CANADIAN MINING JOURNAL

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HAMMER YOUR DRILL BITS

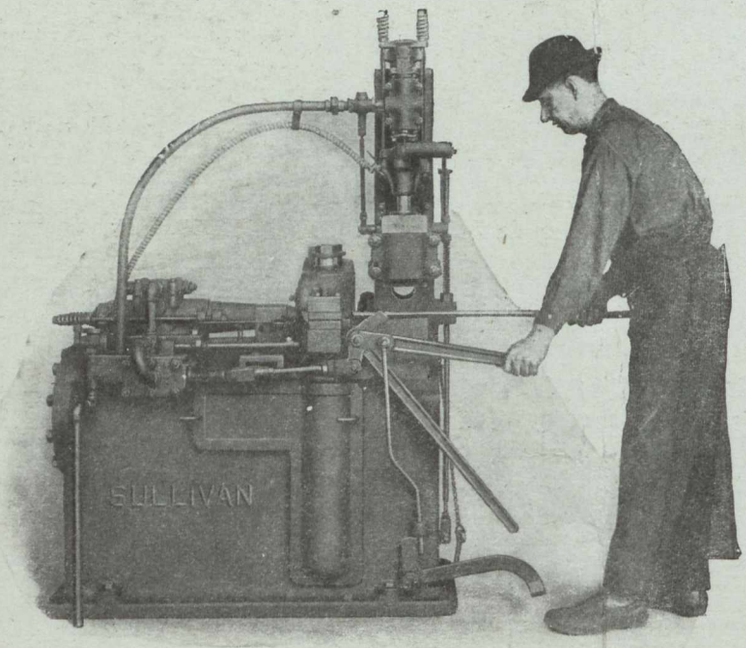

FIG. 1.

Put More Footage in Your Steel

Do not handicap your drills or delay your runners by using improperly formed or poorly sharpened steel.

Train your blacksmith to put as much footage as possible into each steel he sends underground.

"Hammer your drill bits" is a good watchword.

The more you hammer steel, the more "life," strength, cutting speed and resistance to wear and breakage you give it.

Watch a Sullivan Sharpener at work. See how the smith hammers out the bit, just as he would on an anvil.

He alternates between the horizontal, upsetting hammer dolly (Fig. 1) and the vertical, swaging hammer (Fig. 2), so that the bit is formed gradually, avoiding strains on the metal, yet quickly (new bits are made from bar stock in a minute or less).

Don't take chances with your steel—High temperatures with the attendant risk of "burning" the steel, are unnecessary in the Sullivan all-hammer method of sharpening; and "burned" steel means a crumbling edge and rapid wear of gauge.

A little additional time and care in the blacksmith shop will pay large returns in time and labor saved underground, and in additional footage gained per length of steel.

The Sullivan All-Hammer Sharpener does it

Ask for Bulletin 672-C.

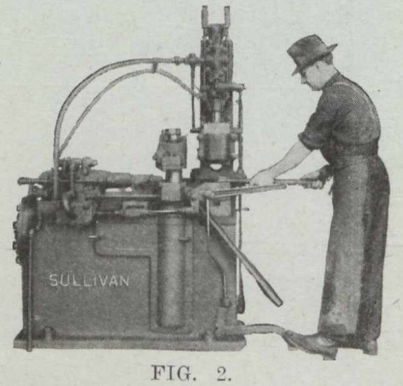

FIG. 2.

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PROVINCE OF ONTARIO

DEPARTMENT OF LANDS FORESTS & MINES

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HON. H. MILLS, Minister of Mines.

Ontario's Mining Lands

Ontario, with its 407,262 square miles, contains many millions of acres in which the geological formations are favorable for the occurrence of minerals, 70 per cent of the area being underlain by rocks of pre-Cambrian age. The phenomenally rich silver mines of Cobalt occur in these rocks; so also do the far-famed nickel-copper deposits of Sudbury, the gold of Porcupine and Kirkland Lake, and the iron ore of Magpie and Moose Mountain Mines.

Practically all economic minerals (with the exception of coal and tin) are found in Ontario:—actinolite, apatite, arsenic, asbestos, cobalt, corundum, feldspar, fluorspar, graphite, gypsum, iron pyrites, mica, molybdenite, natural gas, palladium, petroleum, platinum, quartz, salt and tale. This Province has the largest deposits on the continent of talc, feldspar, mica and graphite.

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

Ontario in 1918 produced 45 per cent. of the total mineral output of Canada. Returns made to the Ontario Bureau of Mines show the output of the mines and metallurgical works of the Province for the year 1918 to be worth $80,308,972 of which the metallic production was $66,178,059.

Dividends and bonuses paid to the end of 1918 amounted to $13,359,210 for gold mining companies, and $74,810,521 for silver mining companies, or a total of $88,169,733.

The prospector can go almost anywhere in the mineral regions in his canoe: the climate is invigorating and healthy, and there is plenty of wood and good water. Hydro-electric power is available in many parts of the Province, and many undeveloped water-powers remain to be harnessed. A miner's license costs $5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 day's assessment work on a claim, patent may be obtained from the Crown on payment of $2.50 or $3.00 per acre, depending on loca-tion in surveyed or unsurveyed territory.

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A Weekly Journal devoted to the Science and practice of the Mining, Metallurgical and Allied Industries with an Up-to-date Review of existing conditions.

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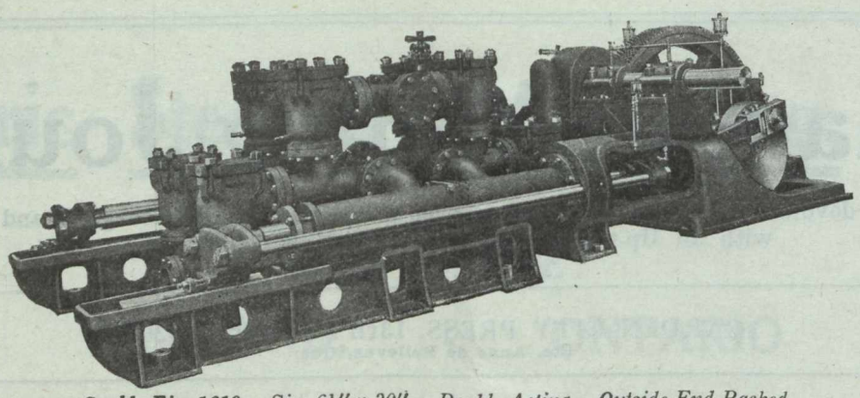

Gould Fig. 1612 Size 6½" x 20". Double-Acting. Outside End Packed Horizontal Duplex Plunger Pump. For High Pressure Service

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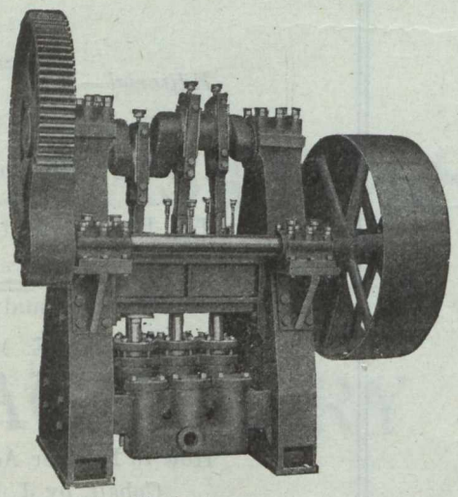
Capacities ranging from 155 gallons per minute at 1500 pounds pressure to 705 gallons per minute at 335 lbs. pressure. Complete data and description in bulletin 115. Copy on request.

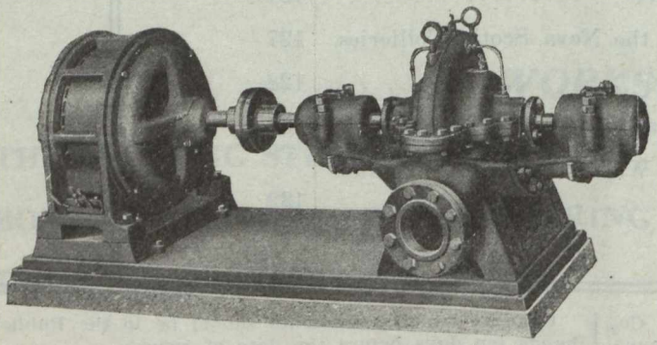
FIG. 1628. For general water supply, Municipal Waterworks, Mine Pumping, etc., where the total net head does not exceed 1305 feet. Made in six sizes, with capacities ranging from 9,360 gallons to 37,500 gallons per hour and for 140 to 565 pounds Working Pressure.

The Frame consists of two standards carrying the main bearings. Crank shaft is steel, accurately machined and the bearings are phorsphor bronze. The gearing, Cylinders and valve boxes are charcoal iron. Crossheads 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 excells 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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:-: EDITORIAL :-:

The Price of Silver

The decision of the Indian Government to fix rupee exchange at ten to the sovereign in place of the "gold exchange" rate of fifteen to the sovereign established in 1898 is interpreted by Mr. Moreton Frewen to mean that silver cannot fall below $1.29 per oz. because of the preponderating influence of the Indian price of silver upon the world price of the metal.

This action of the Indian Government adds another reason to the many that are causing the present unprecedented persistence of high quotations for silver, and it will prove to be one of the most important factors from the viewpoint of Canadian silver producers because it promises a virtual stabilization of silver at a value of approximately $1.30 Canadian money. The additional revenue which Cobalt shippers of silver are obtaining from payment in New York funds is, it is to be hoped for our general national good, a passing phase, but there is every reason to expect that a substantial premium on New York funds—which means of course a serious discount on Canadian funds —will persist throughout 1920 at least, and this will ensure good revenues to producing gold and silver mines for some time to come.

From the national standpoint there is today in favour of gold and silver production not only the promise of satisfactory financial reward, but there is the compulsion of necessity. During the war period, it was a moot question whether precious metal mining should be prosecuted with full vigor or not, and in the critical days of the war, our leaders may be forgiven if they had not the time to devote to thinking out the infinite complexities of currencies, and saw more clearly the necessity for men and guns. Today, however, the demand for bullion is insistent. Unfortunately, the effect of the war was to reduce the capacity for mines for output, and this is true of gold and silver mines, as it is also true of iron-ore and coal mines.

If the new production of precious metals will help our national credit, and the credit of Britain, as the most competent economists tell us it will, then every possible encouragement should be given by provincial and federal governments to assist production. Labour shortage is one long existing reason for restricted gold output in the Northern Ontario camps. If the Federal Government were to detail a competent person to study the labour situation it might be possible to find some means of supplying the existing deficiency of workmen.

It seems to us that Canada is singularly fortunate in having within her borders at this time natural resources of gold and silver, and it would also seem the obvious part of wisdom to augment production by every possible expedient. The quickest and most tangible results can be obtained by operating the larger and most dependable mines to the limit of their capacity, which means, in short, supplying them with enough workmen.

The Politics of the Technical Man

The Secretary of the Association of Technical Engineers in Great Britain in stating that the technical men are unlikely to make common political cause with the so-called "labour" party, expresses probably a fairly general attitude of technical men. Under this head are included a wide variety of workers, and the term is wide enough to cover all persons who by study and application of brain and hand have equipped themselves with a special knowledge of one branch of human endeavour. Most of these men have at some time felt themselves in revulsion against that form of "labour" propaganda which arrogates all the so-called dignity of labour to the man who works with his muscles. If the British labour leaders have felt it necessary to suggest an alliance with the technical men it reveals a tardy, if not a grudging recognition of the usefulness of the part played by the white-collared and black-coated person to whom in the past there has so often been allotted the thankless triple role of long hours of hard work, meagre remuneration, and denial of the "dignity" of labour.

If those who govern and direct the stabilizing influences of modern civilization, which are variously known as governments, capital and industry, have retained the backing of the technical men, it is solely because of the inherent common sense and the decent loyalty of these men, for they are the men who, in person and vicariously suffered the brunt of the hurt

occasioned by the war, and they are today shouldering the burden of reconstruction.

The technical men are unlikely to organize, except in associations for the study of their respective arts, and they are likely to remain inarticulate in political life, for they are primarily thinking men, and will wish to choose their political affliations by the free use of their brains and consciences.

There is however the danger that technical men, in both their lower and higher grades, will be impelled to organize for self-protection unless fitting recognition of their difficulties and aspirations are made. Indications of this tendency are not lacking in Canada, and while one young association is making "service" the keynote of its policies, it is useless to hide the fact that the genesis of this association, and others in other countries, lay in the necessity for technical men either to organize for self-protection, or suffer piecemeal disintegration of all their hopes and ambitions in life.

The trained technical man, with his analytic mind, and his desire to connect cause and effect in all that concerns mankind, is one of the first to detect the fallacies of such forms of group government as have recently become fashionable, and he is the last man in the world to support political organizations which have frankly announced economic aims for any one industrial group. He represents the commonsense of mankind, the saving sanity of decent men, and his vote, in the long run, will decide national policies. There are moreover, in the ranks of "labour" itself many men of this type, numbering amongst themselves the fathers or the putable fathers of men of the technical grade of workers.

"They do not preach that their only duties are spreading dissension and going on strike.
They do not teach that its square and decent to scamp their work as they damn well like.
They aim to uphold a mind of fairness, not class suspicion and social strife.
They too must think of making a living—but they sometimes think of making a life."

But—if the living is denied to men, then the herd instinct will surely show itself.

INDEX TO VOLUME 40.

Bound in with this issue will be found the Index to the issues of the "Journal" during 1919, being Volume No. 40.

The United States Senate has amended the Zinc Ores Bill to provide for an increase in the rate of cobalt from ten cents to twenty-five cents per pound.

THE FINANCING OF MINING ENTERPRISES.

By R. E. HORE.

Mr. Thomas Mulvey K. C., Under Secretary of State for Canada in a recent discussion on "blue sky" legislation made some statements that should prove interesting to those who wish to see the public take part in mining ventures. Mr. Mulvey has found that in many cases blue sky legislation has failed to prevent the licensing of certain companies which operated to defraud the public. He considers that the British law, the underlying principle of which is publicity is preferable.

There was last year prepared for the Ontario Legislature a bill of the "blue sky" class. Drafts of this bill were given some publicity and there was much criticism of it because it appeared that legitimate business was to be made more difficult. There was general approval of the endeavor of the framers of the bill to provide protection for the investor against fraud, but disapproval of the effect the bill would have on honest enterprise. Mr. Mulvey's opinion that blue sky legislation is not even successful in preventing fraud is worth noting in this connection. The bill was withdrawn at the last session not because it was not expected to ensure protection for the investor, but because its provision would have done more harm to industries than the framers intended. In aiming to make business safe, legislation was proposed that would make some desirable business impossible. Mr. Mulvey is evidently of the opinion that it would not even provide the safety that its proposers claimed for it.

For the successful development of a mine much work and money is necessary. The first essential is an ore deposit. There are many known undeveloped ore deposits and there are doubtless very many unknown. To find the unknown ones and to develop the known ones much money must be expended. When preliminary development gives satisfactory results. and profitable operation appears to be possible, very large sums of money are required for the necessary mining equipment and further development work.

If our material deposits are to be developed, we must first find where they are. This is the work of the prospector, and on his efforts the expansion of the mining industry very largely depends. The prospector has an arduous task and usually very little money. He knows that good ore deposits are not common and that he may search months and years without making an important discovery. Whether he will succeed or fail depends partly on his enterprise and largely on fortune. He lives in hope, facing hardships without certainty of reward. If, finally, he does find an ore deposit that looks promising, he cannot himself mine the ore and put the metal into merchantable form, for that requires money far beyond his means.

The ordinary prospector has little money and yet must be prepared to spend his time at work for which no one pays him wages. In most cases therefore he must be financed by some other person. Often he accepts a "grubstake", undertaking to share his interest in any discoveries made during a certain period with the person supplying his living and transportation expenses. Commonly the money, a comparatively small amount, comes from a personal friend of the prospector who has himself a modest but more certain income.

When a prospector makes what seems to him to be an important discovery, he and his partner find many difficulties confronting them. To obtain any reward from the success of the search they must find money to develop the deposit or sell it to some other person. In either case they must first give the discovery some publicity and induce others to examine it. Then follow negotiations and the claim or an interest in it is disposed of. The prospector's reward depends of course not only on the merits of the property but on his ability as a salesman. In a few cases the discoveries are so valuable that the prospector's fortune is made; but the ordinary ore deposits are, when first discovered, of such doubtful value that very large sums are not often obtainable for them. In most cases the sum realized for discoveries is a modest one which permits the prospector to take a holiday and then to return to his work in the wilds, without the need this time of financial assstance. If fortune smiles on him he makes another find before he has spent his "stake".

The purchaser of the prospector's claim may be one who shares the hardships of pioneer life and who intends himself to dovelop work on the property or to personally supervise the work. Some supply merely the necessary money and delegate the work to others. In either case the success of the venture is very uncertain. Frequently the development work proves unsatisfactory and the time and money spent on the property yield no return. In some cases however results are considered satisfactory and then heavier expenditures are undertaken.

It is often at this stage in the history of a mining property that an appeal is made to the public to invest money to provide mining equipment and do development work. In view of the fact that a large amount of money is needed to bring the ordinary property to the producing stage, public stock offerings are not only necessary but desirable otherwise we would be dependent on a few wealthy men or companies for the expansion of the industry and the average man would be unable to take part in the venture. The uncertainty attaching to mining ventures is of itself a good reason why the risks should be shared by many.

In the interests of the mining industry, which must have more money from the public for its development, the transaction between mining companies and the public or between mining brokers and the public must be above reproach. The promoters of a mining company are unable to state with any degree of accuracy what the capitalization should be. The fixing of some figure is however, required, and some large round number like $1,000,000 is commonly chosen. The capitalization therefore bears no necessarily fixed relation to the value of the property. It would prevent some misunderstanding of the par value of shares was not fixed, but the common practise is to require this. The proper capitalization on an earning power basis obviously cannot be determined for a company whose mining property is in the prospect stage.

In some cases the treasury stock is sold in large blocks to brokers who in turn sell to the public. Some companies sell their own to the public in small lots directly or through agents working on a commission basis. Much might be said in favor of either method. The latter method involves much greater head office expenditures and a selling staff, but allows the company to sell stock at a higher price than might be obtainable for large blocks. The operator might have had little experience in selling shares, however, and then he naturally turns to brokers, who make it a business.

The development of mineral resources in Canada, as in other countries, requires large sums of money. Those who supply the money must have confidence that their money will be wisely spent, for there are risks enough in the venture in any case. To gain the confidence of the public every endeavor should be made to inform the shareholders of the progress of the work. Publicity is desirable and should be insisted upon by shareholders.

THE ENGINEER AND THE PUBLIC.

In an address to the Engineers' Club of Philadelphia, on January 20th, George Otis Smith, Director of the U. S. Geological Survey dealt with engineering as prosperity insurance. He pointed out that the engineer is an insurance agent of the first magnitude even if he does not talk like one. "Conservation, whether of material or of energy, is engineering, and the policy which a few years ago began to attract public attention is really as old as engineering. The truth is that we needed thrift on a national scale before we began to realize it, and conservation or national thrift therefore became a popular issue. The task is growing larger and more critical, however, as the years pass, and it places a large civic duty upon the engineer. In his role of insurance agent the engineer has not only to plan but to execute, yet in putting his plans into effect he must depend upon popular support. The public must be educated in its use of resources, and the engineer must therefore also function as a teacher."... "No type of citizen, is better fitted to tackle the civic problems of today than the engineer. The large questions before the people are economic questions, and engineering is mainly applied to life in an economic way."

In urging American engineers to take a prominent part in public affairs, Mr. Smith appeals to their interest in the general welfare of their country. He believes that it is in the power of engineers to be of greater service to the community by assuming more of leadership in public opinion so that raw materials and energy will be used to greater advantage. It is not enough to know what should be done. The general welfare is not promoted by secretiveness and exclusiveness. The engineer has duties in addition to those which he owes to his employers.

There has been during the past few years much discussion among Canadian engineers along the lines of Mr. Smith's address. The engineer's potential power for public service is well recognized. Possibly he might learn something from other insurance agents. Mr. Smith says he does not talk like one

R.E.H.

The anunal meeting of the Mining Society of Nova Scotia is expected to be held in Glace Bay on May 4th and 5th.

Nickel Ore Mining In Sudbury District

ONTARIO, CANADA

By W. L. WOTHERSPOON.

The Geological Survey reported finding Nickel in the Sudbury District as early as 1853, up to which this section of the country was little seen by the white man, with the exception of the officers of the Hudson Bay Company and the Geological Survey, whose travels were confined more to the immediate vicinity of the lakes and rivers, and little was known of the minerals of the district.

The country, although broken by rocky ridges, was well wooded but extensive forest fires raged throughout the district in the thirties and forties, destroying heavy timbers and leaving vast tracks of dead pine standing like grim sentinels, with little or no undergrowth.

Following these fires, second growth timber sprang up, but similar fires raged from time to time resulting in the rocks being exposed to the action of the weather, which soon attacked the ore where exposed and converted it into gossan.

The presence of mineral was first shown during the construction of the Canadian Pacific Railway in a cutting on the main line about four miles from Sudbury, (now Murray Mine), and later in a cutting on the Soo branch of the C. P. R. about twenty-five miles south-west from Sudbury, now Worthington Mine.

In the summer of 1885, New York interests had a shaft sunk in one of these ore exposures, and a small quantity of copper-ore was obtained, but in quantities not considered for a paying mine and the property was abandoned.

The prospecting in the district dates from 1884, among the pioneers being Thomas Frood, R. McConnell, Henry Ranger and James Stobie. Mr. Frood discovered some promising looking properties in the spring of 1885, and with other associates began development work on a field in the Township of Snider, known as the McAllister Mine. The prospected were reported encouraging for a paying copper mine, and in 1886 this property was visited by Lady MacDonald, in company with a party of Montreal capitalists, among whom were W. C. Van Horne, Sir George Stevens, and Sir Chas. Tupper. In honour of the visit the name of the mine was changed to the Lady MacDonald Mine, afterwards McArthur No. 5. Prospecting was also done at other points, the most notable being by Thomas Frood and associates at McKim, and by R. McConnell in the Township of Snider.

Until the end of 1885 only prospecting had been done, and copper was the only metal of commercial value known to exist in the district. During 1885 Mr. S. J. Ritchie of Akron, Ohio, visited the district and took over several properties, and during the winter of 1885-86 the Canadian Copper Company was formed to operate these properties, among them being the McAllister, now Lady McDonald Mine, the McConnell Mine later known as the Copper Cliff Mine and part of the Frood or No. 3 Mine.

The Evans Mine was then discovered and was purchased by the Canadian Copper Company in September 1886. The Stobie Mine was also discovered, the Canadian Copper Company acquiring same in July 1886, when a railway was built from Sudbury to the Mine, a distance of four miles.

The Canadian Copper Company began prospecting and developing several properties about this time, work being begun on the McConnell or Copper Cliff mine. An open cut was made which exposed ore which consisted of pyrrhotite and chalcopyrite, but the pyrrhotite was considered valueless the presence of nickel not being suspected.

Several hundred tons of picked copper ore were shipped during 1886 to New York, upon the treatment of which the presence of nickel in the ore was discovered.

Prospecting was continued at the McAllister and at the McConnell mines, and a vertical shaft was sunk on the Evans Mine.

R. McConnell then discovered mineral in Denison Township, and sunk several test pits and stripped the surface, exposing ore; this property later being known as the Victoria mines, now owned by the Mond Nickel Company.

In October 1886 the southern half of lot 7, Con. 6, McKim, (part of Frood or No. 3 Mine), was purchased by the Canadian Copper Company from Thomas Frood, P. C. Campbell and Robert Tough for the highest price reported to have been paid up to this time for any mining property in the district.

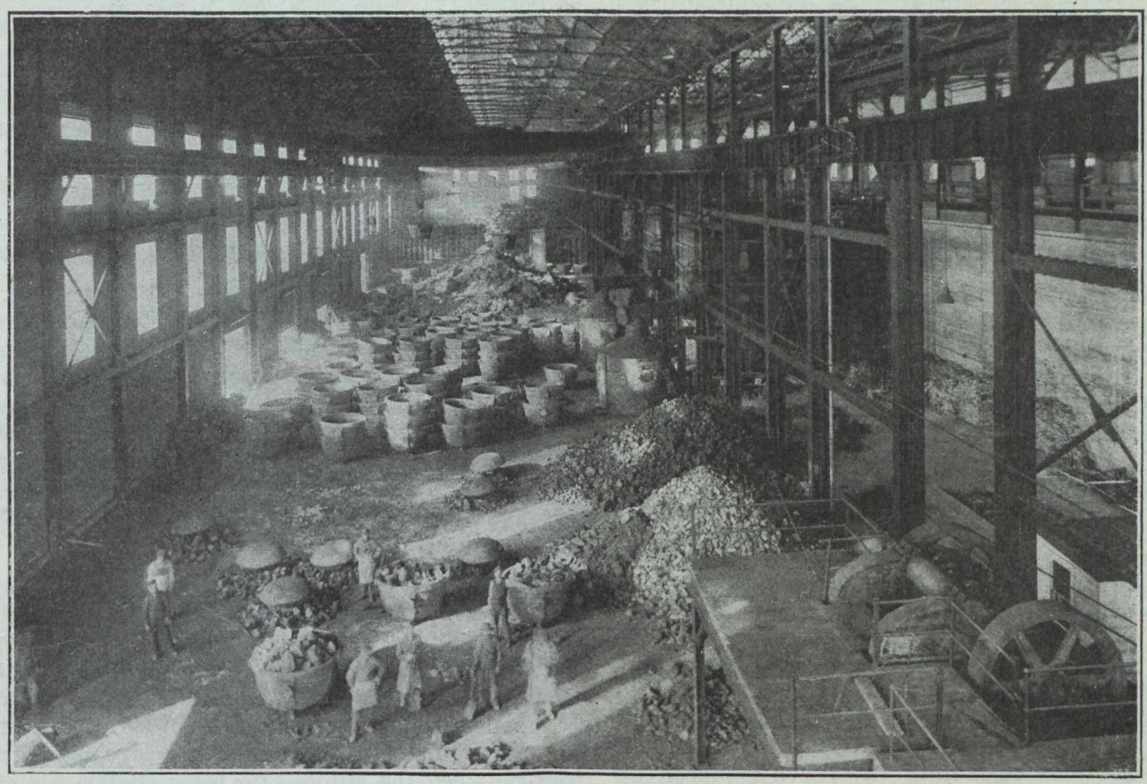
The year 1887 did not show any marked increase in mining activity, beyond a few further discoveries, the principal difficulty being that a practical method for the treating of nickel ores had not yet been discovered.

The Canadian Copper Company secured the services of Dr. E. D. Peters, who went to Copper Cliff in July 1888, and planned and erected the first smelting plant in the district, which consisted of a roast yard, one 100-ton Hereshoff smelting furnace with blowing engine pumps, etc., which furnace was blown in on December 22nd, 1888; a nickel and copper matte being produced containing from 15 to 20% nickel and 20 to 25 per cent copper. A second furnace was added early in the summer of 1889.

Spurs were completed from the Canadian Pacific Railway tothe Copper Cliff and Evans Mines in September 1888, and ore was brought from Copper Cliff, Evans and Stobie mines to the roast yards, near the smelting plant at Copper Cliff. The ore from the three mines differed somewhat in character, that of Copper Cliff carrying a relatively high percentage of copper, but all the ores consisting of intimate mixtures of pyrrhotite, chalcopyrite and pentlandite.

The ore from the Stobie mine is fairly free from rock and carries a much smaller percentage of chalcopyrite than Copper Cliff ore. It was found that the Stobie ore, although lower in nickel and copper, carried more iron, and aided the smelting operations, the excess of iron assisting the fluxing quality of the other ores.

In 1889 other mining and smelting companies entered the field. The Dominion Mineral Company



Cupola Building in the Port Colborne Refinery of the International Nickel Co.

opened and developed the Blezard and Worthington mines and built a smelter in 1890 a short distance from the Stobie mine. The Blezard mine was closed down in 1893, the Worthington mine in 1894 and the smelter in 1895. The property was purchased in 1913 by the Mond Nickel Company who are again operating the Worthington mine.

In 1889 the Murray mine was secured by the H. H. Vivian Company, of Swansea, Wales, and a mining and smelting plant was erected in 1890. This property was worked about five years and then closed down. The property was sold in 1912 to the Dominion Nickel Copper Company, now the British-American Nickel Company, who have built a large mining and smelting plant.

In 1891 the Drury Nickle Company acquired the Chicago mine in Drury Township and built a smelter there. It was closed down in 1892, but was worked again for a time in 1896-7 by the Trail Mining Company.

The Nickel Copper Company of Ontario, (promoted by the Late John Paterson), built a small plant near Worthington and a refinery in Hamilton in 1900. The Hoepfner and Frosch refining processes were tried in turn, presumably without success, as the plant was closed down in 1901 and some time later the holdings were sold to the Dominion Nickel Copper Company, (now the British-American Nickel Company).

In 1900 the Great Lakes Copper Company built a plant at Mount Nickel near Blezard mine, to try out the refining process of Aubon Graf of Vienna. This failed and the Company closed down in 1901.

The Lake Superior Corporation, operating the Gertrude and Elsie mines, built a smelter at Gertrude in 1902 which closed down in 1903. This property was also sold in 1912 to the Dominion Nickel Copper Company. Other nickel mines operated without any smelting plant being erected, were as follows:— Algoma Nickel Company, Township Lorne, 1891, Sheppard Mine, Township Blezard, 1891, Gersdorffite Mine, Townshrip Denison, 1891, Trillabelle Mine, Township Trill, 1894, Sultana Mine, Townships Trill and Drury, 1900.

This review covers the situation generally up to the year 1900.

The Mond Nickel Company was incorporated in 1900, and The International Nickel Company in 1902, the latter embracing as subsidiaries The Canadian Copper Company, The Vermillion Mining Company, The Anglo-American Iron Company, etc., and the Oxford Copper Company with its refinery at Bayonne, N. J.

Since 1900 the history of the nickel production is confined to the story of these two companies, by far the largest part of the production, however, going to the credit of the latter company.

The British-American Nickel Company has a mining and smelting plant at Nickelton near Sudbury, (on the old H. H. Vivian property), and a refinery at Deschenes near Ottawa, both nearly completed.

The International Nickel Company of Canada, Limited, was incorporated in 1916. This Company, with head office in Toronto, has a $5,000,000.00 refining plant at Port Colborne, Ontario, completed about two years ago, and is amalgamated with the former

Canadian Copper Company, which has large mining and smelting plants in Copper Cliff, Ontario, and vicinity, and is now known as the Mining and Smelting Division of The International Nickel Company of Canada, Limited.

A large capital investment has been distributed over the many branches necessary for the success of the industry, including mining, smelting, refining, exploitation and sales, each department of which has a history of its own which would make a long story.

A general description follows of the work done by The International Nickel Company, Limited, in connection with the development of the largest nickel mine in the world, namely, Creighton mine, located about eight miles from Sudbury, in Northern Ontario, from which the major portion of the ore is obtained for its current operations.

The ore is located on the Company's holdings on the South Range of the Sudbury nickel belt. The ore consists of pyrrhotite, with chalcopyrite and pentlandite, together with some gangue material which is generally basic.

The ore deposit is a massive body and for some years mining was done by the open pit or quarrying methods, but during the last ten years has taken place at depths which have now reached about 1,200 feet, and the earlier methods of mining have been replaced by a system of main levels from which the ore is mined in underground chambers, or stopes, and hoisted to the surface through a large incline shaft.

The capital investment in Creighton Mine, (aside from the ore deposit), including machinery, equipment and housing for employees, amounts to many millions of dollars. The expenditure covers such items as many miles of diamond drilling to a maximum depth of 2,000 feet for exploration work necessary to prove the existence and amount of ore in the mine, and, in addition, to give information to the Company's mining engineers for the design and layout of the main shafts and system of mining to be adopted.

A general idea of the efficient methods of mining of mining and the large expenditure involved will be appreciated from the following:

The main shaft is an incline of 55 degrees, has five compartments, two being used for hoisting ore in skips, two for transportation of men and material in specially designed cages, while the fifth compartment is used for pipes, such as compressed air and water mains, electric cables for power and lighting, and a ladderway for emergency use by employees. The shaft has at present a total depth of 1400 feet the section dimensions being about 45 feet by 8 feet.

The hoisting of ore is now from a station having a vertical depth of about 1000 feet, the capacity being about 5000 tons per day, working 16 hours. The shaft connects with several main stations in the mine from which levels consisting of drifts and crosscuts are made through the ore body in order to carry out the development of the mine and give haulage facilities between the stopes and main shafts.

Three main levels have tracks of 45 lb. steel rails, the ore being hauled in trains of automatic side-dumping type steel cars of four tons capacity hauled by electric locomotives. These cars dump the ore into a large underground storage chamber of 100-tons capacity which in turn connects with a crusher

Nickel Finishing Building, Port Colborne Refinery, International Nickel Co.

station for the purpose of reducing the ore from the large pieces as mined to about six inches in size before being loaded in the 7½ ton skips from measuring pockets for hoisting to the surface.

On account of the massive nature of the ore which is extremely tough and heavy, extra heavy crushers have been designed with 42 inches by 30 inches jaw opening, and each operated by two 100/H.P. electric motors. These crushers were made in sections, to permit taking down the shaft, the total weight of each machine being about 25 tons.

The underground workings have electric light and fresh water supply for drinking purposes, and in addition special attention has been given to ventilation There are at times as many as 200 rock drills in use, all operated by compresed air, generated in a compressed air power station at the surface, the air piping system being distributed to all the working places in the mine by the use of approximately ten miles of steel pipe of varying sizes from two inches to sixteen inches in diameter.

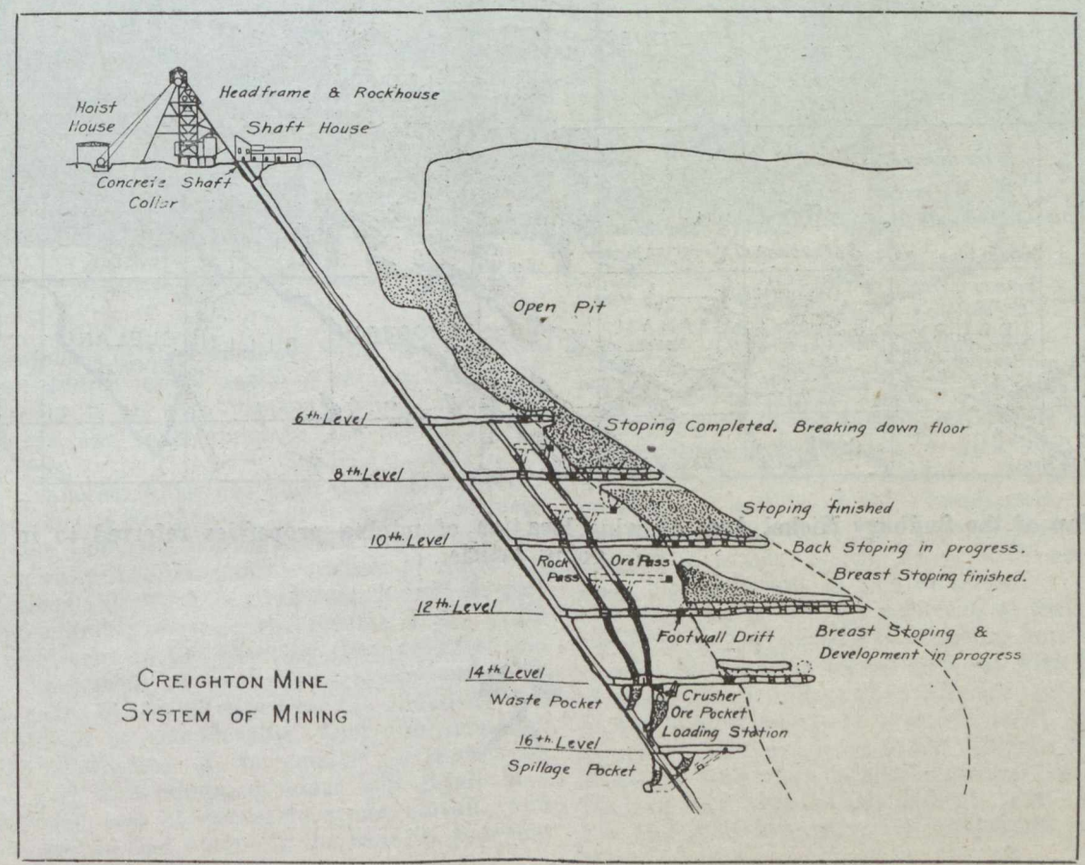
The underground equipment also includes pumps, operated both electrically and by compressed air, for the handling of mine water, and there are many other important items, but the reader will be particularly interested in the surface equipment and machinery which has been designed, erected, and placed in operation successfully during the last five years.

There are many important mining districts in America and in Canada, but there will not be found anywhere a more complete equipment than at Creighton mine. All machinery is operated by electric power, generated in the Company's own hydro-electric station at High Falls, 26 miles away, being transmitted at 34,000 volts. This power is used at the mine for hoisting engines, air compressors, locomotives, pumps, lighting workshops and sundry service, and even to the heating of the buildings during the winter months when temperatures as low as 20 degrees below zero occur.

The main hoisting engine has a 1500 H/P motor and is capable of hoisting nine tons of ore at a speed of 2500 feet per minute, and on account of the motor load being as high as 3000H/P for a few seconds at the start of each hoisting trip, the engineers have installed the most modern systems of electric drive known as the Ilgner'' system, in order to take care of this extremely large variation in the use of power. The ''Ilgner'' system utilizes for the equalizing of the power a large fly wheel weighing fifty tons and is connected to a converter set driving the hoist motor. In operation this wheel absorbs and gives out power in such a way that the motor driving the hoist has a steady load.

There are special high tensile steel cables used for hoisting the ore, men and material from the mine. At present it is not necessary to operate the hoist at more than 1500 feet per minute, but in years to come when the mine has reached greater depths the speed will be greater in order that the increasing quantities of ore can be hoisted in a minimum time.

There are other hoisting engines used solely for handling men and material. The men who work underground are transported in special man-cages so that thirty men can be handled per trip. There are in addition four large electrically driven air compressors, three of which have motors of 1000 H/P each.



Diagramatic View of Mining System of the Creighton Mine of the International Nickel Co.

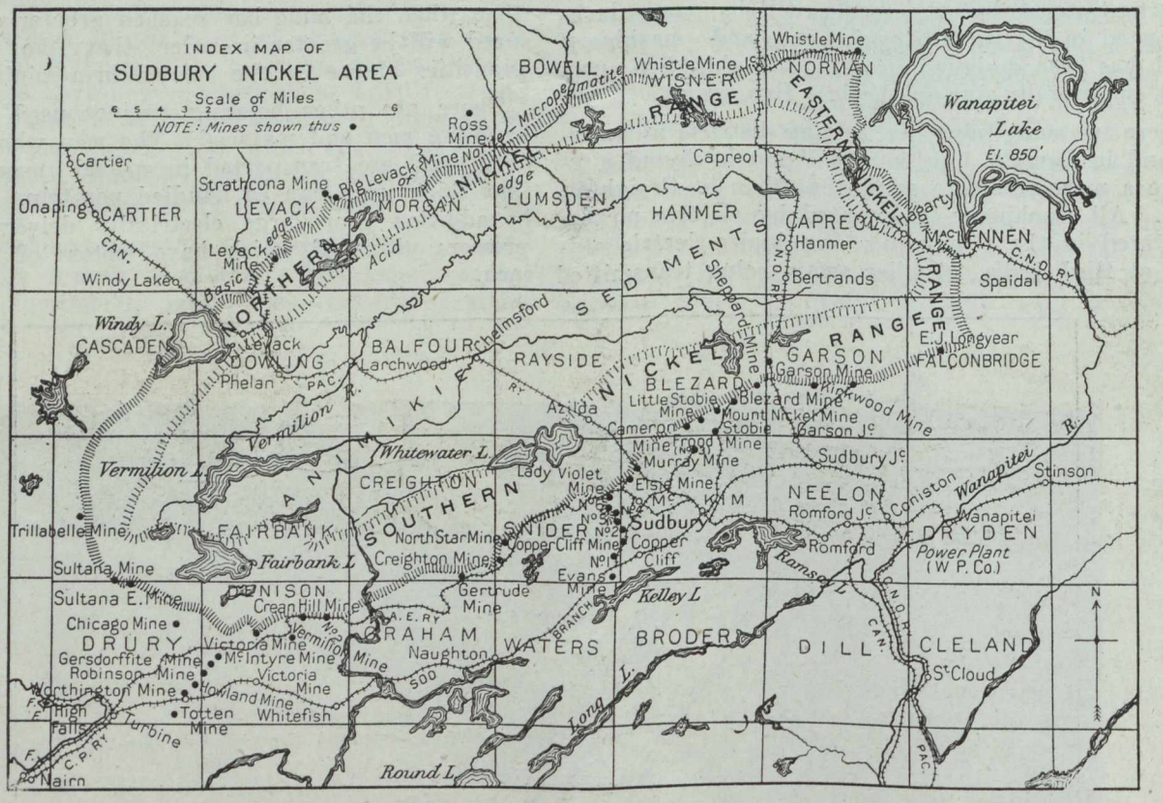
The shaft house or rock house is an immense steel structure 145 feet high, containing about 1600 tons of constructional steel. This huge structure, believed to be one of the three largest shaft houses in the world, is enclosed with hollow tile on account of the climatic conditions in this district. It is in this structure that the ore delivered from the skips, after being hoisted by the massive engine, gravitates through rock crushers and screens on three floors and is classified to various sizes on rubber sorting belts from which the waste rock is removed by the pickers. An electric elevator is installed for handling men and material, and ore storage facilities are for 4000 tons, steel bins being arranged so that ore and waste rock is discharged directly into 50-ton hopper bottom railroad cars.

The mine equipment includes blacksmith shops where a large number of steel sharpening machines are in use, together with steel hammers, forges, steel plate rolling machines, etc., etc., so that all repairs to mine cars, skips, cages, ets., are made at the mine. Machine shops containing lathes, shaping, drilling and milling machines, drill presses, etc., and an up-to-date carpenter shop are provided, and owing to an immense amount of stores and supplies being necessary, special facilities for storing have been made, the arrangement for the storage and handling of explosives having received particular attention.

The comfort of employees is provided for in a well laid-out town, with modern houses owned by the Company and rented on a favourable basis. Water supply and sanitation is under direct supervision of a resident medical officer, who is also responsible for the health and physical examination of employees.

Connected to the main shaft by a covered passageway is a large change house for 1700 men, containing individual steel lockers, shower baths and other conveniences, with hot and cold water service, so that every employee has the opportunity of leaving work refreshed from the day's labor.

A modern club house, well equipped for recreation and amusement, together with facilities for sport, and a school house with qualified teachers have also been provided by the Company.



Map of the Sudbury Nickel Area showing location of mining properties referred to in foregoing article..

How to Recover Added Millions from the Mines of Cobalt

(By J. A. McRAE, COBALT.)

As further evidence in support of the fairly general belief among the mining operators of Cobalt that a merging or consolidation of various of the mines is to become fairly general is last week's announcement in The Canadian Mining Journal that the Trethewey mine has been sold to the Coniagas Mines, Limited. All signs point to the likelihood of the Conagas being one of the companies which may become active in this respect.

..As regards the financial status of the company it is an excellent position to carry out a policy of absorption of other properties. This is also true as regards mining and milling equipment. The annual statement from year to year which shows the cost of producing silver at the Coniagas to compare favorably with the best records in the Camp is conclusive proof of the efficiency of the management, and serves to show that the system of ore handling and treatment must necessarily be of the highest order.

View No. 1 being a general view of the Coniagas, forms only a limited idea of the size of the mining and milling plants. In the foreground is the main shafthouse and mill, but the mining plant as well as the oil flotation plant is concealed in the background owing to the situation of the buildings making it difficult to secure a photograph of the whole.

No. 1—General View of Coniagas Mine.

No. 2.—Trethewey Mill.

In the purchase of the Trethewey mine, the Coniagas acquires an additional 43 acres of mining lands situated adjacent to its own property which comprises some 40 acres, and thus increases the whole to 83 acres.

On the Coniagas, work has been carried to deeper levels than on the Trethewey, but it is now proposed to extend the Coniagas workings onto the Trethewey and drive a raise into the main workings of the latter property. Once this work is completed it will be possible to considerably increase the volume of ore available for treatment in the plant of the Coniagas, and with the elimination of dual management and with very little extra overhead expenses, the added margin of profit should be considerable. That this tendency toward the absorption of the smaller properties by the larger and well equipped mines will result in a greatly reduced cost of operation seems certain, and promises to add to that extent to the benefits accruing to the shareholders of the companies involved. It is a practice that should be beneficial to the purchaser and the vendor alike, in that it offers an opportunity for the company owning a mine which may be pretty well worked out in itself and therefore a source of much worry and but little revenue, to sell its property at a substantial cash price, and at the same time it offers an opportunity for the purchasing company to add to its acreage and volume of low grade ore, which, combined with its own brings the whole to a point sufficiently large to maintain a high degree of efficiency and the attendant higher margin of profit. In a word, worked singly and with a multiplicity of managerial staffs the mines of any camp in the days when mill heads become low will be compelled to close at a much earlier period in their life than is the case where they become merged into one large operation and under the expense of but one management.

In view No. 2 is shown the mill situated on the Trethewey mine, and which now also becomes a part of the Coniagas.

As to what companies will play a leading part in the process of absorbing other properties would be difficult to estimate at this time. The Nipissing, with some 840 acres situated in the heart of the Cobalt Camp appears destined to be a fixture even without becoming involved in any consolidations. The Mining Corporation of Canada already owning the Townsite, City of Cobalt, Cobalt Lake, and having recently purchased control of the Buffalo as well as a lease on the Foster appears determined to stick with the camp to the end. The Northern Customs Concentrator in the purchase of a part of the Chambers-Ferland, as well as consolidating with the Bailey-Cobalt and the acquiring of a lease on the Silver Cliff appears also to have big ambitions in this direction.

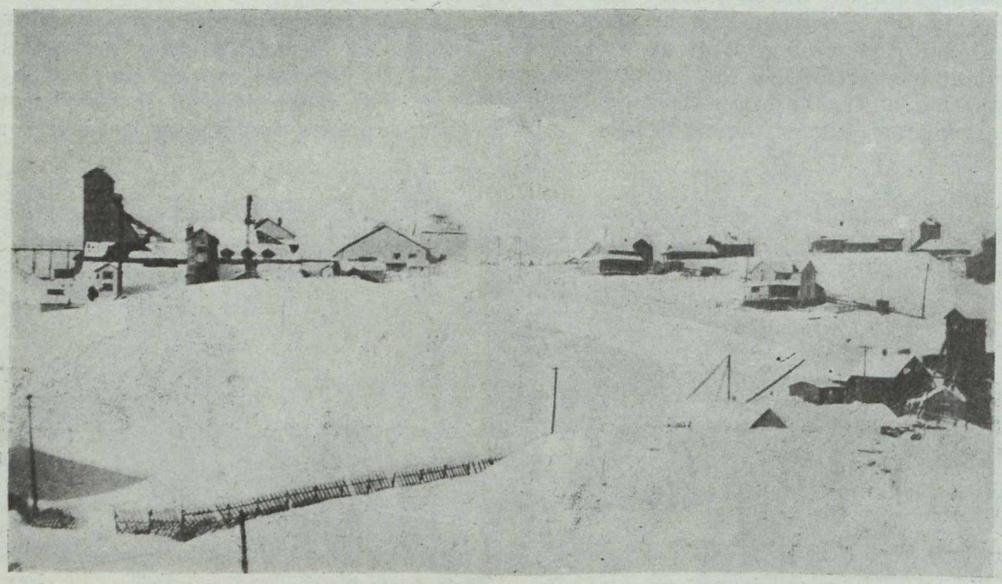
It is in the case of the activities of the Coniagas and the Mining Corporation of Canada, however, that the careful observer is found turning with a great deal of interest and in regard to which, sooner or later, one of the biggest consolidations in Cobalt may reasonably occur. In this I refer to that entire ridge extending from the McKinley-Darragh mine on the South, to the Hudson Bay Mine on the North. This ridge includes the McKinley-Darragh, the properties of the Mining

Corporation inclusive of the Buffalo, the Coniagas as well as the Trethewey and the Hudson Bay. It also includes that part of the Nipissing lying to the West of the railway as well as the Chambers-Ferland, Right of Way, and the original property of the La Rose.

In dealing with this chain of properties, all of which have produced a large volume of high grade ore in which are maintaining their output by treating medium grade ore, I have in mind the belief that they will some day all be a part of one enormous consolidation. As to this, I have discussed the matter with some of the best informed mine managers in the Camp and they have readily concurred that the idea of a large mill, possibly with a capacity of two thousand tons daily located somewhere along this great ridge and operated at a minimum of expense under one management would add many millions of ounces to the final production record of the Cobalt camp and would result in added millions of profit to the operators.

The fact is that in various parts of this enormously rich strip of territory, there are sections that could actually be quarried out and treated provided equipment sufficiently large to treat such a volume of ore were available. To treat this enormous tonnage of low grade ore in small parcels in small mills could not be carried out on a commercial basis, but to include the whole in one giant operation would make it possible to reduce the cost per ton treated to a point where the margin of profit would be very satisfactory. A merger of this description would include every producing mine situated along the west side of the railway. In years to come it might not be unreasonable to suppose that even the Nipissing might also figure in the scheme which is already presenting itself as desirable to mines where the resources of high grade ore are gradually becoming exhaustd.

Below is a somewhat long-range view showing a part of the North end of this ridge. The high shaft house is that of the Coniagas while at the opposite end of the picture are the buildings of the Trethewey. North of the Trethewey lies the Hudson Bay, while South of the Coniagas lie the long chain of properties, which belong to the Mining Corporation of Canada. On the East lies a part of the Nipissing and farther over the Chambers-Ferland, Right of Way and La Rose.



No. 3.—"The Ridge," showing the Coniagas and Tretheway Mines.

Our Northern Ontario Letter

THE SILVER MINES.

During the past week the silver producing mines of Cobalt have received as high as $1.60 an ounce for their silver. The reason for this rapid jump in price is not due to an upward movement in New York quotations but is brought about by the rate of exchange between Canada and the United States.

With silver quoted in New York at $1.34½ an ounce, and with United States funds at a premium of 18 p.c. at the time of writing, the Canadian producer is actually receiving $1.59 an ounce for silver. Old Canadian silver coins, minted on a basis of silver at $1.29 are rapidly disappearing from circulation. These coins, figured in 1000 parts are made up of 925 parts silver and 75 parts alloy.

It will be recalled that the Canadian Government at the beginning of this year decided to reduce the silver content of new coins to 800 parts silver and 200 parts alloy. With the rate of exchange operating unfavorably in addition to possible further increases in New York quotations for silver the question may arise as to whether or not the proportion of alloy in the new coins will constitute an adequate safeguard against these sufficiently unscrupulous to resort to the melting pot in the work of mutilating the Canadian piece for its silver content, which in turn may be marketed in New York at the high price plus the premium on U.S. money.

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CANADIAN MINING JOURNAL

Vol. XL. January—December 1919

Authors

Editorials

The Crown Reserve Mining Company during 1919 produced $223,034 a gain of $25,000 as compared with 1918. The net profits for the year amounted to $77,,330 as compared with $6,756 during the preceding year. Optimistic reference in the report is made to other properties in which the company is interested. These include the Porcupine Crown mine at Porcupine which the Crown Reserve controls, as well as the Canadian-Kirkland property at Kirkland Lake on which the Crown Reserve holds a working option and on which work is now being prosecuted.

The Mining Corporation of Canada proposes to carry out a limited amount of exploration work on claims acquired last fall in the township of Butt, district of Nipissing. The work will probably consist chiefly of surface prospecting in an effort to explore the possibilities of commercial deposits of radium-bearing ore. It will be recalled that considerable attention was attracted to that district late last summer on the strength of a report that radium-bearing ore had been found, which was later confirmed by Cyril Knight, geologist for the Ontario Bureau of Mines.

The Kerr Lake continues to produce upwards of 100,000 ounces of silver monthly, thus indicating an output at the rate of about 1,250,000 ounces a year. The January output amounted to 108,000 ozs. With costs for 1919 having averaged under 41 cents an ounce, and since having perhaps risen to around 45 cents an ounce (owing to the high price of silver entitling the workmen to a bonus), it is evident that at present the company is realizing over $1 an ounce on its silver output. Should this continue throughout the year the net profit would amount to about $2 a share on each of the company's 600,000 issued shares.

The Directors of the Coniagas Mines have under consideration an option on the Gamble-Thompson group of properties in the Gowanda silver area. Provided the deal goes through, arrangements will be made to commence exploration work this month. The claims in question are situated in the Miller Lake area.

On February 2nd the Trethewey-Cobalt Company received $100,000, this being payment in full from the Coniagas Mines Company for the Cobalt mine of the Trethewey Company. Further reference as to this is made on another page of this issue of the "Journal".

It is learned that the management of the Temiskaming mine plans to submit the annual report about the last week in February. From the available information it would appear reasonable to expect that an increase in ore reserves will be shown. Also, that net earnings for 1919 were adequate to take care of the 4 p.c. dividend paid last month, without drawing from the surplus of $900,000 with which the year 1919 was commenced.

The deal for the Dodds property, situated at the Leroy section of the Gowganda district has been closed. Exploration work will be commenced by the new holders within the next month or so.

Your correspondent has received the following statement from Premier E. C. Drury, in reply to a request for an expression of opinion in regard to the possibilities in regard to the Gowganda district being provided with railway accommodation this year:

"The matter to which you refer is under consideration, but at the present time, I am unable to express an opinion on the question. It is a matter of such importance that I should not express an opinion until I have fully gone into the facts of the case and had an opportunity to view it from all angles."

The above statement appears to be an admission that the government is as yet undecided in regard to authorizing the Canadian Light Railway Construction Company to proceed this spring with the building of a light narrow-gauge line, in that if the government had decided to let private interests proceed it would scarcely be itself considering the extension of the Elk Lake branch of the T. & N. O. as urged by mine operators. The situation has given rise to the fear that the Ontario Government by lack of decision may discourage the private enterprise, and itself finally fail to take definite steps to provide the desired accomodation. In the meantime it is learned that an application will be made to the Legislative Assembly of the Province of Ontario at the next session thereof for an act to incorporate the Northern Light Railways Company with the following powers:—

"to construct and operate light narrow gauge railways with steam, electricity or other motive power, from a point at or near the Elk Lake Branch of the Temiskaming and Northern Ontario Railway adjoining the Town plot of Smythe, in theDistrict of Temiskaming, thence in a south westerly direction through the Township of Roadhouse and Lawson, thence in a south westerly direction through the Township of Nicol, to a point in, at or near the Town plot of Gowganda, and with Branch lines proposed as follows:—(1) Commencing at a point on the Elk Lake Gowganda line in the township of Nicol. Thence in a northerly direcrow connecting with the established gold mines in the township of Powell known as the Fort Matachewan Gold Mining Area.

(2) Commencing at a point on the Elk Lake-Gowganda line in the township of Nicol, running in a westerly direction through the townships of Nicol, Milner and Tynell, in the District of Temiskaming, and McMurchy in the Distict of Sudbury, and connecting with the mines in the township of Churchill known as West Shining Tree Gold Mining area. And a loop line commencing at a point on theT.&N.O. Railway at or near Swastika station in the township of Teck, running in a north earserly direction through the township of Teck and the Kirkland Lake Gold Mining area, thence in an easterly direction through the townships of Lebel and Gauthier, thence in a southeasterly directrion to Larder Laks in the township of Hearst; thence in a southerly direction through the township of Hearst near Lake St. Anthony in the township of Skead; thence in a westerly direction through the township of Skead and in a north westerly direction through the townships of Catherine and Boston at a point or at near Boston Creek Station on the T. & N.O. Ry. and other railways that may be built; with bonding powers and with such other powers as are usually given to Railway Companies."

In connection with the development of the Gowganda district it is interesting to note that nine out of ten of the concerns operating in that field are doing so on behalf of previously financed mining companies or with private capital and that stock promotions are playing but a very small part in the financial requirements of the camp. The situation is regarded as highly favorable and one that lends strength to the camp. One reason for this is that funds of the above description are usually handled

with greater care than where they are a part of a campaign of stock selling. Also, that money of this kind is only spent upon property of outstanding merit, whereas that in less stable concerns may be spent any place where a spectacular showing may be made as a temporary advertising medium.

As an instance of one unfavorable influence of the decline in British sterling exchange those companies with head offices in the Old Country, endeavoring to spend money in the development of mining properties in this country.

On the Dickson Creek property, located about half way between Haileybury and New Liskeard, the main shaft has reached a depth of 200 feet. This will be continued to a depth of 300 feet. The head office of the company is in England.

Ore and Bullion Shipments.

During the week ended Feb. 6th, two Cobalt companies shipped an aggregate of three cars containing approximately 233,612 pounds of ore.

A summary follows:—

Shipper	Cars	Pds.
McKinley-Darragh	2	170,412
La Rose	1	63,200
Totals	3	233,612

On Saturday the Nipissing sent out 75 bars containing 100,365.97 fine ounces of silver bullion. At the present high price of silver, plus the high premium on United States money for which the silver is sold, it is probable that the shipment had a value of around $155,000.

THE GOLD MINES.

The gold mines in this country find themselves in the favorable position of receiving the equivalent of a very substantial premium on their gold. In the past week when United States money rose to a premium of 18 per cent. the mining companies of Porcupine found themselves free to dispose of their gold in New York and instead of the standard value of $20.67 an ounce they received 18 per cent. additional, this premium amounting to approximately $3.70 an ounce.

While the premium is merely the result of unfavorable trade balances and therefore subject to more or less rapid fluctuation, and while there is no doubt the exchange rate will lessen within a reasonably short time and finally be brought back to normal, yet for the next few months it may prove to be an important factor operating in favor of the producers of gold.

The monetary problems of the greatest nations of the world appear to have reached a state bordering upon demoralization. That as in other things the British Empire as well as France will in due course recover their financial status is certain. At the same time, the period of readjustment promises to be slow and the premium on United States money mal reasonably rule high for considerable time to come. For this reason, mine operators of Northern Ontario look forward to the receipt of a substantial premium for their product for at least some months.

Mining men who had given the matter careful thought appear to be convinced that the crest of high prices had been reached. "I believe that the twelve months immediately before us will be marked by a collapse in the price of material and a big decline in wages", said a conservative mining man to the writer. "Should this reach proportions of money-panic", he said, "it will be a pity, for many will suffer; but, as for the gold mines, it is a thoroughly recognized fact that a money-panic and a gold producing mine is one of the finest combinations known."

The Hollinger Consolidated is treating around 2700 tons of ore daily. It is now understood that the present equipment is adequate to treat 3000 tons when at full capacity instead of 3500 tons daily as indicated in previous unofficial estimates. With mill heads averaging around $9 a ton, and treating 300 tons daily, the rate per annum would be 1,095,000 tons treated and $9,855,000 produced or approximately 492,750 ounces of gold. Receiving payment in American funds which are at a premium of 18 per cent. and therefore equal to a bonus of $3.70 an ounce, the added revenue on one year's output would approximate $1,822,175. Of course, this 18 per cent. basis of calculation is not permanent, but the importance of the exchange situation is in this way emphasized. The fact is that even if exchange drops to half that of the present the income of the Hollinger will still be enhanced by several hundred thousand dollars for the year 1920. As regards costs of operation it is understood that during 1919 they were reduced to $4.31 as compared with $4.93 in 1918.

At the Dome where production is running between $2,000,000 and $3,000,000 annually, and at the McIntyre-Porcupine where an output of not far under $2,000,000 is being recorded, it can readily be seen that these mines will also derive large benefits from the exchange situation.

It is learned on good authority that the McIntyre will not drop its option on the Plenaurum property, but, rather, will seek another extension of time. Water troubles as well as a shortage of labor were unfavorable factors during the past year, and the general impression appears tobe that the Plenaurum control will grant the requested extension of time.

The mill of the Dome Lake is once more in operation, the first clean-up since resuming work having been made during the past week. A force of between 40 and 50 men are now employed and the mill is treated between 60 and 70 tons of ore daily.

Sinking operations have commenced at the Porcupine-Keora. For the time being, this work is being done with hand steel and progress is consequently not rapid. However, by the time the steam mining-plant is installed, the work will have been carried to a point where the sinking of the shaft to the 300-ft. level may be rapidly carried out.

At the Clifton-Porcupine mine the main shaft has been completed to a depth of 225 feet and average values are stated to have been uniform to that depth. At the 200 ft. level a warking station was cut and drifting both north and south is under way at that depth on vein No. 7. Crosscutting east to cut the downward continuation of veins 5 and 6 as well as the Boulder vein is under way. It is estimated that these veins will all be cut with about 120 feet of undergroundwork. Owing to vein No. 7 having contained uniform values to a depth of 225 feet it is reasonable to expect that the other veins which con-

tain good ore at surface may also be found to show up well at depth. It is officially announced that the mining plants is to be used at practically full capacity, and that if the work of the next three or four months continues to be favorable, the question of installing a mill during the coming summer will be gone into.

In the Kirkland Lake district the scope of operations continue to broaden. Whereas a year or so ago the active section was confined to a two-mile strip of territory running from the Elliot-Kirkland to the Tough-Oakes and only a claim or so in width, this has no wbroadened out to a mile or so in width and gives promise of extending several miles in length.

In connection with the development of the Ontario-Kirkland property (formerly the Hurd group, it is learned officially that for a distance of 100f eet along the vein recently encountered at a depth of 300 feet the ore body has averaged $20 a ton for the full width of the drift, and with the vein still strong in the West face of the drift. It is also stated that the two other veins have been encountered recently, being known as veins A. and B. Vein A. is only twenty feet north from the rich vein above mentioned and is stated to be highly mineralized and containing visible gold. At the time of writing the average gold content has not been determined by assaying. Drifts have been commenced on veins A. and B.

At the Lake Shore, Kirkland Lake and the Teck-Hughes production continues at normal rate, and development work it being attended with favorable results.

In the Boston Creek district, the usual activity continues. The shaft on the Kennedy-Boston has reached a depth of 85 feet and is completely timbered. It will now be carried to the 100-ft. level where a station will be cut and a contract for drifting will be let.

The Catherine Gold Mines is planning the purchase of a mining plant consisting of a boiler, compressor, hoist and corresponding equipment. This will enable the management to make more rapid progress in developing the very promising veins which occur on the property. Sinking will be resumed as soon as a plant can be secured and installed and it is expected that this equipment wil be taken to the property before the snow is off. A small sawmill is now in operation on the Catherine property, and sufficient lumber for shaft timbers, building material, etc., will be sawed before spring.

On March 1st, J. A. Hough will retire from the service of the Department of Mines after having served for thirteen years as mining recorder in the Larder Lake and Swastika division. A successor for Mr. Hough has not yet been named.

The War Veterans in the district of Temiskaming are urging the Minister of Mines to give preference to the appointment of a returned soldier to fill the vacancy on the staff of mining inspectors caused by the death last fall of A. H. Brown. It is pointed out that not a few returned men can thoroughly qualify, having had previous practical experience as well as having a knowledge of engineering, and that the appointment would be made on merit. The request is regarded with general favor throughout the North.

WAGE ADJUSTMENTS AT THE NOVA SCOTIA COLLIERIES.

The adjustment of wages at the colleries in Nova Scotia has made fair progress since the New Year. A number of Conciliation Boards have been appointed to deal with the questions as they stand at issue between the separate companies and their workmen, and, owing to the fact that the mineworkers are now all members of the United Mine Workers of America, it has been necessary for the individual Boards to arrange their meetings seriatim so as to permit of the U. M. W. Executive Board being in attendance.

The Dominion Coal Company and its workmen have agreed upon a complete revision of the wage schedule, particulars of which are given in this issue, in so far as they relate to day-paid rates. There have been some not unusual difficulties in getting the individual locals to ratify the agreement made by the Executive on their behalf, but these difficulties have existed chiefly in the imagination of the newspapers who have assiduously striven to create the impression that serious trouble was brewing among the employees of the Dominion Coal Company. As a matter of actual fact, the leaders of the U. M.W. have driven the most advantageous bargain for the workmen that was ever driven, nor should it be forgotten that the increased wages earned by the mineworkers does not affect the price of workmen's coal, which stays at $1.50 per ton; or the house rentals, which are probably the lowest in North America today. If the Secretary of the United mine Workers in America never has any harder task than to defend the text of the latest agreement with the Dominion Coal Company he will not complain.

The Conciliation Board appointed to deal with the wages of the Nova Scotia Steel & Coal Company's workmen is in session, and its duties have been enlarged to include the collieries in the Inverness field.

In the Pictou Field, the demands of the mineworkers has called forth from the Manager of the Acadia Coal Company a remarkable statement of the position of that Company, a position, which it may be remarked has general application to the coal mines of Nova Scotia, and an even wider field. The statement is as follows:

"During the past few days we hav discussed with the representatives of our employees the question of advancing certain datal rates and have tentatively intimated that we would be willing, in case an agreement is arrived at, to make certain concessions as a compromise.

"The Acadia Coal Company expected to be able to make these concessions without any increase in the price of coal to the public. We would try to do this by a policy of economy and would expect to have assistance and good will of all our employees who would enjoy the benefits of these concessions.

"We have been asked to discuss the question of an advance in certain contract rates. We can only reply that any advance in these rates, be it ever so small, would make it necessary for us to increase in proportion the price of coal to the public. An agreement between ourselves and our employees to increase the present contract rates is in effect an agreement that would compel the public to pay more for coal otherwise we cannot exist.

"We believe such an agreement to be an unsound method of settling these disputes, and we desire to set out briefly for the information of our employees, the board of conciliation and the general public, the reasons why we believe no such increase should be made.

"First.—The average daily earnings for contractors is now $5.83 while in 1914 it was $2.99, an increase of 95 per cent. In addition to this, our employees are provided with houses at low rents and with coal at $1.20 per long ton, privileges which are equal to not less than 55 cents per day. Both in wages paid and in the percentage of the increase our employees compare favorably indeed with coal miners anywhere in Canada or in the United States, and this, in spite of the undoubted fact that the Pictou coal seams have been among the most difficult to work at any profit. We think also that they compare favorably indeed with the men in any other industry.

"Second.—The price of coal is not increasing. It is decreasing. We are actually selling coal today for 95 cents less than in 1918. And the price of coal today is hardly 80 per cent. greater than in 1914, although wages have increased 100 per cent. We do not know that we can get an increase in the price of coal from many of our customers. We may be driven out of certain markets. Local industries may be unable to operate and we and our employees (if we agree to demand an increase in the selling price) may find ourselves eventualy met by a lack of orders, broken time and other difficulties.

"Third.—No industry can prosper which does not have a decent regard for the community to which it sells its product. To meet together and agree to charge more to the public for coal, without regard to the merits of the question is economically unsound. For these reasons we will not take the responsibility of agreeing to any increase, nor will we make any agreement behind closed doors which will make it necessary for us to forthwith increase the price of coal to the public."

There has been very general belief that coal owners can increase wages and absorb the increased cost of production without increasing the cost of coal to the public. In the United States this misconception almost led to a mandate from the U. S. Government to increase wages without increasing selling prices. Under these circumstances, Mr. Notebaert's complete expose of his Company's dilemna is important. There is no leading branch of industry in Canada today that is so unremunerative as coal-mining to the operators. This statement is made advisedly. The profits of the coal and steel companies in the past few years have been made out of steel manufacture, and not out of coal-mining. The unremunerative character of coal-mining is a condition that affects all collieries in Canada, east and west, and there is only one way by which mineworkers can be given increased wages, namely, by passing that increase along to the consumer.

The public is indebted to Mr. Notebaert for his frank statement.

Col. Walter Karri-Davis, well-known to the mining fraternity of the Pacific Coast, has been visiting British Columbia, familiarizing himself with present conditions. He expressed much interest in the recent developments in the Portland Canal section of the north.

Joseph Errington, the mining engineer who is interested in the exploration and development work now underway at Aspen Grove, near Kamloops, B. C., denies that the Temiskaming Company, of Toronto, Ont., with which he is associated, has acquired any interest in the large low grade property staked on Buttle's Lake, central Vancouver Island.

Mr. C. J. Coll, formerly General Manager of the Acadia Coal Company, and later General Manager of the Cape Breton Coal Iron & Railway Co., at Broughton,, Cape Breton, has been appointed General Manager of the Minto Coal Co., at Minto, N.B.

CORRESPONDENCE FROM BRITISH COLUMBIA.

Victoria, B. C.

A meeting of Coal Mine Operators was held at Calgary over the week-end. January 24th to 26th, to discuss the wage question and also the matter of the "check-off," which already has been described as being a method set out in an order issued by W. H. Armstrong, Director of Coal Operations, by which the men's union fees were to be deducted from their pay cheques and the aggregate amount forwarded to the U. M. W. or A. headquarters. This was designed as a means of circumventing the One Big Union and was by way of being a *sine qua non* to the receipt by the men of a 14 per cent increase in their wages. Word from the coal fields, however, indicates that many of the men refused to accept this condition. It is said that as many as 5,000 took this stand. Rather than face a walk-out in mid-winter a proportion of the Operators ignored the Armstrong order and the men are being paid at the advanced rate, without the deduction of union fees. At the Coal Operators' meeting referred to no way was discovered out of the dilemna and no action, apparently was taken.

An interesting action to those connected with the coal mining industry in British Columbia was mentioned in the courts a few days ago. It is known as Hodgson vs. French, Elliott, Hamilton and Dunsmuir. On the occasion in question an application was made for the dismissal of the case but it was not allowed. Edward E. Hodgson, it appears, is asking for a portion of the $1,000,000 commission paid to Messrs French, Elliott, Hamilton and Dunsmuir, as a result of the sale years ago of a large block of Vancouver Island coal lands. In 1912 an action was started by Hodgson in which he claimed one-third of the commission. Subsequently he brought another action in which no amount was specified. Counsel for the defendant sought to have the latter phase of the litigation set aside as he could not see the idea of starting a second action before the first was settled.

Counsel for the Pacific Coast Coal Mines, Limited has left for Ottawa to appear before the Supreme Court of Canada in re Wellington Collieries and Canadian Collieries (D), Ltd. vs. the Pacific Coast Coal Mines, Ltd. This is a suit brought by the Wellington and Canadian Collieries for the recovery of $85,009 damages for alleged trespass by the Pacific Coast Coal Co. on their Vancouver Island coal properties. In the Supreme Court of British Columbia the plaintiffs were successful but in the Court of Appeal (Provincial) the decision was reversed. The Willington and Canadian Collieries now have taken the suit to the highest court of Canada where, of course, it is being combatted by the defendant Company.

Coal lands near East Princeton are being developed by the Harvard Coal Company a re-organization of the United Empire Company. James Gray, an experienced miner, is the superintendent He has only some fifteen men employed at present but is said to be meeting with good success. Small coal shipments are expected in the course of a short time.

Alexander Ewart, a pitt boss in the Middlesboro Coal Mines, was murdered on the evening of the 19th of January. Ewart returned to assist in straightening out some trouble the rope-riders were having with the cables. He had just reached his objective when a

masked man stepped in from the darkness and discharged two revolver shots at him from point blank range. Ewart was killed instantly. The murderer, picking up a lamp, which subsequently was discovered in the mine, made his escape. While an arrest of a suspicious character has been reported there is no ceratin evidence that the man responsible is in the toils. Ewart was a well-know and highly respected citizen. He was a member of the Masonic Lodge and had served for several terms on the aldermanic board of the City of Merritt. He had been engaged in the coal mining business in the Province for some years.

Samuel Matthews Robins, for many years a prominent figure in connection with the coal mining industry of British Columbia, died on the 4th of November last in Devonshire, England, where he took up his residence after the Vancouver Island Coal Company's holdings on Vancouver Island passed in to the hands of the Western Fuel Company. This happened in the year 1901. It was in 1884 that he took charge of the old Company's business in this Province, making his home at Nanaimo, B. C. He is well remembered by all the old timers of that City and the miners who worked under him have nothing but praise for their old boss. Pursuing an energetic programme of development the properties were made highly productive. The workers, too, were contended. The late Mr. Robins always gave them a hearing and, while his word was law, it was not passed before both sides of every story were weighed. He was fair and just in his balancing of the scales as between employer and employed with the result that there was little of the bickering that has been so common in latter years and the then little mining town flourished.

Stewart, B. C.

Native silver is reported to have been discovered on the crosscut being driven on the E. Pluribus Claim, William Noble, superintendent of the development work in progress, being credited with bringing samples of the same from the property to the town of Stewart. The Big Missouri Group, to which this claim belongs, has been considered to be an immense low grade proposition but, if information from the North can be accepted, recent work has disclosed ore carrying high silver values.

According to statements made in Seattle, Wn., Governor Riggs, of Alaska, has left for the Eastern United States with a view to interesting the American authorities in the question of obtaining more adequate transportation facilities for the town of Hyder, which is situated on the seaboard of Alaska and is one of the gateways to the Salmon River mineral zone. He is quoted as expressing confidence in the future of the district to which the Premier Mine has been chiefly responsible for the attraction of general attention and interest. The Alaska Territorial Government, cooperating with the Forestry Service and the Alaska Road Commission, is to have a road completed up Salmon River, across American territory to the British Columbia border by next summer. It is proper to interpolate here that the British Columbia Government has expended a considerable sum in the construction of a road from Stewart to Hyder and in the building of a road from the American boundary to the mines. More expenditure, it is likely, will be authorized this year for the further improvement of the avenues of transportation on the Canadian side. To return to Governor Riggs, he is credited with saying that this American road will permit silver ore being brought to Hyder for transportation to the smelters. He also is quoted as being dissatisfied because the American Steamship Lines do not touch at Hyder while the vessels of the Grand Trunk Pacific Steamship Co. do so at regular intervals.

Grant Mahood, of Stewart, is reported to have takne a very rich specimen of silver ore from the Divide Group, situated in the Salmon River section, about a mile and a half from the Spider Prospect.

Kamloops, B. C.

Application for the extension of the charter of the Kettle Valley Ry. to permit of the construction of a branch line into the Aspen Grove Mining Properties, which now are under development, is being made at Ottawa. The same railway company is applying for authority to build a branch to tap the Coalmont Coal Mines. The latter has been operated on a small scale recently, its output being transported by motor truck to railhead. With railway connection no doubt the production will be increased.

Princeton, B. C.

H. R. Van Wagenen, General Manager of the Canada Copper Corporation, who has been spending the winter at Denver Colo., with his family, is expected to return to Princeton early in February to take personal charge of the Company's preparations for the opening of the mine and mill at Copper Mountain and Allenby respectively.

Nelson, B. C.

The Prospectors' Association of British Columbia is growing in strength rapidly. Branches are springing up in different parts of the Province, organizations have been launched at Prince Rupert, at Cranbrook, as well as at Nelson and others being promised for other centres. The intention is that these various locals shall affiliate and a central executive selected whose headquarters shall be at Nelson. At a recent meeting of the Nelson Association resolutions were adopted as follows:

To petition the Railway Companies and the Railway Commission for special transportation rates on small shipments of prospectors' ore.

To ask Consolidated Mining and Smelting Company for a special smelting rate on such small shipments.

To advocate the establishment of ore testing and sampling plants and free assays.

To advocate the furnishing to prospectors of powder at cost.

To advocate the establishment of a winter school of mines at Nelson under the British Columbia University.

To oppose the section of Engineers' Incorporation Bill which would compel foreign mining corporations to retain local mining engineers.

To advocate the application on assessment work under the Mineral Act of expenditures by prospectors or miners on trail or cabin building.

To advocate that reports of district engineers be made accessible to owners of properties dealt with by said reports.

To advocate a division of the Eastern Mineral Survey District or the appointment of an assistant engineer under A. G. Langley, the present Resident Engineer.

To advocate that where partners of overseas soldiers allowed their half interests in mining properties to lapse, while the government retained the soldiers' interests intact, the delinquent half interest be made over to the returned soldiers.

Officers named in the application of the Association for incorporation are: President, J. W. Mulholland; Vice-President, Cecil E. Crossley; Secretary, Fred. A. Starkey; Treasurer, Dr. F. E. Morrison; Directors, James Miller and M. C. Monaghan.

Development of the Mountain Chief Mine at Renata continues with satisfactory results. After taking 423 tons of ore from the upper workings J. W. Evans, the manager, has started to sink from the bottom of the shaft. There has been a considerable addition to the mine plant during the last few months, notably a two-drill compressor and a power hoist.

Kimberley, B. C.

A shoot of silver-lead ore, samples from which have assayed between $101 and $103 for the total metallic content, has been encountered by Robert B. Durrant while tunnelling on a gold-bearing quartz ledge on Perry Creek. This galena ore body in a quartz ledge is not the chief feature of the property and Mr. Durrant proposes driving to 100 or 120 feet depth to ascertain whether the ore body persists and, if so, to gain stoping ground.

Slocan, B. C.

The Silver Bell is reported to be showing up very satisfactorily on further development. A new find is announced as a result of a raise from the lower tunnel. It consists of 12 inches of mixed ore, through which more or less clean ore is scattered. The indications become better as the work progresses. The Silver Bell has about 1,000 feet of work in its two tunnels and raise, the latter opening into ore about midway between the tunnels. The property has been operated continuously since August 1918 last year shipping 135 tons of ore. New cabins have been constructed with accommodation for twenty men and a crew of fourteen now is engaged in taking out ore, four cars having been shipped since sleighing began. R. F. Green, M.P. and S. H. Green, of Kaslo, are the owners.

Trail, B. C.

Some additions as well as remodelling is underway at the Trail Smelter of the Consolidated Mining and Smelting Company. A supplementary drafting office is being provided for the use of a staff of about twelve draftsmen who will be engaged in connection with the new concentrating plant which, it is expected, will be erected at Rossland. As far as can be learned the site of this Mill has not been definitely decided as yet, there still being a possibility that it will be placed at Trail, owing to the difficulty as to the obtaining of a satisfactory water supply at Rossland.

Sixteen properties shipped ore or concentrates to the Trail Smelter during the week ending January 14th, the total being 6,510 tons. Included in these were three of the Clarence Cunningham properties, the Queen Bess, at Three Forks, and the Wonderful and Richmond-Eureka, at Sandon. For the first two weeks of the year a grand total of 12,214 tons have been shipped to the smelter, which is considered an excellent start.

Golden, B. C.

The Castledale Mine at Castledale, a copper property on which development work has been done to the extent of about 50 feet of tunnel and 60 feet of drift, is reported by C. H. Rowley, the superintendent, to be showing up well. He says that ore carrying between 15 and 20 per cent copper has been struck but the extent of this body will not be known until development is carried further.

Vancouver, B. C.

C. Camsell, in charge of the British Columbia Branch of the Geological Survey of Canada, is quoted as being of the opinion that the airplane should prove of much assistance in the exploration of the vast areas of northern Canada of which little is known. As a means for the transport of travellers and supplies to points almost inaccessible under ordinary conditions he considers the aeroplane of first importance. He states that, as far as the geological survey can learn, there are one million square miles, practically one-third of Canada, which has never been traversed by a white man. The greater part of this territory lies between the Rocky Mountains and the Hudson's Bay to the north of the provinces of Saskatchewan and Alberta. British Columbia, with the exception of a strip in the northeast section, has been examined and authenticated by geologists. Mr. Camsell spoke of the hydroplane as being the most suitable form of an airplane for the work in mind because, as the northern part of Canada is broken up by many lakes and rivers, there would be little difficulty in finding good mooring. In support of the suggestion it was pointed out that under present conditions geologists spent much of their time in travelling to the point marked for exploration. On one of his recent trips he left Edmonton in May and the party was absent for five months, six weeks of which period was devoted to the work in hand. Their destination then was Athabaska Lake, which is only a comparative short flight from Edmonton. With the development of the airplane during the war, and its present reasonable cost, Mr. Camsell thought it might be well that the proposal be given consideration. Mr. Camsell also referred to the loss of a number of the members of the staff of the Canadian Geological Survey, who have taken positions with a private Company, stating that their loss probably would mean the curtailment of this season's work.

Victoria, B. C.

It is definitely announced that the Consolidated Mining and Smelting Company of Canada has taken over the Jordan River properties, Vancouver Islands, known as the Sunloch Group. These have been under development for some time, about 1,000 feet of crosscutting and drifting and 300 feet of diamond drilling having been done. Besides this there has been constructed some 6,000 feet of automobile road. A four drill compressor plant has been installed and new building erected. A track also has been laid from the mine to the waterfront. The Consolidated Company is expected to pursue development energetically and it is possible, although no official announcement has been made, that, with confirmation of the belief that the Sunloch is to become a large producer, a concentrator will be installed. It has been known for some time that the Consolidated Company was interested in this property but not until now has a definite statement been authorized.

TORONTO NOTES.

Preparing for the annual convention of Canadian Mining Institute

(From Our Toronto Correspondent.)

Arrangements for the annual meeting of the Canadian Mining Institute to be held in Toronto on March 8, 9 and 10, were well advanced at the meeting of the Toronto branch last Saturday. Assistant Secretary Rose was present, and during the meeting a provisional program for the convention was drawn up and read. It will, of course, be subject to changes, but as it stands now the program provides for a full and very interesting three days. The first day will be devoted to an address of welcome, the President's address and the presentation of mineral statistics by John McLeish, T. W. Gibson, T. C. Denis and W. Fleet Robertson. Papers are expected from O. C. McKenzie, B. Geikie Cobb, W. H. Collins, F. E. Lucas and others.

At the Tuesday and Wednesday sessions time will be given to a consideration of the coal and oil resources of Canada when among the speakers will be J. T. Stirling, W. J. Dick, F. W. Gray, editor of the Canadian Mining Journal, W. B. Lanigan, freight traffic manager of the C.P.R., O. E. S. Whiteside, A. McLean, Edgar Stansfield, M Y. Williams, T C. Bosworth, Dr. R. C. Wallace, J. G. Ross, Professor Baker. Papers are expected to be read before the Iron & Steel Section of the Institute dealing with the manufacture of alloy steels in Canada, the new plate mill of the Dominion Iron & Steel Co., in Sydney, and the general question of fuel economy in steel plants. It has been arranged that J. A. Campbell, M.P., will speak at the evening dinner on the closing day.

The local committees have charge of the arrangements for entertainment, these to include luncheons, dinners and possibly a dance. It was decided at the meeting to send representatives to the Joint Committee of Technical Organizations. This Committee has been about three years in existence and was originally appointed to give the engineers an opportunity to help the Government in war work. It has been reorganized on a peace basis now. James McEvoy was appointed representative of the Toronto branch of the Canadian Mining Institute on the Committee.

Vickery & Co., a mining brokerage firm doing business at 56 King Street West, Toronto, has made an assignment and a meeting of creditors revealed what appeared to be assets in the neighborhood of $1200 as againt $40,000 liabilities. The firm carried on a business mainly on margin, the stocks dealt in being chiefly of Northern Ontario properties.

Sir John Carson, in his address to the shareholders of the Porcupine Crown ines, Limited, in submitting the annual report, pointed out that development had proceeded on the Canadian Kirkland, one of the company's options, despite the fact that they had been hampered by labor troubles, and good progress had been made. According to the annual report, surplus had been reduced $54.166, bring the account to $224,610 and comparing with an addition in 1918 of about $13,-000. Mine operating account, development, etc., during the year, totalled $46,736.

Schedule of Wage Rates and Classification agreed upon between the Dominion Coal Company and those of its employees who are members of the United Mine Workers of America.

1st Jan. 1920.

AT THE COLLIERIES

Surface.

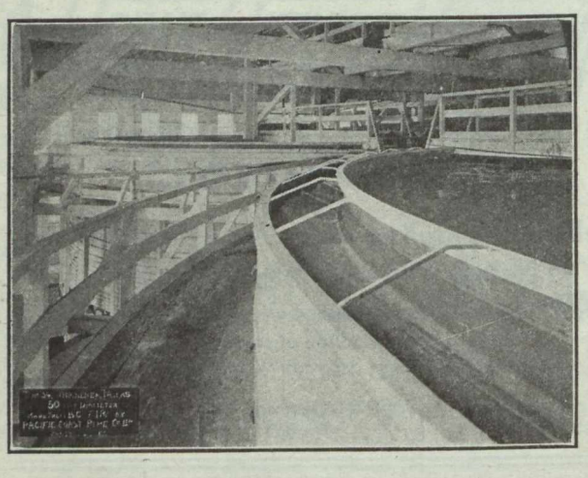
	Per Day
Headman (attending man cage or coal hoisting cage where men are lowered and dumping cage-man	$ 3.75
Tally boys (boys taking tallies out of empty boxes)	2.40
Tipple men, unhookers and grabmen, at head of slopes.	3.50
Bank and screen-men (including men reading off tallies at weigh scale)	3.50
Car shunters and trimmers (including box car trimmers)	3.35
Pit tub oilers,	3.30
Pick men , ,	3.30
Hoisting enginemen (including shafts and main trip haulages)	4.60
Man enginemen, shafts	4.60
Man enginemen, slopes	4.30
Main endless haulage	3.95
Fan enginemen (steam engine) Nos. 2 and 9.	4.00
Fan enginemen, other large engines.	3.80
Fan enginemen, small engines and motor fans.	3.55
Screen and bank mechanic, (No. 2)	4.00
Others	3.80
Box car enginemen	3.75
Brook and reservoir pumpmen	3.80
Compressor men (with oilers)	3.85
Compressor men (doing own oiling)	4.50
Compressor men, oilers	2.85
Head stokers	4.00
Stokers.	3.80
Ash wheelers and coal to fires	3.40
Convey men	3.70
Machinists, 1st grade.	4.00
Machinists, 2nd grade	4.00
Machinists, apprentices (boys)	2.80
Electricians.	4.05
Smiths, 1st grade	4.30
Smiths, 2nd grade	4.00
Smiths' helpers.	3.40
Carpenters, 1st class.	4.05
Tubmen and 2nd class carpenters	3.80
Masons	5.60
Masons' helpers	3.25
Teamsters (double team)	3.50
Teamsters (single team)	3.40
Stablemen, (per month)	110.00
Washhouse and boiler tenders	3.50
Washhouse tender only	325
Lamp room men (monthly) No. 2	120.00
Lamp room men (others)	100.00
Lamp room men (daily)	3.80
Lamp room boys	2.80
Laborers.	3.25

Underground

Examiners and shot firers (by night.	4.50
Examiners and shot firers (by day).	4.25
Boss drivers	4.00
Drivers, rooms	3.60
Drivers, levels	3.40
Pit stablemen.	3.60
Haulage enginemen (main deeps and main haulage)	3.80
Haulage enginemen, levels	3.55
Haulage enginemen, headways and small donkeys.	3.35
Trip riders, main deep and main and tail rope haulage	3.80
Others	3.55
Air loco drivers	4.00
Air loco brakemen	3.70
Spraggers	3.40
Rollermen.	3.80
Couplers	3.40
Pit tub oilers	3.40
Landing tenders (datal)	3.70
Onsetters (hoisting cages) headmen	4.00
Onsetters' helpers	3.70
Jig and balance onsetters	3.50
Brakeholders	3.30
Cage runners	3.80
Man cage onsetters (Nos. 2 and 9	4.05
Man cage onsetters, others	3.75
Rope examiners and splicers	4.25
Bratticemen	3.60
Trappers, men.	3.35
Trappers, boys	2.29
Roadmakers (main track and turnouts.	4.25
Roadmakers, others	4.00
Timbermen.	3.75
Pumpmen (capable of doing ordinary repairs).	4.00
Shartmen	5.00
Material men	3.40
General laborers	3.35
Assa. examiners	3.35
Asst. shotlighters	3.60
Machine repairs	4.00
Pick men, No. 2	4.25
Pick men, others	3.70
Pick boys	3.00
Miners (taken from the face to do other work)	4.50

Railway and Machine Shops

Classification	Rate per hour
Loco fitters	67.0
Loco. fitters helpers	44.0
Shop sweeper	40.0
Machinists	
Chargehand.	72.0
Machinists	67.0
Machinists' helpers	44.0
Scale repairmen	67 & 63
Tool-room keepers	44.0
Grab fitters	50.0
Wheel pressmen	50.0
Drillers	67.0
Drillers' helpers	44.0
Stokers	50.0
Compressor tenders	28.0
Pattern makers	67.0
Carpenters, wood machinists and wagon repairmen	62.0
Blacksmiths, 1st grade	67.0
Blacksmiths, 2nd grade	60.0
Blacksmiths' helpers	44.0
Boilermakers.	67.0
Boilermakers' helpers	44.0
Iron workers	62.0
Tool dresser.	67.0
Bolt threader.	50.0
Car Repairers	
Chargehand	67.0
Repairmen (steel cars)	62.0
Repairmen (wooden cars)	62.0
Painters	
Passenger cars, freight cars, etc.	62.0
Car oilers	44.0
Tub shop.	
Chargehand	55.0
Tubmen.	50.0
Tinsmiths	62.0
Head fitters, Glace Bay roundhouse.	72.0
Head fitters auxiliary roundhouse	67.0
Fitters, 1st class	67.0
Fitters, 2nd class	60.0
Fitters' helpers	44.0
Cleaners	44.0
Boiler washers	65.0
Sand dryers	50.0
Ash pit men	50.0
Car inspectors	60.0
Laborers	40.0
Moulders, 1st class	67.0
Moulders, 2nd class	60.0
Moulders' helpers	44.0
Brass moulders	67.0
Cupola tenders	62.0
Chippers	44.0



The Canadian Miners' Buying Directory.

Acetylene Gas:
Canada Carbide Company, Ltd.
Canadian Fairbanks-Morse.

A.C. Units:
MacGovern & Co.

Agitators:
The Dorr Co.

Air Hoists:
Canadian Ingersoll-Rand Co., Ltd.
Mussens, Limited.

Alloy and Carbon Tool Steel:
H. A. Drury Co., Ltd.
International High Speed Steel Co., Rockaway, N.J.

Alternators:
MacGovern & Co.

Spielman Agencies, Regd.
Aluminium:

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.

Antimonial Lead:
Pennsylvania Smelting Co.

Arrester, Locomotive Spark:
Hendrick Manufacturing Co.

Arsenic White Lead:
Coniagas Reduction Co.

Assayers' and Chemists' Supplies:
Dominion Engineering & Inspe tion Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
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.

Babbit 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.
The Mine & Smelter Supply Co.
Mussens, Ltd.
The Wabi Iron Works

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 & Gltssco
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:
Dominoion 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:.
The Mine & Smelter Supply Co.
Deister 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.

Conveyors:
The Mine & Smelter Supply Co.

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.
The Mine & 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
The Mine & Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Cyanide Plant Equipment:
The Dorr Co.
The Mine & Smelter Supply 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., Rockawaw, 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.
The Mine & Smelter Supply 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 Mine & Smelter Supply 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, L
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.
The Mine & Smelter Supply 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, Lt .
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
mart-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.

Siline:
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:
Ltnk-Belt Co.

Spring Coil and Clips Electrico:
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.
Northen 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.

ulphate 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
The Mine & Smelter Supply Co.

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
The Mine & Smelter Supply Co.

Tanks (water) and Steel Towers:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Chicago Bdidge & 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 Appuiances:
Jones & Glassco

Troughs (Conveyor):
Hendrick Manufacturing Co.

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

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

TTrucks:
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:
Prest-O-Lite Co. of Canada, Ltd.
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.

Xineonium:
Everitt & Co.

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

Zinc Spelter:
Canada Metal Co., Ltd.
Hoyt Metal Co., Ltd.

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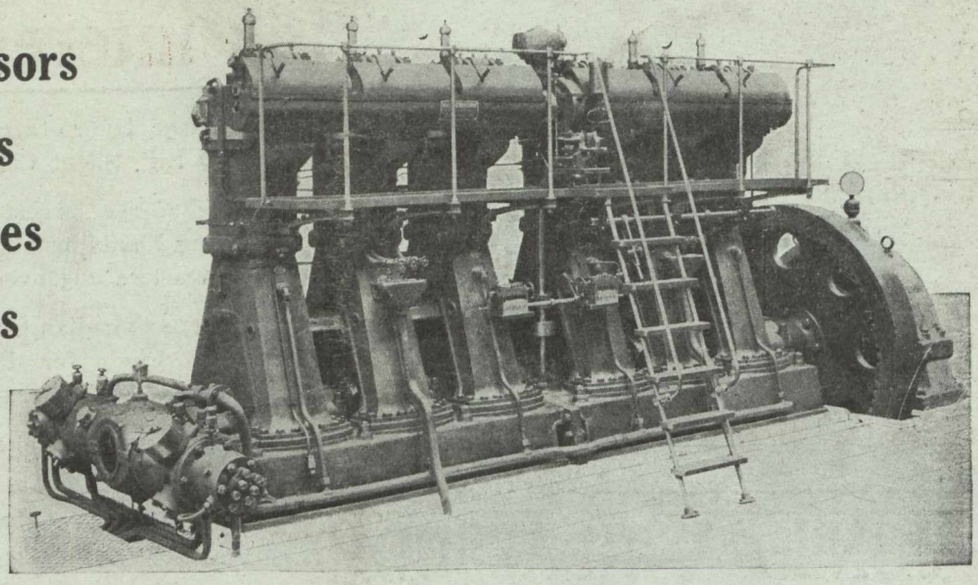

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