CANADIAN MINING JOURNAL

Vol. XLI. Garden City Press, Ste. Anne de Bellevue, March 5, 1920 No. 9.

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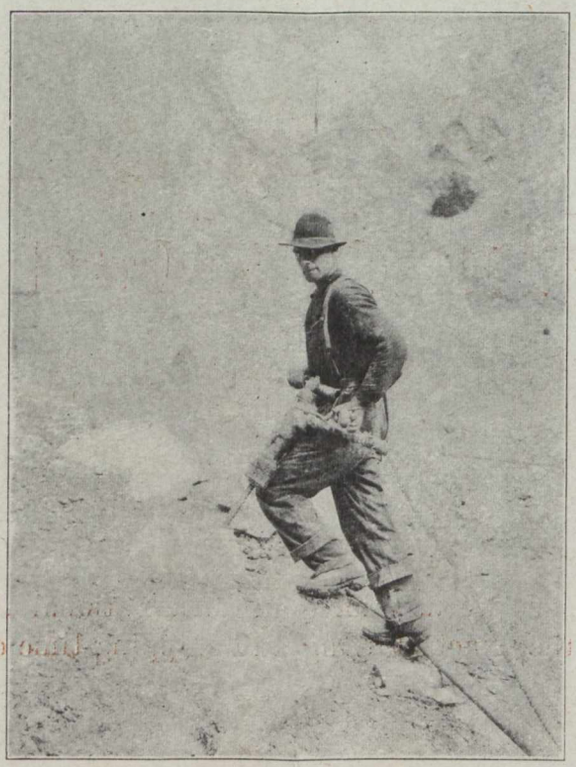

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PROVINCE OF ONTARIO

DEPARTMENT OF LANDS FORESTS & MINES

BUREAU OF MINES

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.

For list of publications, illustrated reports, geoligical maps and mining laws, apply to

Thos. W. Gibson,
Deputy Minister of Mines,
Toronto, Canada

CANADA
DEPARTMENT OF MINES

HON. ARTHUR MEIGHEN, *Minister* R. G. McCONNELL, *Deputy Minister*

MINES BRANCH

Recent Publications

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

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

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

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

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

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

The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B.Sc.

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

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

Summary Report of the Mines Branch, 1918.

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

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

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

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

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

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

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

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

GEOLOGICAL SURVEY

Recent Publications

Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should therefore, state what particular geologist's report is required, or what subjects they are interested in.

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

Memoir 108. The Mackenzie River basin, by Charles Camsell and Wyatt Malcolm.

Memoir 109. The Harricanaw-Turgeon basin, northern Quebec, by T. L. Tanton.

Memoir 110. Preliminary report on the economic geology of Hazelton district, British Columbia, by J. J. O'Neill.

Memoir 111. The Silurian geology and faunas of Ontario peninsula and Manitoulin and adjacent islands, by M. Y. Williams.

Memoir 112. Geology of the district belt of southwestern Alberta, by J. S. Stewart.

Memoir 113. Geology and mineral deposits on a part of Amherst township, Quebec, by M. E. Wilson.

Memoir 114. Road material surveys in the city and district of Montreal, Quebec, by Henri Gauthier.

Memoir 116. Investigations in the gas and oil fields of Alberta, Saskatchewan and Manitoba, by D. B. Dowling, S. E. Slipper and F. H. McLearn.

Museum Bulletin 30. Gabbros of East Sooke and Rocky Point, by H. C. Cooke.

Map 164A. St. John, New Brunswick. Topography.

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

Map 1585. Mackenzie River basin. Geology.

Map 1680. Portions of Grenville, Harrington, Chatham and Wentworth townships, Argenteuil county, Qubec. Geology.

Map 1708. Bridge river, Lillooet district, B.C. Topography.

May 1712. Foothills of Southern Alberta, St. Mary river to Highwood river. Geology.

May 1714. The Niagara peninsula, Ontario. Geology.

May. 1715. The Ontario peninsula. Geology.

Map 1724. Sheep River, Alberta. Geology.

Map 1726. Athapapuskow Lake region. Geology.

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

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

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

PROFESSIONAL DIRECTORY

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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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:-: EDITORIAL :-:

The Mineral and Metallurgical Industries of Canada and Customs Tariff

The guiding principle in the policies of the farmers' organisations in Canada is the immediate financial betterment of the farmer through decrease in taxation and the lessening of the price of agricultural implements and accessories by the abolition of protective tariffs. Mr. T. A. Crerar has publicly stated: "I would absolutely root out the principle of protection in our customs tariff."

In a straightly drawn issue between the merits of free trade versus protection there is no discharge in the war of argument, and unfortunately persons who have strong convictions on either side appear to draw these convictions from a natural preference, or perhaps it should be called a prejudice, which takes no account of economic facts. These prejudices partake of the nature of religious leanings, or they may be likened to the incompatibility of temperament between the prohibitionist and the non-prohibitionist. It is as useless, and as profitless to indulge in academic argument concerning free trade as compared with protection as to argue about many other matters that are merely a reflex of two eternally opposed types of human nature.

Unfortunately those whose business is connected with the production of minerals and their utilisation in Canada must reckon with economic facts, chief among which is that the two most important branches of Canadian mining and metallurgy, namely, the production of coal, iron, nickel and various ferro-alloy materials, and their utilisation in the arts on the Canadian side of the border, are based upon protective tariffs. This is a fact that is thoroly appreciated by the farmers in the East, which accounts for their disapproval of the root and branch condemnation of all forms of protection favoured by the western farmers. The day is coming when this conflict of agricultural opinion will be cured by the industrial development of the West itself. When the enormous coalfields of Alberta are developed on a scale somewhat commensurate with their extent, then we may expect to see the industrial activities of the West exceed the industrial activities of the East in the proportion that the fuel supply of the West exceeds that of the East. The possession of coal spells commerce, industry, political power and purchasing power. Coal is the most important commodity in modern civilisation. Its value exceeds that of agricultural products, because without coal large agricultural production is impossible, seeing that neither the provision of modern implements or transportation are possible in the absence of coal. The cure for the single and very selfish vision of the western farmer is the admixture of manufacturing industries with grain raising, and this will come in time.

Meanwhile, however, there is a grave danger that in order to reduce the cost of farm implements the farmers' parties may be willing—if they obtain the power—to chance the destruction of the established industries of Canada, on which the purchasing power and wealth of our population depend. If the farmer thinks that he can escape the effects of the financial depression which would cover Canada from coast to coast were protective tariffs completely abolished, he is much mistaken. The price of wheat would fall, and even at reduced prices would be beyond the purchasing power of Canadian industrial workers. The facts are so inescapable that, should the farmers' parties control Canadian politics, it may be expected, when faced with the actual responsibility, they would do as many other parties with similar aims have done in Canada, and decide they dare not risk the commercial disintegration of Canada to achieve a temporary saving in a few selected agricultural accessories, and to test a pet political theory.

There should be no ambiguity among the mining men of Canada as to the protected nature of their industry. The fact should be freely and frankly admitted, and the necessary steps should be taken to safeguard the industry when tariff changes are proposed. We believe also that the industry should look at the largest aspect of the question, and should not urge the exemption of tariff duties upon some specialised and selected equipment needed in mining operations, without fully realising that the basic mineral and metallurgical industries are all protected by tariffs, and that requests for small and relatively unimportant exemptions on mining equipment, may effectively weaken and vitiate a principle that works to the benefit of the larger interests of mining men as a whole.

BLASTING COAL ON THE NIGHT SHIFT.

The Dominion Coal Company, under the direction of the General Superintendent, Mr. A. J. Tonge, has decided to extend the practice of night blasting to all its collieries. For a number of months past all the shots in the Caledonia Colliery have been fired at night, and the system has lately been given general adoption in Nos. 2 and 9 Collieries, where two seams of coal are worked to a common hoisting shaft. The holes are bored during the day, and at night they are charged and bored by shotfirers. These men are specially certified as to fitness, and have the status of an official. The "Special Rules" governing the practice of shot-firing require strict examination as to the presence of mine gas and dust.

An examination of the records of the mine explosions in Nova Scotia will show that most of them were connected with blasting. Approximately four hundred lives have been lost in Nova Scotia coal mines by explosions attributed to blown-out or "flaming" shots, and each of the larger explosions is believed to have been so caused. The object of Mr. Tonge's decision to confine shot-firing to the night shift is, o course, to minimize the loss of life which may follow blasting on the day-shift because of the larger number of men at work underground. The plan should also be attended with more efficient and skilful blasting, arising from the added knowledge that comes from specialization. The chief merit of the new plan is, however, that it removes from the mine, during the crowded day-shift, what has by painful experience been indubitably proved to be the proximate cause of all the great colliery explosions in Nova Scotia, and an infinitely large number in collieries in other fields.

The seductive literature of the "Little Gem" still continues to appear in the "Montreal Star", but as the Company ceases to give away money, (which we gather is the equivalent of the withdrawal of the stock offer) on March 6th, possibly readers will be shortly deprived of this source of amusement. The latest advertisement quotes a telegram received from the mine in Alaska, which reads: "Vein widening "Quartz two feet wider and looks very good and pans strong". For the benefit of investors it is explained that "The words 'pans strong' mean that the ore pans "lots of gold, and 'Quartz two feet wider' means con- "siderable more ore". The explanation of the meaning of the telegram would appear on its face to be elementary, not to say gratuitous, and discriminatingly adapted to the intelligence of the prospective investor.

WHAT IS A CONCENTRATOR?

The varied usage of the term concentrator has been well brought out by the recent dispute over the interpretation of the Assessment Act in Tisdale township. Whether or not certain property of the Schumacher, Dome Lake, McIntyre, Dome, Porcupine Crown and Davidson mining companies should be assessed or not must be determined by the applicability of the term concentrator, for under the Act such are not assessable.

In the treatment of ores after they are brought to the surface at a mine, various processes are used to separate and recover the valuable constituents. The elimination of any material of less value than the average gives a product containing a correspondingly greater proportion of desirable constituents. This gives an increased concentration and the process may be spoken of as concentration and the agent as a concentrator. The agent might be a person handpicking the ore, either picking out and discarding waste or picking out and saving the pieces of supposedly higher grade. Such a person might properly be called a concentrator. Again the agent may be a machine or a series of machines doing work of a similar kind—mechanically separating better from poorer material. Such machines might well be called concentrators. If the man who acts as picker used a hammer to break the ore he is sorting, he and his hammer are concentrator and crusher and since the degree of concentration which he is then obtaining, necessitates the breaking of the rock, the hammer becomes a necessary agent—a part of the concentrating machinery though not itself doing any concentrating. Among the earliest records of mining in America are the stone hammers which are found in hundreds in Michigan native copper districts. The native copper was obviously concentrated from the mixed masses of copper and rock by men who wielded hammers. The men equipped with stone hammers were not simply rock breakers they were concentrators. So also if machines are used to separate better from poorer material and other machines are used to crush the ore preparatory to sorting it, these other necessary auxiliary machines become a part of the plant that is called concentrating plant. The crushers are not primarily designed to do any concentrating, though commonly they do a certain amount, owing to the fact that some of the ore crushes more readily or into finer particles than the remainder. A crusher is not of itself a concentrator, but it can be, and in concentrating plants is commonly made to serve in some way as a concentrator by utilizing its classifying action.

A very different type of concentration is that effected in smelting operations. Here instead of fine crushing and subsequent mechanical sorting, melting at high temperature is used to concentrate the valuable constituent. In the ordinary furnace operation the object is to separate the molten mass into two parts in one of which will be concentrated most of the valuable constituent, while in the other will be the greater part of the undesirable constituents. Advantage is here taken of the behaviour of metals when in the liquid state and the furnace may quite properly be regarder as a concentrating device.

Still another method of concentration is that of utilizing the solubility of minerals in water in which has been dissolved some chemically active substance lke sodium cyanide. In a dilute cyanide solution gold

and silver are soluble while many minerals and rocks are not. It is thus possible to effect a concentration of valuable constituents by separating a liquid part containing the metals from the solid part which contains relatively little of them. In the furnace, concentration is effected by the formation and separation of two hot liquid solutions, while in the cyanide plant, concentration is effected by the formation and separation of a cold liquid solution from a mass of solid particles. The cyanide plant, like the furnace, is therefore a concentrator. It is however not common practice among mill men to speak of either as concentrators, that term being used by them more specifically for plant used to effect concentration without solution.

What is meant by the term concentrator is therefore not easily determinable. When the average chemist or physicist speaks of concentration he seldom has in mind a machine for treating ores. If he happens to be interested in gold mining he probably considers cyanide plants and Wilfley tables and amalgamating plates all as concentrating machines. If he happens to be an iron furnace chemist he probably considers that concentration is very well effected in a furnace. The practice among gold and silver metallurgists however is to disregard the ordinary use of the term in order to have some useful name for the processes of effecting concentration in which resort to solutions is not used. The limited meaning of the term concentration has been generally accepted by each class of metallurgists. These same persons are however not very strongly inclined to reject the name concentrator for a plant in which solution processes are used. The term "mill" is frequently used as an alternative, but such use is open to objections also. Hence the latter is frequently used for all the buildings and plant at a mine in which the treatment of ore is carried on. The stamps, ball machines, tables, cyanide plant, melting furnace are frequently considered as parts of the concentrator. The term concentrator is used in gold mining districts practically equivalent to "metallurgical works". On the other hand the metallurgical works at Copper Cliff or Hamilton are not commonly called concentrators, and the terms are not equivalent.

Most of us would probably call the metallurgical works at Porcupine and Cobalt concentrators or mills indifferently not being satisfied that either was a good name. Where concentrators are named as not assessable the term concentrator will be more popular. In other places the shorter and more general term "mill" will doubtless continue to win favor until some more adequate nomenclature is adopted.

In the evidence, Mr. H. E. T. Haultain expressed the opinion that the term concentrator is understood to apply irrespective of whether the process is a mechanical one or if it is chemical. Mr. Gauthier claimed that if a chemical process is used it is not concentration. Mr. A. A. Cole would distinguish between concentrating, cyanding and amalgamating mills and is evidently of the opinion that the term concentrator is not applicable to the mills at Porcupine.

For the purpose of interpreting the Assessment Act the important determination to make is the common usage of the term concentrator in Ontario. Many will be found to agree with Prof. Haultain that the term is loosely applied to various kinds of mills in various localities. What names should be used for these mills is another matter.

The dispute should lead to the better nomenclature of metallurgical works. There is already a useful distinction made between two classes of works—mills and smelters. Mr. Cole's suggestions as to the classification of mills merit attention.

GRAPHITE IN SOUTH AUSTRALIA.

There is ground for believing that there is a bright future for the graphite industry of South Australia. The Director of Mines and Government Geologist, in his annual report, states:—"As in the previous year, a great deal of work was done in the testing of samples of graphite ore from Eyre Peninsula. The result was very encouraging, and taken in conjunction with the departmental reports on the mine, there is very good reason to believe that a valuable deposit of graphite exists in that locality, awaiting only the erection of a suitable mill to treat it. For the better treatment of samples of graphite ore, an experimental winnowing machine was constructed. The design was made in the department, and the construction carried out in workshops of the Public Works Department.

"Briefly this little machine consists of a narrow box, 2.5 ft. long, 2 ft. high, and about 8 ins. average width. A current of air is drawn through the apparatus by means of a small fan placed at one end of the box, and the ore is fed in through a slot in the top at the opposite end. The width of the box increases regularly from the feed to the end where the fan is. Arrangements are made whereby the formation of eddies is reduced to a minimum. The effect of the winnowing operation can be watched through the sides of the machine, which are of glass, and the final products are caught in a drawer, divided into a number of compartments, which fits into the bottom of the apparatus.

"Although no doubt capable of much improvement, still the machine is highly effective, and has eliminated to a large extent the uncertainty connected with the operation of winnowing by hand, which had to be practised formerly. The machine undoubtedly forms a basis upon which an apparatus working on a commercial scale could be designed."

Toronto officials of the International Nickel Company of Canada this week refused to verify the Canadian Press Despatch which stated that the company had bought the huge sulphite copper mines at Flin Flon outright for one million dollars. The despatch, which was sent out from The Pas, Manitoba, further says: "It is known that the nickel crowd have been negotiating for it since early in January and ten days ago it was reported that the deal was tied up satisfactory to both parties. A sum of nearly ten millions of dollars will have to be expended upon its development before taking out a pound of ore. This includes the construction of a railway from the Pas, the erection of a smelter and the harnessing of water power in the Churchill River, besides the usual mine equipment.

The death took place in Toronto this week of T. D. Ledyard, 74 Shuter Street, who for fifty eight years was a barrister in this city and a mining expert of some prominence. Deceased, who was eighty years of age, was educated in Toronto and the Old Country and was one of Toronto's oldest residents. He had retained his mental vigor and was at his office daily until his recent illness.

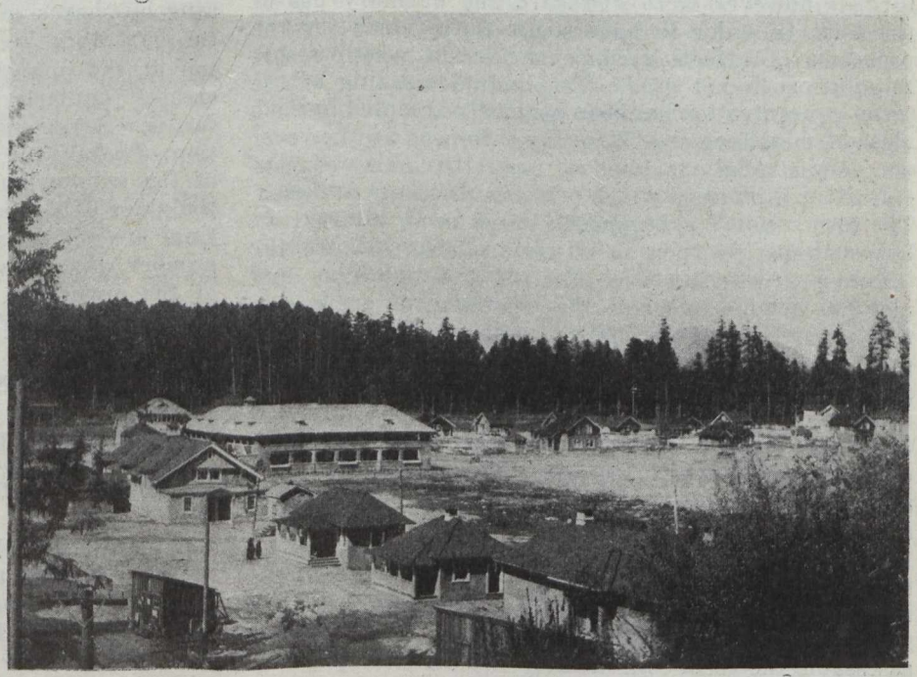
The Cassidy Colliery of the Granby Consolidated Mining & Smelting Company, Vancouver Island

A Colliery Lay-out which includes unusually complete provision for the comfort of the work people.

The Cassidy Colliery of the Granby Company is situated about eight miles from Nanaimo, on Vancouver Island. The site selected was beautiful in its original state, and care has been taken in laying out the residential district not to destroy its natural attractiveness. The residential site comprises eighty acres of an alluvial flat, or what is locally known as "bench land" overlooking the Nanaimo River to the North, Haslam Creek to the South, and is sheltered by a well forested ridge, 300 feet in height, to the East and West, which is being preserved as a park. In the distance can be seen the purple silhouettes of Mount Buttle, Tyee Mountain and other mountains. To one coming from the East, the tall trees luxuriant ferns and brilliantly tinted undergrowth are very pleasing. Close to the colliery site is a gorge of the Nanaimo River cutting through the Protection sandstones, of unusual beauty.

The seam worked at Cassidy's is the Upper Douglas Seam, which outcrops about ten feet thick, in the bed of the Nanaimo River at this point. From this seam the first coal on Vancouver Island was mined by the Hudson Bay Company in 1852. The area was thoroly tested by diamond drilling, and the first coal was hoisted from the Main Slope in June 1918.

The seam dips at about eight een degrees, and the coal varies in thickness from 5 to 20 feet, averaging about 10 feet. As is common in this district, the seam is disturbed by rolls, which at Cassidy's are more pronounced in the shales of the pavement, the roof shales being fairly regular. The coal, as seen at the screens, is very slickensided, and does not possess the regular laminated appearance, or the cleat of bituminous coals as they are usually found.



CASSIDY COLLIERY—GENERAL VIEW.

Small Panels and Large Pillars assure Maximum Extraction.

The mine is opened on the dip of the seam, the Main Slope having been driven to a depth of approximately half a mile. It is being driven 7 ft. x 14 ft. in the clear to allow for double track and is timbered with 12" x 14" framed sets spaced 4 ft. centres. A separate railway is provided as a travelling road and employees are not allowed to use the main haulage way in passing to and fro from their working places. The mine is worked on the pillar and stall system. The mine is divided into relatively small panels, as a precaution against mine fires, and large pillars are left along all main haulage roads and permanent airways, the idea being to extract a maximum amount of coal at the least cost rather than to take out cheap coal for a few years to the final detriment of the mine, as has been done in so many of the mines on Vancouver Island and elsewhere.

Storage Battery Locomotives Used Underground.

Mining is planned so as to deliver the coal from the face to the main haulage system by gravity as far as possible. Storage battery locomotives are used on the levels underground. No horses or mules are used.

The drainage system has been carefully planned so that surface water entering the mine from the gravel will drain by gravity, and water from workings below the Drainage Level will run to a central pump.

The mine is ventilated by a Sirocco fan, capacity 150,000 cu. ft. per minute. The mine is provided with a double intake and return airway throughout the workings which are planned so that the air can be taken to the face where required with a minimum loss.

The mine cars are of wooden construction having a capacity of 1¾ tons of coal. The track gauge is 36 inches. Hadfield manganese steel, self-oiling wheels 18" diameter and 3" tread are used. The mine cars are built in the company shops at the mine and have no end doors.

The Fan House is a concrete fireproof structure and also houses the telephone exchange and motor generator set for charging storage battery locomotives. The fan is driven by 150 H. P. Westinghouse electric motor.

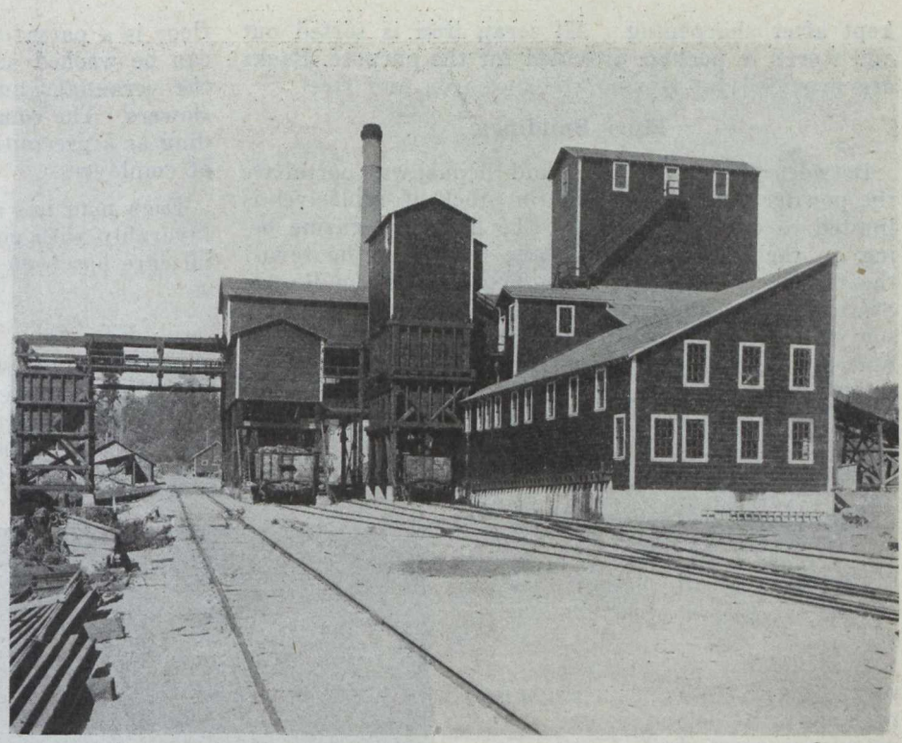
The main hoist is a Vulcan 18" x 36" double-drum second-motion hoist.

Tipple and Washery.

The tipple is equipped with Fairbanks scale, rotary drum, Marcus screen and loading booms. The railroad cars are handled with Fairmount car-retarders. The track scale is a Fairbanks Standard all steel and concrete, capacity 100 tons. The rock cars are handled with a special Wilson rotary dump.

The washery is equipped with two, 2-compartment jigs, having a capacity of 40 tons per hour each. The tipple and washery were designed by Roberts & Schaefer of Chicago. The washery is equipped with sludge recovery and uses the same water over and over again.

The washed slack is used in the new by-product plant at Anyox in making coke for the copper smelter and the lump, nut and some pea coal sold. The bone coal is burned under the colliery boilers.



CASSIDY COLLIERY—BANKHEAD AND WASHERY.

Special attention has been paid in the screening plant to protection of the coal against breakage. The "Marcus" screen appears to be a general feature of British Columbia and western collieries generally. A handy arrangement for raising and lowering the extension of the picking-belt that feeds the coal into the railway cars, is a small electric motor, which is used instead of the air-hoist that is generally seen in the collieries in the East.

Power and Water Supply.

The equipment for generating the motive powers used, and the arrangements of the water-works system, are all designed with a view to checking consumption by accurate measurement, and especial care has been taken to avoid radiation and condensation losses, and to effect every possible economy in fuel use. The colliery consumption at Cassidy's will no doubt show the economies which must follow such careful planning. The mechanical layout of this colliery is not by any means the least notable achievement of a really remarkable plant.

Power House.

The boiler plant at present consists of two Badenhausen water-tube boilers, 260 H.P. each, fired by Type "E" mechanical stokers. The ashes are removed by washing and fluming to the dump. The feedwater is heated with Webster feedwater and forced draft is used. The brick stack is 8 feet in diameter and 125 feet high. The boilers and steam pipes are all insulated with asbestos and magnesia to prevent loss of heat. Venturi meters are used to check quantity of water pump station and at the boilers.

The compressor is a Rand cross-compound condensing, capacity 2000 cu. ft. of air per minute. The air is used for running the underground drills, pump and hoists.

Electric power is supplied by an Allis-Chalmers 450 K. W. generator (2300 v. 3-phase 60 cycles, 360 rpm) and also an auxiliary unit 250 K .W. (2300 v. 3-phase, 60 cycles, 450 rpm) both direct connected to vertical high speed engines (Goldie & McCullough). The remainder of the electric equipment is of Westinghouse make. The power-house is equipped with the Bowser oil-handling system. A Worthington fire pump, capacity 1,000 gals. per minute, size 18" x 10 x 12", is ever in readiness for an emergency.

Exhaust-Steam Heating System.

The entire plant is equipped with an exhaust-steam heating system, the condensation being returned to the boilers.

Water Works System.

The pump station is equepped with two Morris Centrifugal pumps each having a capacity of 300 gallons per minute. These pumps elevate the water to the two 50,000 gal. storage tanks situated on top of the hill overlooking the town, from whence it flows by gravity through the water mains. The pumps are driven by 50 H.P. Westinghouse electric motors. A Venturi meter records the quantity of water leaving the station at all times. The Nanaimo River furnishes a plentiful supply of pure fresh water for domestic and power purposes.

Carpenter, Machine and Blacksmith Shops.

The shops are all thoroughly equipped, well lighted, and will be conected with the mine tracks. The carpenter shop is fitted with rip-saw, band-saw, planer, boring and mortising machine.

The machine shop is equipped with a large lathe, small lathe, planer and shaper, pipe-threading machine, drill press, emery wheel, etc. The shafting is all well guarded. The Master Mechanic's office adjoins the Machine Shop.

The Blacksmith Shop is fitted with two forges, steam hammer and swing crane. Adjoining the blacksmith shop is a special tool house where miners' picks are

kept after sharpening. All scrap iron is sorted out and stored in pockets provided for the purpose. Racks are provided for storing stock of iron and steel.

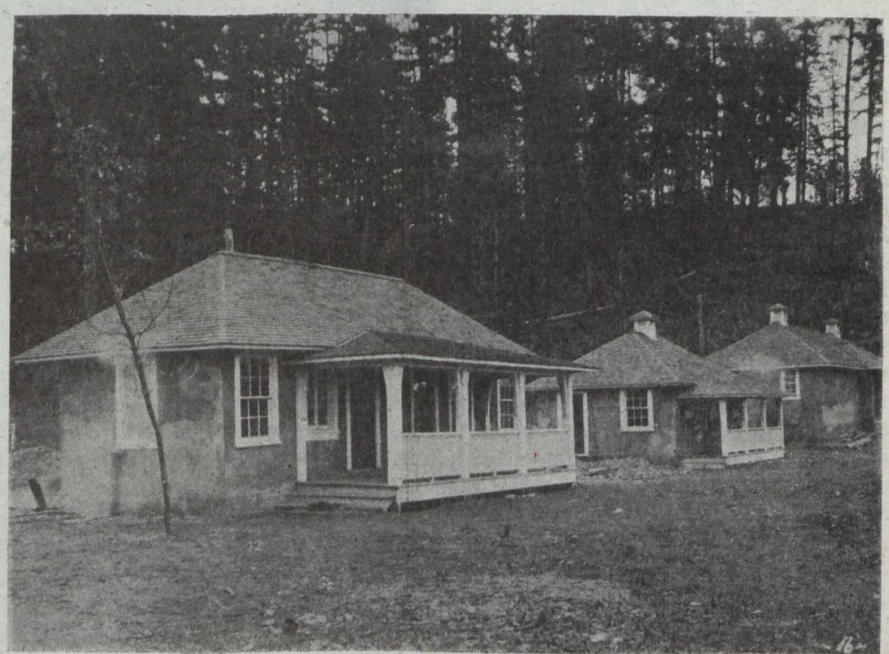
Mine Buildings.

Between the change house and the manway portal are the powder house (in which the stock of explosives is limited to one day's supply, the larger magazine being on the opposite side of the hill from the town) the timekeeper's office, lamp-house and Mine Rescue Station. The lamp house is equipped with 300 Edison storage-battery electric lamps. The Mine Rescue Station is equipped with Gibbs apparatus, lungmotor, smoke chamber, etc., and a large lecture room for holding First Aid or Mining Classes.

The above-mentioned buildings are all heated with exhaust steam from the power house.

Arrangements for Comfort of Workmen.

Cassidy's is unique, in Canada at least, in the care that has been taken to provide for the well-being, the health and comfort of the employees. The climate of Vancouver Island is one that permits a great deal of open air life, and indulgence in the pleasures of gardening to an extent difficult to appreciate in the East. Full advantage has been taken of the pleasant aspect of the site and the favourable climate to create a mining village that is without a parallel, in Canada at least. The streets have been boulevarded, and planted with one variety of trees to each street, which give their name to the street alongside which they are planted. For example, one street is an avenue of pink and white flowering hawthorn. Each house is surrounded by a lawn and flower beds, and the climate permits the use of hanging flower-baskets on the verandahs, a privilege that is not confined to the dwellings but is made full use of on the large verandahs of the Mess House and Rooming House.



CASSIDY COLLIERY. FROM LEFT TO RIGHT—TIMEKEEPER'S OFFICE, LAMPROOM AND RESCUE STATION.

The water system has already been referred to, and in addition to this, a modern sewage disposal system is provided. The colliery and town are provided with a telephone system.

Some idea of the style of the dwellings provided for the workpeople can be obtained from the accompanying photographs, but these do not show the houses to best advantage, as they were taken prior to occupation and completion of the lawns and gardens.

Accomodation for Single Employees—Rooming House.

The Rooming house for the accomodation of single employees is a "gunite" structure built in the form of a double "L". It contains about 80 rooms, all of which open to the outside verandah or balcony. The rooms are steam-heated, electrically lit, and each room is provided with running hot and cold water. The floor is a patent material "Raccolith" and the rooms can be washed out with a hose when necessary. On the verandahs and balconies are window boxes of flowers. The company supplies the furniture and bedding as a precaution to ensure cleanliness and comfort of employees.

Each man has a room to himself which compares favorably with good-class hotel accomodation. Especial care has been devoted to the lavatory provision.

Mess House.

The Mess House or Dining Room is a "gunite" structure and is equipped with every modern convenience. The men enter the building through a lobby equipped with wash basins and running hot and cold water, so that they may enjoy a refreshing wash, hang up their hats and then proceed through a pretty vine covered pergola to the Dining Hall. At the entrance to the Dining Room a drinking fountain is provided where a stream of clear cold water is constantly available. The Dining Hall is bright and comfortable cool in summer and steam heated in winter. Each table accomodates six men. No enamel dishes are used.

The kitchen is equipped with every labor-saving and modern device, which include an electric dish washing machine, vegetable-paring machine, tables heated by steam coils to keep dishes hot and a refrigeration plant. Living accomodation is provided up stairs for the help. The completeness of the kitchen must be seen to be appreciated.

The Dining Hall is one of particularly pleasing proportions, and its decoration is in the best of taste.

In order that there may be no waste the scraps from the Mess House are fed to pigs. A vegetable garden will furnish all vegetables for the Mess House.

The Change House.

The Change House is in charge of an ex-British soldier who is an experienced First-Aid man. Here the miners can turn in their working clothes, if they are wet, and have them placed in the drying-room by the attendant so that they will be perfectly dry and comfortable when the men are ready to go to work in the morning.

The change house is equipped with steel lockers which are heated with steam coils from underneath, shower baths and large lavatories including every convenience.

The plumbing is not of the rough and ready type usually seen in colliery wash-houses, but is all shining nickel and brass and porcelain. The writer has seen colliery change-houses in many countries, including the elaborate arrangements at the Westphalian coal-mines, but has never seen anything so workmanlike, durable, clean and attractive as the arrangements at the Cassidy wash-house. It reminded one of the wash-room and lavatory appointments of a good city club.

CASSIDY COLLIERY—THE MESS HOUSE.

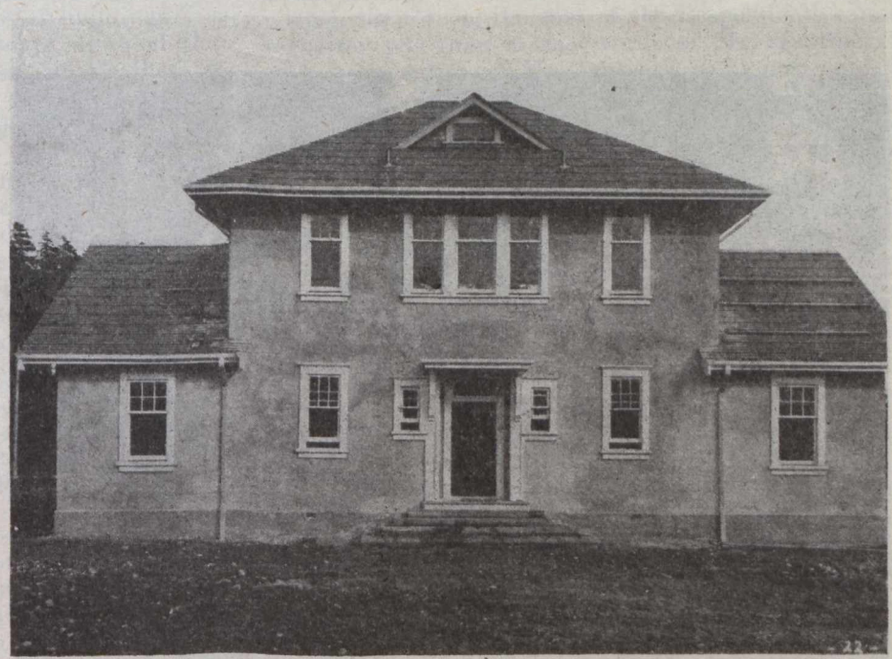
Hospital and First Aid.

A modern temporary hospital and first aid station has been established in one of the larger houses until the permanent hospital can be constructed. This hospital is in charge of a skilled Matron and trained nurse.

Cassidy Colliery and its residential features are an attempt by Mr. F. M. Sylvester, the Vice-President and Managing Director of the Granby Consolidated Mining & Smelting Company, to translate into actual being his conception of the duty of a large corporation towards those who serve it. The contrast between the residential conditions provided for mine workers at Cassidy's and those usually provided is so great as to come as an actual shock to those who have been accustomed to the traditional accompaniments of life in a coal-mining community of long-standing.

It is to be hoped that the actual operation of the colliery, under the ideal conditions of residence provided for the workpeople and staff, and with the aid of the extremely well-designed surface and underground equipment will reward the management of the Granby Company for its courage in blazing so wide a trail towards improved conditions of mining and mining life, a trail, unfortunately, that less wealthy companies will find it hard to follow.

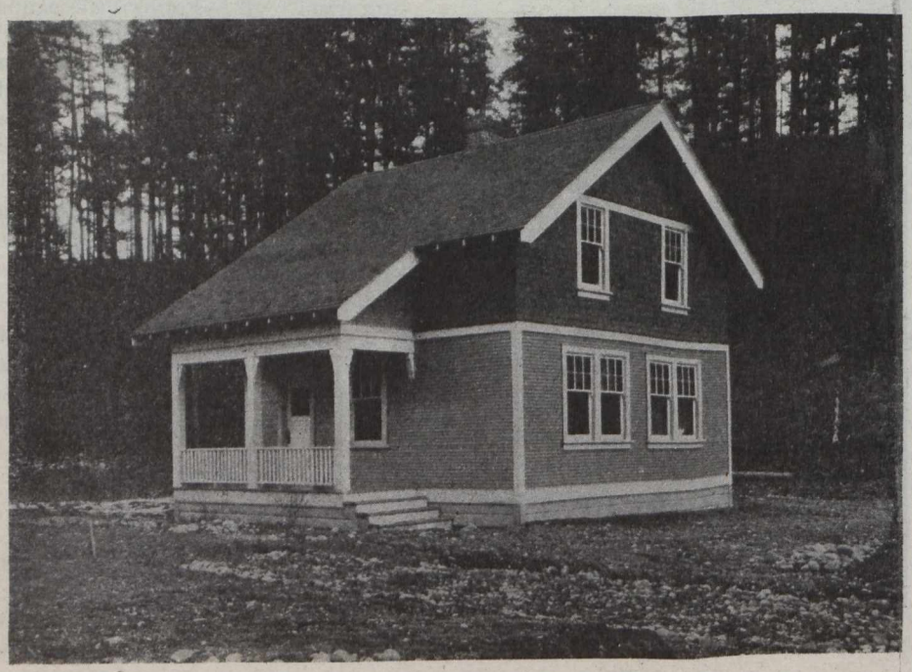
The Cassidy Colliery was developed chiefly to provide a supply of coking coal for the coking plant which supplies the copper smelting at Anyox, B. C., a purpose for which it is understood the coal has been found entirely suitable. This coking plant, the first full-scale by-product plant on the Pacific Coast, has



CASSIDY COLLIERY—THE GENERAL OFFICE.

been already described in the "Journal". (See C. M. J., 26th Nov. p. 881). The output of coal from Cassidy's has now reached 700 tons daily.

The coal area tributary to the Cassidy Colliery the subject of an unfortunate dispute as to ownership. The provincial grant under which the Granby Company holds the property was given under the Vancouver Island Settlers' Rights Act of 1904, the validity of which is attacked by the Esquimalt & Nanaimo Railway Co. The Settlers' Rights Act, as amended in 1917, was disallowed by the Federal Government in 1918, but it is not considered in British Columbia that the action of Ottawa ends this matter. In any case it is hardly likely that the outcome of the pending litigation will be allowed to interfere with the further development of the Cassidy Colliery, which has made so auspicious and commendable a commencement.



CASSIDY COLLIERY—TYPES OF RESIDENCES.

Outdoor Sports.

The Colliery is provided with one of the finest athletic parks in the country. There is a baseball diamond, football ground, tennis courts, bowling green and quarter-mile track. The athletic field is so large that a baseball and football game can both be played at the same time without clashing, and the entire field is as level as a billiard table. The hillside, back of the athletic field, forms a natural grand-stand and the company has reserved this as well as the timber on the other side of the town as a natural park.

The school is to be erected close to the athletic field, and playground equipment installed so that the school children will be enabled to enjoy all the advantages of the facilities for clean healthy sport.

Amusements.

A striking feature of the company's plans in laying down ideal condition under which the men shall work is the programme of entertainment and physical and metal relaxation provided. A temporary recreation hall has been provided with gymnasium, dancehall, library reading room, billiard and pool room. Provision is made for wrestling, boxing and every other means of amusement and recreation which it is possible to give the men.

The town is within a short distance of bathing beaches, in a first-class game country where pheasants, grouse, deed, wild duck and other game are plentiful, and within a few hundred feet of the best fishing waters on Vancouver Island.

Note:

The "Journal" wishes to acknowledge in the preparation of the foregoing description the use of the information contained in a paper read by Mr. R. R. Wilson, the Resident Manager of the Cassidy Colliery, before the Vancouver Meeting of the Canadian Mining Institute in November last. The rules of the Institute forbidding prior use of papers before they appear in the publications of the Institute prevent the presentation of Mr. Wilson's paper in full. We are also indebted to Mr. Wilson for the photographs included in the description.

TEXT OF JUDGMENT IN ASSESSMENT APPEAL BY SIX GOLD-MINING COMPANIES OF PORCUPINE, ONT.

The Assessment of Concentrators.

Between:—The Schumacher Gold Mines, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Dome Lake Mining and Milling Company, Ltd., Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The McIntyre-Porcupine Mines Ltd., Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Dome Mines Company, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Porcupine Crown Mines, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Davidson Gold Mines, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents.

Opinion of the Board.

These are appeals from the judgment of the learned District Judge of the District of Temiskaming allowing an appeal from the decision of the Court of Revision of the Township of Tisdale in respect of certain several assessments of the above. Applicants for the year 1919. The appeals were by consent of all parties heard together as the facts in the several cases were either identical or so closely similar that the same question was raised in each for determination by the Board.

It appears that the Assessor for the Township of Tisdale assessed each of the Appellants in respect of "Mill Buildings," Plant and Machinery," for specified amounts. The Assessments in respect of all six Appellants appear to be irregular as not sufficiently identifying the lands assessed, in that number of the Concession, Lot etc. is not given as required by Section 22 of "The Assessment Act," nor is the valuation in each case suggested under columns appropriated to "actual value of land," and "value of buildings," as prescribed by that section. The Board directed that subject to its determination of these appeals these irregularities should be cured and the assessment in those details made to conform to the requirements of "The Assessment Act."

Upon an appeal to the Court of Revision the assessments of the several Appellants were struck off, and upon an appeal to the District Judge the several assessments were restored. The question of the propriety of the Judges' determination turns upon the interpretation of subsection (4) of Section 40, of "The Assessment Act." This subsection reads as follows:

"(4) The buildings, plant and machinery in, on or under mineral land, and used mainly for obtaining minerals from the ground, or storing the same, and concentrators and sampling plant, and, subject to subsection 8, the minerals in, on or under such land, shall not be assessable."

No question arises upon these appeals as to the assessability of the buildings, plant and machinery in, on or under mineral land, and used mainly for obtaining minerals from the ground or storing them, nor as to the assessability of the sampling point or the minerals in, on or under such land; all these are admittedly entitled to exemption from assessment. The crux is the meaning and application of the term "concentrators" and whether the mills of the several Appellants properly fall within that designation, and incidentally also what is the status in respect of taxation of certain subsidiary structures such as pump houses, power houses, carpenter, machine and blacksmith shops, assay and refinery buildings etc.

The question raised here is a question of fact, as in the case of Township of Turnberry and North Huron Telephone Company, 4 O. W. N. 598, which is to be determined as all questions of fact should be, upon evidence. By the testimony of witnesses, and by a view of the McIntyre Mill, the nature of the operations, carried on in the various mills wes made to appear as well as the instrumentalities by which those operations are affected. In the result it was clear that by whatever route it is reached the sole objective of these complex operations is the segregation of the valuable constituents from the mass.

Coming now to the instrumentalities by which this objective is reached it appeared that they are divisible into two classes, mechanical and chemical Among the mechanical agencies are the crushers, stamps and other devices used to crush, pulverize, classify and separate the ore. The Chemical agencies employed are the amalgam process and the cyanide process reinforced by zinc precipitation; admittedly the latter is a purely chemical process, but as to the amalgam tables some witnesses asserted that their action was wholly physical, and others that it was partly chemical. In view of the conclusion reached by the Board on the main question this difference of opinion of the technical witnesses is unimportant.

It may be well to note here that of the six Appellants, the Dome Mines Company, the McIntyre Porcupine Mines, and the Dome Lake Mining and Milling Company use both the amalgam and cyanide processes, while the Schumacher Gold Mines and the Porcupine Crown Mines use only the cyanide and not the amalgam process, and the Davidson Gold Mines use the amalgam and not the cyanide process. All the mills take advantage of a property inherent in gold—its high specific gravity—a physical fact and of course neither a mechanical nor chemical process.

Upon these facts the case of the Respondents cannot be better put than in the words of Mr. Gauthier in cross examination of Mr. Dowsett, p. 21 notes of evidence:

Q. If there is a chemical process used it is not concentration, it is a process of metallurgy; it is the treatment of the ore metallurgically. In other words concentration of ore is purely and simply a mechanical operation; therefore a concentrator is a building in which only a mechanical operation is carried on.

Again in argument Mr. Gauthier said as reported, pp. 337, and 338 notes of evidence:

"We have evidence that the whole process of taking the mineral from the ground and finally refining the same is in the mining world, divided into three distinct branches; the actual mining and storing of ore, then there comes the ore dressing operation, or the preparation of that ore for shipping away from the mine or for treatment on the mining property. Ore dressing is the preparation by mechanical means of these ores for shipping away from the mines or for further treatment; then there is the division of metallurgy, which takes in the actual extraction of the metal from the concentrates or from the ore. Concentration and concentrating mills are used for the purpose of the mechanical dressing of ore for the purpose of treating it, or shipping it as concentrates. The cyanide mill or amalgamation mill is for the purpose of treating the ore itself as is done here. That is the distinction between the mills of the Cobalt Camp that are known as concentrators, and the mills that we have here for the purpose of treating their ores. The amount of con-

centration that is accomplished in a concentrating mill is 60 or 75 to one. The concentration that is accomplished, if you want to use the term in that way, in one of our Porcupine Mills is from rough ore down to bullion, or from 1000 to one, showing that the output from these mills is different from the output from a concentrator."

Applied to the mills in the so called Porcupine Camp Mr. Gauthier's argument comes to this, if a mill confines itself to purely mechanical processes in ore dressing, its output—a coarse product at best with the values still heavily involved in ton of dress—is concentrate and the mill is a concentrator and as such exempt; on the other hand such a mill ceases to be exempt from assessment if the mill owner supplements his mechanical appliances with an amalgamating or cyaniding plant or both, whih may enable him to turn out bullion of a fineness varying from 950 to 995 parts gold and silver in 1000 parts to from 50 to 5 parts base. In this conclusion Mr. Gauthier is supported by the evidence of several mining engineers. For instance, Mr. Arthur Cole, Mining Engineer, for the Temiskaming and Northern Ontarion Railway Commission is reported as saying at p. 302 notes of evidence:

"In looking over these different definitions (of concentrator) the best one that seemed to cover the case in point to my understanding best was, that concentrator is a machine that concentrates mineral by mechanical means without changing its chemical character."

Again at p. 302 notes of evidence; "It (Concentration) is to a certain extent the art of enriching ores by mechanical means."

Q. You would differentiate that term (concentrating mill or concentrator) from a cyanide mill or an amalgamating mill?

A. Yes, when the concentration is the essential part of it; When the cyanide part become the essential part of the mill then I would call it a cyanide mill.

Q. And an amalgamating mill?

A. In the same way, as soon as amalgamating becomes the essential part of the mill, I would call it an amalgamating mill.

Asked at p. 303 notes of evidence how he would describe the mills in the Porcupine Camp, his answer was: "I would call them all mills, I would call none of them concentrators."

While holding so strong an opinion Mr. Cole when asked (p. 309 notes of evidence) could give no reason why mills producing bullion should be taxed and the concentrating mills be exempt.

While aware that enactments conferring a special privilege such as this should be construed strictly the Board is of the opinion that to give effect to the intention of the Legislature in this case a broader meaning must be given the term "concentrators," one adaptable to the developments from time to time of a progressive art. For didactic purposes or purposes of exposition it may be convenient to portion out into separate compartments the complex successive processes observed by the Board at the McIntyre Mill, but in practice there is no such arbitrary subdivision. On the contrary the various processes are dovetailed into one another, at one stage mechanical process following chemical, but all contributing in some measure to the consummation sought; the segregation of the valuable and the expulsion of the worthless constituents.

As Professor Haultain when called as a witness for the Respondents says at p. 38 notes of evidence, speaking of the three divisions of ore dressing—mechanical—physical and chemical—referred to by Henry Louis in his work on Ore Dressing;

Q. Are these used in combination or how?

A. Always in combination.

Q. Various mines that have made and developed these processes have done so to what end?

A. To reduce the cost and increase the efficiency of the plant, and also to increase the capacity of the plant. These are the three ends.

Q. One would produce a finer product, something nearer the pure article?

A. Get rid of waste, I should have said.

Q. The more of that you do, the more of a concentrator you have?

A. Yes.

Again p. 93, notes of evidence:

Q. Paragraph 28, page 27 (Independence Correspondence School) states "The object of concentrating works is clearly to get the values in an ore into smaller bulk in order to diminish the trouble and expense of further treatment, and not for the immediate actual extraction of the metals in the ore?

A. That is a pretty good general statement.

Q. Is that a proper statement, if so, how can you make it coincide with your statement that the cyanide process carried on in the McIntyre mine or mill is concentration?

A. I think I had the McIntyre mill in mind when you were reading it; I think that applies to the McIntyre entirely.

Q. Don't they get it in the form of bullion?

A. Bullion is only one stage purer than the other. It is not the final product any more than coarse concentration. It is a matter of degree only.

Q. Bullion is an article of commerce.

A. So are concentrates. I have sold hundred of tons of concentrates.

Again on page 94, notes of evidence.

Q. Do you mean to say that the object of the McIntyre Mill is not for the immediate extraction of the metals in the ore?

A. I take that as an ordinary, common sense every day expression. That fits the McIntyre, both first part and second part. You can extract the value of the ore in the form of concentrates—dirty concentrates—clean concentrates— dirty bullion—clean bullion; there is only a difference in degree between any of them. You are extracting values in every case. They are not extracting pure gold or pure silver here; even if they were it would not make it any less a concentrating plant.

Q. Is the object of the work to produce concentrates?

A. It is to produce just what they say in the first part of that definition.

Q. Concentrates?

A. To reduce the bulk, and that is what the McIntyre does beautifully.

It seems to the Board that the solution of the controversy is to be found in certain statements made by Professor Haultain in the course of his testimony; for example—at page 35 notes of evidence:

Q. Dealing with the concentration of ores, is the term "concentration of ores" a scientific term, or what would you say it is?

A. It is not a scientific term, it is a colloquial term, it is a term describing a practice, an art rather than a science. I should think it is a term attached to a very varied practice and very varied art.

Again at p. 40:

Q. What do you say as to the cyanide process as to whether or not it is a method of concentration?

A. It is an ideal method of concentration.

Q. The amalgamation process that is in use at the McIntyre and at the Dome and some other mines, are you familiar with that?

A. Yes.

Q. Do you say that is a method of concentration?

A. Decidedly.

Again at p. 41:

Q. Is the term "concentrator" a term of fixed definite scientific meaning any more than concentration?

A. No, it is like so many of our other engineering terms. It is used loosely and has a variety of applications.

Q. What do you say is a concentrator as applied to a plant?

A. A concentrator as applied to a plant, that is more or less of a colloquialism.

A significant confirmation of Professor Haultain's testimony is this regard is to be found in the Report for the year, 1910 of Mr. Cole, Mining Engineer of the Temiskaming and Northern Ontario Railway

Commission. At page 19 the flow sheet of the Buffalo Plant using the cyanide process is labelled a "concentrator" and so at page 27 he designates "concentrator" the Nova Scotia Plant turning out bullion by the amalgam process. It is true Mr. Cole stated or the stand that his characterization of these plants was erroneous, and that he had corrected it in later reports, but the fact of the so called error seems to establish that the term "Concentrator" had not then at all events taken on a definite scientific meaning which excluded from that category a mill using chemical processes. In the Report of the Bureau of Mines for Ontario for the year 1910 in the division headed, "Mines of Ontario" contributed by Mr. E. T. Corkhill, Inspector of Mines, the Buffalo Plant and the Nova Scotia Plant are each designated a concentrator.

From this Board concludes as a fact that the term "concentrator" is a term loosely applied by technical men to various kinds of mills in various localities. and is not a rigid term of act having a strctly defined signification, and that a mill of the kind in question on these appeals s not disentitled to be termed a "concentrator" by reason of its combining chemical processes—the amalgamating or cyaniding or both—with mechanical apparatus is separating values from mineral bearing ore. It follows in the opinion of the Board the mills of the Appellants are not assessable. Mr. Cole concedes (p.324 notes of evidence) that the assay office and equipment and the refinery building and equipment go with the mill and should be exempt if the mill is exempt, and with this conclusion the Board agrees.

Two other classes of buildings with their equipment so far as the latter consists of fixtures, remain to be dealt with.

The first is the class of buildings with their fixed equipment, which are by their accessories physically connected with the several mines or mills such as pump house, power house, transformer house, boiler house. These are necessary to the proper functioning of mine and mill, driving lighting, heating, and watering them. "Machine includes the "engine that works it" (Stroud's Jud. Dict., Title "Machine.")

These, so vitally essential to the efficient working of a modern mine or mill, share the character of the latter and are entitled to the same exemption from assessment to the extent to which they serve mine or mill. To the extent that they are used for purposes other than to serve mine or mill the buildings are assessable, but the fixed equipment in its entirety, as fixed machinery used for manufacturing purposes, is exempt under Sections 5, subsection (17) of "The Assessment Act." It may be that the fixed equipment in the pump house cannot be regarded as fixed machinery used for manufacturing purposes, and that it is therefore, assessable but only to the extent that it is used for purposes other than to serve mine or mill. This proportion of the whole value of the pumping plant is however negligible. The telephone equipment of the several Appellants, while no doubt fixed machinery can scarcely be regarded as used for manufacturing purposes. It is however, physically annexed to mill and mine and is indispensable to the efficient working of both under modern conditions. Besides it exists and is used solely in and about the mines and mills of the several Appellants, the installation of certain instruments in the dwelling houses of officials and employees is quite consistent with such sole user. In the view of the Board this equipment is exempt, none of these companies being companies "carrying on business," under Section 14 of "The Assessment Act," and assessable as such.

The second class of buildings are those which do not form an integral part of mine or mill by reason of physical annexation as do those in the first class, and these are in the opinion of the Board assessable. This class includes such buildings as stables, blacksmith, machine and carpenter shops, store houses for other than ore, bunk houses, oil houses, dry and change houses, ice houses and offices. It is to be noted that while subsection (4) of Section 40 opens with an enumeration in general terms of things—buildings, plant and machinery—used for two specified purposes, it closes with an enumeration of specific things—"concentrators" and "Sampling plants." The class of buildings under consideration cannot fall under any of the things in the general enumeration in view of the limited purposes set out. If the Legislature had intended to exempt this class of building it would have enumerated them specifically along with "concentrators and sampling plant," but this it has not done. The fixed equipment in blacksmith, carpenter and machine shops may perhaps, though near the line, be regarded as fixed machinery used for manufacturing purposes, and as such exempt in toto, while the fixed equipment, if any, in the other buildings of this class is assessable as partaking of the nature of land as land is defined in "The Assessment Act." In the foregoing when the term "mine" is used, the reference is to the "buildings," plant and machinery in, on or under mineral land and used solely for obtaining minerals from the ground."

Where an apportionment of valuations requires to be made in accordance with the findings of the Board, the parties indicated that such apportionment could be made by agreement. Before adopting the valuations appearing in the statements furnished the municipality by the several companies the provisions of subsection(2) and (3) of Section 40 of "The Assessment Act," should be considered. The Board understands that the valuations appearing in these statements are the cost values of the several structures as carried on the books of the companies. It may be well that in many cases the cost at which a structure is carried on the books of the Company is quite different from the "amount by which the value of the land is increased" by the erection of the structure.

The appeals will be allowed and the several assessment rolls amended in accordance with the foregoing. There will be no costs to either party. There will be a fee of $10.00 in Law Stamps on each order payable by the Appellant, the Appellant in each case being recouped $5.00 by the Respondent.

(Signed) D. M. McINTYRE,
Chairman.

The Sudbury "Star" reports the death of Mr. Geo. Behenna, of Creighton mine, one of the pioneer miners of the nickel district. Mr. Behenna was captain of Stobie and Murray Mines when they were flourishing and Creighton just beginning. Stobie has been abandoned, and Murray is just opening up after 20 years inactivity. Mr. Behenna was born at Redruth, Cornwall, coming to the United States at the age of 24. After holding the position of captain of a copper mine at Champion, Michigan, for several years he came to the Stobie Mine.

Our Northern Ontario Letter

THE SILVER MINES.

At the time of writing, the New York quotations for commercial bar silver have receded to a fraction above $1.29 an ounce. This is approximately the point around which quotations may be expected to hover just as long as the white metal remains in a position where it is virtually standard, that is to say on a parity with gold on a basis of 16 to 1.

Detailed figures issued this week by the United States Bureau of Mines shows a further decline in the silver production of that country in 1919. This is pointed to as evidence that the less intensified development of the base metal mines of the U. S. from which a large amount of silver is mined annually as a by-product, is bound to bring the silver mines themselves into greater favor.

As an illustration of the favorable affect this situation is having in Northern Ontario where a large number of mines are operated exclusively for the silver they contain, is this week's announcement that the Keeley mine in South Lorraine will be re-opened, and that immediately following an aggressive development program an effort will be made to place the mine on a steady producing basis. In former years this mine was worked intermittently, but without commercial success. In the first place, it was never equipped with milling facilities. The cost of shipping the ore by truck and steamer to the railway was expensive and made it possible to deal only with the high grade ore. Now, however, with the price of silver having jumped to such high levels, and the operation company having decided to install a 20-stamp mill on the property, the indications appear to be that before the end of the current year the mine will be producing silver at a substantial rate. Work will commence on March 9th and will consist of de-watering the underground workings and the commencement of a comprehensive development scheme. In the meantime, the plans for the new mill have been completed, and the purchase of the equipment has already commenced. By the time the mill is on the ground the amount of development work accomplished is expected to have placed sufficient ore in sight to keep it running at full capacity.

The directors of the McKinley-Durragh Mines have declared a regular quarterly dividend of 3 p. c. payable April 1st to shareholders of record March 6th. The disbursement will amount to $67,428, and is the second to be paid so far this year. The total paid to date by this company amounts to 259 per cent., or some $5,754,163.

The Buffalo Mines has gone into voluntary liquidation, a winding up order having been issued for Mach 13th. The mine and its assets all pass to the Mining Corporation of Canada.

Development work on the Temiskaming Mine continues to add more ore to that already in sight. As yet, however, there is a tendency to regard the current developments as being somewhat similar to those of 1919 at which time the number of comparatively small shoots of ore were encountered from time to time.

It is stated that the proposal to merge the Adenac with the Victory Silver Mines, as outlined in last week's Canadian Mining Journal is meeting with considerable favor among the shareholders of both companies. Provided the consolidation goes through on the present basis of 1,000,000 of the new issue to the Adenac, 1,000,000 shares to the Victory shareholders and 500,000 shares to the treasury, it is believed possible that work may be commenced on the Victory part of the merger in the early spring.

Up to the present, Henry Cecil, holder of an option on tailings pile on the Chambers-Ferland mine has failed to consumate a deal. The option was for $55,000 and it had been planned to erect an oil flotation plant for treating the tailings.

From the outlying districts there is every evidence that the coming summer will bring increasing activity. The Gowganda district promises to be the leading prospective field, while interest in the Elk Lake and in the old South Lorraine district is steadily growing.

The Silver Bullion Mines, at Leroy Lake in the Gowganda district, having completed the purchase of the Dodds property, now announces that a $30,000 mining plant has been purchased from a Nova Scotia mining concern and is already in course of transportation to Elk Lake. Also, the contract for hauling the equipment from the railway to the property has been let, and it is expected that the mining plant will be in operation before the break-up.

In the South Lorraine district, the announcement that the Associated Gold Mines of Western Australia, operators of the Keeley Mine, will erect a new mill, has caused more than ordinary interest, and the indications appear to be that it may be the commencement of a general revival of activity in that promising silver distrirct. On a number of properties in the neighborhood of the Keeley there are encouraging silver bearing veins, the development of which is now given added incentive due to the high quotations for silver and, also, on account of the more abundant supply of labor.

The Cobalt branch of the G. W. V. A. continues to press its request for three free mining claims to all returned soldiers who were "bona fide" prospectors prior to enlistment. While it has as yet been impossible to secure definite figures, it would appear as though 10,000 would be a conservative estimate of holders of Miners Licenses who enlisted for service from Ontario. Provided this estimate is correct, the request presented to the government is for the surrender of approximately 30,000 mining claims, of 40 acres each, or a total of about 1,200,000 acres. This area would be equal to 52 townships of the size of Teck in which is situated the mines of the Kirkland Lake district or of Tisdale in which is located all the proven mines of the Porcupine field. It is believed that the government will not acede to the request, but, instead, will endeavor to find some other way in which to satisfy the request of the veterans without placing the entire mining industry of the province in jeopardy by adding to the already enormous area tied up and idle.

According to official advice from Thos. W Gibson, Deputy Minister of Mines, to the New Ontario Pros-

pectors' Association, it has been suggested that the following townships shall be transferred from the Temiskaming Mining division and added to the Larder Lake Mining Division:—Catherine, Pacaud, Marquis, Otto, Eby, burt, Black, Tolstoi, McEvay, Nordica, Terry, Lee, Sheba, Dunmore and Bombas. As regards this, the general feeling appears to be that such a transfer would be reasonable with the exception of the transfer of the townships of Catherine and Pacaud. These two townships, or that part staked for mining property, are largely held by prospectors and mining men resident in Cobalt, Haileybury and New Liskeard. For that reason it is believed that they should remain a part of the Temiskaming Mining Division the recording office for which is located at Haileybury. Concerning the request from the New Ontario Prospectors' Association, it is pointed out, the Department should keep in mind that such a request represents a total membership of less than one score.

During the week ended Feb. 28th, four Cobalt companies shipped a total of four cars containing 309,593 pounds of ore.

Following is a summary:—

Shipper	Cars	Pounds
McKinley-Darragh	1	106,850
La Rose	1	78,057
O'Brien	1	64,040
Hudson Bay	1	60,646
Totals	4	309,593

During the corresponding period, no bullion was shipped.

THE GOLD MINES.

For the first time for the past two years, some of the gold mining districts of Northern Ontario report a surplus of men. In some instances, according to official advice of your correspondent, men are applying for work faster than jobs can be found. While this does not show that the labor supply is favorable in all parts of the country, yet, when such a condition is found in some of the smaller camps, the belief is expressed that it will be a matter of but a very short time when the same will be true of the larger camps. In fact, all of the mining centers of Northern Ontario, the Porcupine field appears to be the only one where a shortage of men is being felt.

On former occasions, the remark has frequently been made: Give the gold mines of Northern Ontario adequate men and they will establish records which will totally eclipse all former achievements. From present indications, the next few months may see this actually being realized. Even now, the rate of the gold output will amount to more than $12,000,000 for the current year.

A statement issued near the close of February states that the annual report of the Hollinger Mine will be in the mails almost immediately, but that the annual meeting will not be held for some few weeks. As regards progress at the mine, the number of men is now stated to be upwards of 1,100, and with about three score machines in operation. Concerning the experiments in connection with mechanical muckers, it is yet too soon to pass judgment, but the impression appears to be that they will not be able to take the place of manual labor. However, in view of the improved labor supply, it will perhaps not greatly matter whether or not the mechanical muckers can be brought into general use.

The directors of the Dome Mines Company and the Dome Extension Company have sent a report to the shareholders outlining the progress made during the past year in developing the Dome Extension property on which the Dome Mines Company holds an option. The latter company has asked for a six month's extension of time, as forecasted in last weeks issue of the "Journal". Accordingly, the shareholders of the Dome Extension have decided to hold a meeting on March 10th for the purpose of considering and, if approved, ratifying such an extension. The statement shows that the cross-cue at the 10th level of the Dome has already passed onto the Dome Extension and is now about 150 feet, and advancing at the rate of 5 feet a day. It also states that exploration and development work will continue at the 6th level. At this point a lense of ore measuring about 14,000 square feet was developed and which contains average gold values of $4.62 a ton. Some 4,878 tons of ore were sent to the mill and averaged $4.39 a ton. It is estimated that up to the present not far under 1000 feet of underground work has been done on the Dome Extension.

Concerning the Clifton-Porcupine, the acting secretary Ernest H. Bridger, has sent out the following statement to the shareholders, under date of February 19th:—

Since out last report was mailed, bearing date of December 1st, 1919, development of your property has proceeded without interruption.

During that interval the main shaft has been continued to a depth of 225 feet. A station has been cut at 200 feet and all timbering, etc., has been completed in preparation for lateral work at that level. This work has included the cutting of an ore pocket and pumping station below the level, and the installation of a skip in the shaft for the more economical handling of ore and waste.

Crosscutting both east and west is now in progress to open up the veins, the development of which gave such satisfactory results on the first level. All of these veins should be encountered within the next thirty days.

The sinking of the shaft on Number 7 has proven that there is no change in conditions in the depth so far reached. Only a small amount of drifting has as yet been carried out on this vein, but this work has proven that values are fully equal to those opened up in this same vein on the surface and on the first level. It accordingly seems reasonable to expect good results from the opening up of November 6 the Boulder and other veins on this new level.

The scale of our operations is being enlarged and from now on it is expected that even more rapid progress can be made. The results of the work so far carried out have been entirely favorable. The attentions of the management will continue to be directed toward demonstrating the possibilities of the property with the least possible expenditure of time and money.

According to an official statemnt just issued by R. C. Coffey, general manager of the Lake Shore mine, the production for January was the highest so far in the company's history, amounting to $45,428.31. The average gold recovery per ton of ore treated was $25.80. Having thus regained its normal standing, the Lake Shore is expected to produce around $600,000 during the current calendar year.

Within the week the Miller Independence will switch on electric power. This is looked upon as of utmost economic importance owing to the increasing difficutly of securing coal. Also, within the week the mine will be connected up with outside points by telephone. The main shaft having been completed to the 510-ft. level, and a large working station having been cut, a contract for several hundred feet of lateral work is to be let. The "D" or inclined shaft has been de-watered to a depth of 100 feet and the work of de-

veloping ore will be carried on at the same time the deeper developments are being conducted.

Sinking operations are now under way at the Mondeau property of the Peerless company and the shaft, beginning with the former depth of 130 feet, is going down at the rate of from 4 to 5 feet daily.

British Columbia Letter

METAL MINES

Stewart, B. C.—A shipment of 250 tons of ore from the Premier Mine, Salmon River District, Portland Canal, B. C., recently was brought over the winter trail to Stewart where it was loaded on the G. T. P. Steamer, Prince John, en route to the smelter at Tacoma, Wn.

R. K. Neill, one of the owners of the property, is reported as saying that a cyanide plant is likely to be installed after development has advanced to the point that a steady supply of ore is assured.

Statements from those in a position to know indicate that the management of the Premier is experiencing some difficulty through the activity of agitators among the workmen. Confidence is expressed, however, that this will not seriously interfere with the plans in mind for development and operation.

Preparations are in hand for the commencement of work on the Spider Group, which consists of three claims lying north of Long Lake in the Salmon River section. This property is under bond to the Algunican Syndicate of Belgium, represented by W. A. Meloche, a mining engineer who was through the district last summer.

Fifty tons of supplies have arrived for the Spider Camp. It is planned to take them over the trail immediately by means of packhorses equipped with snowshoes. Some machinery required for initial development is expected to arrive shortly.

Sandon, B. C.—The annual report of the Silversmith Mines, Ltd., operators of the Old Slocan Star Mine, gives an account of 1919 activities. Ore mined amounted to 14,558 tons, of which all but 325 tons went through the Mill at the Mine. Concentrates were marketed on both sides of the line, the smelter at Trail receiving 19 cars of silver concentrates, 17 going south, and all but 3 of 24 cars of zinc concentrates shipped went to the United States. It is estimated the report asserts, that the ore in sight totals 90,000 tons.

Nelson, B. C.—At the recently held Annual Convention of the Associated Boards of Trade of Eastern British Columbia several resolutions affecting the mining interests of the Province were passed. One protested against the "Engineers Profession Act," a measure being presented to the Legislative Assembly which, it is alleged against it, would exclude all foreign engineers except those who are duly qualified members of the Association or have a temporary license from its Council. This, the Convention declared, is undesirable, if on no other ground, on that that its effect would be to bar engineers and others coming into the Province as the representatives of outside capital seeking investment. Another resolution dealt with the taxing of "so-called" profits from Mines, the opinion being expressed that an allowance should be made for the depletion of mines in assessing the Income Tax. The concluding two paragraphs read as follows:

"Whereas the United States Government and the Canadian Government both have granted such allowance and an eminent expert engaged by the British Columbia Government has reported favourably to such allowances;

"Both precedent and justice are in favour of granting an allowance for mine depletion and the Taxation Act should be amended accordingly."

Alice Arm, B. C.—The railway from Alice Arm to the Dolly Varden Mine is to be extended from its present interior terminal to the Wolf Group of Mineral Claims, a distance of about two and one half miles. That this work is to be undertaken this year, and that as little time as possible will be lost, is officially announced by the managemeint of the Taylor Engineering Co. This additional mileage involves some heavy canyon work and the Kitsault River will have to be bridged. The benefit to the district, and particularly its mining industry, will be substantial. Not only will it mean the development to a shipping point of the Wolf property, which together with the Dolly Varden passed from possession of the Dolly Varden Mining Co. to the Taylor Engineering Co., but it will give transportation facilities to several other promising prospects.

A. J. T. Taylor, managing director of the operating Company, confirms the report that workmen already have been dispatched to open up a camp at the Wolf, that a water power compressor is to be installed there, that some new plant is to be added to the equipment at the Dolly Varden, that a quantity of new equipment is to be provided for the railway, and that work will be commenced as soon as practicable on new ore bunkers at tidewater at Alice Arm.

The North Star Mine is one of those which, with the completion of the railway extension, will become a shipper. Already there is a considerable quantity of ore ready to be taken out. Others affected are the Toric, Tiger and Muskateer, now under development. With these, as well as the Wolf, waiting for the steel it would appear that before long now the Dolly Varden will have a number of rival shippers in the district.

The Last Chance, belonging to A. McPhail, is reported to be under bond to Messrs. Price and Keith, of New York. It now is being explored by diamond drill. The David Copperfield claims situated near the Dolly Varden, are said to have been bonded to Messrs. Watt and Watt. of Toronto, Ont., for the sum of $200,000, with a cash payment of $2,000. R. F. McGinnis, Wm. McLean and A. E. Wright are the original locators. The La Rose Group, situated about two miles from the Dolly Varden Ry. and about eight miles from Alice Arm, is to be developed extensively this year according to a recent announcement. A 450 foot crosscut tunnel and considerable diamond drilling are planned. For the past three years the property has been worked on a small scale, several shipments of high grade ore having been made.

D. J. Hancock, an operator of the Alice Arm District, has returned from Eastern Canada and the United States and asserts that he has been successful in exacting a promise from Major General Sir John Carson, president of the Crown Reserve and the Porcupine Crown, well-known properties of the Crown Reserve and the Porcupine areas to visit British Columbia accompanied by two engineers for the purpose of looking over the Alice Arm section with a view to investment.

Trail, B. C.—Ore receipts in gross tons at the Trail Smelter, Consolidated Mining and Smelting Co., of Canada, from the 31st January to the 7th of February, inclusive, were 8,057 tons, making a total for the year of 34,278 tons.

The management of the Consolidated Mining and Smelting Co. has announced an advance of 50 cents a day in the wages of their employees in all their camps to take effect on and from the 16th of February.

Authoritative announcement was made recently of some additions to plant and improvements in contemplation by the Consolidated Mining and Smelting Co., of Canada. One, of which brief mention already has been made, in the enlargement of the Copper Refinery Plant at the Trail Smelter. The purpose of this is to increase the output to 50 tons of refined copper a day the present capacity being 29 tons. This is rendered necessary by reason of a contract with the Canada Copper Company for the handling of about 130 tons of concentrates a day, with an estimated copper content of 25 per cent; the anticipated greater production of the Rossland mines: and the general mining development of the country. The cost of this is placed at $250,000. A Rod Mill, for which plans are complete, represents an entirely new line of industrial activity for the Company. Heretofore copper has been exported to the United States, rods produced and the material re-shipped to Canada for convertion into copper wire. Prior to 1916 all the copper production of Canada with the exception of a small amount of copper sulphate, was exported in the form or ore, concentrate, matte, or blister. A slight change but an important step forward, took place three years ago when some refined copper, from the plant of the Consolidated Co., Trail, was produced. And now the decision of the same company to put in a plant for the manufacture of copper rods at an expenditure of approximately $200,000 is a further advance in the independence of Canada, at least as far as the commercial perfection of this particular metal is concerned. A minor improvement, comparatively speaking, is the construction and equipment of a large machine shop, the functions of which will include some foundry work which formerly went elesewhere for attention, and which will be more efficient and modern in every respect. Draughtsmen are engaged preparing plans for the concentrator designed to treat the ores of Rossland and a definite statement as to its site, Rossland or Trail, is looked for soon. The installation complete is expected to cost $1,000,000.

Windermere, B. C.—The Ptarmigan, Sitting Bull, and the Bald Eagle, the former situated on Horse Thief Creek and the latter on Slade Creek, are properties on which development gives promise of good results. W. S. Watson is operating the Ptarmigan under lease and bond. While the owners of the Sitting Bull have been devoting most of their attention to the Trojan Mine, the ore of which contains copper values, and for the development of which a compressor run by gasoline power has been installed, they plan to extend the wagon road to the first mentioned property this pear. Operation on a considerable scale are expected then to be initiated. The Sitting Bull ore is a steel galena of a fairly good grade. On the Bald Eagle a crosscut is being driven to tap the vein. The Paradise, is a well-known mine of this district, and work is continuing shipments being made regularly.

Vancouver, B. C.—That the discoveries made in the Mayo District, close to Stewart River and about 200 miles southeast of Dawson Y. T., are as rich as reports have given them credit for is stated by J. E. Binet, a miner who went to the Yukon in 1895 and who arrived at Vancouver recently. He compares the ore with that of some of the richest pockets which twenty years ago made famous the Payne and Slocan Star and other well-known mines of the Slocan District of the Kootenays B. C. Assays, he states, give returns running from $150 to 1500 a ton in silver. Surface indication and development as far as it has gone appear to assure large reserves. The finds have been made above the timber line. Last summer, Mr. Binet says, the Yukon Gold Company bought the most promising claims, paying about $45.000, and one of the Company's representatives spent the season in camp. They are working all winter. At present the ore is being sent out by sleds to the bank of the Stewart River, 40 miles away, and from there will be shipped by steamer to White Horse and probably to the Anyox smelter in the spring. The Silver King, which was staked in the Mayor District two years ago, is reported to have yielded its owner, Thomas Aitken, who has shipped 3500 tons of picked ore, a modest fortune. The Guggenheims are expected to install a concentrating plant. It is estimated that there are about 165 miners in the district and work is in progress on claims situated on Kino Hill, Haldane, Patterson and Cameron Mountains.

Claiming that he has a legal claim to a one-fifth interest in the Engineer Mine, of the Atlin District, W. Pollard Grant, a barrister of Vancouver, B. C. has brought action against J. A. Fraser, gold commissioner and mining recorder. The latter is made defendant in his capacity as administrator of the estate of the late Capt. James Alexander and also of the estate of the late Allan I. Smith, of Philadelphia, the latter being named in Capt. Alexander's will as his sole legatee. Interest in this suit is keen because Mr. Grant is well-known on the Coast and because the Alexander Mine, admittedly a very rich property has been strong corporation and is likely to be sold for a considerable figure.

W. Porteous Sloan, of the Drum Lummon Mine, Skeena District, has returned from the North. He asserts that a new body of promising ore has been uncovered on the Drum Lummon and that it is expected that the Mill will be operating by next month .

Victoria, B. C.—The possibility of large deposits of alunite, situated near Kyuquot, West Coast of Vancouver Island, containing potash in commercial quantities is to be thoroughly investigated by Wm. M. Brewer and P. B. Freeland, Government Mining Engineers. They have been instructed to inspect the property as soon as possible, to obtain large samples and to undertake to see that the latter are so assayed as to leave no doubt as to the content of the mineral. If the claims of the owners of the deposits are substantiated there is no doubt that the establishment ot an important industry will result. There is some difference of opinion, however, on this point and it is to set at rest all questions of this character that the government engineers have been sent to investigate.

(*Continued on Page* 186.)

RESIGNATIONS FROM THE GEOLOGICAL SURVEY.

Copies of Letters and Resolutions of Protest from the Council and Branches of the Canadian Mining Institute.

February 21, 1920.

Sir George Foster,
Acting Prime Minister of Canada,
Ottawa, Ont.

Sir:—

I have been instructed by the Council of the Canadian Mining Institute to forward to you the enclosed copy of a letter sent to the Minister of Mines, with reference to the harm which the mining industry of Canada is suffering by the resignation of technical officers from the Geological Survey and the Mines Branch.

I am, Sir,
Yours faithfully,
(Sgd.) R. R. Rose
Assistant Secretary.
February 21, 1920.

The Honourable Arthur Meighen,
Minister of Mines,
Ottawa, Ontario.

Sir:—

The Council of the Canadian Mining Institute has noted with regret and alarm the large number of resignations from the staff of the Geological Survey. It is understood that the cause of these resignations includes the following:

a. Inadequacy of the salaries in actual amount, these being insufficient to meet the ordinary living expenses in Canadian cities.

b. Entire inadequacy of the salaries in comparison to those paid by private employees.

c. Unfair classification of the members of the Survey in view of the experience of the men who have resigned, their length of service and technical attainments, which has caused grave dissatisfaction and actually brought about the resignations.

While the council fully appreciate the reasons that have compelled the resignations, and sympathise with the geologists affected by the above-mentioned causes, it is chiefly concerned at the harm which the loss of these geologists will occasion to the progress of the mining industry in Canada. A number of letters and telegrams of protest have been received from the provincial branches of the Institute, copies of which are appended hereto. These protests represent accurately the feeling of the mining industry throughout Canada, and the Council desires to respectfully emphasise the extreme unwisdom of allowing the most capable and experienced men among the younger geologists of Canada to leave the country because of such an entirely indefensible scale of salaries as is provided by the classification.

The members of the Survey who have resigned are all men who have unique experience in certain phases of Canadian geology, and have become especially fitted by long service in the Survey to advise on the problems of our economic geology. On certain phases of the mineral industry in Canada, including oil occurences, coal, copper and precious metal deposits, the men who have resigned can give the most competent and expert advice obtainable. Such advice may mean millions of dollars to Canada, and this fact is well recognized by private corporations. The Council does not suggest that the scale of government salaries can compete with those offered by private companies, but it does most emphatically believe that the existing absurd and indefensible disproportion should be lessened, and that the members of the Geological Survey should be remunerated in keeping with their training, their professional attainments, their social status and their value to the mining industry, and through this to the country as a whole.

The Council would for these reasons respectfully suggest that the salaries of the members of the Geological Survey and Mines Branch should be reviewed, and that the obvious injustices of the existing classification should be removed.

I am, Sir,
Yours faithfully,
(Sgd.) R. R. Rose,
Assistant Secretary.

The Northern Alberta Branch, Canadian Mining Institute.

Edmonton, Alta.
Feb. 7, 1920.

Dear Sir:—

At the meeting of the above Branch the executive were instructed to draft up and forward to you a resolution with reference to the resignation of Dr. J. S. Stewart from the Geological Survey of Canada, protesting against the possibility of the local office being closed.

A meeting of the executive was held on Friday the 6th inst. when the following resolution was drawn up and I was instructed to send same to you with the request that you forward it to the proper authorities.

"That the Northern Alberta Branch look with anxiety upon the recent resignation of Dr. J. S. Stewart of the Geological Sulvey, whose work in the Alberta Branch has been most valuable and thoroughly appreciated.

This source of information has been taken advantage of and proved of great benefit to the Mining Industry, Boards of Trade and other individuals throughout the Province.

We hope and sincerely trust that adequate steps will be taken immediately to carry on the work of Dr. Stewart."

Kindly give this matter your very best attention in the interests of the Mining Industry.

Yours truly,
(Signed) JAS. A. RICHARDS
Secretary.

R. R. Rose, Esq.,
503-4 Drummond Bldg.,
Montreal, Que.

Night Letter.

SYDNEY, N. S.
Feb. 10/20.

R. R. Rose,
Asst. Secy., Canadian Mining Institute,
Drummond Bldg.,
Montreal.

It has come to the notice of the Council of the Mining Society of Nova Scotia that, owing to inadequate salaries paid by the Survey and Mines Branch of the Geological Department, some of the staff have been forced to resign. In the interest of the mining in-

dustry we wish to protest against the scale of salaries now being paid to such highly trained technical men, whose services to the country are of such value. We would urge that steps be taken immediately to make the salaries paid sufficient to attract and retain for the service a class of men of the standard formerly associated with the work of the Department.

E. C. HANRAHAN,
SECRETARY.

CANADIAN MINING INSTITUTE.
Hastings District Branch.
Deloro, 9th Feb. 1920.

Council of the C. M. I.,
Montreal, Que.

Gentlemen:—

Hastings District Branch views with alarm the wholesale resignation of the Geological Staff, and consider it necessary that energetic action be taken by the Institute to bring the matter forcibly to the attention of the Government.

Yours truly,
(Signed) R. A. ELLIOTT.
SECRETARY, HASTINGS
DISTRICT BRANCH.

The Northern Alberta Branch Canadian Mining Institute.

EDMONTON, ALTA.
Feb. 7, 1920.

Dear Sir:—

I am in receipt of your telegram of the 5th inst. which reads as follows:—

"Reference resignations of Geologists from Geological Survey, please forward protest by the Branch against the Government allowing resignations to continue."

This matter was brought up at a special meeting of the Executive of the Northern Alberta Branch when the following resolution was unanimously carrried.

"That the Executive of the Northern Alberta Branch regret to hear that it has been necessary for a considerable percentage of the regular staff of the Geological Survey to resign particularly as it will greatly hamper the progress of the Geological Survey throughout the Dominion, especially as it is required for the industrial progress of the country. The Executive therefore trust that immediate steps will be taken to restore to its former strength this valuable Branch of the Government service."

Yours truly,
(Signed) JAS. A. RICHARDS,
SECRETARY.

R. R. Rose, Esp.,
503-504 Drummond Bldg.,
Montreal, Que.

Night Letter.

COBALT, ONT.

R. R. Rose,
Asst. Secy., Canadian Mining Institute,
Montreal, Que.

The Cobalt Branch of the Canadian Mining Institute protests most emphatically against the Government allowing resignations of trained geologists from the Dominion Geological Survey on account of inadequate remuneration and suggests the immediate consideration of the reclassification of such men so as to allow them salaries more in keeping with their training and ability and showing less disparity with the salaries being offered by private concerns.

ARTHUR A. COLE.
SECRETARY.

MINING CORPORATION DIVIDEND.

The Mining Corporation of Canada, Limited, have declared a quarterly dividend of twelve and a half per share for the three months ending March 31st, payable March 15th to all shareholders of record March 1st.

MINING BROKER DEAD.

The death took place this week in Toronto of H. Acton Fleming of the Standard Exchange firm of Fleming & Martin. Death resulted from pneumonia following an attack of scarlet fever. He was among the best-known members of the exchange. Mr. Fleming is survived by a wife and two children.

A SAN FRANCISCO OPINION ON GEOLOGICAL SURVEY SALARIES

Canadian geologists are like American geologists in expecting their government to give them a living wage. We referred recently to the loss suffered by the personnel of the U. S. Geological Survey on account of resignations caused by the inadequacy of the salary paid to members of the staff. The same blight has fallen upon the Canadian Geological Survey. Out of a field staff of 25, no less than 13 have resigned since last October. As an example of the lack of appreciation for scientific service shown by the Government, and back of it, of course, the Parliament of the Dominion, we may instance a graduate of McGill university who was receiving $2100 per annum after having been on the Survey for ten years. He was offered, and accepted, $5600 per annum from Pearson & Son. All the younger men are leaving the Survey, and we do not blame them. One may love the rocks, but one cannot live on them.—Editor, Mining and Scientific Press.

METAL QUOTATIONS.

Fair prices for ingot at Montreal March 3rd 1920.

	Cents per lb.
Electro Copper	24½
Casting Copper	24
Lead	11¾
Tin	78
Zinc	12
Antinomy	14
Aluminum	34

BRITISH COLUMBIA LETTER

(*Continued from Page* 183.)

A bill has been placed before the Legislative Assembly of British Columbia providing for the amendment of the Mineral Act in such fashion that power will be given the Lieut-Governor-in-Council (the Government) to reserve from location and mining for iron any lands containing iron ores which are not at the time of reservation included in any mineral properties held under the existing or other statutes and to dispose of such reserved lands on such terms as to royalty per ton of ore removed as may be deemed advisable. This authority is to extend over a period of three years. Under the Act the term "Iron Ore" means any mineral deposit containing in itself or in the concentrates made therefrom not less than 40 per cent of metallic iron capable of being melted on a commercial basis.

Indian reservations of British Columbia are to be thrown open for the location and mining of gold and silver as and from the 1st of April of this year. This announcement is contained in a Provincial Gazette issued recently and with it is published the regulations, drawn by the Dominion Government under which mining on such lands will be governed.

THE COLLIERIES

The coal output of the British Columbia Collieries for the month of January, 1920, follows:

Nicola-Princeton Field.

	Tons
Princeton Coal and Land Co.	2483
Middlesboro Collieries Ltd.	9306
Fleming Coal Co., Ltd.	4100
Calmont Collieries	340
	16,231

Crow's Nest Pass Field

	tons
Crow's Nest Pass Coal Co.	66,254
Corbin Coal & Coal Co.	11,287
	77,541

Vancouver Island Field

	tons
Granby Consolidated Mng., Smltg. & Power Co., Ltd.	16,510
Vancouver-Naniaimo Coal Co.	4,881
Nanoose Wellington Collieries Ltd.	2,480
Canadian Western Fuel Co.	61,062
Canadian Collieries (D) Ltd.	70,394
Pacific Coast Coal Mines, Ltd.	7,665
	162,992
	tons
Twelka Collieries	350
Total for month	257,114

PERSONAL

Samuel W. Cohen, General Manager of the Bluestone Mining & Smelting Company, Mason, Nevada, has returned to Montreal, after an examination of the Company's property.

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.

Ashes Handling Machinery:
Canadian Mead-Morrison Co., Limited

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.

Bridges—Man Trolley and Rope Operated—Material Handling:
Canadian Mead-Morrison Co., Limited

Bronze, Manganese, Perforated and Plain:
Hendrick Manufacturing Co.

Buckets:
Canadian Ingersoll-Rand Co., Ltd
Canadian Mead-Morrison Co., Limited
The Electric Steel & Metals Co.
R. T. Gilman & Co.
Hendrick Manufacturing Co.
Link-Belt Co.
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:
Canadian Mead-Morrison Co., Limited
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.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Cable Railway Systems:
Canadian Mead-Morrison Co., Limited.

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.
Canadian Mead-Morrison Co., Limited.

Carbide of Calcium:
Canada Carbide Company, Ltd.

Cars:
Canadian Foundries and Forgings, Ltd.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
John J. Gartshore
MacKinnon Steel Co., Ltd.
The Electric Steel & Metals Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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:
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.

Coal Crushers:
Canadian Mead-Morrison Co., Limited

Coal Mining Explosives:
Canadian Explosives, Ltd.

Coal Mining Machinery:
Osborn, Sam'l (Canada) Limited.
Canadian Ingersoll-Rand Co., Ltd
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery
Canadian Mead-Morrison Co., Limited.
Link-Belt Co.

Coal Pockets:
Canadian Mead-Morrison Co., Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Mead-Morrison Co., Limited.

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.

Conveyors—McCastin Gravity Bucket:
Canadian Mead-Morrison Co., Limited.

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.
Canadian Mead-Morrison Co., Limited.
Link-Belt Co.
R. T. Gilman & Co.
Smart-Turner Machine Co.

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.
Osborn, Sam'l (Canada) Limited.

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.
Osborn, Sam'l (Canada) Limited.
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:
American Cyanamid Company.

Cyanide Plant Equipment:
The Dorr Co
The Mine & Smelter Supply Co.

D. C. Units:
MacGovern Co.

Derricks:
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
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.
Canadian Mead-Morrison Co., Limited.
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.
Osborn, Sam'l (Canada) Limited.
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
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Drill Steel Sharpeners:
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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:
Canadian Mead-Morrison Co., Limited.
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.
Canadian Mead-Morrison Co., Limited.
Fraser & Chalmers of Canada, Ltd.

Engines—Gas and Gasoline:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd.
Osborn, Sam'l (Canada) Limited.
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
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.

Engines—Marine:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
MacGovern & Co., Inc
Swedish Steel & Importing Co., Ltd.

Engines—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
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:
Canadian Mead-Morrison Co., Limited.
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:
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.

Hoists—Air, Electric and Steam:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Fairbanks-Morse Co., Ltd.
Jones & Glassco
Canadian Mead-Morrison Co., Limited.
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.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co.

Hoisting Towers:
Canadian Mead-Morrison Co., Limited.

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
Osborn, Sam'l (Canada) 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.
Osborn, Sam'l (Canada) Limited.
International High Speed Steel Co., Rockaway, N.J.

Mining Requisites:
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) 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 Handling Equipment:
Canadian Mead-Morrison Co., Limited.

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.
Canada Wire and Iron Goods Company.
Greening, B., Wire Co.

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

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

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

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

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

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

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

Platinum Refiners:
Goldsmith Bros.

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

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

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

Pumps—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
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, Ltd.
Mussens, Limited
Mine & Smelter Supply Co.

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

Pumps—Diaphragm
The Dorr Company

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

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

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

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

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

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

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

Rope—Manilla:
Osborn, Sam'l (Canada) Limited.
Mussens, Limited

Rope—Manilla and Jute:
Jones & Glassco
Northern Canada Supply Co
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Canada Wire and Iron Goods Company.
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.
Canadian Mead-Morrison Co., Limited.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Ship Bunkering Equipment:
Canadian Mead-Morrison Co., Limited.

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:
Link-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.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
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.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
R. T. Gilman & Co.
The Wabi Iron Works

Sulphate of Copper:
The Mond Nickel Co., Ltd.
Coniagas Reduction Co.

Sulphate of Nickel:
The Mond Nickel Co., Ltd.

Surveying Instruments:
C. L. Berger

Switches and Switch Stand:
Canadian Steel Foundries, Ltd.
Mussens, Limited.

Switches and Turntables:
John J. Gartshore

Tables—Concentrating:
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.

Tanks:
R. T. Gilman & Co.

Tanks—Acid:
Canadian Chicago Bridge & Iron Works
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
Osborn, Sam'l (Canada) Limited.
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.

Weighing Larries:
Canadian Mead-Morrison Co., Limited.

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

Winches—Power Driven:
Canadian Mead-Morrison Co., Limited.

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.
Canada Wire and Iron Goods Company.
Dominion Wire Rope Co., Ltd.

Wire Rope Fittings:
Canada Wire and Iron Goods Company.

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.

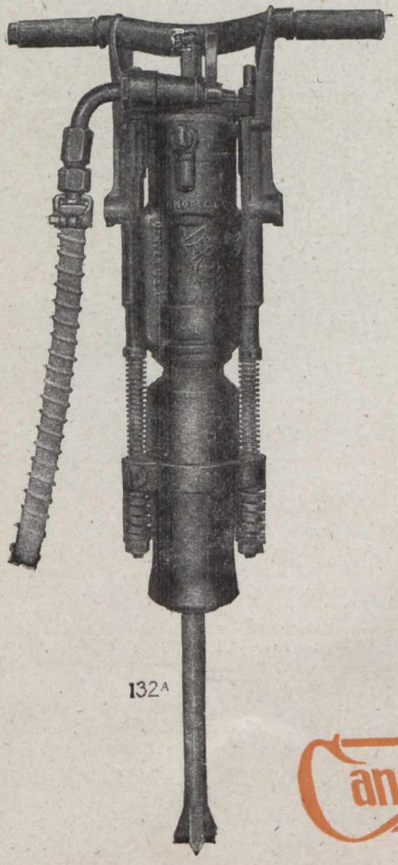
Woodworking Machinery:
Canadian Fairbanks-Morse Co., Ltd

Zirconium:
Everitt & Co.

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

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

ALPHABETICAL INDEX TO ADVERTISERS



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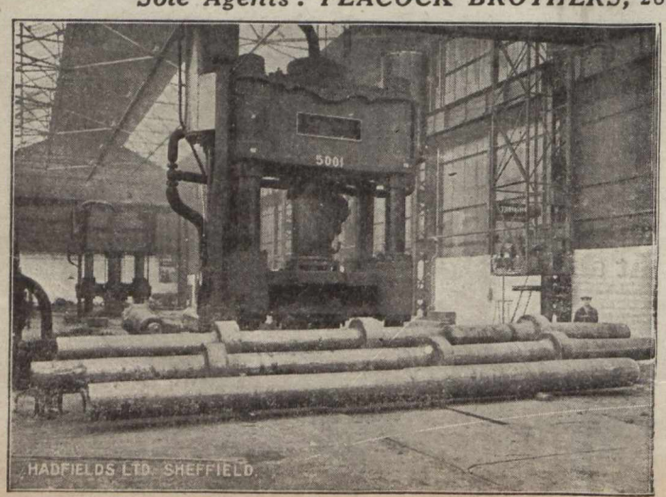

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