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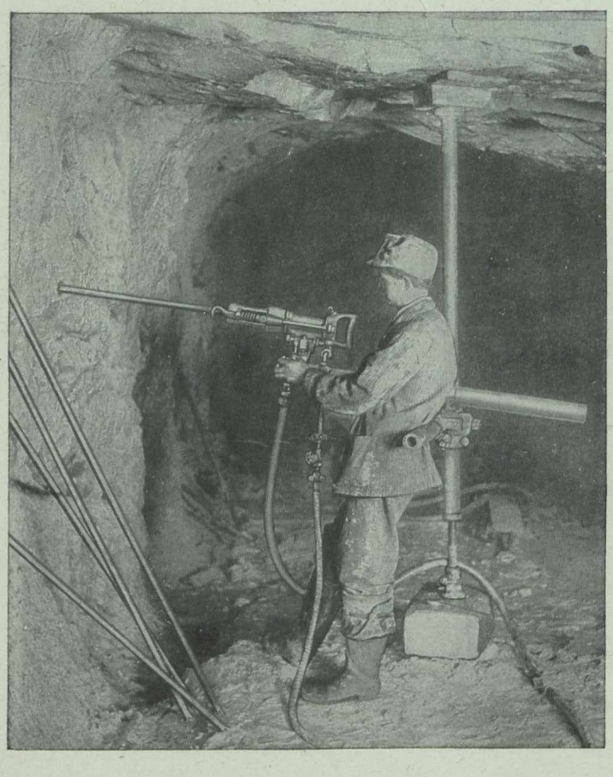
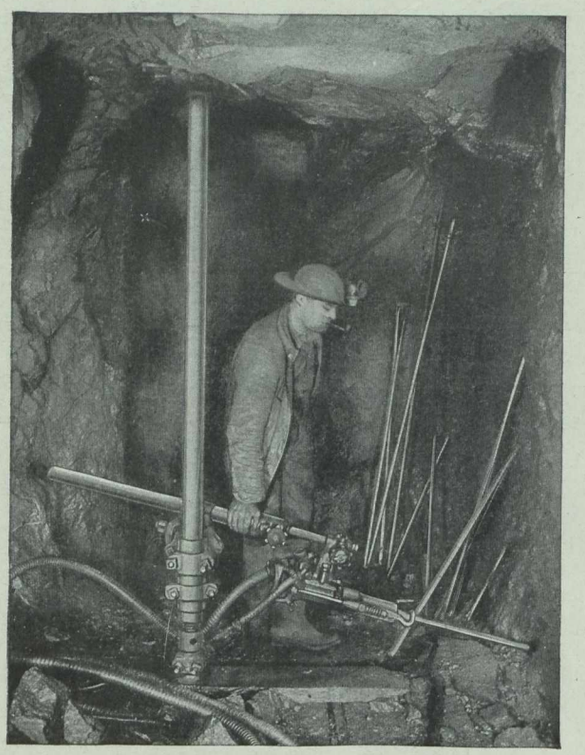
"NO CRANK TO YANK"



Sullivan Rotator on "Pnufeed" Mounting, Normal Position



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The Flotation Process

All patent and other rights to this process in North America are now controlled by

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who is the registered owner of the following Canadian patents: Nos. 76,621; 87,700; 94,332; 94,516; 94,718; 96,182; 96,183; 99,743; 127,397; 129,819; 129,820; 134,271; 135,089; 137,404; 142,607; 147,431; 147,432; 148,275; 151,479; 151,480; 151,619; 151,810; 157,488; 157,603; 157,604; 160,692; 160,693; 160,694; 160,846; 160,847; 160,848; 160,849; 160,850; 160,937; 163,587; 163,608; 163,707; 163,936; 165,390; 166,415; 167,474; 167,475; 167,476; 167 603.

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

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

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

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

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TORONTO, CANADA

THE CANADIAN MINING JOURNAL

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REGINALD E. HORE

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CIRCULATION

"Entered as second-class matter April 23rd, 1908, at the post office at Buffalo, N.Y., under the Act of Congress of March 3rd 1879."

CONTENTS.

SUDBURY'S NEW INDUSTRY.

The power problem of the British America Nickel Corporation has been settled.

From now on, rapid progress may be expected at the property at Murray Mine, Sudbury district, Ontario. During the past several months exploration has been carried on with considerable success and additional ore located by diamond drilling. Plans made for the construction of smelter and refinery have not been carried out, pending arrangements being made for power. Satisfactory arrangements have now been made for power. The plans have been approved by Sir Adam Beck and will be acted upon as soon as the Ontario Government passes on them. This should be only a matter of a few days now.

During the past few weeks there have appeared in several papers, news items from Boston and New York concerning the British America company as a factor in the nickel market. There has been expressed some doubt as to the intentions of the company. We can assure our readers that the British America Nickel Corporation is to be a big factor in the nickel industry. It owns good orebodies and a proved process for treating the ore; it has arranged for the sale of its product; and it has employed a manager who has a reputation for getting things done. The men in charge of the corporation's affairs have during the past year encountered and overcome several difficulties and are now only awaiting approval of the Ontario Government before proceeding with construction work.

The demand for nickel is so great that the entry of a third big company into the Sudbury district has long been expected. It seems likely that there will be a ready market, during and after the war, for much larger quantities of nickel than can be produced at present. The two present producers will of course be somewhat affected by the new producer; but there is plenty of business in view for all.

The Sudbury district is to be congratulated on securing a new industry. A nickel-copper smelter and refinery near Sudbury is no longer a mere dream. The plans are ready and the money is available. A company controlled by the British Government will in less than two years be shipping nickel from Sudbury to England.

MORE RESEARCH BUNKUM.

There has just reached this country from London a report on the resources and production of iron ores and other principal metalliferous ores used in the iron and steel industry of the United Kingdom. The report was prepared at the instance of the Advisory Council, Department of Scientific and Industrial Research, "to assist their Standing Committee on Metal-

lurgy in their survey of the field for research in connection with iron and steel."

Those who prepared this report may have believed that they were compiling useful information. If we are to judge from what they say of Canadian ore deposits, however, it would seem necessary to request the Advisory Council to gather a little real information on Canadian resources before publishing more reports on them. The present report, so far as references to Canada are concerned, does not reflect credit on its authors or on the organization responsible for its publication.

The report is neither accurate nor up-to-date. Although just published, it contains such absurdities as the following: "New furnaces have lately been installed at Deseronto, Hamilton, Midland, Sault Ste. Marie and at Port Colborne"; "mining operations are at present being carried on at Moose Mountain and at the Atikokan Range, west of Port Arthur." From such statements it is evident that the authors have depended on reports now out of date. There is no excuse for this, as many more recent reports are available. As our readers are aware, Moose Mountain and Atikokan Range mines are idle. The chief producer is the Magpie. The Ontario furnaces mentioned have been in operation for several years. Most of the iron ore used is imported.

One of the chief constituents of much of the steel used in armament is nickel. As most of the nickel used in the world is produced in Ontario we might expect to find in the Advisory Council's report a fairly intelligent account of Canadian nickel deposits. In view of the fact that much has been recently published concerning these deposits we might be pardoned for expecting the review to be up-to-date as well as accurate. Even an Advisory Council may be expected to make some attempt to gather reliable information. There is, however, no indication of this in the report on Canadian nickel. Here is the Advisory Council's grotesque account of the occurrence of nickel in Canada:

"Canada.—The most important deposits of nickel, at present known to exist, are those of Cobalt and Sudbury, both in Ontario, Canada. A recent find of nickel ore has also been made at the Alexo mine, in North Ontario.

"J. D. Frossard has described the nickel ores of Sudbury (Philip and Son, London, 1893). E. D. Peters has also published an important paper on the Sudbury nickel and copper deposits in the Transactions of the American Institute of Mining Engineers, 1889. The deposits were first opened up in 1884 during the construction of the Canadian Pacific Railway, when, in making a cutting near Sudbury, the deposit now known as the Murray mine was discovered. The following are analyses of some of the nickel-cobalt-copper-ores of Sudbury:—

	Canadian Copper Co. (1889) Per Cent.	"Bessemerised" 1892 Per Cent.
Nickel	14.84	35.93
Cobalt	0.27	35.93
Iron	31	1.09
Copper	27.06	40.98
Sulphur	26.9	19.71
C, SiO_2 and other impurities	0.92	2.29

As everyone interested in nickel should know, the world's chief source of supply is the Sudbury district, Ontario. Some nickel ore is produced at Cobalt, but the quantity is very small in comparison with the Sudbury output. The statement of the Advisory Council that "the most important deposits of nickel are those of Cobalt and Sudbury" is therefore misleading. Similar lack of appreciation of the facts is indicated in a statement that the chief ores of nickel are: niccolite, pyrrhotite, pentlandite, and garnierite.

The analyses of Sudbury ores given by the Advisory Council are ridiculous. Apparently the compilers have copied some analyses of low grade mattes and called them average analyses of ores. For inaccuracy they can only be paralleled by the "average analysis" of New Caledonia ores which we find on the same page as the Sudbury absurdities. Here are the misleading figures given for "average analysis, omitting moisture and other minor constituents":

	Per Cent.
NiO	19.73
SiO_2	44.75
MgO	15.25

The ore mined in New Caledonia contains only about 5 per cent. nickel and over 20 per cent. moisture.

It is to be hoped that the Advisory Council is better informed concerning resources of the United Kingdom than concerning Canadian resources. An indication of its information concerning the Lake Superior regions is the following amusing sentence: "In the area between the Marquette and Menominee regions (both in Michigan) there are two outliers, namely, the Cuyuna in Minnesota and the Braboo district in southern central Wisconsin."

The Advisory Council in Great Britain is evidently not well informed concerning mineral resources of Canada. If they insist on publishing such nonsense as that contained in this report we cannot be expected to consider their work of any value. In fact, their statements concerning Canadian mineral resources are harmful instead of useful.

THROUGH THE MINERAL BELT OF NORTHERN MANITOBA.

Early in July, 1917, Mr. F. H. Kitto, D.L.S., representing the Natural Resources Intelligence Branch of the Department of the Interior, and Mr. J. A. Campbell, Commissioner of Northern Manitoba, made a trip together through the mineral belt of Northern Manitoba, lying north of The Pas. They went in by way of the Saskatchewan River and came out by Hudson Bay Railway, thus "swinging around the circle." They speak in glowing language of the scenic beauties of many parts of the district through which they passed and were enthusiastic about prospects of the district especially from a mineral standpoint and intimate there are good possibilities for agricultural development at different points. The following is a resume of the journey given by them, setting out some of the characteristics of the country and developments now taking place therein.

First Stage of the Trip from The Pas.

We left The Pas on June 26th on the "Minasin," one of the Ross Navigation Company's steamers, to which was attached a large barge for carrying ore and other freight. The first stage of the journey was up the Saskatchewan river and into Cumberland lake, through the tearing river, thence after a brief stop at the old Hudson's Bay post at Cumberland House, the course was through Sturgeon lake to the Landing at the mouth of Sturgeon river, which point was reached about 7 p.m. of the 27th.

There was manifested at that point considerable activity in connection with the loading of ore, construction of the Athapapuskow road and the departure of the various passengers on the boat to different northern points, for it is from this point that miners, prospectors, traders and other parties having business in the north country branch off in various directions to their different destinations.

The Road to Lake Athapapuskow.

It is from here that the road is being constructed to connect with Lake Athapapuskow. This road runs along the Sturgeon and Goose rivers for about five miles, then crosses Goose river and takes a pretty direct course for the lake, the total distance being about sixteen miles. We walked over the first part of this road—between seven and eight miles—and then took to the canoes which had proceeded up the river under the guidance of a couple of Indian canoe men. The road traversed is the one over which the ore from the Mandy mine was hauled last winter. It is very good in some places, but requires considerable grubbing and some ditching before it will be satisfactory as a summer road. This work, it is hoped, will be done this summer. On that portion of the road further on Messrs. Burman & Boyd, contractors, have a gang of men at work, their contract being to build and complete the road from the point where we left it to Lake Athapapuskow. Considering labor conditions, good progress is being made. When this road is completed there will be direct communication between the two lakes above mentioned—a very important link in the trans-shipment of freight.

The land along the Sturgeon and Grace rivers is of good quality and suitable for agricultural purposes. Several settlers already have gardens which are doing well. Surveyors are at work in this district and four or five townships will be opened up for settlement at an early date.

Goose Lake was negotiated in the afternoon and Goose Creek the following morning when the great Lake Athapapuskow—the lake of many rocky islands—was reached. From a scenic standpoint this lake is not surpassed on the continent. Besides, from a utilitarian standpoint evidences are abundant that minerals abound on its shores and islands. Already a number of claims have been staked out, but no development work to any extent has yet been done.

A particularly beautiful stream, Schist Creek, is the connecting link with Schist Lake. A seven-mile paddle on the inside of the three arms of this lake brought us to the Mandy camp, noted for its mining and shipment of 3,600 tons of sulphide ore last winter.

The Mandy Mine.

The makeshift and somewhat primitive machinery which was used in this work has been discarded and new modern machinery installed in a large frame power house which is now almost completed. We descended the shaft in approved fashion—on the bucket. This is now to a depth of 90 ft. When it reaches the 100-ft. level it is proposed to start drifting. Work on the power house is being rapidly pushed to completion.

The Great Sulphide Mine.

From the Mandy mine a walk over a so-called trail, "estimated" at four miles, landed us at Flin-Flon camp. This is the most extensive sulphide body of ore yet discovered in the north. Two diamond drills were working on this property steadily last summer, and they are still on the job, approximately 6,000 ft. of drilling having been done already this year. Over 6,000,000 tons of sulphide ore has been proven up, and there is every indication that this will develop into the greatest orebody of its kind in America. General opinion seems to be that a railway will be built in from The Pas in due course, and a smelter erected on the property.

These enterprises will result in the opening up and working of a number of other claims in the district where mineral deposits have been shown to exist, and which, owing to their remoteness and the amount of money involved in handling them under existing conditions, make their development by present owners now out of the question. The shore of the picturesque little lake is already dotted with cabins of those engaged in the development operations, and of others who own or are interested in claims in the vicinity.

We arrived back at the Mandy camp that night, and next morning started south. It was a pleasant experience, as well as an agreeable change, to make the return journey down the lake on the new stern-wheeler. A channel has been cleared in Schist Creek by removing the boulders therefrom, and the steamer and barge can now navigate this to Lake Athapapuskow, where the barge is transferred to the tug "Notin" for transportation across the lake to the northern end of the Sturgeon Lake road. This channel, however, will not be navigable in low water, so the company have cut out a road a mile or so in length connecting the two lakes. Over this road a caterpillar tractor will do the ore-hauling.

It is therefore a very much handled ore that reaches The Pas for transportation—mine, boat, tractor, tug, team hauling, Ross Navigation Company's steamer, another team haul, then finally the railway. But that kind of ore will stand all this labor and expense and still bring astonishing returns.

The return trip through Lake Athapapuskow was made in the day time, and revealed additional attractive features. By noon of the next day we had arrived

at Cranberry portage, one and a half miles in length, connecting up with Cranberry Lake. It is a good dry trail through bush, with gradual rise and descent.

General Character of the Cranberry Lake Country.

The shores and islands of the lakes and rivers throughout the journey are all well wooded, but it is only at certain of the portages that an opportunity was given for getting an idea of the character of the country generally, especially in the matter of soil and timber. The region in the vicinity of Cranberry portage is characteristic of many parts observed. It is thickly wooded with spruce, birch, jackpine and poplar, chiefly spruce, the trees being generally from 8 to 20 inches in diameter. On an island in Reed Lake, which we visited later, the trees were much larger, one of them taking over 10 ft. of tape line to go around the butt. There are stretches of good merchantable timber at different points through the area traversed, besides vast areas covered with trees suitable for pulpwood. This timber is especially valuable for mining work. The Mandy company promptly availed itself of this opportunity by erecting and operating a saw mill, and the company operating the Rex mine at Herb Lake expects to have a similar mill set up in a very short time.

Cranberry Lakes consist of several small lakes joined by narrow channels. The general formation of their shores and islands resembles that of Athapapuskow, but these lakes, while quite picturesque, suffer somewhat in comparison with their more magnificent neighbor.

Claims at Copper Lake.

It is several years since the discovery of sulphide ore was first made in this vicinity. To the north a short distance are certain small lakes, on one of which, known as Copper Lake, a number of claims are staked. Owing to discoveries having subsequently been made at more accessible points, attention has been mainly directed to those latter places. However, prospectors who have just come out of the district exhibited samples of sulphide ore which contain a variety of minerals, including silver. They state they have discovered an immense body of this ore, and careful assays are now being made. A gentleman representing Duluth capitalists, who has been looking around the district, has taken an option on some of these claims, and it is probable some development work will be done shortly.

From Cranberry to Elbow Lake.

Between Cranberry and Elbow Lakes there is a stretch of country that is different from any that had been visited. It is in the nature of low-lying level valley, varying in width from three-quarters of a mile to about one and a half miles, and on either side is a high rock wall. The river meanders through this valley in a most tortuous manner, sometimes running along the rock on either side. At times the banks are grassy meadows; again trees bend over and dip their branches into the stream, and at almost every turn there is a pond of water-lilies now in bloom. The whole course is of the kind the tired city dweller would picture in his mind for a restful summer canoe trip. From a practical standpoint, it might be pointed out that this piece of country, being composed of alluvial soil, is very fertile, and might easily be made quite productive in the way of raising root crops and cattle.

Elbow Lake.

Elbow Lake is well named. After pursuing a course almost north the route is now straight south, so that, after canoeing 12 miles or so, one is back within a short distance from starting point. In the Elbow river are numerous rapids and falls, making several portages necessary. The banks are of rock formation, well wooded. In many places the course has to be steered between boulders. Along the water's edge on each side is a fringe of long, bright green joint grass, with black tops. Altogether this river opens up a series of natural pictures worthy of special remark. Throughout the course are to be seen the location stakes of the prospector, but only the edge of this district has been touched in this respect.

Reed Lake.

Reed Lake was traversed in the afternoon. It is one of the larger lakes of the series, and the scenery to some extent resembles Athapapuskow, but is not so diversified. It was an afternoon like what one reads about in glowing descriptions of sunny Italy, with blue skies, placid lakes, and dark green foliage. All the notable features of such a description were there that afternoon in one of Northern Manitoba's lakes.

There are several settlers at different points on the lake, mainly engaged in the fishing industry, and raising vegetables as a side-line.

From Reed Lake to Wekusko, or Herb Lake, the main feature is Sandy Lake, so called presumably from the fact that there is a small piece of hard sand beach at the end of the portage. Otherwise the shore formation is similar to that of the other lakes, only more regular. The discovery of sulphide ore on the south shore of this lake was made some time ago. On the north shore for a distance of about a mile there is an immense area of red granite.

Water Power at Herb Lake.

The waters of this lake are discharged into Herb Lake by a short river, at the mouth of which are the Wekusko falls, a series of falls and rapids in which there is a descent of 45 feet, and which, therefore, offer excellent facilities for development of power.

The journey across Herb Lake, a distance of about seven miles, was made in the evening, and we arrived at the camp of the Northern Manitoba Mining and Development Company shortly after nine o'clock, just at sunset.

Moosehorn and Rex Mines.

The changes which have been wrought in the eastern shore of Herb Lake during the last year are very noticeable. On a number of properties active development work is taking place. The Moosehorn and Rex claims are now in the category of real mines.

On the Moosehorn, otherwise known as Northern Manitoba Company's property, a complete mining plant has been erected. The shaft is sunk to a depth of 80 ft. and the vein has widened out from 15 in. on the surface to 30 in., and the ore values have increased with depth.

One shaft on the Rex is down 117½ ft., and drifting is being commenced at the 110 ft. level. The mean width of the vein is 49 in., and the assays throughout have averaged $36. Mr. Neal, the chief engineer for Makeever Brothers, when on a visit to the mine in May, found conditions so satisfactory that he immediately ordered a complete new outfit of mining and milling machinery. Most of this is now at The Pas, and Mr. Neal is back to superintend its transportation to the mine and the installation there. The main items in this shipment are as follows: 10-ft. Lane mill,

with a capacity of 40 tons per day; amalgamating plates; 2 Deister Overstrom concentrating tables. The engine is 55 h.p., and there are two 60 h.p. return tubular boilers, and 390 cu. ft. air compressor with modern equipment of air drills. In addition, an assay office will be established and further buildings erected to accommodate a crew of 40 or 50 men. There is also being brought in, as a necessary adjunct, a portable saw mill and equipment and two gasolene launches.

Kiski-Wekusko Property.

The Kiski-Wekusko claims have been thoroughly prospected by stripping, and at least 20 veins uncovered. A shaft has been sunk to a depth of 53 ft. On the completion of a wagon road to the railway, machinery, which has already been purchased, will be brought in for this property.

Elizabeth and Bingo Claims.

Work is progressing on the Elizabeth and Bingo claims. The former is one of the best looking veins on the lake, and, while the vein in the latter is narrow, this is compensated for by its extraordinary richness.

Other Claims.

The owners of other claims in the district, such as the Ballard, Le Roi, etc., are getting satisfactory results for the work performed. The McCafferty claims, some distance further north, have been attracting considerable attention, and a representative of certain Ontario people has been on the ground for some time and is negotiating a deal which has every appearance of being closed out.

A Recent Discovery.

A recent discovery which is attracting particular attention is that of the Syndicate claim, on the other side of the lake, right across from the Rex mine. A number of prospectors and miners have visited this property, and, while no work of any moment has been done thereon, they are practically unanimous in reporting that surface indications show a particularly rich vein, 3 ft. or thereabouts in width, and well defined.

Transportation Facilities.

The mining district is about ten miles from McKay's Landing at the foot of the lake, where there is a fine sandy beach backed by a grove of big trees. This is the lake terminus of the Gordon road from Mile 82 H. B. Ry., a distance of about 11 miles. The road has been under construction for some months, and is now nearing completion. The laying of about 1,500 ft. of corduroy and some drainage are the main items yet to be attended to. The completion of the road will be a great boonto the mining district, and large quantities of machinery and supplies are now awaiting this event.

The country through which the road passes has various characteristics. About two and a half miles is flat limestone, almost like a pavement. There will be nearly two miles of corduroying through muskeg. The remainder is clay and moss land.

Altogether there is a considerable quantity of land in the vicinity of Herb Lake which can be brought under cultivation, with excellent results. There are now a number of small gardens and patches of potatoes. At one of the mining camps we had the pleasure of eating fresh lettuce and radishes grown on Campbell's island, a short distance from the shore. The growth of these has been exceedingly rapid, and the quality was the very best. Mr. Campbell has a considerable clearing and a diversified crop of garden stuff all doing well. Mr. G. Lacroix, of Mile 82, H. B. Ry., has an acre of potatoes, and from present appearances he is entitled to expect a record crop.

After walking over the new road we were fortunate in catching an extra train on the railway and arrived back at The Pas on the evening of July 10th, having made the round trip in exactly two weeks.

CORRESPONDENCE.

August 27th, 1917.

The Editor, Canadian Mining Journal:

Sir,—In his letter in your issue of August 15th, Dr. Adams says: "Professor Haultain's story would have been a good one if his facts were correct. . . . but . . I may set forth the actual facts." A careful re-reading of the Doctor's letter and of my letter in the issue of July 1st fails to give me any light as to where I was incorrect. I am not wittingly lying and if I am shown where my statements are incorrect I shall be anxious to retract and to make such amends as tht circumstances call for. I wish Dr. Adams would be specific in this matter either in a letter to the Editor or in one sent directly to me. Yours, etc.,

H. E. T. HAULTAIN.

PORCUPINE CROWN.

Montreal, Aug. 18.—Directors of the Porcupine Crown Mines, Limited, have decided to pass the dividend payment on the stock, which has heretofore been paid at the rate of 12 per cent. per annum. In making the announcement the president, Sir John W. Carson, states that owing to the excessive shortage of labor in the Porcupine district and the resultant inability to keep the mine development ahead of production, the directors deemed it advisable temporarily to discontinue dividends. It is the intention to keep up the development work at the mine with whatever labor is available and to produce just enough to pay expenses. The president also states that as soon as the labor situation adjusts itself dividends will be resumed.

Porcupine Crown was placed on the 12 per cent. per annum dividend basis on January 28, 1914, when President Carson pointed out that the company was in a splendid position to pay the disbursement in view of the fact that the property had been purchased only after a considerable option period had enabled them to put it on a producing basis, fully equipped, without a cent of debt, and with ample money in the treasury for all purposes. It closed its year in 1914, or rather its initial six and one-half months with a credit on the right side of the ledger of over $150,000, and the gross production of the mine to the end of June last was $2,401,335, while dividends to the extent of $840,000 have been paid.

The statement for the half-year ending June 30 last shows the surplus on hand as $277,390. The profit and loss for six months follows:

Production bullion, gross value	$245,031.45
Mint charges, mining, milling, mine expense	120,851.79
Profit on operating	$124,179.66

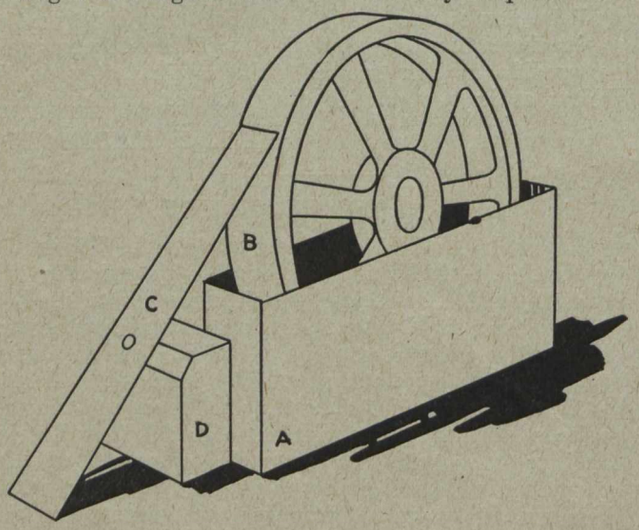
FLOTATION OIL FEED.

By A. E. Hall.

Any device used to feed oil in flotation operations should incorporate two main features. First, the device should be so constructed that the oil feed can be varied over a considerable range; second, once the oil feed is determined and the device set, the oil feed must be steady and regular.

The old Massey mine near Massey, Ont., which was closed down for several years, used the old Elmore flotation process. Recently the mine was reopened and the Callow flotation system installed.

The first device used as an oil feed was simply an old oil barrel with a tap in the side near the bottom. The oil mixture was made up and put into the barrel. There was a steam coil in the barrel and it was sometimes necessary, especially in cold weather, to run steam through this coil in order to keep the oil mixture liquid enough to flow through the tap easily. It was also found necessary to stir up the oil mixture frequently as the oils stratified. It was very hard to regulate the oil feed satisfactorily with the tap, although it might be imagined this would be very simple.



The arrangement shown in the sketch was then suggested and worked very satisfactorily. An iron pulley 14 inches in diameter and 3 inches face was mounted on a small shaft and placed just before the tube mill. The shaft was mounted in bearing and held a small drive pulley. A counter shaft was installed between the oil pulley shaft and the main drive shaft of the mill and using suitable pulleys a slow speed was secured at the oil-feed pulley (about 5 r. p. m.). The pulley is marked "B" in the sketch. At first a wash basin was used to hold the oil mixture. This was unsatisfactory for two reasons: (1) Enough oil mixture could not be made up at once; (2) the wheel did not go deep enough into the mixture to give the spokes opportunity to keep the mixture stirred up. Therefore a zinc box (A) should be used. When the oil mixture is put into this box and the pulley started the oil will adhere to the face of the pulley. A strip of zinc (C) is set bearing against the face of the pulley and is held in place by a nail driven into a block of wood (D). The strip of zinc (C) can be moved so as to scrape as much of pulley face as desired and therefore take off as much oil mixture as desired. The zinc strip revolves around the nail as a pivot which makes adjustment possible, but the nail is driven in tight and the zinc strip moves very hard so that it will remain where set and maintain a constant and even feed.

CONCENTRATING COPPER ORE BY FLOTATION, AT AN ONTARIO MINE.

By A. G. Morrison, B.Sc.

Among the rapidly increasing number of Canadian mines which are introducing flotation in their milling processes, there are only two, according to the writer's knowledge, that operate on copper ores exclusively. One of these is situated in British Columbia (the Britannia mine), and the other in Ontario.

It is the purpose of this article to describe the Ontario property.

The external factors are good with two exceptions. There is direct rail connection, plentiful water supply, a sufficiency of wood and coal and reasonably efficient labor. The unfavorable factors are the long haul of concentrates to the eastern United States smelters. There are no smelters for smelting straight copper ores in eastern Canada, and the cold winter climate is not of such consequence as the length of haul.

The surface plant is very complete and consists of a 70 ft. x 80 ft. 100-ton mill, power plants, rock-house, blacksmith shop, machine shop, assay office, manager's house, bungalow, four cottages, sleep camp, cook camp and stables.

The property consists of 800 acres along the strike of the main vein. This has a known length of 4,600 feet, with considerable minor faulting. The country rock is mainly greenstone schist and quartzite schist.

The primary ore is chalcopyrite. It is accompanied by pyrite, magnetite, specularite, quartz, and a large amount of country rock. All have been metamorphosed to some degree.

The main shaft has been sunk to a depth of 530 ft. with about 1,200 ft. of drifting. A second shaft is under development and is down about 80 ft. On another part of the property there is a tunnel 120 ft. long which develops considerable ore. The ore blocked out amounts to about 60,000 tons, or a two years' supply for the 100-ton mill. The operators avoided the common error of building a big mill when there was only a small supply of ore, as the mill itself is one of the most interesting features of the property. It is regarded as the greatest single factor affecting the success or failure of the enterprise.

The ore is trammed from the rock-house to the mill. It is fed to a 16-in. Blake type Dodge crusher which reduces it to 3-inch cubes. It is then carried by a belt conveyor to a 9-ft. Krupp mill. This mill would hardly be recognized by its makers in its present form, for the housing and screens have been removed and the ore allowed to leave the mill through 5/8-in. holes. From the Krupp mill the ore is carried by a bucket elevator to a 125-ton ore-bin. The ore-bin delivers, by means of a shaking trough, to a 6-ft. Hardinge ball mill. As these mills are not intended to be run dry, the water is added at this point by means of a 1½-in. pipe controlled by an ordinary Globe valve. From here the pulp is fed by gravity to a 6 x 8 ft. Krupp pebble mill, in closed circuit, with a drag classifier, then elevated by Fernier pumps to Callow Cells. The cells are at present arranged in tandem, that is, one rougher feeding to another and the cleaner tails returned to the circuit. Mr. J. M. Callow, in his articles on the use of the cells, does not indicate a preference for either a tandem or a parallel circuit in the roughers. In fact, his summation of the situation is that it is a matter of individual taste. However, when they are run at less than capacity a curious result is shown with the tan-

dem arrangement as indicated by the following assay results:

Rougher.	Insoluble.	Copper.
First rougher concentrates ..	23.1%	22.51%
Second rougher concentrates	64.6%	4.84%
Cleaner concentrates	27.0%	20.50%

This result of 22.51 per cent. copper in the first rougher, 4.84 per cent. in the second, and 20.50 per cent. in the cleaner actually gives a lower grade concentrate than if only one cell were used. This, although it gives probably a better tailing result, is undoubtedly a detriment owing to freight rates. Running the first rougher at a lower grade would help the second to some extent; but would not crowd out a great deal of the 64.6 per cent. insoluble in the second rougher. The insoluble is probably largely iron, although no assays were made to determine this. Silica is also carried over in the concentrates; but not in sufficient quantities to make it a factor worthy of consideration as yet. This is an advantage over many mines where the silica is a serious factor.

This example is given as a case where a parallel arrangement of cells is a distinct advantage over a series arrangement. Had the freight rate been less of a factor, the tandem arrangement might pay, owing to the cleaner tails which this arrangement might give. Practically, however, it is not likely that the tails would be any cleaner.

To return to the flow sheet—the tailings from the roughers go to waste, the tails from the cleaner back into the circuit, and the concentrates to what are known as "hydros." These are simply large steel bowls which spin around at a rapid rate. They are fitted inside with copper screens. The screens allow the water to go off and hold the concentrates with about 25 per cent. moisture. This amount leaves them in the form of a dry caked mud which can be dried in the sunlight in the summer and by steam coils in the winter. When it is desired to empty the "hydro" the moveable bottom is lifted and the contents allowed to run down to the next floor, where it can be easily shovelled. These concentrates make a very spectacular showing, being a bright yellow color, reminding one very strongly of a new copper coin fresh from the mint.

The oil feed, here as elsewhere, has been a matter of long experiment. Most of the experimental work has been done with Pensacola and General Naval Stores oils and include coal tar creosote, mineral creosote, wood creosote, coal oil, rosin oil, and a number of mixtures that are known only by manufacturers' numbers. These have been used with and without pine oil. The final oil settled on is 60 per cent. coal tar and 40 per cent. mineral creosote. Curiously enough this corresponds with the oil used at the Britannia mine last year on somewhat similar ore, according to the writer's recollection. Oil feeders are small things which sometimes give trouble. The form adopted at this mill consists of a pulley wheel driven at about 6 feet a minute running in a pan of oil with a square trough of tin pressing against the circumference of the wheel. The position of the trough with reference to the wheel is controlled by a threaded screw which can be set in any position by set screws. This simple and efficient scheme was in the beginning nearly abandoned owing to the fact that the heavy coal tar settled to the bottom of the pan and the light mineral creosote being on top was carried off by the wheel. However, the reason being quickly discovered, the wheel was set deeper in the oil and kept it thoroughly stirred up. Since then it has worked without any attention being paid to it whatever. In winter the oil is kept warm by means of a steam jet, in summer this is not necessary.

One problem which the management has still to solve is saving the gold which accompanies the copper. That the flotation plant does not at present save much of the gold is clearly shown by the following assays:

23 tons hand-picked ore..0.0625 gold oz. per ton.
11 tons milled ore.....0.0450 gold oz. per ton.

This hand-picked ore gives a value in gold of $1.29, and the milled ore gives only $0.93 in gold, despite the fact that picking saves only 50 per cent.

This is a new problem forced on the management by the opening of new ore reserves. However, with the striking success of so many companies in floating all kinds of ore, it would be idle to be anything but optimistic as to the success of floating the gold along with the copper.

There is no pretense that the flow sheet is ideal in regard to the grinding machinery as it is still in the transition stage. The grinding machinery is greater in capacity than the flotation department. This postpones the necessity of classifying the feed. This must ultimately be solved, however, as the present arrangement makes too much fines, and as 80 mesh is regarded as the limit of grinding for flotation, this will give a greater capacity and a much more even feed.

Flow Sheet of Mill.

16-inch Dodge Crusher (Blake Type).
Belt Conveyor.
9-foot Krupp Ball Mill.
Belt Elevator.
125-ton Crushed Ore Bin.
Trough Feeder.
Water. 6-foot by 16-inch Hardinge Mill.
3 feet by 8 feet Krupp Pebble Mill in Closed Circuit with Belt Drag Classifier.
Frenier Pumps for Elevating Pulp.
Callow Rougher Cell.

Concentrates . . . . . .
| Tails.
| Callow Rougher Cell.
| Concentrates . . . . . .Tails to waste.
| | Callow Cleaner Cell.
|.....|.....Tails to circuit
Hydros for Partial Drying.
Final Drying and Shipping.

It is hardly likely that any radical changes will be made in the flotation department, so satisfactorily does it work. The saving made varies from 90 to 95 per cent. This is the more astonishing when it is remembered that there are no other machines used in the concentrating, Wilfley tables, slime tables, and vanners being entirely eliminated. Nor can the rule of milling be invoked which calls for the greatest degree of concentration consistent with the greatest commercial return. The first cost of the cells is low, being about $200, and the power consumption small.

The cells resemble the little girl who, when she was good, was very, very good; but when she was bad, was awful. However, it is only fair to say that it is not often that they get out of control. This occurs when there is a sudden change in the ore, oil, or water feed. When this happens, the best thing to do, according to one millman, is "to curse them liberally and go away and let them recover themselves." There is some common sense in this philosophy, for if one attempts to screw the tailings plug in too tightly the pulp fouls the blanket, and a heavy addition of water at the feed end causes the water to boil in a way that

destroys the froth. Any changes that are made should be made gradually as the machine is constitutionally opposed to sudden changes. Happily, for the good of the millman's soul, these scenes are of seldom occurrence, and as the mill force gets better acquainted with the work may be eliminated, provided that the feed is automatic and regular.

MINING ACTIVITY IN NORTHERN BRITISH COLUMBIA.

By J. H. C. Gainfort.

From all parts of the Omineca district, the great mining area of northern British Columbia, there comes news of development and progress that is creating a new record for the province. Old mines are being improved and their output increased; new ones are being opened up and a huge stream of ore is flowing from the north to be turned into the metals that are helping to win the war for the Empire.

Rocher Deboule.

In the Rocher Deboule mine near Hazelton a fine shoot of ore has recently been opened up in the lower vein. The showing of ore is between five and six feet wide and is said to run ten per cent. of copper.

The surface equipment of the mine is being arranged to lift this ore by the existing tramway to the level of the upper terminal of the aerial tram. This delivers it to the Grand Trunk Pacific Railway and shipments are now being resumed.

Development of the new ore is continuing satisfactorily and considerable tonnage is already in sight. The cross-cut tunnel was driven to intersect the three veins on the property at depth and is approximately 3,000 feet from the point where it is expected the main, or upper, vein, should be encountered.

Drifting is being carried on here on vein matter and there is every expectation that the main vein will be proved at this depth.

Work on the wagon road from Skeena Crossing on the Grand Trunk Pacific Railway is being carried on by the Government road crew. Some much needed improvements are being effected and the road is being put in good condition.

Delta Copper.

The Delta Copper Company controls the Delta and Chicago groups, as well as several other locations, making in all twenty-five claims, and adjoins the Rocher Deboule on the east.

Active work was carried on during last winter on the Highland Boy and the Delta groups under the supervision of Mr. G. A. Clouthier, the newly appointed Government engineer in charge of No. 1 district. At present the necessary communication with the railway is being completed and work is being concentrated on that while the weather permits.

In addition to the known exposures of ore on this company's property a very fine showing of copper was found the other day on the Delta Group's Lucky Jack claim.

Six feet of the vein is reported to run 5½ per cent. copper. There are much higher assays from the clean ore.

As soon as communication is established this company intends to prosecute active work on the known orebodies. Good results are expected as they have a number of promising showings.

Mr. Harrison Clement is managing this property for the Delta Copper Company. Most of the financing is being done from Edmonton, and there is said to be a good deal of capital interested.

Molybdenite.

The Hazelton View and Indian groups, comprising eight crown granted claims, are owned by the New Hazelton Gold-Cobalt Mines. They adjoin the Rocher Deboule Company's ground on the west and north.

Since last summer a tunnel has been driven on the main gold-cobalt vein on the Victoria claim and a number of high-grade shoots of promising ore have been cut.

An interesting feature of this work has been the development of several shoots of molybdenite ore, which have successively shown richer content. They occur quite distinctly from the gold-cobalt ore shoots and assays show from 5 to 20 per cent. molybdenum.

The company is about to instal a light aerial tram to take ore from the tunnel down the mountain to a point whence it can be packed to the railway, pending the construction of a wagon road.

Stoping is now being commenced on both the gold and molybdenite ores with the intention of making a shipment of each class of ore as quickly as possible.

It is understood that the plans of the company for this season include considerable exploration and development work on the several parallel veins of similar character which lie in their ground. They will also do some work on their copper veins.

Developing Copper Deposits.

Adjoining the New Hazelton Gold-Cobalt Company's holdings on the west or lower side a group of ten claims is being developed by a Vancouver syndicate. They are at present occupied with the surface work of tracing the extension of the Victoria vein on their property to a point suitable for the starting of a drift tunnel.

The Golden Wonder Group, owned by W. S. Harris and Denis Comeau, of Hazelton, has been bonded to M. W. Sutherland, who has been conducting extensive development work upon it. There is a fine showing of copper ore in a shaft that he is now sinking.

This group is situated at the foot of the west slope of Rocher Deboule Mountain on the Hazelton wagon road and, being only one mile from the railway, is well suited for economical development.

The shaft is now about twenty feet in depth and shows a vein the full width of the bottom, with about two and a half feet of clean chalcopyrite. About fifteen tons have been taken out in the course of the work.

Arrangements are being made to commence shipping the ore that is now being extracted. Assays show an average of eight per cent. copper with samples as high as eighteen per cent.

Comeau Group.

Work is being carried on at the Comeau Group, which lies on the west slope of Rocher Deboule Mountain, between Hazelton View and the Golden Wonder Group. The owners, Denis Comeau and Magnus Johnson, are driving a tunnel on one of the promising outcrops.

This property had considerable work performed on it last summer and winter, mainly in sinking a winze from the original crosscut tunnel and drifting there; but it has been found impracticable to continue the old workings owing to difficulty with water.

The owners report that, before being driven out by the water, a good shoot of chalcopyrite had been made, fully up to expectations.

Has New Power Plant.

The Silver Standard Mine is installing a new power

plant, consisting of gasolene engine, dynamo, compressor, boiler plant and shop equipment. It will enable operations at the mine to be carried on to much better advantage.

Erection of a concentrator is now being considered. This would open up much greater possibilities not only for the property itself, but, if arrangements were made to mill custom ore, for the neighboring mines on Nine-Mile Mountain.

There is little doubt that the whole Nine-Mile district would see greatly increased activity if a custom concentrator and separator were established as there are large bodies of milling ore available on the mountain, while at present none of the properties is in a position to maintain its own mill.

Telkwa District Active.

Reports from Telkwa indicate considerable mining activity in all the surrounding territory. Representatives of a number of well known mining and smelting corporations are at present in the district, examining properties for their principals. Among the companies represented are the Granby Company, the Consolidated Mining and Smelting Co. of Canada, the American Smelting and Refining Co. and the Tonopah Mining Company.

The Tonopah Company has bonded the Wilson Brothers claim near Knockholdt station on the Grand Trunk Pacific Railway, and it is reported that several other transactions have been made or are in progress.

Work is progressing on the wagon road from Telkwa to Howson Basin and is about to be started on the Babine wagon road. The former will open communication to the Santa Maria Mine now being operated by Dockrill and Jefferson of Telkwa and other properties; the latter will reach the Cronin Mine in Babine Mountain as well as the Dome Mountain camp and other prospective shipping properties.

A complete plant was hauled in to the Santa Maria last winter, a permanent camp built and shipments of ore were brought out by a sleigh road built by the operators. The ore consisted of high grade chalcocite and bornite.

Upon completion of the Babine road the Cronin mine will ship ore and it is expected that the Debenture Mines will also be ready at that time to join the list of shippers.

Prospecting is active on the main branch of the Telkwa River, the Babine Mountains, the Sibola country and to the south of Houston.

Survey of Hazelton District.

There is a good deal of interest in the work of the geological survey of the Hazelton district, which is being carried on now by Mr. J. J. O'Neill of the Dominion Geological Survey Branch. He is conducting a detailed survey of an area fifteen miles square, embracing all the district immediately surrounding Hazelton and the main working camps.

The topographic survey of the same area is being made concurrently under the supervision of Mr. F. S. Falconer. The resulting maps and reports of these surveys will be of immense value to all who are interested in the district and will greatly facilitate scientific development.

Much satisfaction is expressed in the Hazelton district at the appointment of Mr. J. D. Galloway as engineer in charge of the district, and of Mr. A. L. Carruthers as district engineer, under the Department of Works.

RULES GOVERNING STEEL AND IRON SHIPMENTS FROM UNITED STATES.

The new rules governing steel and iron shipments, which supersede all previous regulations, are as follows:

First—That all shipments to those nations associated with the United States in the war are, until further instructions, to be licensed freely, without reservation, and without restriction, except iron and steel plates, pig iron, iron and steel scrap, and steel billets, for which licenses shall be granted only in case said articles are destined for actual war purposes or will directly contribute thereto.

Second—Licenses which may be properly issued, will be granted for shipments of all iron and steel plates and structural shapes, and other articles properly included under these general headings, under the following conditions only:

(1) The application for such license must be received by the Department of Commerce, Division of Export Licenses, Washington, D.C., on or before August 10, 1917.

(2) Such articles shall be completely made up and manufactured on or before August 10, 1917.

(3) Such license shall be valid, and shall indicate that it is valid, only in case such shipments are covered by railroad or ocean bill of lading dated on or before August 15, 1917.

With respect to the general term "Explosives," used in the proclamation of the President on July 9, 1917, the following chemicals are included in its meaning:

Ether, alcohol, sulphur, sulphuric acid and its salts, acetone, nitric acid and its salts, derivatives of benzol, phenol (carbolic acid) and its derivatives, derivatives of toluol, mercury and its salts, ammonia and its salts, glycerine, potash and its salts, all cyanides.

TUNGSTEN.

No metal has had the wide-price range that tungsten has encountered since the war began, the current quotation of $25 per unit comparing with normal quotation of $7 and high record figure of close to $90. It has been a matter of supply and demand with requirements far exceeding available stocks at one time, but later succeeded by larger production induced by the high prices.

The United States has never figured as a material factor in the production of this metal, practically all the product being imported from South America. Up to the first of June there had been brought into the United States from abroad during the past fiscal year a total of 3,480 tons of tungsten bearing ore having a value of $4,601,204. No comparison can be made owing to the fact that prior to this year the Government kept no separate records of the movement of this metal.

Throughout the West tungsten-bearing deposits have been opened up and profitably worked in some instances and the aggregate production therefrom has gone far to meeting domestic demand.

High grade tool makers use tungsten very heavily and under the pressure of their demand after the war started tungsten jumped by leaps and bounds to the equivalent of $5,250 a ton against a normal price of $420. This demand has now been very largely met; resulting in quiet conditions now prevailing in the tungsten market.—Boston News Bureau.

DR. C. W. DRYSDALE'S WORK.

In an article in the Daily Colonist, Mr. E. Jacobs says:

Some of those who are familiar with the considerable and valuable work done in B C. by the late Dr. Charles W. Drysdale, of the Geological Survey of Canada, are desirous of promoting a movement having for its object endeavors to induce the Dominion and Provincial Governments to each make a grant for the benefit of his widow and three young children, the regulations of the Dominion service with which he was connected not making sufficient provision in such a case as this. With a view to showing its extent and nature, the following outline of the work of the deceased geologist has been prepared:

The first mention I remember having seen made of Dr. Drysdale's work was the acknowledgment in the Geological Survey Summary Report for 1908, in which (on page 65) Mr. O. E. LeRoy stated that in making a detailed geological survey of Phoenix camp, in Boundary district, he "was most ably assisted by Mr. C. W. Drysdale."

In the Summary Report for 1909 (p. 131) Mr. LeRoy stated that in his work of geologically mapping the Slocan map area he "was assisted in a most efficient manner by Mr. C. W. Drysdale," and he bore similar testimony in the Summary Report for 1910 (p. 123) concerning geological work in Ainsworth and Slocan mining divisions.

The field season of 1911 found Dr. Drysdale doing geological work in Franklin camp, in the northeastern part of Boundary district, and in the Summary Report for that year (pp. 133-138) there was included his preliminary report of his work in connection with completion of a detailed geological map of that camp, while in 1915 there was published Memoir 56, Geological Series 56, "Geology of Franklin Camp, B.C.," by C. W. Drysdale.

In 1912, much of the field work done by the Geological Survey was in preparation for the excursions of members of the International Geological Congress arranged to be held in Toronto the following summer. That congress was attended by many of the most noted geologists of the world, and an appreciably large number of them took part in the Transcontinental Excursion to the West. Dr. Drysdale's part in preparing to place knowledge at the disposal of those eminent scientists, in particular, and the general public at large, was to geologically map a section ten miles wide along the Thompson River Valley between Sixmile Point, Kamloops Lake, and Lytton, this being part of the important work done to make "a complete geological section across the Canadian Cordillera, from Vancouver to Banff, along the Canadian Pacific Railway." His description of the geology of the country from Savona to Lytton, printed in Part II. of Guide Book No. 8 (pp. 234-256), was, in common with that of others also included, in this way given wider publicity than geological reports usually obtain. In addition, there was printed in the Summary Report of the Survey for 1912 (pp. 115-150) his official report on the "Geology of the Thompson River Valley Below Kamloops Lake, B. C."

With the exception of one month, given up to International Geological Congress business, Dr. Drysdale spent the field season of 1913 at Rossland. In 1905 and 1906, Professor R. W. Brock and Dr. G. A. Young, both of the Geological Survey, had been engaged in making "a detailed geological survey of the Rossland mining camp," but, as was the case with the Lardeau, Mr. Brock failed to complete the promised geological report, the only result of his work made public having been a pamphlet issued in 1906 as a preliminary report, the greater part of which was information such as an ordinary newspaper writer would have compiled at very much less expense. Eventually to keep faith with those interested in Rossland, Dr. Drysdale was allotted the work of completing this long waited geological report, with the result that in 1915 the Survey published Memoir 77, Geological Series 64, "Geology and Ore Deposits of Rossland, B.C.," a volume containing more than 300 pages, freely illustrated and accompanied by topographic and geological maps, altogether comprising a most valuable work on a mining region that has made a total production officially valued at more than $70,000,000 and still one of the most important of the productive mining camps of British Columbia. This work will long remain a striking testimony to the zeal and industry displayed by Dr. Drysdale.

It may here be mentioned that on the initiative of myself in my capacity of secretary of the Western Branch of The Canadian Mining Institute, at a meeting held on October 26, 1916, the following resolution was passed:

"Be it resolved, that the residents of Rossland and district generally, through representatives attending the twenty-third meeting of the Western Branch of The Canadian Mining Institute in convention assembled in the city of Trail, B.C., express to the directors of the Dominion Geological Survey their sincere thanks for his interest in the development of the mineral resources of the country, in authorizing the completion of the structural survey of the Rossland camp; and be it further

"Resolved, that we express our hearty appreciation of Dr. Charles Wales Drysdale's valuable contribution to Economic Geology in the work entitled "Geology and Ore Deposits of Rossland, British Columbia."

In moving this resolution, Mr. M. E. Purcell, superintendent of the Centre Star-War Eagle mines, said, in part: "Mr. R. W. Brock had spent considerable time in Rossland making a detailed structural survey of the camp several years since, but for some unexplained reason the work so ably begun was never finished by him, and all that the people of Rossland had to whet their desire for information as to the potential mineral resources of the camp was a brief preliminary report of less than forty pages. I learned later that the reason the detailed report was delayed was because Mr. Brock's duties as director of the survey took up all of his time, and that men equal to the magnitude of the work at Rossland were not easy to find, but that as soon as a suitable man should be available, the work would be finished and the complete report written. It gives me great pleasure to say that in Charles Wales Drysdale the right man was found, and the delay in completing the report on the Rossland camp has since been completely justified. It is perhaps fitting in the absence of men better qualified for this duty, who have been prominent in the development of Rossland's great mines in the past, that one who has also been intimately and continually associated with the development of the camp's mineral resources for about twenty-one years, should, on behalf of Rossland and neighborhood, present the foregoing resolution."

Mr. S. G. Blaylock, assistant general manager for the Consolidated Mining & Smelting Company of Canada, Limited, said: "It affords me much satisfaction to support the resolution that this meeting expresses

sincere gratitude to Dr. Drysdale for his able work on the Rossland camp. The work which Dr. Drysdale has accomplished in this region can only be appreciated thoroughly by those who know the Rossland camp. He has solved numerous problems, and pointed out a great many things that were not before known to any of us. His work was all the more valuable in that as it progressed, he instructed various men interested in the district in the different rock formations and ore bearing measures, so that we did not have to wait a long period of time until his completed report could be issued, before we could take advantage of the knowledge he gained at Rossland. I may say that his findings have been of very real value in laying out development work in mines of the camp. I am sure we will give Dr. Drysdale every credit, and wish him the great success he deserves."

After having spent several weeks of the early part of the 1914 field season in Rossland camp, and in examining recent developments in mining in Franklin camp, Dr. Drysdale was engaged during most of the season in making a detailed examination of Ymir mining camp, preparatory to mapping an area of about 145 square miles in Nelson mining division, lying between Hall, ten miles south of Nelson, on the Nelson and Fort Sheppard Railway, and Salmo. Memoir 94, Geological Series 76, "Ymir Mining Camp, B.C.," published early in 1917, by the Geological Survey, gives more information concerning an easily accessible mining region, than, perhaps, is obtainable in any other similarly convenient form. Before returning to Ottawa for the winter, Dr. Drysdale gave attention for some days to gold mines in Sheep Creek camp, some copper occurrences in the North Fork of Salmon River, and the Molly molybdenite mine on Lost creek, also in Nelson division.

The first detailed official description of that molybdenite property, together with other most acceptable information relative to molybdenite, made available to the public was that contained in Dr. Drysdale's paper entitled "Notes on the Geology of the Molly Molybdenite Mine, Lost Creek, Nelson Mining Division, B.C.," read at a meeting of the Western Branch of the Canadian Mining Institute held in Rossland on July 15, 1915. Two or three months later, the property was visited by the Provincial Assistant Mineralogist, but his account of it was not made public until fully a year after Dr. Drysdale's paper was presented.

During the main part of the field season of 1915, Dr. Drysdale was engaged in geologically mapping the Bridge River area, Lillooet mining division, and there he paid "special attention to the working mines of the district and other mineral occurrences." At the close of the season he devoted a short time to examining a few of the chief mining properties in the Highland Valley copper camp, situated about 27 miles southeast of Ashcroft, B.C. A preliminary report on Bridge River map-area and some notes on Highland Valley copper camp were printed in the Summary Report for 1915 (pp. 75-91).

As the Geological Survey Summary Report for 1916 has not yet been received, I am without information concerning Dr. Drysdale's field work in that year. He was assigned to do further geological work in British Columbia this year, and was on his way to the scene of his intended activities in Windermere division, East Kootenay, when on July 11, ultimo, he was drowned when trying to cross the Columbia River on a raft.

Of all the men who in recent years have done field work in British Columbia in connection with economic geology, the opinion may be expressed that he was distinctly in the lead. Highly efficient, untiring, assiduous in his investigation, and diligent in preparing for publication the results of his work, he set an example that it would be to public advantage to have emulated by some of the go-easy officials whose leisurely procedure causes unreasonable delay in the publication of information that would be much more valuable if quickly made available for use. Added to these high qualifications for his important work, were kindliness and courtesy that freely and generously responded to inquiry concerning problems and difficulties met with in mining, so that all who came into contact with him in the field or underground appreciated his pleasing personality. It is to be hoped that appreciation of his most valuable work in British Columbia will not be restricted to empty words, but that it will rather find expression in substantial provision for his widow and children left, it is feared, without adequate means to meet their needs beyond the immediate future.

INCREASE IN U. S. COAL PRODUCTION.

The Committee on Coal Production in the United States in a recent letter to operators says in part:

We call upon the coal operators and miners of the United States to rise to the present national emergency —to render the best service that is in them in advancing the cause of our country in the great struggle for democracy as opposed to autocracy—and we urge that all elements of society make sacrifices to support the flower of American manhood, who will soon go forth in battle to uphold the principles of freedom, justice and humanity. As we operators and miners cannot all fight in the trenches, we can and must do our part in the war by working as earnestly, constantly and faithfully as our armies will fight gallantly on the battlefields of Europe.

Response has been made to our last appeal, and the coal production has been increasing sufficiently to warrant the belief that there will be a sufficient supply of coal to meet the requirements of consumers in the United States. The bituminous coal loaded at the mines in May was 24 per cent. more than in May a year ago, and 2 per cent. more than in April of this year. In June, 1917, the increase was 26 per cent. above the output of June, 1916. This means that in June, 1917, a new record was established, with a production of nearly 47,000,000 tons of bituminous coal. This gratifying record was even exceeded in July. Yet not enough coal is being mined to meet the increased requirements, estimated at ten million tons annually, which will be necessary to supply the growing needs of our allies, for the bunkering of fleets which will transport our troops and supplies to France, and for Cuba and South America.

It is not the intention of this committee to seek to arbitrarily restrict the normal activities of operators or miners, but we are interested, as the whole nation must be, in maintaining uninterrupted operation in the coal-mining industry and in securing at all times the maximum production of coal. This committee, representing the coal operators and miners, renders great service in promoting good will and harmony in the coal industry and in co-operating for the purpose of bringing about the adjustment of differences between operators and miners to the end that production may be increased.

MOND NICKEL COMPANY, LIMITED.

The third ordinary general meeting of the Mond Nickel Company, Limited, was held July 27 in London. Mr. Robert Mond, J.P., chairman of the company, presiding.

The chairman said, in the course of his address, that the balance carried to profit and loss account was £327,248, as compared with £322,589 last year, and with the balance brought forward there was £410,193 (compared with £360,622 last year) available for division. The directors proposed, after paying the preference dividend, to declare a final dividend of 15 per cent. on the ordinary capital (on which an interim dividend of 5 per cent. was paid in February), placing £50,000 to reserve account and carrying forward £111,598. Last year a provision was made for war taxation in the carry forward, which had since been dealt with. The fourth unit, at Clydach, had been in successful operation during the year; the erection of the fifth unit was progressing favorably, and preliminary steps were being taken towards the erection of a sixth unit, to follow on when the fifth was completed. They had also during the year acquired at very reasonable prices a large adjoining farm, covering some 300 acres, which would enable them to extend their building operations when so desired. The Clydach Estates Company—of which they held all the shares—had been steadily developing its building estate. The projected increase of the works by the two new units made the proper housing of the additional workmen required essential.

In Canada, the increase of the smelter in preparation for supplying the matte necessary for six units, and the corresponding development of the mines, were nearing completion, whilst very extensive explorations had disclosed further large extensions of the ore in their existing mines, which provided ample reserves for a long period.

During the year they had a visit from the Royal Ontario Nickel Commission, who had since published an extremely able report. The legislation passed at the last session of the Ontario Parliament, on the recommendation of this report, with regard to both taxation and refining in Canada, in no way prejudiced the interest of this company.

To enable them to improve relations with the workmen, the board has elaborated a new scheme, to give the company the opportunity to discuss with the men at regular intervals any questions relating to wages and labor conditions, and to provide automatically for the varying increase in the cost of living due to the war, and to allow the remuneration of labor, so far as it should be affected by other considerations, such as responsibility and hardness of the work, to be dealt with separately. It was consequently arranged that there should be three meetings at regular intervals between the Union, the representatives of the men, and the board, during the year, at which all questions referring to conditions of work might be brought up and thoroughly discussed, the same months being chosen as those agreed upon by the Amalgamated Society of Engineers. No changes of wages were to take place in the intervals between these meetings, nor were any questions with regard to the alteration of wages to be brought up.

The figures in the "Board of Trade Labour Gazette," showing the average increase in the cost of living over pre-war figures for the month previous to the meeting, were to be adopted as the standard, and the wages of the lowest class of labor to be increased by that amount; and the sum thus ascertained added to all other classes of unskilled or ordinary labor. This figure would be the standard figure for the succeeding four months, and would vary with the figures published in the "Board of Trade Labour Gazette."

The report was adopted, and the retiring directors and auditors were re-elected.—Mining Journal, London.

TEMISKAMING.

The directors of the Temiskaming Mining Company have sent to shareholders a letter, dated August 28th, in reply to circulars published by Mr. H. B. Wills and Mr. Max Morgenstern. The directors say in part:

A summary of the management of your property since your directors assumed control in March, 1914, is as follows:

There was turned over to us—

Quick assets consisting of	
Cash in bank	$ 77,173
Due from smelters	39,853
Ore at mine (estimated)	20,442
Total	$137,469
Less accounts payable	21,164
Available balance	$116,304

We found—

Mill ore bins empty—

No high grade ore in sight—

Mill running at about half capacity on account of lack of mill ore and inefficient equipment.

From August 1st, 1914, to October 1st, 1914, we were forced to close the property on account of labor troubles. While mining operations were suspended, we made necessary extensive repairs to mine buildings, and improved sanitary conditions, all of which at a cost of several thousand dollars.

August 1st, 1917—

The mill ore bins are full.

The mill is running at full capacity.

There are between 8,000 and 10,000 tons of ore on timbers underground ready to be taken to the mill.

The plant is in a high state of working efficiency.

Surface buildings all in thorough repair.

Sanitary conditions A-1.

In addition to the betterments which have cost several thousand dollars, we have paid to the shareholders Dividends amounting to $525,000

and have quick assets as of August 1st, 1917, as follows:—

Cash on hand and in banks	$246,560	
Bullion in storage,	222,572 oz.	
Due from smelters	42,161 oz.	
Ore bagged at mine (estimated)	99,556 oz.	
Total	364,289 oz.	
at 79c. an ounce, the official price of silver on August 1st	287,788	
		534,348
		$1,059,348
Deduct balance as of March 31st, 1914		116,304
Leaves a net profit in a little over three years' time of		$943,044

And these figures do not include any estimate of ore broken down or in place in the mine.

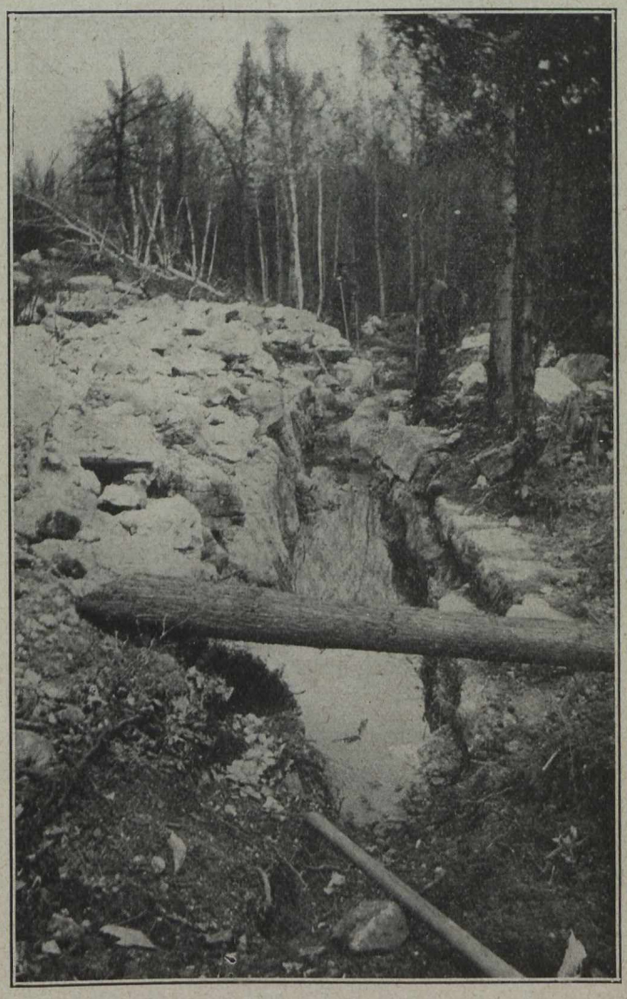
SHIPPING FLUORSPAR FROM MADOC.

A new shipper of fluorspar from Ontario is the Wallbridge mine. This property is now being developed and a carload of fluorspar has been sold.

There is a good demand for fluorspar and the price is much higher than normal. Sales in New York recently were at around $22 per ton for 75 per cent. ore.

Messrs. Cross and Wellington, Madoc, have during the past year made several shipments of fluorspar to the iron furnace at Hamilton.

The new producer is near that of Messrs. Cross and Wellington. The accompanying photograph was taken May 19, 1917.



Wallbridge fluorite mine, Madoc, Ont.

FLUORSPAR.

American mines broke another record last year in the production of fluorspar, as shown by statistics compiled under the direction of Ernest F. Burchard, of the United States Geological Survey, Department of the Interior. In 1916 the shipments were 155,735 short tons, valued at $922,654, an increase of 14 per cent. in quantity and of 21 per cent. in value over the shipments of 1915, heretofore the record year.

The increased demand for fluorspar has come largely from the manufacturers of open-hearth steel, who use the mineral as a flux, but the demand for it in other metallurgic operations and for the manufacture of hydrofluoric acid has been very active. One of the newer uses for fluorspar is as a reagent in the recovery of potash from feldspar and from Portland cement clinker.

The bulk of the fluorspar sold in 1916, as in former years, was gravel spar, the quantity in 1916 amounting to 133,651 short tons, or nearly 86 per cent. of the total. The average prices per ton received at the mines in 1916 were, gravel $5.34, lump $7.94, and ground $12.38, and the general average price for all spar sold was $5.92. These prices compare with $4.89, $7.51, $10.80, and $5.58, respectively, in 1915. At the close of 1916, owing to a shortage in supplies, the price of gravel spar for prompt delivery, not covered by contracts, was about $21.50 per ton, although it is believed that not much was sold at this price.

SENECA-SUPERIOR AND UNITED KIRKLAND.

During the past few weeks Toronto mining brokers interested in the flotation of United Kirkland have issued statements connecting Seneca-Superior interests with the United Kirkland enterprise. These statements are likely to mislead readers. Enquiry at the office of Seneca-Superior permits us to say that neither that company nor its chief shareholders is interested in United Kirkland. So far as we can learn the only connection is that one director of Seneca-Superior owns a share in an option on United Kirkland which has not yet been exercised.

STANDARD MOLYBDENITE CO., LTD.

The prospectus of the Standard Molybdenite Co. has been received. The company is to be capitalized at $150,000. The office is at 265 Queen St., Ottawa. Shares of $1 par value are being offered at 25 cents. The company is being organized to secure the mining rights to property in Wright County, Quebec. The prospectus states that "this property is situated in the same range of mountains as the mine owned by the Canadian Wood Molybdenite Co." As to profits, we read "it is estimated that the cost of mining, transportation, and concentration of the ore will not exceed $10 per ton, leaving a profit of from $22 to $70 per ton." Unfortunately no facts are presented to substantiate the statements made.

SENECA-SUPERIOR.

The fifth annual report of Seneca-Superior Silver Mines, Ltd., has been issued. The Seneca mine has been worked out and is closed down after a brilliant career. The financial summary covering the period from incorporation, January 31, 1913, to December 31, 1916, shows a production valued at $2,191,280 and dividends of $1,579,817.

An interesting feature of the report is the summary of costs. Royalty amounted to 13.33 cents, war tax 0.28 cents, and mining, marketing, etc., 15.77 cents per ounce.

AN ALLUVIAL GOLD FIND.

Mr. Louis Gendreau, Jersey Mills, Beauce Co., Quebec, reports that a farmer showed him a piece of alluvial gold found last week on the edge of a brook crossing his farm. Heavy rains early in August changed the courses of streams and will make prospecting easy.

LADYSMITH SMELTER.

After being closed down for five years the big smelter at Ladysmith, on Vancouver Island, has just been reopened. The 20,000 tons of ore necessary as a supply before the furnaces could be blown in has been collected.

This is one of the most important events in British Columbia mining developments since the war started and will go a long way towards fostering and maturing the very considerable activity that is now taking place on the island, as well as in other parts of the province.

One of the great advantages of the smelter will be its arrangements for treating local ores. The plant is of sufficient capacity to handle the entire output of the island for many years to come, and present and prospective owners will be able to proceed with development work in full confidence of having adequate smelting facilities.

It was in 1901 that the smelter, then known as the Tyee smelter, was erected. It was located at Ladysmith because of the advantageous position, cheap transportation rates being available from most parts of the province.

The plant was closed down in the latter part of 1911 and has remained idle ever since. Last autumn it passed into the hands of the Ladysmith Smelting Corporation and that concern has arranged numerous contracts for ore that will ensure a constant and adequate supply.

The president of the company is Colonel Stevenson, who is well known in provincial mining circles and has long been associated with important mining interests in British Columbia and in Alaska. He is one of those controlling the Alaska Corporation, which operates in conjunction with the Ladysmith smelter. Mr. H. W. Aldrich is superintendent of the plant.

Naturally there is deep interest in mining circles as well as among business men generally as to the effect the operation of the smelter will have upon the movement of ore into the United States. At present large quantities are shipped to the Tacoma smelter and it appears likely that a considerable portion of that ore will in future be sent to Ladysmith.

The Ladysmith Corporation has announced a treatment charge of $5 per ton. All of the copper will be paid for, but a deduction of four-tenths of one per cent. will be made from the wet assay.

The price paid for copper will be three cents a pound less than New York quotations ninety days after the receipt of the ore; 95 per cent. of the gold content will be paid for at $20 per ounce, but if there is less than a tenth of an ounce per ton it will not be paid for; 95 per cent. of the silver will be paid for at New York quotations ninety days after sampling, but the ore must assay over 0.5 ounce in order to be paid for.

An advance of 60 per cent. of the value of the ore content at current prices will be made, but the shipper must pay seven per cent. interest for the advance.

Tacoma, with which Ladysmith is in direct competition, issues two schedules, of which the shipper may make his choice. The charge for treatment is $1.50 per ton, $3.50 less than the Ladysmith rate.

In both Tacoma schedules 95 per cent. of the gold and silver content is paid for, but no gold under three-tenths of an ounce or silver under one ounce per ton is paid for. On this point the Ladysmith terms are better.

Under schedule A of the Tacoma smelter 100 per cent. of the copper is paid for after deducting 1.3 for wet assay. Then there is a deduction of three cents a pound from the market price. When copper is quoted higher than fourteen cents a pound only 75 per cent. of the excess is paid for—which means that the smelter claims 25 per cent. of all the copper value over fourteen cents, after deducting 1.3 for wet assay and three cents a pound in addition.

Under schedule B of the same smelter, the same percentages of value are allowed, but preliminary settlement will be made on the basis of copper at fourteen cents and silver at 55 cents. Final settlement will be made 120 days after sampling, on the basis of the average New York quotations for a week prior to the expiration of the 120 days.

If the final quotation is in excess of 18 cents a pound for copper the treatment charge is advanced from $1.50 to $2.50 per ton. Any shipments under five tons are charged $10 flat for sampling in addition to the treatment charges and reductions.

A comparison of the Ladysmith and Tacoma rates shows that the former is generally the most favorable.

AMERICAN CYANAMID CO.

Montreal, Aug. 13.—The American Cyanamid Co. reports net profits of $638,648 for the year ending June 30 last, against only $58,583 two years ago, when the company's business was demoralized by the war. Profits, as shown, were equal to slightly more than eight per cent. on the $7,895,200 preferred stock outstanding at the end of the year. During the past twelve months the company acquired the entire capital stock of the Ammo-Phos Corporation, which is to begin manufacturing a new fertilizer material, ammonium phosphate, this month, and has already been producing sulphuric acid and sulphate of ammonia. With this corporation was also acquired in the same transaction the Amalgamated Phosphate Company, which owns phosphate rock mines in Florida.

The annual report notes that:

"The demands upon your company's treasury to defray the cost of the phosphate mines extensions (the capacity of the mines being doubled, coupled with the extensions and improvements at the Ammo-Phos plant and at Niagara Falls, have been such, together with the undue risk at this time of the world's history in assuming large loans, as to involve the necessity of passing the dividend on the preferred stock, amounting to 6 per cent. for the fiscal year ended June 30, 1917. The preferred stock is cumulative, so that this action is only a deferment; all accrued dividends on the preferred stock must be discharged before any dividends can be paid on the common stock. Your directors have taken this action with the conviction that this reinvestment of earnings in plant extensions and improvements at this time will result in extraordinary and immediate benefit to holders of both the preferred and common stock."

Net sales for the past year amounted to $2,705,053, against $1,881,532 the preceding year. Contracts for delivery in the current year already in hand are placed at $2,025,811.

The balance sheet shows current assets of $1,343,328, of which $105,066 is cash, against current liabilities of $684,443, including $359,114 notes payable. Surplus account, which was $232,283 a year ago, stands at $525,402, after deducting $148,951 for losses sustained through dismantling part of the Niagara Falls plant, and $196,578 for deferred dividend paid last December. Accrued dividends due on the preferred stock amount to $439,837.

PERSONAL.

Mr. W. E. Segsworth has returned to Toronto after a trip to industrial centres in the Maritime Provinces. He expects this month to visit the Western Provinces to see what facilities are available for the industrial training of returned soldiers.

Mr. J. B. Tyrrell is in British Columbia.

Mr. N. S. Clarke, for years engaged in developing mineral claims on the west coast of Vancouver island, has returned to Victoria, B.C., from a visit to Montana.

Mr. Frederic Keffer, of Spokane, Washington, president and general manager of the Highland Valley Mining and Development Co., operating a copper mine and concentrating plant in Ashcroft mining division of British Columbia, was in Victoria on a business visit about the middle of August.

Mr. James Cronin, of Spokane, who is developing a mining property situated in the Babine Mountains, Omineca division of British Columbia, recently examined some mineral claims in East Kootenay.

Mr. B. H. Bennetts, of Tacoma, Washington, is at the Ladysmith Smelting Corporation's smeltery on Vancouver island, to supervise the installation there of a copper converting plant.

THE BITER BIT.

The following is an editorial from the Houghton Mining Gazette:

"On several occasions an I. W. W. agitator in Butte declared in public speeches that city ordinances, the laws of the country, even the constitution of the United States, are mere scraps of paper, which should be torn up and disregarded; that the city fathers should be told to go to hell, along with their ordinances and laws. He asserted the I. W. W. would keep Uncle Sam so busy that it will not be possible to send soldiers to France. He made many other utterances of like import. Then, early one morning, a band of men who had conveniently accepted his doctrine for the moment, took this unbeliever in laws, this man who had no regard for authority and who was a law unto himself, and hanged him to a railroad trestle. It was a lawless finish of a lawless man, and the act of lawless men. Yet he had invited the practice of the lawlessness he preached. He was the victim of the very violence he upheld and encouraged. The I. W. W. not only is a dangerous menace to society but, fortunately, its entire outlook on life, and the destructive character of its practices, constitute as great a menace to itself."

U. S. IRON ORE PRODUCTION.

The iron ore mined in the United States in 1916 reached a total of 75,167,672 gross tons, the greatest annual output ever made. The shipments from the mines in 1916 were 77,870,553 gross tons, valued at $181,902,277. The quantity mined in 1916 was more than 19,600,000 tons greater than that mined in 1915. The increases in quantity and in value of iron ore shipped in 1916 amounted to about 40 and 80 per cent., respectively. The average value per ton at the mines in 1916 was $2.34, as against $1.83 in 1915. These figures, which were compiled under the direction of E. F. Burchard, of the United States Geological Survey, Department of the Interior, include for 1916 only iron ore containing less than 5 per cent. of manganese.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA.

Generally, reports from the various camps in which metalliferous mines are being operated, are favorable. Much development work is being done; the outlook for an increased output of ore is believed to be encouraging; in several instances additions are being made to plant and machinery; prices of metals continue high enough to leave a good margin of profit to most operators producing ore, and on the whole there is much in the mining situation to warrant the expectation of the industry being in a flourishing condition in the future.

East Kootenay.

There is little to add to last month's notes concerning mining in this district. Coal-mining and coke-making operations are once more in full swing, so far as the restricted supply of labor will allow them to be. Shipment of lead and zinc ores from the Sullivan mine is comparatively large with a total of 10,553 tons for the month of July, and 756 tons for the first week in August, while several smaller mines in Fort Steele, Windermere, and Golden divisions have also shipped ore lately.

West Kootenay.

Ainsworth.—Mines in this division from which ore has been received at Trail since July 1st are the Bluebell, Cork-Province, Florence, Highland, Retallack, and Spokane Trinket. The chief developments have been the starting of the Florence Silver Mining Co.'s new concentration mill, the installation of concentrating plant at the Silver Hoard, encountering of ore in a low-level crosscut adit drive on the Crescent-Eden property, the resumption of work in the Cork-Province mine and concentrator and the satisfactory showing of ore opened in the Utica mine at depth. Work is being continued in the Skyline, on several properties higher up the South Fork of Kaslo creek than the Cork-Province, on Retallack & Co.'s group near Whitewater, and at the Bell zinc mine in Jackson basin. The resumption of operations at the concentrating mill in Kaslo, where zinc-lead ore from the Lucky Jim mine is treated, is another satisfactory evidence of progress.

Slocan—The mines in Slocan mining division that were on the Trail smeltery list as ore shippers during four weeks ended August 7 were the Freddie Lee, Galena Farm, Idaho-Alamo, Lucky Jim, Lucky Thought, Queen Bess, Rambler-Cariboo, Slocan Star, Standard, Surprise, Van-Roi and Wonderful, and the Ottawa in Slocan City division. Total of receipts from these mines for the period mentioned was 2,610 tons, much of it of silver-lead concentrate, with the remainder either crude silver-lead ore or zinc concentrate. There are other properties on which development work is being done, but from which no ore is being shipped. The Slocan-Star Co. is reported to be making a fair profit above cost of operating; the Rambler-Cariboo Mines, Ltd., has declared another dividend, payable on September 1, total amount $17,500; the Standard Silver-Lead Co. distributed $100,000 as a dividend, which was paid on July 15; and the Lucky Jim has arranged to make a second payment of 25 per cent. to its company's unsecured creditors.

Nelson—Few mines in Nelson division have been on the shipping list of late, the chief exception having been the Emerald lead mine, near Salmo, in the southern part of the division. Between 30 and 40 men have been employed at this mine in recent weeks, and five 4-horse teams have been hauling ore to the rail-

way at Salmo, a distance of eight miles, shipments to Trail having totalled 959 tons in June, July, and the first week in August. Recent news is that a concentrating plant has been purchased and will shortly be removed from its present situation, near Chesaw, Washington, to a suitable site within easy reach of the Emerald mine. Mr. W. J. Barker, for many years superintendent of mines of which the late Mr. Leslie Hill was in charge, is now superintendent of the Emerald.

The stamp mill in connection with the Granite-Poorman group of gold mines, near the town of Nelson, is being operated, there now being sufficient ore opened to keep it going. More machinery and plant has been added lately, and provision is being made for further mining development and increased stamp-milling operations.

Rossland—It is noteworthy that shipment of ore in considerable quantity from Rossland mines to the Consolidated Mining and Smelting Co.'s smelting works at Trail was resumed in the first week in August, receipts from that camp having been as follows: From Centre Star mine, 1,137 tons; from Le Roi mine, 1,421 tons; from White Bear mine, 202 tons; total for week, 2,760 tons. There had been a practical suspension of ore production at the Centre Star and Le Roi mines, both owned by the Consolidated Co., during a period of four months, their total output of ore shipped in that time having been but 1,618 tons. The shipment from the White Bear, mentioned above, was the first from that mine for a number of years, the mine having long been inactive until recently when the Consolidated Co. commenced further developing it, presumably under an option of purchase. Pending resumption of smelting of Rossland ores at Trail, the Le Roi No. 2, Ltd., has been shipping ore from its Josie group of mines to the Ladysmith Smelting Corporation's smeltery on Vancouver Island.

Trail—There was a decided increase in the quality of ore received at the Consolidated Co.'s smelting works here during the first week in August as compared with all other seven-day periods since the first week in April. A comparison of average daily totals is as follows: For the three months ended March 31, last, the daily average was 1,350 tons; for the month of April it was 830 tons; for May, 514 tons; for June, 571 tons; for July, 669 tons, and for the first week of August, 1,169 tons. During recent weeks the receipts included 186 tons from the Venus mine, in Southern Yukon, and 1,642 tons from the Mandy mine, in Manitoba. It is stated that one of the copper blast-furnaces was blown in early in August. During the period of shortage in coke supply the lead stacks were kept in operation to the extent found practicable, but the copper furnaces were all blown out when it was found that coke could not be obtained in sufficiently large quantity to admit of both copper and lead furnaces being kept in blast

Boundary.

Late reports are to the effect that there are now six furnaces in blast at the Granby Consolidated Co.'s copper smelting works at Grand Forks, and that once again the Canada Copper Corporation's smeltery at Greenwood is being operated.

Apart from the big mines situated in the Boundary district that the above-mentioned companies are working, there are a number of smaller ones to which attention is being given. In Burnt basin, in Franklin camp, and in other parts of Grand Forks division, progress is being made, while in various parts of Greenwood division, from the Emma mine in the eastern part away to Beaverdell in the western part, work is being done in more or less important degree.

Similkameen and Nicola.

The Hedley Gold Mining Company is finding difficulty in getting mine-workers. Miners are being paid $4.25 a. day, muckers $3.75, and laborers $3.50, but there is still a shortage of men.

The Princeton Coal and Land Co. has an active demand for coal from its colliery at Princeton, so that its coal mine is running pretty well to present capacity.

The Canada Copper Corporation is making financial arrangements that will admit of the erection and equipment of a 3,000 tons a day concentrating plant, to include flotation, being proceeded with, to provide for treatment of ore from its Copper Mountain property.

In Nicola Valley, preparations are being made to resume work on the respective properties of the Donohue Mines, Ltd., and the Aberdeen Syndicate. In other parts of Nicola district mineral claims are also being developed, while coal-mining is receiving the usual amount of attention as well.

Coast.

Production on a large scale is being continued at the mines of the Britannia Mining and Smelting Co., near Howe Sound, Vancouver mining division. On Texada island there is the usual work in progress at the Marble Bay copper mine, and at others of less present importance.

Metalliferous mining on Vancouver island is more active this year than for a number of years. Ore is being mined at the Indian Chief mine, Sidney inlet, and the erection of a concentrating mill has been undertaken. In Quatsino division, mining work is being done at the old Yreka mine, from which a shipment of ore was made lately to Ladysmith, and much development work is being done at the Coast Copper Co.'s Merry Widow group. Near Cowichan lake, the Blue Grouse is making occasional small shipments, while lower down the island, at Sooke, in Victoria mining division, there is being opened a promising showing of copper ore.

STANDARD SILVER-LEAD MINING COMPANY.

The Standard Silver-Lead Mining Company, operating at Silverton, Slocan mining division of British Columbia, earned $34,293 net in June, according to a report issued from the office in Spokane, Washington, on August 13. This is compared with $36,434 in May.

The receipts were $77,636 as compared with $83,606 in May. They include $44,458 in preliminary settlement on 261 tons of ore and $22,795 on zinc sales.

The disbursements were $36,697 as compared with $28,477. They include everything from ore production to workmen's compensation. The relative operating profit was $40,939 as compared with $43,202, and the actual operating profit $34,685 as compared with $36,-809. The difference between relative and actual operating profit is the cost of development. For development, $6,254, of which $1,993 was for supplies and $4,261 for labor.

The surplus was $301,247 on June 30. The cash in bank was $261,345. A credit of $79,815 is taken for ore shipped but not settled for. The obligations were $39,910 on payroll and vouchers.

MARKETS

STANDARD STOCK EXCHANGE.

J. P. Bickell & Co., Toronto, report the following quotations as close of August 23, 1917.

Silver.

	Asked.	Bid.
Adanac	.18¾	.19
Bailey	.03¾	.04
Beaver	.36	.36½
Buffalo	1.12½	...
Chambers F.	.15	.16
Coniagas	3.50	4.25
Crown Reserve	.26½	.27½
Foster	...	.04½
Gifford	.04	.04½
Great Northern	.07	.07½
Hargraves	.13½	.14
Hudson Bay	35.00	38.00
Kerr Lake	5.00	5.90
Kenabeek	.24½	.25
La Rose	.49	.52
Lorraine	...	.09
McKinley	.59½	.60
Nipissing	8.30	8.50
Ophir	.08⅜	.08¾
Peterson Lake	.11½	.12
Right of Way	...	.05½
Rochester	.02	.03
Seneca	.01½	.02½
Shamrock	...	.21½
Temiskaming	.32	.32¼
Shamrock	...	.21½
Temiskaming	.32	.32¼
Trethewey	...	.15
Wettlaufer	.06½	.07½

Gold.

	Asked.	Bid.
Apex	.06½	.06¾
Dome Extension	.16½	.17
Dome Lake	...	.17½
Dome Mines	10.10	...
Eldorado	.02⅞	.03
Gold Reef	.01½	.01⅜
Hollinger	4.53	4.55
Keora	.16	.17½
Kirkland Lake	.43	.46
McIntyre	1.60	1.61
Moneta	.07¾	.09
Newray	.77	.79
Porcupine Crown	.42	.49
Porcupine Imperial	.02½	.03
Porcupine Tisdale	.01¾	.02½
Vipond	.34	...
Preston	.04¼	.04⅜
Schumacher	.48	.50
Teck-Hughes	.45	.50
Thompson-Krist	.07	.09
West Dome	.18½	.19

TORONTO MARKETS.

Cobalt oxide, black, $1.50 per lb.
Cobalt oxide, grey, $1.65 per lb.
Cobalt metal, $2.25 per lb.
Nickel metal, 45 to 50 cents per lb.
White arsenic, 15 cents per lb.

Aug. 23, 1917—(Quotations from Canada Metal Co., Toronto.)
Spelter, 11½ cents per lb.
Lead, 13 cents per lb.
Tin, 63 cents per lb.
Antimony, 18 cents per lb.
Copper, casting, 33 cents per lb.
Electrolytic, 35 cents per lb.
Ingot brass, yellow, 23 cents; red, 25½ cents per lb.

Aug. 23, 1917—(Quotations from Elias Rogers Co., Toronto.)
Coal, anthracite, $9.50 per ton.
Coal, bituminous, nominal, $9.00.

SILVER PRICES.

		New York. cents.	London. pence.
Aug.	7	81¾	41½
"	9	82⅞	42 1/16
"	10	82⅞	42 1/16
"	11	82⅞	42 1/16
"	13	82⅞	42 1/16
"	14	83¾	42½
"	15	86¾	44
"	16	86¾	44
"	17	86¾	44

NEW YORK MARKETS.

Connellsville Coke—
Furnace, spot, $13.50 to $15.00.
Furnace, contract, nominal.
Foundry, spot, $14.00 to $15.00.
Foundry, contract, nominal.
Straits Tin, spot, f.o.b., 62.62½.
Copper—
Prime Lake, nominal, 28.50 to 29.50.
Electrolytic, nominal, 26.75 to 27.25.
Casting, nominal, 26.00 to 26.50.
Lead, Trust price, 11.00 cents.
Lead, outside, nominal, 10.62½ to 10.87½ cents.
Spelter, prompt western shipment, 8.55 cents.
Antimony—Chinese and Japanese, nominal, 15.12½ to 15.37½ cents.
Aluminum—nominal.
No. 1 Virgin 98-99 per cent., 48.00 to 50.00 cents.
Pure, 98-99 per cent. remelt, 46.00 to 48.00 cents.
No. 12 alloy remelt, 36.00 to 38.00 cents.
Powdered aluminum, 75.00 to 85.00 cents.
Metallic magnesium—99 per cent. plus, $2.00 to $2.50.
Nickel—Shot and ingot, 50.00 cents.
Electrolytic, 55.00 cents.
Cadmium, nominal, $1.45 to $1.50.
Palladium, $115.00.
Quicksilver (August shipment from California), $115.00.
Platinum—Pure, $105.00.
10 per cent. Iridium, $111.00.
Cobalt (metallic), $2.70.

Tungsten—

Wolframite, $25.00.
Scheelite, $26.00.

Silver (official), 86¾.

Metal Products.—Following quotations represent mill prices and are strictly nominal except in the case of lead sheets and sheet zinc:

Sheet Copper—

Hot rolled, 36.00 to 38.00 cents.
Cold rolled, 37.00 to 39.00 cents.
(Shipments from stock 2c per pound extra.)
Copper bottoms, 50.00 cents.
Copper in rods (round), 40.00 cents.
Square and rectangular, 41.00 cents.
Copper wire, nominal, August, 33.00 to 33.50 cents.
Copper wire, Sept., Oct., 32.00 to 33.00.

High brass—

Sheets, 33.25 to 35.25.
Wire and light rods, 33.25 to 35.25.
Heavy rods, 33.25 to 33.75.
Low brass—sheet, wire and rods, 38.75 cents.

Tubing—

Brazed bronze, 50.25 to 50.50.
Brazed brass, 46.75 to 47.75.
Seamless copper, 45.00 to 48.00.
Seamless brass, 41.00 to 45.00.
Seamless bronze, 54.00 cents.
Full lead sheets, 12.75 cents.
Cut lead sheets, 13.00 cents.
Sheet zinc, f.o.b. smelter, 19.00 cents.

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Recent Publications

The Nickel Industry: with special reference to the Sudbury region, Ont. Report on, by Professor A. P. Coleman, Ph.D.

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

Building and Ornamental Stones of Canada (Western Provinces). Vol IV., by W. A. Parks, Ph.D.

Feldspar in Canada. Report on, by H. S. de Schmid, M.E.

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 Report of Mineral Production during Calendar Year, 1915, by John McLeish, B.A.

The Petroleum and Natural Gas Resources of Canada: Vols. I. and II., by F. G. Clapp, M.A., and others.

The Value of Peat Fuel for the Generation of Steam. Bulletin No. 17, by John Blizard, B.Sc.

Cobalt Alloys with Non-corrosive Properties. Report on, by H. T. Kalmus, B.Sc., Ph.D.

Electro-thermic Smelting of Iron Ores in Sweden. Report on, by A. Stansfield, D.Sc.

Non-metallic Minerals Used in Canadian Manufacturing Industries. Report on, by H. Frechette, M.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

Memoir 64. Preliminary Report on the Clay and Shale Deposits of the Province of Quebec, by J. Keele.

Memoir 74. A List of Canadian Mineral Occurrences, by Robert A. A. Johnston.

Memoir 77. Geology and Ore Deposits of Rossland, British Columbia, by C. W. Drysdale.

Memoir 82. Rainy River District of Ontario. Surficial Geology and Soils, by W. A. Johnston.

Memoir 84. An Exploration of the Tazin and Taltson Rivers, Northwest Territory, by Charles Camsell.

Memoir 85. Road Material Surveys in 1914, by L. Reinecke.

Memoir 87. Geology of a Portion of the Flathead Coal Area, British Columbia, by J. D. Mackenzie.

Memoir 88. Geology of Graham Island, British Columbia, by J. D. Mackenzie.

Memoir 89. Wood Mountain-Willowbunch Coal Area, Saskatchewan, by Bruce Rose.

Memoir 92. Part of the District of Lake St. John, Quebec, by John A. Dresser.

Memoir 93. The Southern Plains of Alberta, by D. B. Dowling.

Memoir 94. Ymir Mining Camp, British Columbia, by Charles Wales Drysdale.

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

Map 59A. Wheaton, Yukon Territory.

Map 60A. Wheaton, Yukon.

Map 67A. Kirkfield Sheet, Victoria County, Ontario.

Map 150A. Ponhook Lake Sheet, Nova Scotia.

Map 175A. Ymir, Kootenay, British Columbia.

Map 176A. Graham Island, Queen Charlotte Islands, British Columbia.

Map 177A. Southern Portion of Graham Island, Queen Charlotte Islands, British Columbia.

Map 180A. Espanola Area, Sudbury District, Ontario.

Map 184A. Roberval, Lake St. John County, Quebec.

Map 187A. Southern Plains of Alberta.

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

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

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

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Consolidated Mining and Smelting Co. of Canada.
Canada Metal Co.
C. L. Cnstant Co.

Monel Metal—
International Nickel Co

Nickel—
International Nickel Co.

Ore Sacks—
Northern Canada Supply Co.

Ore Testing Works—
Ledoux & Co.
Can. Laboratories.
Milton Hersey Co., Ltd.
Campbell & Deyell.

Ores and Metals—Buyers and Sellers of—
C. L. Constant Co.
Geo. G. Blackwell.
Consolidated Mining and Smelting Co. of Canada.
Orford Copper Co.
Canada Metal Co.

Perforated Metals—
B. Greening Wire Co., Ltd.
Fraser & Chalmers of Canada, Limited.
Northern Canada Supply Co.
Hendrick Mfg. Co.

Canadian Miners' Buying Directory.—(Continued from page 19.)

Pig Tin—
Canada Metal Co., Ltd.

Pig Lead—
Canada Metal Co., Ltd.

Pipes—
Can. Fairbanks-Morse Co.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Pacific Coast Pipe Co., Ltd.
Northern Canada Supply Co.
Smart-Turner Machine Co.

Pipe Fittings—
Can. Fairbanks-Morse Co.
Northern Canada Supply Co.

Piston Rock Drills—
Mussens, Limited.

Pneumatic Tools—
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.

Prospecting Mills and Machinery—
Standard Diamond Drill Co.
Fraser & Chalmers of Canada, Limited.

Pulleys, Shafting and Hangings—
Can. Fairbanks-Morse Co.
Fraser & Chalmers of Canada, Limited.
Jeffrey Mfg. Co.
Northern Canada Supply Co.

Pumps—Boiler Feed—
Can. Fairbanks-Morse Co.
Darling Bros., Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Limited.
Wettlaufer Bros.

Pumps—Centrifugal—
Can. Fairbanks-Morse Co.
Darling Bros., Ltd.
Escher Wyss & Co.
Mussens, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
Can. Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada Limited.

Pumps—Electric—
Can. Fairbanks-Morse Co.
Darling Bros., Ltd.
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Limited.

Pumps—Pneumatic—
Can. Fairbanks-Morse Co.
Darling Bros., Ltd
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.

Pumps—Steam—
Can. Fairbanks-Morse Co.
Can. Ingersoll-Rand Co., Ltd.
Darling Bros., Ltd.
Mussens, Limited.
Northern Canada Supply Co.

Pumps—Turbine—
Can. Fairbanks-Morse Co.
Darling Bros., Ltd.
Smart-Turner Machine Co.
Can. Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Limited.

Pumps—Vacuum—
Can. Fairbanks-Morse Co.
Darling Bros., Ltd.
Smart-Turner Machine Co.

Quarrying Machinery—
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.

Rails—
W. Fraser.

Roasting Plants—
Fraser & Chalmers of Canada, Limited.

Rolls—Crushing—
Fraser & Chalmers of Canada, Limited.

Roofing—
Can. Fairbanks-Morse Co.
Northern Canada Supply Co.

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

Rope—Wire—
B. Greening Wire Co., Ltd.
Allan, Whyte & Co.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Limited.

Samplers—
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heys & Son.

Scales—
Can. Fairbanks-Morse Co.

Screens—
B. Greening Wire Co., Ltd.
Jeffrey Mfg. Co.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Limited.
Roberts & Schaefer Co.
Hendrick Mfg. Co.

Screens—Cross Patent Flanged Lip—
Hendrick Mfg. Co.

Separators—
Can. Fairbanks-Morse Co.
Darling Bros., Ltd.
Smart-Turner Machine Co.

Sheet Lead—
Canada Metal Co., Ltd.

Sheets — Genuine Manganese Bronze—
Hendrick Mfg. Co.

Shovels—Steam —
M. Beatty & Sons.
W. Fraser.

Smelting Machinery—
Fraser & Chalmers of Canada, Limited.

Stacks—Smoke Stacks—
Can. Fairbanks-Morse Co.
Hendrick Mfg. Co.
MacKinnon, Holmes & Co.

Stamp Mills—
Fraser & Chalmers of Canada, Limited.

Steel Barrels—
Smart-Turner Machine Co.

Steel Drills—
Sullivan Machinery Co.
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.

Steel Drums—
Smart-Turner Machine Co.

Steel—Tool—
N. S. Steel & Coal Co.
Armstrong, Whitworth of Can., Ltd.

Surveying Instruments—
W. F. Stanley.
C. L. Berger.

Tanks—Cyanide, Etc.—
Fraser & Chalmers of Canada, Limited.
Hendrick Mfg. Co.
Pacific Coast Pipe Co., Ltd.
MacKinnon, Holmes & Co.

Tipples—
Roberts & Schaefer Co.

Transits—
C. L. Berger & Sons.

Tube Mills —
Fraser & Chalmers of Canada, Limited.

Turbines—
Escher Wyss & Co.
Fraser & Chalmers of Canada, Limited.

Valves—
Can. Fairbanks-Morse Co.

Winding Engines—
Can. Ingersoll-Rand Co., Ltd.

Wire Cloth—
Northern Canada Supply Co.
B. Greening Wire Co., Ltd.

Wire (Bare and Insulated)—
Standard Underground Cable Co., of Canada, Ltd.

Zinc Spelter—
Canada Metal Co., Ltd.

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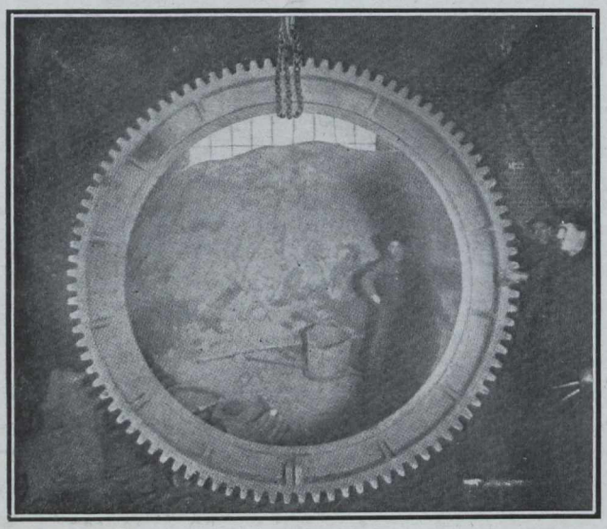

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