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THE BRITISH COLUMBIA UNIVERSITY BILL.

Last summer Dr. J. Bonsall Porter, representing McGill University, brought before the Province of British Columbia the question of establishing a Provincial University. The aid of McGill was offered; but it was carefully explained that this aid was tendered unconditionally. Dr. Porter outlined a plan that met with hearty approval. "For years," he remarked, "it has been our policy to promote and unify advanced teaching in the East as well as in the West, by affiliating local institutions whenever possible, and thus establishing standards which could scarcely be maintained by separate and weaker bodies . . . Whenever you are in a position to get on without help we shall quite contentedly drop out."

The Hon. Dr. Young, who is responsible for the Bill, in a lucid and well-balanced speech moved its second reading recently. After removing any misapprehension as to the attitude of the University of McGill, he stated that the Universities of Toronto and Queen's were entirely in accord with the movement.

The provisions of the University Bill are statesman-like in tone. The governing body is to be chosen thus:

"The first convocation of the University shall consist of all graduates of any university in His Majesty's Dominions who are actually residing in the Province two years prior to the date fixed for the first meeting of convocation, and who at least six weeks prior to the said date register themselves as members of such convocation, as hereinafter provided:

"Twenty-five members to be selected by the Lieutenant-Governor in Council and appointed for the first convocation only.

"After the first convocation, all convocations shall be composed of the Chancellor, the Senate, the members of the first convocation, and all persons who shall have become graduates of the University."

Clauses 21 and 22 provide thus:

"There shall be and there is hereby constituted a Board of Management for the University, under the name of the Board of Governors of the University of British Columbia.

"The Board shall consist of the Chancellor, who shall be chairman thereof, and the President of the University, both of whom shall be, ex-officio, members thereof, and nine persons appointed by the Lieutenant-Governor in Council."

The proposed University is to be strictly non-sectarian. Tuition in the department of the Faculty of Arts is to be free. The University will work in conjunction with the Mining School, the Normal Schools and the High School systems. Night Schools are also to be established.

In brief, the Hon. Dr. Young's scheme is comprehensive and effective.

British Columbia should be grateful to the gentlemen whose patriotic zeal has inspired this movement. Particularly are the disinterested efforts of McGill's representative, Dr. Porter, to be commended.

There has been adopted in Nova Scotia a systematic scheme of technical instruction. Ontario is awakening to the need of more complete arrangements for such education. The Federal Government is considering the advisability of appointing a commission to visit foreign countries and report upon their systems of trades schools and technical colleges. The technical colleges of the East are full to overflowing. Many of their best students come from British Columbia.

All of these considerations lend force to the conviction that no time could be more opportune than the present for the establishment of the proposed University of British Columbia.

Here we wish to make one urgent recommendation. If the proposed University is created, it will be wise for British Columbia to develop first the technical branches of instruction. The mining industry is the bone and sinew of the Province, and no truer way of insuring the wise development and conservation of her mineral resources can be devised than by that of training the sons of British Columbia in the sciences of mining engineering, metallurgy and geology. The arts and the humanities may come later.

Also it would be ungracious to refuse the proffered aid of McGill. The high traditions and standards of that University will be of tremendous assistance to the new and traditionless foundation.

It is our earnest hope that but a short time will elapse ere the University of British Columbia becomes an accomplished fact.

CANADIAN MINING INSTITUTE.

The tenth annual general meeting of the Canadian Mining Institute will be held at the Russell House, Ottawa, on Wednesday, Thursday and Friday, March 4th, 5th and 6th.

On Wednesday, March 5th, at 10 a.m., the proceedings will be opened by His Excellency the Governor-General, who has kindly consented to welcome and address the members. If necessary both the morning and afternoon sessions of Wednesday will be devoted to the transaction of business affairs. The Council's report will be read; the treasurer's statement received; and the changes in by-laws determined. At this session, also, the results of the election of officers and members of Council will be announced. On Wednesday evening and at the Thursday and Friday sessions, papers will be read. The annual dinner will be held on Friday evening at 8 o'clock.

GEOLOGY.

In a series of lectures in the course in Science, Philosophy and Art, delivered during the session 1907-1908 at Columbia University, Professor J. F. Kemp spoke on geology. His address is one of unusual excellence. Glancing briefly over the nebular hypothesis, he touches upon the alternative conception formulated by Professor T. C. Chamberlin, of Chicago, whose hypothesis is styled the "Planetesimal Hypothesis." Continuing his survey of the scope of geology, Professor Kemp alludes to a matter that is of signal interest to Canadians. He speaks in terms of high appreciation of the brilliant work of Dr. F. D. Adams, of McGill University, who, with the aid of elaborate and expensive apparatus, succeeded in demonstrating that, under proper conditions, marble could be made to flow like wax, under a strain far beyond the limit of its crushing resistance. Professor Kemp refers to the experiments now being carried on by Dr. Adams upon rocks such as granite, and under burial and metamorphism. "In so far as these have yet gone," writes Professor Kemp, "they are a striking corroboration of the conclusions reached by observers in the field, among whom Professor Adams also occupies a most honorable place."

THE CONSULTING MINING ENGINEER.

One of the best and clearest expositions of the functions of the consulting mining engineer appeared in a recent number of the *Engineer and Mining Journal*. The article referred to is reprinted on another page of THE CANADIAN MINING JOURNAL.

There are two principal causes of loss and waste in mining investments. The fever of a mining boom hatches a host of fakirs whose object is to milk small investors of sums insignificant in themselves but often aggregating hundreds of thousands of dollars. The success of these schemes depends upon the ignorance of those to whom the appeal is made.

The mining fakir is a serious, although a sporadic, source of loss. He hurts the industry directly and indirectly. To his operations, more than to aught else, may be ascribed the prevalent idea that mining is necessarily speculative.

The mining fakir flourishes because of the profound ignorance of the general public as to what mining means. He will disappear only when in the schools of Canada our children are taught something about our second greatest industry.

The other principal cause of waste and loss is well defined by our New York contemporary. The great losses of money in mining, it is pointed out, are due not so much to deliberately fraudulent schemes as to those innumerable "more or less honest, more or less misguided ventures that are not illegitimate but are entered into without competent engineering advice."

Not seldom private mining enterprises are entered into without the advice of an experienced engineer. Costly mistakes are nearly always the result. Either the plant does not meet the requirements of the ore, and this is most frequently the case, or else there is a painful lack of harmony between the integral units of the overground and underground equipment. Special training, long experience and mature judgment are needed in determining just how much equipment a mine will pay for and just what that equipment shall be.

Although it may be out of the question for the small owner to engage the continuous services of a first-class consulting engineer, yet, as is pointed out in the article alluded to, the full benefit of his advice and guidance may be obtained by arranging to have him visit the mine at stated intervals.

It is, of course, in the actual purchase of the mine or property and in the first installation of equipment that the consulting engineer is most needed, for then his counsel will have a vital bearing upon future operations.

THE BRITISH COLUMBIA COAL TAX.

In our last issue we referred to the new British Columbia tax upon coal and coke. The subject is one of large importance alike to the operators of coal mines and to the owners of smelters and metalliferous mines.

It is worthy of remark that the British Columbia Legislature, in dealing with the matter, consulted none of those whose interests are most deeply affected. This is to be regretted.

It remains for the Canadian Mining Institute to discuss the questions involved and then take whatever action is thought fit. Meanwhile the Boards of Trade of Fernie and other towns are protesting vigorously.

MINING SOCIETY OF NOVA SCOTIA.

The annual meeting of the Mining Society of Nova Scotia is to be held in Halifax on March 25th and 26th. The annual dinner, always a well-managed and profitable function, is set for the evening of the 25th.

The Council of the Society has issued a circular announcing that the chief topic of the meeting is to be the "Investigation of the Natural Resources of Nova Scotia." Among the guests of honor will be technologists of international reputation. In every respect, indeed, the meeting will be made the most notable in the history of the Society.

Nova Scotia possesses large and varied stores of mineral wealth. Coal mining is the Province's most important mineral activity. As yet iron mining has met with but slight encouragement. In fact almost all the progress made in this direction is due to the perseverance and courage of the companies organized and controlled by the Messrs. Drummond of Montreal.

The gold mining outlook, although relieved by occasional successes, is not bright. And for this there is no sufficient reason. We believe firmly that many of the abandoned gold mines of Nova Scotia could be made to yield handsome profits if the mining and treatment problems were attacked as systematically and as scientifically as similar problems in South Africa have been.

Other minerals, such as gypsum, marble, barite, stibnite, infusorial earth, etc., etc., occur abundantly. There is also promise of workable tin deposits.

What Nova Scotia needs is just what the Mining Society is attempting to do. The interest and advice of geologists and engineers from the outside world cannot but be immediately helpful.

NOVA SCOTIA STEEL AND COAL COMPANY.

The annual report of the Nova Scotia Steel & Coal Company, noticed fully on another page, has exceeded expectations. Although affected to some extent by the depression of last autumn, the company has succeeded in showing a large profit on its operations for 1907. Undoubtedly both its outputs and its profits would have been larger had it not been for the slackening of all business in the last months of the year. The falling off of 62 per cent. in the earnings of United States Steel for last December gives a fair criterion as to the manner in which Nova Scotia Steel weathered the storm.

A strong and growing concern, built up by men who were at once careful, progressive, and cleanly ambitious; managed by a capable and energetic executive; the Nova Scotia Steel & Coal Company is a Canadian enterprise of which Canadians may well be proud.

Editorial Notes.

Our Nova Scotia correspondence in the current number should be read by all coal mine operators. Although our news letters from all the mining provinces are valuable and interesting, the questions dealt with by our most easterly correspondent are important in a large and national sense.

The Government of Newfoundland is being criticized for expending thirty thousand dollars on coal boring operations. It is stated that parties are sent out year after year without proper appliances. This criticism seems hardly fair. Even a remote chance of finding coal in Newfoundland should not be neglected.

Estimates of the production of mining camps are very seldom accurate. Even when issued officially they are either incomplete or approximate. The importance of correct returns is indisputable. Investors are influenced largely by a mining district's record. THE CANADIAN MINING JOURNAL receives regularly reports from many mining companies. It would help us greatly if every Canadian mining company sent us monthly returns.

THE ATIKOKEN IRON COMPANY.

L. B. ORCHARD.

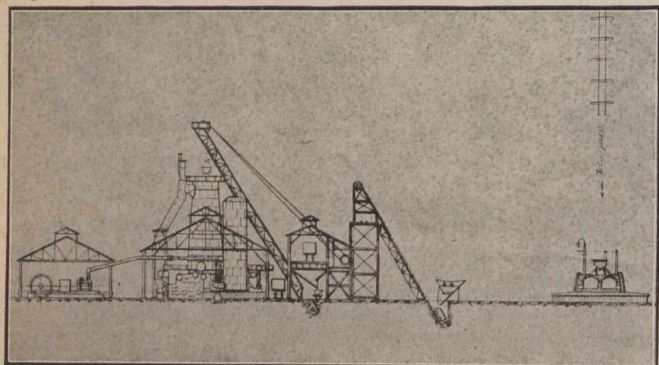
Cuts made from photos loaned by C. N. Ry. Co.

The plant of the Atikoken Iron Company is situated at Port Arthur, on the north shore of Lake Superior. The site selected was one adjacent to the Canadian Northern coal docks.

Dry land was hard to procure, and this was rather a setback to the company in starting operations. The surrounding district is low and swampy, largely muskeg. So the plant was built on a sandbar on the shore line of the lake. In order to procure a good foundation, piles were driven to a depth of about 20 feet to a gravel and clay bottom, and were cut off under water. A concrete filling was then placed over the piles.

The whole plant covers an area of about 2,500 feet by 600 feet, including the dock. It was designed by Mr. Frank C. Roberts, of Philadelphia. The slag from the blast furnace, after having been granulated, was exclusively used for the filling in and the building up of the yards. The main yard and furnace track was built on piles and afterwards filled in in this manner.

The plant is modern in every respect, and no money has been spared to make the industry the most successful the province has seen.



Section showing Stock-Shed, Furnace, Roaster and Ovens.

Furnace.—This is 75 feet high and has a 14 foot bosh and a hearth 8 1-2 feet in diameter. The capacity of the furnace is 100 tons per 24 hours; but a time last summer, when everything was running smoothly, the output reached 130 tons per day. All parts of the furnace plant, except the boilers and blowing engines, have been designed to accommodate a lining with a 17 foot bosh, which would raise the capacity to 200 tons. Hence with very few alterations the capacity of the furnace could be doubled. The furnace is fitted with two cinder notches at opposite sides, one being used for hot cinders, the other for granulating purposes, for which a special plant has been added. This has also the distinct advantage that should one cinder notch be lost there is the other to fall back upon.

The cast house is 160 feet by 55 feet, and the bed is raised about 10 feet to the level of the furnace; the iron is cast four times in the 24 hours, at 9 and 3 respectively. The bulk of the iron made is No. 1 foundry, with a good open fracture and having an average analysis as follows: Silicon 3.76, sulphur 0.005, phosphorus 0.20, manganese 0.15 per cent. respectively.

Stoves.—The furnace is connected with three Roberts 2-pass hot blast stoves, 18 feet by 75 feet respectively,

and are all fitted with valves of the latest design. Each stove has a heating surface of 18,500 square feet, which raises the blast up to a temperature of about 1,250 degrees F. The three stoves are used in rotation, changing every hour, so that when stove No. 1 is on blast, stoves 2 and 3 are on gas, or when 2 is on blast 1 and 3 will be on gas, and so on. Thus each stove has two hours on gas consecutively. Owing to the fact that the furnace is equipped with a Roberts-Whistler dust catcher, the gas conveyed to the stoves is practically free from dust, so saving many unnecessary close downs for cleaning.

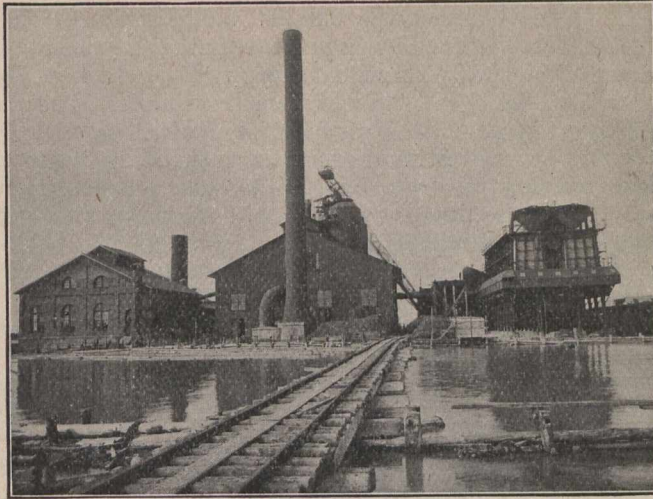
The Blowing Engines.—These were built by the Southwark Foundry & Machine Company of Philadelphia. There are two engines, which are horizontal disconnected compound of 600 horse-power each, with steam cylinders 32 by 54 and 48 by 54 inches respectively. These engines are fitted with air tubs 66 inches by 58 inches, and are so arranged that they take their air supply from outside the engine room. This is a great advantage, as it keeps the air free from steam, and also keeps the blowing room heated in winter time. Again, the air outside being colder, necessarily contains less moisture, hence the air blown to the furnace is much drier than would otherwise be the case. The total volume of air blown is nearly 30,000 cubic feet per minute from both engines.

The light and power for the plant is supplied by two 75 kilowatt dynamos connected to two Robb-Armstrong engines. Adjoining the engine room is the pump house, where two 2,500 gallon pumps and a jet condenser are installed, also two boiler feed pumps, all manufactured by the Canada Foundry Company of Toronto. The main blowing engines and large pumps are operated condensing. The dynamos and feed pumps exhaust into heater.

The boiler plant consists of four 225 horse-power Atlas water tube boilers, also built by the Canada Foundry Company. These boilers are specially set to use the water gases from the furnace, thus saving a high consumption of coal. Just sufficient coal is used to keep the gases ignited. For the four boilers only about 20 tons of coal are used per month.

Roaster.—On account of the iron ore used in the furnace containing such a high percentage of sulphur, it has to be roasted before being charged into the furnace. For this purpose a Roberts roaster has been added to the plant. This roaster is charged mechanically from the top and has a capacity of 400 tons per 24 hours; it is divided into sixteen sections of about 25 tons capacity each. Each section has a separate combustion and chimney chamber. The ore passes through the roaster by gravity and is heated to a temperature of about 1,500 degrees F. by a mixture of air and gas from the blast furnace, which is passed through it. The ore remains in the roaster about 24 hours. In its natural state the ore contains anywhere from 2 to 5 per cent. sulphur; but after roasting the sulphur is reduced to about 0.5 to 0.8 per cent. The mechanical draught for the roaster is maintained by two Sturtevant 12 foot exhaust fans.

The arrangements for the handling of the stock are extremely neat and satisfactory, one man being able to handle all that is required for the charging of the furnace. The stock is stored in a series of iron hopper bins, or pockets. These are raised on a steel structure to allow



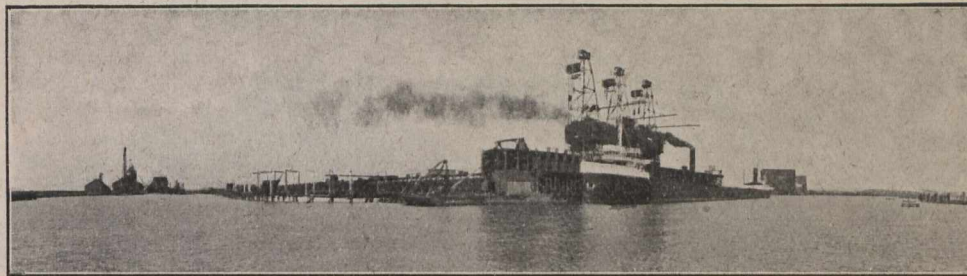
Power House, Furnace and Roaster

for the loading of the scale car by gravity. A track runs over the top of these lines and the limestone and nace skip, as all the coke for the furnace is charged by measure and not by weight; hence the coke can be dropped straight into the skip. This saves much unnecessary handling. Underneath each bin is a small trap door to allow the stock to enter an electric scale car or lorry. This scale car runs on a track alongside the

head is lowered, the large bell is dumped, precipitating the stock into the furnace. In this way no gas escapes to the atmosphere, and greater uniformity of distribution is effected. The actual charging of the furnace is all operated from a small shed at the bottom of the furnace skipway. Here the tunnel head is revolved by an electric switch and resistance, and the valves are operated for the steam cylinders for lowering the bell. Here also is a mechanical device for testing weights for gauging the height of the stock in the furnace. All these and the electric scale car are operated by one man. Occasionally there is an extra hand for charging coke. The furnace top is visited but once a day for inspection, and any necessary oiling that may be required.

Coke Ovens.—The Atikoken Iron Company make all their own coke and for this purpose a battery of 100 ovens was built, producing about 130 tons per day. On account of the very flat nature of the ground and filling being at a premium the ovens were built on a concrete dock, supported on piles driven into the ground, to bring the ovens to the necessary elevation for loading into the railroad cars. It was at first feared that the ovens being built in this manner, the air would have a considerable cooling effect; but experience has shown that this is not the case, the draught making no appreciable difference.

The ovens were built adjacent to the coal dock of the Canadian Northern Railway Company. The coal is



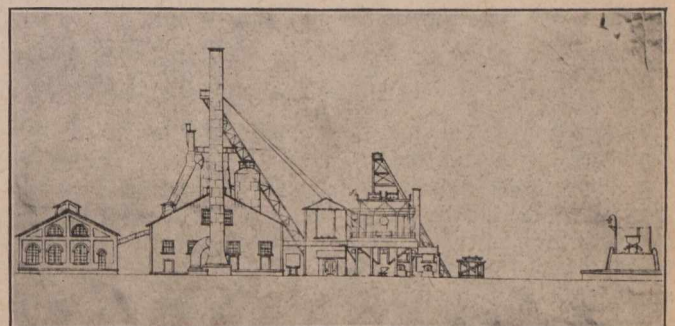
C.N.R. Coal Docks and C.N.R. Elevator.

coke are unloaded direct from the railroad cars into these pockets. The coke bins are adjacent to the furnace bins, and on it is a tipping buggy which receives the necessary charge of stock, limestone or ore, weighs it and conveys it to the furnace skip, into which it is dumped and then hoisted to the furnace top. The charges of ore from the roaster are received in the same manner as the stock from the other pockets. Under each section of the roaster is a pocket and trap door and the ore is taken in rotation from these pockets—16 in number. It is so arranged that there is always a ready supply of roasted ore. After using ore from pocket No. 1, pocket No. 2 is used, and so on. Thus by the time the round has been made the ore in pocket No. 1 is ready for use. In photograph No. 1 the arrangement of stock bins can be clearly seen at the end of the trestle, and photograph No. 2 shows the separate pockets under the roaster. The stock is raised to the top of the furnace in two skips, operated by a steam hoist. The furnace is fitted with a Roberts revolving top. The charge of stock is dumped into the tunnel head, which is hung on rollers and may be revolved any multiple of a right angle by a small electric motor. After the required revolution has been given the stock, the tunnel head is raised, which allows the stock to fall from the small bell on the large one, the small bell remaining stationary. After the tunnel

stored in large bunkers at the dock and transferred to the ovens in a hopper bottom electrical lorry. The Pittsburgh Coal Company supply the coal, which is mined at New River Fields, West Virginia, and is transported to the head of the lake by water.

The coal is of a very good coking quality, an average analysis running as follows:—Volatile matter 22.89, fixed carbon 71.89, ash 5.22, sulphur 0.69 per cent. respectively.

Nothing but 48 hour coke is made. The coke is dark, rather soft. This also shows up well by analysis:—



Section of Plant.

Volatile matter 3.71, fixed carbon 88.60, ash 7.69, sulphur 0.67 per cent. respectively.

The coke is loaded direct into railroad cars and switched to the stock bins at the furnace.

Flux.—For fluxing purposes a limestone from Kelley Island, Ohio, Lake Erie, is used. This is brought up to Port Arthur by water. It is a first-class stone and very clean, as will be seen by the accompanying analysis:—CaO 47.66, MgO 5.1, SiO₂ 1.5, Al₂O₃ 0.10, Fe₂O₃ 0.30. This is an average of several analyses from stock pile.

The chemical laboratory is well equipped with all the necessary and latest apparatus for analytical work required in this industry. Adjoining the laboratory is the crushing room, where all the samples are prepared. It is well supplied with a good mixing table, crushers, bucking boards, also a small hand power drill for drilling the sample pigs. It was pleasing to note that particular attention has been paid to this department, which in many cases is sadly slighted. This department is under the able supervision of Mr. W. Benner. Great credit is due to Mr. Robert Jones, the superintendent, for the efficient manner in which he has superintended the construction of the plant. From the results obtained Mr. Jones has proved himself to be one of the foremost furnace men on the continent. Mr. Jones was previously with the Illinois Steel Company, South Chicago.

Mines.—The iron mines of the Atikoken Iron Company are 130 miles west of Port Arthur, on the Cana-

In physical aspect the ore is a fine grained, close compact magnetite, showing fine seams and splashes of iron pyrites and pyrrhotite. Traces of calcite may also be noticed here and there in small veinlets. The ore has been traced on the surface for a distance of 4,000 feet and several estimates have been made as to ore in sight ranging up from five million tons. The present mining capacity is 200 tons per ten hour shift. The outfit of air drills consists of four No. 2 and eight No. 43 1-4 "New Giant," all from the Canadian Rand Company. Only the eight large drills have been in operation.

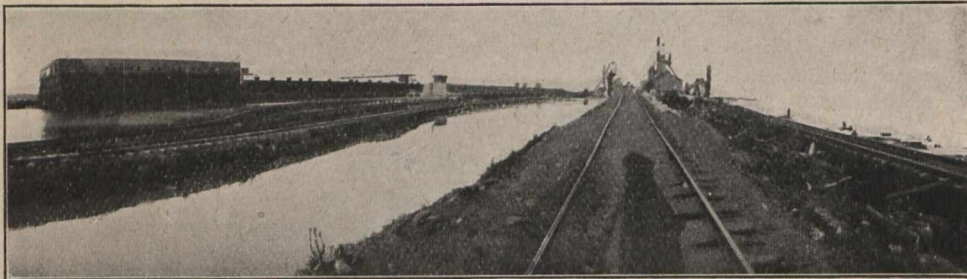
The main tunnel up to the first vein is 12 feet wide and has a double track. This section of the tunnel is the only part of the mine that is timbered. The veins are perfectly perpendicular and so far no other ground has been cut that requires timbering.

On the west side of the tunnel, at vein D, ore was struck, but not in quantity. Two open cuts were worked for a while to try and increase the output, but they have now been abandoned.

The average analysis of the ore shipped to the furnace for the last six months is as follows: Ore before roasting contains anywhere from 2 to 5 per cent. sulphur.

Ore Roasted:—Iron 60.06, silica 9.33, sulphur 0.16, manganese 0.12 per cent. respectively.

The ore is trammed out of the mine in 1 1-2 ton cars direct to a No. 6 Austen cone crusher with a capacity of



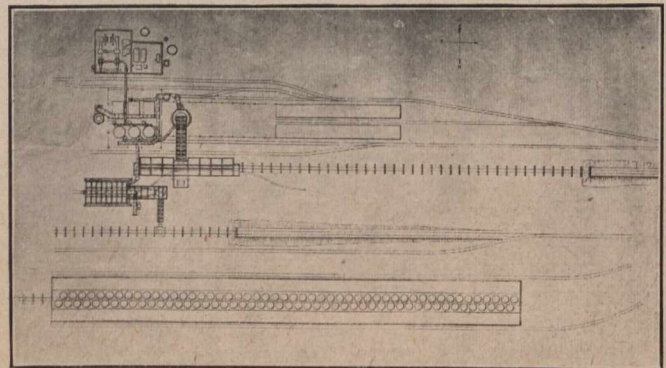
Hard Coal Shed, C.N.R. Coal Docks and Atikoken Iron Works.

dian Northern Railway. From the main line a spur runs north for three miles to the mine. The accompanying sketch will help to give some idea of the mine and relative positions of the ore deposits. There are three parallel veins striking east and west. At the bottom of the hill a tunnel 12 feet wide was driven in a northerly direction, and after cutting through 40 feet of rock ore of high grade was struck. This ore was cut through for 40 feet. The tunnel was continued at a width of 6 feet through another 60 feet of rock, when a second vein of ore was struck, but of poorer quality. This second vein proved to be smaller than the previous one, being only 10 feet wide. After another 15 foot rock a third vein was cut of a similar nature to the second, but a little larger, measuring 16 feet. The tunnel was then continued through to the other side of the hill a distance of 100 feet.

Deposit A is the only one being worked at present. Here ore has been stoped out to a height of 20 feet, and east and west of the main drift for 85 feet. Raises have been started at both ends. That on the west side is up 50 feet. When these two raises are through to the surface, underhand stoping will be tried. Veins B and C are both smaller than A and much broken up, showing more of a schistose structure. They are also lower in sulphur and higher in lime than A.

50 tons per hour. The crusher feeds direct to a bucket elevator, which raises the ore to a height of 30 feet and delivers it into 50 ton steel ore cars, which are brought up to the switch and then allowed to run by gravity to the elevator.

In the power house, which is a wooden building 40 feet by 70 feet, and divided into three sections, is one-half of a Canadian Rand compressor, compound condensing class B, one 4 1-2 by 7 by 4 1-3 Fairbanks boiler feed pump, and one 750 horse-power Wainright heater.



General Plan of Works Atikoken Iron Company.

Steam is supplied by three 100 horse-power return tubular boilers, built by the Polson Iron Works, Toronto. The pumps exhaust into the heater, and the suction is direct from the Atikoken river, about 200 feet away.

A 50 horse-power Jenckes single high pressure engine is used for driving the crusher and elevator.

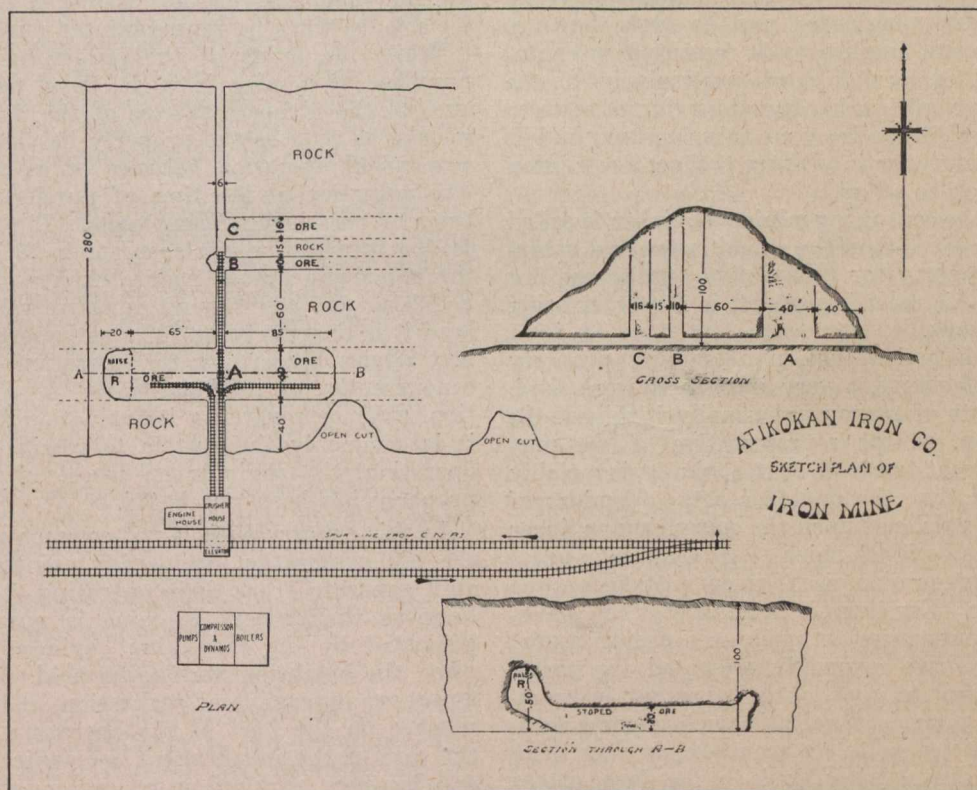
Preparation has been made for the installation of an electric light plant of 150 lamp capacity.

Labor of all kinds has been very scarce, only 65 men being employed at the mines. All the mucking is done by foreigners, chiefly Italians, and many of the machine men are Swedes. All work is done on day pay. The comfort of the men has been well studied. The boarding house is a large two storey wooden building 27 feet by 60 feet with an annex for a dining room. On the upper storey are bedrooms for mine superintendent, foreman, cook, etc., also the mines office. The men's bunk house is splendidly fitted up with iron bedsteads,

CHANGES IN ALASKAN MINING LAWS.

A copy of the new regulations governing filing of affidavits of work on mining claims has been received for publication. The law reads as follows:—

During each year and until after patent has been issued therefore, at least \$100 worth of labor shall be performed or improvements made on, or for the benefit or development of, in according with existing law, each mining claim in the district of Alaska heretofore or hereafter located. And the locator or owner of such claim or some person having knowledge of the fact may also make and file with the said recorder of the district in which claims shall be situate an affidavit showing the performance of labor or making of improvements to the amount of \$100 as aforesaid, and specifying the character and extent of such work. Such affidavit shall set forth the following:—



Atikoken Iron Mine—Sketch Plan of Iron Mine.

mattresses and blankets to accommodate 100 men. Other buildings at the mine are: dry house, 20 feet by 40 feet, and blacksmith shop 20 feet by 40 feet. The mining department is under the direct supervision of Mr. F. Rodder, M.E.

The mines started operation early in the year, and the furnace was blown in on Wednesday, July 17th, 1907. Everything worked to the entire satisfaction of the management. But for the financial depression that swept the country and the fact that it was so late in the season when the furnace was blown in that the western foundries had placed their orders elsewhere, the plant and mines would be in operation to-day. The furnace was blown out on Friday, December 13th, 1907.

It is expected that with the opening of navigation on the lakes operations will be resumed and continue "in aeternum."

First—The name or the number of the mining claims and where situated.

Second—The number of days' work done and the character and value of the improvements placed thereon.

Third—The date of the performance of such labor and of making improvements.

Fourth—At whose instance the work was done or the improvements made.

Fifth—The actual amount paid for work and improvements, and by whom paid when the same was not done by the owner.

Such affidavit shall be prima facie evidence of the performance of such work or making of such improvements, but if such affidavits be not filed within the time fixed by this act the burden of proof shall be upon the

claimant to establish the performance of such annual work and improvements. And upon failure of the locator or owner of any such claim to comply with the provisions of this act, as to performance of work and improvements, such claim shall become forfeited and open to location by others as if no location of the same had ever been made.

The affidavits required hereby may be made before any officer authorized to administer oaths, and the pro-

visions of sections 5392 and 5393 of the Revised Statutes are hereby extended to such affidavits.

Said affidavits shall be filed not later than ninety days after the close of the year in which work is performed.

Section 2. That the resources of the several divisions or districts of Alaska shall collect the sum of \$1.50 as a fee for the filing, recording and indexing said annual proofs of work and improvements for each claim so recorded.

Approved March 2, 1907.

FUNCTIONS OF THE CONSULTING MINING ENGINEER.

BY ALLEN HASTINGS ROGERS.*

(Reprinted from the "Engineering and Mining Journal" of New York.)

There are many engineers in this country who call themselves consulting engineers, and as such they are prepared, as their title implies, to be consulted on engineering questions. Referring more particularly to the consulting mining engineer, his functions do not seem to be understood in their entirety in this country, and it does not appear improper to venture a short description of the service which he offers.

It is rarely that the consulting mining engineer is called on for any service other than the examination and valuation of mining property for prospective purchasers, but this, while one of his most important, is far from being his only field of work.

The examination and valuation of mining property for purchase is, of course, a very important work, and, since large amounts of money are usually involved, the engineer's position, as the representative of the purchaser, is one of great trust. But it is almost invariably for the purchaser that the engineer acts. Vendors of mines do not, as a rule, call upon the consulting engineer for a report on the basis of which to present their property. This, in my opinion, is a great mistake on the part of the vendor. For there is nothing that can awaken interest in an enterprise as much as a proper report on the property. Those commonly presented are worthless in that they fail to give much important information, and what is given is usually in such general form as to awaken suspicion as to its accuracy; in fact these statements often prove on analysis to be inconsistent and sometimes even contradictory. The width and assay value of the ore and the tonnage developed may be stated, but if, by chance, any detailed figures are given, they will generally be found to fail entirely to support the general statements.

PREPARATION OF A PROPERTY FOR SALE.

No one is likely to spend several thousand dollars in the examination of a property, the description of which, on reading, leaves a feeling of distrust. Owners would further their own ends if, on offering their property for sale, they first invested a little money in a good report, accompanied by assay and other maps, thus showing that the property is worth the price asked. Besides, a great many owners have not the faintest idea how to value their mines and, for fear of selling too cheaply, put a price on them which is prohibitive, and thus spoil the chance of a sale. The consulting engineer, represent-

ing the vendor, is just as capable of fixing a fair price for sale, as when he represents the purchaser.

While the fixing of the proper price, at which the purchase of a mine is made, is of paramount importance to the ultimate success of the undertaking, nevertheless, as soon as the property has been purchased, its economical operation becomes of as great importance. The valuation at the time of purchase is made on the basis of certain operating costs. If these costs are exceeded through inexperienced or inefficient management, the enterprise has as poor a chance of success as if it had been purchased at an excessive valuation. In England it is thought to be fully as important to obtain the best advice concerning the operation of a mine (and, concurrently, of information as to ore reserves, condition, etc.) as regarding its valuation for purchase, and it is commonly the custom to retain, for advice as to operation, the engineer on whose recommendation the property has been purchased.

In this country such is not commonly the case. Even the big exploration companies maintain an examining staff separate from their operating staff, and it often happens that, after the mine is purchased, the costs estimated by the examining engineer are not realized when the operating staff takes hold, either because the figures are impossible of realization, or because of incompetence on the part of the operating department. In the case of the independent companies, when the property has been acquired on recommendation of a properly constructed report by a competent engineer, the operation of the mine is often intrusted to an incompetent man and the examining engineer's recommendations are disregarded so that failure results, with, in many cases, unjust discredit to his judgment. This is mainly due to the desire of the directors to economize as much as possible, but also in some degree it is due to too much confidence placed in the so-called "practical miner." The desire for economy is laudable, but, when practiced at the expense of results, becomes folly, or worse.

MISTAKES OF SMALL MINING COMPANIES.

Nowadays it comes pretty near being true in almost every line of work that a man's ability is measured by the salary that he earns, and, while no doubt appreciating this, the directors, of what we may call the amateur mining company, argue that, as their operation is small, they cannot afford to pay a high salary for the management of a property employing, perhaps, 25 men. So they place their property in charge of a low-salaried

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man, who, perhaps, under competent direction may be well qualified to look after the details of the work, but who, without such direction, spends the company's money on such errors as driving long crosscut adits to gain hundreds of feet of depth on the strength of a surface showing, but little, if at all, explored; who sinks shafts 200 or 300 feet apart; who drives levels at 40 or 50 foot intervals or buys tramways, mills or smelters entirely unsuited to the ore or of a capacity entirely disproportional to the capabilities of the mine.

But the consulting engineer, by making two or three visits a year to such a property can direct, in a general way, the development and save the owners from such expensive errors. His charges for such service would be relatively small, as it would consume comparatively little of his time. The large companies, each operating a number of mines, place in charge of all their operations a high salaried man, who, by periodical visits and by correspondence during the interim, directs operations so that a much lower salaried man may be employed for resident superintendent. One of the advantages gained by consolidation in any branch of industry is that small constituent properties get the benefit of superior ability at small cost. But the small independent mining company can put itself in a position analogous to that of one of the mines of the big consolidation by retaining a consulting engineer.

Let us see what the consulting engineer would do under such circumstances. His work would be, according to the terms of his engagement, to act either as advisor to the board of directors or as non-resident manager. In the first case he gives advice, but only when called upon to do so, regarding any point which may be brought up. Such advice includes the decision as to the purchase of certain machinery or other equipment, the examination and criticism of an ore-selling contract, etc. Such service is rendered for a small retaining fee under much the same arrangement as lawyers are retained. In addition, it is frequently stipulated in such arrangements that the engineer may be called upon to visit the mine, if necessary to settle some question which may have arisen; in such a case a stated per diem rate, in addition to his regular retainer, is paid him.

DUTIES OF A NON-RESIDENT MANAGER.

At the other extreme is the full management of the property with full responsibility to the directors. The engineer's duties under such an arrangement are the same as those of a resident manager except that the carrying out of the details of the work, which he plans, are left to a superintendent on the ground, who may thus be a low salaried man. He visits the property as often as the magnitude of operations and the speed with which the work advances require; he engages a man having his confidence as resident superintendent, who reports to him; he receives at frequent intervals reports and maps covering the progress of operations and so is enabled to issue instructions supplementing those given at his visits; he approves all important requisitions for supplies and equipment; he draws specifications for obtaining bids where necessary and, in fact, oversees in every way the operation of the property. He renders to the directors all information regarding the progress of operations and draws up for the annual meeting a report describing the work done during the year, the condition of the mine, the extent of the ore reserves and the outlook for the coming year.

The foregoing paragraph describes briefly the work of a number of consulting mining engineers in England

but, except for the large companies, which take all the time of their general manager, I believe there are few such instances in this country. The number could be increased with profit to the mine owner. But the consulting engineer can be employed to cover any range of authority between none, as when he acts in purely an advisory capacity as described in the first case, and full authority as described in the last. I believe many people are ignorant that such arrangements can be made at reasonable terms, or if informed at all, they think it necessary to pay the enormous salaries we see occasionally reported in the daily press.

ERRORS AVOIDED BY EMPLOYING NON-RESIDENT MANAGERS.

Although cited as one of the greatest errors which can be made in the development of a mine, one frequently hears of the erection of a mill or smelting plant before sufficient ore has been developed to warrant it. In a great many cases, even when the erection of a reduction works is warranted, the process or apparatus is entirely unsuited to the character of the ore, or the capacity is too large for the mine. There are two principal causes which tend to hasten the erection of a reduction plant—the desire of the owners to make the property pay and the desire of the machinery manufacturers to sell their goods. Both of these tendencies are perfectly natural. We cannot blame the owner for wanting to limit his investment to the smallest possible figure, nor for his desire to obtain dividends. He is perfectly right from his standpoint; the only error which he makes is that he decides to erect the mill on incompetent advice. Having decided to erect the plant, the catalogues of machinery companies furnish a variety of plans from which to choose and the machinery manufacturer does not inquire whether the plant which is ordered is properly adapted for treating the ore, nor whether there is sufficient ore to warrant its purchase and erection.

To avoid such errors, a mining engineer should be consulted. In the first place, he will tell the owner whether the condition of the mine warrants the erection of the reduction plant; whether the ore as then shown is likely to change its character with depth, and so render the mill erected for treating it valueless later; what process should be adopted for treating the ore, what capacity the plant should have, and furnish plans for the plant. If there is not ore enough developed to pay for the plant, it is folly to erect it, for the ore may give out. If the character of the ore is likely to change it would be foolish to build a plant until its permanent character is determined. The cost of this service is not excessively high and the insurance of success which it gives to the owner, instead of leaving the question to be decided by chance, is worth many times the cost.

In conclusion, then, it should be impressed on mine owners, directors and shareholders in mining companies that success is not largely a matter of chance, but that the surest road to success is to entrust the operation of the property to a man thoroughly qualified by technical knowledge, which has also been supplemented by a long experience. If they will employ such a man as resident manager, they are giving their property the best possible chance of a profitable outcome. But, if the operation is small, let them turn the technical management over to some well qualified consulting mining engineer as the next best course. Just as they would not turn the trusteeship of an estate over to a stockbroker's clerk, so they should not take the advice of the mine foreman when they invest large sums in adits, shafts or mills.

CHROME IRON MINING IN CANADA.

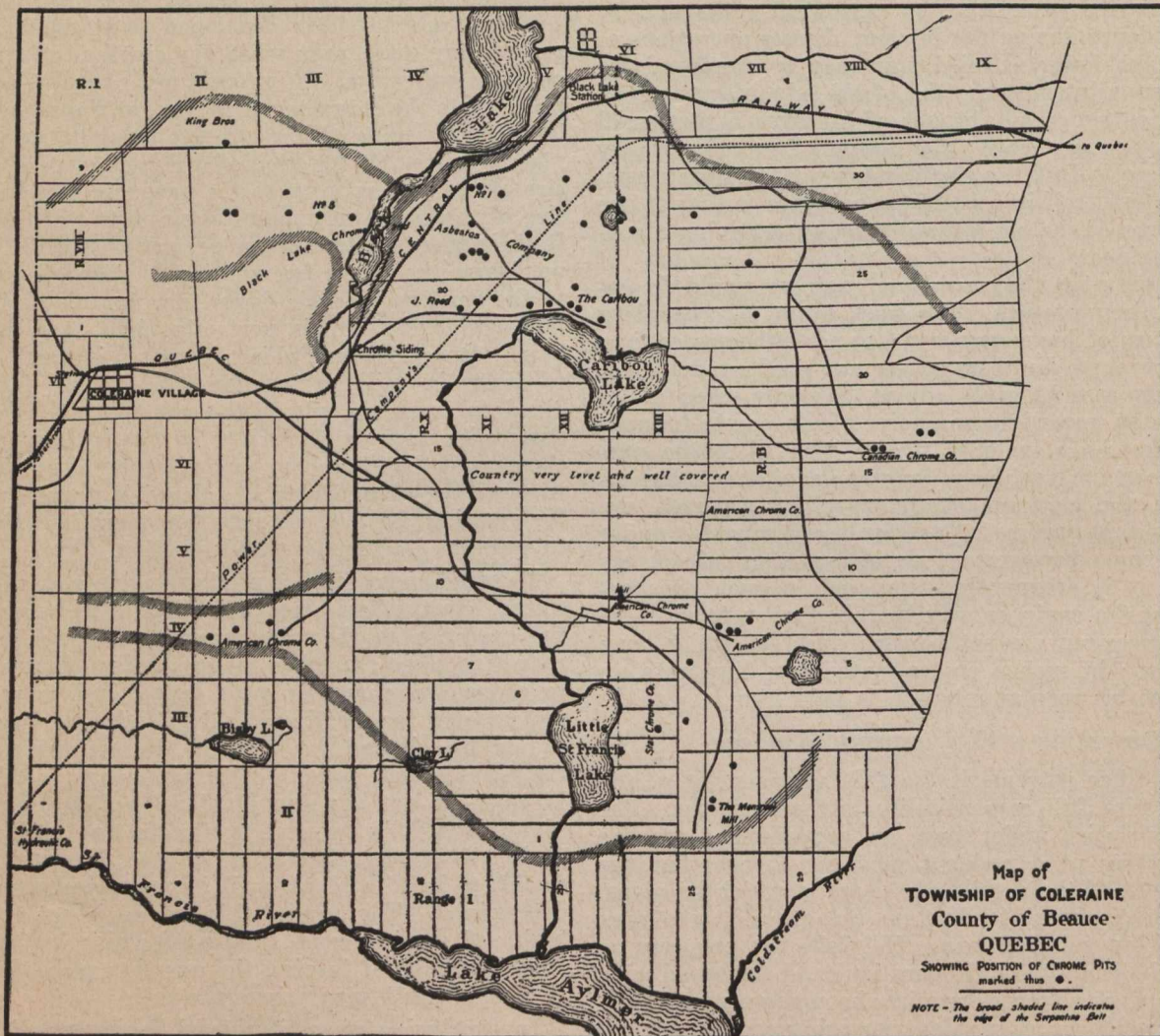
(A paper read before the Mining Section of the Canadian Society of Civil Engineers.)

By H. F. STRANGWAYS.

Within the last few years there has been a large increase in the consumption of chromium in the Arts. This increase has been chiefly caused by the large demand for chromium salts in the tanning industry, to furnish a substitute for the acid in the tan bark, the increasing use of chrome brick for refractory purposes, and of ferro-chrome alloys for special steels. Chrome, however, is used, and is likely to be used in the future, to a much greater extent in the manufacture of chromium salts than for any other purpose.

Thetford, the distance from Montreal to Black Lake being 60 miles,

Chrome iron mining was begun in this region in 1894, and up to comparatively recent date, was carried on in a very spasmodic manner. The production up to 1898 amounted to a total of only 10,000 tons, while in 1905 alone it amounted to 7,600 tons, and in 1906 it had increased to nearly 9,000 tons. The greater portion of the ore shipped to the United States. Ore which is sufficiently rich to be shipped without concentration is termed



The Eastern Townships' deposits all lie in the region known as the "serpentine belt." The centre of the deposits is situated approximately at the little village of Black Lake, in the Township of Coleraine, but the productive region may be said to extend for a radius of about five miles from this village. All the districts from which chrome is now shipped, lie within ten miles of Black Lake. The Quebec Central Railway passes through this region, and none of the chrome pits are more than seven miles from the track. The journey from Montreal is made either by the Canadian Pacific Railway or Grand Trunk Railway, as far as Sherbrooke, and thence by the Quebec Central Railway to Black Lake, or

"Crude," and grades from 45 per cent. and upwards of chromic acid or sesquioxide. Concentrates also are shipped and paid for according to grade. The prices paid for both "crude" and concentrates vary between \$9.00 and \$12.50, the price depending on the grade or percentage of Cr_2O_3 contained.

In the earlier years of this industry in Quebec, there were large numbers of small producers, whose inability to keep their contracts, forced buyers to make their purchases elsewhere. The competition of the European and the New Caledonia ores, together with the irregular and pockety nature of the Quebec ore bodies, then being worked, was answerable for this state of affairs. Mining

was carried on by means of open pits, and all the ore was taken out as soon as it appeared. When the ore body punched out, as happened in most cases, there was no chrome ore forthcoming to enable the mine owners to keep their contracts; hence purchasers in the United States became disinclined to contract for Quebec ore, and in consequence the pits closed down, as either the uncertainty of finding more ore, or the dead work necessary to extract it when found, proved too great a handicap to the small producer.

The consequence is that at the present day there are, scattered all over this region, numbers of small pits from which crude ore has been taken and shipped, the pits themselves having been eventually abandoned. The success of chrome mining is due, not to mining men, but to those not immediately connected with the industry, and the credit for putting the industry upon a solid basis and establishing a reputation for the Quebec product should be given to Mr. J. N. Greenshields, of Montreal, who is the principal shareholder in the Black Lake Chrome-Asbestos Company.

GEOLOGY.

The geology of this region is rather complex, and it is only necessary to state that the chrome deposits all lie in what is known as the "serpentine belt." This serpentine represents the alteration of a peridotite, which was intruded through sedimentary rocks, probably of Cambrian age.

Chromite has been found only in peridotites and allied magnesium rocks, or in serpentine, which has resulted from the alteration of these rocks. It is true that there are alluvial deposits of chrome, but these can be traced back to the original peridotite rocks. The New Caledonia deposits are of this type.

Up to the present time comparatively little investigation has been made into the origin of chromite deposits. The theory set forward by Pratt, Vogt, Adams, and others is, that deposits of chrome ore, wherever found, are segregations which have crystallized out from igneous magmas on cooling. Pratt, in 1899, in speaking of the North Carolina deposits, says: "My observations have shown that large deposits of chromite occur in the peridotite rocks, near the contact of these rocks with the enclosing gneiss. Also, that where there is but a small amount of chromite, either in pockets or crystals, these are more abundant near the contact and diminish in number towards the centre of the mass.

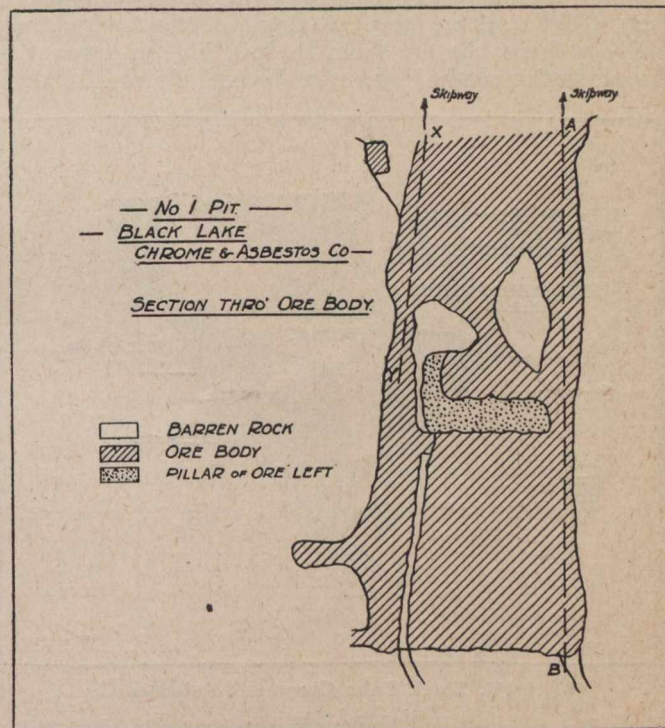
"The constant occurrence of the chromite in rounded masses of varying size near the contact of the peridotite with the gneiss, and its occurrence in the fresh, as well as in the altered peridotite, would indicate that the chromite was held in solution in the molten mass of the peridotite when it was intruded into the country rock, and that it separated out among the first minerals as this mass began to cool."

This theory of segregation can very well be applied to the Eastern Townships' deposits, as regards the proximity of the ore bodies to the contact.

Nearly all the pits which have been worked lie close to the contact between the serpentine and the country rock, which here is probably Cambrian. At No. 1 pit of the Black Lake Chrome Asbestos Company the actual contact, although covered, is not very far from the ore body; the contact in this case is between serpentine and a chloritic schist. At the Caribou pit the geological relations cannot be obtained on account of the heavy covering of drift. At No. 5 pit the contact is close to the pit, being the same as that at No. 1. At the Montreal

pit the contact is within 50 yards of the ore body; in this case it is between the serpentine and a later diabase which evidently was intruded at the point of original contact between the serpentine and the earlier sediments.

Even if the ore bodies were not near the contact the irregular and pockety nature of these deposits would lead one to accept this theory of segregation. The irregularity is further accentuated by an extensive fracturing and faulting which has taken place. The ore sometimes occurs as large masses of "crude," which gradually die away or disseminate into concentrating ore, and then passes to the barren rock. Sometimes, however, the "crude" will separate cleanly from the barren rock without any gradual transition, suggesting a possible re-arrangement by underground waters, although in most cases in which this happens the rock face will be found to be slickened so that this clean separation may more probably be due to the extensive fracturing and movement which has taken place, especially as



No. 1 Pit, Black Lake Chrome & Asbestos Co.
Vertical Section.

such ore bodies represent a line of weakness along which movement would occur.

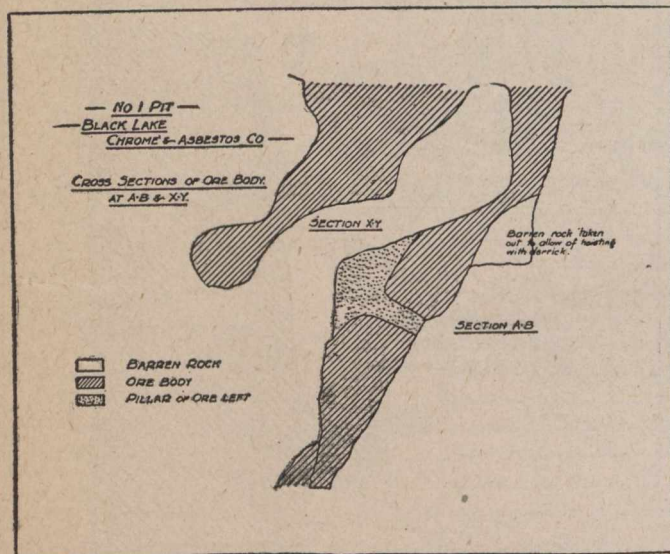
Slickensides are numerous in the serpentine, and the greasy, slippery rock face, which results renders mining operations dangerous.

The Canadian ore is produced principally by three companies Black Lake Chrome Asbestos Company, the Canadian Chrome Company, and the American Chrome Company. Of these the B. L. C. A. Company is by far the largest. In its extensive holdings the company has several chrome pits, only four of which have been worked to any great extent. These are No. 1, the Caribou, No. 5, and the Montreal. The company employs between fifty and seventy-five men when four pits are all in full working order.

No. 1 pit is the largest single chrome pit in Canada. It is admirably situated as regards transportation, power, and water facilities. The pit itself is about 1,200 feet to the south of the Quebec Central tracks; the siding put in to serve the pit leaves the main track about

one mile from Black Lake station. Power is furnished by the St. Francis Power Company, at reasonable rates. The water for the mill is obtained from Black Lake, which is distant some 400 yards.

The two sectional drawings which accompany this paper will serve to give some idea of the shape and size of the ore body at this pit. Originally there were three distinct ore bodies at the surface; one of these, shown to the extreme right of the section, was very small and soon pinched out; the other two were worked by an open cut to a depth of 70 feet. At this point both bodies showed signs of pinching out and the company expected to lose them altogether. The pit at the surface measures, roughly, 100 feet by fifty feet, which can be taken as the dimensions of the ore body at this point; at the 70-foot level, the width of the ore body is only 5 feet. However, on following this narrow strip of ore, it was found that both bodies took a sudden pitch as shown in the section, and then widened out considerably, the distance between the hanging and foot wall being as much as forty feet in some places. A single derrick served originally to hoist the ore from the pit, but on account of the pitch this method was abandoned. Before its aban-



No. 1 Pit, Black Lake Chrome & Asbestos Co.
Vertical Section.

donment a considerable amount of barren rock was removed to permit hoisting with the derrick. A narrow band of barren rock separated both bodies from the surface down, and on account of the great width of the bodies beyond the point where the dip changed, it was deemed expedient to work each separately, leaving the barren rock as a pillar to support the roof. Two skip ways were put in and the ore hoisted in small self-dumping skips. The method used to extract the ore beyond the pitch was the same as in the open cut system. All the ore was taken out as it was found.

It was evident, however, as the pit increased in depth that measures must be taken to support the roof on account of the great distance between the hanging and foot wall. Accordingly on the 250-foot level, a large pillar of ore, some 16 feet in thickness, was left in, extending across the pit. The bodies were worked below this to the 340-foot level. In the meantime the company had bought a diamond drill and had begun exploration work in the bottom and sides of the pit. Finally the pit was considered too dangerous to be worked on account of several minor accidents which had occurred, and the

company decided to close it down. This took place a year ago, and since then an incline shaft has been sunk starting about 40 feet to the left of the present pit. The shaft is a two compartment, one measuring 6 feet by 10 feet, inside the timbers, the inclination being 60 degrees easterly, which is the approximate dip of the pit. At present the shaft is 270 feet deep, and sinking is being extended. A considerable quantity of ore has been left in, at the pillar already mentioned, and a cross cut is being driven at the 250-foot level to extract this ore. Another cross cut will be put in at the 340-foot level, as there is a large quantity of ore in the lower part of the pit.

Diamond drill borings have proved the continuance of the ore below this level, and also indicate that the ore bodies have taken a pitch to the left or north and east. This is indicated in the section. As to the manner in which the ore which is left in the pit, and also that below the present level, will be extracted, the writer is unable to say. The equipment of the pit is not very extensive, consisting, as it does, of a five-drill Rand Air Compressor, driven by an induction motor, furnishing air for pumping, hoisting, haulage, and drilling. A new hoist, capable of handling 150 tons a day, is to be installed when the shaft is finished, and a large bin, discharging to a sorting floor under cover, has already been erected at the pit head.

SORTING.

A certain portion of the ore as it is mined is sufficiently rich to be shipped; this ore grades 43 per cent. (and upwards) chromic oxide, and is known as "crude." This proportion varies, but the average for this pit is about 15 per cent. of the total rock hoisted. The mill waste, or concentrating ore, varies in contents of chromic oxide from 7 per cent. to 40 per cent., and amounts to about 45 per cent. of the total rock hoisted, and the rest, amounting to some 40 per cent., is dump material. Nothing, roughly speaking, under 7 per cent. is put through the mill. This necessitates a certain amount of sorting. Formerly each of the two skips dumped into a bin and the ore fell from the bin on to a platform on which it was sorted. The "crude" was still further cobbled at the siding. A great deal of trouble used to be caused on account of the freezing up of the ore in the bins in winter time, and on account of the difficulty of getting good men who would do good sorting, when exposed to the cold. When active operations are resumed all the ore will be hoisted from the shaft and dumped into one large bin, falling thence to a sorting floor. The material will be shovelled through holes in the floor into the tramway cars.

THE MILL.

The mill is situated at the siding some 1,200 feet from the pit, and a tramway connects the two. The tramway is carried on a trestle throughout its entire length, thus in winter any trouble from snow is avoided. A small double cylinder hauling engine, with cars operated on a tail rope system, serves to deliver the mill ore to bins in the mill, which is 85 feet below the pit head.

The mill scheme is a simple one, being as follows:—

From the cars the ore is dumped into a 100-ton bin, falling thence to a 12 inch by 15 inch Blake crusher. From the crusher it is elevated to a shaking trough, which distributes the ore to the battery or feed bins. From the bins the ore is fed by Challenge feeders to the stamps, which, in this mill, number 30. The duty of the

stamps is in the neighborhood of 2 1-2 tons per day, their weight is 1,100 pounds, and the drop 8 inches, which, as the dies wear, increases to as much as 15 inches. The mortar has a double discharge, both back and front, and the screens are twenty mesh. Each battery of five stamps discharges its pulp directly through a pipe to a single Wilfley table, and each table makes three products—heads, middles, and tails. The heads are shoveled from receiving boxes into barrels and wheeled to the concentrate shed, and dumped there to drain. The bulk of these concentrates is large, amounting to as much as 15 tons a day, and two men are kept fully occupied in handling them. A drag conveyor was once installed for this purpose, but the wear and tear due to the hardness of the ore was so great that this method was abandoned.

The middles from all six tables fall into a launder, and are passed thence to a separate Wilfley table, which makes two products, heads and tails. These heads are of lower grade than the heads from the first six tables, and are put through the mill again. All the tailings flow from the mill to the lake. There is a difference in level of some 250 feet between the mill and the lake, and an electrically-driven pump supplies water to the mill. The power required for the mill and the machine shop is supplied by a 100 H. P. three-phase induction motor. The machine and blacksmith's shop are situated at the back of the mill.

THE CARIBOU PIT.

This pit lies some two and a half miles to the south of No. 1, and a wagon road connects the two. A large quantity of "crude," of good grade, has been taken from this pit, but at the present time no work is being done in it.

No. 5 PIT.

This pit is situated on the west side of Black Lake, and is not being worked at the present time, although a considerable quantity of ore has been extracted from it in the past. The "crude" from this pit is of the highest grade of any found in the district, running as high as 56 per cent. chromic oxide.

THE MONTREAL PIT.

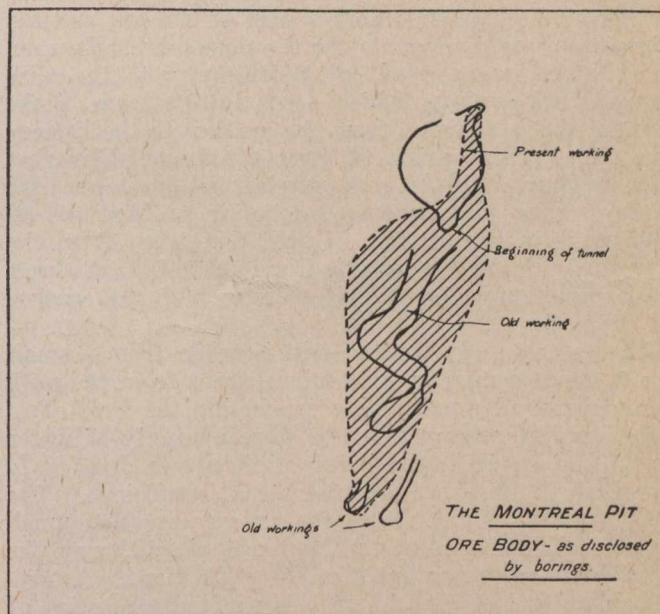
This pit was originally owned and worked by the "Eastern Townships Chrome Iron & Milling Company." It lies about seven and a half miles to the east of the railway, and a waggon road connects it with Chromem Siding, from whence all its ore is shipped. Chrome Siding is about one and a half miles to the south of No. 1 pit. At the present this Montreal pit, together with No. 1, are the only two out of the four which are being worked. This pit has its own mill.

Up to 1898 3,000 tons were taken from this property, and there was every indication of its being able to furnish many times that amount. Numerous outcrops of ore, from 12 to 15 feet in thickness, occurred along a length of some three hundred feet, but when worked were found to pinch out. Their position is indicated on the map by the outline of the old workings.

The present company took the property over two years ago, and since that time a considerable quantity of ore has been taken out. The company has also done some diamond drill exploration work, which has proved very satisfactory. The borings indicate the existence of a large body of chrome ore of the shape shown on the map. The size of the body as at present developed by the borings is 400 feet in length; with an average of 50 feet, while the thickness varies from 16 to 50 feet. There is a covering of barren rock some 50 feet in thick-

ness over this body. The present output is maintained from the pit shown at the extreme left of the diagram. This pit, at the surface, measures, roughly, 80 feet by 50 feet; a depth of 50 feet has been attained, and a body of good ore is showing on the bottom and east sides of the pit. The ore disclosed by the drill holes is being taken out by a drift, which, at present, has reached some 50 feet, being in ore all the way. One of the drill holes has been pased, and the results given by the drill compare very well with the ore actually found.

The deposit will be mined probably by a room and pillar system, although no very regular system can be employed on account of the variation in the thickness. At present two boom derricks serve to hoist the ore from the pit. The ore is roughly sorted in the pit, and the large pieces of "crude" are hoisted separately and dumped at the surface in heaps, to be cobbled. The boxes in which the mill waste is hoisted are lowered on small trucks and conveyed by the tramway to the mill. The barren rock is hoisted separately and dispatched to the dump. The drills, hoists, and pump are steam driven, the boiler of the mill supplying the steam.



Sketch Plan.

THE MILL.

The location of the mill is an admirable one, situated, as it is, on the hillside about 400 feet from the pit, and about the same distance from the lake. The mill scheme is the same as that at No. 1 mill. The ore is fed to a Blake crusher, falling thence to the battery bins. Fifteen stamps, in batteries of five, discharge the pulp through twenty mesh screens to three Wilfley tables. The middlings from these tables all go to a fourth, which makes lower grade heads and tails. These heads are re-fed to the crusher, and again passed through the mill. The tailings from all the tables flow to the lake. Two 45 H. P. flue boilers supply steam for both pit and mill, the fuel being cordwood. A single cylinder Corliss engine drives the mill and crusher.

A great deal of difficulty is being experienced in the transportation of the ore to the railway. Teams are employed for this purpose at present, but the method is costly and inadequate for the present output. The load is favored by the grade of the road, an advantage, however, which is off-set in wet weather on account of

the very bad state of the road, notwithstanding the fact that the road is constantly being improved by the company. An aerial tramway or narrow guage road for this distance of seven and a half miles would be impracticable on account of the first cost: probably the best means of transportation which could be employed would be either a traction engine or a motor lorry.

THE CANADIAN CHROME COMPANY.

This property is situated about four miles from Thetford, from which point all its ore is shipped. The company has opened up four small pits, all within a distance of 400 feet; only one of these pits is being worked at present, but it is by far the largest of the four, being some 100 feet to 125 feet at the surface, and 60 feet in depth. There is a small amount of "crude," and a considerable quantity of concentrating ore showing in the present workings. A single cable hoist, similar to those used in the asbestos pits, elevates the ore to a tramway, carried on a high trestle, and thence to the mill. One small vertical boiler supplies the steam for hoisting, pumping and drilling. All the hoisting arrangements will probably soon be changed, as the cable hoist at present used, commands only a part of the pit, and the steam supply is inadequate for the demands made upon it. The ore is conveyed on the tramway to the mill, dumped into a chute which feeds into a large Blake crusher, and is elevated from the crusher to the battery bins. The mill consists of twenty stamps, delivering pulp to four Wilfleys; the middles all go to a fifth Wilfley. The mill scheme is similar to that of all other mills in the district. Current is taken from the St. Francis Power Company's line to a 100 H. P. three-phase induction motor, which operates both the crusher and the mill.

The water supply for the mill is taken from a small stream about a quarter of a mile distant from the mill, an underground wooden pipe connecting the two. Two small dams at present serve to store a supply of water for the dry months; the lower of these two dams is to be raised six feet, as the reserve is insufficient. The transportation of the ore to the railway presents much the same difficulty as at the Montreal pit, although the distance is less, being but 4 miles to Thetford. A traction or motor lorry would probably afford a solution of this difficulty.

In conclusion, a few words on the concentration of these ores may be of interest. The present system of concentration has been in use practically since the beginning of the industry. Since the time when it was first used there have never been any radical changes, and it must be remembered that although the system is admittedly wasteful, it nevertheless possesses many advantages, chief among which are low first cost, and the simplicity of operation. The later advantage bore greater weight at the start than it would perhaps bear at the present day, as the labor had to be recruited from the vicinity, and experienced mill men would have been hard to find. Then, again, the uncertainty of the industry, both as regards the ore itself and also the market, told against any changes. The use of the Diamond Drill will undoubtedly greatly remove the difficulty of supply, as it will certainly help in development work. Once the question of supply is settled, definite contracts can be more easily made and kept, thus disposing of the market difficulty.

As regards crushing, in connection with this system, it is necessary, in order to produce a concentrate of high enough grade to ship, to reduce the ore to a size of about

20 measures to the inch. Certain experiments, performed by Mr. Patterson, under the supervision of Dr. Porter, M. Can. Soc. C.E., in the laboratory of McGill University, indicated that, with a 15-mesh screen, a larger total extraction could be made, although the grade of the concentrate was not improved. The practice at the mills, however, is to reduce all ore to 20-mesh.

One of the first mills in the district, installed at No. 1 pit, used graded crushing with jaw crusher rolls, and the writer believes, jigs, but these were replaced eventually by stamps and tables. It is very difficult to get information regarding this mill, on account of the time which has lapsed, but the scheme proved unsatisfactory, either on account of losses or else on account of the inability to produce high grade concentrates. Probably, as regards losses, the amount of fines made when rolls and crushers are used would be less than when stamps are used, especially as chromite is very brittle, and shows a great tendency to slime. However, in the experiments already referred to, it was found that the amount of slimes made when using a Huntingdon mill were more than those made by the stamps, using the same sized screens in both cases; and possibly the same may be found to be the case in a system using rolls. It is more probable that the simplicity of operation in the case of stamps, together with their small maintenance cost, as compared with the complications of a method using graded crushings, and as compared with the high cost of up-keep of such a system for screens, etc., were the deciding factors in the crushing arrangements of these mills. The mineral shows a great tendency to slime, so that if stamps are used the pulp should be driven out of the mortar as soon as possible; for this purpose heavy stamps, with a quick, small drop, a mortar with a low, double discharge both back and front, and plenty of water, are necessary. The present stamps possess these requirements, except perhaps as regards the water. From the stamps the ore passes without sizing to the Wilfley tables. Before dealing with the question of sizing one peculiarity in attempting the concentration of this ore, as compared with ordinary concentration practice, will be pointed out.

In most cases in which concentration is necessary to obtain a product of high enough grade either to smelt or ship, the mineral content is rarely over 5 per cent., and the variation in this content, although it may be as much as 50 per cent. of the original amount above or below the average value, does not affect to any great extent the ratio of the gangue to the mineral, as the gangue is so greatly in excess. In the case of chromite the percentage of mineral in the ore is large, and the variation in grade is excessive, the range being, roughly, between 7 per cent. and 40 per cent. chromic oxide.

Classifiers were used at the Montreal and No. 1 pits in previous years, but they have since been removed, as it was found difficult to keep them in adjustment. The reason for this was probably the irregularity of the feed, but there is no doubt that, given a good, steady head of water, and some good type of classifier, satisfactory results could be obtained in classifying the pulp before sending it to the tables.

The other alternative for sizing is the screen. Since the introduction of the Callow screen, many of the difficulties of screening fine material have been removed. The writer has never seen a Callow screen in operation, but understands that there is no doubt as to the possibility of its being satisfactorily used on fine material.

The irregularity of the feed would not altogether be removed, if either screens or classifiers were used, but

the tables could be more easily adjusted to take a particular size, whereas at present, with the irregularity of both grade and size on the tables, the smaller particles of chromite stand but little chance of being saved.

Sizing might, or might not, improve the grade of the concentrate, probably it would do so, and, at any rate, the extraction could be made greater.

The next difficulty in these mills is the re-treatment of the middles. All middles at present are sent to an extra table and two products are made, heads and tails. The tails from this table run exceedingly high, grading as much as 18 per cent. chromic oxide. The heads made are not of a sufficiently high grade to be shipped, and are put through the mill again. The object of re-con-

structing the middles and putting the resulting heads through the mill again is not apparent. A much better course would be to put either all the middles through the battery bins again, or to dump them separately and keep them for future re-treatment. They could be either crushed by stamps, using a finer screen, or reduced by means of some type of grinder.

The limit of values of losses in tailings may be put as between 3 per cent. and 7 per cent. A loss of 7 per cent. on a 40 per cent. ore would represent good work, giving a total extraction in the neighborhood of 82 per cent., while a 3 per cent. loss on a 7 per cent. ore would represent only an extraction of 57 per cent.

Actual figures are very difficult to obtain; but the extraction is probably in the neighborhood of 70 per cent.

INTERNATIONAL COAL & COKE COMPANY, COLEMAN, ALBERTA.

GEORGE A. OHREN.

One of the most up-to-date coal mining outfits in the Crow's Nest coal fields is that of the International Coal & Coke Company, situated at Coleman, Alberta, on the Crow's Nest Branch of the Canadian Pacific Railway, half way between Fernie, B.C., and McLeod, Alta. It is now four years since the first coal was mined on their property and tested in two temporary coke ovens to ascertain its coking qualities. It is needless to say that the coal was found well adapted to coking purposes and fully up to the expectations of those who were interested. Then the company was duly formed and active work began. In the last few years the mine has been brought up to a producing basis of 2,000 tons daily. Of this about 1,600 tons of the coal is sold to the Canadian Pacific Railway Company for fuel purposes, and the balance is used to make 300 tons of coke per day, which is sold under contract to the Dominion and British Columbia Copper Companies in the Boundary district.

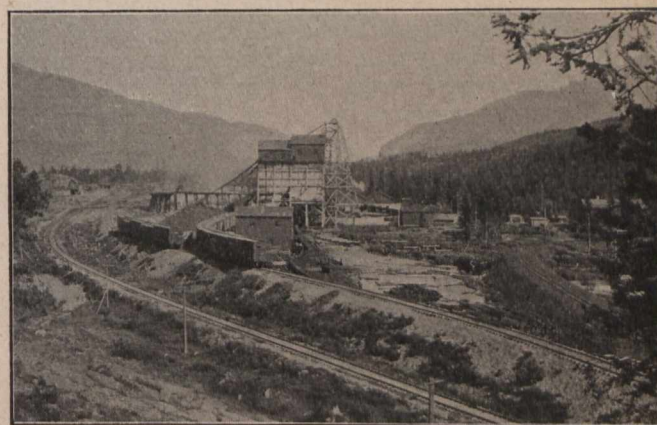
Much to the credit of the management, it can be truthfully said that the extensive plans for mining operations and installation of the plant, which have always been conducted with an eye to the future and an increased production, have fully met the requirements of that increased production, without any unnecessary changes or delays; and, while the coal field has proved to be very extensive, all operations up to date have been conducted on two openings.

On October 7th last the directors of this company declared a dividend of two per cent., payable November 1st. Heretofore the company has been paying one and one-half per cent. The two per cent. dividend will amount to about \$56,000, there being 2,800,000 of the 3,000,000 one dollar shares issued and 200,000 shares still in the treasury. The total dividends paid by the company up to date amount to around \$154,000.

At the present time the company is executing development work on another of the rich seams which traverse the property. It is estimated that when this new seam is opened up and coal is being mined therefrom it will be possible to bring the output up to 3,000 tons per day. In addition to this work and the regular mining operations the company is building snok sheds over all of their railway tracks to facilitate the transportation of

their product in the vicinity of their property. They are also building twenty new cottages for the accommodation of the coal miners, and an extension to the railway side track at Coleman, three-quarters of a mile long, all of which goes to indicate the spirit of advancement that prevails about the place.

It is estimated that at the present time there are 3,000,000 tons of coal developed on the property, and approximately 50,000,000 tons in sight. The measures are located in the Cretaceous and Laramie-Cretaceous formations, and are part of the extensive Crow's Nest field. From the point of the openings of the seams the moun-



View of Tipple I. C. & C. Co., Coleman, Alta.

tain rises gradually, until at the face of the entries now being driven there is a height of coal of 1,200 feet.

Quite a little town has sprung up around the mines at Coleman, and there are now about 1,500 souls residing there. In the way of modern improvements they have a local telephone system, waterworks, carrying 140 pounds pressure, electric light, bank, churches, school, etc. Five hundred and thirty-five of the residents of Coleman are employed by the International Company, the last pay roll amounting to approximately \$45,000.

The coal is of a bituminous grade and is coked in 176 bee-hive type coke ovens. These ovens are built 14 feet in diameter by 8 feet high.

The president of the company is Mr. A. C. Flumerfelt, Victoria; vice-president and manager, H. N. Galer, Spokane, Wash; secretary, W. G. Graves, Spokane; superintendent, G. L. Fraser, Coleman; purchasing agent, D. P. Oliver, Coleman; directors, A. C. Flumerfelt, H. N. Galer, D. M. Royers, D. Shultz and C. S. Houghton.

The labor situation at Coleman is all that could be asked at present. Perfect harmony prevails between the men and management. The men are working under a two years' contract, and it is not expected that there will be any interruption of operations during the life of this agreement. Average day's pay for inside work during the year 1906 was \$4.85 a day. Outside common labor is paid \$2.50. Machinists, engineers, carpenters, blacksmiths and other skilled laborers are paid from \$3 to \$4 per day.

The company has just completed a commodious wash and change room for the men. This room is 30 feet by 82 feet, with office, private baths and surgery. It is heated with steam and furnished with hot and cold water. There are 20 shower baths and expanded metal lockers in which each man can lock up his clothes.

The coal is loaded into the railway cars by an Ottumwa box car loader. The tippie has a capacity of handling 1,500 tons in ten hours. It also has a storage capacity of 3,000 tons—2,000 tons of coarse coal and 1,000 tons of slack. The slack is carried to the coke ovens by two six-ton Larry cars, electrically driven.

The total length of the main entry in No. 2 seam is 9,000 feet; that in No. 4 seam is 7,000 feet.

The 800 horse-power required to operate the machinery about the mine is derived from four 125 and two 150 horse-power boilers. The steam from these boilers operates a 4-stage Rand high pressure compressor with a capacity of 750 feet of free air per minute compressed to 1,000 pounds to the square inch. This high pressure air is stored in a pipe line reservoir and is principally used to drive three 6 inch by 10 inch and two 5 inch by 5 inch compressed air locomotives, the capacious storage tanks of which are charged from the pipe line with air at about 750 pounds pressure and which is in turn supplied to the cylinders through a small auxiliary reservoir at a much lower pressure.

The surface workings consist of a boiler house, power house, containing two 400 horse-power electric generators and the compressor; fan house, containing an electrically driven Capell fan, supplying 125, to 160,000 cubic feet of air; lamp house, containing 500 Wolff lamps; machine and blacksmith shops combined; store room, containing an average of \$30,000 worth of fittings and supplies; stable, granary, etc.

While I do not know exactly what it costs the International people for their coal and coke, I can say that it costs about 90 cents to \$1 per ton to mine and place coal on the cars in Crow's Nest district; coke costs most of them about \$1.50 to \$1.75, f.o.b., shipping point. The coal is sold at an average figure of \$2 per ton for run of mine, and upwards, depending on size of contract, and the coke at about \$2.50 per ton and over at the mine. These figures are only approximate and conditions at different mines may alter them.

The future outlook for the Crow's Nest coal mines is good. They have a large market in Alberta and the other Eastern Provinces, in British Columbia, and a good market for their coal and coke in the States of Washington, Idaho and Montana.

THE PRODUCTION OF COPPER IN THE UNITED STATES IN 1906.

A Review of L. C. Graton's Paper, "The Mineral Resources of the United States."

The world's production (smelter output) of copper in 1906 was 1,596,973,700 pounds. In the following table it is seen that the United States produced 57.47 per cent. of this, or about the same as the previous year. It is interesting to find Canada standing seventh in the world's copper producing countries:—

Country	Pounds
United States	917,805,700
Mexico	135,800,000
Spain	105,055,200
Japan	95,737,600
Australasia	81,200,000
Chili	57,668,800
Canada	57,030,400

The total ore treated in the United States was 19,743,000 short tons. The average yield of copper was 2.15 per cent. This tonnage includes certain ores which were mined and treated primarily for values other than copper. Leaving these ores (amounting to, 1,700,000 tons) out of consideration the average yield of copper was 2.5 per cent. The native copper ores of Michigan ran only 1.26 per cent. Excluding these the remaining copper ores gave an average of 3.65 per cent.

The ores mined primarily for copper yielded 0.015 ounce of gold and 0.882 ounce silver per ton.

About 26 per cent of the total ore tonnage was of "sufficient richness or of such favorable metallurgical character as to be smelted without concentration. The remaining 14,722,000 tons were concentrating ores, from which were produced about 2,985,000 tons of concentrates, the average concentration being slightly under 5 into 1. If the immense tonnage of milling ores of Michigan is excluded, the concentrating ores of the rest of the country exceeded the smelting ores by only a small tonnage."

Almost 75 per cent of the copper produced in the United States, first passes through the stage of copper matte, which is then further concentrated by converting or bessemerizing it into "blester" copper. Nearly 95 per cent. of the latter is subjected to electrolytic refining, both to recover the gold and silver that it contains and to remove deleterious elements. Of the three stages, mining, smelting and refining, in the transformation from copper ore to pure metal, it is the refined product which possesses most significance to the dealer and consumer, "the production of mines and smelters indicating possibilities of future months rather than final results accomplished to date."

The writer points out that copper mines in general do not fall in the class of "poor man's mines," so that it has happened that the most important copper mines in the United States are in the hands of strong companies. In 1906 four operators produced 720,000,000 pounds. These were: The Amalgamated Copper Company, the Calumet & Hecla Mining Company, W. A. Clark, and Phelps, Dodge & Company.

"Production at the principal mines is on a truly enormous scale, with ore tonnage and copper output of individual mining units ranging up to more than 2,000,000 tons and 100,000,000 pounds, respectively, with single milling plants of a daily capacity up to 8,000 tons, and with smelting plants turning out annually

90,000,000 to 175,000,000 pounds of copper each. To the magnitude of these operations almost as much as to the abundance of her natural resources, does this country owe her pre-eminence as a copper producer, with a record of over half the world's production".

C. W. K.

TREATMENT OF LOW-GRADE COPPER ORE.

JAMES PARKES, B.A.Sc.

The occurrence of many deposits of low grade copper ore between Sudbury and Sault Ste. Marie, as was stated in the issue of February 1st, 1908, of THE CANADIAN MINING JOURNAL, as well as some promising ones between Sudbury and North Bay, opens up a wide field for reduction works that will enable the mining companies to dispose of their ore.

The development work done on any of these deposits does not justify the expenditure of the large sum required to erect reduction works on the property. It is obvious, however, that this low grade ore, unlike the rich ore of Cobalt, cannot be shipped to other parts of Canada or to the United States for treatment, but must be treated fairly near the district in which it is mined.

It might be supposed that the excessive freight rates might be avoided by concentration at the mine and shipment of the enriched product. However, the concentration would involve enormous loss of mineral and the method has yet to be discovered by which this loss may be avoided.

Granted, therefore, that the ores must be treated in the district, it is necessary to examine the character of the ore and the mining conditions in order to determine the method best suited to meet these circumstances. The methods which suggest themselves are the smelting or fire process, and the lixiviation or wet process.

In order that an ore may be suitable for smelting it must, especially if low grade, be self-fluxing, or nearly so. Cheap fuel must also be obtainable. These ores, running usually from four to five per cent., have neither of these advantages. They almost invariably consist of copper pyrites with a gangue of quartz and iron pyrites. The large amount of fluxes required

to smelt such an ore, together with the high cost of fuel, make direct smelting prohibitive. If first concentrated, the enriched product would still be difficult to smelt, while the heavy losses occurring during concentration would also add to its unfitness.

In the lixiviation process two conditions are most important. The gangue must be fairly insoluble and the valuable mineral easily soluble, or at least of such character that it may be converted into a soluble condition. It will readily be seen that an ore with copper pyrites as the valuable constituent and the quartz and iron pyrites as the gangue, fulfills both conditions. The quartz vein matter is almost completely insoluble, while by roasting the iron pyrites is converted into the oxide and rendered fairly insoluble in dilute acid or any other solution that may be employed. By roasting the copper pyrites is made easily soluble in very dilute acid, in fact the greater part of the values may be extracted without the addition of any acid whatever. Another important fact about this process is that the fumes evolved in the roasting of the pyrites may be condensed, thus supplying all the acid required for the lixiviation. It might also be added that the cost of erecting such a plant would be almost fifty per cent. less than that of erecting a smelter.

The only company that is as yet working along these lines is the North Ontario Reduction & Refining Company, Limited, at Sturgeon Falls, Ont. They will dissolve the copper according to the method already outlined and precipitate electrolytically. An alternating method of precipitation is afforded by the well-known action of scrap iron on copper in solution. The iron which nearly always exists in the solution will be precipitated and sold as a pigment, thus making a valuable by-product out of what would be thrown away in any other process. By this method all the silver and nearly all the gold, which might exist in the ore, would be thrown into solution and collected from the bottom of the precipitation tanks. The tailings by the addition of Portland cement form an admirable concrete, and would be valuable for road building.

The importance which the treatment of these low grade copper ores bears to the prosperity of Northern Ontario leads the writer to suggest it as a profitable subject for discussion by the contributors to THE CANADIAN MINING JOURNAL.

BOOK REVIEWS.

THE METALLURGY OF IRON AND STEEL. BY BRADLEY STOUGHTON, B.S., PH.B., ADJUNCT PROFESSOR OF METALLURGY, SCHOOL OF MINES, COLUMBIA UNIVERSITY. 500 PAGES, 6 x 9. PROPERLY ILLUSTRATED. \$3.00 POSTPAID. HILL PUBLISHING COMPANY, 505 PEARL ST., NEW YORK.

There are two errors into which the writer of a scientific text-book is prone to fall; the error of indulging in excessive detail and the converse mistake of omitting explanations that are essential to those for whom he has written.

Mr. Stoughton appears to have avoided both these pitfalls. His aim has been to prepare a text-book adapted not alone to college work, but to the needs of the civil, mechanical, electrical, metallurgical and mining engin-

eers. There are, of course, incidental shortcomings. But, in the main, the author has accomplished his object. He has contributed to the literature of iron and steel a needed and valuable volume.

The first chapter is taken up with definitions of cast iron, steel, and their various commercial modifications. Here also is given a list of general text-books, reference books and periodicals on the metallurgy of iron and steel.

Chapter II. outlines the manufacture of pig iron. Blast furnace fuels and fluxes are described. The varieties and distribution of iron ores are noted. The deposits of the United States are mentioned, along with notes on transportation and mining. The handling of raw material at a modern furnace and the blast furnace itself are the next subjects touched upon. The following sections on smelting practice and chemical reactions are particularly good. In a paragraph on dry blast, J. E.

Johnson's ingenious explanation of the great economy effected by desiccating the blast is referred to. Allusion is made to the skepticism with which the results of James Gayley's innovation were received. The apparently disproportionate saving in fuel and improvement in practice are explained by showing that every blast furnace has a certain "critical temperature," below which it will not perform any smelting, and that the theoretical temperature of combustion of the smelting zone is only a little above this "critical temperature." The standardizing of the air blown into the furnace by the removal of moisture, which otherwise enters in large fluctuating amounts, increases the interval between the critical temperature and the temperature of combustion, and thus renders more heat available.

Further details of furnace accessories are succeeded by four pages devoted to the calculation of a blast furnace charge. Here the author has skillfully simplified the usual methods of calculation. Whilst the method given is largely empirical, yet the functions of each constituent of the charge are made sufficiently clear. Possibly the introduction of a few standard factors would have enhanced the value of this section.

The succeeding chapter, Chapter III., is unique. It is entitled "The Purification of Pig Iron." As an introduction to the fuller treatment of the Bessemer process, open-hearth practice, puddling, etc., it sketches in a masterly way the relations of these processes to the blast furnace and to each other. Short as this chapter is, it gives a better idea of these branches of the iron and steel industry than I have found in any other treatise. It is supplemented by a list of references to standard works.

The manufacturing of wrought iron and crucible steel, the Bessemer process, the open-hearth, the mechanical treatment of steel, iron and steel founding, the solution theory of iron and steel, the constitution of steel, and cast iron, malleable cast iron, heat treatment, alloy steels, corrosion, electro-metallurgy, and metallography are treated in the remaining chapters.

The last chapter, within the limits of thirty pages, gives a very condensed statement of the basic principles of chemistry and physics. The author's intention is to convey to the reader, who has had no grounding in these sciences, a working knowledge of both. This, obviously, is an attempt at the impossible. Still the chapter will serve the purpose of refreshing memories grown rusty from disuse.

Mr. Stoughton is not merely an academician. He has occupied responsible positions with manufacturing concerns. Hence he writes with freshness and vigor. He has endeavored to describe and co-ordinate all the branches of the manufacture of iron and steel. To say that he has not failed is praise. But Mr. Stoughton merits more than this. His book outranks any extant text-book upon the metallurgy of iron and steel. Its plan is broad and comprehensive; its execution is satisfactory.

MEN WHO SELL THINGS — BY WALTER D. MOODY. A. C. McCLURG & COMPANY, CHICAGO.

A crisp, readable book. Those of our readers whose vocation is the selling of mining machinery and supplies, or the products of mines and smelters, will find here much good, practical advice. Whilst the book is replete with commercial colloquialisms, it is not otherwise elegant in diction.

MARTIN'S MINING AND WATER CASES OF BRITISH COLUMBIA, WITH STATUTES—BY THE HONORABLE MR. JUSTICE MARTIN, OF THE SUPREME COURT OF BRITISH COLUMBIA, AND THE JUDGE IN ADMIRALTY FOR THAT PROVINCE. VOLUME II. PART II. PRICE, \$7.50. THE CARSWELL COMPANY, LIMITED, TORONTO.

In Volume I. and in this and the preceding part of Volume II. are to be found all the reports of Mining Cases and of Water Clauses Consolidation Act Cases of British Columbia from the earliest time up to January 1st, 1908, in all the courts and from the trial up to the Privy Council. Here also may be found all the mining statutes of practical utility covering the same period. In addition to much other information, we notice all the reported Yukon Mining Cases decided by the Supreme Court of Canada.

In this part of Volume II. the interesting case of the Star Mining & Milling Company v. Byron N. White Company is summarized.

EXCHANGES.

Science and Art of Mining, January 25th.—In an article on "Roof Action in Long Wall Work" the writer states that "the roof near the working face may be conveniently divided into three zones: (1) The dead roof; (2) the moving roof; (3) the pulled roof." Two essentials to the success of long wall work are, that all timber should be withdrawn behind the face timber; that the cogging should be made as compact as possible, the front wall rocks being bedded in loose material that will fill all crevices, and the insides completely filled. Of the moving roof the following analogy is made:—

The total action of this moving roof may be compared to that of a cantilever; that is, a beam supported at one end, but free at the other. One end of the cantilever roof is on the coal, the other on the yielding timber and cogging. Due to the great weight of the absolute roof this cantilever is constantly being broken (that is, pieces, so to speak, are being broken off its free end), and it is one of the essentials in successful working that these fractures should not take place at the working face, but that the weight should be what miners commonly call a travelling weight, ever and ever being rolled back on to the solid coal.

PERSONAL AND GENERAL.

Mr. W. A. Carlyle is making a thorough examination of Le Roi mine. He will not leave for London until late in March.

Mr. James Monroe, a successful Yukon pioneer, came to Winnipeg with the Dawson curling team to compete at the Winnipeg bonspiel.

Dr. Winthrop Spencer, F.G.S., who occupies a leading position among geologists, visited his native town of Dundas, Ont., last month.

Mr. Frederick Bolton, who had considerable interests in the Manitou gold district of Ontario, died recently in Blackpool, England, aged 61 years.

Mr. J. E. Jones, of Camborne, B.C., has been appointed official liquidator for the Silver Dollar mine and mill, owned by the Elwood Tin Workers Gold Mining Company.

Mr. J. A. Robertson succeeds Capt. Harris as manager of the McKinley-Darragh. Mr. Robertson was formerly with the Diamond Drilling Company.

Mr. Frederick Norton Coombs, a well-known mining engineer, largely interested in Cobalt properties, was found dead in bed in his apartments in Buffalo on February 9th.

Dr. Henry T. Bovey, Dean of the Faculty of Applied Science of McGill University, Montreal, has been appointed Rector of the Imperial College of Science and Technology, London, England.

The engineering department of Manitoba University, Winnipeg, was opened on February 10th, Prof. E. E. Brydon-Jack delivering the inaugural address, dealing with the work of the engineer and the progress of engineering education.

Mr. Malcolm Stewart and Mr. John Dorsey, underground managers of Sydney No. 1 colliery of the Dominion Coal Company, were instantly killed on February 13th by the fall from the surface of the steel cage used in sorting coal.

Mr. T. T. Fulton, of the Londonderry Iron & Mining Company, Londonderry, N.S., has left for Bathurst, N.S., with a staff of assistants. Mr. Fulton will survey and prospect the Bathurst iron ore properties of the Drummond Mines, Limited.

Mr. J. Dix Fraser, formerly superintendent of the Dominion Iron & Steel Company, has been selected by the Dominion Coal Company, as their representative on the Conciliation Board appointed to adjust matters between the Coal Company and their employees.

Mr. Joseph Irwin, of Ottawa, managing director of the Western Canada Cement & Coal Company, recently established at Exshaw, Alta., Mr. Frank Dunsford representing the English stockholders and Mr. Mackinnon appointed resident manager, arrived at Exshaw February 10th in connection with the starting of the works.

Mr. A. W. Robinson, M. Can. Soc. C.E., of Montreal, sailed from New York February 26th, having been commissioned to examine and report on the River Niger with a view to improvement of navigation by dredging. He has also in hand the design of dredging plant for the extensive improvements on the Upper Nile, which the Egyptian Government are entering upon for irrigation purposes.

The Robins New Conveyor Company, which has been recently incorporated, will be operated under the management of Thomas Robins, who founded the Robins Conveying Belt Company in 1896, and was president of that concern until March, 1907, when its management passed into other hands. The position of chief engineer in the new company is filled by Mr. C. Kemble Baldwin, who has served in the Robins Conveying Belt Company in the same capacity for the last seven years. The officers of the company are at 38 Wall street, N.Y., and 1240 Old Colony Building, Chicago.

A hard coke, with about the heating value of coal, and a half-formed coke, soft and burning freely, are made by distilling peat at Bodkino, Russia, 25 or 30 tons each being produced daily by eight furnaces. Having little sulphur, the fuels have an advantage for iron-making. The gases distilled off are burned in the furnaces, and the tar and ammoniacal by-products are valuable.

CORRESPONDENCE.

[THE CANADIAN MINING JOURNAL is not responsible for opinions expressed by contributors to this department.]

Editor's Note.—We have received many letters from subscribers, some of whom have approved and some of whom have disapproved our attitude in matters affecting the Canadian Mining Institute. Mr. Hill's letter is the first sent us for publication. As may be gathered, without difficulty, Mr. Hill holds that the JOURNAL has erred. Our position has been well enough defined to require no further explanation. Therefore we print Mr. Hill's letter without further comment.

Nelson, B.C., February 7th, 1908.

To the Editor, CANADIAN MINING JOURNAL,
Toronto, Ont.

Sir,—It is unfortunate that certain members of the Canadian Mining Institute should have commenced a most uncalled for and unwise agitation against certain officials of the Institute. I have just received a circular signed by M. J. C. Murray, in which I find the following:—

“It is believed that the movement to fill these two offices with technical men will appeal to all members of the Mining Institute.”

Now I would enter a most emphatic protest against this assertion. A technical education does not qualify a man for the work of a secretary or of a treasurer. There are, of course, exceptions, but as a rule the higher the technical qualifications of a man the less fitted is he for secretarial or business work.

In this particular case it seems that the present Secretary of the Canadian Mining Institute, Mr. Mortimer Lamb, and the Treasurer, Mr. Stevenson Brown, have filled the positions of Secretary and Treasurer with credit to themselves and to the satisfaction of the officers of the Institute. The circular signed by the President and four Vice-Presidents of the Institution is ample testimony to this, and should be sufficient for all unprejudiced members of the Institution. The membership has been largely increased, the finances are in good shape, and a large number of valuable papers have been contributed by members and printed in the transactions. It seems to me a mean, dishonorable thing to agitate for the dismissal, without adequate cause, of officials who have done good work for the Institute, and I trust that the members of the Canadian Mining Institute will not countenance such action.

Whether the offices of Secretary and Treasurer would be better filled by technical or by untechnical men may be a matter of opinion, but I think there can be no doubt that these dissensions among the members of the Institution, these agitations by cliques, are very detrimental to the best interests of the Institution. If the Canadian Mining Institute is to be the influential and successful institution, which it ought to be in a mining country like Canada, the members must all work together for the good of the Institution and must loyally support the Council and officers of the Institution.

Trusting that you will find space for this in your paper, I am yours faithfully,

LESLIE HILL.

MINING MACHINERY NOTES.

The Sullivan Hammer Drills for Mining Work.—large pneumatic rivetting or chipping hammer. In its operation it differs from the ordinary machine drill in that the bit is held against the rock, and the hammer hits the shank end of the steel twelve hundred or more blows per minute. The drill is rotated by hand. For up-holes an air piston supports the machine and feeds it automatically. On flat and down-holes the operator feeds by hand.

For overhead work in stopes and raises; for special sinking operations; and for trimming, cutting hitches, and drilling pop-holes the hammer drill has been proved superior to the ordinary reciprocating machine drills.



Sullivan "D-21" Hammer Drill in operation.

For usual sinking work and for drifting this is not the case.

In stoping out narrow veins, the lightness and compactness of the hammer drill are obviously advantageous. No tripod column or other mounting is required. They can be handled by one man and can be carried anywhere by him. Their flexibility enables the drillman to place his holes so as to ensure economy of time and powder. Time is saved, also, in changing steels, as a new length can be inserted almost instantaneously.

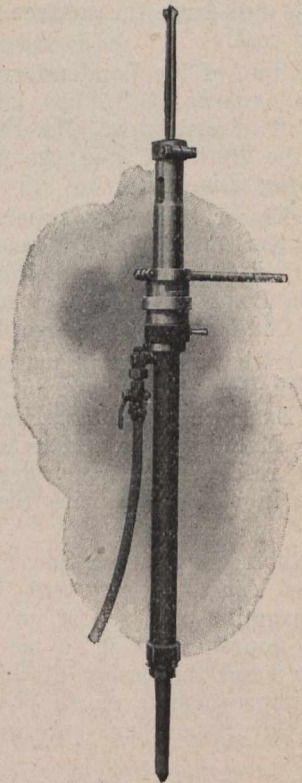
The "D-21" air-feed hammer drill has a two-inch cylinder, weighs 70 pounds complete and consumes about 45 cubic feet of free air per minute at 80 pounds pressure. It is intended for raising and stoping, where all holes point upward. It is claimed that the Sullivan "D-21" can drill up-holes 25 to 50 per cent. faster than

can reciprocating drills. They cannot, however, work well in wet and sticky ground, where the cuttings pack around the bit. Using a 1 3/4 or 2 inch starter, eight-foot holes, large enough for one-inch powder can be drilled.

Solid one-inch cruciform steel is employed. No shank is needed. The shank end is merely given a slight temper. This steel sharpens easily and allows the cuttings to run out freely.

All parts of the machine are light, strong, compact and accessible.

"D-15" and "D-19" are respectively light and heavy hand drills. The former weighs 18 pounds, uses 20 cubic feet of free air per minute and drills holes three feet deep, large enough for 7-8 inch powder. The latter

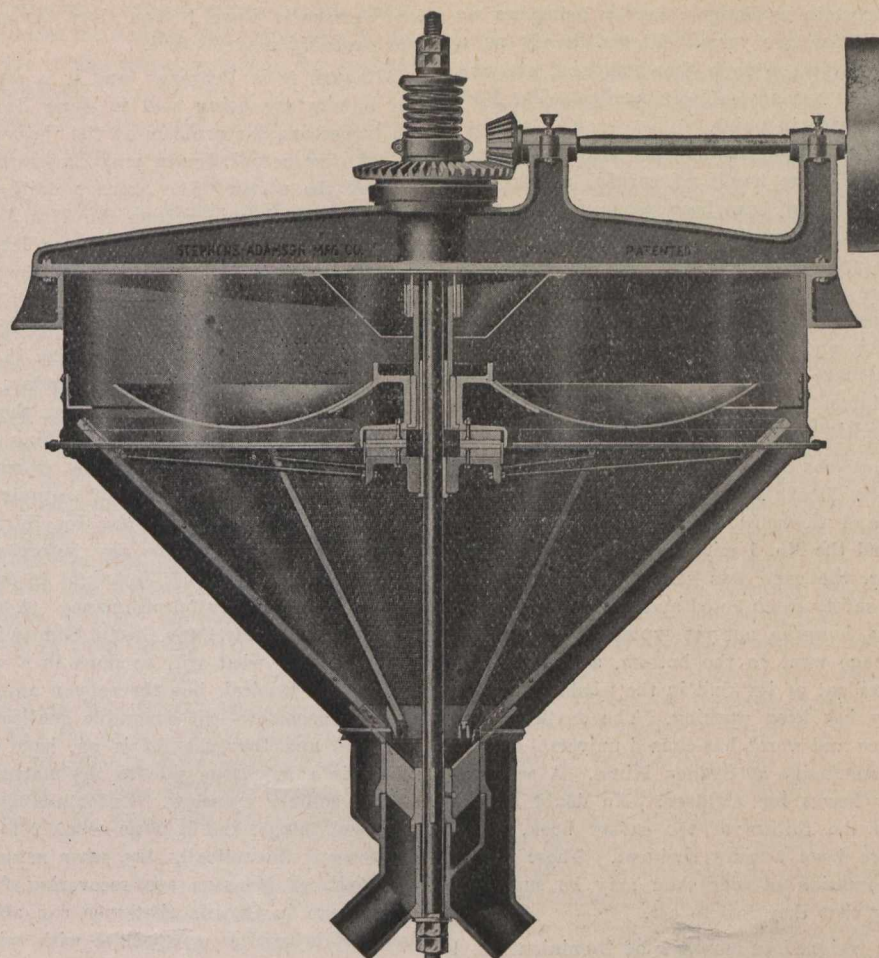


Sullivan "D-21" Air-Feed Hammer Drill—For drilling up-holes only for raising and back-stoping.

weighs 30 pounds, consumes 35 cubic feet of free air per minute and will drill to five feet by using hollow steel and employing an exhaust for cleaning the holes.

"D-15" is widely used for block-holing, cutting hitches, and trimming. "D-19" is most useful for shaft sinking under favorable conditions.

The "Vibracone" Separator, manufactured by the Stephens-Adamson Manufacturing Company of Aurora, Ill., is described in their monthly publication, "Conveying and Transmission. The "Vibracone" separator requires less than one-half horse-power and will screen any product that can be separated by a revolving or vibrating screen, either wet or dry, from 1-2 inch to 200



meshes per inch. In actual practice it has screened 10 tons of Portland cement clinker per hour, 99 per cent. of which would pass a 20-mesh screen, giving tailings not in excess of 10 per cent. The screen cloth is of heavy wire about twice the size of the product desired.

In screening, for instance, material that will pass a 20-mesh screen, a 10-mesh No. 20 wire screen is used. This gives a long life to the screen. The "Vibracone" can be used for handling cement, lime, clay, ores, sand, fine coal, carbon, graphite, stone, salt, etc., etc.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

GLACE BAY.

The first half of February has been marked by two sad accidents in Cape Breton mines, namely, the Port Hood explosion and the cage incident at Sydney Mines.

The Port Hood disaster occurred about seven a.m. on February the 7th, and resulted in the instantaneous death of ten men, four of whom were Bulgarian loaders, unable to speak English. From the evidence given at the inquest there appears to have been a small accumulation of gas caused by defective bratticing, but there does not appear to have been such a quantity of gas as would account for an explosion of such violence, and many circumstances point to an explosion of powder in an explosive mixture of gas and air, aided by the coal dust present.

The use of open lights was permitted in the mine, and also the use of loose powder, two cans of which containing 12 pounds are said to be missing. The testimony of the witnesses and of the men's officials who inspected the mine after the explosion is that the underground workings were well kept and in good condition. No doubt this was the case, but it is to-day accepted as an axiom that no mine is so safe that open lights can be used without danger.

The manner in which old miners cling to the idea that their efficiency is lowered and their wage earning capacity is impaired by the use of safety lamps would be amusing were it not so fraught with dreadful danger to themselves and their comrades. Some mines may be termed non-gassy, but this is only a comparative term, and it is every day becoming more certain that gassy or not gassy, the more or less hypothetical influence on wages of the closed lamp as compared with the naked light is not to be weighed in the balance for one instant against the general safety of the mine. What is the extra cost of safety lamps or any fancied inconvenience which may result from their use when compared with one mine explosion or one mine fire in its financial aspect? Safety lamps are the best insurance premium in a mine. A seam of coal is a layer of inflammable material containing occluded gases in more or less volume; being underground, the means of escape are limited, and the means of ventilation are restricted by the confined area; the necessity of keeping up the roof gives rise to the presence of more inflammable material in the shape of timber, and the grinding of the coal in the haulage boxes and by the traffic of the mine creates a dust which can be detonated. These conditions vary in degree, but not in kind. A non-gassy mine may at any moment become a gassy one, and in underground

conditions nothing is so certain as danger: safety being, as we said before, merely a comparative term. Viewed solely as a preventive of fire, apart altogether from the danger of gas and dust explosions, safety lamps are advisable in a mine. The Port Hood disaster is one more case in point.

The presence of the four Bulgarians in this death roll leads to another consideration. In the hands of careful and experienced miners the naked light may have been permissible in some mines, but when it is found necessary to introduce unskilled men naked lights become a standing menace and disaster is only a question of time. We are not discussing the advisability of introducing foreign and unskilled labor into our mines. This has arisen because of necessity, and from no other cause. But their presence means additional care in supervision. To be frank, the juxtaposition of naked lights, loose powder, and laborers unable to speak English, is unhealthy to say the least, and so it proved.

The other accident caused the death of two of the most valued officials of the Nova Scotia Steel Company, namely, Underground Managers John Dorsay and Councillor Malcolm Stewart. The men were about to descend the No. 1 mine on the 13th of February when, by some error, the cage was sent up into the head-frame, where the Walker safety catch acted and released the hoisting rope. By some means, however, not yet explained, the catches failed to hold and the cage went to the bottom, a drop of 700 feet. This is the first accident of its kind in the whole thirty-one years that No. 1 colliery has been working. The death of two officials of such importance and worth has caused universal mourning among the mining community at Sydney Mines. A sad feature is that Mr. Dorsay leaves ten children. No doubt an enquiry will be made into the failure of the safety hook, which at present seems to have been a pure accident. These safety hooks are called into operation oftener than may be supposed, and it is only very rarely that they fail to act.

Mr. J. W. Devison has resigned as manager of Dominion No. 1 colliery, which position he has occupied since 1905. Previous to that Mr. Devison was manager of International Mine (Dominion No. 8). His successor is Mr. James D. Maxwell, lately manager of Dominion No. 2 and 9. Mr. Absalom Beaton has been appointed manager of No. 2 colliery (Phalen Seam), and Mr. John J. McNeil manager of No. 9 colliery (Harbor Seam).

The Dominion Coal Company have lately been unfortunate with their stores. The Glace Bay store was gutted by fire on the 23rd January, and the Dominion No. 1 store was entirely destroyed by fire on the 4th instant. The total loss is somewhere about \$50,000, fully covered by insurance.

It is now being realized by some who made railing accusations against "Company's stores" that they are not altogether an unmixed evil from the standpoint of the employee. One thing is certain, that they are a powerful weapon in the hands of the coal companies with which to protect their workpeople against the exactions of unscrupulous tradesmen and local combines, and that they tend to keep down the cost of living is undeniable. This is the secret root of the opposition to them, such opposition being engineered so as to appear as if it emanated from the workpeople. The only valid objection to the company's stores is that in the past they have been too lenient in the matter of credit and have laid themselves open to the accusation of encouraging thriftlessness. Under the present regime this is decidedly not so. The fact that throughout the present winter the stores of the Dominion Coal Company have sold butter at from 30 cents to 32 cents per pound against from 33 cents to 36 cents per pound charged by other merchants should tell its own tale. Men who think do not usually quarrel with their bread and butter. If the coal companies apply their vast organizations and purchasing powers to the cheapening of the cost of living for their workmen, where is the iniquity of company's stores? The day when the vicious practices that antedated and led up to the Truck Acts could be carried on has gone by, and such practices have never been

in existence in Cape Breton since the advent of Dominion Coal, and probably never before.

Although it is February, and it is supposed that no intoxicating liquors are being sold in Cape Breton, if one may believe the inspectors, the problem of the "pay-day drunk" is still with us. A few actual figures may illustrate its effect on the operation of the mines. The average daily output of the Dominion Coal Company's mines from the 27th January to the 31st inclusive was 13,200 tons. Saturday, the 1st February, was pay day, and the average daily output from the 1st to the 8th, inclusive, was 9,800 tons per day. From the 10th to the 15th, inclusive, the output was an average of 11,500 per day. The day before pay day, that is the 14th, the output was 12,300 tons. Saturday, pay day, produced 9,200 tons, and Monday, the 17th, produced only 9,000 tons. The difference between these figures is attributable to the effects of pay day and nothing else. A fair estimate is that 14,000 tons per month is lost in outputs by men staying off after pay day. The curve of outputs when plotted resembles the Alps, being a steady rise for thirteen days after pay day to a maximum height the day before pay day. Then comes a fall, which takes another fortnight to overcome, and this kind of thing is a continuous performance. And the amusing part of it is that theoretically Cape Breton County is *dry*. If this be done in a *dry* county, what will be done in a wet? The Scott Act was sufficiently farcical, but the solemn assurances given us periodically by inspectors—all honorable gentlemen—that no liquor is being sold and that the *lid* is on, have a flavor of comic opera. There is a humorous side to the matter, but it does not appeal to the colliery manager. Unfortunately, outputs are dreadfully practical things, and it is no comfort to a manager to know that his town is theoretically dry, when actually in cold truth perhaps one-tenth of his men are recovering from a drunk. It is not everywhere in Canada that men can afford to loaf in this fashion. It is hard to sympathise with tales of low wages and demands for advances in wages from men who will lose time in this way.

The formation of the Conciliation Board to adjust the differences between the Dominion Coal Company and their men in the matter of wages is now complete. Dr. Arthur Kendall will represent the men, Mr. J. Dix Fraser will represent the company and the chairman, and the third member of the Board is Prof. Adam Shortt, of Kingston, Ont. It is not likely the Board will meet before the 24th.

PORT HOOD.

The following is a summary of the evidence of John Moffatt, Grand Secretary of the P. W. A., a competent authority on conditions of coal mines and mining:—

"We mutually examined the balance inside on the north side of No. 3 level. Found debris on the high level outside of the balance, two little walls about 150 feet, and on the other level a little more. The mine is in a very nice condition, it is a very nice little mine, in fact it is in a splendid condition, well timbered, roadways are kept well and clean. The roof generally seems to be a very good roof, and the timber used is large and well put up. The ventilation is very good, in fact ice was found along No. 3 level south, and in the cans. The air is well conducted, the doors and steppings are firmly placed in the cross-cuts and ribs. I found the condition of the mine, without a doubt, much better than the other mines of the province. The airways are all well placed, and the air well split and divided up. The air was also so properly conducted."

ALBERTA.

TABER.

It is reported that Spokane men have bought 440 acres of coal land at Taber for the sum of \$75,000. A company under the

name of the Stanton Coal Mining Company, with a capital stock of \$125,000, has been organized to develop the property. It is stated that it is the intention of the company to put the product of the mine on the Spokane market.

Dissatisfaction still continues at the rate of wages paid in some of the small mines in the Woodpecker district, near Taber, and it is probably that a Board of Investigation under the Lemieux Act will be formed to settle the wages question.

EDMONTON.

The Morinville mines, owing to the lack of market cause by the mild weather, have closed down No. 1 and 2 shafts. Only No. 3 shaft will be operated to supply the Canadian Northern Railway. No. 3 shaft is sunk in the centre of the coal basin, and can therefore be more cheaply operated than the other two shafts, also as this was the last shaft to be sunk it is better equipped and can handle the coal to better advantage. The miners' union officials complain that the company is keeping on single men and turning off married men, but the real state of affairs is that the company is dispensing with the services of the men who are discontented with their wages and are agitating for advances. This is the inevitable result of slack trade; "the kickers" are the first to be laid off.

Two very important bills have been introduced in the Alberta Legislature this session. The one is an "eight hours bank-to-bank" bill for miners, and the other is a workman's Compensation Act. Hon. W. H. Cushing, Minister of Public Works, introduced the former, and Hon. C. W. Cross, the Attorney-General, introduced the latter.

Hon. Mr. Cushing gave a long and interesting speech on the eight hours bill on the introduction of that measure. He cited the various laws in European countries limiting the hours of labor underground.

Several acts regulating hours of employment had been passed in the States, but these had been declared unconstitutional owing to the constitution in the United States making interference between contracting parties impossible. Hon. Mr. Cushing showed from statistics how in England, where the hours of labor were longest, the number of accidents was largest, and where the hours of labor were shortest the number of accidents were fewest. In England when it was proposed first to reduce the hours of employment of boys underground the claim was advanced that the industry would be ruined, but instead the industry had prospered.

It was found that men working underground could do more or as much work in eight hours as they could do working ten hours per day.

The Act which it is proposed to bring into force on March 31st, 1909, is very comprehensive. Under its provisions a workman shall not be below ground for the purpose of his employment, or of going to or from his employment, for more than eight hours during any consecutive twenty-four hours.

The owner, agent or manager of every mine shall fix for each shift of workmen in the mine the times at which the lowering and raising of men from the mine is to be commenced, and completed in such manner that each workman shall have the opportunity of returning to the surface without contravention of the time set out in the Act.

A register is to be kept by the mine owner as to the times at which the men go into the mine and come up, and the workmen may appoint one of their number to see that the provisions of the Act are being complied with.

The making of any false entry incurs a penalty. There are certain exemptions as to furnacemen, pumpmen, horsekeepers and mine officials, men engaged in work in cases of accident or in extensive repair work.

A repairing shift may also work an extra shift on a Saturday to prevent Sunday work.

The Act may also be suspended by Order in Council for a stated period in case of any emergency, such as a fuel famine, etc.

The Hon. C. W. Cross made a lengthy speech on the Compensation Act on the occasion of the bill being given its second reading in the Legislature.

This bill, "An Act with respect to Compensation to Workmen for Injuries Suffered in the Course of Their Employment," previously introduced by Hon. Mr. Cross, was explained by him at length. The bill has now been referred to committee of the whole, where in the usual mode of procedure it will be considered clause by clause, its details entered into and what amendments are desirable made.

The scale of compensation provided includes weekly payments during incapacity for injury not to exceed \$10, as well as payments of a lump sum to defendants, on death of workman from injury, this sum not to exceed \$1,500. Arbitration is arranged for fully, as are schemes of insurance or compensation upon which the employer and employed may agree. The bill is to a large extent similar to that in force in Great Britain, adapted, however, to the conditions in this province. Hon. Mr. Cross said, in moving the second reading of the bill: "The principle which underlies this Act is the same as that which underlies the various systems of workmen's insurance which have been in force in Europe for more than 15 years."

He went on to show how poor a chance a workman had to obtain compensation under the old Employers' Liability Acts.

Hon. Mr. Cross, proceeding, said: "The discussion evoked in the early eighties by the Employers' Liability Acts brought out the fact which had not hitherto been sufficiently recognized, that a large percentage of accidents were due either to chance or to occurrences practically beyond human control, or at least to causes the responsibility for which could not be located, and that under modern conditions the class of accidents that was due to the character of the industry itself was growing proportionately very much larger than the class of accidents which was due either to the employer or that of the employee.

"It was shown by statistics collected at that time that considerably over 50 per cent. of the accidents occurring in the various parts of Europe in industrial employments were traced to the character of the industry in which the workmen were engaged. That is to say, to the fact that it was more or less of a hazardous occupation, rather than to any specific cause, such as negligence in either the employer or employee.

"There did not seem to be any reason why the burden of accidents of this kind should not be made to constitute an item in the cost of production in the articles produced by such industry in the same way as any other item of cost in that production.

"The amount of compensation under this Act varies under different circumstances. In each individual case it has to be determined by the amount of the injured person's earnings.

"The amount of compensation payable in the case of a person's death from injury from accident differs according as to whether such person leaves:

- "(1) No dependents.
- "(2) Partial dependents.
- "(3) Dependents wholly dependent.

"Where the deceased leaves no dependents then the compensation payable is limited to the reasonable expenses of medical attendance and burial, but in no case to exceed \$100.

"Where he leaves persons partly dependent on him, the amount is fixed by agreement or by arbitration, according to the nature of the case.

"Where the deceased workman leaves dependents wholly dependent upon his earnings the amount of compensation payable

is a sum equal to his earnings in the employment of the same employer during the three years immediately preceding the injury from which he dies, or \$1,000, whichever of these two sums is the larger. However, in no case is the amount to be more than \$1,500."

Mr. W. C. Simmons, the member for the mining district of Lethbridge, also spoke in favor of the bill and said that on the whole he felt that the bill was an admirable one, and would recommend itself to every fair-minded person in Alberta.

SASKATCHEWAN.

TAYLORTON.

John Galvin, vice-president of District 18, United Mine Workers of America, who is organizing the miners in the Souris coal field, has met with considerable opposition from the mine owners in that district. The union movement commenced with the workmen, who formed themselves into a local union and then made representation to District 18 of the U. M. W. of A. to be admitted to their organization.

The Taylor mines, the Manitoba and Saskatchewan Coal Company mines, and the Roche Perceé Coal Mining Company mines are the chief coal-producing outfits in the district. At all three mines the men have been organized. Last week, as reported, strenuous objection was made by Senator Watson to the presence of Mr. Galvin, the organizer, on the property of the Manitoba and Saskatchewan Coal Company property, and now all men who have joined the union at the Taylor mine have been dismissed.

The bulk of the capital invested in the Souris coal field comes from Winnipeg, and a considerable quantity of the coal finds its way into the same city. The coal is also shipped as far north as Saskatoon, where it competes with Edmonton coal, and as far west as Moose Jaw, where it competes with Galt coal.

The coal is a lignite and, although not a high grade lignite, yet makes a good fuel for domestic use. It is also used as fuel at elevators and milling plants, and has been tried on locomotives, but without success in this latter case.

BRITISH COLUMBIA.

ROSSLAND DISTRICT.

The Centre Star Consolidated, Le Roi, Le Roi 2, Limited, and Evening Star mines are working and shipping steadily, the combined tonnage averaging about 5,600 tons of gold-copper ore per week.

Mr. W. A. Carlyle is now in the camp, and is interesting himself in Le Roi affairs. He is a man who has enjoyed a wide experience in copper mining, and no doubt his services will prove valuable to the Le Roi Company. At the Northport smelter but one of their battery of six furnaces is running at present, this furnace handling 200 tons of ore per day. Most of the ore smelted, of course, is shipped to the smelter from Le Roi mine, but they are also getting about 200 tons per week from the United Copper Company, of Chewelah, Wash, 50 to 100 tons from the First Thought, Orient, Wash., and 30 tons from the Queen, Salmo, B.C.

The Consolidated Company smelter at Trail is smelting about 5,500 tons per week. The receipts of lead ore for January were 3,682,594 pounds, more than half of which came from St. Eupene mine. The next largest shipper was the Vancouver, in Slocan, which is controlled by Le Roi 2.

BOUNDARY.

The Granby Company has been maintaining shipments since last writing with the exception of week ending February 12th,

when owing to some extra work having to be done only 17,000 tons was sent to the smelter. The total shipments from the Granby's Phoenix mines for January were 74,203 tons. Figuring on the basis of 24 pounds copper per ton of ore, the Granby must have produced about 1,725,000 pounds of copper in January.

A few men were put to work in the Snowshoe mine early in the month and got out about 400 tons of ore, which was shipped to the Trail smelter. This was shipped to meet some special requirements at the smelter. When the Snowshoe is working full force the major portion of its output is sent to the smelter of the British Columbia Copper Company, and only about one-third is smelted at Trail. Snowshoe ore is valued as a flux at the Trail smelter, but it is situated 100 miles from the mine, whereas the British Columbia Copper smelter is only 16 miles distant. Nothing new has been divulged as to when the Snowshoe and British Columbia Copper properties will resume operations.

There is much talk in Greenwood anent a proposed 3-mile tunnel to be driven from some point near that city to Phoenix camp, tapping the ore bodies of the latter place at some 2,100 feet depth. The estimated cost of the project is \$3,000,000, and the Greenwood City Council may bonus the proposition in the sum of \$50,000. Messrs. Johnson, Peacock and Armstrong, of the Crescent mines, in Skylark camp, are the promoters of the idea and think that they can get Chicago capital to finance the scheme. While this work would no doubt be a source of gratification to the owners of mineral claims which it would pierce, the writer is somewhat skeptical as to whether the thing would pay the promoters unless they can make a reasonable arrangement with the mining companies as to ore encountered, or unless they would be entitled to certain tunnel claim rights, such as enjoyed in parts of the United States, a point which the writer is unable to ascertain at this writing. One thing is clear, it would not pay the Granby and other Phoenix mining companies to ship their ore through such a tunnel.

Spokane people have acquired an interest in the Bertha Con. G. M. Company and intend to put a small plant on the property and work it. A recent shipment of 500 tons sent to the smelter gave returns of \$55 per ton.

NELSON.

The Hall mines smelter and the Silver King mine here have passed into the hands of the debenture holders, and it is hoped that work will be actively prosecuted on the Silver King now and the mine and smelter made to pay. The Silver King mine paid well in the early part of its working days, but the ore was lost and the mine closed until lately when it is claimed the lode was again encountered. The smelter was built especially to treat Silver King ores and was never very successful as a custom plant for several reasons. The plant is a little out of date now, and will no doubt have to be remodeled before economical smelting can be done there.

The Vancouver group has leased the Wakefield mill from the Hewitt Company. The Hewitt Company expect to treat about 100 tons of ore per day in the near future and ship a couple of cars of concentrates to the Trail smelter.

Minneapolis capitalists have been looking over the Orehill and other Salmo properties. Salmo camp is busy just now. The Emerald recently shipped three cars of ore to Trail, the Nugget mine two cars, one of which assayed over \$100 to the ton. Mining is quiet in the Lardeau. The Blue Bell mine is now employing about 100 men. The Argenta and La Plata mines still remain closed down.

EAST KOOTENAY.

The St. Eugene mine is working steadily, and is shipping 325 tons of ore per week to Trail, in addition to the quantity concentrated. A body of ore 40 feet wide and 300 feet in length has just been opened up on what is known as the "2,000 foot

level" of the mine. Mr. S. G. Blaylock, formerly of the Hall mines smelter, has succeeded the former superintendent, Mr. W. P. White.

At a recent meeting of the Sullivan Group Manufacturing Company, Mr. James Finley, formerly in charge of the mines, was appointed manager of the mines and smelter, and the head office was removed to Marysville from Spokane. It is certainly the best policy for the offices of a mining company to be right at the mines, as it is much more convenient for all concerned and certainly more economical.

CROW'S NEST.

Coal mining is quiet along the Crow's Nest Pass line, but the Crow's Nest Pass Coal Company and the International Coal Company are working regularly. The former company will make extensive improvements to their plant in the near future, with a view to augmenting their output. These additions will entail an expenditure of nearly one million dollars.

Work is proceeding at a good rate at the Hosmer mines of the Canadian Pacific Railway Company, where 200 coke ovens and a large tipple are being constructed. At the expiration of the coke contract between the Trail smelter and the Crow's Nest Pass Coal Company the Canadian Pacific Railway Company will supply that plant and all of its mines and western lines with its own products. As the output of its mines will be greater than its own consumption, the railway company will be in the market as a vendor.

The proposed legislation whereby the coal miners will be constrained to pay a tax of ten cents per ton on coal mined and of fifteen cents per ton on coke manufactured, instead of five cents

on coal and nine cents on coke as heretofore, is causing considerable comment among the coal mining men. While it is only right that the province should derive some revenue from its rich coal and mineral lands, still, legislation in this direction should be tackled with due care and the already heavily taxed mining industry should not be made to bear a burden that will prove a detriment to its progress. The competition of Alberta coal mines and the view that prospective investors will take of it, together with the possibility of adding more to the two per cent. load now carried by the metal mines, through the coking and smelting industries, must all be carefully considered. However, there is little doubt but when the whole thing is threshed out legislation will be enacted that will benefit all concerned and the taxation will be placed on a more uniform basis than it was before.

We cannot be too emphatic in our exhortations to small investors in regard to buying stock in mining propositions that they know nothing about. The days of the "wild-cat" are not past by any means, and like the humble pussy of the domesticated variety, by means of its nine lives, is still with us. Just because the promoters secure a glowing write-up in some of the daily papers and show assay certificates running into high figures, does not say that the mine is a proposition that can be worked on an economical and businesslike basis. There are good mining companies who seek capital in this way, but those with merit are few and far between, and concerns who inform the possible investor that "next month the stock will advance five cents per share" and use like catch phrases are to be shunned. In fact, if one has not seen the property or had a report on it from some banker or commercial agency it would be better for them to keep their savings where they know they are safe and are earning the usual three or five per cent.

GENERAL MINING NEWS

NOVA SCOTIA.

GLACE BAY.—A circular issued by the Dominion Coal Company announces that J. W. Devison, manager of Dominion No. 1 colliery, has resigned. James Maxwell, manager of No. 2 colliery, succeeds him. Collieries Nos. 2 and 9 will hereafter be managed by two men instead of one.

Deputy Minister Mackenzie King arrived here last week. Mr. J. Dix Fraser is the representative of the company, and Or. Arthur Kendall, M.P.P., for Cape Breton, the men's representative.

The Dominion Coal Company have commenced sinking an air shaft at their new Dominion No. 12 colliery, and have quite a large force of men at work there. Superintendent of Mines Fergie said the company were well satisfied with the progress made at the new Victoria colliery during the past few months. He said the sinking of the new shaft was being carried forward with splendid results, and it was down to a depth of 535 feet. They were hoisting an average of 100 tons of coal daily at the new colliery. The company have had only about sixty men employed at No. 12 up to the present time.

The new long wall mining machine is in operation on the Phalen seam. It is a disc diamond coal cutter. The picks are attached to the sprocket itself and the chain is done away with.

HALIFAX.—Dr. A. S. Kendall, senior M.P.P. for Cape Breton, has given notice of a motion for the appointment of a commission to inquire into all the conditions of coal mining in Nova Scotia. The commission, if granted, will be instructed to ascertain, and make public, the present truth as to the following:—

1. The extent and conditions of the Province's asset in coal.
2. The conditions of coal mining leases.
3. The methods employed by promoters to form companies and to obtain capital.
4. The preparation of plans for new mining enterprises and extensions.
5. The methods of mining and losses of coal to the Province incident to mining.
6. The prices of coal in this Province and beyond the Province.
7. The remuneration of miners, provisions for old age, for injuries and dependents of miners.
8. The enforcement of laws intended to lessen or prevent accidents.
9. Further requirements to prevent accidents and to afford relief to victims or the dependents of victims.
10. And other matters relating to mining.

NEW BRUNSWICK.

ST. JOHN.—F. J. Jones, manager of the Dominion Iron & Steel Company, of Sydney, C.B., which has completed the negotiations and taken over the iron mines of the New Brunswick Iron Company, at Lepreaux, was in the city to-day, and said that men have already started at work drilling to locate the body of ore. Asked if it was probable that a smelter would be built on the new property, he said that was a matter for the future to decide.

ONTARIO.

COBALT.—During 1907 a complete plant was installed at the Nancy Helen. The strike delayed mining operations; but now the No. 1 shaft is down 125 feet. Two drifts at the 100 foot level, on two diverging veins, are in 40 and 44 feet respectively. The shaft will be sunk to 200 feet and levels started at 50 foot, 100 foot, 150 foot and 200 foot. Crosscutting will be continued at the 100 foot level to catch the Buffalo veins. Five cars of ore are on hand. A concentrator will probably be erected.

A strike was made recently at the Badger mine, in No. 6 shaft, on what is known as No. 9 vein. This shaft was sunk in calcite, where only cobalt was shown on the surface, but at a depth of 72 feet the vein is from four to eight inches in width, and shows plenty of native silver, argentite and niccolite.

During January the Nipissing Company shipped six cars of ore of 180 tons, containing silver estimated at \$322,900 ounces, and valued at \$166,000. This makes the second largest shipment in one month since January, 1907. In September, 1907, shipments amounted to 323,000 ounces, which marks the record for that year.

Shipments for the week ending February 22nd were smaller than usual. The City of Cobalt with 42,960 pounds, the O'Brien with 129,860 pounds, the Temiskaming with 56,250 pounds, and the T. & M. B. with 125,000 pounds, totalling 355,070 pounds, or 177 tons, made up the week's record.

Up to the middle of October last nearly five hundred companies had been incorporated for the purpose of carrying out mining operations in the Cobalt and Larder Lake districts. Four hundred and ninety-one companies received charters, and of these the great majority proposed to operate in the Cobalt district. The total capitalization of these companies totals \$472,326,000. The total paid-up capital amounts to about \$79,273,838. The total capitalization has been further increased by many added millions. A further analysis of the figures shows that of the 491 companies previously referred to no less than 240 were incorporated with their proposed capital set out as being a million dollars or over. In eighty-nine cases the capital was between \$500,000 and \$1,000,000; 104 between \$100,000 and \$500,000, and 60 under \$100,000.

OTTAWA.—Mr. John Retallack and Mr. Louis Pratt, of Kaslo, B.C., representing the Boards of Trade and owners of lead mines in British Columbia, presented petitions to the Government on the 20th of February, asking for a renewal of the bounty on lead for another period of five years. The conditions asked for are different in many respects from those now in force. In 1903 the Government appropriated \$2,500,000 to be paid in lead bounties between them and June 30th, 1908. The bounty was to begin automatically whenever the English price of lead fell to £12 10s. per long ton, and was to be paid at the rate of 75 cents per 100 pounds, or \$15 per short ton, until the price of the British Columbia product reached £16, when the bounty would stop. This stimulate and developed the British Columbia lead industry. But owing to the fact that the price of lead in England rose above the minimum £12 10s. soon after the bounty was inaugurated, and is now about £14, the bounty was partly inoperative. Consequently, by next June, when the arrangement expires, only \$750,000 of the original \$2,500,000 appropriated, will have been expended. The lead miners are therefore asking for a new appropriation of \$2,500,000, and are requesting the the bounty begin when the English price is £14 10s. and cease at £18. Even this will afford but moderate protection to British Columbia. Lead produced in that province is shut out of the United States by a duty of \$42 per ton, but receives very little protection in the Canadian market. The smelting charges in British Columbia are low. But the cost of marketing is heavy. The industry will

be put on a firm footing and the market facilities will be improved by Government assistance at this conjuncture.

ALBERTA.

CALGARY.—On February 12th a joint committee of mine operators and workers met in Calgary. The object of the meeting is the settlement of disputes. Mr. L. Stockett, of the Bankhead mines, is chairman. The union, the miners, and the operators are represented. The meetings are being held in camera.

BRITISH COLUMBIA.

FERNIE.—The pay roll of the three collieries of Coal Creek, Michel and Carbonado amounts to \$185,236.25.

HOSMER.—The Hosmer Mines Company have expended to date \$1,500,000. Shipments of coal will begin in 1908 and will be increased as the market requirements justify to 3,000 tons a day. The first installation of coke ovens will have capacity of 300 tons a day.

VANCOUVER.—The first shipment of coal from the collieries of the Diamond Vale Iron & Coal Company, in the Nicola country, has reached Vancouver.

ROSSLAND.—The main ledge of the Stemwinder mine was struck at the 500 foot level last week. It is 80 feet from the station, and men are now working their way through the ledge.

The Vancouver mine near Silverton is shipping zinc ore to Antwerp. Two more compressors are to be put in at this mine.

NELSON.—The Kootenay Engineering Works are installing their portion of the machinery for the Canada Zinc Company. The roaster has been rivetted and the whole plant will shortly be in readiness.

At a meeting of the Nelson Board of Trade it was resolved to telegraph the local member of the Provincial House, Mr. G. A. B. Hall, asking him if possible to obtain delay in the passage of the coal tax bill. The telegram was sent in response to representations made by the Fernie Board of Trade.

The Hall Creek Placers, ten miles south of Nelson, are to be worked this spring. All the claims will be consolidated under a large company. On one of the leases an hydraulic plant will be supplemented by a set of Wilfley concentrating tables.

NELSON.—The Hewitt Mining Company will commence milling ore within two months. The mill is awaiting the construction of a subsidiary tramway. Much of the material of construction has been manufactured in Nelson.

VANCOUVER.—The sending of a lot of Australian and New Zealand miners to the Marble Bay mines may give rise to trouble with the labor organizations.

NELSON.—Arrangements for the consolidation of the Krao with adjoining properties are almost completed. The Krao Company was floated last year on a \$600,000 capital. The mine is at Ainsworth on Kootenay Lake.

The Consolidated Mining & Smelting Company has announced that owing to improved market conditions a reduction will be made in the smelter tariff for lead ores. The Trail smelter has been accumulating lead ore steadily, whilst the American smelters have refused it throughout the stringency.

BARKERVILLE.—The Canadian Creek shaft was unwatered on January 2nd. It bottoms in two feet of clay. The Willow River Mining Company began breasting pay gravel during the latter part of January.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

Extensive alterations are being carried out at the Vale coal pit, Birtley Black Fell, England. A new winding engine has taken the place of one that has done service for 120 years, and the output will be increased from 480 to 900 tons per day.

The Newport Chamber of Commerce have unanimously expressed their condemnation of the mines eight hours bill. Newport is the third largest coal-exporting port in Great Britain, and it is asserted that the adoption of the measure would reduce the export by 750,000 tons per annum.

GERMANY.

The Eich Huttenverein, Le Gallais-Metz & Company, of Luxemburg, have decided to erect a larger electric steel works, with plant on the improved Kjelin induction furnace system. Experiments carried on for eight months with a view of producing special qualities of steel and steel castings have yielded favorable results. The output will be 250 tons per day.

The Hansa Coal & Coke Company, Bremerhaven, which has hitherto drawn its supplies from England, has contracted with the Rhenish-Westphalian Syndicate for 2,000,000 tons of coal.

The Prussian Government has introduced a measure authorizing the development of the coal properties in the Dortmund district, acquired by the State in 1902, by means of three new shafts and to raise 55,000,000 marks for the purpose.

AUSTRO-HUNGARY.

An investigation of the Rivers Drau, Mur and Danube, which have furnished much alluvial gold in Hungary, has led to the conclusion that in the Tyrol, Salzburg and Styria there must be numerous unworked gold veins.

AUSTRALASIA.

Gold dredging in the Bright district, Victoria, is yielding well, and it is expected that the value of the output for 1907 will run over £125,000.

Additions to the milling plant of the Waihi Gold Mining Company at Waikino, New Zealand, have been made on an extensive scale. When completed in March the treating capacity of all the company's mills will be about 30,000 tons per month, and the bullion output will reach £70,000. The power will be supplied by gas-producing engines of 1,000 horse-power capacity.

SOUTH AFRICA.

In accordance with an agreement with the De Beers Company, the Premier Company is about to shut down a tube mill and magnetite separator and part of the washing gear, which it is estimated will result in a reduction of the diamond output of 30,000 carats per month.

A cablegram from Pietermaritzburg, Natal, states that an explosion in a coal mine at Glencoe, on February 14th, buried five Europeans and forty natives. A rescue party of five Europeans and twenty-five natives, headed by Government inspectors, went down, when another explosion occurred, burying them. All but eight natives were at last accounts supposed to have perished.

A dredger belonging to an English syndicate is operating on the Queen's River, Transvaal, just below its junction with the North Kaap river. It has a capacity of 1,500 tons per twenty-four hours.

JAPAN.

A combine of 32 owners of collieries in Fukuoka, Oita and Kumamoto prefectures has been effected, and a company organized under the title of the Dai Nippon Taeko Kaisha (Japan Colliery Company). They are endeavoring to secure a foreign loan for the improvement and extension of the mines.

The results of official investigation on the Japanese portion of the island of Sakhalien show that it presents a favorable field for mining enterprises. Concessions for the working of two coal mines have been granted.

INDIA.

The production of coal in British India has continuously increased since 1886. In 1878 it was 1,015,210 and in 1906 had risen to 9,783,250 tons. Ceylon and the Straits Settlements are the principal export markets.

TUNIS.

Mining made considerable progress in 1906 as compared with the previous year. The phosphate exports increased to the value of 18,000,000 francs as compared with 12,000,000, and the output of copper, zinc and lead ores also showed an increase.

UNITED STATES.

From the Deer Trail district in Eastern Washington tungsten ore is to be shipped to the Krupp people, Essen, Germany. About two tons per day is the output.

The rush to the new Nevada gold camp at Rawhide is said to be the greatest in the history of Pacific coast mining. Thousands from California and the East have been attracted since the middle of January. Other camps are being deserted and there were at last accounts some 3,500 people in the camp. The ore is claimed to yield very high values. It is quartz and porphyry, and most of the rich finds have been on the surface. The rock is somewhat porous and will prove a free-milling medium, running up well in gold percentages with very little silver.

Mr. Joseph A. Holmes, chief of the technological branch of the United States Geological Survey, has been delegated by the Government to make experiments, probably at Pittsburg, to devise some better means of protecting miners from gas and coal dust explosions in coal mines.

The output of ore from the Cripple Creek district for January was the largest on record since the labor troubles of 1904, amounting to 56,785 tons of a gross bullion value of \$1,445,820, being nearly a quarter of a million in value in excess of the production of January, 1907.

MEXICO.

Since the first of the year about 400 men have been added to the working forces of the companies operating at Cananea, most of them being employed by the Greene-Cananea Company.

The Los Obates Mining Company, in which British capital is largely invested, has taken over the silver mine of J. Solis in the Obates mining district, Chihuahua, which has produced over \$1,000,000. A concentrator will be added to the plant, which already includes a 10 stamp mill.

COMPANY REPORTS.

The first annual report of the Cobalt Lake Mining Company has come to hand. Pressure upon our space has made it impossible to give this important document editorial notice. In our next issue, however, such notice will be given. Meanwhile THE CANADIAN MINING JOURNAL'S congratulations are tendered to the working executive of that company. Pitfalls have been evaded and progress has been made. The managing director, Mr. D. B. Rochester, and the engineer, Mr. E. L. Fraleck, have won and maintained the confidence of the shareholders. This they have done in the face of some large and many petty discouragements.

Before discussing the body of the report it may be said that the JOURNAL has no sympathy with a certain class of obstructionists who are attempting, by means of legal technicalities, to block the progress of the Cobalt Lake Mining Company. If the claims of these men have even the color of genuineness they should have been settled or compromised long ago. If they have no just cause of complaint, they should be arbitrarily and forcefully quieted. The questions involved, also, could be settled by arbitration.

Under date of December 31st, 1907, the engineer, Mr. Fraleck, reports as follows:—

The work done on the company's property up to date consists of 1,393 feet, made up of 160 feet of raising, 567 feet of sinking and 666 feet of drifting.

"The north shaft has been sunk to a depth of 70 feet and a station cut at the 60 foot level. It is the intention to continue this shaft a further depth of 60 feet and prospect the north end of the lake by means of drifts at the 120 foot level.

"No. 4 shaft is 154 feet in depth with the first level at 86 feet. Three hundred and twelve feet of drilling and crosscutting has been done, comprising 60 feet of drifting on the No. 4 vein, 86 feet of drifting on the No. 3 vein, and 166 feet of crosscutting. It is the intention at the 154 foot level to drift across the lake on the strike of the No. 4 vein and crosscut to the No. 3 vein, which may then be opened up by a drift and rendered available for stopping in a manner similar to that on the first level.

"No. 6 shaft has attained a depth of 90 feet, with a station at the 70 foot level and a drift to the east on the vein 23 feet. It is the intention to sink this shaft an additional 40 feet and crosscut to the south end of the lake at the 120 foot level.

"These shafts will comprise our main working shafts, and to them the work at No. 1, No. 2, No. 3 and No. 5 will be subsidiary, for example (the company's No. 5 shaft is 100 feet in depth with a station at the 93 foot level) 42 feet of drifting has been done on the No. 5 vein, a crosscut run to the south a distance of 68 feet and to the north 139 feet. An additional 50 feet to the north will connect the No. 5 workings with those of No. 4, which can then handle the work of the No. 5 shaft and eliminate the expense of its maintenance.

"All of these shafts have been substantially timbered."

Mr. Fraleck's report is followed by that of the managing director, Mr. D. B. Rochester, who writes under date of January 17th:—

"Plant and Equipment.—The statement of present value, which stands at \$37,365, consists of two 100 horse-power boilers, 13 drills cross compound air compressor with condenser, electric light plant, 3 air receivers, and a pipe line which covers our

boundary from the north end of the lake to the McKinley-Darragh line, a distance of seven-eighths of a mile, with four hoists, pumps, drills and everything required for a first-class plant, hoist houses, ore houses, two blacksmith shops, shaft houses, store-houses, water tank for fire protection, and all the accommodation necessary for housing and boarding 75 men.

"Development.—The entire development charges, amounting to \$40,000, is more than covered by ore at present bagged and in the ore house, and nearly completes the most expensive part of our development, that is, the sinking of the shafts.

"Ore on Hand.—The amount of ore actually bagged and ready for shipment amounts to 52,000 pounds first grade silver ore, 30,000 pounds second grade silver ore, and 90,000 pounds of smaltite, niccolite and cobalt ore. This I will not attempt to estimate the value of, but feel satisfied that we have enough to cover all we have spent in development work.

"Conditions at Present.—It would be unfair to attempt to give an estimate of the value of the ore in sight, as it would be altogether speculative and not at all reliable. We have seven veins that we have done more or less sinking on, three of these are smaltite and niccolite veins that run from two to six inches in width, one niccolite vein, that we have drifted to at the 86 foot level and at that depth is from 26 to 28 inches in width, and has lessened in niccolite and increased in cobalt. This we are drifting to at the 154 foot level and hope at that depth to get good silver values. The other three are silver, cobalt and smaltite, and it is from these that we have taken nearly all our silver ore. We have at 80 feet struck a slate formation which continues for a depth of about 12 feet and changes again to conglomerate. In one instance we have lost our vein in this formation and, although we have gone below this for a considerable depth without recovering it, still, it may be either to the north or south of our shaft. The other veins we will drift to at the first level.

"Owing to the great activity in the camp in the summer of 1907 and the demand for the better or skilled class of labor, the work was more expensive than usual. The strike by the Western Federation of Miners on the 8th of July increased the difficulty and made it impossible to properly man the property for at least six weeks or two months.

"The Future.—Our aim is to get our shafts at the north and south end of the lake down as quickly as possible, so that we can drift under the lake at both ends and also at our No. 4 shaft, where we are now 154 feet in depth. We have at the south end the three veins of the McKinley-Darragh, and at the north end the prospect of the Right of Way vein. We have a first class plant in every particular, and has worked since its installation without a hitch, and to our engineer, Mr. Fraleck, is due the credit for its success. We have demonstrated beyond a doubt that Cobalt Lake can be mined from beneath with perfect safety. Our expense in the way of equipment will be small in the future as it will take the shape of expense maintenance and will be a charge against development instead of equipment as formerly. I have about completed arrangements for shipping a car of first grade ore to Copper Cliff, and expect to do so in a few days.

"We are having a survey of the property made, and a plan showing buildings and shafts, which will be submitted to you with this report."

The fact is mentioned that on the 25th of January, 1908, the first shipment of ore was made. This consisted of 50,878 pounds of first grade silver ore.

The report is accompanied by a not to artistic cut of the plan of the company's holdings.

The financial statement is given, thus:—

FINANCIAL STATEMENT FOR YEAR ENDING 31st
DECEMBER, 1907.

BALANCE SHEET.

ASSETS.

Cash in Bank	\$ 79,534.35	
Mine Plant and Equipment, including Buildings, Equipment, Power Plant, Office Furniture, etc., etc.,	39,340.02	
Supplies	1,658.09	
Insurance, unexpired	188.00	
Development Charges	\$39,940.00	
Ore extraction Charges	912.04	
	<u>40,852.04</u>	
Mine Property	3,635,000.00	
Profit and Loss	132,776.20	
		<u>\$3,929,348.70</u>

LIABILITIES.

Capital Stock	\$5,000,000.00	
Less Treasury Stock still to issue	1,070,834.00	
	<u>\$3,929,166.00</u>	
Accounts Payable	182.70	
		<u>\$3,929,348.70</u>

PROFIT AND LOSS.

EXPENSES. Including Preliminary, Prospecting, Legal, Camp and Head Office Expenses and Salaries \$	27,431.48	
Depreciation on Equipment, etc.,	3,862.16	
Discount on Treasury Stock sold.....	106,124.90	
	<u>\$ 137,418.54</u>	
LESS.		
Interest on Bank balance.....	\$ 3,603.09	
Transfer Fees Account	\$ 1,039.25	
	<u>\$ 4,642.34</u>	
		<u>\$ 132,776.20</u>

The annual meeting of the company, held in Toronto on February 21st, when this report was submitted, was pleasingly quiet. The next annual meeting is to be held in Ottawa. The old board of directors was re-elected with the addition of Mr. E. Marchand, as the representation of Eastern shareholders. Sir H. M. Pellatt was elected president and Mr. G. F. Henderson, vice-president.

RIGHT OF WAY MINING COMPANY, LIMITED.

At the annual meeting of the Right of Way Mining Company, it was announced that during the calendar year, ending December 31st, 1907, \$70,000 had been paid out in dividends. In all, about \$340,000 worth of ore had been taken out of the mine. This includes the \$163,000 awarded to Right of Way in its dispute with La Rose mine. As the Right of Way mine cost only \$50,000, its dividends are, at least, substantial. During 1907 the company sold ore to the value of \$179,621.75. Net profits were \$101,522.35. Two 7 per cent. dividends were paid, totalling \$69,889.75. The profit and loss account shows a balance of \$31,632.57. On plant and equipment \$40,000 has been spent. The 25 per cent. royalty, payable to the Ontario Government, has amounted to \$43,000.

The old Board of Directors were re-elected as follows: President, Mr. Geo. Goodwin; Vice-President, Mr. T. A. Beament; directors, Messrs. Edward Seybold, A. W. Fraser, and Dr. J. F. Kidd; Secretary-Treasurer, Mr. E. A. Larmonth.

NOVA SCOTIA STEEL & COAL COMPANY.

The annual meeting of the directors of the Nova Scotia Steel & Coal Company was held at the Windsor Hotel, Montreal, on Tuesday, February 17th. President R. E. Harris occupied the chair. After fully discussion of the profit and loss account, the statement of assets and liabilities and the general manager's report, the usual quarterly dividends of 2 per cent. on the preferred and 1 1-2 per cent. on the common stock were declared. These are payable April 15th, to shareholders of record, on March 31st next.

Although the New Glasgow works were closed for several weeks at the end of the year, yet the business of the company was the largest in its history. There was a considerable increase in the output of iron and steel, but a decrease in ore and coal. The steel shipments aggregated 53,632 tons, about 25 per cent. over the preceding year. A comparatively small amount of pig iron was sold, almost the whole output being converted into steel.

In May it was decided to single shift No. 3, colling, hence the quantity of coal mined was smaller than usual.

The profits for 1907 were \$944,790.66, as compared with \$960,281.03 for the preceding year.

The amount at the credit of profit and loss account on January 1st, 1907, was \$1,180,783, which, with the profits of the year, makes a total of \$2,125,574.55 to the credit of this account, on December 31st, 1907. Out of this the sum of \$158,904.50 has been transferred to the credit of the special reserve funds, of which \$50,000 is for general depreciation and renewals, \$14,404.50 for blast furnace renewals (being 25 cents per ton on the output of pig iron during the year), and \$14,500 for depreciation of the shipping property owned by the company, \$5,000 has been set aside for a contingent liability in connection with accidents, and the sum of \$75,000 has been placed to the credit of a special account for ore exploration and development. During the year these reserve funds were charged with the sum of \$17,656.79 for new furnace lining, bosh plates, crucible jacket, etc., which are at present in stock, and will be used when the blast furnace is next re-lined.

The balance to the credit of these special reserve accounts is now \$792,237.22, as compared with \$650,989.51 at the beginning of the year.

The balance carried forward to the credit of profit and loss on the 1st of January, 1908, is \$1,202,604.39, as compared with \$1,180,783.89, on the first of January, 1907.

Sum expended.—The sum of \$378,386.37 has been expended during the year on capital account, in equipping the new colliery at Sydney Mines, new forge buildings, at New Glasgow, the purchase of iron ore properties, the development of the submarine iron ore areas at Wabana, and for plant, improvements, etc.

During the year four quarterly dividends of 1 1-2 per cent. each on the common stock, and the usual quarterly dividends of 2 per cent. each on the preferred stock of the company, have been paid.

The annual report of the Dominion Coal Company to be submitted at the meeting early in March, is now being completed, and will show that the total output for 1907 showed a decrease of 75,000, as compared with that of 1906, which amounted to

3,552,746 tons. The money received from the Dominion Iron & Steel Company on the existing two years' contract is being placed in a contingent fund in case the old contract is maintained by the Privy Council, and the money will have to be paid back.

Your directors have to report that the Coal Company has obtained leave to appeal from the judgment of the Supreme Court of Nova Scotia to the Judicial Committee of the Privy Council, in England.

The Dominion Steel Company has issued the following statement:—

The supplementary annual report issued on 20th September last, contains a statement of the claim against the Coal Company, as it stood at the close of the previous month. The position of the claims, as at 31st December, 1907, exclusive of interest, is as follows:—

Paid for extra cost of coal purchased from Dominion Coal Company	\$1,237,235.39
Paid for extra cost of coal purchased from others	402,721.43
Damage due for short deliveries in August, September and October, 1906.	132,252.75
Damages due to cessation of deliveries in November, 1906, estimated..	479,000.00
Total, as on 31st December, 1907, exclusive of interest	\$2,251,209.57

Temiskaming directors have declared their first 3 per cent. dividend. It is payable March 12th. The old boards of both companies were re-elected. The Temiskaming board is composed of: President, Louis Struber; Vice-President, Robert T. Shelling-ton; and directors, Harvey D. Graham, Alex. Fasken, and Harvey D. Roberts, Mr. Graham is treasurer and Mr. Fasken secretary.

The annual meeting of the Cumberland Railway & Coal Company has been postponed indefinitely. Mr. J. R. Cowans, the general manager, was in Montreal recently, but has returned to Springhill.

The annual meeting of the Dominion Coal Company will be held in Montreal on March 6th. Books close on February 21st to March 6th.

STATISTICS AND RETURNS.

CROW'S NEST PASS COAL SHIPMENTS.

The output of the collieries of the Crow's Nest Pass Coal Company for the week ending February 14th, was 21,651 tons, or a daily average of 3,608 tons. In the same week last year the output was 20,219 tons, or a daily average of 3,370 tons. The output for the week ending February 16th, 1906, was 16,773 tons, or a daily average of 2,795 tons.

The output of the Crow's Nest Pass Coal Company for the third week in February, during the past four years, compares as follows:—

	Tons.	Daily aver.
1908	21,205	3,534
1907	21,488	3,581
1906	17,981	2,997
1905	18,457	3,076

Following are the shipments from Cobalt camp for the week ending February 15th:—

	Ore in lbs
Buffalo	63,750
Coniagas	65,440
Drummond	40,000
Kerr Lake	42,610
La Rose	59,390
McKinley-Darragh	386,420
Nipissing	64,200
O'Brien	130,750
Tem. and H. B.	66,000
Trethewey	115,080
Watts	61,700

The total shipments for the week were 767,640 pounds, or 483 tons. The total shipments from January 1st to date, are 4,159,232 pounds, or 2,079 tons. The total shipments for the year 1907, were 28,081,010 pounds, or 14,040 tons.

COBALT ORE SHIPMENTS.

Following are the shipments of ore from the Cobalt camp for the week ending February 8th:—

	Pounds
Drummond	52,340
King Edward	62,370
La Rose	42,452
O'Brien	191,000
Temiskaming	66,000
Watts	61,700

The total shipments for the week were 539,842 pounds, or 269 tons. The total shipments from January 1st, are 3,191,592 pounds, or 1,595 tons.

The London Statist calculates the world's output of gold in 1907, as £82,205,000, or \$411,025,000, against £82,482,000 in 1906, or \$412,410,000, divided as follows:—

	1907.	1906
Transvaal	£27,406,000	£24,580,000
Rhodesia	2,218,000	2,000,000
West Africa	1,160,000	877,000
Australia	15,539,000	16,929,000
India	2,559,000	2,261,000
Canada	2,000,000	2,300,000
United States	17,923,000	18,875,000
Other countries	13,400,000	14,300,000
Total	£82,205,000	£82,482,000

World's production in 1905, was £75,427,000; 1904, £69,378,000; 1903, £65,192,000; 1902, £59,348,000; 1901, £52,198,000; 1900, £50,915,000; 1895, £39,752,000; 1890, £24,260,000; 1880, £22,130,000; 1870, £21,370,000.

Following are the weekly shipments from Cobalt camp, and those from January 1st, to date.

	Week end	
	Feb. 22. Since Jan. 1.	
	Ore in lbs	Ore in lbs
Buffalo		237,500
Coniagas		198,930
Cobalt Lake		50,800
City Cobalt	42,960	42,960
Drummond		92,340
Foster		168,600
Kerr Lake		82,590
King Edward		127,240
La Rose		237,842
McKinley		506,420
Nipissing		437,700
Nova Scotia		40,790
O'Brien	129,860	828,240
Standard		29,730
Silver Queen		243,000
Silver Cliff		52,000
Silver Leaf		62,000
Townsite		45,000
Temiskaming	56,250	115,650
Temiskaming & H. B.	126,000	258,000
Trethewey		115,000
Watts		61,700

The total shipments for the week were 355,070 pounds, or 177 tons. The total shipments from January 1st, to date, are 4,514,302 pounds, or 2,257 tons. The total shipments for the year 1907, were 28,081,010 pounds, or 14,040 tons. In 1894 the camp produced 158 tons, valued at \$136,217; in 1905, 2,144 tons, valued at \$1,473,196; in 1906, 5,129 tons, valued at \$3,900,000. The estimated value of the ore shipments for 1907, is between \$10,000,000 and \$12,000,000.

Following are the coal shipments of the Nova Scotia Steel & Coal Company, for January:—

January, 1908	47,750
January, 1907	38,729
Increase, 1908	8,021

The following are the lead receipts at the Consolidated Mining & Smelting Company's plant, at Trail, for the month of January last. The figures given are in pounds:—

Arlington, Erie	13,219
Arlington, Slocan	15,655
Bluebird, Sandon	24,558
Bluebird, Rossland	2,742
Canadian Group	11,817
Emerald	68,429
Ferguson	92,954
Hewit	9,275
Keystone	1,458
Kootney Ore Co	2,232
Krao	29,749
Lone Bachelor	19,938
La Plata	153,013
Montezuma	29,184
New Jerusalem	23,936
Lightning Peak	12,199
North Star	132,930
Richmond-Eureka	47,516
Reco	39,260

Ruth	154,190
Revenue	19,582
Rambler-Cariboo	108,661
St. Eugene	1,896,677
Standard	198,003
Silver Cup	3,481
Sunshine	9,580
Sunset	85,021
Slocan Sovereign	15,939
Summit	502
Vancouver	305,687
Whitewater Deep	134,008
Whitewater	20,936
Nugget	263

BRITISH COLUMBIA ORE SHIPMENTS.

Week ending February 8th:—

	Week.	Year.
Boundary shipments	17,034	86,366
Rossland shipments	5,382	33,775
Slocan-Kootenay shipments	2,089	16,426

The total shipments for the past week, were 24,505 and for the year to date 136,567 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

Week ending February 15th:—

BOUNDARY SHIPMENTS.

Mine.	Week.	Year
Granby	19,538	105,901
Other mines		23
Total	19,538	105,924

ROSSLAND SHIPMENTS.

Centre Star	2,720	23,579
Le Roi	1,599	10,860
Le Roi No. 2	704	4,306
Evening Star	59	172
Total	5,142	38,917

SLOCAN-KOOTENAY SHIPMENTS.

Sullivan	600	3,900
St. Eugene	534	3,385
Whitewater	22	22
Whitewater, milled	280	1,820
Queen	21	93
Queen, milled	185	1,100
La Plata	62	734
North Star	60	420
Vancouver	22	354
Richmond	77	250
Standard	31	237
Nugget	37	169
Rambler-Cariboo	21	105
Second Relief	25	50
Daily	43	43
Monarch	32	32
Other mines		5,784
Total	2,052	13,478

The total shipments for the past week, were 26,752, and for the year to date 163,319 tons.

Dominion Coal Company outputs, February 1st to 15th, 1908:—

	Tons.
No. 1	20,101
No. 2	30,279
No. 3	14,218
No. 4	11,624
No. 5	24,404
No. 6	8,603
No. 7	3,054
No. 8	5,823
No. 9	12,901
No. 10	2,712

136,719

The Nova Scotia Steel & Coal Company reports for the year ended December 31, as compared with former years:—

	1907	1906.	1905.
Gross profits	\$ 944,791	\$ 960,281	\$559,966
Intest on bonds	260,885	255,038	248,177
Balance	\$ 677,906	\$ 704,643	\$311,729
Deprec. sinking fund, etc.	274,428	236,783	129,753
Net profit	\$ 406,478	\$ 467,830	\$181,976
Prof. div.	82,400	82,400	82,400
Balance	\$ 321,078	\$ 385,460	\$ 90,576
Com. div.	299,256
Sur. for year	\$ 21,822	\$ 385,400	\$ 99,576
Prev. sur.	1,180,785	795,325
Total surplus	\$1,202,607	\$1,180,785

A despatch from Sydney, Australia, says that the gold yield of New South Wales, for January, amounted to 29,361 ounces, valued at £110,583, compared with 37,584 ounces, valued at £126,750, same month last year.

The British Columbia Copper Company has issued a statement for the year ending November 30th, 1907. The profit and loss account is as follows:—

Credits:	
Balance December 1st, 1906,	\$231,022
Premium on stock sales	57,116
Adjustment account	21,724
Income for year ended November 30, 1907,	88,155
Total	\$398,018
Expenses	20,777
Net	\$377,241
Dividends	201,200
Surplus	\$176,041

PIG IRON PRODUCTION.

Philadelphia.—The American Iron & Steel Association has received from the manufacturers complete statistics of the pro-

duction of all kinds of pig iron in the United States and Canada, in 1907. The total production in the United States was 25,781,361 tons, against 25,307,191 tons in 1906. In Canada the total production in 1907 amounted to 581,146 tons, against 541,957 in 1906.

The world's gold production for 1907, in contrast with 1906, as estimated by the Statist, shows a decrease of about £200,00 to £300,000. Of a total estimated output of a value of £82,200,000 for 1907, the Transvaal contributed £2,200,000 and Rhodesia £2,200,000 in round figures.

Market Reports.

New York Metal Market, February 24th:—

Pig iron, quiet; northern, \$17 to \$18.75; southern, \$16.25 to \$18.25. Copper, quiet, lake, \$12.62 1-2 to \$12.87 1-2. Lead, quiet, \$3.70 to \$3.75. Tin, easy; Straits, \$28.50 to \$29.10. Plates, easy. Spelter, quiet; domestic, \$4.70 to \$4.75.

Price changes in metal at New York for the week ending February 15th were as follows:—

	High.	Low.	Close.
Copper, lake	13 $\frac{5}{8}$	13 $\frac{1}{4}$	13 $\frac{1}{4}$
Copper, elec.	13 $\frac{1}{2}$	13	13
Copper, casting	13 $\frac{1}{4}$	12.80	12.80
Lead, spot	3.70	3.70	3.70
Spelter, spot	4.82 $\frac{1}{2}$	4.60	4.82 $\frac{1}{2}$

The week's metal prices at London were as follows:—

	High.	Low.	Close.
Copper, spot .. £60 0 0	£58 10 0	£58 10 0	£58 10 0
Copper, futures . 60 7 6	59 0 0	59 0 0	59 0 0
Lead, spot 14 10 0	14 3 9	14 3 9	14 3 9
Spelter, spot ... 23 0 0	20 13 0	22 0 0	22 0 0

Silver.—February 6th, 55 3-8 cents; February 7th, 55 7-8 cents; February 8th, 55 1-2 cents; February 10th, 57 5-8 cents; February 11th, 56 3-4 cents; February 13th, 57 1-4 cents; February 14th, 57 cents; February 15th, 55 7-8 cents; February 17th, 56 1-8 cents; February 18th, 56 1-2 cents; February 19th, 56 1-4 cents.

The Barret Manufacturing Company takes elaborate pains to supply every inquirer with a free sample of Amatite roofing in order to show what the famous mineral surface is like. This real mineral surface is firmly embedded into the top surface of the roofing and is, of course, practically indestructible by wind or weather, and can be exposed to the elements without fear of damage. Paint or coating is not needed for Amatite, and the manufacturers do not manufacture anything in the way of paint for use upon it. An Amatite roof, once laid in position upon a shaft house will stay there indefinitely without further care or attention of any kind. This is a vast improvement over the roofings which require a new coat of paint every two or three years; and if Amatite cost more than the other roofings it would still be worth while for this reason alone. Amatite, however, does not, in fact, cost as much as other roofings, and farmers who are preparing to roof any of their buildings should investigate it. The Barrett Manufacturing Company, New York, Chicago, Philadelphia, St. Louis, Cleveland, Allegheny, Cincinnati, Kansas City, Minneapolis, New Orleans, Boston, will send a sample on request.