

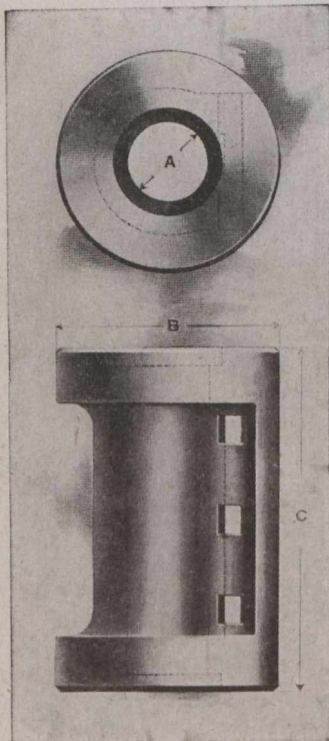
# CANADIAN MINING JOURNAL

VOL. XL.

February 12th, 1919

No. 6

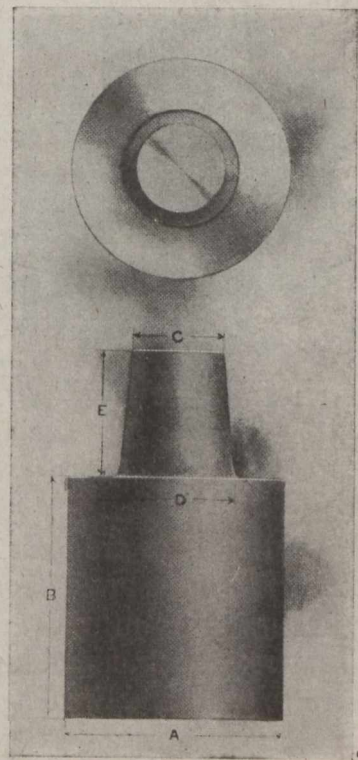
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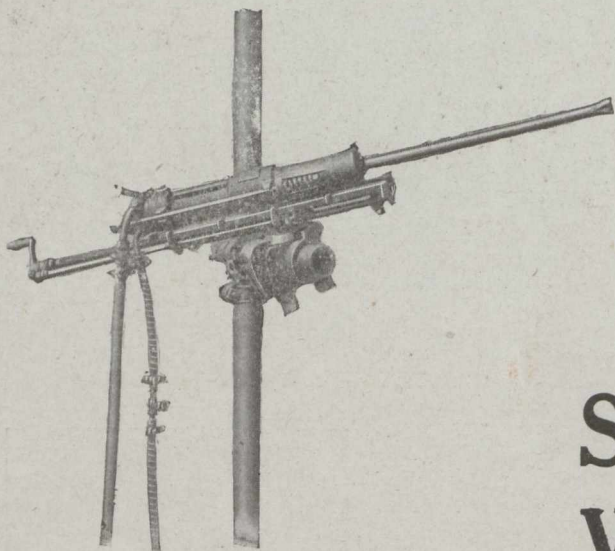
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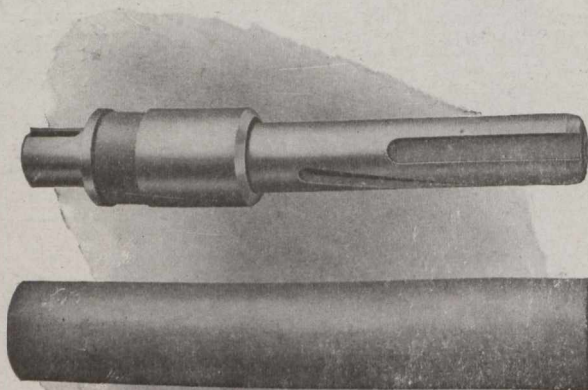
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## To Users of the Callow Pneumatic Flotation Cell

---

**T**HE recent decision in the Butte & Superior Suit with Minerals Separation has an important bearing upon the use of the Pneumatic, or Callow method of flotation.

The Appellate Court's decision at Philadelphia, in the Miami case, had already made clear the distinction between (1) froth produced by violent mechanical agitation of the Minerals Separation process, and (2) simple levitation by air bubbles, as practised in the Callow or pneumatic cell, without such agitation.

Now the Appellate Court at San Francisco has interpreted the United States Supreme Court's opinion in the Hyde case, whereby the Minerals Separation Patent was restricted to the use of a minimum, or 'critical' proportion of oil, in combination with violent mechanical agitation.

This latest decision of the Appellate Court in the Butte & Superior case, restricts the Minerals Separation basic patent to the use of a quantity of oil *not in excess of ten pounds (0.5%) per ton of ore, in combination with violent agitation*: it is a logical sequel to the Supreme Court's opinion and confirms the status of the Callow or Pneumatic method of flotation as distinct from the agitation-froth process.

Both the use (1) of oil in excess of ten pounds (0.5%) in combination with violent agitation, and (2) the use of the Callow system of aeration with any quantity of oil, appear therefore to be immune from any charge of infringement.

(Signed) J. M. CALLOW  
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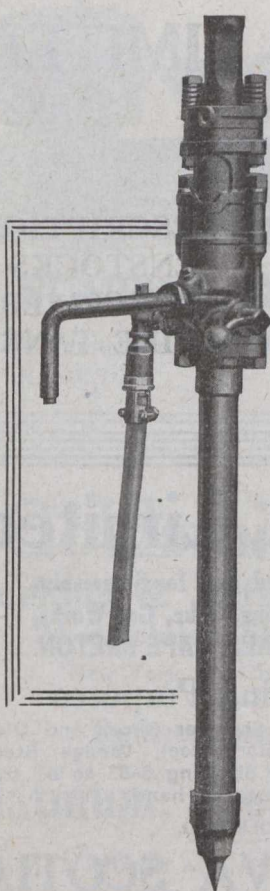
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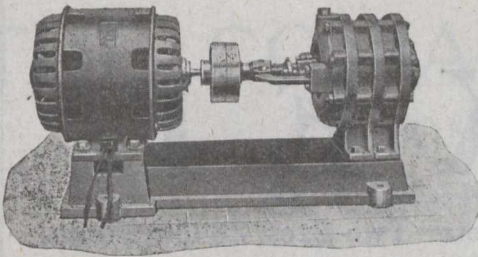


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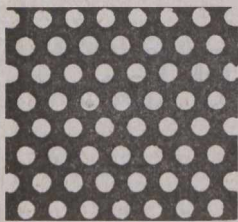
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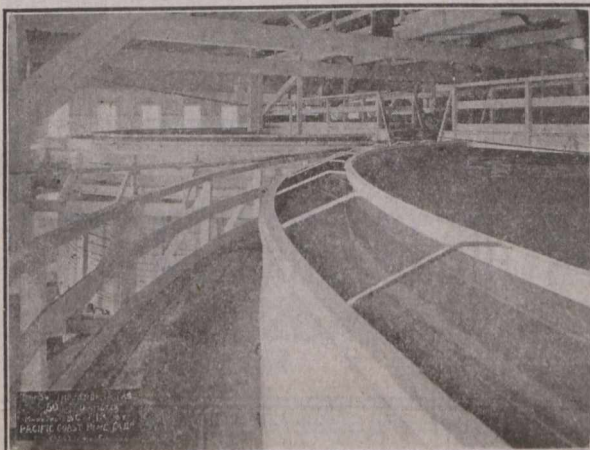


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The Canadian Northern Railway, recently constructed across Northern and Western Ontario, has opened up for prospecting a large territory. Easy access to many promising areas is now available. Geological maps of some of these areas can be obtained from the Geological Survey, Ottawa.

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# THE FLOTATION PROCESS

## MINERALS SEPARATION NORTH AMERICAN CORPORATION

Is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,333; 129,819; 94,516; 96,182; 96,183; 99,743; 127,397; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,608; 163,707; 163,936; 164,587; 165,390; 166,415; 167,474; 167,475; 167,476; 167,603; 187,263.

On December 11, 1916, the SUPREME COURT OF THE UNITED STATES unanimously adjudged our basic patent for air-froth-flotation to be valid, holding that this patent covers any process of froth flotation wherein the results obtained are such results as are secured by the use of a fraction of one per cent., on the ore, of an oily frothing agent in an ore-pulp, with agitation. Three of the thirteen claims which specified the use of "a small quantity of oil" and which the Court held to be invalid have since, by proper disclaimer, been brought within the scope of the Supreme Court's decision.

On May 4, 1917, in the UNITED STATES DISTRICT COURT OF MONTANA, the opinion of Judge Bourquin was filed in the case of Minerals Separation Ltd., and others against Butte & Superior Mining Company, and was followed by a decree on September 17, 1917, wherein it was adjudicated that the three claims which had been limited by disclaimer were valid and infringed, and that the seven claims adjudged to be valid by the Supreme Court of the United States were infringed. The acts thereby adjudged to be infringement included the use of mixtures of petroleum oils and mineral-froth-forming oils in a total amount exceeding one per cent. on the ore, and also the use of Callow pneumatic cells.

On May 24, 1917, the UNITED STATES CIRCUIT COURT OF APPEALS at Philadelphia, in the case of Minerals Separation, Ltd., against Miami Copper Company, unanimously sustained the validity and broadly construed a second basic patent, owned by us, for the use of all "Soluble Frothing Agents." In the same opinion, the Court also validated a third patent for the use of cresols and phenols in the cold and without acid. The defendants, Miami Copper Company, endeavored to avoid infringement of these patents by using Callow pneumatic cells, but the Court held that the operations of the defendant company infringed all three patents.

On November 11, 1918, the SUPREME COURT OF THE UNITED STATES granted the petition of Minerals Separation, Ltd., and others for a Writ of Certiorari to review the decree of the United States Circuit Court of Appeals at San Francisco which had reversed so much of the decree of Judge Bourquin in the suit against Butte & Superior Mining Company as adjudged to be infringements those acts which employed oil of any kind or character used in excess of one-half of one per cent. on the ore.

Prospective users of our flotation processes are earnestly requested not to be influenced by the views disseminated by interested parties that any of these BASIC PROCESS PATENTS can be evaded by a mere variation of apparatus for agitating and aerating the pulp, or by the simple addition of oils or other materials in excess of a fraction of one per cent. on the weight of the ore treated.

### Minerals Separation North American Corporation

Head Office:  
61 Broadway,  
New York, N. Y.

Engineering Office:  
220 Battery Street,  
San Francisco, California.

Canadian Attorneys.

Messrs. Ridout & Maybee, Patent Solicitors, 156 Yonge Street, Toronto, Canada.

# THE FLOTATION PROCESS

MINERALS SEPARATION NORTH AMERICAN CORPORATION

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## NOTICE

**N**OTICE is hereby given that we will enforce our patents and stop all infringements, but are prepared to grant licenses for the right to use all or any of our processes to those who wish to use them. To those who infringe or have infringed our patents, notice is given that a settlement for such infringement must precede the granting of licenses for the future use of same.

Notice is further given that no one is authorized to introduce our processes or apparatus into the United States, Canada or Mexico, without direct authority from us.

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All applications should be made direct to

**Minerals Separation North American Corporation**

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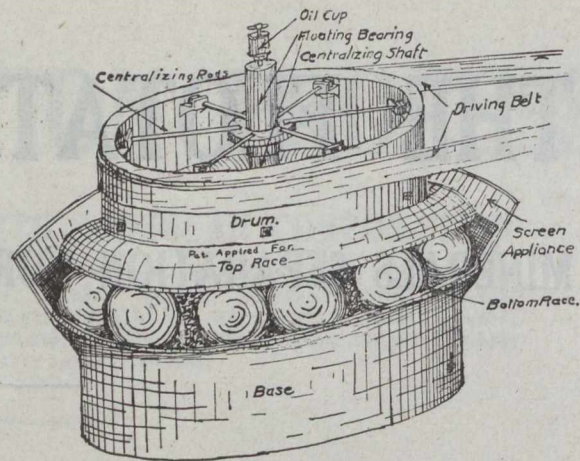
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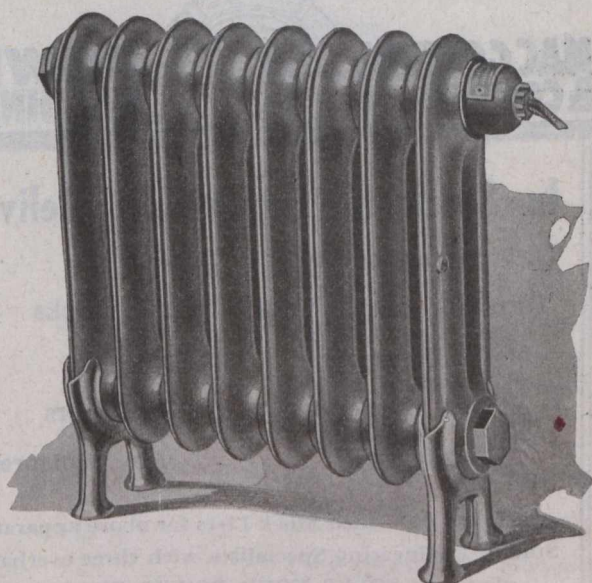
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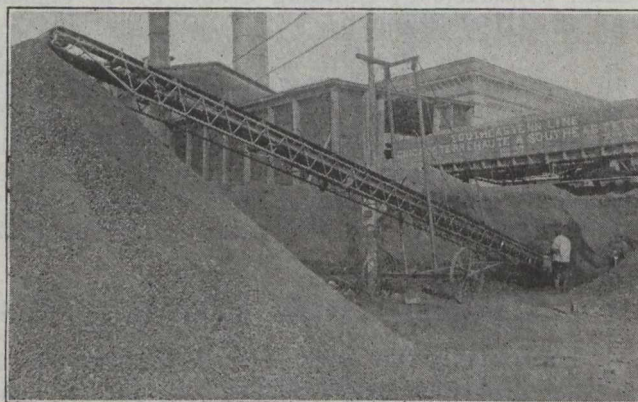
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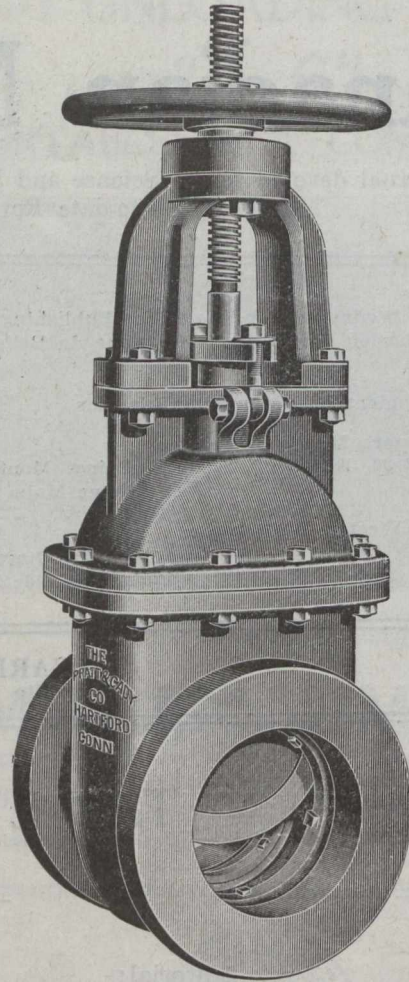
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# EDITORIAL

## AMENDMENTS TO MINES ACT OF ONTARIO.

Questions of importance to prospectors as well as mining men in general, are being discussed. It is learned on good authority that a number of amendments to the Mining Act of Ontario are under contemplation. Any action taken, will have the double object in view of being beneficial to prospectors, as well as to the best interests of the mining industry. Among the questions being discussed is the advisability of inducing prospectors to have their claims surveyed soon after staking takes place, thus eliminating the danger of friction or dispute over uncertain and irregular boundaries. Toward this end, it would appear likely that the Department will allow the cost of survey for each claim to apply as the equivalent of about twenty-five days' work. This would be beneficial in two ways. First, many claims would probably be surveyed shortly after being staked, the cost of surveying to apply against the first instalment of work, and with these regularly established lines as guides, much of the inaccuracy of blue-prints gotten out on the strength of carelessly run claim lines, would not occur. Second, the burdens of the prospector would be made lighter to the exact extent of the cost of survey, which, under the present Act the prospector is now obliged to pay in addition to assessment work and patent fee.

Another matter that is receiving consideration is the advisability of placing a tin tag on all four corners of mining claims, instead of only on the No. 1 or north-east corner as at present. This, it is obvious, would cause the boundaries to be less liable to become confused in case of fire destroying one of the corner posts, on which might chance to be the one tin tag as at present specified.

Incidentally, in pointing out the two foregoing amendments, which are now understood, among other things, to be the subject of consideration, it might be well to also point out the necessity for amendments that would serve to protect co-holders in mining claims, where one or more of the co-holders have duly performed and recorded their assessment work, but where one or another of the co-holders has failed to do so, thus causing the entire mining claim to become automatically forfeited and imposing upon those whose work has been performed, the only alternative of applying for relief from forfeiture, involving a good deal of expense and uncertainty, as well as the usual legal proceeding before the Mining Commissioner. To overcome the possibility of such occurrences it would be necessary to add a "provisional" sixty-day period to the time when each or any instalment of work is required to be performed. Thus, in the event of one co-holder failing to record his work in the proscribed time, the remaining co-holders would have ample time in which to perform the delinquent's work, and thus protect their own interests, but the protection of such

"provisional" extra period not to apply to the delinquent or delinquents themselves. Those performing the necessary work to protect the claim, should automatically become entitled to divide the entire forfeited interest of their co-holder among themselves equally or in proportion to the share of expense borne by each, or otherwise, as they should agree between themselves.

Another matter of deep concern, not only to prospectors, but to mining men in all parts of the province, is the retarding effect on the mining industry of the granting of mineral rights to settlers. It is pointed out that settlers take up land either for its cultivation or for "skinnin" the timber, and not for mining purposes. Invariably they fail to do any mining work. In various mining districts throughout the north, large sections have been held idle, due to the fact that settlers have paid some \$20 or so to the Government for the right to settle on a piece of land. Undoubtedly this is a big contributing factor toward retarding development of the mineralized areas, and constitutes an evil that could be eliminated without retarding the settlement of the country. This would not rob the settler of the right to mineral occurring on his farm, provided he follow the regular procedure of a prospector, and in addition to holding the farming rights, stake out claims and perform the required assessment duties devolving upon such a course. In the event of others staking the mineral rights of his farm, he would always be entitled to the payment for any damage to his land or buildings.

Greater inducement is being offered to those who are seeking out the hidden riches of the province of Ontario. Prospectors are being given every reasonable consideration within the power of the Department of Mines. Hon. G. Howard Ferguson, Minister of Mines, through Mining Commissioner T. E. Godson, K.C. is keeping an ever watchful eye on the mining situation in all parts of the province. Commissioner Godson is perhaps in touch with a greater variety of prospectors than is any other man in the Dominion. Disputes involving the good and bad points within the Mines Act are constantly before his attention. The opinion of gentlemen of the legal profession as expressed in each and every dispute is carefully weighed by the Commissioner, with the result that perhaps the most satisfactory mining law ever compiled, governs the mining industry of this province. Not only does this satisfactory state of affairs exist, but each year amendments are made which still further improve the Act.

It seems reasonable, therefore, to look forward to a number of the questions now under debate, as above outlined, figuring in the probable amendments for the year 1919.

## Coal Dust Firing of Blast Furnaces

By T. W. CAVERS.

The increase in the price of coke in the last few years, and the ever-pressing demand for lower smelting costs, have led the metallurgist to try pulverized coal in the blast furnace. The experiments have been so successful that there is every reason to believe that the blast furnace will regain its former place in the smelting industry and again prove a serious rival to the reverberatory.

When coke is introduced into the blast furnace with the ore and flux, it is partially consumed by the surplus oxygen of the blast before it reaches the point where it is most needed. Even in rare instances, when the oxygen delivered at the tuyeres is practically all combined with the sulphur, iron and carbon in the lower part of the furnace, the hot, ascending sulphur dioxide gases, coming in contact with hot coke above, are decomposed and the coke consumed.

The logical place, therefore, for the introduction of fuel is at the bottom of the charge, a little above the level of the molten slag in the crucible. This condition is secured in coal dust firing.

By the introduction of coal with the blast, the abundance of oxygen in intimate contact with the finely divided coal, ensures its complete combustion at a point a little above the level of the tuyeres, and, consequently the utilization of all the heat generated. It has been found in practice that the coal necessary to keep the furnace in good running condition is only 55 per cent. of the coke used on the same charge. The furnace runs more smoothly and gives less trouble with crusts when using the coal. No coke whatever is used except for "blowing-in."

In the blast furnace, the fuel maintains the temperature at which the various reactions take place, and supplies the reducing agent in roasted ore smelting. The substitution of coal dust for coke does not seem to make any material change in the condition of the lower part of the charge, nor alter the character of the slag or matte. In the absence of coke, however, the sulphur of the incompletely-roasted ore takes the place of carbon in the reduction of  $Fe_2O_3$  to  $FeO$  and makes for greater concentration.

It has not yet been demonstrated that coke may be entirely dispensed with in lead smelting, or that carbon monoxide, from coal dust in excess of what the blast is capable of burning to carbon dioxide, will prove as satisfactory a reducing agent for lead oxide as coke.

All coals are not suitable for the manufacture of coke; but almost any coal may be used in the blast furnace. It is possible that peat or any other carbonaceous material, capable of being pulverized, may be successfully employed.

### BOOK REVIEW.

**The Mineral Industry, Its Statistics, Technology and Trade During 1917.** Edited by G. A. Roush and Allison Butts, McGraw-Hill Pub. Co., New York. Price \$10 net.

This is the 22nd volume of "The Mineral Industry." It contains information regarding the production of all countries for which statistics could be obtained. The greater part of the volume is devoted to the

mineral industry of the United States; but foreign countries also receive considerable attention and an attempt has been made to present information concerning all mineral producing countries.

Many contributors have assisted in compiling the book, and most of the chapters include special articles by men well qualified for the task. The minerals are treated in alphabetical order, separate chapters being devoted to all the more important minerals or groups of minerals.

There are also special chapters devoted to, ore dressing and coal washing, data of the world's principal mines and mineral statistics.

As in previous volumes a wealth of information is included in this volume. It will be found referred to even more often than the earlier volumes owing to the many changes that are taking place in the industry owing to the war and to the return to peace conditions.

**Mine Tracks, Their Location and Construction.** By J. McCrystle. McGraw-Hill Book Co. Price, \$1.50 net.

This little book is designed to furnish those in charge of trackwork and the laying out of trackwork with the necessary data in convenient form. The several chapters are headed: rail, ties, projection of haulage roads, grades, gravity grades, frogs and switches, locating the turnout and book of rules. As most books deal with standard-gauge track, this one should be welcomed by those who want information about narrow-gauge track.

**Handbook of Mineralogy, Blowpipe Analysis and Geometrical Crystallography,** by G. Montague Butler. John Wiley & Sons, New York. Price \$3.50.

This book includes a second edition of "A Pocket Handbook of Minerals," and a first edition of "Pocket Handbook of Blowpipe Analysis," and "A Manual of Crystallography," 311 pages are devoted to the first part; 80 pages to the second, and 155 to the third. There is a separate index for each part. There are a number of tables for use in determining minerals by their physical properties.

The information given in this book is such as will help the user to identify minerals. The book is not intended to be used as a manual of mineralogy. An attempt is made to emphasize the features most useful for determination, rather than to state properties in detail.

**Mill and Cyanide Handbook,** by A. W. Allen. Charles Griffin & Co., London. Price 6s. net.

This is a book of tables for the use of those who are engaged in the milling of ores. The tables are arranged in sections under the following heads: technical chemistry and physics; weighing, measuring and estimating; experimenting and testing; crushing, regrinding and amalgamation; treatment of ore pulp; precipitation, clean-up and bullion recovery; conveyance of ore, pulp and solution; miscellaneous tables. In addition there are treatment charts, solution charts, clean-up charts, titration charts, report forms, construction costs and a glossary.

It should prove a useful handbook for the mill man.

# Lightning River Gold Area and a Remarkable Series of Lava Flows

By A. G. BURROWS and C. W. KNIGHT.

In pursuance of instructions received from the Provincial Geologist, Dr. Willet G. Miller, the authors spent the summer of 1918 examining the recently discovered gold deposits in what has been called the Lightning river area, which lies directly south of Upper Lake Abitibi, Timiskaming district, Ontario. Our work covered an area of eight townships, the eastern limit of which was the interprovincial boundary between the provinces of Quebec and Ontario.

The boundary lines of the eight townships were surveyed during the summer of 1918 by Provincial Land Surveyor H. J. Beatty, but the lot and concession lines were not run. Consequently our geological mapping was, of necessity, more or less of a reconnaissance nature. The newly surveyed townships, Frecheville, Garrison, Harker, Holloway, Lamplugh, Marriott, Rand and Stoughton, were named after men well known in the mining and geological world.\*

In this paper the account of the gold deposits and of other economic aspects has been written by Mr. Burrows, while the general geology has been described by Mr. Knight.

Gold was discovered in the Lightning river area in August 1917 by Messrs Howey, Cochenour and Willans. At that time it was a difficult matter for prospectors to get into this little-prospectured area. During last summer, however, a rough road was built from near the Croesus mine into the Howey-Cochenour-Willans claims, this road being a continuation of the road which runs from Matheson to the Croesus mine. From Matheson, on the T. & N. O. Ry., to the Howey-Cochenour-Willans prospect, it is more than 40 miles by road. The area may also be entered by going to La Reine, north of Upper Lake Abitibi on the National railway. La Reine is 72 miles east of Cochrane, and is in the Province of Quebec immediately east of the interprovincial boundary. A gasoline boat may be taken at La Reine, and Upper Lake Abitibi reached by going down the Okikodasik river, a distance of about 5 miles. From the mouth of this river it is about 17½ miles southwest across Upper Lake Abitibi to the mouth of the Lightning River. A small gasoline boat may be taken about six miles up the Lightning river to the place where the river forks, at which point a trail about six miles long leads south directly to the Howey-Cochenour-Willans prospect.

The rocks in the eight townships covered by us consist almost entirely of greenstones, which are nearly always massive, and seldom are altered to schists. The greenstones consist mainly of basaltic or andesitic lava flows, interbedded with which are pink or grey acidic flows, probably for the most part rhyolites. All of these rocks have been considered to belong to the Keewatin series. We were fortunate in discovering in the southwest part of Holloway township an area in which the rocks are so little altered that we were able to re-

cognize and map an orderly succession of lava flows, the tops and bottoms of the flows being found, and their thickness measured.

There are other rocks present besides these Keewatin lavas. We found here and there throughout the area dikes of feldspar porphyry and diabase cutting the Keewatin. There are also dikes or other masses of serpentine rock cutting the Keewatin.

In addition to these dikes there are larger intrusions of igneous rocks. For instance, Ghost mountain is made up of a great intrusion of diabase, presumably cutting the Keewatin lavas, about five miles long and more than a mile wide. This mountain rises some 660 feet above the Lake Abitibi, and is the most striking topographical feature in the area.

In Garrison Township there is an intrusion of pink hornblende granite, syenitic in places, a few square miles in extent, and also a much smaller, though coarse-grained and very beautiful syenite intrusion in Harker township. Both these masses intersect the Keewatin lavas.

Little is known about the age relationship of these various intrusions, one to another, since we rarely found them in contact with each other. We were able to prove, however, that along the shores of Upper Lake Abitibi certain of the feldspar porphyry dikes are older than certain diabase dikes. All of the intrusions, including dikes of porphyry, diabase, serpentine, and bosses of granite and syenite, cut, and are therefore younger than, the Keewatin lavas.

While most of the rocks in the area are igneous, there are small outcrops of iron formation, and also of volcanic tuffs and breccias. In the northern part of Garrison township, for instance, an iron formation strikes in an easterly direction. Its extent is not known since it occurs partly in low or swampy drift-covered areas. Iron formation also occurs along the south shores of Upper Lake Abitibi, while in Boundary bay we found some bedded tuffs and breccias with at least a thickness of 60 feet.

Carbonate rocks occur in the heavily drift-covered valley of the Mattawasagi (Teddy Bear) river, and in other places.

## Lava Flows in Holloway Township.

In the southwest part of Holloway township, about 10 miles south of the shore of Upper Lake Abitibi, there is a remarkable series of lava flows, presumably of Keewatin age. The flows have been tited into almost vertical positions, and now dip at an angle of about 80 degrees to the south. Their upturned edges strike a little south of west. The time at our disposal was not sufficient to work out the length of the flows, but it was found that one of them extends for at least five miles in an east and west direction. The older flows occur at the north; in other words, younger flows are successively met with towards the south.

The lava flows indicate the great volcanic activity which existed in this part of the earth's crust in ancient times. Even our hurried work showed the presence of 14 distinct flows having a combined thickness of about

\*Can. Min. Jr. May 1st, 1918, p. 146.

4,400 ft. In this thickness of 4,400 ft. there may be more than 14 flows, but owing to lack of time, and to the soil which covers the rocks in many places, we did not recognize more than 14 flows. Unquestionably the total thickness of the lava flows must be enormous, since similar volcanic rocks extend for ten miles to the north as far as the shores of Upper Lake Abitibi, and are reported by prospectors to occur for miles to the south.

The thinnest flow noted was about 27 feet, the thickest being hundreds of feet.

For comparative purposes it may be pointed out that the lava flows of the Keweenaw series in the Lake Superior region vary from about two feet to those which are 100 feet or more in thickness. In only two instances do they reach a thickness of 500 feet. The thin flows are not of great length, nor, for the most part, are the thicker flows. The greatest distance which a single flow has been followed is 30 miles. In some parts these Keweenaw flows in the lake Superior region have a total thickness of 23,000 feet.\*

The volcanic rocks in Holloway township are indisputably stamped with the characteristics distinctive of lava flows. The most striking of these characteristics is the ropy, slaggy and at times half glassy nature of the tops of most of the flows. Sometimes the tops present a fragmental appearance. This appears to be due to the fact that the surface of the flows was the first part to solidify into a more or less thin crust, and that this solidified crust then broke up, and allowed the liquid rock from below to well up and cement the broken fragments. No doubt this process may have continued over and over again. Other characteristics, which we found for the most part abundantly developed, are the amygdaloidal, vesicular, scoriaceous, spherulitic and flow textures. Of common occurrence also are the pillow structures, which are developed in the basalts, but not in the rhyolites. Another interesting feature of these volcanic rocks is the occurrence of what are known as lithophysae, which consist of a series of concentric shells, resembling somewhat nested watch glasses.†



Columnar Structure in Diabase Dikes—Lightning River Gold Area.

In order to prove beyond question that we were dealing with a series of lava flows and not a number of parallel dikes we made a special search for the actual tops, or surfaces, of the flows. In nearly all of the fourteen flows we found these tops. The bottoms were also generally found. It was seen that the dense, fine-grained bottoms were chilled and frozen against the

\*U. S. G. S. Monograph 52, 1911, pp. 386, 408, 409.

†Pirsson, Rocks and Rock Minerals, p. 264.



Prospectors in Lightning River Gold Area, Sept., 1918, at Howey-Cochonour-Willans Claim.

ropy and slaggy tops. If further proof were needed, to show that we were dealing with lava flows, it is found in the study of each individual flow. For instance, the bottom of the basaltic flows are generally dense, fine-grained, sometimes amygdaloidal rocks; as the centres of the flows are approached the rock becomes coarser in grain, even as coarse as a medium-grained diabase. As the top is approached the flow becomes finer in grain, amygdules begin to make their appearance, and finally the rock assumes the ropy, slaggy and scoriaceous features which are characteristic of the surface of many lava flows.

The thickness of the ropy tops varies in the different lavas; in the flow in front of the office of the Howey-Cochonour-Williams gold prospect the ropy surface makes up almost half of the flow, the total thickness of the flow itself being about 27 ft. In other instances these ropy surfaces attain a thickness of as much as 40 ft., in which cases the flows themselves are hundreds of feet thick. Sometimes the ropy surface is only a few feet thick.

The lava flows briefly described above are in an unusual state of preservation in so far as their textures and structures are concerned. The ropy, slaggy, scoriaceous, amygdaloidal and other characteristics are all easily recognizable. This is due to the fact that the rocks, although they have been tilted up into almost vertical positions, have not been subjected to those severe processes of metamorphism which alter them to schists. They, as a consequence, retain their massive characters.

Of the fourteen flows which were worked out three are acidic varieties, which may be called, in a general way, rhyolites, while the remaining eleven are basalts, or andesites. Two of the rhyolites are light pink in color on weathered surfaces, while the third rhyolite has a pink to dark grey, or at times greenish, color. The basalts are all dark green in color.

The discovery of these flows in Holloway township is of unusual interest. In no other area of Keewatin rocks in the Province of Ontario has there been found such an orderly succession of flows. Of course it has been believed that the Keewatin was composed of a series of lava flows, since the textures of the rocks pointed clearly to their volcanic nature. Nowhere, however, had the tops and bottoms of the flows been found, and the flows mapped in detail. The Keewatin

was simply known as a chaotic tangle, consisting largely of volcanic rocks, to which stratigraphic methods could rarely be applied.

Whether the flows in Holloway township really belong to the Keewatin, or to a younger series of rocks, cannot be dogmatically stated. Until it is proved that they do belong to a younger series, we prefer, in the meantime, to class the flows as Keewatin in age.

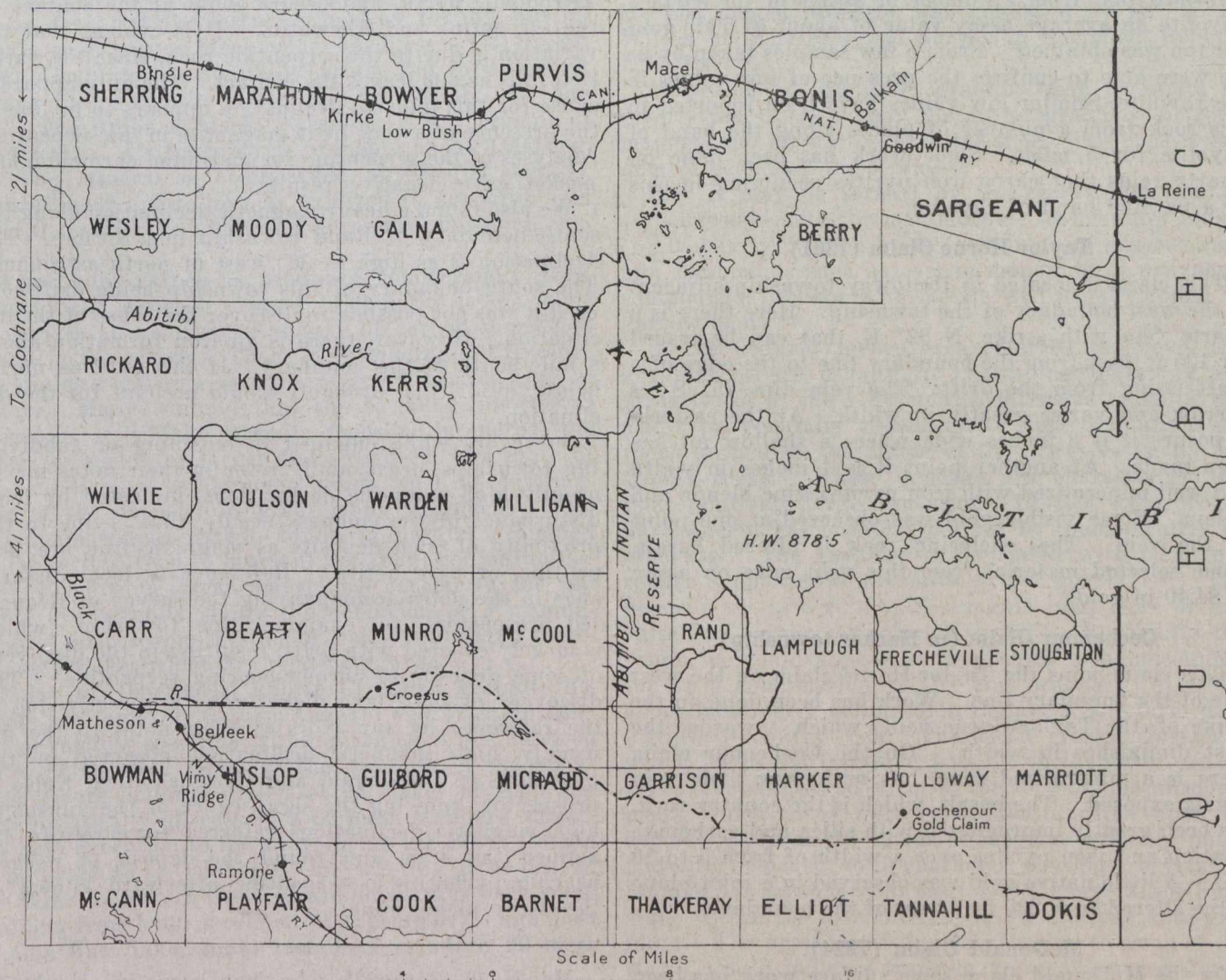
**Economic Geology.**

The chief interest in the area centres in its gold discoveries, and while a few claims have been partly prospected, on the whole only a limited amount of work has been done, due to the lack of prospectors and the distance of the area from a railway.

Most of the work has been done in the southwest

two rocks being to the south of west and the dip being about 80°S. From information furnished by Mr. J. W. Morrison, who was manager of the property at that time, it has been learned that when the shaft penetrated the contact of the basalt and rhyolite the low dip of the vein was maintained, and the contact between the rocks has been displaced a distance of four feet on the plane of the vein. This evidence points to the formation of the vein along an inclined fault that intersected the rock formations.

The vein structure, as revealed in the shaft to a depth of 35 feet, shows a main persistent quartz vein, varying in width from an inch to 10 or 12 inches, with an average width of about 4 inches. Roughly paralleling this main vein there are a number of narrow quartz



part of Holloway and the southeast part of Harker, these townships being adjacent.

**Howey-Cochonour-Willans Claim.**

Work on the Howey-Cochonour-Willans claim, No. 7135, has been largely confined to an examination of the vein in which the original discovery of gold was made in August, 1917. This vein has been traced by means of pits and trenches a distance of 175 ft. At the westerly exposure it is in the basalt, and at the easterly exposure in the rhyolite. At the west outcrop in the basalt an incline shaft has been sunk on the vein where the dip is 23° south. When the property was last visited by us the shaft had reached a depth of 35 ft. and the vein was still in the basalt, which rock lies to the north of rhyolite, the strike of the contact of the

veinlets usually less than an inch in width and more or less discontinuous, the whole partaking of the character of a sheeted zone produced by shearing that accompanied the formation of the fault. This zone varies in width from about 2 to 3 ft. The quartz veins carry considerable calcite often of a pink color, and also pyrite, chalcopryite and zinc blende. In the main vein the pyrite, which is the most abundant sulphide, frequently occurs in a roughly banded arrangement, parallel to the walls, and is also concentrated between the quartz and the wall rock. Fragments of country rock occur in the vein and are said to be more numerous as the contact between the basalt and rhyolite is approached.

The gold usually occurs in a fine condition with the

pyrite, but samples from the main vein often show gold in the quartz visible to the eye.

The rock adjacent to the veins has been mostly replaced by silica and carbonate solutions, accompanied by iron pyrites. Samples of the replaced rock effervesce strongly with the acid. Away from the veins the original lath-like structure of the plagioclase feldspars is well preserved.

The shaft is reported continued to a depth of about 70 ft., and work was stopped after the rhyolite had been penetrated for 20 ft.

The rhyolite contains scattered crystals of iron pyrites and on the surface to the south of the shaft there are numerous loose fragments of the rock. Native gold has been observed in some of the fragments. We were informed that from a number of assays of the surface rhyolite an average assay value of about \$1.50 in gold per ton was obtained. From a few samples taken by us we were able to confirm the presence of low values in the rhyolite. Similar low values have been reported in this rock from a number of places along the band of rhyolite for 5 miles. Some work has been done on quartz veins that carry iron pyrites occurring in this or a parallel band of rhyolite.

#### **Taylor-Horne Claim (7261)**

This claim is located in Holloway township adjacent to the west boundary of the township. Here there is a quartz vein with strike N 82° E. that can be traced for 125 ft. east from the boundary line to the edge of a bluff rising from the drift. The vein dips 75° S., is narrow and varies greatly in width. At the easterly exposure it is 8 inches wide where a shallow pit has been made. At another point it is 4 inches in width and well mineralized with iron pyrites, zinc blende and galena. Some visible gold was observed at one point in the vein. The enclosing rock is altered basalt. Some selected material from this vein gave on assay to \$4.40 in gold.

#### **Cochonour Claim (in Harker township).**

This claim joins the Taylor-Horne claim on the west side of the boundary line. Work has been done on the strike of the Taylor-Horne vein, which towards the west diminishes in width. On the Cochonour claim there is a mineralized zone, but with very little vein quartz exposed. The basalt, which is the country rock, has been greatly impregnated with silica and carbonate solution and iron pyrites over a width of from 5 to 10 feet. A little native gold was observed in a joint plane in the altered rock 230 feet west of the boundary.

#### **McDonald Claim (7324).**

On the McDonald claim some surface work has been done on 3 quartz veins in the rhyolite. These veins from 2 to 10 inches in width carry iron pyrites and copper pyrites. This prominent vein, which strikes N. 15° E. and dips 75° easterly, has been traced on the surface for 150 ft. Some native gold has been reported from this vein and values of \$8.40 and \$7.60 in gold were obtained from samples of quartz and rhyolite, carrying iron pyrites.

Reference has been previously made to the general character of the rocks in the area south of Abitibi lake. These rocks, largely of a basic character, basalt and diabase, are very similar to the massive basic rocks that occur in the vicinity of the Croesus mine in Munro township, where in 1914 a quartz vein carrying the richest gold ore yet found in Ontario was discovered.

It is possible that in the area to the east, which so far has been little prospected, other gold deposits of a similar character may be found.

#### **Magnetic Declination in Holloway and Frecheville Townships.**

Along the north boundary of Holloway township the compass was found to have an unusual variation at and near the contact of an intrusion of serpentine which cuts Keewatin lava. The Keewatin here forms a prominent hill known as Lightning mountain about two miles east of the Southwest corner of Frecheville township. At the foot of Lightning mountain, on the southwest side, the mass of serpentine referred to is found striking about west 30° north. The greatest variation of the compass is 95° west of the true astronomic north, and occurs about at the contact of the serpentine and Keewatin. It is evident that the variation is due to the serpentine rock, since the variation falls as one leaves the contact. The only apparent cause for this unusual declination appears to be due to the presence of a very little magnetite in the serpentine. Analyses of the serpentine for platinum, chromium and nickel gave negative results.

We also found a heavy magnetic declination along the south boundary of Rand township in a swamp. The declination is as high as 36° west of north astronomic. The south boundary of this township being drift-covered it was not possible to discover the cause of the declination. However, there is an iron formation about a mile south of the boundary. If this extends north, below the drift, it probably would account for the declination.

Surveyors while engaged in outlining or subdividing townships, occasionally refer in their notes to unusually high magnetic declinations, indicated by local disturbance of the compass needle, that is due to the proximity of such deposits as magnetic iron ore, serpentine, or pyrrohotite. Reference to local disturbance in the notes accompanying the survey of Reaume led prospectors to examine this township, which is largely covered with drift, resulting in the discovery of some deposits of chrome-bearing serpentine. The discovery of the Alexo nickel mine is directly due to the reference by surveyors in their notes to the unusually high magnetic declination observed in the townships of Dundonald and Clergue. Alex. Kelso, a prospector, knowing the significance of the unusually high magnetic declinations referred to, carefully examined the area, and found the deposit of nickel-bearing pyrrohotite in serpentine afterward known as the Alexo nickel mine.

Mr. N. T. Bothwell, who has been in charge of gold-quartz mining operations in Alaska during the past summer, is in Winnipeg for a few days. Mr. Bothwell intends to continue operations as soon as the spring break-up comes.

Mr. J. B. Tyrrell has been nominated for the presidency of the Canadian Mining Institute for the coming year. Mr. Tyrrell is chairman of the Toronto branch of the Institute.

Mr. C. E. Smith has not accepted the nomination for election as a councillor of the Canadian Mining Institute for the coming year. It is probable that Mr. Geo. Mackenzie, of Ottawa, will be nominated.

Mr. T. W. Carvers is at Copper Cliff. He is interested particularly in the use of coal dust as a substitute for coke in blast furnaces.

# The Graphite Industry

By CHARLES SPEARMAN.\*

The mineral graphite, generally speaking, is widely distributed throughout the world, deposits being found in Canada, United States, Mexico, Ceylon, Siberia, Madagascar, Greenland, Norway, Finland, etc.

Graphite crystallizes in the rhombohedral division of the hexagonal system, usually in six sided tabular crystals which at times may have the appearance of being circular or elliptical in outline; may also occur foliated, radiated or columnar; may be granular to compact, earthy, scaly or flaky; has a perfect basal cleavage, greasy feel, metallic lustre; is opaque, flexible but inelastic, steel gray to black color; hardness is 1-2; Sp. gr. 2.24. Graphite is essentially carbon, but in its purest form contains volatile matter and ash usually less than 1%. The streak is black. Graphite is a conductor of electricity. Its fusibility is probably about 3,000 deg. C. The mineral is combustible at 650-700 deg. C. Crystalline graphite may be oxidized to graphitic acid  $C_{11}H_4O_5$ , while the artificial amorphous substance cannot.

Amorphous carbon is produced commercially from coke by the Acheson process. Schungite is the name applied to an amorphous variety of carbon sometimes found in the schists. There is considerable difference of opinion regarding amorphous graphite occurring in nature. Many contend that the so-called amorphous carbon is really flake graphite deposited in microscopic flakes or scales, or larger flake reduced to a state of fine subdivision by dynamic action, such as deformation of the deposit. A great many specimens of so-called amorphous carbon found in nature, examined by the writer, tend to bear out the above contention i.e. that which appears as amorphous carbon to the unaided eye actually shows the condition of a ground-mass of microscopic crystals or flakes containing therein many flakes which are relatively large.

Some of the richest known Canadian graphite deposits are found in Eastern Ontario and Western Quebec or roughly speaking within a radius of one hundred miles of Ottawa. Most of the graphite in the above area occurs in large disseminated flakes of such size that practically all rest on a 60 mesh standard screen, the only exception to the above being the Black Donald Mine graphite at Calabogie, Ont. where a great deal of the flake in certain parts of the deposits is very small. Judging from hand specimens it appears as though most of this fine flake would rest on a standard 90 mesh screen.

## Flotation Process Replacing Old Dry Process.

About half a dozen miles for the concentration of graphite were built from time to time in the above area, some dating back to twenty years. In 1916 all were closed down, with the exception of one with a small output in Buckingham Tp., Que. and the Black Donald at Calabogie, Ont. The others attempted to concentrate by the dry process and failed. In 1916 or thereabouts, flotation began to play an important part in the concentration of graphite ores, and with such success that within a short time there will be flotation concentrators replacing the old dry processes in the various mills.

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The average graphitic carbon content of the Black Donald ore is much higher than that of any within the area mentioned, averaging about 30-35% graphitic carbon; the remaining properties on which, comparatively speaking, little development has been done outside of open cutting, should average about 8% or better graphitic carbon if developed to that end. The Globe Graphite Mining and Refining Co., Ltd., at Port Elmsley, Ont. stands second to the Black Donald as far as development work is concerned. A full description of the last named property was published by Mr. M. E. Wilson of the Geological Survey in Summary Report, 1917, Part E.

According to Lindgren, graphite may originate in several ways; (a) it may for an integral part of rock magmas and crystallize with the rock, (this type is seldom of economic importance).

(b) it may be formed by the recrystallization of carbonaceous matter in metamorphic sedimentary rocks, (c) it may be formed by deposition from gaseous carbon compounds such as carbon monoxide or cyanogen compounds, perhaps with metals, and usually found in narrow veins.

In the Ontario-Quebec area referred to above, the graphite occurs usually in crystalline limestone adjacent to or at the contact with intrusive rocks of the acid type, generally pegmatites or their derivatives i.e. rocks formed by the action of the intrusive on the intruded rocks. These deposits are characterized by their relatively large dimensions, 10'-100' wide, where development has been carried out by diamond drill or otherwise. The graphite is associated with mica, pyroxene, scapolite, wollastonite, pyrite, quartz, etc. The deposits are as a rule quite irregular and more or less varied in carbon (graphitic) content. Regarding the origin, it would appear in most cases to be accounted for by a combination of (b) and probably (c) types above mentioned, acting upon the already deformed or disturbed country rock. The major crustal movement which made the intrusive possible incidentally caused zones of weakness adjacent to the zone of major movement, which zones were subsequently acted upon by emanations from the intrusive magma, probably pneumatolitic or nearly so in character, causing recrystallization of the carbonaceous matter of the crystalline limestone within the influence of the emanations, into graphite. The presence of quartz adhering to some of the flakes would indicate transportation of some material at least from the intrusive magma with possibly some graphite formed by the deposition of gaseous carbon compounds, (c) type above, of the intrusive. From the above it would follow that the size of the deposit would depend directly upon the extent or degree of deformation adjacent to the intrusive and the richness of the deposit depends directly upon the duration of the action. The duration of the action depends more or less upon the volume of the intrusive magma.

In the United States the greatest producing area is in Alabama, in the Ashland district of Clay county where the graphite occurs in a metamorphosed mica schist much weathered and decomposed so as to render mining comparatively easy. The deposits are from 10' to 80' wide, the flake is a fair average size; but the deposits are on the whole low grade averaging about

3-4% graphitic carbon. In Clay and Coosa counties there are about 60 mills with a rated total of about 7,000 tons per day, many operating, the remainder under construction. New York State is the second largest field in the U. S. Generally speaking the graphite occurs there in pre-Cambrian crystalline schists of sedimentary origin and averages about 5% graphitic carbon.

In Ceylon the graphite occurs in veins from 4" to 12" wide in a fine grained acidic or basic gneiss intruded by granites and pegmatites. The ore is high grade and is sorted at the mine and as marketed runs over 70% graphitic carbon. The graphite occurs in these relatively narrow veins in a fibrous or radiated structure with the long axis of the fibre normal to the walls of the veins. This graphite is remarkably pure and is much used for crucible manufacture.

In 1917 Alabama produced about 3,000 tons of graphite; New York about 2,500 tons, Pennsylvania and other United States areas 450 tons. The production for 1918 for the above areas is approximately the same as for 1917. Ontario produced over 3,000 tons in 1917 and about the same in 1918, practically all of which came from one mine, the Black Donald at Calabogie, Ont. Importations from Ceylon to United States in 1917 were 25,000 tons much of which was used to mix with domestic flake for the manufacture of crucibles. In 1918 this importation was greatly diminished by the placing of an embargo on the Ceylon product by the War Trade Board. In 1917 Madagascar produced 35,000 tons of which England and France used 28,000 tons. From 3,000-4,000 is produced artificially at Niagara Falls by the Acheson process and which is "deflocculated" and is used in oil as a lubricant.

Graphite for the market is usually graded according to purity and size of flake. No. 1 flake should be no smaller than 90 mesh standard screen, over half of which should rest on a 50 mesh standard screen, all or nearly all pass through a 16 mesh standard screen, and contain 85-90% graphitic carbon or better. No. 2 flake should rest on 120 mesh standard screen and pass through 90 mesh standard screen and contain 75-80% graphitic carbon, while all flake which passes through a standard 120 mesh screen is known as No. 3 and contains from 40-70% graphitic carbon. No. 1 domestic flake in 1918 sold at 17-22 cents per pound; No. 2 domestic at 13-15 cents per pound while the lower grades sold at from 3-11 cents per pound. The present price is somewhat lower than the above for domestic product, but with a better domestic grade going on the market it is likely that the price will remain quite steady.

A great deal of the domestic No. 1 flake is used in the manufacture of graphite crucibles, usually mixed with Ceylon graphite in the proportion of 30% domestic to 70 per cent Ceylon Graphite flake for crucible manufacture must meet with the specifications enumerated above and, in addition, must contain little or no basic gangue which would flux the clay which is used in the art. The flake must not be thin, light or fluffy or it will not shake down to the requisite density when in bulk, and will thus possess too great a percentage of voids which must be filled with clay in the manufacture of the crucible. A crucible with too much clay in its make up loses its conductivity for heat and requires a greater heat to carry out the operation and consequently at a greater cost. Hence the more dense the mass of finished flake taken as a whole the better suit-

ed it is for crucible manufacture, other features being equal. In explanation of the above I would quote the following test; 100 grams of Alabama No. 1 flake, shaken down, occupies about 150 c.c.; the same weight of Canadian No. 1 flake occupies about 135 c.c. while the same weight of Ceylon flake occupies about 91 c.c.; hence the Ceylon product makes a crucible with more graphite in its make up than could be made from the other products, for the same size of crucible. Experiments carried out on a commercial scale by the writer have resulted in the obtaining of a Canadian crucible flake, practically free from basic gangue and when subjected to the above standard test occupying about 101 c.c.. It can be made still more dense. This should make an excellent crucible stock as far as domestic flake is concerned, and further research along this line would mean much towards decreasing foreign importations to this continent, and greatly improve the American markets and assist the American industry.

Much graphite is also used in paint manufacture foundry facings, pencil manufacture, polishing powder, as an adulterant in fertilizers, etc.

From the preceding brief general summary of the graphite industry it is apparent that the Canadian area referred to has graphite deposits which are valuable, and field examination reveals the advisability of further exploration and development in order to bring the area into prominence as a world producer. This statement is based on evidence of numerous large and relatively high grade deposits already outcropping or shown by limited development work already done; nature of the flake contained in such deposits which is unexcelled commercially; accessibility to transportation by rail and water, cheap power, etc. Then there is the industry of manufacturing graphite products within the area, which merits a great deal of attention on account of the foregoing facilities. In fact this area presents qualifications for the development of the industry which no known area can duplicate.

#### TEMISKAMING BUYS DOLLY VARDEN.

Toronto, Feb. 3.

The shareholders of Temiskaming, at their annual meeting yesterday, consented to the proposal of the directorate, to extend the operations of the company, by taking over the Dolly Varden and Wolfe silver mines in British Columbia. These mines have been handicapped for some time by lack of finances, and Temiskaming has entered into an agreement whereby operations will be resumed. The purchase price of the property is \$900,000, but the obligation to the former holders of the mine is only \$450,000 because of the liabilities that Temiskaming has to assume. A narrow-gauge railway extending from the coast to Alice Arm to the Dolly Varden property is to be completed, and all debts will be met by the purchasers. According to the agreement, the vendors receive no payments on the purchase price, before the Temiskaming Company recoups itself for this outlay. The vendors will only be paid out of the profits.

The known ore reserves are said to be heavy, the properties, it is stated, having over two million ounces of positive ore in sight. The two properties lie within nine miles of each other, and both are said to be rich and extensive.

Temiskaming's annual statement was received and adopted at yesterday's meeting, and the old Board of Directors were re-elected.



## Special Correspondence

### NORTHERN ONTARIO.

#### Payment Made on Patricia.

A large cash payment on the purchase of the property of the Patricia Syndicate, at Boston Creek was recently made, according to official information. Advice is also to hand that an early resumption of operations at the property may be looked for, owing to the improved economic condition and better supply of labor. The small mill on the property was closed down early in the winter owing to the difficulty in securing fuel for its operation. Last week it was announced the Mining Corporation of Canada and also Detroit interests were negotiating for the purchase of the property, but so far nothing definite has transpired.

#### Exploring Skead Township.

Evidence points to a considerable increase in mining activity in Skead Township area during the coming spring and summer, and even now a number of properties are being worked in a more or less extensive way. Gold has been found in various sections of Skead township and in some instances spectacular gold values were found. Chief among the mining operations under way in the district at present is the Skead Gold Mines Limited. This company owns more than a score of claims on which work has been commenced. The Wisconsin Mining Company owning property in the district has engaged a number of men for the putting in shape of the mining plant, with the intention of resuming operations early in March. Plans are under way for a fairly extensive exploration of the vein system. Owing to the distance the new field lies from the railway, the development of the district has not been as rapid as the showings would appear to warrant. The coming summer, however, appears to mark the beginning of an aggressive period of development and those interested in the district are very optimistic at the outlook.

#### Will Resume Work at White Reserve.

Tenders are being called for 150-ft. of drifting at the 140-ft. level of the White Reserve property, in the Maple Mountain section. Arrangements are being made for an early resumption of mining operations at the property. Considerable development has been accomplished on this property and results to date have been very encouraging.

#### Development Plans for Miller-Independence.

The work of surveying and sampling the Miller-Independence Mines at Boston Creek has been completed. While no official report of the extent of the rich orebodies as so far opened up has been given out, it is stated the assays check up well with previous optimistic statements made. The consulting engineers have been so favorably impressed as to advise the sinking of the present shaft to lower levels. The recommendation is to the effect that the present shaft be continued from the present level of 200-ft. to a depth of at least 500-ft., with large stations at the 300 and 400-ft. levels, from which points lateral work is advised. The management is making preparations to carry out this work with the least possible delay. The shaft from the surface down to a depth of 40-ft. is being lined up with the remaining portion of the working which has reached a depth of 200-ft., and which has an incline of about 51 degrees. A concrete cellar will be placed at the mouth of the shaft. Two additional drilling machines have been placed on order and will be used for the purpose of sinking the shaft, while the present machines will be free for the carrying on of

further development work. The shaft will be timbered and additional machinery installed to facilitate the hoisting of the ore. The shortage of labor appears to have been overcome and as ample funds are available for the development of the property and erection of a large mill, there appears to be nothing to prevent the carrying out of the large plans of development recently outlined, and the placing of the property on a producing basis in a reasonable time. The small mill installed on the property has been satisfactory as a testing plant, for the testing of the ore in the mine as the various levels of the property are opened up. The high grade nature of the ore makes it unwise to use the present milling system for treatment. It is thought this plant will eventually serve as a customs mill for a number of the smaller properties opening up close to the Miller-Independence. The increasing importance of developments at the mine presage a bright future for the property at the coming spring and summer will see long strides made in the proving of the rich orebodies, the limits of which at the present time can only be guessed at. From what has been so far proven it is the opinion of many prominent mining men that the Miller-Independence operation is one of the most important in the annals of gold mining in the Dominion of Canada.

#### Gowganda.

A deal for the Walsh property in Gowganda, involving a sum said to be well up in six figures is under way. This silver property was under option to the Crown Reserve Mine of Cobalt and development work was carried to a depth of 200-ft. Owing to a very large payment falling due and terms not proving satisfactory, the option on the property was allowed to lapse. The Walsh lies adjacent to the famous Miller Lake-O'Brien mine and the geological conditions are very favorable for the encountering of silver deposits of importance.

#### Teck-Hughes Increases Output.

The December output at the Teck-Hughes Mine in Kirkland Lake is the highest in the history of the company. During the month some 2,035 tons of ore were treated, from which an average of \$10.12 per ton was recovered. It was officially stated that the grade of ore to be treated in the future at the Teck-Hughes would be higher than in the past. The reason given for this is the fact that the ore encountered in the course of development has been conveyed to the mill and does not represent the average contained in the main orebodies of the property. One orebody in the mine has been opened up for a distance of 400-ft. and a depth of 600-ft., showing a width of thirty-seven feet at its widest point. It is further stated officially that one of the main orebodies of the mine has an average value of between \$11 and \$12 per ton. The mill on the property is designed to treat between 100 and 120 tons of ore daily when brought up to full capacity. The outlook therefore is for an output of upwards of \$30,000 per month when operating at capacity.

#### Porcupine V.N.T.

Reports to the effect that the Porcupine V.N.T. property was about to be re-opened have been officially denied. Following the curtailment of operations last year, the lower workings of the mine were permitted to fill with water. It is therefore not probable that any action towards a resumption of work will be undertaken until the spring arrives.

#### McRae Porcupine.

Arrangements are understood to have been about completed for the further opening up of the McRae-

Porcupine property in the township of Deloro. Considerable work has previously been done on this property, and the results have been promising.

#### Porcupine-Keora.

Plans have been completed for a resumption of operations at the Porcupine-Keora property in the northern part of Whitney township. The preliminary work to be undertaken will consist chiefly of diamond drilling with the conclusion of which underground work will be started. Considerable success was met with in the diamond drilling of the Keora upwards of two years ago, when this work carried to a depth of 800-ft. Ore-bodies of a substantial width which are said to contain commercial values were cut.

#### Hunton-Kirkland.

It is understood interests closely identified with the McKinley-Darragh mine are connected with the purchase and development of the Hunton-Kirkland property at Kirkland Lake. Plans are under way for the installation of a steam plant for the exploration and development of the property, and work is to be commenced early in February.

#### Cheaper Supplies.

Striking evidence of the decline in the cost of mining materials is borne in the fact that steel plate which not long ago was on the market at 12 cents per pound can now be purchased for six cents. Copper wire has also declined nine cents per pound in the past few weeks.

#### McKinley-Darragh's new orebody.

The McKinley-Darragh mine ore shoot recently discovered at the 300-ft. level of the property near the old Princess property of the LaRose Mine continues to prove up well under development. Some rich ore occurs along the vein which has been opened up for a distance of fifty feet, in addition to the high grade being encountered there is a considerable tonnage of low grade mill rock in the wall rock. It is expected the vein will be picked up in the level above the present point of operation.

#### Good Ore at Adanac Mine.

The persistent efforts of the Adanac Mining Company have at last been crowned with success. The ore shoot at the 310-ft. level has been opened up for a distance of fifty feet, the vein showing a uniformity of width during the last few rounds of shots, and has every appearance of continuing for a considerable distance. The high grade portion of the vein runs from six inches to one foot in width, carrying values from one thousand ounces up to five thousand ounces to the ton, with an average value of approximately one thousand five hundred ounces to the ton. Besides this high grade vein the wall rock on both sides of the vein carries good milling ore, considerable leaf silver and ruby silver being in evidence for several feet from the main portion of the vein. Arrangements have been made for the hauling of ore to the Temiskaming mill which adjoins the Adanac, and a trial run of between fifty and sixty tons will be made as a preliminary to steady production. The length and breadth of the present ore shoot affords ample opportunity for the commencement of stoping operations, and this work will probably be commenced at an early date. An additional machine is to be employed in the mine next week which will increase the speed of development. A contract for the hauling of the ore to the Temiskaming mill has been let at 60 cents per ton for the time being, but it is expected a considerable reduction in this rate will be effected in the near future.

#### Tough-Oakes.

It is anticipated that any possible further litigation in the affairs of the Tough-Oakes Mining Company of Kirkland Lake, will not hinder the affairs of the Company. It appears to have been definitely established at the recent annual and special meeting of the company that the Foster control was at an end. However, it is possible the present controlling interests of the company will demand an accounting of the affairs of the concern during the past three years in which control was in dispute. The present directorate of the company holds that the former directorate are solely and entirely responsible for the present condition of the property, and the present directors have not had the opportunity of investigating the situation. Any dispute along this line or legal action taken should not hamper the development of the mine from this date forward and it is expected the development of the mine and subsequent opening of the mill will soon result in large earnings.

#### Hollinger's Construction Program.

A large construction program is being mapped out by the Hollinger Consolidated Gold Mines at Parcupine, including the immediate erection of some fifty houses for the accommodation of workmen. The early commencement of an additional 100-ton unit to the present 2,800-ton mill is also expected to be considered before long. Since the commencement of the war a 1,000-ton unit has been added to the plant, and an additional 1,000-ton unit will be installed. This work had been planned previous to the war. However, lack of labor and high cost of material consequent of the war led to the latter addition to the mill being left until a more opportune time. At the present time men are pouring into Timmins in large numbers, and housing accommodation in the town is being taxed to the limit. The whole district is teeming with activity and the probability is that with the coming of spring conditions warranting the construction of the extra milling facilities will have arrived and the work should be under way early in the summer. The Hollinger mine is the mainstay of the town of Timmins and with the enlargement of this and other properties in the district, the town of Timmins is now a thriving hive of industry. There is every evidence that the present town will soon be swallowed up in a big city, which the mining industry, and its demand for labor will create. Even now the number of new buildings being constructed and planned will go a long way towards changing the present appearance of the town and giving it a long step towards cityhood.

Mining Commissioner T. E. Godson, K.C., has completed his January sitting in Haileybury, and returned to Toronto.

Mr. A. Brant, manager of the Porcupine-Keora Mine, in the township of Whitney, went north last week to reopen the mine.

Plans are being arranged for the resumption of work on the Baldwin property, near Kenogami station in the Kirkland Lake district.

Plans are being made to resume work on the Murray-Mowgridge property, in the Wolfe Lake district, a few miles east from Bourke's Siding.

### BRITISH COLUMBIA.

#### Testing Breathing Apparatus.

Acting on instructions from Hon. Wm. Sloan, Minister of Mines, the Chief Inspector of Mines of British Columbia has arranged for a series of practical tests of the efficiency of the Gibbs Mine Rescue Apparatus and the Paul Breathing Apparatus. These will begin on Tuesday, the 28th of January, at the Government Mine Rescue Station at Nanaimo, and continue until the efficiency of the machine is thoroughly demonstrated.

#### Activity at Trail Smelter.

Notwithstanding the present unsettled condition of the metal market, Trail, B.C., the home of the smelting plant of the Consolidated Mining & Smelting Company of Canada, is as busy now as it was some months ago, and has more men on its payroll. The explanation of this, in a few words, is that the management is preparing for the time, expected soon, when the work of reconstruction will make itself felt in the demand for the product of the plant.

#### Plant for Treating Tailings.

To be ready to take the fullest advantage of the shortly looked for readjustment and the return to the normal, there is considerable to be done at Trail. This was forecasted in the annual reports of the company's officials, which were issued recently.

One of the most important things in mind is the construction of a concentrating plant in connection with the zinc plant for the purpose of treating the tailings of the Sullivan mine and other silver-lead-zinc ores after they have passed through the zinc electrolytical process. There is an immense quantity of this residue which has been accumulating ever since the process for the recovery of zinc was installed, because there was no known, economically practical method, of extracting the lead-content. Both Messrs. J. J. Warren, the Company's General Manager, and S. G. Blaylock, his assistant, have stated that this vital problem has been solved by their own chemists. If this is so, and officials in question are evincing their faith by proceeding with the necessary installations, its importance to the mining industry of Eastern British Columbia, where the refractory ores of the Sullivan mine are found repeated in many other promising properties, can scarcely be over-estimated. It is said that the method by which the said tailings are to be handled is a combination of the concentration and leaching processes. Its success means the continued production of spelter at Trail at a cost which will permit in all probability its being placed on the market in competition with the products of other American smelters which are handling less complex ores because the lead content also will be available. This, therefore, is one of the works that the Trail Smelter management is engaged in and which, to some extent, accounts for the activity referred to at the outset.

#### Enlarging Copper Refinery.

A second matter, and also one of first importance, which is receiving attention is the enlargement of the copper refinery to provide for a daily minimum capacity of 50 tons. Present facilities permit the producing of not more than 20 tons a day. The concrete footings for this structure have been placed and the work will go ahead as soon as weather permits.

The extension of the copper refinery plant at Trail is the logical outcome of the company's policy in acquiring the Voight copper claims, Copper Moun-

tain, B.C. Of course, considerable development is necessary before this property begins to produce on a large scale, but, in the meantime, the Smelter is assured the concentrates of the Canadian Copper Corporation's mill at Allenby (near Princeton) B.C. The latter concern, which has made a large investment at Copper Mountain in the development of claims which adjoin the Voight claims (so-called), and the construction of a branch line from Allenby to the property and a mill at Allenby, has entered into an arrangement for the shipment of concentrates to Trail. Active work in the extraction of ore at this mine should commence within a few months so that the Trail Smeltery, with such a source of supply in addition to what is available from its own and custom properties, will have no difficulty in finding material for the augmented facilities of its copper refinery.

#### Alice Arm District.

The Alice Arm District of British Columbia is expected to develop into one of the large producing sections of the Province before long, it being the opinion of mining men that the Dolly Varden mine, which now is inactive because, owing to the failure of the Taylor construction company to carry out its contract relative to the construction of the railway from the coast to the mine, both the railway and the mine are tied up. The former is practically complete. When work ceased on it last autumn only five more days work would have found the terms of the charter complied with but, although within reach of the goal the company could do no more, and the charter has been allowed to expire. Considerable sums are owing to the workmen, and there also are large accounts outstanding for material. The owners of the mine have offered, according to well authenticated report, to pay these off providing the Provincial Government will renew the charter, which is an indication of faith in the mine very encouraging to all interested in the minerals of the section. It is confidently expected that the Government will take the action sought, in which event the line will be finished and its operation commenced. This, it is pointed out, will not only permit the Dolly Varden mine to undertake shipment of ore and further development, but will result, through providing transportation facilities, in opening up many other promising mining properties of the district.

#### Galena Farm Mine.

Eight carloads of ore have been shipped from the Galena Farm mine since Mr. W. J. Casey, of Los Angeles, Cal., became lessee of the upper workings, according to a report from Silverton, near where the property is situated. Three carloads were zinc concentrates and the remainder crude lead-silver, and all were produced from ore discovered in recent months above the intermediate tunnel level. The lead-silver ore has an estimated net value of \$4,000 to the carload. The new ore is contained in a body 11 to 14 feet wide, disclosed in raises 150 feet apart on the intermediate level. The 14 feet of ore in the west raise includes two and a half to three feet of a shipping grade, while the 11 feet in the east is of milling grade xx. Drifts are proceeding on ore from the tops of these raises, which are less than 100 feet in height, eastward from the east raise and westward from the west raise.

### Cork-Province Mines.

Cork-Province Mines, Ltd., operating mines and mill on the south fork of the Kaslo River, Kaslo, B.C., has concluded arrangements for refinancing, and expects to start operations early in the spring with sufficient capital to sink the main shaft 200 feet deeper and drive the main tunnel level into the third vein, which is particularly promising on the surface, and will be tapped at vertical depth of 700 ft. A letter has been addressed to the stockholders by the management stating that all metallurgical problems have been overcome, and that a successful run is confidently expected when operations are resumed. Running full time it is figured that the mine will earn a monthly profit of \$12,000, based upon a lead and zinc concentrate output of 390 tons, worth \$20,294 gross. These figures, it is explained, have been prepared with due allowance for the decline in price of lead, and present net value of zinc concentrate shipped to Trail, where no payment is made for silver content.

### Developing Fluorspar Near Grand Forks.

Progress is being made in the development of the fluorspar property of the Consolidated Mining & Smelting Co., near Grand Forks, B.C. Eighty-two men now are employed there. The tram line being built to convey the ore from the mine to the bunkers for shipment is nearly completed, and is expected to be ready for operation this month. At the bunkers a mill is being installed which will grind the ore to almost flour-like consistency before shipment. The mill site is to be connected with the Kettle Valley Ry. by a branch line which is under construction.

### COAL RIGHTS ON VANCOUVER ISLAND.

The Government of the Province of British Columbia has announced that it will stand by the settlers of Vancouver Island, who are claiming the coal rights in connection with the lands they occupy providing they can prove that such claims are based on sound premises. It will be recalled that the Dominion Government last year disallowed the Provincial Act giving the settlers a further period in which to record their applications, this measure being termed "An Act to amend the Settlers' Rights Act, 1904." One of the objections taken by the Federal Administration is that such legislation proposes to authorize the alienation of rights which were conveyed by the Province to the Dominion and by the Dominion conveyed to the E. & N. Ry. Company in consideration of the latter constructing a railway on the Island. Among other points advanced by the Provincial Government in its answer is that there is no difference in principle between the Act of 1917 and that of 1904, both being identical in character, and that the Dominion is inconsistent in disallowing the one and allowing the other to stand. This legislation, and the conflict which it has caused between the Federal and Provincial Administrations, involves title to considerable of the undeveloped coal areas of the Island. This is now, for the most part, in the hands of the Canadian Collieries (D), Ltd., to which company it was transferred by the Esquimalt & Nanaimo Ry Co.

### THE SMELTER RATES INQUIRY.

At the opening session of the Committee appointed to inquire into the fairness or otherwise of the treatment rates charged on custom ores by the Consolidated Mining & Smelting Co. of Canada at its Smeltery at Trail, B.C., it was explained by Mr. S. S. Fowler, the chairman, that evidence either in the nature of criticism or suggestion would be heard from anyone. Such evidence might be given orally or in writing. It had been decided that, where witnesses made the request, their testimony would be heard "en camera" and would be treated as confidential. It was explained, in this connection, that some who might wish to be heard felt that, if they went before the Committee without assurance to the contrary, details of their mining business or of the concerns for which they were employed, would become public to the prejudice of such private interests. Members of the Committee, after taking the evidence of one witness behind closed doors, decided that they would visit the Trail Smeltery and meet representatives of the management of the company in order that necessary arrangements might be made for investigation of the conditions relative to the operation of the plant. A circular is being issued by the Committee for distribution among operators and mining men throughout the Province, explaining that the inquiry has been opened, and that evidence on the question will be welcomed from all who desire a hearing or are of the opinion that they have knowledge which will throw further light on the issue. In the meantime further indications that the inquiry does not satisfy a faction of the operating miners of Eastern British Columbia is furnished by a resolution passed by the Kalso (B.C.) Board of Trade, which explains itself and reads as follows:

"That this board place itself on record as not being satisfied with the appointment of a committee with limited power and authority for investigation into the matter of smelter rates and treatment of lead and zinc ores by the Consolidated Mining & Smelting Company's plant at Trail, and that we believe only by a Royal Commission can a complete and satisfactory investigation be made, and that copies of this resolution be forwarded to the Minister of Mines and the Federal Member."

### Prospecting at Trail.

"Sandy" McDonald, an old Cariboo placer miner, has interested and surprised residents of Trail, B.C., by staking Camp Welcome, Claim No. 1, on the Columbia River, just opposite the town. His work is proceeding practically in full view of the populace of the smelting centre and he is said to already have recovered both fine and coarse gold. He professes confidence that, as soon as he has the ground properly opened up, he will be able to prove its value and, incidentally, to justify his faith.

Mr. D. A. Angus, of the Wright of Way Mines has returned from a trip to southern points.

**JANUARY SITTINGS OF MINING COMMISSIONER.**

The January sittings of Mining Commissioner T. E. Godson, have been concluded at Haileybury.

The dispute of John I. Ritchie, George T. Hamilton, and J. W. Myles vs. John T. Green, was a question involving discovery. An examination had been made by engineers of the department, as well as by the mining inspector. After consultation the litigants agreed to relinquish the restaked properties, the former claims to be reinstated and divided according to the terms of settlement agreed to.

Decision was reserved in the case of E. H. Horne vs. R. B. Morrehead, B. Babayah and Robert Carlyle.

In the dispute of J. A. Knox vs. C. Steveson, as well as the dispute between J. A. Knox and Peter J. Graham, owing to the illness of Stevenson, a material witness, stands over to the next sittings.

In the case of Horace Patterson vs. R. A. P. Mining and Development Company, the order of the applicant is to go as asked unless the respondents show cause forthwith.

A settlement is pending in the dispute between Peria et al vs. Kell and Ufland. An enlargement was asked for to permit settlement.

In the dispute between Joseph Harvey, jr., vs. Fred Egan, judgment was reserved.

**ASKING FOR BOUNTY ON IRON ORE.**

Ottawa, Feb. 3.

In support of a movement to encourage the mining of iron in Canada, representatives of the Boards of Trade of Port Arthur, Sudbury, Sault Ste. Marie, North Bay, Vancouver and other cities and towns will wait on Sir Thomas White, acting Premier, and other members of the Government at 12.30 p.m., to-morrow. The delegation will be introduced by Mr. F. H. Keefler, M.P., Parliamentary Under-Secretary of State for External Affairs.

The deputation will suggest that one dollar shall be paid for every dollar's worth of iron ore produced in Canadian mines. When iron and steel bounties were paid on the tonnage of pig iron produced in Canada, members of the deputation state, the amount of Canadian ore used in smelters was comparatively small, American ore being used mainly. If the \$26,000,000 so expended had been paid in the way now suggested, the deputation believes iron mining in Canada would have been much more advanced than at present.

**Miners Flocking to Gold Camps.**

The trek of mine workers to the gold camps of Northern Ontario has become fairly general. Accommodation is being taxed to the utmost. The leading Porcupine mine is about to construct fifty dwelling houses in the town of Timmins. Various mines, closed down for from one to three years, are planning early resumption of work, and the gold output of this country may reasonably be expected to record a big increase during the current year. Before the end of the current year it is expected eight Porcupine gold mines will be producing gold, as against four at the present time. Likewise in the Kirkland Lake field similar increases are anticipated. Two mines are now producing, whereas before the end of the current year six are expected to reach the producing stage. In the Boston Creek district very satisfactory headway is also being made.

**CENTRAL ELECTRIC POWER STATIONS IN CANADA.**

A Census and Directory of the Central Electric Power Stations in Canada has just been completed by the Dominion Bureau of Statistics and the Dominion Water Power Branch of the Department of the Interior working in co-operation and with the assistance of the Ontario Hydro-Electric Commission, the Quebec Streams Commission and other Provincial Departments concerned. The Report is in two parts, Part I. comprising a complete census and statistical survey, with accompanying explanatory matter, whilst Part II. forms a comprehensive directory of all commercial and publicly-owned power stations in operation throughout Canada, showing the principal features of each, the locations where blocks of electrical energy are for sale, the price at which power is obtainable, transportation facilities available in the vicinity, etc. The collection of the data was made by the Bureau of Statistics and the Provincial Departments and the analysis and preparation of the data by the Dominion Water Power Branch.

The statistics include only central electrical stations, that is, stations engaged in the sale of electrical energy; all other electrical establishments, such as electric railways, electro-chemical and other electrically operated industries, are excluded. Outstanding features of the report are as follows:

*Capital and Labor.*—The capital invested in central power stations totals \$356,004,168, of which 79.5 per cent is invested in commercial stations and 20.5 per cent in municipal or publicly-owned stations. These figures indicate that the capital cost of central electrical station systems in Canada per primary horse-power installed is \$193, averaging \$196 per horse-power for commercial stations and \$183 per horse-power for municipal or publicly owned stations. This cost includes all capital invested in construction and equipment of hydraulic works, power stations, transmission and distribution systems; real estate; cash on hand; current assets; sup-

The total employees connected with the industry, including officials and wage earners, numbers 8847, of which 58 per cent are connected with commercial and 42 per cent with municipal stations. The salaries and wages paid to these employees total \$7,777,715 per annum.

*Revenue.*—The total revenue received from the sale of electrical energy is \$44,536,848, of which \$29,135,399 was secured by commercial and \$15,401,449, by municipal plants.

*Power Installation.*—The primary power installation in central stations totals 1,844,571 h.p., of which 78.3 per cent or 1,444,314 h.p. is installed in commercial stations and 21.7 per cent or 400,257 h.p. in municipal stations. Of the total primary horse-power installed, 1,652,661 h.p. is derived from water, 180,800 from stream, and 11,710 from gas and oil.

The total primary power installed in central electric stations throughout the Dominion averages 221 h.p. per thousand population. Yukon averages the highest with 1,206 h.p. per thousand population, British Columbia coming next with 378 per thousand population, Ontario with 286 per thousand population, Quebec 271 per thousand population, Manitoba 118 per thousand population, New Brunswick 49 per thousand population, Saskatchewan 47 per thousand population, Nova Scotia 34 per thousand population and Prince Edward Island 13 per thousand population. Population by provinces is the only feasible basis available for making a per capita

analysis of the central station industry. The occupation of the population, and its varied density in different localities have a direct bearing on the market for electrical power, and consideration of these phases will assist in explaining the above variations in the per capita development.

*Cost of Construction.*—Of special interest is the actual cost of construction of hydro-electric power stations per installed horse-power. Omitting all real estate, transmission and distribution equipment, seventy representative hydro-electric stations throughout the Dominion, with an aggregate turbine installation of 745,797 h.p. and a total construction cost of \$50,740,458 show an average cost of \$69.11 per installed turbine horse-power. The figure in brief represents the average capital cost of construction at the power site and is of considerable interest to engineers.

*Hydro-Electric Power in the Central Station Industry.*—One of the most important facts disclosed as a result of the statistics is the outstanding position which water power takes in the central station field. Out of a total installed primary capacity of 1,844,571 h.p., 1,652,661, h.p., or 89.6 per cent—practically 90 per cent—is derived from water. This figure is indicative of the extent and availability of the water power resources of the Dominion and of the remarkable degree to which their adaptability for central electric station work has been appreciated in principle and realized in practice. The vast water power resources of the Dominion, the ready adaptability of hydro-power to the production of electrical energy and the increasing extent and scope of economical electrical transmission form an industrial asset which probably more than any other will ensure a full measure of future prosperity.

The Yukon develops 97.4 per cent of its primary central energy from water. Ontario develops 95.7 per cent from water indicating markedly the commercial adaptability of water power for central station work, even where in competition with convenient and reasonably cheap coal supplies. Manitoba develops 95.2 per cent of its central station energy from water, Quebec 94.9 and British Columbia 89.9 per cent. Alberta develops 43.2 per cent from water, although an abundant supply of coal is available. New Brunswick develops 38.8 per cent from water power, Nova Scotia 19.2 per cent. The percentage of water power used in central electric stations in Nova Scotia is low although the province is exceptionally endowed with available water power resources. An abundant coal supply indicates the reason for this condition. The city of Calgary is served from a steam-driven plant, the largest central electric station in the Province. The present tendency in the province is, however, towards the increased use of hydro power. In Prince Edward Island only 13.9 per cent of the central station power is derived from water. Topography and area of the Island province explains the lack of water power resources. In Saskatchewan no water power is developed. Here the topography of the province is solely responsible, the entire settled portion being located in prairie country which is not naturally endowed with attractive water power sites.

Tables 1, 2 and 3 provide a more detailed analysis of the statistical data referred to in the foregoing.

*Directory of Central Stations.*—The directory of central electric stations in Canada, which forms Part II. of the Report constitutes a ready reference to the central electric stations of the Dominion. Garvke's Annual issued in England and McGraw's Directory published

in the United States have attempted to deal with this field in Canada, in order to provide reference data in the general interests of commerce and industry. The material which has now been compiled is much more exhaustive and comprehensive in every way than either of these publications, and it is thought that it will prove a valuable asset in the reconstruction period as it permits a bird's eye view of the present status of the industry in all parts of the Dominion and indicates the locations where expansion is readily feasible. As already stated, a special effort has been made to secure from the various corporations and municipalities, information relative to blocks of electric power available for sale; the prices at which such power can be provided; the available sites for industry in the vicinity, and the transportation facilities available. The corporations and municipalities have co-operated heartily in this connection. It is intended that, in so far as possible, this information shall be kept up to date, in the Dominion Water Power Branch.

For Part I (statistical) application should be made to the Dominion Bureau of Statistics, while for the Directory, Part II., distribution will be made by the Dominion Water Power Branch.

## Time Clocks in Schools

**Proposal that School Pupils and Students Register Their Time, Arouses Wide-Spread Attention —Employers are also Keenly Interested in the Movement.**

Educators all over the country are discussing the proposal of Principal F. P. Gavin, of the Windsor, Ont., Collegiate Institute, that students be required to register IN and register OUT on time recorders, just as they will later do in the business world.

Principal F. P. Garvin is to be highly complimented on this advanced idea, showing that he realized that the future business people of the country cannot be taught the value of time and the value of punctuality too early in life.

People prominent in various walks of life have gone on record to the effect that Principal Gavin's idea marks a new era in school life. What greater lesson, they ask, can a child or young person be taught, than the value of time and punctuality, and at the same time be taught one of the greatest essentials to success in business? While School Boards in some sections are already using Time Recorders in connection with the Teachers, Principal Gavin's proposal quite indicates that he is of the opinion that its disciplinary benefits should go further and include the pupils also.

### Incentive Supplied Students.

In addition to affording both teachers and parents an indisputable record of the time that each pupil arrives at the class room, or leaves the class room, it is pointed out that a direct incentive is supplied the student, for the reason that the method would eliminate the bad habits of arriving late or leaving early on some trivial and often doubtful excuse, frequently offered under the supposed parental authority. This, teachers argue, would be a great benefit in carrying out the class schedules, and improving the morale of the class.

Moreover, the valuable study time lost by each pupil must, when one considers the hundreds of thousands of pupils, amount to many hundreds of thousands of hours monthly. Moreover, such lost time must set a bad example to all pupils as is evidenced by the present indifference on the part of many pupils to this question of punctuality. These two factors are said to be the greatest evils in the present educational system, and is one of the reasons why the teachers have been found to be genuinely interested in the new movement, to record all the comings and goings of their pupils.

#### Eliminated Favoritism.

Teachers are recognized as being very human people. In fact, it is necessary that they be so, and this fact in itself makes it difficult indeed for a teacher to eliminate what might be called favoritism. Parents see in the new idea a method that will remedy this element. The time recorder of course is totally impartial, and since each pupil would register his or her record, it follows that the personal element cannot enter into it. This must be important in the childrens' minds, for they would quickly recognize that each and all were treated exactly alike, which is recognized as the one method to command the greatest respect.

Parents would unquestionably place high value on the time card record that the pupil could bring home at the end of each week or month. They would know immediately whether their children were loitering on the way to school or on their way home, and further, know almost to the minute how long a child had been kept in at school, all of which is valuable information.

#### Employers Keenly Interested.

In view of the far-reaching effects in later life this proposition is likely to have, business men and particularly manufacturers, are watching the progress of the new movement with undisguised pleasure. They see in it the best remedy for the old commercial and industrial evil, the "late" habit of new employees recently out of school.

It is a well-known fact to all employers that this tardiness with its direct loss to the firm, is mainly due to the fact that all through school life the pupils or students were not educated along the lines of making a printed record of their comings and goings. Manufacturers feel that the time recorder should have its place in school life, it is the training ground for business, since it has been found indispensable in the later. The general concensus of opinion of the business men interviewed on the subject is unquestionably in favor of the installation of time recording machines, in every school and educational institution in the country. They point out that many young men or women have lost an opportunity of promotion by their executives owing to the fact that they had not exhibited the proper appreciation of the value of time or the value of punctuality.

Major R. W. Coulthard, who recently returned from France, is now in Toronto, where he recently took charge of the Davisville limb factory of the Department of Solviers Civil Re-establishment.

Mr. O. A. Dunlap has been elected vice-president of Hollinger Consolidated Mines, succeeding the late John McMartin.

## Want Bounty on Iron

Mining men and citizens generally of the Canadian West propose once more to bombard the Dominion Government in the effort to secure the passage of legislation placing a bounty of 50 cents a ton on the production of pig iron in Canada. Some action of a similar character was urged by a strong delegation from British Columbia at the Canadian Capital last year with no more effect than the elicitation of a promise that the Federal Government would purchase all pig iron produced for which no other market was available at "the market price." This had no effect on the industry, and none was looked for by the disappointed delegates. Apart from other considerations the phrase "the market price" was too indefinite. Did it mean "the market price" in the West or the East of Canada. If the latter, then there was no advantage, and further representations failed to secure any clearer explanation of what was meant. Now mining men of northern Ontario are joining with the Pacific Province in the movement, as is evinced by the following telegram received by Hon. Wm. Sloan, Minister of Mines for British Columbia:

Port Arthur, Ont.,  
January 2t8h, 1919.

Wm. Sloan,  
Minister of Mines,  
Victoria, B.C.

Delegation meets at Ottawa February 3rd on iron bounty and increased production of iron and steel in Canada. We urge you to attend. If impossible, send representative or wire your endorsement of movement to your own member or to F. H. Keefer, M.P., Ottawa.

E. J. BLAQUIR,  
MAYOR A. W. ROBERTS,  
President Board of Trade.

The whole-hearted co-operation which Port Arthur may look for from British Columbia in regard to this matter is indicated by Hon. Mr. Sloan's reply, which follows:—

January 29th, 1919.

E. J. Blauquier,  
Mayor A. W. Roberts,  
Board of Trade,  
Port Arthur, Ont.

Re your wire and importance of Dominion Government adopting such policy as will encourage development of Western Canada Mineral Resources and production of Iron and Steel, wish to state that representations of this character have my hearty sympathy, and that I sincerely trust your efforts will meet with success. Regret am unable, owing to opening of Provincial Legislature to-day, to join your delegation in person. However, have taken this matter up with Dr. S. F. Tolmie, M.P., and Charles A. McIntosh, M.P., who assure me that there is no doubt the British Columbia representation at Ottawa is a unit on this question, and will as a body press the claims of the West during the forthcoming session of Parliament. In this connection may say that it is my present intention, as soon as local sessional duties permit, to visit Ottawa to add my support to the end that the Federal Government take steps to encourage this important industry. We feel that our Government, in offering bounty of \$3 a ton on pig iron produced in

the Province from local ores, has gone as far as our financial resources permit, and the Dominion Administration should give practical evidence of its interest in the development of the immense iron deposits of the West which now are dormant. We are on the threshold of a period of reconstruction and it is of the utmost importance to the industrial and commercial future of our country that this vital basic industry should be established.

WM. SLOAN,  
Minister of Mines.

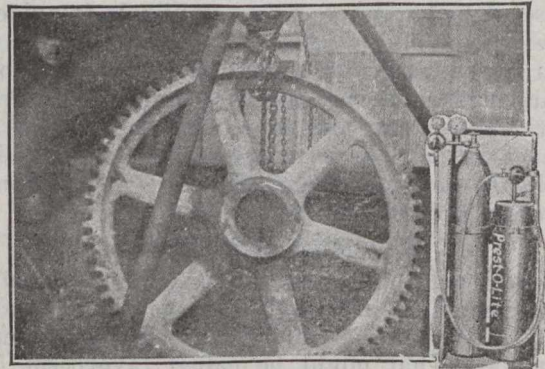
**OBITUARY.**  
**James Cumming.**

One of the pioneer mining men of the Canadian West died at Vancouver, B.C., on December 3rd last, in the person of James Cumming. He was known to all old timers, having figured prominently in the events connected with the rush to the Cariboo gold fields, where he went in 1862 and where he worked for eight years, having been identified with the development of the famous Cameron claim. Until a few years ago he lived in the same district, operating various placer claims with indifferent success, but always cheerful and buoyed up with the never-failing confidence that some day he would make the "big strike." In 1912 Sir Richard McBride presented him with a Free Miner's License as a public and personal testimonial.

**Will Abolish "Closed Towns."**

Legislation is proposed by the Hon. T. D. Pattullo, Minister of Lands for the Province of British Columbia, which will affect the policy of the Granby Consolidated Mining & Smelting Co., Ltd., as well as other mining and manufacturing companies, of maintaining what are termed "closed towns" in those areas near their plants where homes are provided for officials and employees. The companies' explanation for their course in this report is that it is in the interest of their respective businesses that agitators and idlers, and people generally with no particular business, shall be kept out of such centres. On the other hand the Minister of Lands takes the position that the right of any private corporation to arbitrarily prohibit intercourse between the members of their particular community with the outside world is questionable, that it results in the restraint of free competitive trade, and is an unjustifiable interference with the freedom of the subject. It is not proposed by the Government, however, to place any law on the statutes which will force the companies to throw open their towns to the same extent as are the usual run of municipal corporations. The Lieutenant-Governor-in-Council will be given power to declare certain communities company towns, within the limits of which the public shall have free right of ingress and egress over the ways and roads used by the companies as avenues of traffic; but it is not intended that the ways immediately adjacent to the works themselves and used solely in connection with actual industrial operations shall be deemed avenues of traffic. In other words the prohibition will be lifted as regards avenues of traffic which are in the townsite proper and on which are located the various public offices, public buildings, etc. Provision also will be made for wharf accommodation for public traffic and use in cases of those towns where water transportation is the only means of approach.

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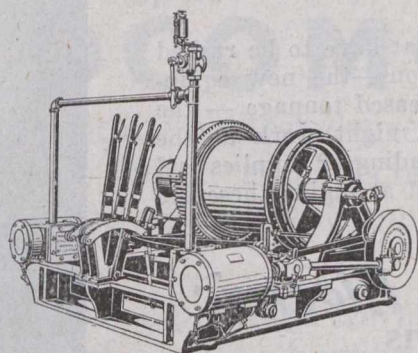
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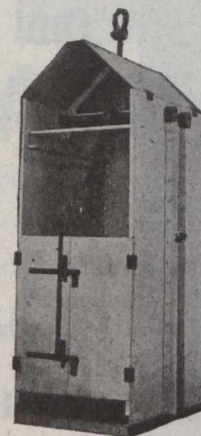


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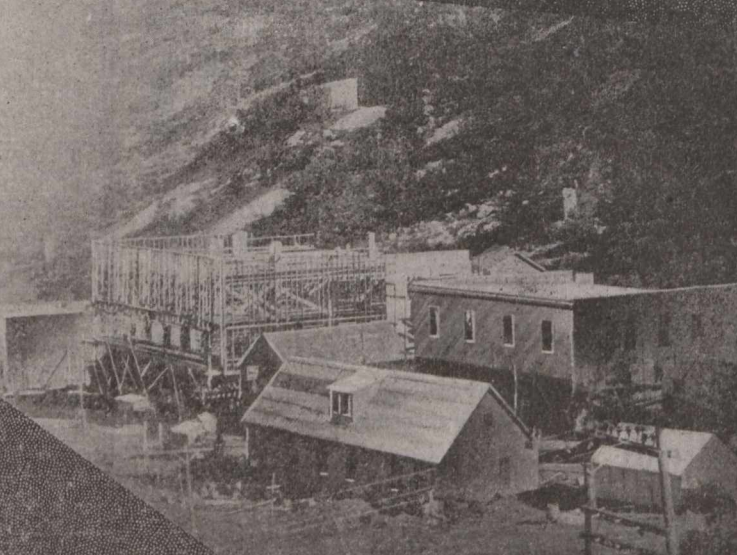
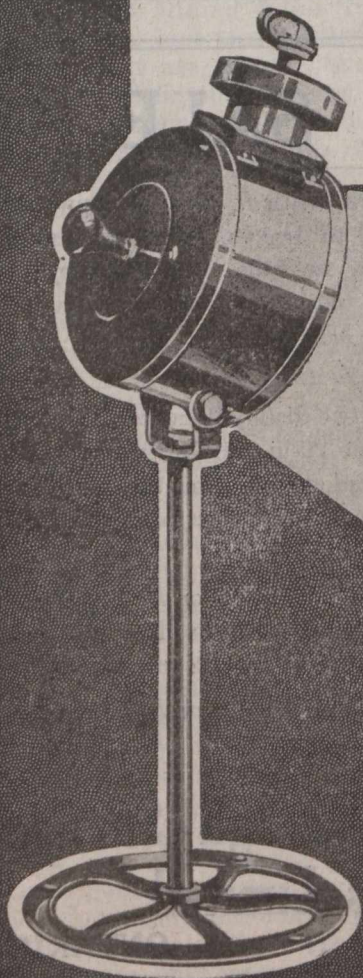
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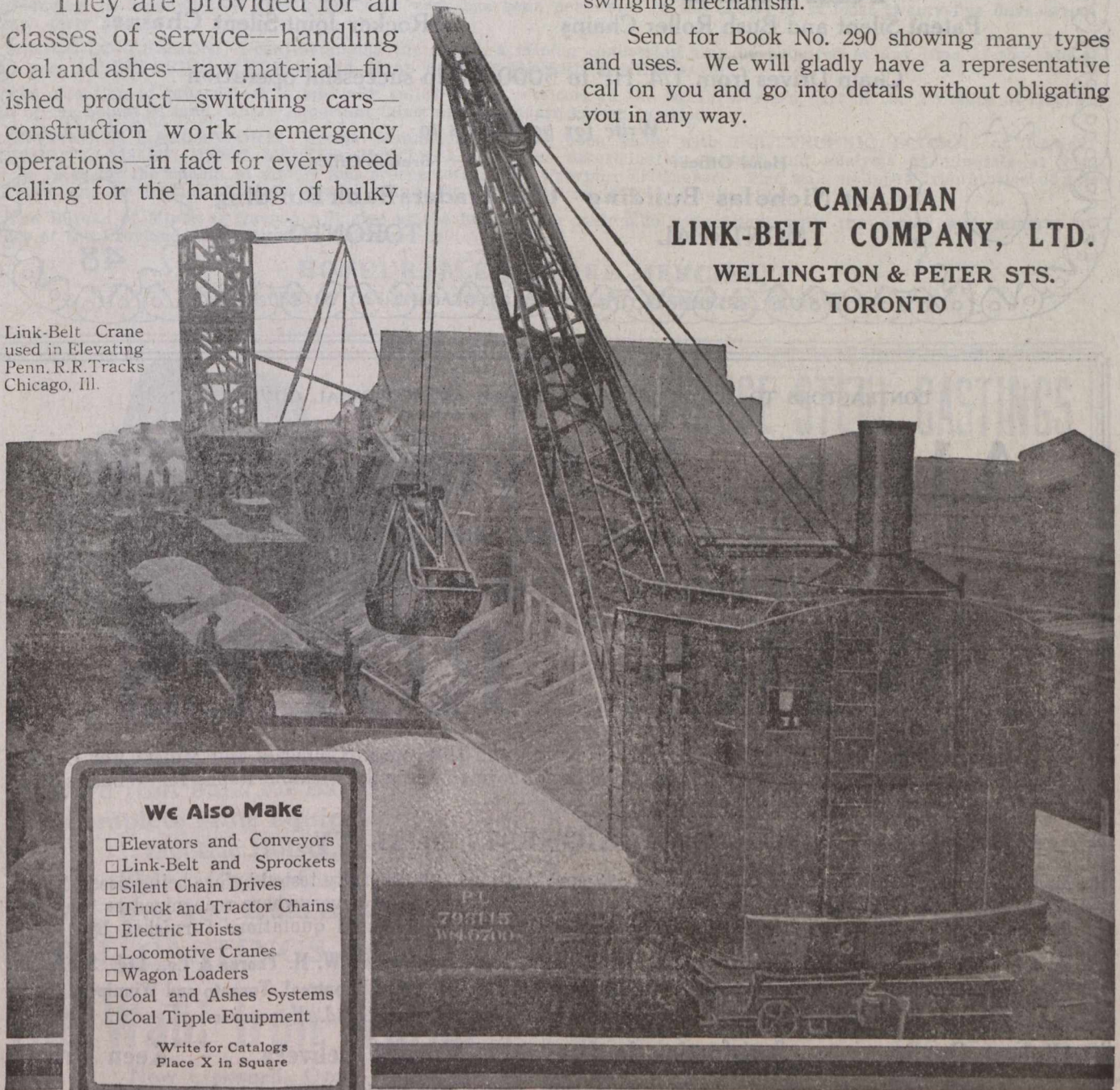
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## MINES BRANCH

Department of Colonization, Mines and Fisheries

*The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.*

**The Mining Law gives absolute security of Title and is very favourable to the Prospector.**

**MINERS' CERTIFICATES.** First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is \$10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

**WORKING CONDITIONS.** During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

**SIX MONTHS AFTER STAKING.** At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

**MINING LICENSE.** The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of \$10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

**MINING CONCESSION.** Notwithstanding the above, a mining concession may be acquired at any time at the rate of \$5 an acre for SUPERIOR METALS, and \$3 an acre for INFERIOR MINERALS

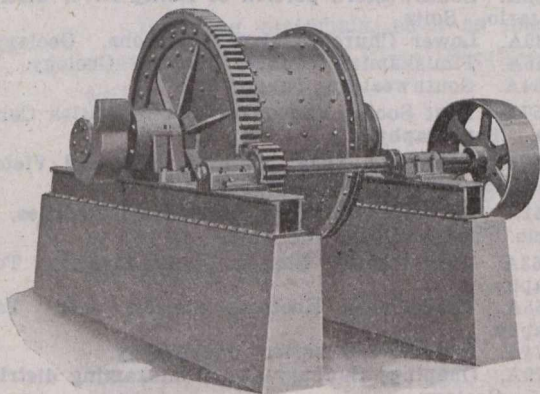
The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

**PROVINCIAL LABORATORY.** Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

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# CANADA

## DEPARTMENT OF MINES

HON. MARTIN BURRELL, *Minister*

R. G. McCONNELL, *Deputy Minister*

### MINES BRANCH

#### Recent Publications

Iron Ore Occurrences in Canada, Vol. II. Compiled by E. Lindeman, M.E., and L. L. Bolton, M.A., B.Sc. Introductory by A. H. A. Robinson, B.A.Sc.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

Occurrences and Testing of Foundry Moulding Sands. Bulletin No. 21, by L. H. Cole, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Clay Resources of Southern Saskatchewan, by N. B. Davis, M.A., B.Sc.

Summary Report of the Mines Branch, 1916.

The Mineral Springs of Canada. Part II., by R. T. Elworthy, B.Sc.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

**Fuel Testing Laboratory.**—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

**Ore-Dressing Laboratory.**—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

**Chemical Laboratory.**—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

**Ceramic Laboratory.**—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

**Structural Materials Laboratory.**—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to The Director, Mines Branch, Department of Mines, Ottawa.

### GEOLOGICAL SURVEY

#### Recent Publications

Summary Report, 1917, Part D. Reports on field work in Manitoba.

Memoir 95. Onaping Map-Area, by W. H. Collins.

Memoir 96. Sooke and Duncan Map-areas, Vancouver Island, by C. H. Clapp.

Memoir 98. Magnesite Deposits of Grenville District, Argensteuil County, Quebec, by M. E. Wilson.

Memoir 99. Road material surveys in 1915, by L. Reinecke

Memoir 101. Pleistocene and recent deposits in the vicinity of Ottawa, with a description of the soils, by W. A. Johnston.

Memoir 103. Timiskaming County, Quebec, by M. E. Wilson.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Map 63A. Moncton Sheet, Westmoreland and Albert Counties, New Brunswick. Topography.

Map 132A. Southwestern portion of Rainy River district, Ontario. Soils.

Map 135A. Lower Churchill river, Manitoba. Geology.

Map 145A. Timiskaming county, Quebec. Geology.

Map 154A. Southwestern Yukon.

Map 157A. East Sooke, Vancouver Island, British Columbia. Topography.

Map 161A. Beaverton Sheet, Ontario, York and Victoria Counties, Ontario. Topography.

Map 162A. Sutton Sheet, York and Simcoe Counties, Ontario. Topography.

Map 163A. Barrie sheet, Simcoe County, Ontario. Topography.

Map 165A. Windermere, Kooteney district, B.C. Topography.

Map 174A. Blairmore, Alberta. Topography.

Map 179A. Onaping; Sudbury and Timiskaming districts, Ont. Geology.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Maps 1697 and 1698. Explored routes in a belt traversed by the Canadian Northern Ontario railway,—in two sheets: Sheet 1 Gogama to Missonga, Sudbury district; Sheet 2 Oatland to Penhurst, Algoma district, Ontario.

Map 1690. Whiteburn Gold District, N.S. Geology.

Map 1702. Klotassin, Yukon Territory. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

Maps published within recent years may be had, printed on linen, at the nominal cost of ten cents each.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to The Director, Geological Survey, Ottawa.



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Many other useful minerals, both metallic and non-metallic, are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and talc.

Building materials, such as marble, limestone, sandstone, granite, trap, sand and gravel, meet every demand. Lime, Portland cement, brick and tile are manufactured in quantity within the Province.

Ontario in 1917 produced 46 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1917 to be worth \$72,093,832, of which the metallic production was \$56,831,857.

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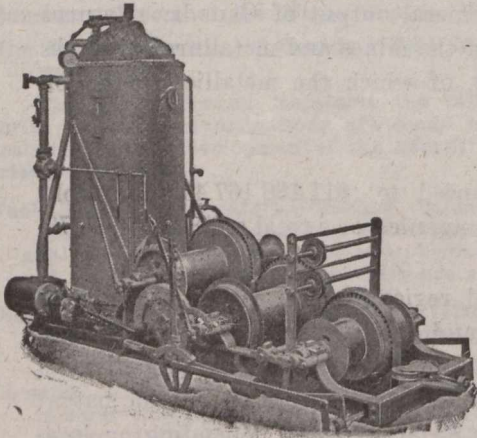
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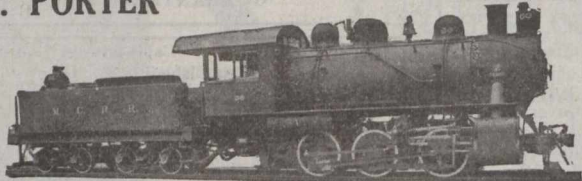
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- Gears—**  
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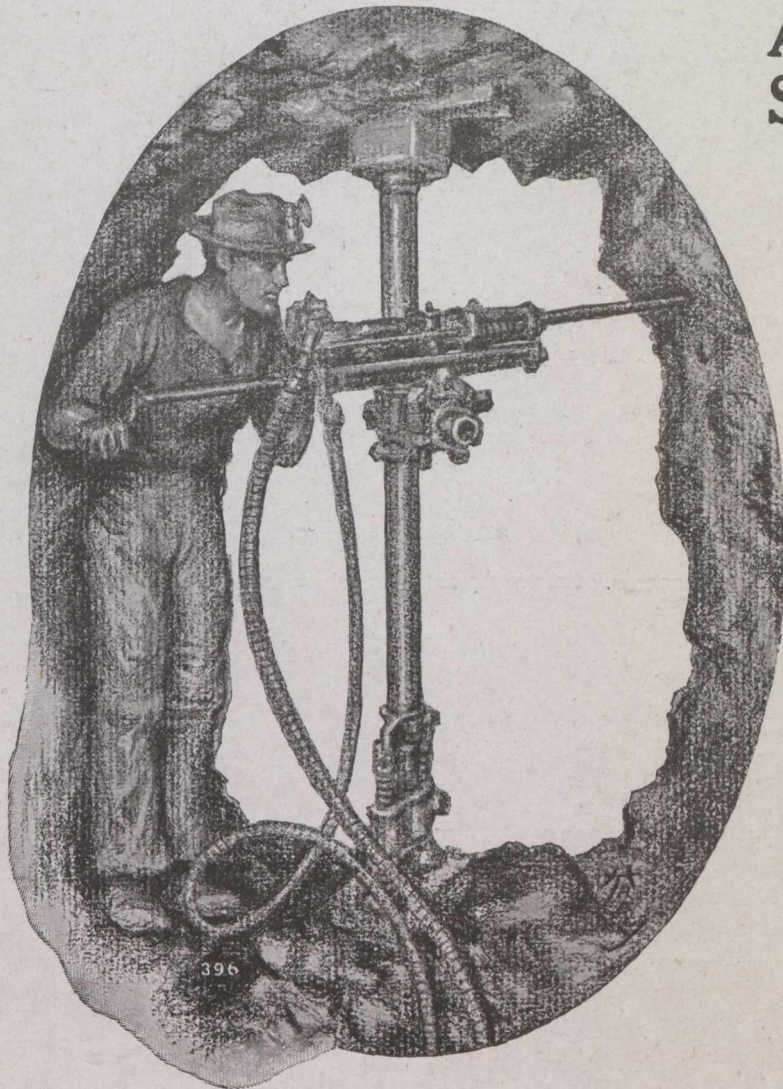
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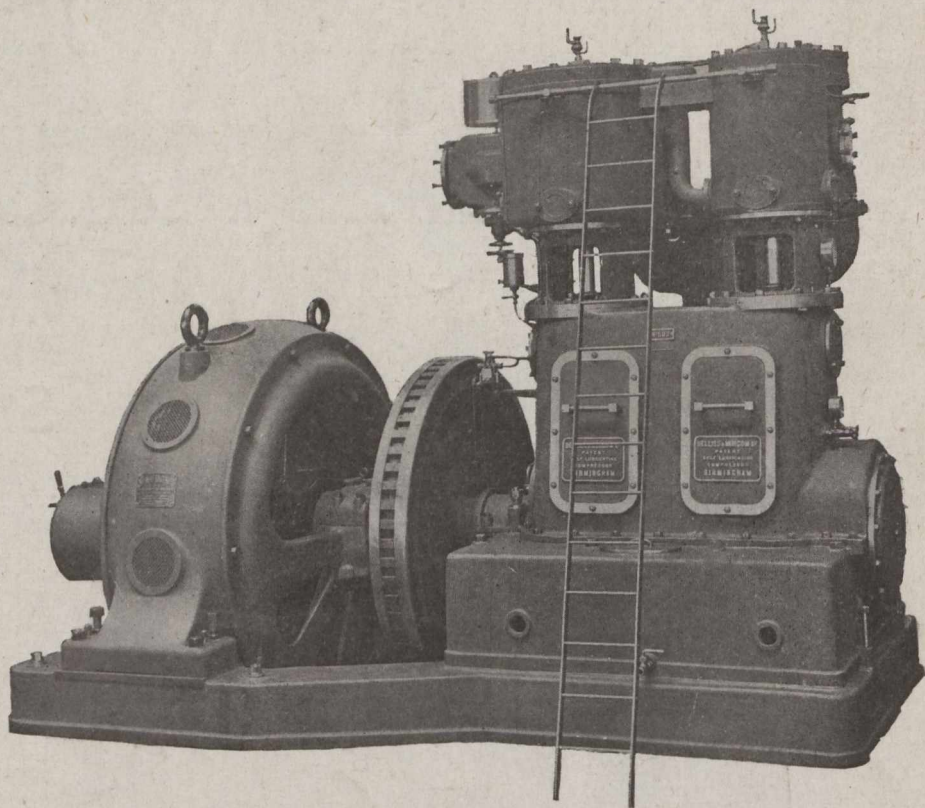
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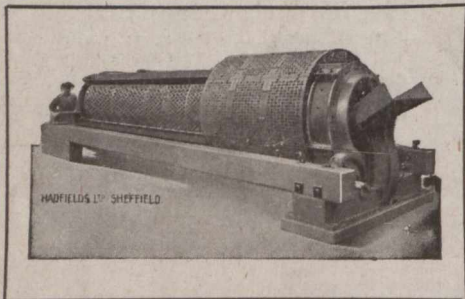
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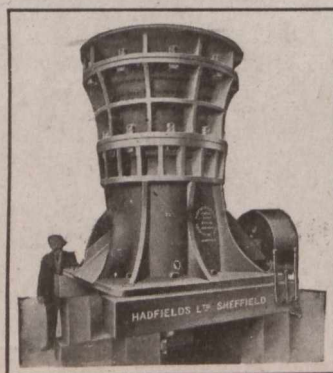
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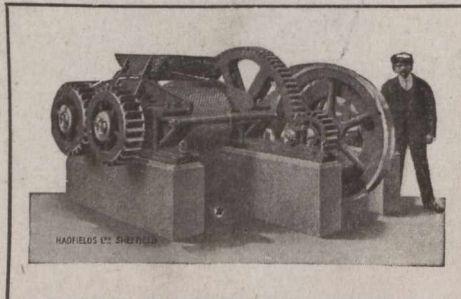
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