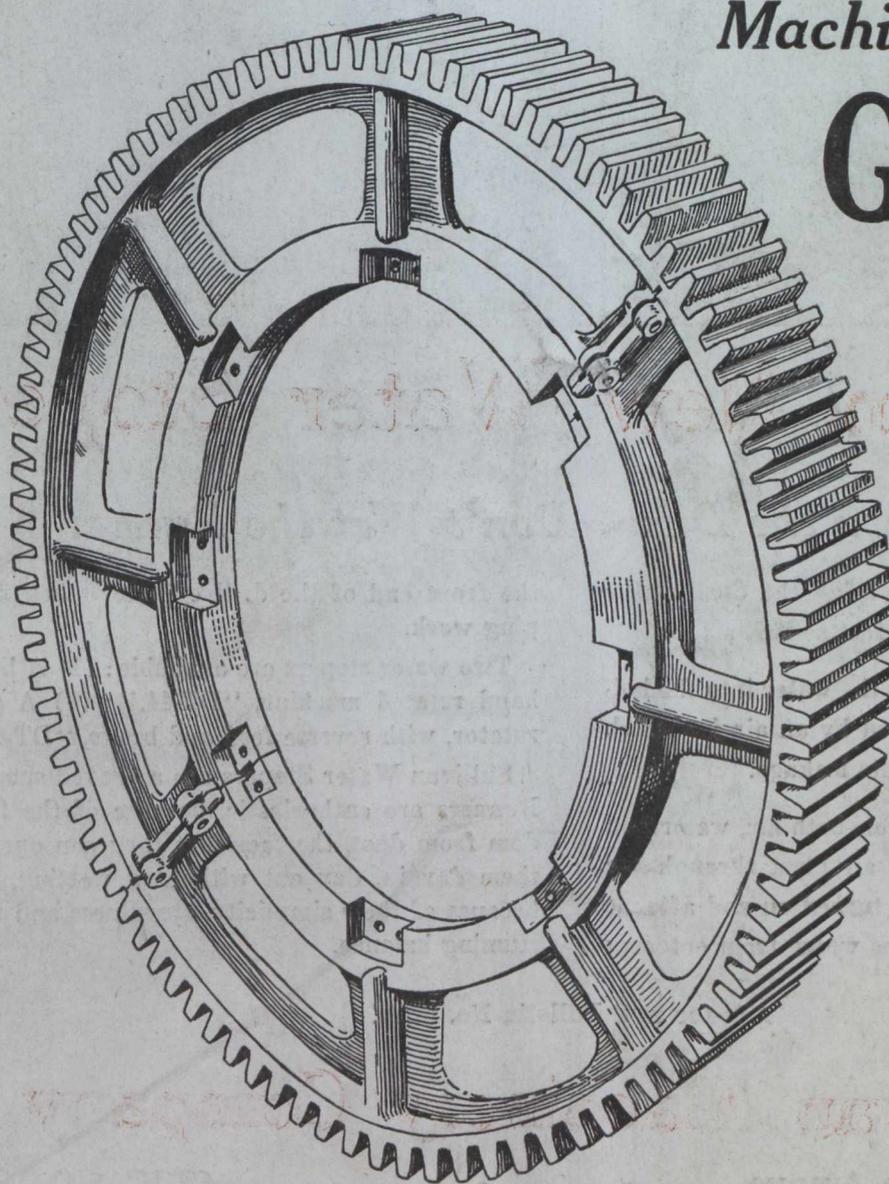


CANADIAN MINING JOURNAL

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No. 2



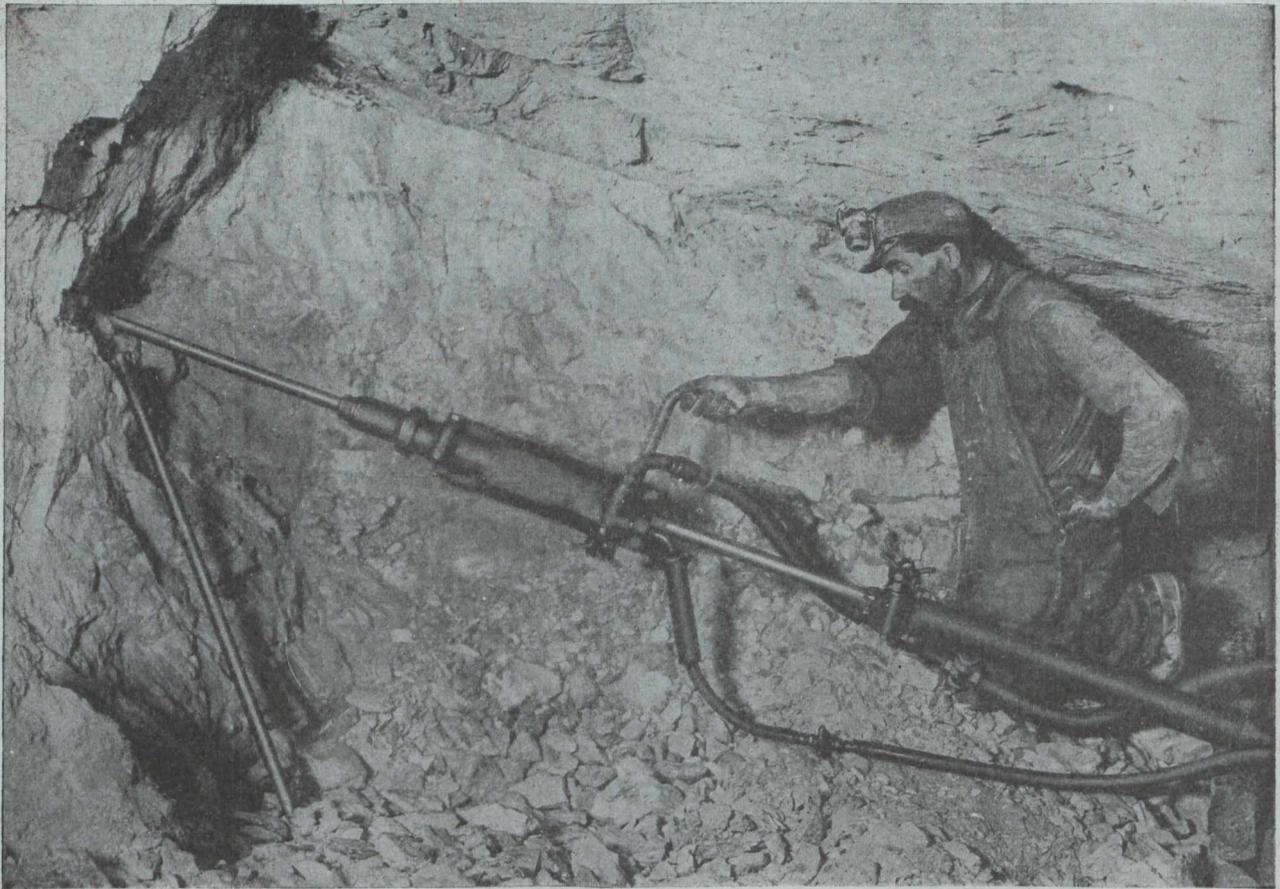
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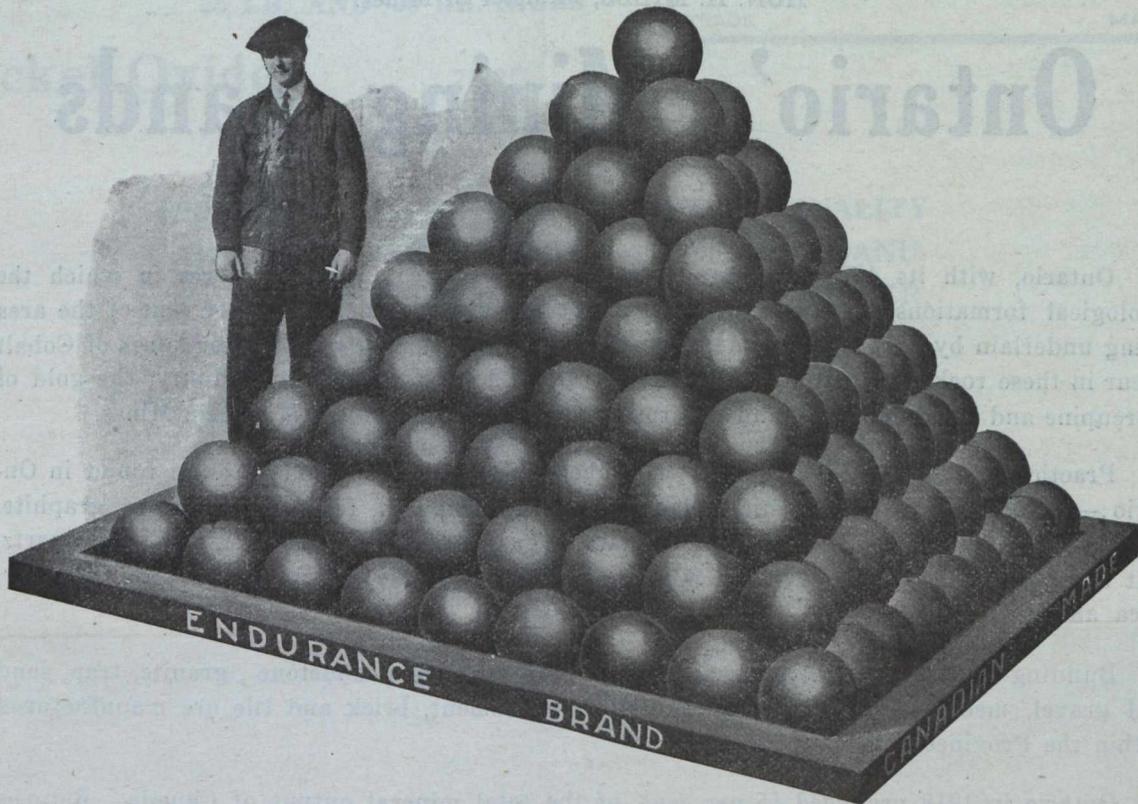
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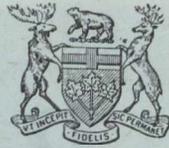
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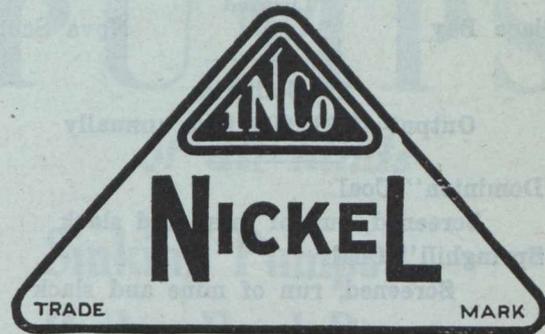
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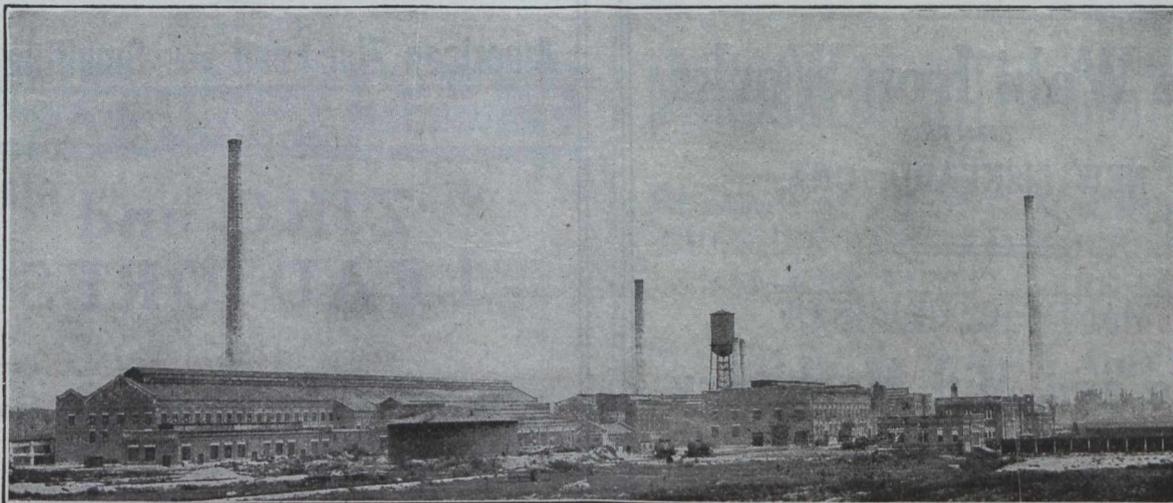
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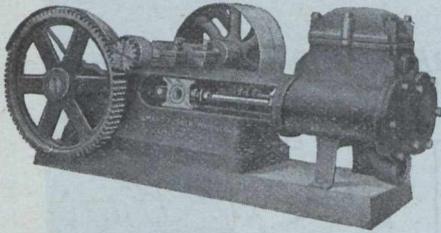
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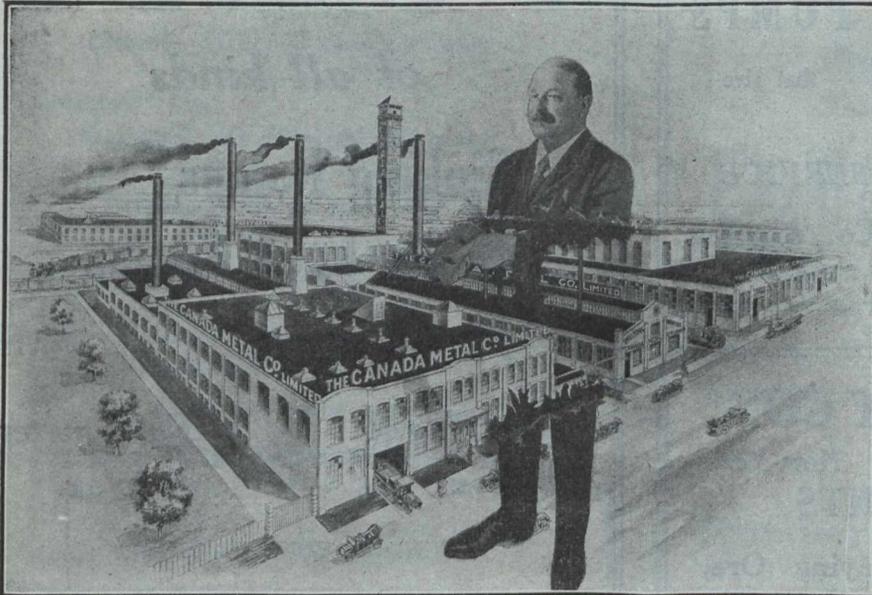
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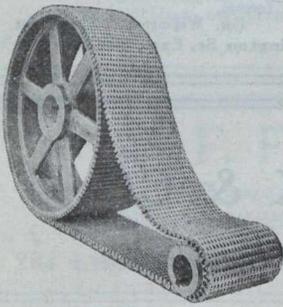
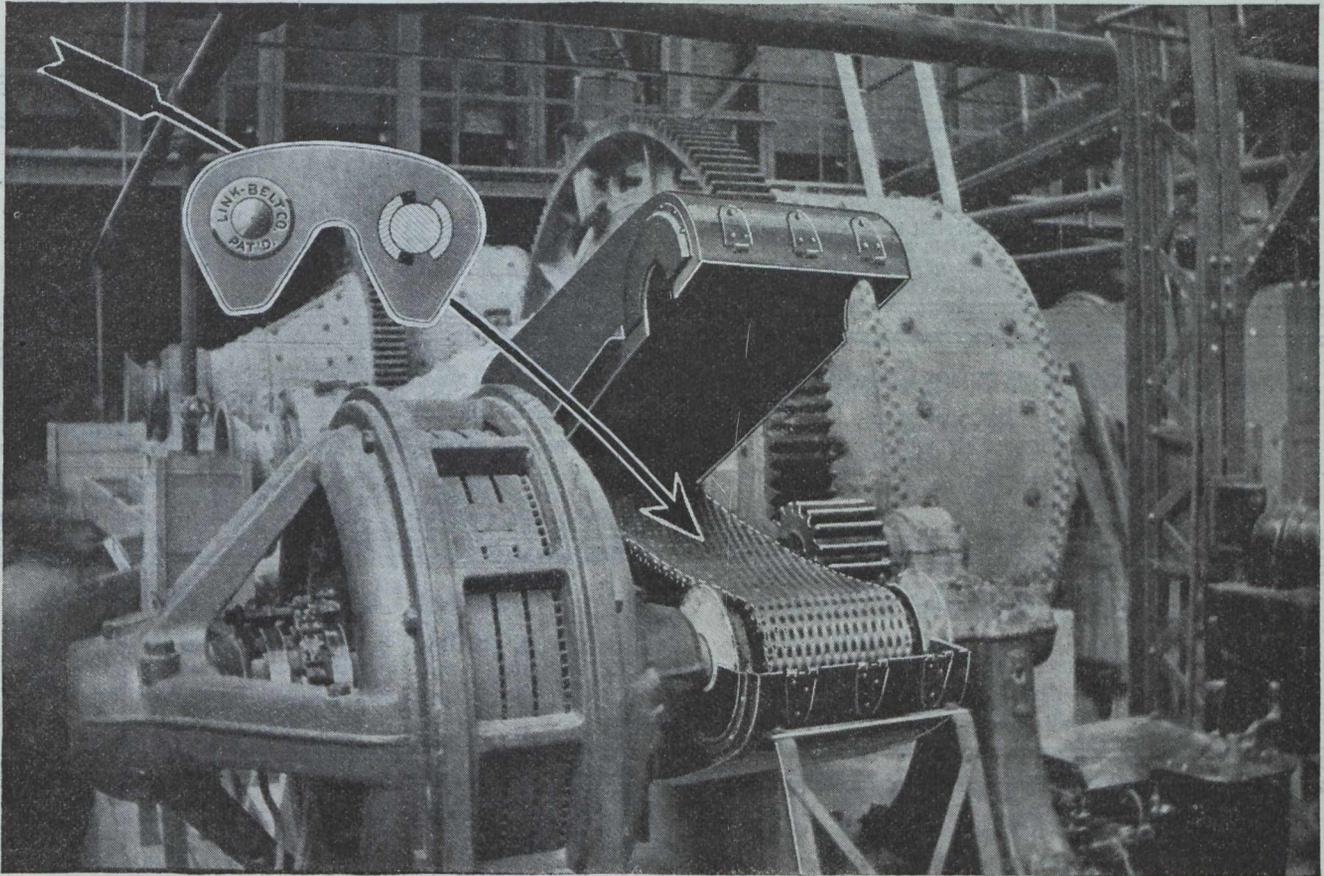


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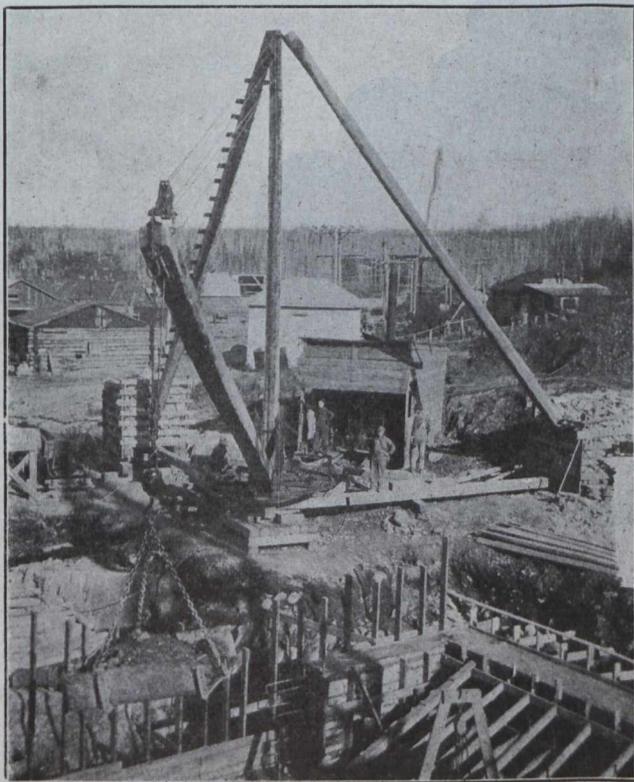
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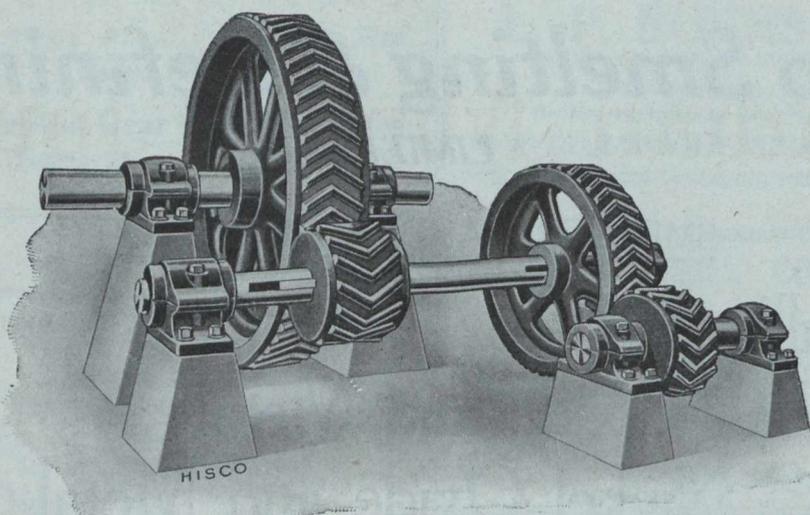
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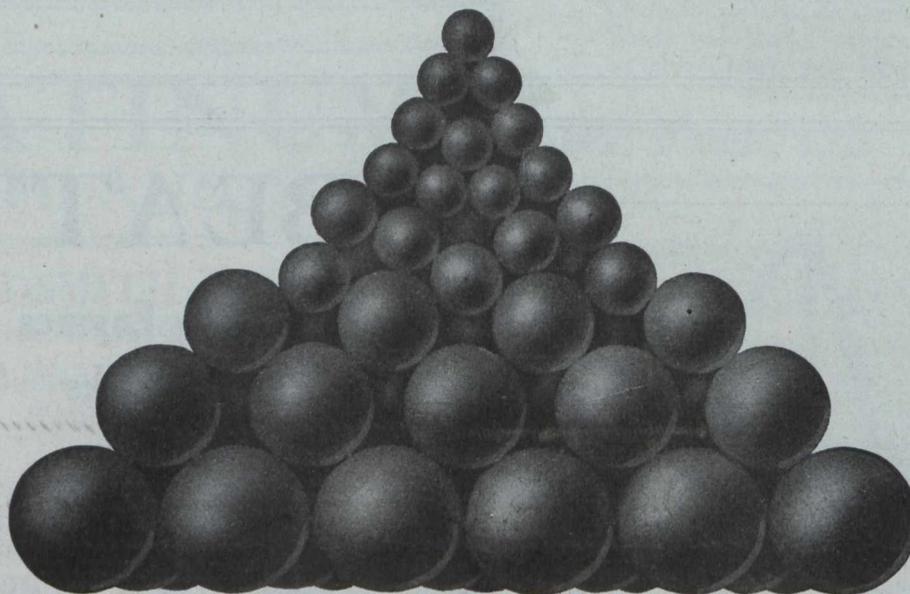
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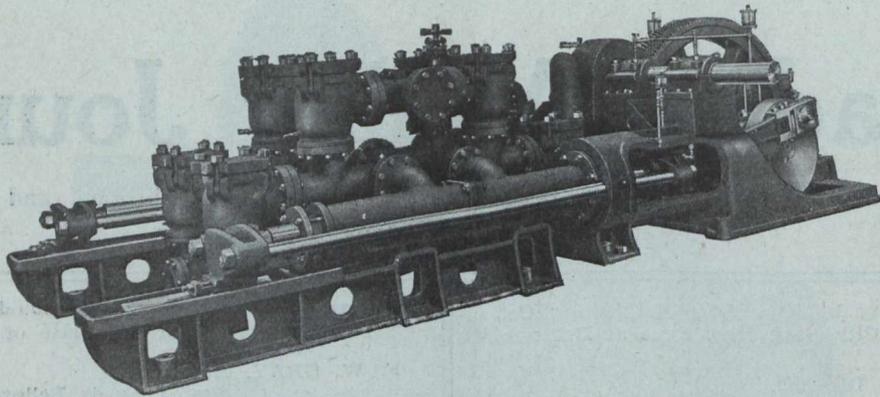
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Gould: Fig. 1612. Size 6 $\frac{1}{2}$ " x 20". Double-Acting. Outside End Packed Horizontal Duplex Plunger Pump. For High Pressure Service

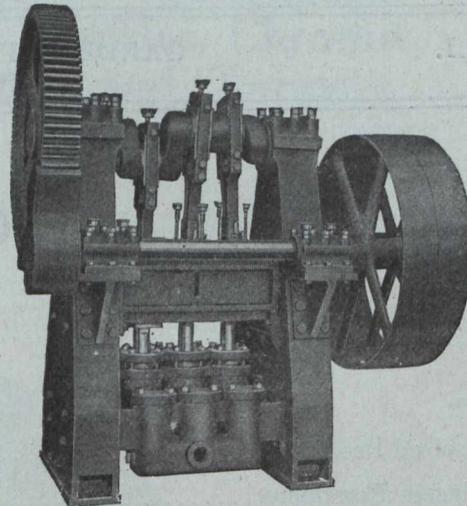
FOR General Water Supply, Municipal Waterworks, Oil Pipe Lives, and General Services, requiring high pressure and large capacities.

Capacities ranging from 155 gallons per minute at 1500 pounds pressure to 705 gallons per minute at 335 lbs. pressure. Complete data and description in bulletin 115. Copy on request.

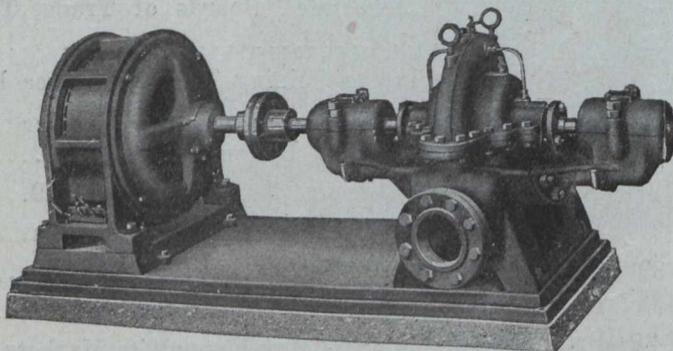
FIG. 1628. For general water supply, Municipal Waterworks, Mine Pumping, etc., where the total net head does not exceed 1305 feet. Made in six sizes, with capacities ranging from 9,360 gallons to 27,500 gallons per hour and for 140 to 565 pounds Working Pressure.

The Frame consists of two standards carrying the main bearings. Crank shaft is steel, accurately machined and the bearings are phosphor bronze. The gearing, Cylinders and valve boxes are charcoal iron. Cross-heads are fitted with adjustable bronze shoes which run in bored Guides. Connecting Rods are cast steel and the plungers cast iron, accurately machined.

Complete data and description in Bulletin 103. Copy on request.



Goulds Single-Acting Triplex Pump



Goulds Fig. 3030. Single Stage, Double Suction Centrifugal Pump, direct connected to an open type motor

FIG. 3030. For general water supply, hot water circulating in heating systems for irrigating, drainages, booster and mine service, and many similar services, where the total net head does not exceed 150 feet, the Goulds Single Stage, Double Suction Centrifugal Pump excels on account of the high efficiency obtained. 80 to 8000 gallons per minute, based on cold, clear water 150 feet head or 65 pounds pressure.

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St. John, Quebec, Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg,
Saskatoon, Calgary, Vancouver, Victoria.

EDITORIAL

A Despised Profession

As was recently pointed out by the "Journal," the salaries paid to the members of the Canadian Geological Survey are a fair indication of the importance attached in Canada to the science of economic geology, and, rated in terms of monetary remuneration, indicate that geologists are considered of less account than a self-respecting locomotive engineer, and that two geologists are equivalent to one steel-melter or rolling mill attendant.

Quite recently, as will be noticed from a newspaper clipping reproduced elsewhere in this issue, six of the members of the Geological Survey, all but one having a record of ten years or more in the service of the Survey, have accepted more remunerative employment outside.

We do not see what else these men could do. Imagine the indignity of their position. With ten years service in the Survey, a Ph. D. degree, and brilliant technical records, these men are asked to support a family on salaries ranging from \$2,200 to \$2,700 per year. How can these men move in the social circle for which their professional status fits them, or how can they avoid the wounding comparisons that arise between their financial and social limitations and the comparatively affluent circumstances of men of less attainments engaged in commercial life?

We have, on several occasions, pleaded for a more accurate understanding of the true functions of a geologist. We believe that the longer and more concentrated the effort of a geologist upon one selected field the more valuable will be the ultimate results of this effort. Geology, like everything else worth while, is a life work. It is not an occupation for the dilettante, or the superficial man, and if a geologist is to yield full value to the department of the public service by which he is employed, the reward must be sufficient to enable him to look forward to a life of long patient work unembarrassed by trying to maintain a professional and social status entirely incompatible with the salaries that tradition allots to the geologist in Canada.

In this connection, our readers may have noted a piece of very special pleading that has been published

Note:—See issue of 24th Sept., 1919, "The Functions of a Geologist."

in reference to the attractions offered by the Geological Survey of the United States to young men. This article stated: "The Survey offers much to the young man newly graduated with a degree in geology. He is enabled to complete his education in the school of practical experience while earning enough to live comfortably. He gets a variety and breadth of experience such as can be seldom obtained elsewhere; he has the opportunity for building up a valuable acquaintance among influential men actively engaged in the mining industry. The unique opportunities offered by the Survey are so obviously advantageous that there will never be difficulty in recruiting suitable members for its staff. *The problem is not so much to attract the best material as to determine just how much the Survey can afford to pay.*"

If the business of the Geological Survey is to train men under advantageous conditions, and introduce them to mining executives with a view to employment, then the foregoing opinion might be allowed to pass; but if, on the other hand, the Geological Survey is to attract to the public service and to retain the services of the best men, the opinion we have quoted is fundamentally erroneous.

A similar misconception existed for many years regarding the status of the mine surveyor, whose work was considered to be a mere preliminary to a managerial position. The result was that mine surveying was not regarded as a profession worth time or study to cultivate. Bad surveying was a further result, and eventually the lack of qualified men led to a statutory recognition of the status of the mine surveyor, and to more adequate remuneration.

We would transpose the opinion italicized above and state that the problem of the Geological Survey is not so much to determine how much the Survey can pay, but to attract the best material.

The steady conscientious accumulation of geological facts by a competent scientist, prolonged over a lifetime of endeavor and concentrated upon one particular field of enquiry, may yield, and often has yielded results of astonishing economic value. Yet, as has often been pointed out, the men whose researches and direction have in the past led to the discovery and de-

velopment of mineral resources of incalculable value, are rewarded with salaries that sound like comic opera, did one not know the tragedy—the word is deliberately selected—of trying to live and discharge family obligations upon these beggarly pittances.

If the salaries of every member of the Geological Survey were doubled, they would still compare unfavorably with the salaries paid by private corporations to men of equal attainments. The position of the geologist is not the same as that of an ordinary civil servant who discharges routine duties, calling for honest service, but little more. The geologist represents an investment, first of the educational expenditures of the country, secondly, of the accumulation of personal and inherited observation of many men at

many periods and in many places. The geologist increases in value with the lapse of years of service, and his personal potentialities are enlarged with his years.

Considering the meagreness of the reward of the geologist in Canada, and the non-appreciation of their services by government and public; the faithfulness of their service, and the integrity of their professional etiquette, has been beyond praise, and, if the country persists in a policy of depreciation of these men, and thereby lowers the prestige and loosens the traditions of this distinguished branch of the public service in Canada, it must not be disappointed if a great part of the usefulness of the Geological Survey is destroyed, and our country is placed at an economic disadvantage.

Misplaced Parsimony

At the Vancouver meeting of the Canadian Mining Institute, Dean Brock of the University of British Columbia, and formerly a member of the Geological Survey, deplored the inadequate attention that had been paid in Canada to the economic geology of our coalfields, and instanced, in contradistinction, the large amount of attention that had been paid by the U. S. Geological Survey to the coalfields of the United States.

As a case in point, little or no attention was paid by the Geological Survey to the revision of the geological maps of the coalfields of Nova Scotia, from the time of the death of the late Hugh Fletcher, whose untimely taking off removed from the chosen scene of his labors a geologist much loved and often remembered in Nova Scotia. Hugh Fletcher's notes were unfinished, and his place has been hard to fill.

During the past three or four summers, after much

pressure from Mining Society of Nova Scotia, a revision of the geological data appertaining to the lower seams of the Sydney Basin was undertaken, and those interested in this imperfectly known territory have been awaiting the new maps and additional data. Now we hear that the member of the Survey charged with this necessary and delayed work has resigned from the Survey, for the totally adequate reason that his salary was not a living wage. Considering the importance of the work, the length of service, and the technical attainments of this member of the Survey—and his case is merely taken as typical of many—the salary paid, under the revised classification, is miserably, even indecently, disproportionate.

We do not recollect to have encountered an instance where parsimony is so out of place, or where the traditional folly of saving at the spigot and wasting at the bunghole is more exactly exemplified.

The Ratification of the Peace Treaty

The concluding paragraph of John Buchan's History of the War will, we believe, commend itself to our readers as a fitting and eloquent comment upon the resumption of international relations that accompanies the ratification of the Peace Treaty.

“When all due praise has been given to gifted leaders, it remains true that the hero of the war was the ordinary man. Victory was won less by genius in the few than by faithfulness in the many. * * *

“The world has suffered a purgation by pity and terror. It has made solemn sacrifice, and the sacrifice was mainly of the innocent and the young. This

“was true of every side. Most men who fell died for honorable things. Perversities of national policy were changed in the case of the rank and file, both of the Allies and their opponents, into the eternal sanctities—love of country and home, comradeship, loyalty to manly virtues, the indomitable questing of youth. Against such a spirit the gates of death cannot prevail. Innocence does not perish in vain. We may dare to hope that the seed sown in sacrifice and pain will yet quicken and bear fruit to the amelioration of the world, and in this confidence await the decrees of that Omnipotence to whom a thousand years are as one day.”

EN PASSANT

The "Engineering & Mining Journal" again betrays a curious inability to understand the status of Canada. In an editorial on the "League of Nations" it remarks that in the case of a dispute "between the United States and England, votes would be admitted from Canada, Australia, New Zealand and South Africa." Most decidedly they would, for each of the peoples so named constitutes a self-supporting, autonomous, sovereign nation, and if this fact is not understood throughout the world, it is only possible to express surprise. Again, it is remarked that "England", as the price for her approval of the League of Nations, has safeguarded herself by providing for her domination of it by plural voting." As we have previously remarked, this use of the territorial term "England" is puzzling, and discloses a complete misapprehension of the constitution of the self-governing nations that compose the British Empire. The implication that Canada is not a sovereign signatory to the Covenant of the League of Nations is likely to be hotly resented in Canada. As to what reservations the United States Senate may insert should the United States subscribe to the League Covenant, that is distinctly and solely the business of the people of the United States, and it is generally admitted they are a competent nation, but, no dubiety should be longer allowed to exist as to the complete status of sovereign nationhood to which Canada has attained.

By request, we publish in this issue the text of the remarks made by Col. L. W. Marsh, of the Marsh Engineering Works, Belleville, Ont., in support of a Resolution which was adopted by the meeting of the Associated Boards of Trade and Chambers of Commerce held in Toronto towards the end of November.

Those who are familiar with the limitations of the economic utilization of iron ores will recognize the difficulties of competing with the United States ores that are apparent in the brief particulars given by Col. Marsh of the Ontario occurrences, but in urging the compilation of a condensed account of the iron ore resources of the Province, written so as to be understandable by persons not familiar with the technical terms of geology or the intricacies of iron and steel manufacture, we believe the Resolution is well adopted. The Department of Mines Report (Ottawa) No. 217, on the "Iron Ore Occurrences in Canada" is very comprehensive, and, so far as we are able to judge, very complete, but, if we correctly apprehend the purport of Col. Marsh's motion, it voices a desire on the part of business men in Ontario for a summarized and non-technical description of the scattered iron deposits of Ontario, setting forth the relative value of the known deposits and attempting to assess their economic value, and their attractiveness as pro-

fit-yielding investments. Such a compilation should not be difficult, but it might very conceivably lead to criticism of the compiler, as all such summarizations are liable to, if honestly and fearlessly carried out.

Our friend and colleague, Hon. Robert Drummond, the Editor of the "Maritime Mining Record," courteously points out in the January "Bulletin" of the Canadian Mining Institute, a rather slipshod statement of the writer, made in "Saward's Journal" to the effect that the royalty revenue of the Province of Nova Scotia derived from the coal sales of that province, had "fallen by \$300,000 annually." What we meant to convey, of course, was that the decline from the maximum royalty yield of 1913 had in the years 1918 and 1919 approached the sum of \$300,000 in each year.

To be explicit, the coal sales in the fiscal year of the Mines Department of Nova Scotia in 1913, yielded in royalties the sum of \$799,200. The royalties for the fiscal year 1919, based on an output of about 5,005,000 tons will probably be in the vicinity of \$500,000, or equivalent to a decline as compared with 1913 of \$300,000. The equivalent decline in 1918 was about \$280,000 for that year. That is to say, the aggregate loss in royalties to the Province attributable to the decline from the figures of 1913, calculated over the period 1914 to 1919 inclusive, approximates \$945,000.

Mr. Drummond, who is the doyen of the mining profession in Nova Scotia, has, in spite of years beyond the Psalmist's estimate, managed to maintain his youthfulness, and that salutary grace of youth, an indomitable optimism. He is a firm believer in the future of the coal mining industry in Nova Scotia, and in this we thoroughly agree with his views, but, so far as the immediate future of the maritime coal trade is concerned, optimism is hard to reconcile with the influences that are now affecting the industry, and will continue to affect it for several years to come.

METAL QUOTATIONS.

Fair prices in Montreal for Ingot Metals as at 13th January 1920.

	Cents per lb.
Electro-copper	24½
Castings Copper	24
Lead	10¼
Tin	52
Zinc	12
Antimony	11¾
Aluminum	34

Wm. Roper, formerly with the Canadian Western Fuel Company Ltd., has been appointed Mine Manager for the Pacific Coast Coal Co., South Wellington, Vancouver Island. This position has been held by Robert Bonner for some time.

The Graphite Industry

III—Oredressing: Graphite Ore.—General Outline.

By CHAS. SPEARMAN.*

The separation of flake graphite from its gangue presents problems comparable to that of the separation of its dimorphous form, the diamond, from its gangue; the separation of asbestos from its gangue, etc. In each of the above cases the desired content of the rock is sought free from the surrounding gangue and in its natural physical form, or as nearly so as possible, and therefore the operation of freeing the gangue must be such as not to interfere with the integrity of the commercial product, for, the reduction of the flake, the fracturing of the precious stone or the disintegration of the fibre, etc., are factors which greatly reduce in value the respective minerals.

In the separation and concentration of graphite from its gangue the ideal condition is attained when the flake, as a whole, is completely separated from the surrounding gangue and recovered by concentration, in the physical condition in which it is found in nature, unless market specifications deem otherwise. The first step in the operation is not at all easily accomplished commercially but when a fair degree of proficiency is attained the subsequent step of recovering the naked flake by concentration methods is a relatively simple matter; in fact, the treatment of graphite ore is more of an ore dressing problem than it is a concentration problem.

For various reasons it is advantageous to effect the complete operation of the separation of the flake from the gangue, prior to the concentration step, instead of adopting the widespread practice of doing more or less of it after the operation of concentration, under the guise of "refining" "finishing" etc., which necessitates an auxiliary ore-dressing unit.

Prior to the commercial application of the art of flotation to graphite ore, the average graphite separation and concentration plant was very crude and inefficient, so much so that it is doubtful if a single one of them ever showed a working profit. The ore was first dried "bone dry" in a suitable kiln in preparation for the dry rolls. This drying of the ore was a heavy burden at the best and was necessary to prevent "pancaking" of the reduced ore on the roll faces. After crushing, the ore went to a series of preliminary or "heavy duty" rolls and when the desired mesh was attained the product then went to a series of secondary or finer rolls usually of the flour mill type. Screening was resorted to between each of the sets of fine rolls with the object of removing the flake graphite as oversize. Some mills of this type were equipped with as many as ten sets of rolls and their corresponding screens so that most of the flake was broken and practically worn out before the end of the circuit was reached.

*Note:

This is the third article by Mr. Spearman on graphite mining and preparation. See issue February 12th 1919, page 87, and issue August 6th 1919, page 586.

The action of the various screens was to remove the oversize naked flake, with adhering gangue in situ, mica, free gangue, etc. This oversize was collected and went to the "refining" or "finishing" ore-dressing unit which consisted of more fine rolls and French buhr stones which disintegrated the brittle gangue present and incidentally more of the flake. This product was then screened so as to remove the undersize—the oversize being the commercial flake. Very often dry tables of various makes were placed at convenient intervals in the circuit in order to lessen the burden on the screens and rolls in an endeavor to rescue more flake. The dust laden atmosphere attending this whole operation from the drier to the "refining unit was almost intolerable.

The final flake graphite resulting from the application of the above ore-dressing practice was thin flattened, polished and the natural physical structure of the original flake was rendered discontinuous due to intimate fracturing caused by flattening, deformation or squeezing by rolls, and the discreet particles were held loosely together. The ordinary handling of this "broken backed" "lifeless" product usually created an abnormal quantity of the lower grade flake.

In a more recent practice, the separation of the flake from the surrounding gangue is a much more simple matter than the above described and having a much higher degree of efficiency. The preliminary drying of the ore is eliminated. After crushing, the ore is fed to any type of wet crushing mill such as a ball mill. The load and feed of the mill is so adjusted as to insure quite a free discharge so as to exclude the liberated flake from the zone of disintegration as soon as possible. This action is sometimes accelerated by the addition of a small quantity of oil ahead of the ball mill on the principle of the well known Macquestin tube section.

The pulp from the ball mill is conducted to a mixer, then to an *Alderson hydraulic classifier from which most of the ganguebound flake is returned as oversize for retreatment while the free or naked flake for the most part follows the undersize to a Spearman concentrator.

After concentration the flake is dried and graded and that portion of it with adhering gangue in situ is removed. This low grade product usually comprises about from 3%—10% of the whole concentrate, depending upon the initial treatment, and is retreated as classifier oversize, while the remainder of the flake after the removal of the dust products classifies as No. 1 crucible stock.

By the older practice all the flake had to be subjected to the attrition of "refining" in order to attempt to properly separate the gangue from a small portion of the whole, which was a wasteful practice as much of the good flake was rendered low grade thereby.

*W. P. Alderson, Manager, Timmins Graphite Mines, Westport, Ont.

The flake resulting from this newer method of separation of the gangue from the flake, may be described as coherent, thick, "bold" "rugged" that is, having rough edges and surfaces and is much higher in carbon than flake from the roll treatment on account of having no powdered gangue impressed into the relatively loosely coherent mass of minute flakes which constituted the so-called flake, and the specific gravity of a unit volume, under like conditions, is much higher than that of the flake resulting from the older practice.

The special advantages of the above described wet method of separation as applied to graphite ore are:

a. Low initial cost of installation.

b. Low cost of operation:—

elimination of preliminary drying.
low power consumption.
low maintenance cost.
low labour cost.

c. Much better grade of marketable products.

d. Greater quantity of the better grade of concentrate.

e. Better grade of low grade products.

f. Smaller quantity of low grade products.

g. One ore dressing unit instead of at least two.

h. Simplicity; short circuit.

i. Elimination of the dust nuisance.

The Dominion Crucible Co.—A New Canadian Industry

By R. F. MAFFRE

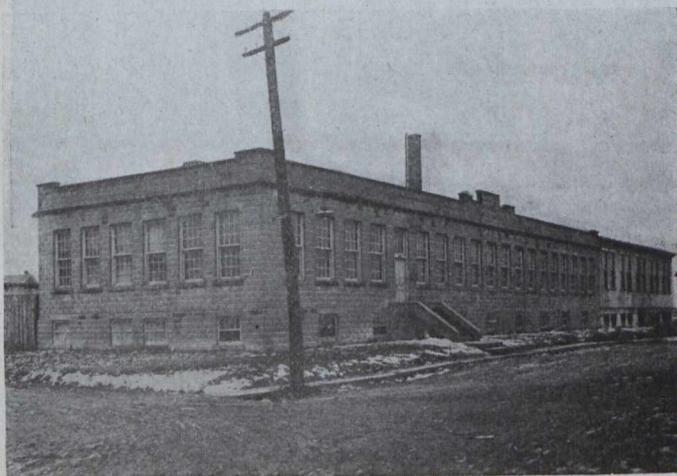
There have been many radical changes in the industrial life of Canada as a result of the World War. The imperative demand for munitions in enormous quantities caused a metamorphosis of the factories and workshops of the nation, and the spur of necessity augmented the efforts of invention in the endeavor to provide articles hitherto required only in small quantities or not at all.

The manufacture of plumbago crucibles was one of the "key" industries concerned in the making of munitions. As a result of the unprecedented demand for crucibles to supply the needs of those engaged in the manufacture of brass cartridge and shell cases and copper driving-bands for shells, the crucible-makers of the United States and Great Britain were literally

The Dominion Copper Products Company of Montreal, was faced with the problem of obtaining crucibles, and, after considering the situation, decided to make its own crucibles. The Dominion Crucible Co. was, therefore, incorporated in October, 1916, and a plant was erected at St. John's, P. Q. Much of the machinery required had to be specially made, and this occasioned considerable delay in the completion of the plant. Owing to the shortage of ocean tonnage, lengthy delays were experienced in getting clay from England and plumbago from Ceylon and Madagascar, so that it was June, 1917, before an output was secured. From this time until the cessation of hostilities, and the consequent cancellation of orders for munitions, the entire output was absorbed by the Dominion Copper Products at its large plant at Lachine, P. Q. The amount of this output was 1,268,000 numbers, equivalent to a melting capacity of approximately 38,500 tons of metal.

The return of peace-time conditions placed this output at the disposal of the trade in general, and Canadian-made crucibles were on the market for the first time, as, previous to the war, all the plumbago crucibles used in Canada were imported, mainly from the United States.

The crucible plant at St. John's P. Q., is capable of producing crucibles in sufficient quantities to take care of all the requirements of the Canadian trade. Crucibles range in size from the jeweller's crucible, with its capacity of a few ounces, to the tilting-furnace crucible, holding 1,800 pounds of metal. The chief ingredients of the paste from which crucibles are formed are plumbago and clay. The requisite qualities in a good clay crucible are—great plasticity, good bonding powers; low vitrification point; high fusion point; great strength when air dried and also when burned. As regards plumbago, different conditions of various grades are made, but in general it may be said that the resulting blend must have a high carbon content and a fibrous structure that will stand reduction in size by grinding without being destroyed



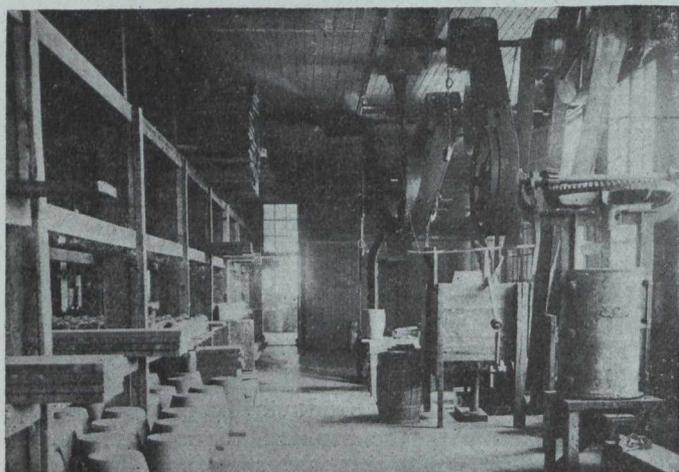
General View of Factory of Dominion Crucible Co.,
St. John's, P. Q.

swamped with orders, and stocks dwindled to the vanishing point. Correspondingly, the prices soared, and consumers paid four and five times the pre-war prices, considering themselves fortunate in securing crucibles at all.

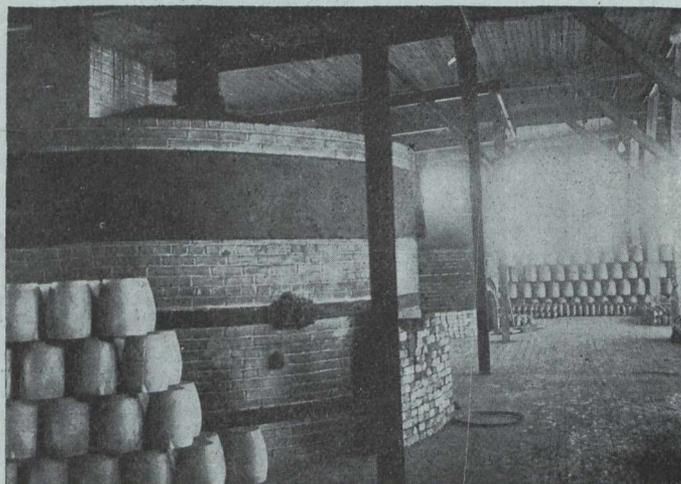
in the individual particles. For this reason, amorphous plumbago is unsuitable on account of its granular structure. No Canadian clay has been found that is suitable for crucibles, but while a portion of the plumbago used, of special quality, must be imported, this material is found in large quantities in Canada.

The making of crucibles is a branch of the oldest art in the world, the art of pottery, and the machine on which the crucibles are formed is an evolution of

important matter to the metal trade, and there is considerable natural hesitation on the part of users to abandon goods in this line with which they are familiar in favour of a new line of goods of unknown qualities. Notwithstanding this, the "Dominion" crucibles, stoppers and nozzles are gradually establishing the fact that they can successfully compete in quality with imported goods but the future development of the industry will undoubtedly depend on being granted a sufficient protection against the foreign



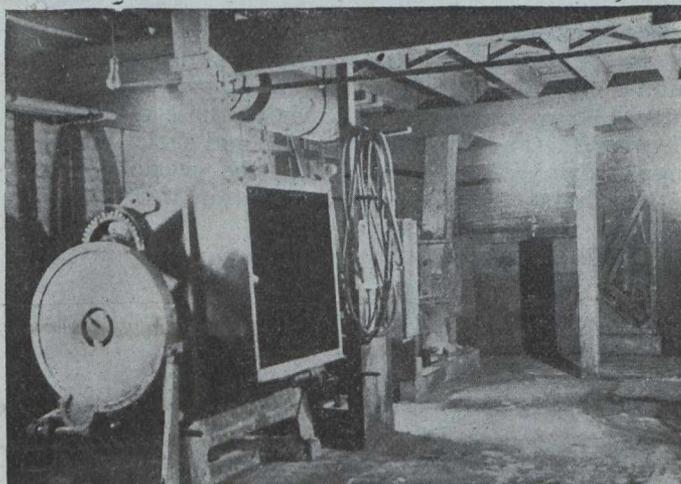
Pugging Machine, showing orifice and cutting-board in foreground. Crucibles are drying on racks preparatory to firing.



Top of Kilns, which extend from Basement. Firing is done on a lower floor.



Crucible-forming Machine, showing mould and forming tool in position.



In foreground is the Mixer. In rear are seen the Burr-Mill and sifter.

the potter's wheel of Biblical times. After the crucibles have been sufficiently dried they are burned in a specially designed muffle kiln which permits of their being subjected to an intense heat without coming in contact with the flames, smoke and gases of the fires.

This company is also making plumbago stoppers and nozzles for steel ladles and has supplied these to the majority of the steel plants in Canada, with the most satisfactory results. These articles were previously imported from the United States.

The quality of crucibles, stoppers and nozzles is an

manufacturer to at least compensate it for the duty it is obliged to pay on the imported material employed.

Every new Canadian industry is an asset to the community at large, and it is hoped that the Dominion Crucible Company will receive sufficient encouragement to warrant a continuance of its efforts to establish this industry on a permanent footing.

The personnel of the Dominion Crucible Company is as follows: H. H. Vaughan, President; W. F. Angus, Vice-President; F. W. Evens, Secy.-Treas.; S. J. Kaufman, Works Manager, and R. F. Maffre, Accountant.

An Underground Loading Pocket Adapted For Heavy Ores

JOHN S. WATTS, New Glasgow, N.S.

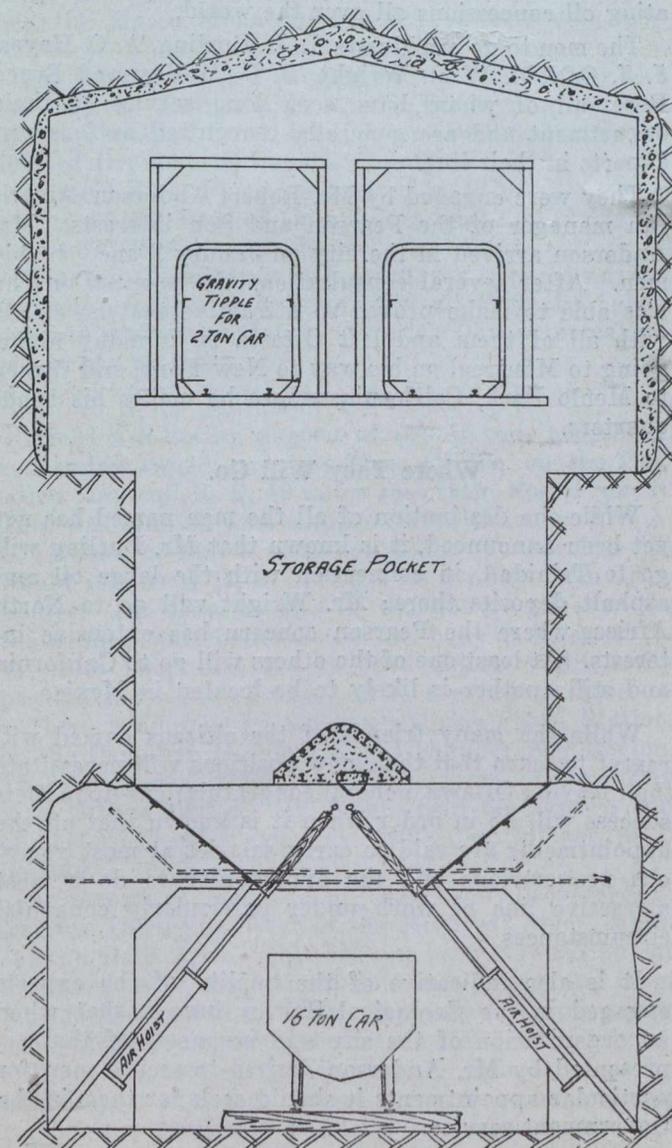
The drawings accompanying this article, show a highly successful underground loading pocket, installed last year, in the submarine iron mine of the Nova Scotia Steel & Coal Co. at Wabana, Newfoundland.

The product of this mine is a hard iron ore, and is mined in large lumps, frequently in cubes measuring three feet each way, and weighing over two tons each.

These heavy pieces make it a difficult proposition to control the loading by any of the ordinary varieties of gates. The design shown in the drawings is the result of much thought, and has proved successful, beyond all expectation.

The original intention was to break the larger pieces of ore, in the mine allowing no piece with any dimension of over two feet to get into the pocket.

This limit has, since, been raised to three feet, as it was found, by experience, that that size gave no trouble, and, as a matter of fact, larger pieces even than three feet have been passed through the gate without sticking.



Underground Loading Pocket

The method of operation, is, to bring the ore from the working faces, in small cars, to the tipples shown in the drawing, above the pocket. The tipples empty the cars by upsetting them, and return the car to its upright position by gravity.

The centres of gravity of the car and tipples, are so arranged, relatively to the centre of suspension of the tipples, that the full car causes the tipples to turn over, and when the car is empty, the tipples return by gravity to its original position, which is as it is shown in the drawing.

The empty car is then pushed off, and replaced by a loaded car, and the operation is repeated. The movements of the tipples are controlled by a hand brake, not shown on these drawings.

As may be seen from the drawing, the bottom of the pocket is of concrete, strongly reinforced, with worn rails, to stand the shock of the dumping of the ore. Also it will be observed that at all places, where the movement of the ore would cause abrasion of the concrete, the surfaces have been lined with rails.

In the bottom of the pocket, places have been provided for six chutes and control gates, but only three chutes have been fitted and have proved sufficient.

These chutes empty the ore from the pocket into a sixteen-ton capacity car, which car carries the ore up to the deckhead on the surface.

It has been found that one of these cars can be loaded to capacity with sixteen tons of ore in less than thirty seconds, and it probably would be done in less time, were it not for the fact that the cars cannot be unloaded as quickly, and the two operations are performed simultaneously, the hoisting being done in balance.

The main improvement in this pocket, over the old one, is, that the control gate rises through the stream of ore to shut it off; instead of pushing down into the ore, as is the more common method.

It is obvious that there is nothing to prevent this door closing, except the weight of the ore on top of the door, and the friction of the ore against the gate. This merely involves applying sufficient power to overcome the resistance, and then perfect control is attained.

With the downward closing gate, however, a lump of ore will get stuck under the door, and make it impossible to get it closed until this lump is got out of the way, by which time the car will be overloaded, and ore piled up on the floor around the car, to be later shovelled out of the way.

It is somewhat of a mystery to me why this type of door is not more generally used, as while it needs more careful designing and manufacture, to avoid the danger of its getting jammed by fines or dirt accumulating in the guides; its perfect control and reliability under the roughest of treatment well repays the small extra cost.

In fairness to all, the writer should state that he thought when designing this gate, that he had invented something new, but discovered afterwards, that the idea of making the gate come up through the stream of ore, had been used by others, previously. Particulars of two doors on this principle, are published in "The

Handbook of Mining Machinery," published by "Mines and Minerals." Neither of these doors, however, are subject to the severe treatment, that the one described has to withstand.

The gates are operated by the 6-inch push and pull, air hoists shown on the drawing, so that power is available for both opening and closing the gate.

To make certain of having ample power to operate the gates, provision was made for fitting either one, two or three air hoists to each. Actual operating experience has proved that two six-inch hoists, with 60 lbs. air pressure, will effectively operate the gate under all conditions of service.

To take care of the possibility of the gates falling open, in the event of accidental failure of the compressed air supply, the gates are fitted with eye bolts at the upper end, and provision made for connecting rope blocks and tackle, to operate the doors by hand. This is, the writer believes, a very remote possibility, as if the air supply should fail, the doors would still remain closed, unless the pocket was nearly empty, and in that case little damage would be done even if the door did open by reason of its own weight.

The details of construction of the chutes and gates are quite clear, and require no further elucidation.

THE "QUALITY OF MARITIME PROVINCES COAL"

In view of a threatened coal shortage in this country this winter, Canadian importers have speculated on the possibility of getting their supply from the Nova Scotia bituminous coal centers. There is a strong feeling, however, in Canadian manufacturing centers opposed to the quality of the maritime provinces coal, and it has been reported through official channels that it is doubtful whether such a change will be made.

In addition to the superior quality of bituminous coal from certain American districts over the Nova Scotia bituminous coal, freight charges from Nova Scotia are reported to be unusually high, and manufacturers in Quebec have found it more profitable to use American coal. The quality of bituminous coal from Nova Scotia, according to a report, would not relieve the domestic heating problem in Ontario.

Despite the warnings that have been sent by the transportation department of the Canadian Manufacturers' Association to all users of bituminous coal to secure their supplies as soon as possible, it would appear from the comparative figure on the importations of bituminous coal in Ontario that the users of this coal were well supplied.

The importations of bituminous coal between April 1 and August 31, 1916, according to customs returns, were in round figures 3,500,000 tons. In the same period in 1919, the importations amounted to 3,300,000 tons in 1917, 4,850,000 tons; and in 1918, 5,350,000 tons.

The large importations of 1918, with the sudden ending of the war and the closing up of many industrial plants, would lead to the conclusion that large quantities were on hand this year.—Coal Age.

Note:—We do not think that our Nova Scotian friends will altogether approve of the foregoing viewpoint of a New York trade journal. Of course anthracite happens to be an exclusive possession of United States collieries, but the reference to the "superior quality of bituminous coal from certain American dis-

tricts over the Nova Scotia bituminous coal" is worthy of notice, not so much because of its appearance in a New York paper, but because it reflects a certain erroneous, but ingrained belief in "Canadian manufacturing centres."

Actually, of course, the reverse is the truth, and Nova Scotian coal will have no difficulty in regaining the market it held before the war in Quebec on the score of quality. We do not grasp, either, the statement that the "quality of bituminous coal from Nova Scotia would not relieve the domestic heating problem of Ontario. Nova Scotia coal relieves the domestic heating problem of a very large area of Canada, and there is no known peculiarity in the climate of Ontario, or the constitution of its inhabitants, that should remove the heating qualities of Nova Scotia coal when it crosses the Ontario provincial boundary.—Ed.

PEARSON OIL INTERESTS ENGAGE SIX MEMBERS OF THE GEOLOGICAL SURVEY.

The Geological Survey branch of the Department of Mines is soon to lose the services of six of its foremost experts, they having accepted appointments with the world famous British oil firm of S. Pearson and Son, Limited, with headquarters in London, but operating oil concessions all over the world.

The men to go are Messrs. L. D. Burling, A. O. Hayes, J. J. O'Neill, W. J. Wright, B. R. McKay and Bruce Rose, all of whom have seen long service in their department and are generally recognized as foremost experts in their line.

They were engaged by Mr. Robert Anderson, American manager of the Pearson and Son interests. Mr. Anderson arrived in the city on January 2 and met his men. After several consultations the propositions he was able to make proved so attractive that he closed with all of them and left Ottawa on Monday night, going to Montreal on his way to New York, and thence to Menlo Park, California, where he makes his headquarters.

Where They Will Go.

While the destination of all the men named has not yet been announced, it is known that Mr. Burling will go to Trinidad, in connection with the large oil and asphalt deposits there; Mr. Wright will go to North Africa, where the Pearson concern has extensive interests. At least one of the others will go to California and still another is likely to be located in Mexico.

While the many friends of the citizens named will regret to learn that their new positions will necessitate their leaving Ottawa, general congratulations upon their success will be in order when it is known that all the appointments are said to carry salaries at most generous proportions and the opportunity to do a most attractive line of work under particularly congenial circumstances.

It is also indicative of the quality of the experts engaged in the Geological Survey branch that when an organization of the size and resources of that represented by Mr. Anderson desires to secure men for particular appointments it should seek for them in the Government service.

—Ottawa Journal.

AN ECONOMIC SURVEY OF THE IRON DEPOSITS OF ONTARIO URGED BY THE ASSOCIATED BOARDS OF TRADE ON ONTARIO.

Being the text of a resolution presented by Colonel L. W. Marsh, President of the Belleville Board of Trade, at the annual meeting of the Associated Boards of Trade and Chambers of Commerce held in the City of Toronto, November 20th and 21st, 1919.

There appears to be considerable information of a certain sort published by Government Engineers regarding the iron mines and formations of Ontario, but it is published partly by the Dominion authorities, and partly by the Provincial authorities. Moreover, it is scattered here and there through several volumes of annual reports where it is difficult to find, and is frequently buried in a mass of technical and geological information unintelligible to the ordinary lay prospector or miner, making the information of no practical use.

According to the Provincial Government 1918 Report, the Mines of Ontario shipped 198,882 tons of iron ore. Of this

91,609 tons were shipped to Ontario Smelters
107,273 " " " " U. S. "

The chief producers were the Algoma Steel Corporation from their mines in the Michipicoten District, and the Moose Mountain Limited, at Sellwood, near Sudbury.

345 Tons were also shipped by the Poe Mining Co., Palmerston Township, Frontenac County, and 80 tons by the Canadian Union Iron Mines Corporation, Township of Drummond, Lanark County.

Ontario Blast Furnaces smelted in 1918

99,852 Tons of Ontario ore, and
1,375,459 " " U. S. "

The Canadian Mining Journal says that iron ore deposits are scattered practically all over the northern and western section of Ontario. The principal deposits are as follows:

In Northern Ontario.

There is a known deposit of titaniferous magnetite, containing vanadium, near Mine Centre, on the Canadian National R. R. 40 miles east from Fort Frances. This was studied and mapped three times by Dr. A. C. Lawson in 1887-8, 1913 and 1918. To develop this would require a R. R. siding 4 to 6 miles from Mine Centre. Dr. Lawson says he did not go all over the ground, but believes the ore body is from 10 to 15 miles long, and the railroad siding could easily parallel the veins, of which there are two or more.

There is another known deposit near Paska Station, on the Canadian National R. R., Thunder Bay Region. There are two distinct Iron Ranges here, examined by E. S. Moore 1907-8. Mr. Moore said the eastern end of the southern range was worthy of further prospecting.

A deposit of hematite ore has been discovered in Yarrow Township, West of the Montreal River, Matachewan Gold Area. This has not been mapped out or examined as to size, though one vein was found from 5 to 30 feet in width. There is plenty of water power handy for developing electricity in this neighborhood.

There are also good iron deposits near Dryden, the 1912 Report says that "there is reason to believe that further exploration will be rewarded by more large bodies of workable iron ores similar to the Helen,

Moose Mountain, Magpie, Atikokan. It is estimated that 100,000,000 tons of low grade ore await development near Helen Mine, Algoma.

In Eastern Ontario.

There are several known deposits of iron ore in the counties of Peterboro, Hastings, Frontenac and Lanark. A few of these are being worked at present. Others were worked a number of years ago and abandoned owing either to high cost of labor and fuel, difficulties of transportation or ore, or ruinous competition of U. S. producers.

The Blairton Mine in Peterboro County, worked back in the 30's and around about 1873, was the greatest producer in Canada. It is now closed, and has been closed for some years. The Belmont mine close by is still being worked. The Blairton used to ship to Pittsburg.

The Mines Branch, Dept. of Mines, Ottawa, made surveys of these two mines 1912-1913.

Besides these two mines, there are known to be three distinct belts of hematite near Belmont Lake, Peterboro County, running from 12% to 15% iron.

There are also six bands of iron ore between Harlowe and Bishop's Corners near the Village of Queensboro, Hastings County.

Iron ore is also suspected in Huntingoon Township, Hastings County. There are good hematite deposits near Eldorado, the Wallbridge mine being one of them.

The Bessemer Iron Mine at Bessemer, Hastings County is now being worked in a small way, and has been a large producer in the past few years. There are also several known deposits of good ore within a few miles of Madoc, Hastings County, some of which were formerly worked.

The information given above was gleaned by much toil from some eight or ten Official Reports and other authentic sources, and is at the best but fragmentary, scattered and incomplete.

Though information is given in a general way that iron is to be found in a certain district, there seems to have been no attempt made to definitely plot out the size and area of any deposit, or to ascertain or give any clear idea as to the amount of ore, or its richness. There are few isolated exceptions to this statement, such as the Blairton and Belmont Mines in Peterboro County, where the Dominion Government, apparently at the request of the mine owners, plotted out the size of these two deposits, but left all the other rich deposits in the neighborhood untouched.

The presence of iron ore, and its near relative iron pyrites, can be detected by the magnetic needle. The Canadian Sulphur Ore Co., located and thoroughly mapped out one of their best deposits of iron pyrites with the magnetic needle, and opened the vein at the spot indicated by the needle to be the best ore though the surface soil or overburden at the spot was forty feet thick.

The known information regarding Ontario iron ores should be assembled in concise form, with non-technical maps, and properly described in terms intelligible to those who are not trained geologists.

In a general way there seem to be two main iron ore districts in Ontario. The deposit in southeastern Ontario, which seems to centre in or about Madoc, and the larger and more widely scattered areas in New Ontario from Sudbury to Dryden and north to Fort Matachewan.

These two iron ore areas should be dealt with separately by the Provincial and Dominion authorities. For instance, the Madoc area, as it might be called, should be thoroughly surveyed magnetically, the size and boundaries of the various deposits definitely given, and also information as to the probable tonnage of ore and its percentage of pure iron. This information should be embodied in a special bulletin or book, as free as possible from geological and technical phraseology. The northern iron area should be treated in the same way, making two distinct publications, the two covering thoroughly the iron resources of the Province. A new survey should also be undertaken, particularly of the older sections of South Eastern Ontario, where the work was done by prospectors and miners a good many years ago, but about which there seems to be little recent authentic information. The iron formation of Peterboro, Hastings, Frontenac and Lanark Counties does not appear to have been properly mapped out and described for a good many years.

The Madoc iron area, being smaller, more central, and easier of access, should be dealt with first, this area covering or embracing portions of four countries, Peterboro, Hastings, Frontenac and Lanark.

Steps should also be taken by either the Provincial or the Dominion authorities, or both in collaboration, to ascertain the best method of extracting the iron from these ores and utilizing the titanium, vanadium, and other rare materials associated with the iron.

The steel strike in the States has called our attention to our utter dependence on the States for most of our steel products. The Government should do what they can to so develop our iron resources and smelters that we will ultimately become independent of the United States for Plates, Sheets, and structural shapes.

Assistance is needed from the Government for solving the great technical difficulties in the smelting of some of our refractory ores, which difficulties have hindered development in the past. This is a problem too big for the private person or corporation, and requires the best knowledge and resources of the government experts.

The following resolution was adopted:—"Resolved that the Provincial and Dominion Governments be memorialized and urged to prepare and publish immediately a reliable and up-to-date general Report upon the minerals and metals of Ontario, their distribution, quantity and quality, and especially with regard to iron, the foundation of one of Canada's basic industries."

"Iron and Coal Trades Review," a well-known technical journal published in London, England, contains in the latest issue received a number of advertising pages printed in colors by the three-color process, which are of striking excellence. The publishers refer to this innovation as a new departure in British technical journalism, although it is of course well-known in the United States, where the advertising pages are often more interesting than news columns. The advertisement of a well-known British safety lamp, which shows the revealing of the spectre of "gas" by the safety-lamp is a combination of clever drawing and effective advertising, effective even in black and white reproduction, but much more so in colors.

DEVELOPMENTS IN THE SHININGTREE GOLD AREA DURING 1919.

The Shiningtree gold area is not easily reached from Porcupine or Cobalt and few of those who write about Northern Ontario gold mines have yet visited the Shiningtree properties. The district has suffered both from the extravagant claims of stock salesmen and from the equally erroneous counter statements of supposedly informed journalists. None of the mines in the Shiningtree district have yet reached the producing stage, but the work that has been done during 1919 has resulted very favorably. Most of the work during the year has been done on two properties—the Wasapika and Herrick, and the results obtained should be gratifying to the owners, for both seem now to be reasonably sure of becoming producers.

At the Wasapika development has been carried on steadily, though slowly. The big vein has been cut at the 100 ft. level, and found to be even wider than at the surface. The shaft is now being deepened. The footwall portion of the deposit where cut on the 100 ft. level carries about \$12. per ton for a width of 5 ft. This of itself would be considered very satisfactory, but there is in addition a wider body of lower grade ore. To satisfactorily develop this large orebody will take time and money. The company has been handicapped by lack of sufficient funds and has not been able to proceed with development rapidly. This weakness will be easier to overcome than would a lack of ore, but it is one of the many problems that the pioneer has to meet. The Wasapika has had a hard struggle and few friends, but it has the earmarks of a big gold mine.

At the Herrick a shaft was sunk by hand, early in 1919, to a depth of 50 feet on the vein. Very good values were encountered and sampling at 5 ft. intervals showed the ore for a width of 5 ft. to be high grade all the way down. The equipping of the property with machinery suitable for carrying on development work was not undertaken during the summer, but a contract for exploration by diamond drilling was let. By this means the deposit has been tested at depth. Three holes have been drilled and a fourth is now nearing completion. The satisfactory results of the summer's work have resulted in plans being made to equip the property this winter with the necessary mining plant. The erection of a mill is also under consideration. If these two leading properties receive the attention they merit during the coming year the Shiningtree district will doubtless emerge as a gold producer in spite of the voluminous criticism, some of it deserved, that it has received.—R.E.H.

PERSONAL.

Frey, Brassert & Company, Engineers, Chicago, announce the appointment of Mr. F. L. Collins as Power and Electrical Engineer.

Mr. Collins was formerly connected with the Illinois Steel Co., South Chicago, and Garv Works and Universal Portland Cement Co. at Buffington, as Electrical Engineer; later joining the Dominion Iron & Steel Co., Sydney, N. S., as Chief Electrical Engineer. Subsequently he was connected with the Ordnance Department of the U. S. Steel Corporation at Neville Island, and lately was Chief Electrical Engineer of the Pittsburg Crucible Steel Co.

Our Northern Ontario Letter

The Silver Mines.

Official statements to the Canadian Mining Journal tend to show that the mining companies operating in Cobalt are taking full advantage of the present high quotations for silver. Not only is \$1.33 silver in their favor, but the rate of exchange adds another 8 per cent for those companies which are Canadian concerns and receive payment in New York funds.

During the month of December the Nipissing mine established the highest month's record in its history by producing \$423,139. This compares with \$350,208 in November and \$375,247 in October, and makes a total of \$1,148,595 for the last quarter of 1919. It follows that this is at the rate of \$4,594,380 a year. With costs averaging about 40 cents an ounce, it is obvious that net profits amount to considerably more than two-thirds of the total value produced. This, based on the above figures would indicate a net profit of well over \$3,000,000 a year, which is equivalent to more than 50 per cent on the company's issued capital. Following is the official report of Hugh Park, manager, to the president and directors of the Nipissing Mining Company:—

"During the month of December the company mined ore of an estimated value of \$423,139 and shipped products from Nipissing and custom ores of an estimated net value of \$449,758.

"Drifting on vein 544 at the 515-ft. level produced good results. Drifting is proceeding east to west, one face showing two inches of 800 ounce ore, and the other face two to four inches of 1200 ounce ore. Vein 3006 continues to show good values. For the last fifty feet the vein has averaged 1000 ounces a ton over one and a half inches. All stoping operations at 73 shaft continue to be satisfactory. No new veins were encountered in exploration.

"Development work on vein 109 at a level 90 feet below the tunnel, is giving good results. Two raises show from one to two inches of ore assaying as high as 4000 ounces to the ton. Vein 99 was also encountered at the lower level. At the present time the vein is low grade but the rock assays sufficiently high to be sent to the low grade mill.

"A few veins of low assay were encountered in cross-cutting at 63 shaft.

"The low grade mill treated 6632 tons. The High grade plant treated 150 tons. The refinery shipped 326,079 fine ounces of bullion.

"The following is an estimate of production for the month of December:—

Washing plant.....	\$198,940
Low grade mill.....	224,199
Total.....	\$423,139

At the Kerr Lake, also, production is running high, a total of 106,000 ounces having been produced in December. Based on silver at \$1.33 an ounce and exchange at 8 per cent, the output had a value of close to \$150,000.

More than usual interest centers upon the renewed success of the Beaver Consolidated, not alone as a result of the success at the company's Cobalt mine, but also due to the favorable results in the development of the Kirkland Lake Gold Mines of which the Beaver owns close to 90 per cent of the stock. While the Beaver Company is realizing about \$2,000 daily net profit from the operations of its silver mine at Cobalt, the mill of the Kirkland Lake mine is operating at full capacity and has definitely taken its place among the important gold producers of that camp. In addition to this come reports that a large amount of new

ore is being developed, a considerable quantity of which is said to contain around \$30 to the ton.

A small shipment, amounting to about ten tons of picked ore, has been made from the Castle property of the Trethewey-Cobalt company. This consignment came chiefly from the new workings on claim R. C. 101. It is learned that effort is now to be concentrated on the latter claim, while work has been suspended on the original Castle property which adjoins the Miller Lake-O'Brien. In Cobalt, it is reported that the Coniagas is endeavouring to purchase the Cobalt property of the Trethewey company.

Concerning the proposed light railways in the North the scheme is coming in for fairly general favor with the exception of the Gowganda silver area where it is contended that the government would be inconsistent were future extension of the present Elk Lake branch to be forestalled by the installation of a light narrow gauge equipment. Leading silver mine operators in the district are utterly opposed to the Gowganda district being used as a field for such an experiment and are open in their criticism of the failure of the government to extend the standard guage railroad. Were the Ontario government to ignore the views of the mine operators on this point it would create a peculiar situation inasmuch as the government confesses to a dearth of knowledge regarding the mining districts.

The McKinley-Darragh will keep its oil floatation equipment in operation all winter if possible to do so. From experience it is learned that the pumps operate successfully in weather registering 30 below zero and that the only danger of the plant being obliged to close would be due to a temporary interruption in operation, in which case the pumps would freeze. Provided the pumping equipment can be shifted to a point where the supply of sand tailings is adequate to keep the equipment in constant operation, it is believed no difficulty will be experienced in operating the floatation plant at full capacity in addition to normal operations in the mine.

The agitation among the workmen at the mines in connection with choosing a future policy still continues. While a majority of the members of the Cobalt Miners' Union have evinced a desire to break away from the International, yet such a step does not appear to have been definitely decided upon. It is learned that some 51 of the membership are in favor of joining the One Big Union. Should such a course be followed, it would probably mark the end of the union as an important factor in the labor problems of the North, because the steady men are utterly opposed to the principles of the O. B. U., knowing that it is condemned by all responsible labor organizations on the continent. Unless the course of the Union is marked by reasonable moderation, the workmen may be expected to split up into factions. For instance, the Finlanders and a small sprinkling of other foreigners are in favor of the O.B.U., while the returned soldiers and British born appear to favor a policy of moderation. It appears certain that the percentage of the workmen who will join the O. B. U. is decidedly small.

In regards to the indicated increase in the scope of operations in Cobalt as well as the outlying silver areas, it is interesting to note that inquiries relative to properties in the Elk Lakes and Gowganda districts as well as South Lorrain and Gillies Limit are coming in with increased frequency.

Another factor of more than usual interest is the decision of a local mining engineer to acquire and develop properties on which large deposits of Cobalt mineral occurs. Cobalt is now worth about \$2 a pound and is being used in the manufacture of cutlery as well as high speed tools. The South Lorrain district as well as a part of the Portage Bay area is expected to come in for attention.

During the week ended Jan. 8th, three Cobalt companies shipped a total of three cars containing approximately 215,855 pounds of ore.

Following is a summary:—

Shipper.	Cars.	Pounds.
Trethewey	1	82,064
La Rose	1	69,795
O'Brien	1	64,000
Totals	3	215,855

During the corresponding period, the Nipissing was the only bullion shipper, sending out one consignment on Jan. 8th made up of 75 bars containing 100,800 fine ounces.

The Gold Mines.

While gold mining operations continue to record a steady increase, interest in the industry is growing keen. Despite the handicaps under which gold mining has been carried on in recent years, and in spite of the lack of government support, it is significant to find a greater number of gold producing mines in Northern Ontario at present than since the year 1917. That this situation will be further improved seems certain, owing to the large measure of success attending all aggressive gold mining operations in the province. The fact is that a large volume of capital is now found ready to participate in the development of the gold resources of this country and the next few months promise to see a greater number of producing gold mines than ever before in Ontario's history. Already the amount of gold being produced is the highest on record for Ontario.

It is stated that the Hollinger mine is now treating approximately 2,800 tons of ore daily. The significance of this may be realized by a glance at the 1918 annual report in which ore reserves are estimated to contain an average of \$9.15 a ton. It is evident that in treating 2,800 tons daily, and with ore averaging \$9 a ton, the daily output approximates \$25,200, and is at the rate of \$9,198,000 annually. While this record is a big one, yet it is interesting to remember that the present mill when at maximum capacity will treat about 3,500 tons daily. On \$9 ore the output at maximum capacity would amount to \$31,500 daily, or something like \$11,497,500 a year. Provided the Hollinger is able to procure sufficient men—and the prospects of this are brighter now than for some time—such a record may actually be achieved by the end of this winter. This seems to indicate that before the end of the current year the Hollinger may indeed take its place as the largest gold producing mine in the world.

The Porcupine Crown Company has dewatered the Moneta and is now proceeding with an examination. It is stated that the prospects of a deal between these two companies is considered more or less promising.

The Dome Mines is stated to be preparing a further increase in tonnage treated, and current earnings unofficially reported at the rate of upwards of \$100,000 a month. Earnings at this rate amounting to \$1,200,000 a year equal to 30 per cent net profit, and, if maintained, would indicate a return of around 10 p.c. on shares at \$30 each, whereas quotations on the open market are now around \$14.

With regard to the option which the Dome Mines holds on the Dome Extension, and which expires in March unless extended or exercised, it is mooted in mining circles that the Dome may request an extension of another year's time. Up until very recently the general impression appeared to be that the option would be exercised this year. Even yet, not a few mining men believe such will be the case. The current report that an extension of time might be requested is unofficial, but has caused widespread discussion among shareholders of the Dome as well as the Dome Extension Company.

According to official advice, the shaft at the Clifton-Porcupine has reached a depth of 200 feet. Down to that point the deposition of gold has been found to be quite uniform. It is stated that drifting and cross-cutting at that depth will be carried out at once for the purpose of developing the downward continuation of the ore bodies developed at the first level. A substantial quantity of commercial ore is now in sight.

A change in the management of the Porcupine-Keora is reported, and Mr. Waite, formerly of the engineering staff of the Hollinger has received the appointment. Arrangements have been made to sink the central shaft to a depth of 250 feet.

At Kirkland Lake, the favorable developments at the 600-ft. level of the Kirkland Lake Gold Mines is among the most interesting events of the week. Some of the ore being encountered is stated to run about \$30 to the ton. While this is considerably higher than the average, yet it indicates the likelihood of mill heads being increased.

In connection with the bonds held by Mr. Denison in the Teck-Hughes Company, it is reported that a large Cobalt mining company is negotiating with the object in view of purchasing them. As to this, nothing of an official nature has been given out.

Arrangements have been made to resume work on the Fidelity property, in the north-east part of Teck township in the Kirkland Lake area. Prior to the labor strike the shaft was driven to a depth of 145 feet at which point the vein had widened out to about six feet in width as compared with less than half that width at surface. The property is equipped with a steam plant. The present plans are to carry out drifting operations at the 145-ft. level, the work to be done by contact.

In the Boston Creek district, satisfactory progress continues. Until the shaft at the Miller Independence reaches the 500-ft. level and cross-cutting toward the ore bodies commences, nothing of particular interest is expected from that property. By the middle of February, developments will have reached an interesting point.

At the Kennedy-Boston, the shaft has reached a depth of 70 feet and high values are said to occur in the vein at that depth.

In the Fort Matachewan district, with operations confined chiefly to diamond drilling, and on account of the extreme reticence of the one important operation, that of the Matachewan Gold Mines, nothing of particular interest may be expected during the next few months.

At Larder Lake, interest centres around the Associated Goldfields. This Company has been extremely successful in raising capital, current reports intimating that the treasury now contains some \$800,000. As yet, however, no detailed report is available, although there is some evidence of the newspaper criticism of the situation causing the management to take some action in regard to the preparation of a report by a thoroughly qualified and reputable mining engineer.

In the Larder Lake district as well as Kirkland Lake, Boston Creek and Skead township, property powers are showing a great deal of interest in the recent proposal to build a light narrow gauge railway, some fifty miles in length proposed to pass through each of the camps mentioned, and interesting developments appear likely.

A revised statement of the dividend record of the silver and gold mines of Northern Ontario shows that the total amount paid up to the end of December 1919, amounted to \$95,757,368.04, and not \$101,087,368.04 as stated in an earlier statement.

The record is:—

Silver mines.....	\$4,882,341	\$81,003,616
Gold mines.....	2,461,542	15,753,752
Totals.....	\$7,343,883	\$95,757,368

A DRAIN ON CANADIAN BRAINS

By offers of better compensation and more brilliant prospects, the representatives of a United States petroleum company has succeeded in relieving the Dominion Department of Mines of half a dozen of its experts. It is not a surprising development. It is a notorious fact, and to the discredit of Canada, that experts and technical men in our public service are grossly underpaid. Even under the recent re-classification, which, despite all the abuse hurled against it, is an improvement on the past, technical men received far from the recognition they deserved. The result is bound to be bad for Canada. It is bound to mean that the old drain upon Canadian brains to help build up the United States will continue. Today, all over the United States Canadians are to be found in the highest positions, helping to build up the commercial, industrial, and scientific greatness of our neighbor. These men might have remained in Canada, might have been enlisted in the service of their own country, except for the fact that their own country refused either to recognize or was too small to pay for their brains. And as time goes on, and the importance of science increases in the growth and development of nations, the situation for Canada is bound to grow worse. It is a subject that might well engage the attention of the highest authorities in the land.

—Ottawa "Journal."

MINING IN THE PORT ARTHUR DISTRICT DURING 1919.

By J. J. O'CONNOR.

The year 1919 closed the first year of mining activity in this district in twenty years.

The abnormally high price of silver caused much attention to be paid to several of the old silver producers in this area, and to the opening of new silver properties. It is expected that the year 1920 will see many of the old properties, such as the Beaver, Porcupine, West Beaver, West End, Silver Creek, Silver Gance and Silver Fox, in the producing list.

Iron ore has been one of the chief factors in the mining activity of 1919. Drilling operations are being carried on on the Nepigon range with amazing results, large bodies of good merchantable ore are being disclosed by the drills, where nothing but lean jaspilites showed on the surface. This is but an indication of what may be expected on all the ranges of this district when drilling is commenced on them. We have vast deposits of iron ore, showing low grade on the surface, that, wherever drilled, have been proven to contain merchantable ore at depth.

A number of iron properties are now under working option to United States interests, and it is confidently expected that another year will see satisfactory results from the work in hand, and others to be undertaken.

A number of gold finds north of Schreiber, some of them carrying spectacular values on the surface, have been made during the year. No actual mining has been undertaken on any large scale. Trending, stripping and shaft sinking is being done on several of them, with highly satisfactory results. This district has been visited by several representatives of mining companies in Cobalt, Porcupine and Montreal, during the Autumn, and options have been taken on a number of the new claims, with operations to begin in the summer of 1920.

The most important transaction in gold mining was the purchase of the "Foley" at Mine Centre, by the Swedish-Canadian Mines, Limited, represented by Mr. J. A. Johnson. This property will be put under active operations Jan. 15th 1920. About 100 men will be employed.

The Wachman Mining Co., began active mining operations on their gold properties near Dryden, in October last, employing 60 miners. The Rognon Mining Co. are developing their properties at Contact Bay, Vermillion Lake.

The Mikado Mine, at Shoal Lake, has been sold to Chicago parties, and will be operated in the summer of 1920.

The Grace, and Norwalk gold properties have been sold to W. A. Burmeister, of Chicago, these mines are on the Algoma Central Railway, and will be actively operated during 1920.

Twelve claims have been staked at Ozone Siding, on which there are splendid showings of zinc blende. Near these claims, a ten foot vein of baryta has also been staked.

More geologists, mining engineers, and men prominent in the mining world have visited, and examined mining lands in the district surrounding Port Arthur, in 1919, than in the whole of the past twenty years, evidencing the interest that is being taken in our mineral areas.

The year 1920 is being looked forward to hopefully by all interested in the development of the dormant wealth of this mineral area.

INSTITUTIONAL ACTIVITIES IN BRITISH COLUMBIA

(From Our Staff Correspondent at Vancouver)

B. C. Chamber of Mines: The British Columbia Chamber of Mines has arranged a series of lectures in the audience room of the Chamber of Mines in the Dominion Building, Vancouver. The lectures are free and the public is invited to attend.

The following is the series of lectures as arranged, and it will be noted that each subject is to be discussed by men well qualified to do this.

Jan. 6. Relationship of Geology to Mining, Dean R. W. Brock, University of B. C.

Jan. 8. Assaying. R. L. McKillop.

Jan. 12. Mine Development. Prof. J. M. Turnbull.

Jan. 15. Chemistry, Dr. D. McIntosh.

Jan. 20. Modern Ore Leaching, Prof. H. N. Thompson.

Jan. 27. Petroleum (Volcanic origin), Prof. G. A. Gillies.

Jan. 29. Oil Flotation Process, G. S. Eldridge.

Feb. 3. Petroleum, Dr. E. T. Hodge.

Feb. 5. Metallurgical Fuels and Refractories, Prof. H. N. Thompson.

Feb. 10. Petroleum, Dr. E. T. Hodge.

Feb. 12. Origin and Occurrence of Iron Ores, Dean R. W. Brock.

Feb. 17. Petroleum, Dr. E. T. Hodge.

Feb. 19. Iron and Steel Metallurgy, H. N. Thompson.

Feb. 24. Petroleum, Dr. E. T. Hodge.

The lectures on Petroleum are intended to form a series dealing with the origin and search for oil, and differing theories on the origin of oil will be presented, which it is hoped will add a little liveliness to the discussions.

It is evident, from the names of the lecturers, that the University of British Columbia intends to be a focus of both light and leading in Vancouver. It is undertaking that extension of its activities among the outside public which most quickly leads to the adoption of a university by the community among which it is placed, and creates that sense of proprietary attachment among the general public which a university must possess if it is to be successful in the best sense of the word.

Short Courses in Mining and Allied Subjects at the University of British Columbia, Vancouver:

For a period of eight weeks, commencing the second Monday in January, the University of British Columbia offers short courses for the benefit of those who have had practical experience in mining and prospecting, or are connected with the business of mining in any way. The courses are not intended primarily for those who have had a technical training, but so far as they go are complete and adapted to fulfill their special purpose.

Classes are to be held in the day-time only, and require about 30 hours per week for those who attend all the courses.

Short mining courses were inaugurated in January, 1917, and lasted six weeks, with 27 students in attendance, which average was well maintained throughout the courses. Prospectors, miners, brokers, businessmen, newspapermen and others took the course. Resolutions were passed stating the appreciation of these persons of the courses, and requesting further en-

largement and extension of the work. As far as possible this request has been carried out.

All courses are free to returned soldiers. A registration fee of \$5.00 is charged, and as many courses as desired can be taken for this inclusive sum.

Following is a summary of the courses offered:

Mining. Prof. Turnbull.

Smelting. Prof. H. N. Thomson.

Geology and Ore Deposits. Dr. E. T. Hodge.

Ore Concentration. Prof. Turnbull.

Mineralogy & Rock Study. Dr. W. L. Uglow.

Fire Assaying. Prof. H. N. Thomson.

Chemistry. Dr. D. McIntosh.

Surveying. Prof. E. G. Matheson.

Blacksmithing. Actual Shopwork. Mr. H. Taylor.

Unqualified commendation should be accorded to the Faculty of the University for their enterprise and public spirit in arranging these university extension courses. There are many mining communities in Canada, older, more populous and as wealthy as British Columbia, that have not yet attained to these privileges.

Canadian Mining Institute: A recent reference in the "Journal" was made to the "Western Branch of the B. C. Division." This should have read: "The B. C. Division of the Western Branch of the C.M.I."

The North Coast Branch of the Institute has approved the proposed bill entitled the "Regulation of the Engineering Profession in Canada." So far, none of the other local branches have taken action in this connection.

ALICE ARM REPORTS ARE EXAGGERATED.

The report in a morning paper of Vancouver that a vein of fabulous richness had been struck in the Dolly Varden mine is denied by the Taylor Engineering Co., Ltd., absolutely.

The Taylor Engineering Co., Ltd., which is operating the Dolly Varden at the present time or were before winter set in, state that they have had some very good returns, and several times have shipped some high grade ore to the smelter, which would total forty to fifty ton, but this would not run over an average of 1000 ounces to the ton. Although this is pretty nice returns at the same time these figures do not reach anywhere near the figures that were given in the newspaper report. In fact the prospector whose name was used now denies that he gave anything like the figures that were published. It will be well for the public in general to make some allowance for fancy stories that may be printed about the different districts throughout British Columbia from now on, as there is every indication of a big rush to the different fields the coming Spring, and some alluring stories will no doubt appear from time to time.

Note:—A report from Vancouver in the Montreal papers of January 13th is evidently the same report that is authoritatively denied by the management of the Dolly Varden Mine.

Canada's future largely turns upon her handling of the coal problem. Until she releases herself from coal subservience, she cannot rise to her full stature nor stride forward with free step. We cannot be economically or otherwise a sovereign people until we show that we can take care of ourselves, in summer or winter.—Montreal "Star."

OUR BRITISH COLUMBIA LETTER

The Metal Mines

Trail, B.C.—While the estimated value of the output of the Trail Smeltery of the Consolidated Mining & Smelting Company for 1919 is less than that of 1917 and 1918, the gross ore tonnage treated is not materially less than that of the previous year. Having in mind the great stimulation for which the war was responsible, and the high prices which prevailed during that period, the 1919 record, the third highest in the fourteen years' history of the Company's Plant, is extremely creditable.

The 1919 production is provisionally valued at \$7,942,101, zinc providing nearly one-third of the total value with lead and silver next in the order named. Details are shown in the appended table:

Output Trail Smeltery for 1919:

(Month of December partially estimated.)

Gold	\$ 938,449
Silver	1,598,489
Copper	951,360
Lead	1,890,597
Zinc	2,563,206

\$7,942,101

The estimated tonnage of ore and concentrates received at the Smelter for the year is 319,147, which is about the same as in 1918. On the basis of the actual figures up to December 21—omitting the last ten days of the year—the total tonnage of 312,589 is divided between raw ore and concentrates in the proportion of 302,589 tons of ore to 10,072 tons of concentrates. Up to that date 134 different properties were represented in these receipts. Properties of the Consolidated Company contributed over 230,000 tons of ore and concentrates.

Ore and concentrates of the Kootenay-Boundary District of British Columbia, not handled at the Trail Smelter, add quite substantially to the production of that section in the past year. The Granby Consolidated Mining & Smelting Company operated the Grand Forks Smelter for the first six months of the year, treating 152,821 tons of ore. All but a few tons from a couple of mines in the Republic Camp were from the Company's low grade property at Phoenix. The output of the Smelter was 1,888 tons of blister copper, which, at an average price of \$400 a ton, would work out at a valuation of \$755,200.

Nineteen Kootenay properties exported ore or concentrates for treatment in various American smelters. These exports were nearly all concentrates, although 3,143 tons of high grade ore were shipped, which at \$100 a ton would be valued at \$314,300. The concentrates amounted to 13,260 tons, which at \$250 a ton would work out at \$3,315,000. Thus the estimated total exports for the Kootenay-Boundary District would total \$649,300 in value.

Referring to ore and concentrates, the production of the district under discussion for 1919, inclusive of a few outside shippers, would be as follows:

	Mines	Ores	Concentrates
To Trail Smelter	134	302,589	10,072
To Granby Smelter	3	156,821	
To American Smelters	19	3,143	13,260
Totals	156	462,533	23,332

The Minister of Mines for the Dominion is to receive a special invitation to attend the annual meeting of the Associated Boards of Trade of Eastern British Columbia to be held next month at Trail, B.C. One of the most important questions for discussion is expected to be that of obtaining a preference in the British market for Canadian metals as well as for other Canadian raw materials and manufactures.

The Florence Silver Mining Company has resumed operation of its mine and mill, situated on Princess Creek. This property has been closed down for between two and three weeks owing to plant trouble experienced during the severe cold of early December.

Slocan, B. C.—The Soho Silver-Lead Mine, which adjoins the Rambler-Cariboo Property in the McGuigan Basin, Slocan District, and which has been closed for the past eighteen months is being reopened under the supervision of J. C. Ryan, the manager of the Soho Mining Company. Although only from ten to twelve men will be employed during the winter it is the intention to increase the force materially in the spring and to that end it is proposed augmenting the camp accommodation. There are four veins on the property, on one of which there has been development of something like 3,000 feet, while on another a 100 foot shaft has been sunk from which there has been some drifting. Two carloads of ore were taken from the shaft in the working. It is said that there is about \$10,000 worth of ore on the dump awaiting shipment, basing the computation on present prices.

Another Slocan property recently heard from is the Ottawa, now under lease from the Consolidated Mining & Smelting Co., by A. L. McPhee and P. Maguire. They are said to have encountered a shoot of high grade ore in a raise from a lower drift, there being a vein of ore, eight inches in width, assaying approximately 1,000 ounces to the ton.

Still another Slocan property, known as the Anna Group, situated near Slocan City, is reported to have rewarded those engaged in development. Here again it is asserted that a rich vein has been struck, the ore of which assays very high in silver. The work of opening this up is proceeding.

Princeton, B.C.—Work on the railway from Allenby to the Copper Mountain Mine of the Canada Copper Company, is being prosecuted now with much vigor. A gang of about 500 men is employed and, if there is no further trouble, there is no doubt that the railway will be in shape for operation some time next summer. The working of the mine as well as the new mill at Allenby, and the placing of this large new British Columbia mining enterprise on a producing basis awaits only the completion of the railway and the power line from Bonnington Falls, near Nelson, B.C.

Vancouver, B. C.

Until sometime in the month of December last officials in charge of the Dominion Assay Office, Vancouver, B. C., were authorized to pay for gold offered for sale in New York Funds, providing the same were demanded. On the discontinuance of this concession by the Dominion Government representations went forward to Ottawa, the Canadian Capital, through the Vancouver Board of Trade, on be-

half of the gold producers of this Province. It was pointed out that with costs increased, the value of their product fixed, and the exchange quite substantially against Canada, the gold miners of British Columbia found themselves in a serious situation. They were tied, figuratively, hand and feet as the government embargo against the export of the metal still was effective. As a result the Canadian Government has decided to modify the condition to an extent by allowing what amounts to a bonus of 5 per cent over and above the actual value of the gold presented at the Assay Office. While this, under present conditions, will not entirely make up the loss incurred through the withdrawal of the previous arrangement of payment, on demand of New York Funds it will in a large measure meet the wishes of those most interested.

The original telegram of the Vancouver Board of Trade to Ottawa read as follows:

December 19th, 1919

Sir Henry Drayton,
Minister of Finance,
Ottawa, Ontario.

We understand Vancouver mint has been instructed to discontinue payments for gold at value New York Funds. This will result in closing down the most important gold producing mines of British Columbia and thereby throw out of employment many men during this most critical period of our gold returns leave the country as blister copper without any arrangements being made for the return of the gold values. We would respectfully suggest that this order be withdrawn. Please wire immediately as situation is acute.

Ultimately the following reply was received:
Vancouver Board of Trade:

"Referring to your message to Sir Henry Drayton the policy of paying New York Funds for gold deposits has been suspended in view of the present high rates. In lieu thereof the Minister has authorized an allowance to be made to depositors to the extent of 5 per cent. In other words the depositors will have a fixed rate of 5 per cent for the present if they desire to take advantage of it.

(Signed) T. C. BOVILLE,
Deputy Minister of Finance.

Shareholders in the Belmont-Surf Inlet Mines recently received their third dividend in a twelve month period, the same amounting to 2½ cents per share, of the share capital of \$2,500,000 in dollar shares. This property, which is situated on Princess Royal Island, has been a steady dividend payer. The mine is worked by tunnels, shafts, stopes and winzes and ore is treated at a cost of about \$7.20 a ton, while the values realized in 1918 were a little over \$11 a ton. Owing to the increased price of silver this valuation will be considerably higher for 1919. Considerable development work also has been done during the past year and it is expected that, when official information is available, it will be shown that the ore reserves have been increased.

A syndicate of prominent Vancouver business-men has been organized, and incorporated as the Whale Channel Mines Co., to take over and develop six mineral claims situated on Princess Royal Island about three miles north of the Belmont-Surf Inlet Property. It is said that the ore bearing lead is about 12 feet in

width and that it has been traced for a distance of 3500 feet. A force of men is being sent north immediately to continue work on a tunnel which is to be driven for 1500 feet.

Statements painting the future of the mining industry in British Columbia in bright colors have been made recently by Hon. Wm. Sloan, Minister of Mines, and by others in touch with conditions. Among the concrete reasons given for this spirit of optimism are the following:

That the Granby Consolidated Mining and Smelting Company proposes the installation of a Mill to treat low grade ores, thus making a rich smelter product.

That the Granby Company also is likely to take over the Exstall Mine on the Skeena River, which it has had under development of some years.

That the Britannia Mining Co., Howe Sound, will be able to maintain its present rate of production.

That the Canada Copper Company will be ready some to commence active production at its Copper Mountain Mine.

That new mills are proposed for this year at the Sunlock Mine and the Old Sport Mine, Vancouver Island, in both of which the Consolidated Mining and Smelting Company of Canada is interested.

All these enterprises have a direct bearing on the copper production of the Province in which there was a distinct falling off in 1919. Basing their calculations on such very clear indications, and having in mind the smaller properties being developed and some producing in small quantities, it is argued that, providing the copper market hold good, 1920 should be a record year for British Columbia.

Mention also is made of the prospects of an iron and steel industry being launched. It is suggested this may be undertaken by the Canadian Collieries (D) Limited. Union Bay, Vancouver Island, where there is a fine harbour, suitable coking coal, and railway facilities is mentioned as a possible site. Here there are available, also, limestone and fire-clay, manganese ores and extensive iron-ore deposits, among the latter being those of Texada and Redonda Islands. In addition the Company has at Puntledge an hydro-electric plant which could be utilized in connection with the projected industry.

Victoria, B. C.

Intimation has been received by Hon. John Oliver, Premier of British Columbia, that the Dolly Varden Mines Company has taken the necessary steps to test the validity of legislation passed by the British Columbia Legislature relative to their holdings in this Province. No definite word has been given as to what course is to be pursued but it is likely to take the form of an appeal to the Minister of Justice, Ottawa, for the disallowance of the Provincial Statute complained of.

Possibly it will be recalled that at the last Session of the Provincial Legislature, that of 1918-19, a special Committee of the House was appointed to investigate a dispute between the Dolly Varden Mines Company and the Taylor Engineering Company, of Vancouver, B. C., the latter Company having been engaged in the construction of a railway from tidewater. Alice Arm, to the Dolly Varden Company's mineral properties. Much the greater part of the railway was complete, but a few miles of steel had yet to be laid and it was the fact that it was essential that the Provincial Charter granted for the building of the railway should be renewed that was primarily re-

sponsible for bringing the matter to the attention of the Legislature. This charter limited the period for the completion of construction and that period had lapsed. Having come before the House the differences between the mining company and the railway construction company became known and were ventilated. It was charged by the last named that the mining company was in debt for the greater part of the cost of the railroad and this allegation was proved, as is apparent from the subsequent legislation, to the satisfaction of the Special Committee of the House.

Then came the legislation which, evidently, it is proposed to have vetoed. It provided, briefly, that the Dolly Varden Mining Company should have a certain stated period in which to meet its indebtedness. Bluntly, it was "put up" to the company to meet what, it was considered, were its just obligations. If it failed, its properties were to be forfeited, and someone else was to have the opportunity to develop and operate them. The company did not respond. Accordingly, and in strict compliance with the terms of the Statutes, the mine, plant, and the almost completed railway fell into the hands of the Taylor Engineering Company. With further financial backing the principals of this company, and some other associates, acting as the Taylor Mining Company, took up the task of the development and the placing on a shipping basis of the Dolly Varden Mine.

These efforts, so far, have met with conspicuous success. The railway was finished to a point just below the mine by September 1st of last year. Within that period, also—work having started about the middle of June—a 2,000 foot, 2-bucket aerial-tramway, with upper and lower terminal-bunkers was ready for operation. Although little development work was done, a careful geological examination of the property is being made this winter on which will be based next year's programme. Between the 1st of September and December 15th the mine delivered to the Granby Company's Anyox Smelter approximately 7,000 tons of ore averaging 56 ounces of silver to the ton, as well as a small quantity of high-grade sacked ore averaging about 1,000 ounces.

W. E. Somerville, a prospector and mine operator of the Portland Canal District, and associates are reported to have bought the Homestake Group of five claims situated in the Alice Arm section. It is said that the lead has been traced for 3,000 feet by tunnels and open-cut and a good deal of diamond drilling has been done.

Grand Forks, B. C.

Since the closing down of the Phoenix Mines of the Granby Consolidated Mining & Smelting Co., with the result that the formerly bustling little town of Phoenix now is deserted, there have been reports from time to time that the company has plans which, in their development, will rehabilitate Phoenix to some extent as well as bringing a larger measure of prosperity to the contiguous section. The assertion now made is that the company proposes the installation of a concentration mill at or near Phoenix for the handling of the low grade ores of the mines. The volume of water necessary is said to be available. Such action, it is pointed out, might lead to the resumption of smelting at the Grand Forks Smelter. In this connection, however, it

is to be borne in mind that there is no assurance that the concentrates would not be shipped to the smelting plant at Anyox. The mines at Phoenix are said to contain a large quantity of low grade ore.

Prince Rupert, B. C.

For the benefit of the many smaller mines situated near the northern Coast and in the northern Interior of British Columbia a sampling plant may be established at Prince Rupert according to report from the latter City. It is said that the enterprise has sufficient financial backing to meet the required initial outlay and to enable advances to be made on small shipments of ore. Mining men consider that the enterprise can be made to pay its way and assert that it will materially assist in the development of the mineral areas of the North, there being not a few instances where operators are retarded in the development of their properties because they cannot ship in large enough quantities to make shipment to the existing smelters worth while.

Stewart, B. C.

The universal labour unrest appears to have spread to the Salmon River Mining District, B. C., from where it is reported that the men employed at the Premier Mine have gone on strike. The quality of the food is said to be the complaint.

Cowichan, B. C.

Having shipped 500 tons of Manganese Ore with satisfactory results the B. C. Manganese Company, whose property is situated on the E. and N. Ry. in the Cowichan District, Vancouver Island, is making arrangements for the installation of an aerial tramway. With better transportation facilities it is figured that it will be possible to increase the output of the Mine. The tram is expected to be in shape within two months. Meanwhile no shipments are being made because the road is in no condition for use.

In a letter to the owners Guy S. Rowe second vice-president of the Bilrowe Alloys Co., Tacoma, Wn., expresses himself as pleased with the quality of the Vancouver Island Manganese Ore. He says that this ore analysed not lower than 48 per cent metallic manganese, with some cars going over 50 per cent metallic manganese, and that it contained no deleterious elements in sufficient quantity to interfere with the manufacture of standard 80 per cent Ferro-Manganese.

Mr. Rowe continues:

"We hope that you will be in a position soon to enter into a contract to supply us with approximately three cars of ore, or about 120 tons, a week.

"It is possible that we may start another furnace and need an additional 50 tons a week. In the event of our doing this we would be glad to contract with you for approximately 150 tons a week.

"Having visited your property we feel assured that you have thousands of tons of this excellent ore in sight, with large amounts yet uncovered, and we trust you will lose no time in installing your aerial tramway, as we are very anxious to use your manganese ore again in our operations."

Nelson, B. C.

James McGregor, for the past 22 years mining inspector for West Kootenay, Boundary and Yale Districts, who has made his headquarters in Nelson for

20 years, has been transferred to another of the Provincial Districts with headquarters at Vancouver, B. C. It is expected that he will assume the inspectorate in the Nicola District.

A British Columbia Prospectors' Protective Association has been organized with a membership of eighty-five and with headquarters at Nelson, B.C. The officers are: J. W. Mulholland, president; C. E. Crossley, vice-present; Fred A. Starkey, secretary; and Dr. F. E. Morrison, treasurer. The objects of the organization as outlined are: To deal with the matter of grants from the Government for roads and trails to mining properties; to continue to a successful issue the agitation for a government ore testing plant in the Kootenay District; to advocate the re-opening of dormant crown-granted mineral claims; to secure free sets of surface samples for purpose of study by prospectors; and to take the necessary action to have prospects examined by the district engineer, or by an engineer representing the association, the engineer's report to be filled with the secretary of the Association and the property to be listed. Not one prospector in a hundred, it was stated, had an engineer's report on his holding and such reports were essential, as investors were not in the habit of buying by word of mouth.

Having accepted an offer of the Henry L. Doherty Company, of New York, to undertake some important reconnaissance work in Southern Mexico, John D. Galloway, for six years prominently connected with the Provincial Department of Mines, during the last three of which he has performed the duties of Resident Engineer of Mineral Survey District No. 2 (Northeastern British Columbia) with headquarters at Hazelton, has placed his resignation in the hands of Hon. Wm. Sloan, Minister of Mines.

While Mr. Sloan very much regrets losing the valued services of Mr. Galloway, it is gratifying to him that a firm of high standing should seek one of the officials of his department to carry on important geological and explorative work in foreign fields it is proposed bringing under development. Mr. Galloway, it is pointed out, will have an opportunity to obtain a broader experience. His selection is taken as a flattering commentary on the reputation of the technical staff of the Department of Mines for efficiency, and Mr. Galloway is being extended the best wishes of his confreres together with the assurance of a warm welcome should he ever decide to return to British Columbia. Mr. Galloway is an honor graduate of McGill University in Mining Engineering. In 1911 he obtained the degree of B.Sc., and in the following year that of M.Sc.

THE COLLIERIES.

While it is conceded that the success of Senator Robertson, Minister of Labor, and W. H. Armstrong, director of coal operations in District 18, U.M.W.A., (Eastern British Columbia and the Province of Alberta) in effecting an agreement with the coal miners, under the direction of the United Mine Workers of America, is a serious blow to the aspirations of leaders of the One Big Union Movement there is a firmly rooted belief that the last has not been heard.

Unquestionably the ground has been cut from under the feet of the O.B.U. in that the miners have agreed to the increase amounting to 14 per cent over wages

previously received and to the principle of the "check off", or, in other words, that the dues of the miners are to be deducted by the operators themselves and remitted to the headquarters of the U.M.W. of A. and not passed over to the various local unions. S. Balantyne, representative of the United Mine Workers, has charged that these funds for some time have been used for O.B.U. purposes.

Nominally the actual position facing the miners is this: They will have either to own allegiance to the U.M.W. of A. or cease work. There is little probability of a strike, however, as the O.B.U. is said to be practically without funds. Another point recognized is that a strike at the present time could not have public endorsement. In the Crow's Nest Pass District the situation has been complicated by the recent declaration of the local union in favor of the O.B.U. Still it is thought that nothing will be done for some time at any rate. From the standpoint of the miners the position appears to be summed up in an observation attributed to Henry Beard, the president of the dual organization in District No. 18, that "we shall wait and see."

In view of the increase of 14 per cent granted the miners the dealers have been authorized to increase the price of coal to the public. In the case of Drumheller coal the increase will be 40 cents a ton. The product of the Lethbridge field will advance 52 cents a ton while bituminous or steam coal will be increased 34 cents a ton.

A reconstruction of the Canadian Collieries (Dunsmuir) Ltd., which company has large holdings and operates on a considerable scale in the coal fields of Vancouver Island, has been announced from London England, where a large proportion of the company's stock is held.

In discussing the present situation, as well as the new proposals, the London Times in a recent issue says:—"It will be recollected that as part of the arrangement made in 1915 a Bondholders' Committee was appointed, and the control of the Company was placed in their hands through deposit of a majority of the shares in a voting trust in their favour. During the war the company's earnings have not sufficed to provide any interest on the bonds. During the first part of the war the company was actually working at a loss, owing to the falling off in the bunker trade on the Pacific Coast. In the latter part of the war the bunker trade revived and the company was able to make a better showing, but the scarcity of labour and its abnormally high cost both reduced the Company's output and continued to keep the margin of profit down to a low figure, while the depreciation of the plant and the upkeep of the mines absorbed considerable sums, leaving no surplus available for interest on the bonds. Although results have been better recently, the outlook for the company must remain uncertain for some time to come. While the Company has very large coal areas available for exploitation, the cost of obtaining the coal is very high, and the market for it is fluctuating both as to demand and price."

The same article then proceeds to give details of the contemplated re-organization, an interesting portion of which reads as follows:—"A new Debenture Stockholders' Committee is to be constituted which will have power to authorize the Company to issue prior lien securities ranking in front of the 'A' and 'B'

Debenture stocks to an amount not exceeding 1,500,000 dollars carrying interest at not exceeding 10 per cent, and will also have other wide powers and discretions, including power to consent to the whole or any part of the company's net earnings up to June 30, 1924, being applied or reserved to meet capital expenditure, and at any time to approve of development and exploration work being charged to revenue, etc."

With the completion of this plan of reconstruction it is believed in British Columbia that the Company will be in a better position to undertake the development of its holdings on the Island and the adoption of a progressive policy, which, it has been suggested, may include the launching on a small scale at least of an iron and steel industry.

Note:—With reference to the figures which appeared in the general review of British Columbia mineral production (see page 13, issue 7th January 1920) your correspondent would point out that the figures therein given are based on what was known regarding production up to the end of October. Since then information is to hand indicating that, contrary to earlier expectations, British Columbia's 1919 output of silver will be slightly in excess of that of 1918. This is accounted by the fact that the returns from the Sullivan Mine, operated by the Consolidated Mining and Smelting Company of Canada, for the latter part of the year were over what was looked for and also by reason of the accumulated production of small shippers of the Slocan District, to which insufficient attention was paid in the compilation of estimated. Gold and Lead production also will be somewhat above what was estimated although not equalling the mark established in 1918. As to Gold the explanation is almost entirely the speeding up of the output of the Rosland Mines, also operated by the Consolidated Mining and Smelting Company of Canada, during the months of November and December. The difference in regard to Lead is due to the increased activity at the Sullivan Mine and to the small shippers of the Slocan. Outside of these improvements the estimates stand and it may be predicted that the monetary value of British Columbia's mineral production for the past year will be approximately \$8,000,000 less than that of 1918 or about \$33,000,000. The decline is accounted for, almost to the full extent, by the falling off in production and the fluctuations in price of copper.

Mr. J. K. L. Ross, who recently resigned from the Board of the Dominion Steel Corporation, has been elected a director of the Consolidated Mining and Smelting Company.

Mr. Lorne Webster of Quebec has been appointed a member of the Senate. Mr. Webster, among many other activities and directorates, is a director of the Nova Scotia Steel & Coal Company, and was for many years the Quebec representative of that Company. He has taken a very active interest in the raising of war funds, and in charitable organizations. Mr. Webster's business acumen, and his wide knowledge of the coal and transportation problems of Canada, should enable him to take a leading part in the counsels and policies of the Senate.

Mr. D. H. McDougall was in Montreal recently for the first time since returning from England, and visited headquarters of the Canadian Mining Institute.

PUBLICATIONS RECEIVED

Investigations in the Gas and Oil Fields of Alberta, Saskatchewan and Manitoba. By D. B. Dowling, S. E. Slipper and F. H. McLearn. Memoir 116. Geological Survey. Publication Serial No. 1722.

This Report is composed of three separate ones, namely, Part 1, "The Structure & Correlation of the formations underlying Alberta, Saskatchewan and Manitoba, by D. B. Dowling; Part 2, "Sketch of the Geology of Southern and Central Alberta, by S. E. Slipper, and Part 3, "The Cretaceous of Peace and Athabaska Valleys, by F. H. McLearn. An appendix gives a record of selected wells, arranged in East-West order, compiled by Dr. Dowling. The Reports are accompanied by relief and contour maps, and a series of colored sections of strata revealed by well records.

With reference to the foot-hill district, Dr. Dowling remarks:

"The oil boom of 1914 will long be remembered on account of the indiscriminate locating of oil leases without reference to the structure of the underlying rocks, and the consequent very large useless expenditure in drilling. The general absence of favorable structure areas in the disturbed belt of the foothills has directed attention to the plains, where the formations are only gently folded, and a little oil has been obtained in the Peace and Athabaska Valleys, and the presence of gas proved at various places. A more extended study of the general structure than has yet been made is necessary before the extent of the new fields can be predicted."

Summary Report, Geological Survey, Part A. This gives a general summary by the Directing Geologist of the work of the season of 1918, details of which have already been published in the parts "B" to "G" issued at intervals.

Mr. McInnes's introduction summarises in brief the chief points of interest in the investigations of the Survey, and is as follows:

"During the season of 1918 the work of the Geological Survey was devoted more than ever to the investigation of areas and deposits that promised to be of economic importance. The number of field parties was fewer than in the period before the war, but investigations were carried on in all parts of Canada. In Yukon, particular attention was given to lode deposits upon which the establishment, there, of a permanent mining industry must depend. In British Columbia, the field parties were placed in areas where geological work seemed to be most greatly needed to help in their commercial development; and particular attention was given to the investigation of the platinum situation and to the prospects of securing a greater supply of that mineral which was then so urgently needed for the purposes of the war. Further work was done in the coal areas of western Alberta; and in the Great Plains area and to the north of it further progress was made in working out the structure of the rocks and its bearing upon the occurrence of oil and gas.

The examination of areas in northern Manitoba in which important copper sulphide deposits and gold-bearing veins occur, was continued and the extent of the areas more closely defined.

The geology of several areas in northern Ontario was studied; the pyrite deposits were specially investigated; and further work was done on the central Ontario oil fields.

Important mineral areas were mapped geologically in Quebec and in the Maritime Provinces; and at Malagash, in Nova Scotia, a deposit of salt and associated minerals was examined. The deposit is of interest both because it is the first bed of salt to be discovered in eastern Canada and because of its promising nature from an economic standpoint."

Gabbros of East Sooke and Rocky Point. By H. C. Cooke. Museum Bulletin No. 30. Geological Survey. Publication No. Dept. of Mines 1762.

This is a petrological study of two plutonic masses of general gabbroid composition which occur on the southwestern coast of Vancouver Island, bordering the Strait of Juan de Fuca, and about 15 miles southwest of Victoria.

The author has formulated a theory of the processes through which the gabbros have passed, postulating an original homogeneous magma, which was differentiated into four differing rock types, these being later subjected to regional disturbances before complete solidification had taken place, followed by the effects of a new intrusion accompanied by faulting and jointing, through which hot solutions were circulated that caused further alterations in the rocks with which they came into contact. At a later date, further faulting took place, and into the fissures thus formed there ascended solutions which deposited the chalcopyritic ores that give economic value to this district of Vancouver Island.

Report of the Commission of Conservation for 1919. Tenth Annual Volume.

The latest annual report of the Commission of Conservation covers a striking variety of subjects, indicating that the Commission considers its scope is not limited to conservation of material resources alone, but includes such matters as town planning, venereal disease, prophylaxis and the general public health. This viewpoint cannot be quarrelled with, although it is a curious commentary on civilization that we spend much time and thought on preserving human life, and then are apparently unable to agree regarding a League of Nations, which, as Mr. Balfour says, if not perfect, has no substitute as a preventative of future wars.

Under the heading "Mines" we note the following paragraph

"In July, last, Mr. W. J. Dick, our Mining Engineer, resigned, to accept a more lucrative position in Winnipeg. Pending the appointment of a successor to Mr. Dick, your Assistant to Chairman has had to carry on this branch of work as best he could. In addition it is quite evident that we cannot get a competent mining engineer for the salary we were paying Mr. Dick."

We believe that Mr. Dick's new position is connected with the sale of coal, and it is evident that when the sale of coal commands a more attractive salary than the work connected with its conservation, the outlook is rather hopeless from the point of view of the public domain.

The Commission of Conservation is doing good work, if only in ventilating the records of waste of material resources in Canada, but in many respects its preaching is like the voice of a pelican crying in the wilderness.

Another proof of the activity of the Commission is

a volume reporting the proceedings of a National Conference on Game and Wild Life Conservation.

Our readers will recollect a recent notice in the Journal of a bird sanctuary made possible by the Dorr Co. at Westport, Conn., and one of the most interesting parts of this recent volume is the description of a bird sanctuary created by Jack Miner of Kingsville, Ontario, who is doing his best to preserve the Canada goose, and to trace its migration by means of name plates.

We would suggest that Isle Perrot, which is situated within view of the "Journal's" office at Ste. Anne de Bellevue, at the junction of the Ottawa and the St. Lawrence, might well be made a bird sanctuary.

The Why of Westport.

This little book is a charmingly designed description of the Dorr Company's metallurgical laboratories at Westport Mill, Conn. The equipment of these laboratories consists of a library of scientific and technical literature, a fully equipped analytical laboratory, a large scale testing plant, with crushing and grinding apparatus, ball mill and Dorr classifier in closed circuit, concentrating tables and flotation equipment, a complete counter-current decantation unit consisting of Dorr agitators, Dorreo pumps and thickeners, and two types of vacuum filters, hydro-separators and percolating tanks. Sleeping accommodation is provided for transient visitors, and, as has been previously mentioned in the "Journal," the surroundings of the Westport Mill are rural and designed to provide ideal working conditions for the staff.

We do not remember to have seen a more tastefully designed brochure, nor one of more consistent typographical excellence.

MINERAL DEPOSITS OF SOUTH AMERICA: By Benjamin L. Miller, Professor of Geology, Lehigh University, and Joseph Singewald, Assoc. Prof. of Economic Geology, Johns Hopkins University. First Edition. Cloth. 6¼ by 9¼ inches. 598 pages with Index and Bibliographies. McGraw Hill Book Co., New York and London.

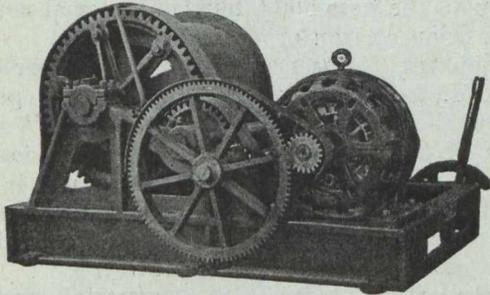
This work fulfils the intention of its author to "fill a genuine want in the literature of economic geology" and is the outcome of an extended trip made by the authors in 1915. The idea of publishing the observations made on this journey in book form is well justified by the volume now presented, for not only have the authors assembled in handy form a great deal of information regarding an immensely wealthy but little known half-continent, but they have added to each chapter that deals with the individual countries, a detailed bibliography that adds greatly to the value of the work.

The volume is too well digested and contains too large a mass of information to permit of covering the ground in a short review, but iron and steel men will be much interested in the description of the large deposits of iron-ore and manganese which occur in Brazil, chiefly in the State of Minas Geraes, and are concentrated around the peak of Itabira. The authors quote Harder's estimate that the Central Mines Geraes region, roughly 100 miles square, contains in the thirty known deposits 410,000,000 long tons of Bessemer ores with over 69 per cent iron and less than

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0.02 phosphorous, and almost three billion long tons of non-Bessemer ores with over 50 per cent iron and 0.05 to 0.3 phosphorous. The authors state that without doubt Brazil contains "the most extensive undeveloped deposits of iron ore of any country in the world".

With reference to manganese, it is stated that during the first years of the European war the steel industry of North America was almost entirely dependent upon Brazilian manganese ores, and it is probable that even after the close of the war North America will continue to look to Brazil for a considerable part of its manganese ores. The authors say: "It is questionable whether any country in the world possesses greater deposits of manganese ore than does Brazil, so that we confidentially predict that the Brazilian manganese industry is bound to increase steadily in importance. No other country, certainly, with the exception of Russia and perhaps India, at the present time, seems to offer more promise in the way of exploration for workable manganese ore bodies."

The mention of Brazilian iron ores is of particular interest to Canadians, as at one time, if not now, one of the large steel companies in Canada held some extensive options on deposits near Itabira.

An interesting reference is made to the Minasragra Vanadium Mine near the Hauraucaca Smelter in Peru, now owned by the American Vanadium Company, which since its discovery is said to have furnished 80 per cent of the world's demand for vanadium.

The Moro Velho Mine of the St. John del Rey Mining Company, at Villa Nova de Lima in the State of Minas Geraes, Brazil, is described as the most interesting mine in South America, and in some respects the most remarkable in the world. The mine, which operates for gold, which has been operated by an English Company since 1834 without serious interruption.

The mine claims the world's record for depth, workings being on August 24th 1917 at a depth of 6,126 ft. below the surface. It is stated that it can probably be worked—if the ore retains its value—to horizon 26, which would give a vertical depth of 7,626 feet, and even to a much greater depth.

The authors remark that the persistence of the ore-body and the absence of any material change in the tenor of the ores with depth are of especial interest "as both are in disagreement with ideas commonly held by mining men."

It is interesting to note, in connection with the depth of the mine, that the surface has an elevation of 2,774 feet above sea-level.

South America appears to be extremely rich in metals, but the coal deposits are unimportant, except in Chili where there is an interesting extension of the coal seams under the ocean near Conception Bay, where mining has been carried on since 1840.

It may well be that Drs. Singewald's and Miller's work will see future editions as the knowledge of South American mineral deposits is added to.

IRON DEPOSITING BACTERIA AND THEIR GEOLOGIC RELATIONS; by Edmund Cecil Harder. Professional Paper No. 113, U. S. Geological Survey. 1919.

While this professional paper is extremely technical it is not without interest even to those who do not

possess the wide knowledge of chemistry and bacteriology that is necessary to its full understanding. In the preface, by F. L. Ransome, it is stated that since 1836, it has been known that certain bacteria have the power of withdrawing iron from solution, and causing its precipitation as ferric hydroxide. "The precipitation of iron sulphide by bacterial processes has also been known for some time. The geologic application of these discoveries, though predicted by some to be far-reaching, have been rather slowly made, and it is safe to say that many geologists have paid little attention to the possible extent of bacterial action in the deposition of iron ores."

Dr. Reinhardt Theissen recently, in a paper before the A. I. M. & M. E., referred to the part possibly played by the so-called "sulphur bacteria" in the formation of the sulphur that is present in coal (see *Iron & Steel*, November issue, page 283) and it is stated also by Mr. Ransome that the part played by bacteria in the deposition of limestones has been specially investigated and found to be important.

While the actual utility to the bacterial organism of the iron particles that it concentrates is not ascertained, it appears quite certain that large bodies of iron-ore have been formed entirely through the activity of bacterial deposition. Mr. Harder's conclusions are that in general it was found that iron-precipitating organisms were present wherever iron-bearing waters occur, both underground in wells and mines, and in surface waters. It was found that the ochreous scums which occur in such localities consisted mainly and in many places entirely of iron-precipitating organisms, of their remains. It was also found "that solutions of certain iron compounds when inoculated with almost any type of natural water or of soil, showed a precipitation of ferric hydroxide by certain types of lower bacteria, thus indicating the almost universal presence in nature of organisms capable of precipitating iron from solution."

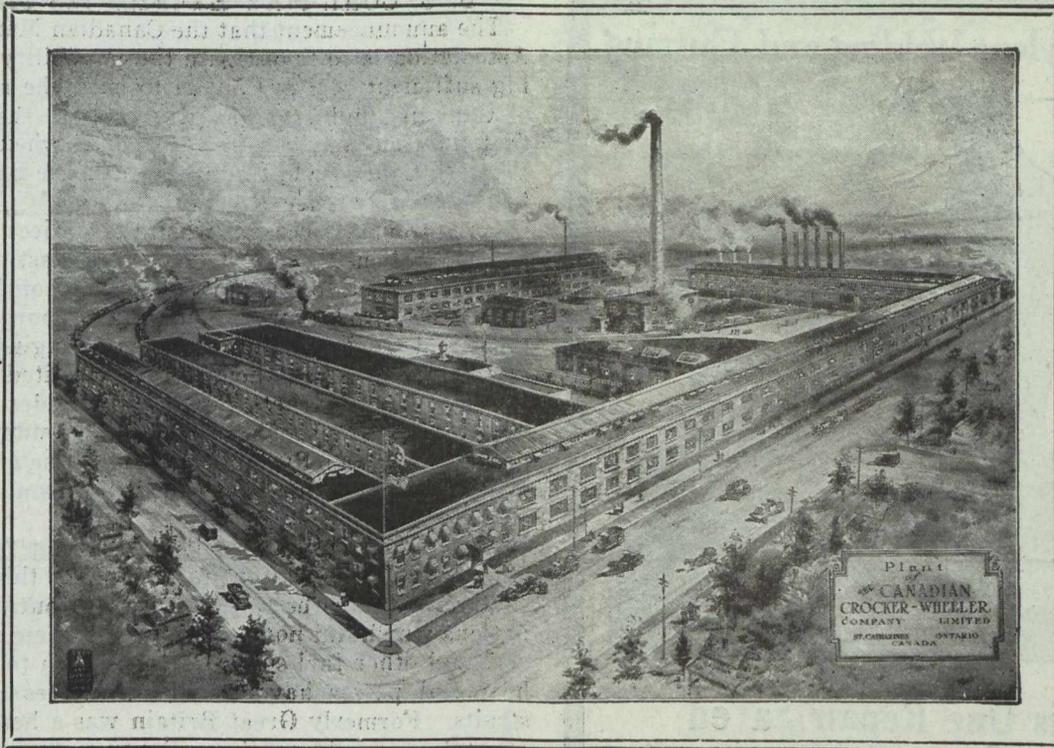
We recollect, as a boy in the mine, seeing in a quiet air-course, a small lake of blood-red, almost cardinal coloured "ochre", which was made more conspicuous because it occurred in the midst of long needles of a saline efflorescence upon the white shale side of the air-course. The consistency and appearance of this cardinal lake corresponds exactly with the results of the work of the bacteria described by Mr. Harder.

Among the iron-ore deposits classified as being originally laid down mainly as ferric hydroxide are included the Wabana ores in Newfoundland, and our readers will recollect a paper which was delivered by Dr. A. O. Hayes of the Canadian Geological Survey, and summarised in "*Iron & Steel*" of August last (see page 176) wherein slight reference was made to the probably bacterial origin of these vast deposits.

The Mine & Smelter Supply Co. announces that Mr. W. A. Leddell has been appointed Manager of their Engineering Dept., with headquarters in Denver, Colo.

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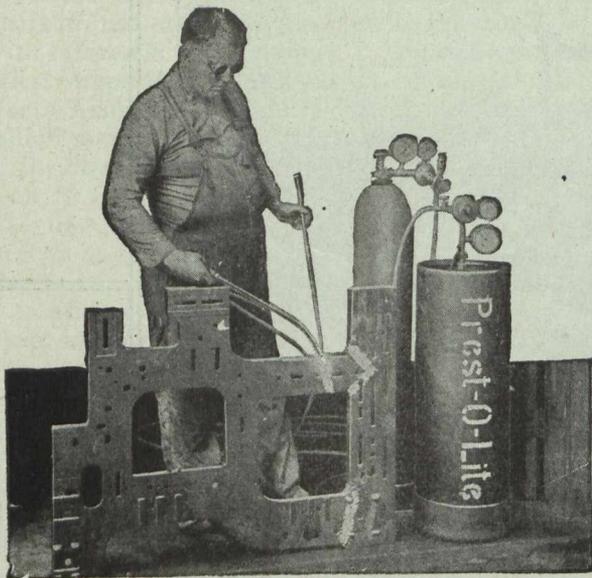
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B. C. COAL MAY EXTEND ITS MARKET

The announcement that the Canadian Manufacturers' Association is to investigate the possibility of developing sufficient coal in Canada to meet the requirements of Canadian industry has given rise to the suggestion that the time may not be far distant when the coal of Western Canada will find its way via the Panama Canal to the St. Lawrence River.

On a previous occasion when the subject was broached the statement was made in the East that British Columbia was too far away to be considered as a source of supply for manufacturing purposes in Ontario and Quebec. But with the changing conditions and the fact facing them that the United States may develop other markets for export besides Canada the whole question probably will be reconsidered and the possibility of this Province coming to the aid of eastern manufacturing concerns will be thoroughly investigated.

Arthur V. White, consulting engineer for the Commission of Conservation, in discussing this matter recently, said that the war had brought out the fact that nations which did not possess within their own borders coal and other fuel supplies from which to derive light heat and power have found themselves in desperate straits. Formerly Great Britain was a heavy exporter of coal especially to those European countries which either had no coal of their own or were only partly able to supply their requirements. But Britain is unable now to supply this demand. European countries which require coal have not only been exercising extreme efforts to produce fuel from all possible sources of their own but have been looking outside to ascertain what are the maximum deliveries that may be secured from those countries fortunate enough to have coal for export. The United States, it was said, is stepping to the forefront as an exporter and Great Britain, among other countries, is looking to the United States for assistance in this respect.

"It is manifest, therefore" Mr. White said "that Canada no longer occupies a favored position as being the easiest market for United States coal operators. It may be the easiest market insofar as transportation is concerned but there is the question of price. European countries have demonstrated the fact that they are practically ready to pay any price demanded because it is so evident to those in charge of affairs in these countries that they cannot go on, either economically or in many instances even maintain physical existence unless additional fuel is available.

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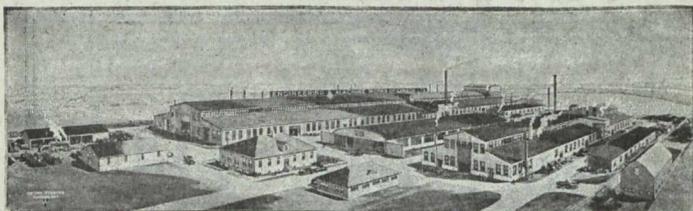
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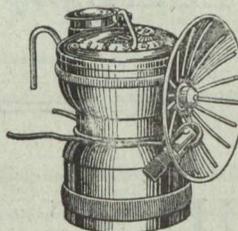
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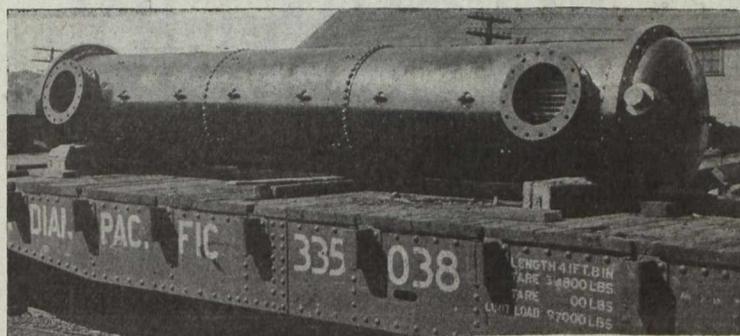
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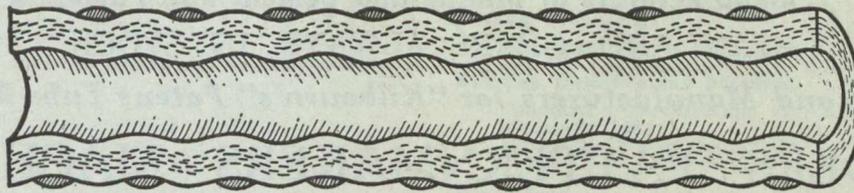
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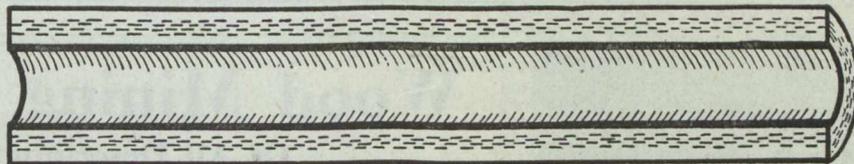
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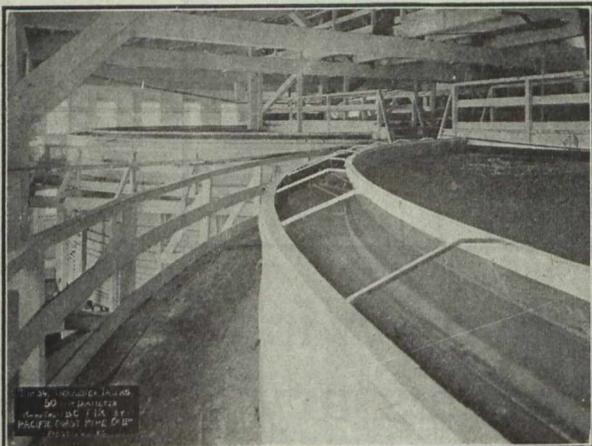
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Mine & Smelter Supply Co.
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Stanley, W. F. & Co., Ltd.

Assayers and Chemists:

Milton L. Hersey Co., Ltd.
Campbell & Deyell
Ledoux & Co.
Thos. Heys & Son
C. L. Constant Co.

Asbestos:

Everitt & Co.

Balls:

Canadian Foundries and Forgings, Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.
The Hardinge Conical Mill Co.

Ball Mills:

Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.

Balances—Heusser:

Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Rabbit Metals:

Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.

Ball Mill Feeders:

Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.

Ball Mill Linings:

Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.

Belting—Leather, Rubber and Cotton:

Canadian Fairbanks-Morse Co., Ltd.
Link Belt Co.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.

Belting:

R. T. Gilman & Co.

Belting (Transmission):

Goodyear Tire & Rubber Co.

Belting (Elevator):

Goodyear Tire & Rubber Co.

Belting (Conveyor):

Goodyear Tire & Rubber Co.

Blasting Batteries and Supplies:

Canadian Ingersoll-Rand Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co.
Canadian Explosives, Ltd.

Bluestone:

The Consolidated Mining & Smelting Co.

Blowers:

Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.

Boilers:

Northern Canada Supply Co.
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The John Inglis Company
Wabi Iron Works.

Blue Vitriol (Coniagas Red):

Canadian Fairbanks-Morse Co., Ltd.

Bortz and Carbons:

Diamond Drill Carbon Co.

Boxes, Cable Junction:

Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Brazilian Rough Diamonds:

Diamond Drill Carbon Co.

Brazilian Mica:

Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)

Hendrick Manufacturing Co.

Brazilian Ballas:

Diamond Drill Carbon Co.

Brazilian Rock Crystal:

Diamond Drill Carbon Co.

Brazilian Tourmalines:

Diamond Drill Carbon Co.

Brazilian Aquamarines:

Diamond Drill Carbon Co.

Bronze, Manganese, Perforated and Plain:

Hendrick Manufacturing Co.

Buckets:

Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Link-Belt Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Buckets, Elevator:

Hendrick Mfg. Co.

Cable—Aerial and Underground:

Northern Canada Supply Co.
Standard Underground Cable Co. of Canada, Ltd.

Cableways:

M. Beatty & Sons, Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.

Cages:

Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Ltd.
The Wabi Iron Works

THE CONIAGAS REDUCTION

COMPANY, LIMITED

St. Catharines - - - Ontario

Smelters and Refiners of Cobalt Ores

Manufacturers of

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Bar Silver—Electrically Refined

Arsenic—White and Metallic

Cobalt Oxide and Metal

Nickel, Oxide and Metal

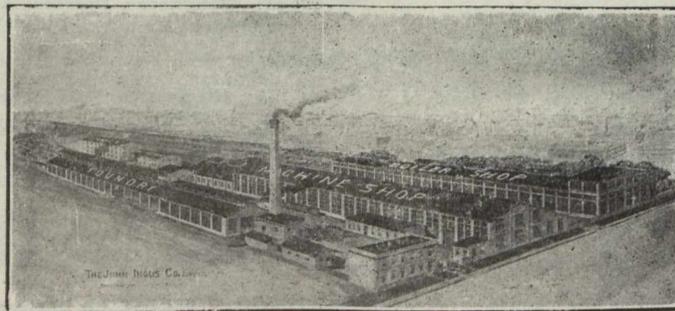
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Codes: Bedford McNeill,
A. B. C. 5th Edition

Bell Telephone, 603 St. Catharines

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Representatives in Eastern Canada:
Ottawa Representative:

JAS. W. PYKE & CO., LTD., 232 St. James Street, MONTREAL
J. W. ANDERSON, 7 Bank Street Chambers

Canadian Miners' Buying Directory.—(Continued)

Cables—Wire:

Standard Underground Cable Co. of Canada, Ltd.
Canada Wire & Cable Co.
Fraser & Chalmers of Canada, Ltd.
Northern Electric Co., Ltd.
R. T. Gilman & Co.

Cam Shafts:

Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.

Car Dumps:

Sullivan Machinery Co.
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.

Carbide of Calcium:

Canada Carbide Company, Ltd.

Cars:

Canadian Foundries and Forgings, Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
John J. Gartshore
MacKinnon Steel Co., Ltd.
The Electric Steel & Metals Co.
Northern Canada Supply Co.
Marsh Engineering Works
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Car Wheels and Axles:

Canadian Car Foundry Co., Ltd.
Burnett & Crampton
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore
Marsh Engineering Works, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Carriers (Gravity):

Jones & Glassco

Castings—Brass

The Canada Metal Co., Ltd.

Castings (Iron and Steel)

Burnett & Crampton
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Cement and Concrete Waterproofing:

Spielman Agencies, Regd.

Cement Machinery:

Northern Canada Supply Co.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Burnett & Crampton

Chains:

Jones & Glassco
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
Greening, B., Wire Co., Ltd.

Chain Drives:

Jones & Glassco

Chemical Apparatus:

Mine and Smelter Supply Co.

Chemists:

Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:

The Electric Steel & Metals Co.
Everett & Co.

Classifiers:

Mine and Smelter Supply Co.
Mussens, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Coal:

Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:

Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.

Coal Mining Explosives:

Canadian Explosives, Ltd.

Coal Mining Machinery:

Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.

March Engineering Works

Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery

Link-Belt Co.

Coal Pick Machines:

Sullivan Machinery Co.

Cobalt Oxide:

Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:

Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
The Mine & Smelter Supply Co.

Concrete Mixers:

Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
Mussens, Limited
R. T. Gilman & Co.

Condensers:

Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.

Concentrating Tables:

Mine & Smelter Co.
Delster Concentrator Co.
The Wabi Iron Works

Converters:

Northern Canada Supply Co.
MacGovern & Co., Inc.

Contractors' Supplies:

Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:

Hersey Milton Co., Ltd.

Conveyor Flights:

Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:

Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
Hendrick Mfg. Co.
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.
The Wabi Iron Works

Conical Mills:

Hardinge Conical Mill Co.

Copper:

The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.

Cranes:

Canadian Fairbanks-Morse Co., Ltd.
Link-Belt Co.
R. T. Gilman & Co.
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.

Crane Ropes:

Allan Whyte & Co.
Greening, B., Wire Co., Ltd.

Crucibles:

Canadian Fairbanks-Morse Co., Ltd.
Mine and Smelter Supply Co.

Crusher Balls:

Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull, Que.

Crude Oil Engines:

Swedish Steel & Importing Co., Ltd.

Crushers:

Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
The Electric Steel & Metals Co., Ltd.
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited
Mine and Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Surplus Machinery and Equipment Property of U.S. Government

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**Toronto District Salvage Board,
Ordnance Dept., U.S. Army**

39 Adelaide St., E.,

TORONTO, Ontario

Canadian Miners' Buying Directory.—(Continued)

Cyanide Plant Equipment:
The Dorr Co.**D. C. Units:**
MacGovern Co.**Derricks:**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
Marsh Engineering Works
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Mussens, Limited**Diamond Drill Contractors:**
Diamond Drill Contracting Co.
E. J. Longyear Company
Smith & Travers
Sullivan Machinery Co.**Diamond Tools:**
Diamond Drill Carbon Co.**Diamond Importers:**
Diamond Drill Carbon Co.**Digesters:**
Canadian Chicago Bridge and Iron Works**Dies:**
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.**Dredger Pins:**
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited**Dredging Machinery:**
Canadian Steel Foundries, Ltd.
M. Beatty & Sons
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.**Dredging Ropes:**
Allan, Whyte & Co.
Greening, B., Wire Co., Ltd.
R. T. Gilman & Co.**Drills, Air and Hammer:**
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Canadian Rock Drill Co.
The Mine & Smelter Supply Co.
Mussens, Limited**Drills—Core:**
Canadian Ingersoll-Rand Co., Ltd.
E. J. Longyear Company
Standard Diamond Drill Co.
Sullivan Machinery Co.**Drills—Diamond:**
Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company**Drill Steel—Mining:**
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.**Drill Steel Sharpeners:**
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Canadian Rock Drill Co.
The Wabi Iron Works**Drills—Electric:**
Canadian Fairbanks-Morse Co., Ltd.
Sullivan Machinery Co.
Northern Electric Co., Ltd.**Drills—High Speed and Carbon:**
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Hadfields, Limited**Dynamite:**
Canadian Explosives
Northern Canada Supply Co.**Dynamos:**
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Company**Ejectors:**
Canadian Fairbanks-Morse Co. Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.**Elevators:**
M. Beatty & Sons
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
The Wabi Iron Works**Engineering Instruments:**
C. L. Berger & Sons**Engines—Automatic:**
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.**Engines—Gas and Gasoline:**
Canadian Fairbanks-Morse Co., Ltd.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd.
Sullivan Machinery Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
The Mine & Smelter Supply Co.**Engines—Haulage:**
Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.**Engines—Marine:**
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Swedish Steel & Importing Co., Ltd.**Engines—Steam:**
Canadian Fairbanks-Morse Co., Ltd.
M. Beatty & Sons
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.**Engines—Stationery:**
Swedish Steel & Importing Co., Ltd.**Engineers:**
The Dorr Co.**Ferro-Alloys (all Classes):**
Everitt & Co.**Feed Water Heaters:**
MacGovern & Co.**Flashlights—Electric:**
Spielman Agencies, Regd.**Flood Lamps:**
Northern Electric Co., Ltd.**Flourspar:**
The Consolidated Mining & Smelting Co.
Everitt & Co.**Forges:**
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.**Forging:**
M. Beatty & Sons
Canadian Foundries and Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
Smart-Turner Machine Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.**Frogs:**
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore**Frequency Changers:**
MacGovern & Co., Inc.**Furnaces—Assay:**
Canadian Fairbanks-Morse Co., Ltd.
Lymans, Limited
Mine & Smelter Supply Co.**Fuse:**
Canadian Explosives
Northern Canada Supply Co.**Gears (Cast):**
Hull Iron & Steel Foundries, Ltd.
The Link-Belt Co.**Gears, Machine Cut:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works**Granulators:**
Hardinge Conical Mill Co.**Grinding Wheels:**
Canadian Fairbanks-Morse Co., Ltd.**Gold Refiners**
Goldsmith Bros.

Canadian Miners' Buying Directory.—(Continued)

- Gold Trays:**
Canada Chicago Bridge & Iron Works
- Hose (Air Drill):**
Goodyear Tire & Rubber Co.
- Hose (Fire):**
Goodyear Tire & Rubber Co.
- Hose (Packings)**
Goodyear Tire & Rubber Co.
- Hose (Suction):**
Goodyear Tire & Rubber Co.
- Hose (Steam):**
Goodyear Tire & Rubber Co.
- Hose (Water):**
Goodyear Tire & Rubber Co.
- Hammer Rock Drills:**
Mussens, Limited
The Mine & Smelter Supply Co.
- Hangers and Cable:**
Standard Underground Cable Co. of Canada, Ltd.
- High Speed Steel:**
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway, N.J.
- High Speed Steel Twist Drills:**
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam:**
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Jones & Glassco
M. Beatty & Sons
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Link-Belt Co.
- Hoisting Engines:**
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
M. Beatty & Sons
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.
- Hose:**
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co
- Hydraulic Machinery:**
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Industrial Chemists:**
Hersey, M. & Co., Ltd.
- Ingot Copper:**
Canada Metal Co., Ltd.
Hoyt Metal Co.
- Insulating Compounds:**
Standard Underground Cable Co. of Canada, Ltd.
- Inspection and Testing:**
Dominion Engineering & Inspection Co.
- Inspectors:**
Hersey, M. & Co., Ltd.
- Jacks:**
Canadian Fairbanks-Morse Co., Ltd.
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
R. T. Gilman & Co.
Mussens, Limited
- Jack Screws:**
Canadian Foundries and Forgings, Ltd.
- Laboratory Machinery:**
Mine & Smelter Supply Co.
- Lamps—Acetylene:**
Dewar Manufacturing Co., Inc.
- Lamps—Carbide:**
Dewar Manufacturing Co., Inc.
- Lamps—Miners:**
Canada Carbide Company, Limited
Canadian Fairbanks-Morse Co., Ltd.
Dewar Manufacturing Co., Inc.
Northern Electric Co., Ltd.
Mussens, Limited
- Lamps:**
Dewar Manufacturing Co., Inc.
- Lanterns—Electric:**
Spielman Agencies, Regd.
- Lead (Pig):**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Levels:**
C. L. Berger & Sons
- Locomotives (Steam, Compressed Air and Storage Steam):**
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
- Link Belt**
Canadian Fairbanks-Morse Co. Ltd.
Northern Canada Supply Co.
Jones & Glassco
- Machinists:**
Burnett & Crampton
- Machinery—Repair Shop:**
Canadian Fairbanks-Morse Co., Ltd.
- Machine Shop Supplies:**
Canadian Fairbanks-Morse Co., Ltd.
- Magnesium Metal:**
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.
- Manganese Steel:**
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
- Metal Marking Machinery:**
Canadian Fairbanks-Morse Co., Ltd.
- Metal Merchants:**
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canada
Canada Metal Co.
C. L. Constant Co.
Everitt & Co
- Metallurgical Engineers:**
The Dorr Co.
- Metallurgical Machinery:**
The Dorr Co.
- Metal Work, Heavy Plates:**
Canada Chicago Bridge & Iron Works
- Mica:**
Everitt & Co.
Diamond Drill Carbon Co.
- Mining Engineers:**
Hersey, M. Co., Ltd.
- Mining Drill Steel:**
H. A. Drury Co., Ltd.
International High Speed Steel Co., Rockaway, N.J.
- Mining Requisites:**
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
- Mining Ropes:**
Dominion Wire Rope Co., Ltd.
- Mine Surveying Instruments:**
C. L. Berger & Sons
- Molybdenite:**
Everitt & Co.
- Monel Metal:**
International Nickel Co.
- Motors:**
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
MacGovern & Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Motor Generator Sets—A.C. and D.C.
MacGovern & Co.

Nails:
Canada Metal Co.

Nickel:
International Nickel Co.
Coniagas Reduction Co.
The Mond Nickel Co., Ltd.

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

Nickel Sheets:
The Mond Nickel Co., Ltd.

Nickel Wire:
The Mond Nickel Co., Ltd.

Oil Analysts:
Constant, C. L. Co.

Ore Sacks:
Northern Canada Supply Co.

Ore Testing Works:
Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
Campbell & Deyell
Hoyt Metal Co.

Ores and Metals—Buyers and Sellers of:
C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.

Packing:
Canadian Fairbanks-Morse Co., Ltd.

Paints—Special:
Spielman Agencies, Regd.

Perforated Metals:
Northern Canada Supply Co.
Hendrick Mfg. Co.
Greening, B., Wire Co.

Pig Tin:
Canada Metal Co., Ltd.
Hoyt Metal Co.

Pig Lead:
Canada Metal Co., Ltd.
Hoyt Metal Co.
Pennsylvania Manufacturing Co.

Pipes:
Canadian Fairbanks-Morse Co., Ltd.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
R. T. Gilman & Co.

Pipe Fittings:
Canadian Fairbanks-Morse Co., Ltd.

Pipe—Wood Stave:
Pacific Coast Pipe Co.
Mine & Smelter Supply Co.

Piston Rock Drills:
Mussens, Limited
Mine & Smelter Supply Co.

Plate Works:
John Inglis Co., Ltd.
Hendrick Mfg. Co.
The Wabi Iron Works
MacKinnon Steel Co., Ltd.

Platinum Refiners:
Goldsmith Bros.

Pneumatic Tools:
Canadian Ingersoll-Rand Co., Ltd.
Jones & Glassco
R. T. Gilman & Co.

Prospecting Mills and Machinery:
The Electric Steel & Metals Co.
E. J. Longyear Company
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Pneumatic:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Sullivan Machinery Co.

Pumps—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Turbine:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Vacuum:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
The Wabi Iron Works

Pumps—Valves:
Canadian Fairbanks-Morse Co., Ltd.

Pulleys, Shaftings and Hangings:
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
The Wabi Iron Works

Pulverizers—Laboratory:
Mine & Smelter Supply Co.
The Wabi Iron Works
Hardinge Conical Mill Co.

Pumps—Boiler Feed:
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Mine & Smelter Supply Co.

Pumps—Centrifugal:
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Smart-Turner Machine Co.
M. Beatty & Sons
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Diaphragm
The Dorr Company

Pumps—Electric
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Smart-Turner Machine Co.

Pumps—Sand and Slime:
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mine & Smelter Supply Co.
The Electric Steel & Metals Co.
The Wabi Iron Works
Smart-Turner Machine Co.

Quarrying Machinery:
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields, Limited
Mussens, Limited
R. T. Gilman Co.

Rails:
Hadfields, Limited
John J. Gartshore
R. T. Gilman & Co.
Mussens, Limited

Railway Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

Roofing:
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.

Rope—Manilla:
Mussens, Limited

Rope—Manilla and Jute:
Jones & Glassco
Northern Canada Supply Co.
Allan, Whyte & Co.

Canadian Miners' Buying Directory.—(Continued)

- Rope—Wire:**
Allan, Whyte & Co.
Dominion Wire Rope Co., Ltd.
Greening, B. Wire Co.
Northern Canada Supply Co.
Mussens, Limited
- Rolls—Crushing**
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hadfields, Limited
The Electric Steel & Metals Co.
Mussens, Limited
The Wabi Iron Works
- Samplers:**
Fraser & Chalmers of Canada, Ltd.
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heyes & Son
Mine & Smelter Supply Co.
Mussens, Limited
- Scales—(all kinds):**
Canadian Fairbanks-Morse Co., Ltd.
- Screens:**
Greening, B. Wire Co.
Hendrick Mfg. Co.
Mine & Smelter Supply Co.
Link-Belt Co.
- Screens—Cross Patent Flanged Lip:**
Hendrick Mfg. Co.
- Screens—Perforated Metal:**
Hendrick Mfg. Co.
- Screens—Shaking:**
Hendrick Mfg. Co.
- Screens—Revolving:**
Hendrick Mfg. Co.
- Scheelite:**
Everitt & Co.
- Separators:**
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Mine & Smelter Supply Co.
- Shaft Contractors:**
Hendrick Mfg. Co.
- Sheet Metal Work:**
Hendrick Mfg. Co.
- Sheets—Genuine Manganese Bronze:**
Hendrick Mfg. Co.
- Shoes and Dies:**
Canadian Foundries and Forgings, Ltd.
H. A. Drury Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
- Shovels—Steam:**
Canadian Foundries and Forgings, Ltd.
M. Beatty & Sons
R. T. Gilman & Co.
- Silene:**
Coniagas Reduction Co.
- Saline Refiners:**
Goldsmith Bros.
- Smelters:**
Goldsmith Bros.
- Sledges:**
Canada Foundries & Forgings, Ltd.
- Smoke Stacks:**
Hendrick Mfg. Co.
MacKinnon Steel Co., Ltd.
Marsh Engineering Works
The Wabi Iron Works
- Special Machinery:**
John Inglis Co., Ltd.
- Spelter:**
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
- Sprockets:**
Link-Belt Co.
- Spring Coil and Clips Electric:**
Canadian Steel Foundries, Ltd.
- Steel Barrels:**
Smart-Turner Machine Co.
Fraser & Chalmers of Canada, Ltd.
- Stamp Forgings:**
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
- Steel Castings:**
Canadian Brakeshoe Co., Ltd.
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
The Wabi Iron Works
- Steel Drills:**
Canadian Fairbanks-Morse Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
The Electric Steel & Metals Co.
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.
- Steel Drums:**
Smart-Turner Machine Co.
- Steel—Tool:**
Canadian Fairbanks-Morse Co., Ltd.
H. A. Drury Co., Ltd.
N. S. Steel & Coal Co.
Hadfields, Limited
Swedish Steel & Importing Co., Ltd.
- Structural Steel Work (Light):**
Hendrick Mfg. Co.
- Stone Breakers:**
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works
- Sulphate of Copper:**
The Mond Nickel Co., Ltd.
Coniagas Reduction Co.
- Sulphate of Nickel:**
The Mond Nickel Co., Ltd.
- Surveying Instruments:**
C. L. Berger
- Switches and Switch Stand:**
Canadian Steel Foundries, Ltd.
Mussens, Limited.
- Switches and Turntables:**
John J. Gartshore
- Tables—Concentrating:**
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
- Tanks:**
R. T. Gilman & Co.
- Tanks—Acid:**
Canadian Chicago Bridge & Iron Works
- Tanks (Wooden):**
Canadian Fairbanks-Morse Co., Ltd.
Gould, Shapley & Muir Co., Ltd.
Pacific Coast Pipe Co., Ltd.
Mine & Smelter Supply Co.
The Wabi Iron Works
- Tanks—Cyanide, Etc.:**
Hendrick Mfg. Co.
Pacific Coast Pipe Co.
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
Mine & Smelter Supply Co.
The Wabi Iron Works
- Tanks—Steel:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Chicago Bridge & Iron Works
Marsh Engineering Works
MacKinnon Steel Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Hendrick Mfg. Co.
The Wabi Iron Works
- Tanks—Oil Storage:**
Canadian Chicago Bridge & Iron Works
- Tanks (water) and Steel Towers:**
Canadian Fairbanks-Morse Co., Ltd.
Canadian Chicago Bridge & Iron Works
Gould, Shapley & Muir Co., Ltd.
MacKinnon Steel Co.
Mine & Smelter Supply Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Tramway Points and Crossings:
Canadian Steel Foundries, Ltd.
Hadfields, Limited

Transits:
C. L. Berger & Sons

Transformers:
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
Northern Electric Co., Ltd.

Transmission Apparances:
Jones & Glasco

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Hendrick Manufacturing Co.

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Canadian Fairbanks-Morse Co., Ltd.

Trucks—Hand:
Canadian Fairbanks-Morse Co., Ltd.

Trucks:
Canadian Fairbanks-Morse Co., Ltd.

Tubs:
Hadfields, Limited

Tube Mills:
The Electric Steel & Metals Co.
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.

Tube Mill Balls:
Canada Foundries & Forgings, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.

Tube Mill Liners:
Burnett & Crampton
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.

Turbines—Water Wheel:
MacGovern & Co.

Turbines—Steam:
Fraser & Chalmers of Canada, Ltd.
MacGovern & Co.

Twincones:
Canada Foundries & Forgings, Ltd.

Uranium:
Everitt & Co.

Welding—Rod and Flux:
Prest-O-Lite Co. of Canada, Ltd.
Imperial Brass Mfg. Co.

Welding and Cutting—Oxy-Acetylene:
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Canadian Fairbanks-Morse Co., Ltd.
Imperial Brass Mfg. Co.

Wheels and Axles:
Canadian Steel Foundries, Ltd.
Hadfields, Limited
The Electric Steel & Metals Co.
The Wabi Iron Works

Winding Engines—Steam and Electric:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Wire:
Canada Wire & Cable Co., Ltd.
Greening, B. Wire Co.

Wire Rope:
R. T. Gilman & Co.
Dominion Wire Rope Co., Ltd.

Wire Cloth:
Northern Canada Supply Co.
Greening, B. Wire Co.

Wire (Bars and Insulated):
Standard Underground Cable Co. of Canada, Ltd.
Northern Electric Co., Ltd.

Wolfram Ore:
Everitt & Co.

Woodworking Machinery:
Canadian Fairbanks-Morse Co., Ltd.

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Zinc:
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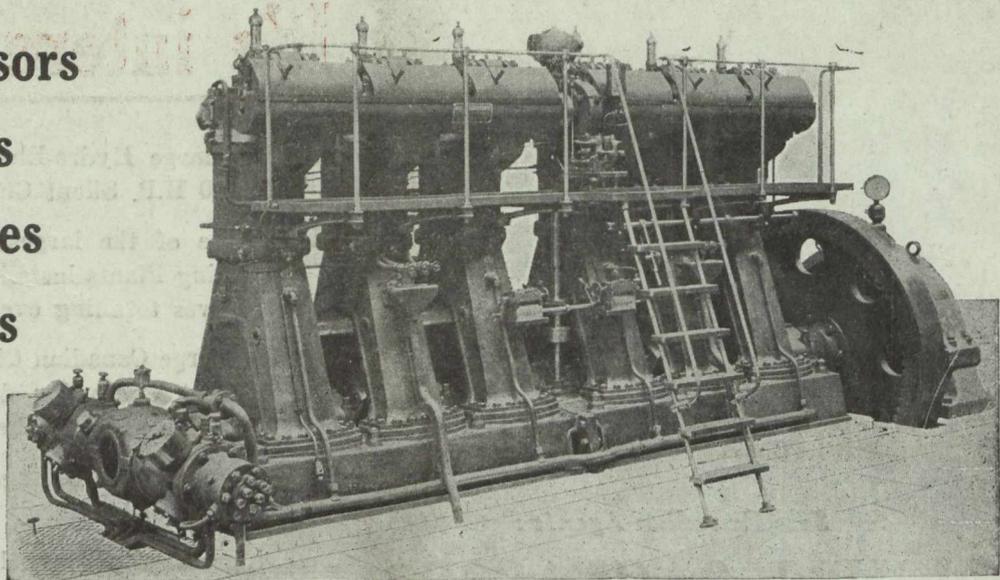
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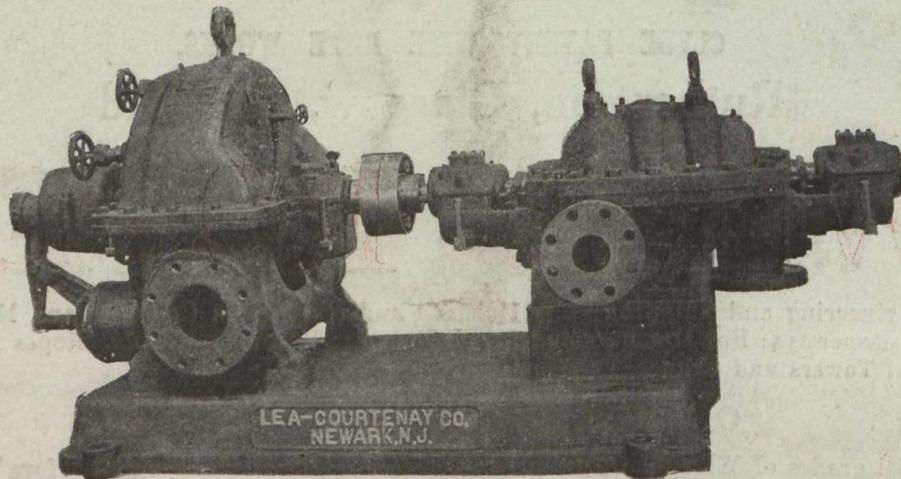


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