large increase over that of last year.

Phoenix.—The first shipment of machinery has arrived at Eholt for the new mill now under construction at the Jewel mine. The mill is being erected by a syndicate to test a slimes-treating process of separating gold from tailings. It is the invention of H. Nichols, of the Ymir mine. It is expected that the mill will be in operation by the end of May.

Greenwood.—The strike in the coal mines of Eastern British Columbia may seriously affect the B. C. Copper Company, which obtains its coke from Hosmer, one of the points where the miners have quit work. The company have only enough reserve coke to last ten or twelve days.

The by-law granting a bonus of \$50,000 to the Greenwood-Phoenix Underground Tramway was carried on April 7th by 114 majority. The largest vote ever polled was cast. The company carried out its promises to the electors by starting work at 8 a.m. the next morning.

Vancouver.—A vein of copper ore 26 feet in width has been struck in the Ikeda mine, near Jedway, on Moresby Island, Queen Charlotte Islands. On March 22nd, at a distance in the tunnel of 850 feet, and at a depth of 350 feet, a 15-foot vein was encountered. Development on the vein showed it to be still larger, and it has now reached a width of 26 feet.

A strike of magnetite ore near the mouth of Campbell River, Vancouver Island, has been made. Tests of the ore have been made by Prof. Hoffman, of Ottawa, and Mr. J. O'Sullivan, of Vancouver. The former gauged it as running 67.47 per cent. magnetite, and the latter as running 68.14. The deposit is said to be large.

YUKON.

Dawson.—Three new discoveries of importance have been made in the Klondike this winter as the result of persistent prospecting. Early in the winter a strike was made on Barker Creek; then came the discovery on the lower end of Glacier, and lately a strike has been made on Hubbard Creek. Bedrock on this last is 45 feet deep, with 4 feet of pay that is said to run from 8 to 10 cents.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The Fife Coal Company have decided to make an experiment in the provision of bathing accommodation for their workmen. A building is to be erected at the pit head and fitted with spray baths, accommodations for undressing and changing garments, and storing working clothes.

There were 14 English mining companies organized in 1908 for the purpose of exploiting the mineral wealth of Russia. The combined capital of these companies is \$18,660,000.

The Northumberland Coal Trade Conciliation Board has decided to reduce the wages of workmen by 8¾ per cent. This is the heaviest reduction since October, 1901.

BELGIUM.

The Belgian Chamber of Mines has, after much discussion, passed a bill limiting the number of hours of work in mines to nine hours.

GERMANY.

The scheme for the formation of a German steel bar syndicate has again miscarried. It had been proposed to syndicate the export trade and pay a bounty of 15s. per ton, which would be provided by a levy of so much per ton on the inland and export sales and on the individual consumption of producers.

UNITED STATES.

A Western Lead Ore Producers' Association has recently been formed at a conference in Salt Lake City. The association intends to bring all guns to bear to have a protective tariff against British Columbia and Mexican lead ores.

The first steps in the upbuilding of the industry that is to rival the smelter trust has been taken. A contract has been let for the excavation work, and an order for 7,000 tons of structural steel placed. The first smelter is to be erected in Tooele

County, Utah, and is to have an initial capacity of from 2,000 to 2,500 tons daily.

MEXICO.

A movement is on foot for the organization of an institute of mining engineers and metallurgists for Mexico. The new society will be known as the "Institute Mexicano de Minas y Metallurgia."

A plant to demonstrate the application of the Delprat & Potter zinc-flotation process will be erected in Mexico City by an English company, of which H. Lawrence Read, of Australia, is the managing director.

The problem of silicious ores for the Mexican smelters is becoming of much moment. The erection of cyanide mills to treat the silicious silver ores of the big camps has changed the surplus of ores of this character into a shortage, and the condition will become more acute in the future.

PERU.

A new smelter erected by the Cerro del Pasco Company will be in commission by April 15th, and the company's monthly output of blister copper will be increased from 2,500,000 pounds to 4,000,000 pounds.

SOUTH AFRICA.

The Johannesburg Chamber of Mines places the March production of gold from the Rand at 608,000 ounces. It compares with 565,000 ounces the output of February, and 615,000 ounces in the opening month of the year.

Twenty stamps to be installed at the West Rand Consolidated Company will be the heaviest on the Witwatersrand. Each stamp will weigh 1,850 pounds, and have a duty of 12 tons per 24 hours.

AUSTRALASIA.

The Broken Hill Proprietary Company have completed their first zinc distillation furnaces, and nine more are to be erected. Suitable clay for making the retorts has been discovered in the vicinity. It is expected that eight furnaces will be in operation by the end of 1909.

In the Broken Hill labor dispute, Justice Higgins, the arbitrator, has fixed the rate of wages for unskilled labor at 8s. 7½d. and 8s. 3d. a day, respectively. Miners are to receive 10s. a day. The hours of labor are fixed at 48 a week. The arbitrator declined to interfere with the contract system, or to compel the Proprietary Company to continue work. Justice Hig-

gins' award provides for wages on the same scale as heretofore. The Proprietary Company has appealed from this decision.

The coal mines of New Zealand are again working after the recent strike. As has nearly always been the case in New Zealand, the miners came off second best.

COMPANY NOTES.

DOMINION STEEL DIVIDEND.

A dividend of 10½ per cent. on account of 42 per cent. of deferred payments on the preferred stock has been declared by the Dominion Iron and Steel Company, payable May 10th. The remaining arrears of dividend are to be paid in full in the course of a year. Regular dividends are to be resumed October 1st, 1909.

EARNINGS OF LA ROSE.

Net earnings of the La Rose Consolidated for February and March averaged about \$75,000 per month. In January the earnings were \$90,000.

The present earnings of the La Rose Company are derived from new developments, without encroaching upon reserves, which are in the neighborhood of \$2,500,000.

KERR LAKE DIVIDEND AND BONUS.

The Kerr Lake Mining Company have declared the regular dividend of 4 per cent., and an extra dividend of 2 per cent., payable June 15th, to stock of record June 1st.

NIPISSING'S MARCH EARNINGS.

During March, Nipissing mined ore of estimated value of \$141,623, and shipped ore of estimated value of \$193,845. Important developments of the month included the striking of ore at the 175-foot level of 64, cutting veins 89 and 67 from the 60-foot level at Kendall, and increased showing of ore in vein No. 26, below the 110-foot level.

CONIAGAS QUARTERLY DIVIDEND.

The Coniagas Mining Company has declared the regular quarterly dividend of 3 per cent., payable May 1st.

DIVIDEND ON TRETHEWAY.

At the meeting of the Trethewey directors an interim dividend of 10 per cent. was declared, payable on May 15th to shareholders of record on May 1st. The finances of the company are said to be in excellent shape, and a statement will shortly be made to shareholders.

STATISTICS AND RETURNS.

The shipments for the month of March as reported by the T. & N. O. Railway Commission were:—

	Cars.	Pounds.	Tons.
Nipissing	21	1,386,220	693.11
La Rose	14	932,800	466.40
Crown Reserve	8	452,800	226.40
Chambers-Ferland	5	297,440	148.72
O'Brien	4	269,510	134.76
Trethewey	4	247,620	123.81
T. & H. B.	4	226,600	113.30
Coniagas	3	189,300	94.65
City of Cobalt	3	188,492	94.24
Kerr Lake	3	177,985	89.00
Right of Way	3	181,800	90.90
Buffalo	3	146,080	73.04
McKinley-Darragh	2	111,960	55.89

Temiskaming	2	100,000	50.00
Peterson Lake	1	51,400	25.70
Nova Scotia	1	79,420	39.71
King Edward	1	44,130	22.06
Cobalt Central	1	40,000	20.00
Totals	83	5,123,557	2,561.78

The shipments from the camp for the first three months of 1909 were:—

	Cars.	Pounds.	Tons.
January	74	4,750,258	2,375.13
February	71	4,207,734	2,103.85
March	83	5,123,557	2,561.78
Totals	228	14,081,549	7,040.76

COBALT ORE SHIPMENTS.

Following are the weekly shipments from the Cobalt camp and those from January 1, 1909, to date:—

	Week ending April 10.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Crown Reserve	118,340	1,539,796
Cobalt Central	43,490	205,245
City of Cobalt	109,000	688,522
Kerr Lake	40,360	423,442
La Rose	324,540	3,709,750
Nipissing	128,880	3,380,060
O'Brien	64,170	461,320
Right of Way	283,000	926,890
Silver Queen	62,865	127,865
Temiskaming	120,000	590,000

Ore shipments to April 10, 1909, are 15,664,342 pounds, or 7,832 tons. Total ore shipments for week ending April 10, 1,294,653 pounds, or 647 tons.

	Week ending April 17.	Since Jan. 1.
	Ore in lbs.	Ore in lbs.
Buffalo	60,930	340,020
Coniagas	63,615	524,820
Crown Reserve	119,480	1,659,276
Cobalt Central		205,245
Chambers-Ferland	60,000	489,522
City of Cobalt		688,522
Kerr Lake		423,442
King Edward		98,050
La Rose	485,468	4,195,218
McKinley-Darragh	66,900	486,940
Nipissing	130,240	3,510,300
Nova Scotia		480,810
Nancy Helen		40,000
Peterson Lake		132,960
O'Brien		461,320
Right of Way	150,680	1,077,570
Silver Queen		127,865
Temiskaming	60,200	650,200
Trethewey		653,550
T. & H. B.		610,600
Muggley Concentrator		72,900

Ore shipments to April 17, 1909, are 16,861,855 pounds, or 8,430 tons. Total shipments for week ending April 17, 1,197,513 pounds or 598 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the ore shipments for the week ending April 2nd and year to date:—

Boundary Shipments.	
Total	30,516 384,949
Rossland Shipments.	
Total	5,226 57,724
Slocan-Kootenay Shipments.	
Total	3,571 45,117

The total ore shipments for the past week were 39,313 tons, and for the year to date 487,790 tons.

Granby Smelter Receipts.	
Grand Forks, B.C.	
Total	19,969 250,589
B. C. Copper Co.'s Receipts.	
Greenwood, B.C.	
Total	8,778 106,857

Consolidated Co.'s Receipts.

Trail, B.C.	
Total	7,628 85,388
Le Roi Smelter Receipts.	
Northport, Wash.	
Total	140 12,761

The total smelter receipts for the past week were 36,515 tons, and for the year to date 455,595 tons.

The following are the ore shipments for the week ending April 9th and year to date:—

Boundary Shipments.	
Total	28,268 413,217
Rossland Shipments.	
Total	4,240 66,964
Slocan-Kootenay Shipments.	
Total	3,877 48,994

The total shipments for the past week were 36,385 tons and for the year to date 529,175 tons.

Granby Smelter Receipts.

Grand Forks, B.C.	
Total	17,395 267,984
B. C. Copper Co.'s Receipts.	
Greenwood, B.C.	
Total	8,442 116,299
Consolidated Company's Receipts.	
Trail, B.C.	
Total	8,693 94,081

The total smelter receipts for the past week were 34,530 tons and the year to date 490,125 tons.

MARKET REPORTS.

Silver Prices.

	New York.	London.
	cents.	pence.
April 3	50 $\frac{7}{8}$	23 7-16
" 5	51	23 $\frac{1}{2}$
" 6	50 $\frac{3}{4}$	23 $\frac{3}{8}$
" 7	50 $\frac{7}{8}$	23 7-16
" 8	50 $\frac{7}{8}$	23 7-16
" 9	Holiday	Holiday
" 10	Holiday	Holiday
" 12	50 $\frac{7}{8}$	23 7-16
" 13	51 $\frac{1}{8}$	23 9-16
" 14	51 $\frac{1}{8}$	23 9-16
" 15	51 $\frac{1}{8}$	23 9-16
" 16	50 $\frac{7}{8}$	23 7-16
" 17	51 $\frac{1}{8}$	23 $\frac{3}{8}$

April 16.—Connellsville coke, f.o.b., ovens:—
Furnace coke, prompt, \$1.40 to \$1.50.
Foundry coke, prompt, \$1.80 to \$2.00.

Metals.

April 16.—Tin, Straits, 29.45 cents.
Copper, prime Lake, 13 cents.
Electrolytic copper, 12.70 cents.
Copper wire, 14.25 cents.
Lead, 4.15 to 4.20 cents.
Spelter, 5.10 cents.
Sheet zinc, 7.25 cents.
Antimony, Cookson's, 8.25 cents.
Aluminium, 22 to 24 cents.
Nickel, 40 to 47 cents.
Platinum, \$22.50 to \$23.50 per ounce.
Bismuth, \$1.75 per lb.
Quicksilver, \$45.00 to \$46.00 per 75 lb. flask.