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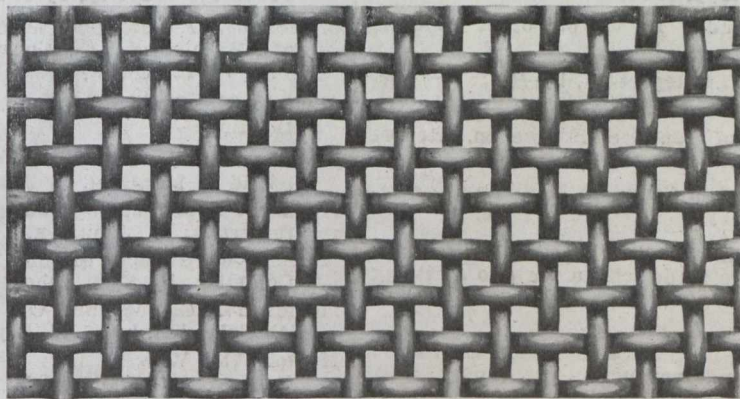
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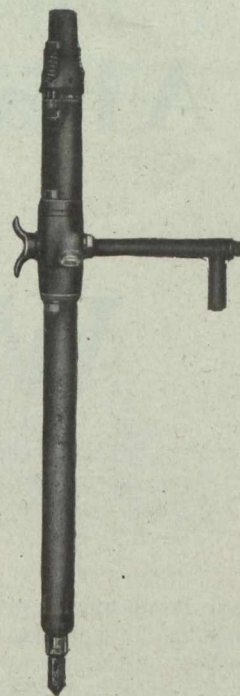
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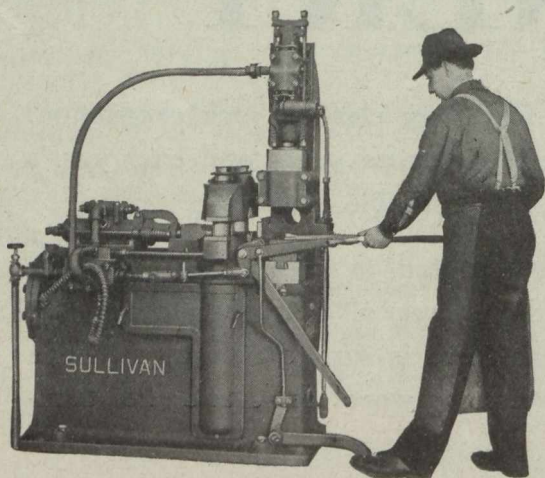
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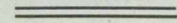
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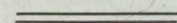
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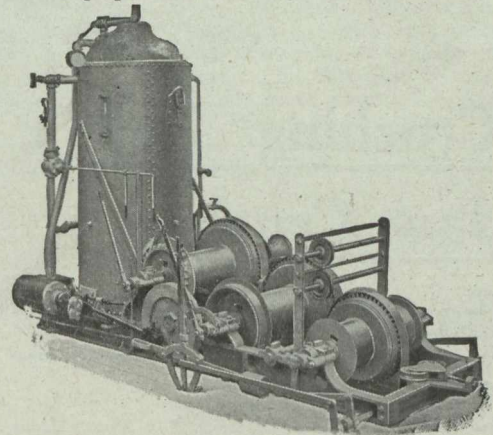
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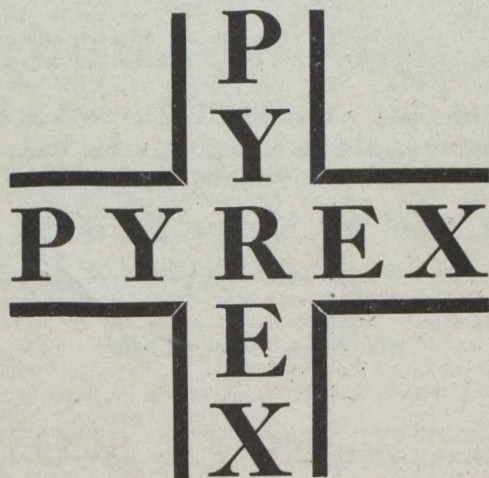
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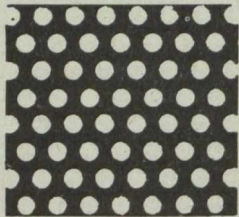
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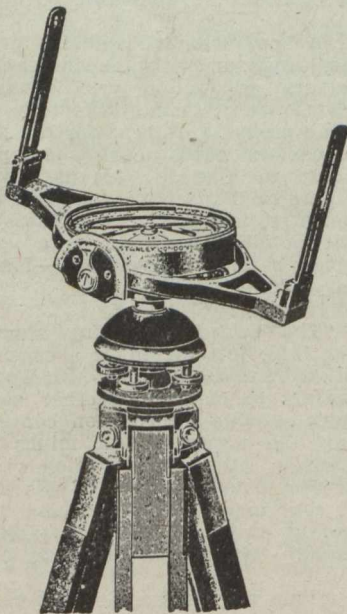
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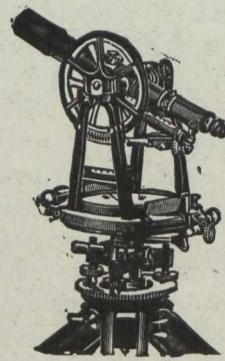
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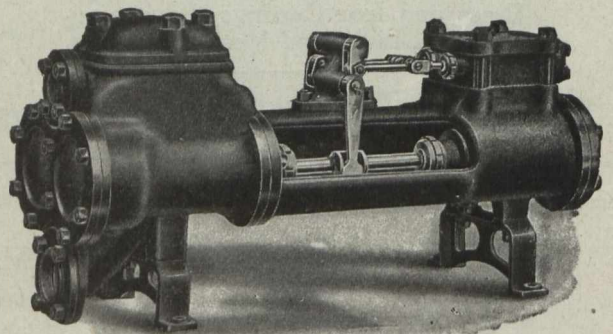
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REGINALD E. HORE

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EXPLORATION AT COBALT

The high price of silver has naturally led to renewed activity in the Cobalt district. Many properties which have not yet received the attention they deserve will now be subjected to careful examination. It is not unlikely that some abandoned prospects will be developed into producing mines.

The structure of many of the silver deposits at Cobalt is such that one may reasonably expect to find silver on some claims which show no ore at the surface. It is characteristic of many of the orebodies in the conglomerate of the Cobalt series that they lie close to the underlying Keewatin and pitch with the sloping contact. Where erosion has worn the conglomerate thin the ore outcrops. In other places, however, the ore does not extend to the surface and can only be discovered by underground exploration.

Another structural feature of Cobalt deposits that demands attention is the faulting of the formations in which the ore occurs. In the mine workings very many small faults and a few large faults have been encountered. Some important discoveries have been made during the past few years by studying the fault phenomena. Further study will doubtless result in the location of more ore.

A third structural feature of importance at Cobalt is the relation of the ore deposits to masses of diabase which intrude the other rocks of the district. These diabase masses are in the form of sheets a few hundred feet in thickness. Ore has been mined from the rocks above and below the diabase and some from the diabase itself. Most of the ore mined at Cobalt has been taken from rocks that were probably once covered by the diabase sheet. On the theory that the lower contact is a promising horizon, development at considerable depth is to be undertaken at the Beaver and Temiskaming mines, where the early workings were in rocks overlying the diabase.

The annual report of Hollinger Gold Mines, Ltd., and the report recommending consolidation of Hollinger, Acme and Millerton, should go a long way towards convincing the public that gold mining in Ontario is a well established industry. The men who are responsible for the development of the Hollinger are to be congratulated on their success. They have converted an hitherto unproductive area of Northern Ontario into a source of millions.

Their enterprise has made the members of the Hollinger syndicate rich men. They have taken their gold from the earth, not from their fellow men. Few men of wealth have such good cause for feeling satisfied that their millions are clean and that in winning them they have aided so largely in the development of their country.

MINING NEWS FROM THE PAS.

The Pas, Manitoba, May 5.—Messrs. Woods and Stanley Simpson got in from Flin-Flon Monday noon, with diamond drill cores, after a most difficult journey by dogs and canoe. They were twice upset in crossing the ice-strewn lakes between Athapapuskow and Cumberland House. They picked up a lost traveller between Cumberland and Beaver.

Charlie Anwater was another canoe arrival from the sulphide fields near Schist Lake. He says the Tonopah engineers feel greatly encouraged over the early results of the diamond drill operations, and the drill is working at a second hole. Instead of vertical drilling, as was reported, Mr. Anwater declares the drill is being worked on the walls at forty-five degrees.

It will probably be some months yet before the diamond drill operations north of here will prove up the ore-body. No information is given out of the values encountered. However, deals are continually being made on the hope that everything will come out satisfactorily. Prices paid for claims run from fifty to a thousand dollars.

The water route to the sulphide camp is reported clear of ice, and the Ross boat will make the mouth of Goose river on the trip leaving here next Tuesday.

Robert Kerr is arranging a large program of development work on his properties at Herb Lake. He is in control of the Percy and the McCafferty claims, and a lot of work is being planned on these two properties. The Percy has over 400 feet of the famous Rex vein, and free gold shows just as plentiful as upon the other three claims through which it traverses.

Tuesday's train from the south brought a dozen prospectors from Northern Ontario camps. They say more men are coming this month.

M. J. K. Allen and A. H. Corkett, of the public works department of the Provincial Government, went to Herb Lake on Wednesday to make a reconnaissance of the proposed Government road from the railway track to the mines.

The Ottawa Government will not undertake the expense of surveying the boundary line between Manitoba and Saskatchewan, north of 60, to determine the location of Flin-Flon and Athapapuskow Lakes. This information was contained in a letter to the Board of Trade from J. H. Challoner, head of the survey branch of the Department of the Interior. The status of the sulphide ore lakes will remain unknown until the survey is made.

The drilling at Flin-Flon goes on rapidly, and something definite about the extent of the ore-body is expected before the end of the present month. The assay returns have not been made public. Mr. Hammell and associates in the enterprise may be here shortly, and it is possible some information will be secured for publication as to the values encountered by the diamond drill.—The Pas Herald.

HEDLEY GOLD.

At the annual meeting of the Hedley Gold Mining Co., held recently in New York, the directors, with the exception of Mr. W. J. Maloney, in whose stead Mr. W. E. Corey was chosen, were re-elected. The directors and officers of the company now are: Messrs. I. L. Merrill (president), W. B. Dickson (vice-president), C. D. Fraser (treasurer), C. A. Congdon, W. E. Corey, Marcus Daly, F. E. Searle, G. E. Tener, and W. D. Thornton. Mr. J. D. Clarke continues as secretary and assistant treasurer, and Mr. Gomer P. Jones as general superintendent.

TONOPAH AT THE PAS.

The Tonopah Mining Company operates the Tonopah placer mines at Breckenridge, California; Eden mines in Nicaragua, South America; Desert Power and Mill Company in Nevada, and the Tonopah mine at Tonopah, Nevada. More lately the company has taken an interest in the sulphide discoveries north of The Pas and at this time they are testing an ore-body with a diamond drill on Schist Lake. J. E. Spurr is vice-president and advising engineer of the Tonopah, and his assistant in this district is L. W. Gabrecht, formerly in charge of operations in Nicaragua. On the board of directors of the company are national figures in American public life, such as Samuel Bell, of the Washburn-Crosby Flour Mills; C. A. Daniel, on the board of directors of several large railways, and Henry D. Moore. Mr. Spurr is accredited with being one of the foremost geologists of the times. His text books are used at mining colleges and by prospectors and mining men all over the world. His visit to this district last fall subsequently resulted in creating the interest of large mining operators throughout America, who are watching the work of the diamond drills at both Schist and Flin-Flon with marked concern.—The Pas Herald.

YUKON GOLD CO.

During the year 1915 the Yukon Gold Co. acquired additional properties in California and Alaska. The seven dredges in Dawson district, Yukon, were operated for 88.1 per cent. of the season of 147 days, mining 5,041,075 cubic yards and recovering gold to the value of \$2,456,597, or an average of 48.73 cents a cubic yard. The average cost, including depreciation, was 26.46 cents a cubic yard, which was less by 1.16 cents than the cost for 1914. Expenditures totaled \$1,333,908, as compared with 1914. There was a reduction in value of the ground dredged, amounting to 5.48 cents per cubic yard. During the season a total of 380,340 square yards, or 64.7 per cent. of the ground handled, had to be thawed by steam. By hydraulicking in Dawson district, 3,031,647 cubic yards of gravel was washed, this yielding \$412,535, or 13.60 cents a yard. Expenditures on this account totalled \$243,247. The water duty was 6.13 cubic yards per miner's inch. In Alaska (Iditarod), the season lasted 196 days, and there was dredged 926,956 cubic yards, producing gold to the value of \$845,998, an average of 91.3 cents per cubic yard. The expenditure was \$358,407, an average of about 38.7 cents, which was lower by 11.5 cents than for 1914. As a result of better dredging conditions and of the installation of sand elevators, the dredge at Iditarod handled 4,717 cubic yards a day, which was a gain of 1,216 yards over the daily quantity for the preceding season. The three dredges operated in California (on American, Butte, and Feather rivers), together handled 3,818,126 cubic yards of gravel, which yielded \$437,852, an average of 11.46 cents a yard. Expenditure was \$172,118 or about 4.51 cents a yard. The total profit for the year was \$2,121,031; dividends paid amounted to \$1,050,000. Figures of gravel handled and gold recovered, included above, give the following totals: gravel handled, 12,817,804 cubic yards; gold recovered, \$4,152,982.

TWENTIETH CENTURY.

Mr. Anson Gard advises us that work is to be resumed at the Twentieth Century mine, Cobalt district. Mr. Gard will be in charge. The directors of the company are S. Sager, Geo. Laws, L. R. Lupton, E. Spiller, H. A. Ball, David Fritz and J. F. Taylor

RENEWED ACTIVITY AT COBALT

The remarkable rise in the price of silver during the past two months is now having its effect on the camp. At first there was no general disposition to accelerate production in any way; nor did outside capital find much confidence in silvers. There is now, however, such a general disposition to regard the rise as of some permanence, that there is a very general demand for silver prospects and many old mines are now being opened up.

Silver has never been so high since the Cobalt camp was in being. It averaged 66 cents in 1906 and in 1907 sales were made just over 70 cents. Since that time there have been no sales made above 70 cents. The average price for last year was 49.68 cents, so that if the present basis of silver is accepted there is now an extra profit over the average of last year of between 20 and 25 cents an ounce. This is, of course, not the average for any length of time, yet it seems most improbable that silver will again go below 70 cents, until war conditions have changed. All producing properties are, of course, making much more profit.

Labor is becoming rather scarce and before any agitation had developed, the mine managers representing the majority of the mines in Cobalt, met and decided to share some of their profits with the miners. Accordingly it was decided to grant a raise of 25 cents a day to underground men; the increase to date from May 1st. In addition to this, a bonus of 25 cents will be granted from June 1st, to all employees at the mine, both surface and underground, if silver averages more than 70 cents for any one month. That is to say, if the May average of silver is higher than 70 cents, the companies will pay to their underground miners 50 cents extra and to their surface men 25 cents extra. If the average price for silver in any month falls below 70 cents, the underground men will still retain their advance of 25 cents, but there will be no difference in wage to the surface men. There is some disposition on the part of the surface men to quarrel with this arrangement, but on the whole and for the present, at any rate, it appears to have satisfied the miners.

All the mines which are at present producing in the camp, are making preparations to take out as much silver as they can, while the price is good. The Kerr Lake is pulling very heavily on its old stopes. The Nipissing is preparing to add to its regular production, by mining pockets of low grade ore that would otherwise not have been touched for some time. Also a number of dumps which were mined from open cuts some years ago will be sent to the mill. The Temiskaming and the Beaver are also taking down as much of their high grade ore as they can and production from these properties will be high in the next month. The same may be said generally of the whole camp.

The most noticeable change in the camp is the disposition to open up old prospects. The Crown Reserve Mining Company has taken an option on the Cochrane and is now dewatering it. It is understood that they will adopt quite vigorous mining methods. While the Trethewey has not yet actually started up, nor fixed a date to start up, it is certain that it will be opened up again soon. Exhaustive tests are being made with the ore, in order to discover if it will not be profitable to install oil flotation process at the Trethewey. The Adanae Cobalt now has two veins to work upon, as another vein has recently been found in a winze. The

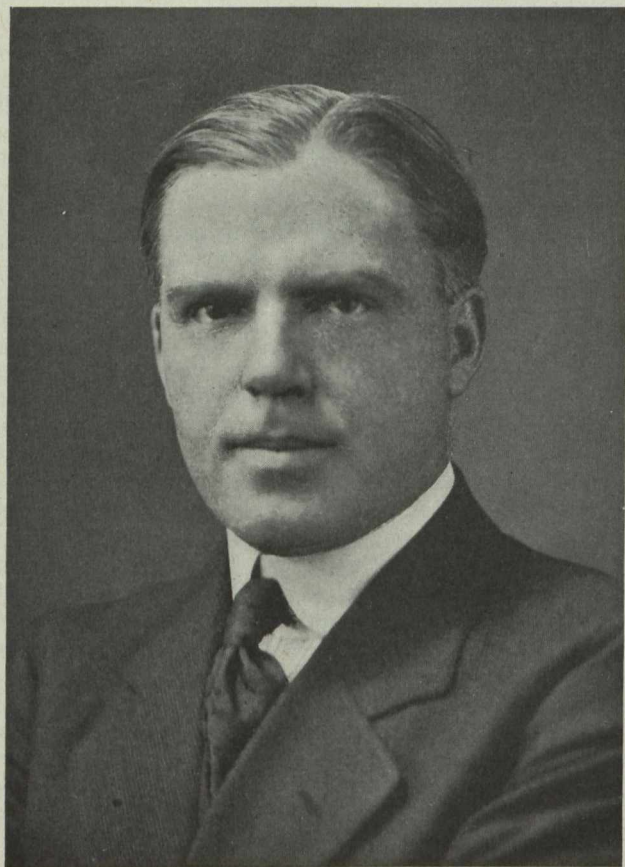
Gifford Cobalt is experiencing considerable difficulty with water and it will not be possible for them to accomplish much work for some time to come.

During April the Nipissing mined ore of an estimated value of \$167,446, and shipped bullion from Nipissing and Customs ore of an estimated net value of \$447,546. Production is about the same as it was last month, but shipments are very much higher. Mining developments were satisfactory at three points. At the end of April, the drift on vein 490, 112 feet below the fourth level, had been developed 80 feet. The width of the vein has averaged seven inches and the silver contains 1,200 oz. to the ton. To the south the vein is now of good ore, although assays were low for the first 25 feet. Favorable results were also obtained in the winze sunk on vein 102, in 96 tunnel. At a depth of 60 feet in the winze, the vein was cut and it here averages 1½ inches of 1,500-oz. ore. The 81 shaft—the work being conducted to open up the ore on the Cobalt Lake fault—is making good progress. The shaft is now down 485 feet. Some success has been met with in the development at the O'Brien, No. 14 shaft, at the 2nd level. Drifting was commenced on a small vein encountered about a month ago. It is now well defined and contains some Cobalt and has assayed as high as 1,500 oz., over a width of ¾ of an inch, but the wall rock carries so well, that the whole drift will assay 50 oz., which is exceptionally high mill rock. Owing to the present price of silver, every effort will be made to take out silver from outlying shafts and dumps.

The favorable results continue to be retained at the McKinley Darragh. In raising on vein 20, some very rich high grade ore has been struck, whereas at the 200-ft. level it was quite low grade. The ore in the raise will run 2,000 oz. over three to four inches. The winze being put down in the foot wall of the Cobalt Lake Fault was stopped at 162 ft.; although it was still in conglomerate. The cross-cut to the north-west is now being undertaken with the purpose of finding new ore-bodies. The flotation plant at the mill is now ready to run, but is held up by the non-arrival of the press. Directly it arrives and is installed, the slimes will be treated.

The old Red Jacket mine, south of Cobalt, has been leased by Mr. Homer Gibson of Timmins, from the Temiskaming Mining Company and it will probably be worked this year. This old prospect has been closed down for several years. It was reported shortly before it closed down, that high grade ore had been struck at the 100-ft. level, but this was never confirmed and the company went into liquidation and was taken over by the Temiskaming Mining Company. It is learned, however, on good authority, that high grade ore was actually struck and that the property closed down owing to disagreement between the various members of the syndicate controlling the company. As this property is in conglomerate, some distance from any other producing mine, its development will be watched with a great deal of interest.

The Coniagas Mining Company will install an oil flotation plant at their mill. The plant will be installed in place of the canvas tables which are now treating the slimes. The tails from the present cyanide plant will also go to the oil flotation plant.



PERCY A. ROBBINS, M.E.

General Manager, Canadian Mining & Finance Co., Ltd., gold mining and milling, operating Hollinger Gold Mines, Ltd., Acme Gold Mines, Ltd., Millerton Gold Mines, Ltd., Timmins, Ont. Consulting mining engineer. Born in Chicago, May 23rd, 1874, son of James A. and Maria Robbins. Educated at Chicago Manual Training School; Cornell University (graduate in Mechanical Engineering, 1894). First engaged with the Philadelphia Traction Co., Philadelphia, 1894-1895; went to South Africa in 1896, and there with S. Neumann & Co. (Engineering Department), Johannesburg, Transvaal, 1896; occupied various engineering positions in South African Mines, 1897-1898; agent, South African General Electric Co., Durban, Natal, 1899-1900; consulting engineer and at times acted as general manager, DeBeers Consolidated Mines, Limited, South Africa, 1900-1904; during this time also acted as Examiner of Engineering Classes, University of the Cape of Good Hope, and acted as consulting engineer to the Indwe Collieries and Imperial Cold Storage Co., DeBeers Explosive Works, 1905-1907; practised as a consulting engineer in New York City and engaged in contracting in pneumatic caisson work; general manager, McKinley-Darragh-Savage Mines, during which time reorganized the company and put the mine on solid financial basis, 1908-1911; appointed general manager of Timmins-McMartin-Dunlap interests, now incorporated as Canadian Mining and Finance Co., Ltd., and controlling Hollinger Gold Mines, Acme Gold Mines and Millerton Gold Mines, Ltd. Married Sophie K. Snowell, September 9th, 1904; has two sons (James S. and Frederick Peter) and two daughters (Helen and Ruth). Clubs: Rocky Mountain and Engineers (New York); Engineers' (Toronto). Technical Societies: Institute of Mining and Metallurgy, London; Canadian Mining Institute; Mining and Metallurgy Society of America; American Institute of Mining Engineers; American Institute of Electrical Engineers. Anglican. Residence, Timmins, Ont.

Mr. Charles Spearman, of Haileybury, has been appointed manager of the Renfrew Molybdenite Mines of Mount St. Patrick, a company controlled by the Algonic Development Company. This company has a deposit of molybdenum twenty miles south of Renfrew. The property was taken up some time ago, when the demand for molybdenite was not very keen and it was soon closed down. Owing to the increased demand and direct contracts with the British Government, the company became active again and two carloads of ore have been taken out, with a view to immediate concentration.

Mr. G. C. Bateman has been appointed general manager of La Rose Consolidated. Mr. Bateman has been lately acting as field engineer for the company and among other duties has been looking after the development of gold property in Deloro which the La Rose Company has under option.

Mr. R. B. Watson has resigned his position as general manager of La Rose Consolidated. Mr. Watson is general manager of the Nipissing Mining Company.

Walter Harvey Weed, E.M., the copper geologist and publisher of the "Copper Handbook," has become managing director of the Crystal Copper Company, with a capitalization of \$1,000,000, to take over the Crystal copper mines in the Cataract mining district, Jefferson county, Montana, near Basin, on the Great Northern Railway. The properties are 30 miles east of Butte, along the Butte granite formation, and have been operated in a small way for 2 years. Mr. Weed recommends building a mill and doing deep development work, and will expend \$100,000 in this way during the present year.

With Mr. Weed on the board of directors is Paul Gow, E.M., formerly consulting engineer of the Pilot-Butte mines of Butte, which recently passed ownership to Anaconda at a price of \$1,100,000. The Pilot-Butte properties consist of only five acres in the northern section of Butte Hill and are considered to be the highest priced mining ground ever sold—over \$200,000 an acre. By the transfer the Apex law suit between Anaconda and Pilot-Butte, over the latter's Gow vein, was settled. Mr. Gow will be associated with Mr. Weed in the direction of the Crystal copper mines.

The financing of the new company is being done by the John E. Allen & Co. copper interests of Boston.

PACIFIC COAST COAL MINES, LTD.

At a meeting of shareholders in the Pacific Coast Coal Mines, Ltd., operating coal mines at South Wellington, and Suquash, Vancouver Island, British Columbia, held at the company's head office in Victoria, B.C., on April 8th, some well known Montreal financial and business men were elected directors, and at the meeting of directors which followed, Mr. James Carruthers, of Montreal, president of the Canada Steamships Line and director of the Dominion Bank of Canada, was elected president; Mr. J. H. Paine, managing director of the Canada Securities Corporation, Montreal, vice-president, and Mr. John H. Tonkin, of Victoria, managing director. The other members of the board are: Sir Thomas Tait, Montreal; Mr. C. A. Barnard, K.C., Montreal; Mr. F. B. Pemberton, Victoria, and Mr. Talbot Schmuck, secretary-treasurer, Victoria.

THE MINING INDUSTRY OF BRITISH COLUMBIA

Victoria, B.C., March 28.—The Budget speech by the Minister of Finance, Hon. Lorne A. Campbell, was delivered last night in the Legislature. The review of the conditions through which the Province has passed in the last year, and the prospects for the future, was listened to with great interest by the members, as well as a large number in the galleries. The speech breathed optimism, showing, as it did, that British Columbia, with its enormous resources, its limited indebtedness, and the prospects for still greater development under the progressive policies of the Government, had nothing to fear, but everything to hope for in the future.

Regarding the mining industry of the Province Mr. Campbell said:

It is worthy of note that the total value of the mineral production of British Columbia for all years has now passed the \$500,000,000 mark; the official figures show that the total at the end of 1915 was \$516,122,000. This industry is progressive, without doubt, notwithstanding that the world-wide demoralization of the metal markets seriously and adversely affected mineral production in this Province during the latter part of 1914 and the earlier months of 1915, for the total value of the 1915 production was within \$3,141,000 of that of 1912, which was the highest year on record; and less than \$1,000,000 short of that of 1913, the only other year of higher total value.

Taking metalliferous mining alone, the value of its production in 1915 was greater by \$2,677,000 than that of any other year in the history of mining in the Province. This was not due to any considerable extent to higher average prices of metals, but largely to the substantial increase in the production of copper, the mining of which metal is becoming increasingly important in British Columbia as the years pass.

This is what Mr. George L. Walker, of Boston, writer of Walker's Weekly Copper Letter, which is published every week in The Boston Commercial, wrote last month of the **Granby Consolidated Company**: "Those who are interested in the Granby Company should fix their attention on the Anyox, or Hidden Creek, end of its business. There the company has expended more than \$5,000,000 in the purchase and development of properties and in the erection and equipment of modern smelting works which have a capacity to smelt approximately 1,100,000 tons of ore a year. Although work has been going on there only about three years, the company has developed around 10,000,000 tons of ore that contains forty-two to fifty pounds of copper to the ton and from which will be recovered in the coming ten years between 370,000,000 and 400,000,000 pounds of copper. In addition, the company has developed approximately 10,000,000 tons of ore containing slightly less than twenty pounds of copper to the ton. It also has 3,000,000 or 4,000,000 tons of siliceous concentrating ore, averaging about forty pounds of copper to the ton, not yet included in any of its estimates of ore reserves. There is every reason to expect that within the next year the Granby Company will be producing at the rate of 35,000,000 or 40,000,000 pounds of copper annually at Anyox. There is no reason to doubt that it will be able to maintain such an output for a great many years."

As indicating the promising future there seems to be for copper mining, it may be pointed out that on March 4 Mr. Walker published the statement that "While it is hardly to be expected that copper will

continue to sell at 28c a pound over a long period of years, that the price will average nearer 20c than 15c during the coming decade is by no means an unwarranted estimate."

At the end of February there was published in New York City a statement that the secretary of the Howe Sound Company, which controls the **Britannia Mining and Smelting Company**, had said that "By April the Britannia mine will be producing at the rate of 3,000 tons of ore a day." It was added that it had been officially stated that the average copper content of the ore going through the concentrating mill was better than 3 per cent., with 90 per cent. or fifty-four pounds of the copper to the ton, being saved. It may be safely figured, the report continued, that the annual production, beginning in April, will be at the rate of fully 1,000,000 tons of ore per annum after allowing for shutdowns, accidents, etc., or 54,000,000 pounds of copper per annum.

As it is known that an output of 3,000 tons a day by no means represents the maximum limit of the company's production plans, it appears quite reasonable to conclude that a year or two hence the Britannia Company alone may be expected to be producing as much copper as was produced in 1915—the year of highest copper production in the history of mining in this Province—from all the mines in British Columbia then operating.

What more striking evidence of the prospective great future of the metalliferous mining industry of British Columbia could be desired than that afforded by the progress of copper mining in what is generally spoken of as the Coast district, which includes mines about Hazelton and in mining divisions tributary to Prince Rupert, as well as the lower Coast mines? Forecasts by men in Boston and New York having first-hand information to guide them—the head offices of both companies being in New York—indicate a reasonable expectation that in the immediate future the Granby and Britannia mining companies will, together, make a production of fully 90,000,000 pounds of copper a year. Add that of comparatively small mines near Hazelton and on Queen Charlotte and Texada Islands, and other Coast localities, and it is a quite moderate estimate to look for a production in the near future of 100,000,000 pounds of copper a year from Coast district mines. Now, take the production of these mines during the last ten years: For five years, 1906-1910, the total was 15,562,000 pounds of copper, or an average of approximately 3,112,000 pounds a year. For five years, 1911-1915, it was 89,389,000 pounds, or an average of 17,878,000 pounds a year. In comparison with this we have (if the estimates quoted may be depended on, and there is good reason to think they may be) a reasonable expectation of a production of copper in a single year nearly as large as that of the ten-year period for which figures have just been given.

In degree, the outlook for increased production of other metals is also promising. Already there is improvement in both Atlin and Cariboo districts, whence comes most of the placer gold recovered in British Columbia, and when the latter district shall have the benefit of the greatly improved transportation facilities that the Pacific Great Eastern Railway will afford it, so that mining machinery, plant and supplies may be taken in at a much lower cost than is now practicable, there should not be any doubt that mining there will receive a great impetus with large and important results. More lode gold will also be produced in British Columbia, for mining in **Rosslund camp**, the big-

gest gold-producer in the Province, is on a better basis and larger scale to-day than in past years, while provision has been made at Hedley for increasing the output of gold from the big mine in that camp. In the Coast district, too, greater production seems assured, for, beside that of the Granby Company, there will soon be lode gold production at the Surf Inlet mine.

As to **silver, lead and zinc**, which metals occur largely together in ores in Ainsworth, Sloean and East Kootenay districts, the general activity in those districts gives assurance of marked progress and increased production of these metals. Standing out prominently in this connection is the enlargement of the operations of several companies and notably of the Consolidated Mining and Smelting Company, with its **electrolytic zinc plant at Trail** about complete, and a beginning being made with other important additions there.

A word or two concerning improved processes for recovery of metals. Years ago the Consolidated Company established at Trail its electrolytic lead refinery. Now the electrolytic refining of zinc there on a commercial scale may be regarded as an accomplished fact; preparaiton for the manufacture of sulphuric acid is stated to be well advanced; while the electrolytic refining of copper will soon follow. **The flotation process in ore concentration** is in successful operation; at the Britannia mill on copper ores and at the mill of the Silverton Mines, Limited, Sloean, on silver-zinc ores; while experiments are being continued elsewhere in the Province. Modern gold extraction methods have been successfully adopted at Hedley and other mills. Attention has been turned, too, to the recovery of molybdenite in the Province.

Then as to **coal**. In the Crow's Nest district, Southeast Kootenay, extensive new areas of coal have been opened and provision made for a greatly enlarged output of coal whenever market demands shall call for it. The saving of by-products from the manufacture of coke is also having the serious attention of one company operating on a large scale. On Vancouver Island several new coal mines have been opened and equipped in quite recent years, and here, too, provision has been made for a very much larger production of coal. It is encouraging, too, to note that the manufacture of coke has again been undertaken on the Island after the coke ovens had been unused for a number of years.

SILVER.

Commenting on the silver situation the Boston News Bureau says:

Production of silver on the North American continent continues to show a smaller yield than in normal times owing to the practical cessation of production of this metal in Mexico. With greater activity among the copper, zinc and lead producers of the United States there has been an increase in silver yield as a by-product, but this has not been sufficient to offset the smaller quantity coming from the rich Mexican mines.

During the first quarter of the year London imported 21,000,000 ounces of silver, whereas in the first three months of 1915 the receipts at that centre were 25,500,000 ounces. It should be clearly understood in this connection that London absolutely dominates the silver market of the world. The exportation of silver from London in the first quarter of 1916 amounted to but 12,000,000 ounces against 21,000,000 ounces last year in the corresponding period. Of the amount shipped from London up to the end of March 6,000,000 ounces were for France, a most unusual occurrence, leaving but 6,000,000 ounces to be shipped to regular customers compared with 21,000,000 ounces last year.

London's best customer for years has been India, where large quantities of the metal go into coinage. Notwithstanding this position there was shipped to India in January, February and March last, but 3,000,000 ounces comparing with 15,000,000 ounces in the first quarter of 1915.

Except for the two years following 1890, which marked the end of the silver boom and the height of the free silver agitation, silver the metal, has never been so high as it is to-day. The New York price of 77¾ cents compares with the average price this month a year ago of 49.91½ cents, and an average of 49.69 for the entire 1915 year. Silver authorities do not care to hazard a guess where the advance will culminate under present conditions. The Mexican production which showed a drop of 9,000,000 ounces last year, or from 26,000,000 to 18,000,000, is still being interrupted and Australian supplies are being cut down. But demand, not supply, is the real factor. There is a heavy demand for coinage purposes in Great Britain and Europe. The Bank of England is carrying practically the smallest silver reserve in its history and must replenish its stock soon from an English floating supply which is hardly 15 per cent. of normal. China, which is standardizing her monetary system has been a big buyer. Curiously enough, India, which is ordinarily a big consumer has not taken a third of the amount of last year. In view of the extraordinary demand which gives every indication of continuance, a selling level of 80 cents for the remainder of the year would not be surprising to some experts.

ACTIVITY IN THE YUKON.

A press despatch from Dawson, Yukon territory, dated May 1st, was as follows: The ice in Yukon river is breaking up in many places between Whitehorse and Dawson. It is expected that the river will be clear in front of Dawson within ten or twelve days. The winter season has been prolonged later than usual, but the weather has now suddenly become warmer. All the Yukon dredging fleet will soon be under way as soon as the ice disappears and allows running water for working the low-grade placer-gold mines. Some of the dredges are already operating.

Steamers at all points on the Yukon river are being prepared for opening of the season of summer navigation along its length of 2,000 miles. River steamboats at Whitehorse and Lake Lebarge will be ready to sail as soon as the ice shall be out of the way.

Dawson markets are still well supplied with everything needed except butter, sugar, and onions. Butter is particularly scarce. Onions are nearly all gone. An unusual crop of native potatoes of excellent quality is responsible for the slow sale of imported potatoes.

A press despatch from Fairbanks, Alaska, states that half a ton of tungsten concentrate has been sent from that place to Philadelphia by parcel post. The rate charged by the Post Office Department is 12 cents a pound, while the Express companies charge 50 cents a pound to Cordova. It was expected that every mail leaving Fairbanks for the remainder of the winter would include several hundred pounds of tungsten concentrate, for the mail contractors are required by the terms of their contract to carry 1,600 pounds of mail matter every trip, and since there is nothing like that much weight of ordinary mail leaving Fairbanks, the difference is to be made up of concentrate as above stated.

UNIVERSITY NEEDS OF THE MARITIME PROVINCES

By F. W. Gray.

The "Journal of Commerce" last month published an editorial, presumably from the pen of the Hon. W. S. Fielding, on "Maritime Universities," suggested by a recent address to the Moncton Canadian Club by Dr. Stanley McKenzie, President of Dalhousie University. This address, Mr. Fielding writes, has revived the question of university consolidation discussed keenly a few years ago in Nova Scotia. He takes a broader view, and certainly a wiser one, and pleads for the creation of one strong central University, for the Maritime Provinces, one, to quote Mr. Fielding, "that can take its place in comparison and competition with the large institutions of Ontario and Quebec."

Dr. McKenzie deplores the existence of the smaller universities "to the exclusion of one really strong University, on many grounds, but none so important as the fact that none of them can afford such expensive scientific equipment in men and appliances as will enable us to keep abreast of the Germans, and of the Swiss, and of the Australians, and of almost every other community."

Mr. Fielding remarks that university consolidation is likely to find more sympathizers west of the Restigouche river than east of it, and that while to the reader at a distance Dr. McKenzie's arguments seem so strong as to be conclusive, yet down east, among the people most concerned, it will receive only a moderate support.

It is to be feared that Mr. Fielding's appraisal of the situation is substantially correct—the more the pity that it should be so.

Technical training is the greatest educational need of the Maritime Provinces, and modern technical colleges need most expensive equipment, equipment that is absolutely beyond the financial resources of the individual denominational colleges, and possible of procurement only by a consolidation of interests.

It is not too much to say that the possibilities of the economic development of the Maritime Provinces are largely bound up with and dependent upon the opportunities for technical knowledge that are available to the college graduates of these provinces.

The extensive seaboard of the Maritime Provinces, the commodious and ice-free harbors on the south-eastern shores, and the central geographical position occupied by these provinces, would in any case have marked them out as the centre of great commercial and shipping activity, but the possession of coal deposits of good quality and accessibility, situated on the seaboard of a territory singularly devoid of coal resources, combined with the presence of iron ore deposits of similarly good quality and accessibility within easy reach, at once compels an analogy with other maritime nations having coal and iron resources, such as Great Britain, Germany and Japan, each of them a synonym for rapid industrial development and the growth of material wealth.

That the Maritime Provinces have not developed their commercial and manufacturing possibilities does not mean that there are any insuperable difficulties in such development. These provinces comprise the seaboard, the outlet of a vast hinterland, which up to the present has been more concerned with the absorption of men and materials for its development than with the distribution of its natural wealth. Signs are now

appearing that the day of the Maritime Provinces is beginning. The completion of two great transcontinental railways to their logical termini on the eastern shores of Canada, the large expenditures now being made on terminals at Halifax and St. John, point to the time when the great and developing territory to the west of the Maritime Provinces will discharge its surplus natural resources at the only place on the eastern shores where it is possible to transport them by sea throughout the whole year.

It is evident, therefore, that the future of the Maritime Provinces lies in shipping and manufactures, that agriculture will advance as urban populations arise to supply a profitable market, and the basic factor in manufacturing activities will be coal production.

A summarized list of some of the industries that are either in existence at the present time, or are possible in the Maritime Provinces, will include the following:

Mining.—Coal, gold, iron, the ores of such metals as tungsten and antimony, barytes, oil-shales and natural gas.

Sandstones for building. Granites for building and paving. Limestones and dolomites. Gypsum. Grindstones.

Clay Products.—Bricks, drain and sewer pipes, and rough earthenware. Fireclay.

Manufactures.—Iron and steel, with finished products, and the fabrication of structural steel, for bridges, buildings, etc. By-products of the steel and coal industries, as bricks, cement, sulphate of ammonia, and the chemical products of coal-tar distillation, including high explosives. Textiles, clothing and caps. Leather products and shoes. Manufactured lumber and finished woodwork. Railway cars, steel and wood. Machinery, including electrical appliances. Agricultural and mining tools. Gas and oil motors. Motor cars. Horse vehicles. Shipbuilding and repairing. Munitions of war.

Agriculture.—Fruit farming. Dairy farming on the co-operative principle, combined with stock raising and rearing of sheep and horses. Market gardening for home consumption. Scientific forestry. Bee farming and fur farming.

Fisheries.—Fish for home consumption and export, lobster canneries and factories for curing, preserving and special preparation of fish.

Transportation and Communication.—Railways, shipping, telegraphs and telephones, ocean cables and wireless plants on the seaboard.

The Maritime Provinces are therefore in possession of all the natural resources for the maintenance of a large population for the establishment of manufacturing for export trade, and for distribution not only of manufactured articles made in these provinces, but those which coming from the populated West will find their natural outlet from the ports of Nova Scotia and New Brunswick. In many respects these provinces resemble Great Britain, and they have many of the same characteristics which have helped to make of Britain a great maritime, trading and manufacturing nation. Also these provinces are as yet chiefly populated by descendants or members of the same northern races that have made the great nations of Europe, and the nature of the climate tends to the perpetuation of

a virile and enterprising people. The Maritime Provinces have from their first founding contributed largely to the learned professions of Canada, and the graduates of their universities are to be found in the theological, medical and legal circles of Canada from Montreal to Vancouver. These provinces have also contributed in an almost disproportionate manner to the legislators and politicians of Canada, and many of the brightest intellects produced by the three provinces of the East have, for lack of scope in their native country, gone to the United States and there achieved eminence. But, if as seems to be the case, the future of these provinces lies in industrial activities, it would appear advisable that the universities of this portion of Canada should devote their efforts to fitting men to create and guide these industries rather than train young men for the already overcrowded learned professions.

For the development of all possible industries before cited, men possessing exact scientific knowledge and acquainted with complex technical processes are needed. At the base of all operating manufactures is the man of scientific research. Modern manufacturing processes are complex in the extreme, and they have been perfected not by lucky discoveries, but by long and laborious research, originating in many instances from pure scientific deduction in the laboratory or the study.

A striking instance of the economic value of scientific deduction, is the geological reasoning which led to the discovery of coal on the eastern border of the Midlands coalfield in England. From certain indications noticed to the north of what had been for years regarded as a purely agricultural district, geologists suspected the existence of a fold in the paleozoic floor which would bring the coal seams, hitherto supposed to be buried at inaccessible depths beneath newer formations, within the limits of mining. Boreholes proved the correctness of this reasoning, and to-day there is every possibility that the Midlands coalfield is twice the area formerly assigned to it, a conclusion that is of momentous importance to England. Similar deductions have led to the discovery of concealed coalfields in the Lippe valley in Germany, in the Campine district of Belgium, and in Kent, England.

Men capable of exact research work can be produced only by university training, and in the Maritime Provinces it will not be possible to provide adequate technical education for the active participants in industry, until the universities are able not only to produce large numbers of trained men, but are also able to become centres for a university extension work, in which the faculty and equipment of each college becomes available for the dissemination of scientific education among the workers themselves.

Two outstanding features in modern industrial development are the value of the so-called by-products of a basic industry, such as coal mining and iron and steel manufacturing, and the interdependence of the various branches of manufacture one upon another, and their combined effect upon agriculture. It is now a truism that the profits of many industries are obtained from their by-products and from the complete utilization of all the raw materials.

A classic and oft-quoted example, but one not yet fully comprehended by the public at large, is the possibilities of the complete utilization of all the products of the destructive distillation of coal, whether this distillation takes place in its crudest form, namely, the

use of coal as a fuel for heating or steam raising; in coke ovens; in the manufacture of lighting gas, or in any other of the many forms in which coal is burnt to secure its heating value. In the ordinary operation of raising steam by burning coal under a boiler, by far the most valuable portion of the coal is wasted in the form of smoke and soot.

At many collieries in Europe to-day the power which operates the mine machinery is obtained for nothing—in fact, for less than nothing, as the yield from by-products is greater in value than the cost of the fuel used. Coal is distilled in gas producers, and from the resulting products is obtained sulphate of ammonia, tar and pitch, crude oil and some benzol. The residual gases are either burnt under boilers to raise steam for the operation of turbo-electric generators or they are utilized in gas engines combined with electric generators. Thus a curious reversal of the old practice has resulted. The modern plant is designed to extract what are called "by-products," and the waste gases are used to generate power. In this case, what were formerly considered as the by-products are now become the main object of the process and the generation of power has become a mere off-shoot of the recovery of the distillation products of coal.

It is not a fairy tale of science, but sober and profitable practice now being realized in many parts of the world, that large territories can be supplied with cheap electric power from a plant of great capacity situated at the pit mouth, designed with a main view to the profitable extraction of coal distillation products and the generation of high electric voltages by gas-fired boilers or the use of gas engines. By the use of heavy voltages, say pressure of 100,000 volts, there is no practical limit to the territory that can be supplied with electric power at a price as low or below that rendered possible by the best water powers. If such a scheme were to be applied to Nova Scotia it would revolutionize both manufacture and agriculture. Electric power can be applied to the operation of light railways and agricultural machinery so as to provide the cheap transportation and the motive power that is so pressing a need in agriculture in a country where farm labor is difficult to obtain and the climatic conditions require the cultivation of the land shall be carried out within the minimum time. The development of the co-operative idea in dairy farming that has been so successful in Denmark would be greatly stimulated by the availability of cheap electric power for use in central creameries.

A prosperous dairy industry will create a market for such nitrogenous fertilizers as sulphate of ammonia, which will make productive meadows of poor pasture land. Properly conducted dairy farming includes, of course, stock raising, which in its turn leads to tanneries, shoe manufactories and leather industries. Sheep raising can be combined with woolen textile manufactories, and all these interdependent potentialities of the Maritime Provinces can be made feasible and profitable by the provision of cheap electric power.

Regarding agriculture. There is just as much need for technically trained men, as in the industries of mining and manufacture of raw materials. It is an extraordinary fact, and although often referred to it will bear repeating, that such prosperous industrial districts as are to be found in Cape Breton are dependent for their dairy produce, meats and green vegetables very largely on sources outside the Maritime Provinces. Upon several occasions when there

have been extended interruptions to the I. R. C. ferry at the Strait of Canso, this has been followed by a shortage of fresh meats and dairy produce in Cape Breton, and during the last two years a large amount of butter has been sold in the Island which was exported from New Zealand. There is no need to labor these self-obvious facts. The peninsula of Denmark, which has a winter climate that is almost as rigorous as that of Nova Scotia, has, by a system of co-operative creameries and by the application of scientific principles to agriculture, developed an export trade in butter, cheese, eggs and poultry, which is now the main source of Denmark's prosperity. The Government-aided Agricultural Colleges in existence in the Maritime Provinces are doing an excellent work along these lines, but there is room for a much more extensive work. What is true of dairy farming is equally true with regard to stock raising, and such incidental but profitable accompaniments of agriculture as bee farming and the raising of fur-bearing animals.

The conservation of the fisheries of the Maritime Provinces, of the lobster industry and the oyster beds, are matters which call for expert technical knowledge.

The oil-shales of Nova Scotia and New Brunswick are an asset as yet untouched. Some of these shales when retorted have yielded from 30 to 80 gallons of crude oil, and from 65 to 112 pounds of sulphate of ammonia per ton. The dense crude oils, when further treated, yield lubricating oils, burning oils and paraffin wax, and the process of refinement may be carried along to produce naphtha, benzol and their innumerable derivatives. In Scotland, very similar shales, no richer in oil and sulphate have been profitably mined, retorted and distilled for many years.

Regarding forestry, a reconnaissance was recently made by Dean Fernow of the University of Toronto, into the forest resources of Nova Scotia and Cape Breton, who asserts that if the whole green forest area of Nova Scotia of, say, six million acres, were managed like the Prussian Government forests, an annual output of more than twice the present one could be had forever, or that we have here a natural resource capable, under proper management, of forever producing, by annual increment, as interest, at least twice as much as is now being cut from capital stock; a resource which basing its value on reasonable rates of growth, both of wood and wood values, may reasonably be stated as representing a potential capital of at least \$300,000,000. If this is true of Nova Scotia, how much greater are the capital potentialities of the New Brunswick forests?

It has lately become the fashion in certain circles not renowned for intellectual profundity to decry the German methods of technical education. The German is represented as a creature capable of incredible labor, but so immersed in scientific detail that he has lost the faculty of initiative, has lost his sense of proportion and the imagination that leads to great inventions. Maybe this is the case, but has not the German shown some little ability in science and invention? To say nothing of the misdirected genius that has produced the Zeppelin, the forty-two centimetre howitzer, the super-submarine and other devilish contrivances, concerning which it is no disgrace to admit that we have followed and not led the way, what about the applied science that has hitherto enabled the Central Empires to live, yea, almost to flourish, despite the Allies' blockade? Could any nation have accomplished the things

that Germany has accomplished had she not had ready to hand a nation of workers, trained not only in war, as we have proved to our cost, but trained in economic processes at which it is easier to poke fun than to emulate?

At a recent meeting of the Dusseldorf Eisenhutte, a Herr Daelen indulged in some perspicacious criticism of British methods in the steel industry. Herr Daelen said:

"Managers and officials (of steel works in Britain) are insufficiently educated. Works managers are lacking in technical as well as in general preparatory education, and were, in so far as the latter point was concerned, mostly foremen whose natural gift was their best property. The technical high schools in England were not equivalent scientifically to the German high schools, as they were rather intermediate schools. Technically, the English methods of working could not be compared with the German, they being backward in all branches."

Allowing for the inevitable bombast of the Teuton and its accentuation at this particular time, there is nevertheless sufficient truth in these remarks to leave a very perceptible sting in the minds of those who read and do not allow their prejudices altogether to cloud their judgment.

If such criticism can be made of English steel works, and the Navy is sufficient proof that there is some technical knowledge even in a land that is not yet blessed by the full-orbed beams of German culture, where do we stand in the Maritime Provinces?

Why should not the Maritime Provinces, containing as Dr. McKenzie says, a million people "without a strong University"—why should not these provinces—so potent in their latent possibilities—have an institution comparable to the Boston "Tech.," or to McGill University? Is there, asks Dr. McKenzie, "another group of a million in the whole civilized world in a similar predicament?"

Therefore, it is with a feeling of sorrow that one reads the conclusions of Mr. Fielding—who should know his Maritime Provinces as well as most men—with reference to the question of university consolidation and the small colleges, that "the feeling of local and denominational pride behind them is so strong that it will over-ride, as it has in the past, the arguments advanced by Dr. McKenzie." And we are constrained to add, "So much the worse for the Maritime Provinces."

A PLACER STRIKE ON NELSON CREEK.

News has just been brought to Whitehorse of a rich placer strike having been recently made on Nelson creek, a tributary of Mayo lake, in the upper Stewart river country. The discoverers were Big Steve and Little Steve, who have been prospecting there for a long time.

Rev. F. H. Black, rector of the Anglican church at Dawson, and Chester Thomas, the well known mining man of the same city, lately returned to Dawson from the scene of the strike and confirm the good reports previously brought out. The creek is said to be from 15 to 30 miles long and already there are 40 to 50 claims staked. The discoverers got one pan which went 16 cents. There are several outfits now prospecting on the creek.—Whitehorse Star.

SUDBURY NICKEL-COPPER DEPOSITS

In an article on the origin of the Sudbury nickel and copper deposits Mr. C. W. Knight says in the May 6th number of *The Engineering and Mining Journal*:

"The Creighton orebody is the most important and largest nickel deposit in the world and one of the greatest metalliferous mines of any kind. It is considered by certain workers to be the example par excellence of the magmatic-segregation theory. It occurs at the contact of granite and norite and dips at an angle of about 45 deg. to the northwest. Granite forms the foot wall, norite the hanging wall. The theory of magmatic segregation postulates that the sulphides—the heaviest materials of the molten norite—settled to the bottom of the norite and rested on the granite foot wall. This explanation is wholly untenable. Why, may be briefly stated.

"The granite foot wall forms a great, coarse-grained intrusion 13 miles long and 2 to 3 miles wide. Field work by the writer during the past year has shown that it is younger than the norite, not older, as has been assumed by the magmatic-theory advocates. Dikes of the coarse-grained granite penetrate the norite. Hundreds of them have actually been counted. The age relationship is so clear that it would be unnecessary to emphasize the fact had it not been denied. The granite dikes can be traced foot by foot into the norite. They penetrate it hundreds of feet. The exposures are often unsurpassed for the purposes of the geologist. There are also small, fine-grained granite dikes intersecting the granite itself, but they have nothing to do with the question. Clearly then, since the granite is younger than the norite, the molten sulphides could not have settled to the bottom of the norite magma and rested on the granite foot wall, for the very good reason that the granite was not there when the norite was erupted.

"The age relationship of the rocks and orebody is as follows: A great mass of norite penetrated a complex composed of schistose sediments and igneous rocks. The complex and norite were invaded by granite which now forms the foot wall of the Creighton orebody. Then came a period of ore formation, during which solutions circulated along and near the contact of the granite and norite and deposited the nickel and copper sulphides which form the orebody. The relationship may be briefly given in the following table, the youngest materials being shown at the top:

Pre-Cambrian

Period of ore deposition from solution.
Intrusion of coarse-grained granite.
Intrusion of norite, cutting complex of
sediments and igneous rocks.

"A second mine, the Worthington, may be mentioned. This orebody is simply a brecciated basic dike. Solutions circulated along the interstices of the fragments and blocks and deposited the nickel and copper sulphides in these interstices. Even the supporters of the theory of igneous origin were compelled to recognize that this nontypical Sudbury deposit was not wholly of magmatic origin.

"At the Froid, or No. 3 mine, where 30,000,000 tons or more of ore is said to be available, the ore occurs largely in schistose beds of greywacke and to a less extent in norite or gabbro. The maps of the area incorrectly show the deposits to occur wholly in norite or gabbro. The greywacke has been crushed and brecciated, and along this zone, solutions have deposited their

burden of nickel and copper sulphides. Some sulphides also impregnate the intrusions of basic rocks. Knowing now the structural and age relationship of the rocks and orebody at the Creighton mine, there is no authority for assuming that the ore of the Froid is of igneous origin.

"The fallacy of certain general arguments that have been advanced to support the theory of magmatic segregation may now be briefly pointed out. It has, for instance, been stated that norite and ore are mixed in every degree and that spotted norite may occur long distances from orebodies. And it has been argued that, because the ore minerals are intimately intergrown with the original minerals of the norite, their magmatic origin is hardly to be questioned. But the sulphides also mix in every degree with granite and greenstone, the former of which is younger than the norite, the latter older than the norite. The granite and greenstone are also spotted with sulphides in a similar manner to the spotted norite. The spotted granite, greenstone and greywacke seem to have escaped the notice of investigators, who have considered the spotted norite to be evidence of the magmatic origin of the orebodies. Thus, following this reasoning, the ore in the granite and greenstone would be also of magmatic origin. But the theory is seen to be even more impossible when it is pointed out that the ore mixes in every degree with greywacke. Obviously the ore in the greywacke is not of magmatic origin. There are other points regarding the origin of the Sudbury nickel-copper ores, not touched on in this paper, that will be dealt with in a forthcoming publication and further evidence in support of the theory that the ores were deposited from solutions which probably emanated from the norite will be given."

CONCENTRATION BY FLOTATION.

In paper presented by F. G. Fuchs at the recent Pan-American Scientific Congress the author deals mainly with experiments to determine to what extent the phenomena of concentration by flotation are due or can be related to capillarity. To this end, he ascertained the adhesive action of oil on different minerals. He found that some minerals, among them quartz, limestone, mangano-siderite, and alabaster, were not wetted by oil, while others, mainly galena and chalcopyrite, were strongly wetted, it being almost impossible to remove the adhered oil even by vigorous rubbing with a cloth. In his principal experiments he used a glass beaker nearly full of water, on the surface of which he poured oil to form a 5-mm. layer. He then placed on the surface small fragments of the various minerals. The results were: (1) Some minerals, especially quartz, fell through the oil layer to the bottom, carrying with them some oil, which, however, soon detached itself and rose, leaving the mineral clean; (2) others, especially galena and chalcopyrite, sank to the bottom but remained enveloped by an oil layer; (3) others, among them blende and iron pyrites, are intermediate between (1) and (2). They carry some oil with them, which they retain if quiescent, but if shaken lose it. When the minerals are pulverized and mixed to a paste with water and oil, and then gently dropped on the oil surface as above, those of class (1) go to the bottom and those of class (2) are held by the oil layer. These phenomena do not occur unless the mineral is wet with water; if it is perfectly dry, all minerals behave like those of class (2).

THE BOUNTY ON ZINC OR SPELTER

On April 19th, 1916, Hon. Sir Thomas White, Minister of Finance, moved that the House go into committee to consider the following proposed resolution:

“Resolved, that it is expedient to authorize the payment out of the Consolidated Revenue Fund of a bounty of two cents per pound on zinc or spelter, containing not more than two per cent. of impurities, produced in Canada from zinc ores mined in Canada; provided the standard price of zinc or spelter in London, England, at the time of production is less than £36 19s. 3d. sterling per ton of two thousand two hundred and forty (2,240) pounds, when the bounty payable shall be an amount equal to the difference between such standard price per ton and £36 19s. 3d. per ton. Further provided, that in no event shall bounty be payable when the price received for zinc or spelter by the producer is eight cents or more per pound, and that no bounty shall be payable on zinc or spelter to the producer during the continuation of the war, and in no event on zinc or spelter produced after July 31st, 1917.

“Further resolved, that the total amount payable under the provisions of any Act founded on these resolutions shall not exceed the sum of \$400,000.”

He said: It may be helpful to the committee if I give a brief explanation. Provision is made for the payment of a bounty not exceeding two cents a pound on zinc or spelter produced in Canada from zinc ores mined in Canada. The legislation will not apply when the price received for zinc by the producer is eight cents or more per pound. It will not apply during the period of the war, or after July 31st, 1917. That is to say, the legislation is confined to the period between the termination of the war and July 31st, 1917. This legislation is in pursuance of a promise which was given by the Government in August of last year to producers of zinc in Canada with the object of providing for the refining of pure zinc in the Dominion. An extraordinary condition prevailed at that time, and, as a matter of fact, still prevails. After the outbreak of the war an unusual demand arose for zinc. To give the committee an idea of the character of that demand, I may say that in 1914 the export of zinc in pigs, bars, plates and sheets from the United States amounted to only 4,000,000 pounds, whereas in 1915, the exports had risen to 256,000,000 pounds; that is to say, the demand for zinc from the United States, where the zinc of this continent has been refined, was increased sixty-fold in a period of one year. The price rose from about 8 cents a pound, which was, I think, the price prevailing before the war broke out, to 40 cents a pound in 1915. It was brought to our attention last summer by the Shell Committee that the Canadian manufacturers of brass cartridge cases were unable to obtain pure zinc for their purposes. At that time no zinc was being refined in Canada, with the exception of that being produced by a small experimental electrolytic plant at Trail. The output of that plant was about one thousand pounds, or half a ton a day. As the result of the shortage in zinc, and of the inability of our manufacturers to obtain the necessary supplies for the manufacture of brass cartridge cases, there was a great delay in their output and the matter became quite serious. We took it up with the view of seeing whether any action on our part would prove an incentive to the zinc producers of Canada, the Consolidated Mining and Smelting Co. at Trail, and the Weedon Mining Co. of Quebec, and

others, to establish plants to provide zinc in Canada at reasonable prices for the purposes of the Shell Committee. After several conferences the Government determined upon this legislation, and, accordingly, a promise was given to the zinc producers in Canada. As the result of that promise, the Shell Committee was enabled to make a contract with the Consolidated Mining and Smelting Co. of Trail for 8,000 tons at the price of 15 cents per pound, with an option upon 8,000 additional tons at a price of 12½ cents per pound.

In consideration of the undertaking which the Government gave to introduce this legislation providing for a bounty, the Consolidated Mining and Smelting Co. undertook to put in the necessary plant to produce zinc at the rate of 25 tons per day, beginning not later than five months from the date of the acceptance of their offer by the Shell Committee. In a word, therefore, the result of the promise which was given by the Government to introduce this bounty legislation, is that the Shell Committee, and the manufacturers of brass cartridge cases in Canada, have been enabled to obtain domestically a supply of pure zinc at 15 cents per pound at a time when pure zinc was selling in the United States at 40 cents per pound. I think that the price of pure zinc in the United States to-day is about 30 cents per pound. I do not think that any further explanation is necessary, as the resolution is fairly plain in its terms.

Mr. Devlin: In view of the promise of the bounty, have many manufacturers given the assurance that they will manufacture this smelting zinc?

Sir Thomas White: There were two companies I have mentioned, the Consolidated Mining and Smelting Co. at Trail, and the Weedon Mining Co. in the Province of Quebec. I am not aware at present of any others, but we made the announcement broadcast through the press, and sent a copy to all those engaged in the zinc mining industry in Canada.

Mr. Graham: There will not be much paid under this legislation at present?

Sir Thomas White: I am glad my hon. friend has raised that point. I overlooked mentioning the reason why it was considered necessary that this bounty should be given. It was this: the producers of zinc were unwilling to establish an expensive plant in view of the possibility of the war coming to an end soon. They were quite content with the price which could be obtained during the war, but what they feared was that if the war should come to an end in the early future, the price of zinc would at once drop and an expensive plant would become unprofitable. They were content to establish their plant should the war last as long as the 1st of July, 1917; so that the contingencies which they had in mind have been provided for in the resolution before the Committee.

Mr. Devlin: Did they ask for any advance on their contract?

Sir Thomas White: At the outset—I am speaking now from recollection, but I am certain that I recall accurately—there was a proposal that the Government should make an advance for the purpose of defraying a part of the cost of the plant. That was not regarded favorably, and the bounty resolution took its place as being more satisfactory.

Mr. Sinclair: Is it understood that the output of the mines, or the product of this industry, will be confined to Canada or to the use of the Allies during the war?

Sir Thomas White: The legislation is general in character, but the Shell Committee was, as I stated, able to make a contract for 8,000 tons at 15 cents per pound at a time when the price in the United States was 40 cents per pound, with an option upon a further 8,000 tons at a price of 12½ cents per pound. I was assured by the Shell Committee at the time that the arrangement which they had made was perfectly satisfactory to them, and, so far as I have been able to learn, there is now no danger of the manufacturers of brass cartridge cases being short of pure zinc.

Sir Wilfrid Laurier: We had legislation of this nature some years ago. Has it expired?

Sir Thomas White: My right hon. friend is probably thinking of lead.

Sir Wilfrid Laurier: Did that legislation not apply to zinc also?

Sir Thomas White: My right hon. friend may be right, as his memory is usually good, but I do not recall that it applied to zinc. There is legislation relating to lead very similar in character to this; that is to say, it provides for a bounty on a sliding scale.

Mr. Graham: As I understand it, this merely guarantees to the producer a certain price to a certain date; that is, that the zinc will not go below a certain price. If it remains at a price of over 8 cents per pound, the producer will get no bounty, but should the war cease before 1917, and the price recede to 6 or 7 cents per pound, he would get a bounty.

Sir Thomas White: Yes.

SILVER.

"The American Metal Market" quotes Zimmerman & Forshay on the position of silver as follows:

"Never in the memory of the oldest handlers of silver have conditions governing the supply and demand been so unique. The increase in demand is not only for actual use, but for speculative purposes, the rapid rise having tempted investors in all parts of the United States to take a flyer in the white metal and to hold on until within a small fraction of the top, having protected themselves by 'stop' orders by which they follow quotations.

"The immensely increased circulation of money to the wage earners in the States, which has now endured for over a year and a half, leaves a surplus after living expenses, to be invested in a few luxuries, and has resulted in a very healthy demand for silverware and silver novelties, in anticipation of the continuance of which the silversmiths are buying very largely to protect their fall business.

"It is becoming more apparent from day to day that at the conclusion of the European trouble there must be some adjustment of finances, even probably to the extent of the creation of a greater limit at which silver will be taken as a legal tender, as gold has practically disappeared from circulation, and the immense debt accruing through the war being out of all proportion to any gold reserves, a new medium must necessarily be created with but one recourse—silver.

"The issues of fractional currencies from the various countries recall the old shin plaster of our own war of 1861. These issues are probably silver-currency and must eventually be retired from circulation as they are emergency issues only.

"The transportation facilities from the States are now down to a minimum, with only an occasional American line boat in the White Star service.

"The combined transportation of silver in one week is hardly sufficient to fill one Mint order from any of the European countries. Russia is the only exception to all metals coming from our Port, as silver for their account is shipped via San Francisco to the Japan Mints who are at present time coining for the Russian Government.

"The entire known stock in London is less than 5,000,000 ounces.

"An embargo recently enacted by the government of Mexico prohibits the exportation of either gold or silver, and, if rigidly enforced, will very materially reduce the floating supply as even with the closing down of several mines, a fair estimate of 30,000,000 oz. per annum would not be much out of the way.

"All the copper, lead and zinc mining companies in the States are driving to their capacity to take advantage of the prevailing high prices and in consequence delivering to the market a much increased supply of silver which only figures as a by-product with them, but helps somewhat to offset the shrinkage from Mexico.

"There has been no appreciable let up in the shipments from the Cobalt section as the worrisome tax imposed has been figured down to minimum and will not be a very heavy burden to any prosperous producing mine.

"While we have enjoyed a most persistent and rapid rise in silver since the Sherman law, there is no reason at the present time to believe, barring a few slight reactions through the flowing over of some large speculative holdings, that we will see anything but better prices, and even should the war suddenly cease and silver take a quick slump, as was the case upon the announcement of the armistice between Russia and Japan, it will soon come into its own again and enjoy its position with the raise of the metals that have had material and substantial advances."

LA BELLE, KIRKLAND.

Mr. Frank Loring, president and general manager of the La Belle Kirkland Lake mines at Goodfish lake, went north yesterday after a trip to Baltimore. Mr. Loring states that the shaft has now reached a depth of 310 feet. A new station has been cut and the vein drifted on for about 30 feet. From this drift some remarkable specimen ore has been taken and the vein is looking good. The footwall of the vein for the greater part of the way sloped at an angle of about 60 degrees, but at the 300 ft. level this has straightened up now to about 70 degrees. The hoisting plant has a capacity of 1,000 ft.—Cobalt Nugget.

CHAMBERS-FERLAND.

Cobalt, May 6.—Twenty-six feet of drifting has been done on the new vein found at the 425 ft. level of the Chambers-Ferland about ten days ago, and bonanza ore shows for the entire distance. Attention is being centered principally on this new find. The vein is about 4 in. in width and the lowest assay obtained was 1,400 oz. of silver to the ton, while assays as high as 6,000 oz. to the ton have been taken. The average of the vein will be somewhere between 2,500 and 3,000 oz. to the ton, it is estimated.

Nothing further has been done on the new vein found at the 450 ft. level on Monday last, but this will be followed later. The new vein is more regular now than at the point where cut and shows as though it might have considerable continuity.—Cobalt Nugget.

METALLURGICAL IMPROVEMENTS IN BRITISH COLUMBIA

By E. Jacobs.

Unmistakable evidence of the progress metalliferous mining is making in British Columbia is found in the installation of new metallurgical plants, the enlargement and improvement of others that have been in use for years, and the making of arrangements for the operation of still others that had long been idle. Generally, it may be said that there are few operating reduction works that have not been improved in recent years by the adoption of newer methods and the addition of modern metal-saving appliances which have considerably increased their effectiveness and made them better adapted for the metallurgical work they had been erected and equipped for doing.

In particular, three mining and metallurgical companies have made important additions and improvements, namely, the Consolidated Mining and Smelting Company of Canada, at Trail, West Kootenay; the Britannia Mining and Smelting Company, at Britannia Beach, Vancouver mining division; and the Granby Consolidated Mining, Smelting and Power Company, at Anyox, Skeena mining division.

The Consolidated Mining and Smelting Co., which has long been operating large lead and copper-smelting and electro lead-refining works at Trail, during recent months added an electrolytic zinc-refinery, concerning which the Trail News said on April 7th: "The Consolidated Co.'s new electrolytic zinc-refinery at Trail has been operated steadily with one unit for some weeks, while the entire plant is being adjusted and tuned up for steady production. Altogether there are nine units in the present installation, with a capacity of about 50 tons of spelter daily—each unit capable of producing five or six tons." Other reports are to the effect that the Consolidated Co. is preparing to establish at Trail a sulphuric acid-manufacturing plant, to be followed shortly by an electrolytic copper-refinery. In this connection it is recalled that there was included in the report of the directors submitted at the annual meeting of shareholders in the Consolidated Co. held on December 28th last, the following statement: "Since the last report important additions have been authorized at the smelter, to take care of an increased tonnage of ore and also to allow of the production of zinc on a commercial scale and to provide a copper-refinery. These additions and extensions are well under way at the present time and some of the equipment is already in operation. Contracts have recently been entered into with the Shell Committee for the supply of a considerable tonnage of zinc and refined copper. The manufacture of zinc is a new departure for the company, but with the large quantity of zinc ores available in the company's mines, it will develop into an important feature of its operations. Up to the present the copper matte coming from the smelter has been refined in the United States, but the copper refinery at Trail when in operation will enable the company to refine copper in Canada." The general manager's report, also submitted to the annual meeting, included mention of the extended and advantageous use at the smelting works of the Cottrell plant for the recovery of fume and flue dust, the erection and equipment of a new lead-sampling mill, the construction of a third lead-furnace, additions and improvements to the electrolytic lead-refinery, the installation of copper converters and necessary accompanying plant, and other additions and improvements.

While no recent report of the manager of the Britannia Mining and Smelting Co. is available at the time of writing, it is known that much progress has been made in the direction of enlarging the milling and concentrating capacity of the company's metallurgical works at Britannia Beach, Howe sound. About a year ago the general manager reported: "The old mill has been brought to an increased state of efficiency through the installation of various improvements. The new mill, which is being erected in two 500-ton units. . . will be up to date in every respect and the effort is to make it the simplest, most economical and efficient mill possible for the treatment of copper sulphide ores." The Provincial Mineralogist wrote, in the "Preliminary Review, 1915," as follows: "The Britannia Co.'s old 800-ton mill was in operation throughout the year, and the first 1,000-ton unit of what will eventually be a 4,000-ton mill was completed and commenced operations late in the year. This mill is situated on the side-hill, in such a way as to allow of a complete gravity system of handling the ore in its passage from crude ore at the top to concentrates at the bottom. Throughout the mill the construction work is of the highest order and the design is in every way up-to-date. The old mill has provided the means of testing the ore thoroughly, so that the most efficient machinery could be installed in the new mill. The process used is a water-concentration by means of jigs and tables, followed by a treatment of the tailing by the oil-flotation system of the Minerals Separation Company. The fine crushing is done in tube mills, in which harder lumps of the ore are used as pebbles, thus saving the cost of imported pebbles and increasing the output. Power is obtained by the hydro-electric development of several water powers, there being in all eight dams, either constructed or under construction. The most important of these is the Utopia dam at the head of Britannia creek. There, 2,500 horse power is now developed, and it will be increased to 5,000 horse power. Steam power is used as an auxiliary, there being three 500-h.p. Babcock & Wilcox high pressure boilers, with necessary engines; oil fuel is used in the boilers."

While it is full two years since actual smelting was commenced by the Granby Consolidated Co. at its works at Anyox, Observatory inlet, the first blast furnace having been blown in about the middle of March, 1914, there have since been made important additions and improvements. The plant as at first provided for included three rectangular water-jacketed blast furnaces, each 50 inches wide by 360 inches long, and three basic converters, Great Falls type, each 12 feet in diameter. In the company's last annual report information was given showing that "the first year's operation has gone far in securing a condition of smooth running with lengthening campaigns for the furnaces and, as a consequence, a greater quantity of ore treated per month with constantly lowering unit costs." The general manager stated in his report that "The plant—originally designed to treat 2,000 tons of Hidden Creek ore a day—has been well arranged and constructed for the economical treatment of these ores. The changes that have been made are minor ones, which actual operation has demonstrated would simplify methods and give greater efficiency. The addition of the fourth furnace and appliances for taking care of flue-dust,

will undoubtedly raise the normal output of the plant as at first designed, fully 50 per cent." The company's superintendent of smelters reported: "A number of improvements have been made in order to lower costs . . . The No. 4 blast furnace and the agglomerating plant are now under construction." Since then this additional plant has been completed and put in operation. Assuming that the general manager's estimate of consequent increased capacity is being realized, a total treatment of 3,000 tons of ore a day has been provided for. With ore of a similar average copper content to that smelted last year, this would give an output, operating at full capacity throughout the year, of between 35,000,000 and 40,000,000 lbs. of copper a year. The actual output, of course, will be determined by the time operated and the average grade of the ore smelted. There is, though, good reason to expect an increase of not less than 50 per cent. over last year's production of copper.

While generally a good standard of efficiency has been maintained at the various concentrating plants in Slocan and Ainsworth mining divisions, at which silver-lead-zinc ores have been concentrated, there have not been changes on anything like so extensive a scale as at the several copper-smelting plants above-mentioned. Yet in degree the progress made has been important in two or three instances. At the mill, on Four-mile creek, near Silverton, the Minerals Separation flotation process has been in use for some time with good results, the percentage of saving of the silver-zinc contents of the comparatively high-grade ore occurring in the company's Hewitt-Lorna Doone mine having been increased appreciably over that obtained by the ordinary water-concentration process. Both this plant and that of the Standard Silver-Lead Mining Co. at Silverton were put in during quite recent years. At the latter, experiments in zinc-saving are being continued, but there has not yet been made any important advance commercially beyond the customary water-concentration method. The new concentrator at the Galena Farm mine, also near Silverton, is reported to have done excellent work on lead-zinc ore during the five or six months it has been operating.

The zinc-concentrating mill at Rosebery, erected and equipped half a dozen or more years ago, which had been unused during the greater part of that period, was overhauled early last autumn and, after Wilfley tables had been substituted for Luhrig vanners, was put in operation in October. Since then it has been running on Lucky Jim zinc ore. The Ruth Mines, Ltd., resumed concentration of silver-lead ore at Sandon, after a long period of inactivity, and the Slocan Star Mines, Ltd., also operated its mill after thorough overhaul and preparation for making two products—silver-lead and silver-zinc concentrate. It has been announced lately that a tube-mill is to be put in by this company, and that flotation is also to be added soon. There was little change at other concentrators in Slocan and Ainsworth mining divisions.

At gold-saving mills there were not many changes. Additions to the Relief company's plant, in Erie camp, Nelson division, included a duplex Dorr classifier, a 4 by 20 ft. tube mill, cyanide plant, and a steam boiler and engine. New plant and machinery at the Hedley Gold Mining Co.'s 40-stamp mill were a Traylor 24 by 36 in. crusher; a second 5 by 22 ft. tube mill, with Montano-Tonopah lining; a Dorr classifier, which works with the tube mill in continuous system; four more large cyanide tanks; a third Oliver continuous

filter, and other plant. This company's new hydro-electric power system, of considerable capacity, has been found fully equal to expectations.

SILVER MINERS' WAGES INCREASED.

Cobalt, May 6.—After considerable consideration on the part of the different mine managements extending over a period of about two weeks, the majority of the companies have decided to raise the rate for all men working underground 25 cents per shift, based on what has heretofore been the standard scale.

In addition to this it has been decided to grant a bonus of 25 cents per shift to all employees both surface and underground, whenever the price per oz. of silver for the preceding calendar month has averaged seventy cents or more.

The average for the preceding month is taken because it would be impossible to have the current average price on time to effect pay rolls in process of being made up, and this is especially applicable in view of the semi-monthly pay roll which will shortly come into effect.

The changes above enumerated go into effect as at May 1st inst.

The above action on the part of the different companies, entirely on their own initiative, must meet with the hearty approval of all those interested in or dependent upon the mining industry in this camp, and must be further accepted as a generous act that will reflect to the advantage not only of the men directly affected, but to the merchants and citizens of the community.—Cobalt Nugget.

HUDSON BAY ZINC CO.

Boston, April 27.—With a period of 18 months in which to carry on development work in order to determine if actual purchase would be profitable, Hayden, Stone & Co. have secured an option on the Hudson Bay Zinc Co. property located eight miles from Salmo, B.C., and but a few miles north of the United States boundary. The Great Northern Railroad serves the territory, while the new zinc plant of the Consolidated Mining & Smelting Co. is a comparatively short distance away. During the past few months there has been shipped from development work alone about 1,000 tons monthly of carbonate ores to the Edgar smelter and one other plant in the United States, the Consolidated plant not being equipped as yet to handle this class of material. The most important piece of development work now under way consists of driving a tunnel some 1,200 feet before ore can be reached. In the so-called second tunnel it is expected that sulphide ores will be found. The ore carries lead values in varying amounts, but no silver. Sufficient work has not yet been accomplished to determine the possibilities of the property.

FIRE IN SOUTH PORCUPINE.

South Porcupine, Ont., May 6.—Fire starting in the Club Cafe about 10 o'clock this morning spread rapidly under a stiff breeze along the street, and caused several thousand dollars damage before it was finally gotten under control by 11.30 o'clock.

The buildings destroyed are: The Homer L. Gibson block; Chinese restaurant; Chinese laundry; Club Cafe and the George Fairburn building.

The Bank of Commerce building and Sky Brothers' store were both slightly damaged.

ANNUAL REPORT BEAVER CONSOLIDATED MINES, LTD.

The directors of Beaver Consolidated Mines, Ltd., in their report for the year ending February 29th, 1916, say:

Aggressive development was the policy for the past year and we are pleased to state that more footage was made than in any previous year. The mine is approaching a most interesting period. Upon the discovery of silver in Cobalt, the Provincial Geologist of Ontario, Dr. Willet G. Miller, made an exhaustive study of geological conditions in Coleman township, and in 1904 proved beyond question the existence of a diabase sill which intrudes both the Keewatin and Huronian formations. The rock formation of the surface of the Beaver property is Keewatin, and to the northwest of us, the diabase sill has come through the Keewatin to the surface. The Beaver shaft was sunk in Keewatin formation, and at a depth of about 500 feet, encountered the contact between the Keewatin and diabase. Along this contact, both above and below, we have obtained our richest values. Diamond drilling (the expense of which has been shared equally by the Beaver and Temiskaming companies) has proven the thickness of the diabase sill to be a little over 1,100 feet, consequently the lower contact at the Beaver property would be between 1,600 and 1,700 feet from the surface. Several companies—the Kerr Lake, Lawson, Drummond, O'Brien and others—have mined along the lower contact, winning millions of ounces of silver. However, the lower contact has not been penetrated southeast of the Kerr Lake shaft except by the diamond drilling which has been done by the Beaver and Temiskaming. It would seem that the theory of eminent mining engineers, that the silver came up with this diabase flow which formed the sill, and deposited along both the upper and lower contacts, has been proven by the values which have been won by the Beaver and Temiskaming along the upper contact and by the Kerr Lake and other properties along the lower contact, the upper contact of these latter properties having been eroded away.

With the knowledge that the Beaver has two contacts, along the upper of which we have recovered our richest values, together with the knowledge that the lower contact has produced such immense values at these other properties, we have deemed it advisable to explore the lower contact in our property. The main shaft is down to a depth of over 1,400 feet, leaving about 200 feet of sinking to be done before commencing the development of the lower contact.

General conditions for mining have changed somewhat owing to the European war in which Canada is engaged, and our development work is much more expensive on account of the increased cost of materials which are essential for our operation.

Below we give you a synopsis of the development which has been accomplished both in the main shaft and on lateral work on the different levels during the past year:

Drifting.	3,077.5 feet
Crosscutting.	808.5 feet
Raising.	848.5 feet
Sinking.	476.5 feet

Total. 5,211.0 feet

Stoping. 8,480.5 cu. yds.

The main shaft is down to a depth of 1,400 feet. Station cut at the 1,200-foot level.

200-Foot Level.—In the No. 2 stope on the No. 5 vein, we have broken down 204 cubic yards of mill

rock. In the latter part of February, we started a crosscut to pick up our No. 4 vein which has shown values on the 400-foot level.

300-Foot Level.—On our new vein system, we have done 130 feet of drifting and 21 feet of raising. The vein shows strong and encouraging. Three hundred and sixty-seven feet of drifting on No. 1 vein in drifts No. 22 and 23 has been accomplished as well as 213 feet of drifting in drifts Nos. 24, 25 and 26 on No. 4 vein. The veins in Nos. 24 and 25 drift have shown some values and in the back of these two drifts we have a chute of low-grade ore about 165 feet long.

350-Foot Level.—Only a small amount of work was done on this level during the year.

400-Foot Level.—Seven hundred and fifteen feet of drifting, 217.5 feet of crosscutting and 80 feet of raising was accomplished on this level. The veins in Nos. 20 and 24 drifts are very irregular, varying in width and values for some distance and then narrowing down and carrying little or no values. We have also driven a crosscut 100 feet farther to the west, picking up No. 1 vein, on which we have drifted for a distance of 145 feet. This vein is about three inches wide and well mineralized. In other parts of this level, several good bodies of mill rock have been developed.

460-Foot Level.—Five hundred and three feet of drifting, 411 feet of crosscutting and 233 feet of raising, together with 1,859 cubic yards of stoping, has been done on this level. About 60 feet of this drifting was done in high-grade ore and about 58 feet in mill rock. We estimate to have about 100,000 ounces of silver in broken ore on timbers on this level.

530-Foot Level.—Seven hundred and six feet of drifting, 61 feet of crosscutting, 482 feet of raising and 2,560 cubic yards of stoping has been done on this level, encountering some small lenses of high grade ore as well as mill rock. In a sub-level, we have taken out some very good high-grade ore and developed a quantity of mill rock.

600-Foot Level.—Quite a lot of stoping has been done on this level and large quantities of mill rock developed but very little high grade.

700-Foot Level.—Work on this level, during the year, has been intermittent and no further values have been encountered.

800-Foot Level.—Very little work has been done on this level during the year.

900-Foot Level.—A station was cut at this level for working purposes in sinking, but no crosscutting or drifting done.

1200-Foot Level.—A large station has been cut on the east side of the shaft at this point and all preparations made to continue the sinking of the main shaft to the lower contact.

Mill.—The capacity of the mill has been increased and it is now treating from 125 to 150 tons a day. We have a large surface dump which will probably all be milled this year. We estimate to have in broken ore on stulls underground ready for the mill 34,332 tons. During the year we treated 30,093 tons of ore, recovering 474 tons of concentrates which produced 349,900 ounces of silver.

Production.—Production was curtailed last year owing to the low price of silver. Our recovery was 746,310 ounces.

Silver.—Upon the outbreak of the war, the silver market became demoralized and for a period during 1914, there was no official quotation for the metal. It

was not known to what low level the price would drop, nor could there be gleaned any information on this subject. The demand for copper became so keen that every effort was made to stimulate the production of this metal. In a great many instances, silver is associated with copper, and with the increased production of the copper mines, it was thought that silver was accumulating in such immense quantities that the price might be forced even below 46¼c. per ounce. However, there soon developed a demand for silver for coinage purposes by the countries at war, particularly England, France and Russia, and it was at this time that the true stocks of silver became known. They were found to be much below normal and from that time, the price of the metal gradually increased until it reached the price of 56⅝c. per ounce on February 29th, 1916. India and China, the largest silver consuming countries in the world, are reported to be much short of their requirements. This, together with the demand made by the warring countries for coinage purposes, has had a very strong, stimulating effect upon the price of the product. Mexico, the largest silver producing country in the world, has been practically at a standstill for some time past, as far as silver production is concerned, and it would hardly seem that the two great silver producing camps, Cobalt and Tonopah, would be able to furnish the requirements of the several countries. The recent decree published by the Sultan, making the Indian rupee legal tender in Egypt, is another very important factor. It would seem that the present price of silver would be maintained for some time, while some predict that it will sell as high as 70c. per ounce.

While we have a large amount of silver both in ore and in bullion in storage, it has been necessary to sell at lesser prices, from time to time, a part of our product in order to meet current expenses.

The Beaver Consolidated owns sixty acres outright, and three-quarters of the stock in the Beaver Auxiliary Mines Co., the holdings of which are one hundred and twenty acres.

Capital Expenditure and Dividends.

We have invested on Capital Account, \$11,646.42; we have paid two dividends of \$60,000.00 each, and exclusive of ore in dump and in the mine, we have ore on hand, bullion in store and due from smelters, aggregating an estimated value of \$170,277.65, all of which appears in the financial statement.

Inspection.

The United States Government has recently issued through the Department of the Interior, Bureau of Mines, Bulletin 75, wherein it speaks at length on page 247 of the Beaver System of Inspection, and says in part as follows:

"The establishment of company inspection systems has become so common as to make it quite impossible to describe them all. The systems of three different companies have been selected as typical of three phases of the mining industry and as representing, each in its own class, probably the highest development of systematic inspection. The Beaver Consolidated Mines, Limited, operates in Cobalt, Ontario, Canada, a property that is typical of the small mine; the Treadwell group, on Douglas Island, Alaska, although nominally owned by three companies, is operated really as one property, and is an excellent representative of the single large mine; the Cleveland-Cliffs Iron Co. operates a number of detached and rather widely separated mines in the Marquette district of Michigan, and is taken as the

example of the large company with extensive interests."

"In respect to the thoroughness and success of its safety efforts, the Beaver Consolidated Mines, Limited, is perhaps the most interesting on the continent."

Employees' Social Welfare.

Both the Beaver and Temiskaming mines, being situated about five miles from the town of Cobalt, early in 1915 the joint management of these properties advised the organization of a social club. The companies joined in buying a moving-picture machine; a building was fitted up; the machine installed, and once a week, films are received from Toronto and an entertaining and instructive picture show is given for the benefit of the employees and their families. Only employees of the two companies are eligible for membership. The members pay 50c. a month for the expense incurred. They have music and other entertainments as well as the picture shows, and all of this at a cost of 12½c. per week per member or family. This has been greatly appreciated by the employees and their families and has made conditions much better both from a social and educational standpoint.

Mining Account, Beaver Consolidated Mines, Ltd.

For Financial Period ending 29th February, 1916.
Earnings—

Ore sales actual.....	\$196,357.84
Estimated value of ore on hand	42,424.00
Estimated value of bullion in store.....	104,323.00
	\$343,104.84
Bank interest earned and accrued.....	1,984.36
Rents collected	2,115.96
Boarding house	2,037.52
Dividends—Temiskaming stock	1,398.00
Stores account	484.14
	\$351,124.82

Charges—Operating—

Mining labor	\$83,336.30
Mining supplies	35,184.52
Assaying.....	900.27
Horse expense and teaming.....	2,447.99
Insurance.....	1,685.88
Taxes.....	367.58
Mine general expense	13,835.82
Prospecting.....	275.81
Bullion expense.....	529.92
Mine shipment exp'se	6,399.94
Mill operation.....	42,701.51
Erie operation.....	117.32
Mill shipment exp'se	12,006.17
Workmen's compensation	3,047.16
	\$202,836.19

Administrative—

Head office salaries.....	\$12,101.47
Directors' fees	2,865.00
Directors' travelling expenses.....	699.82
Travelling expenses.....	866.42
Stationery & printing	279.16
Legal expense	145.00
Head office rent	600.37
Postage.....	457.05
Telegrams and telephone service.....	155.04

Audit.	250.00
Head office expense.	510.93
Periodicals.	9.25
Stock transfer exp'se	394.45
Subscriptions.	25.00
	\$19,358.96
	222,195.15

Balance transferred to Profit & Loss Acct. \$128,929.67

Profit and Loss Account, 29th February, 1916.

Credits—	
Balance at credit, Feb. 28th, 1915.	\$480,981.34
Transferred from Mining Account, 29th February, 1916	128,929.67
	\$609,911.01

Debits—	
Dividend No. 9 at 3 per cent.	\$60,000.00
Dividend No. 10 at 3 per cent.	60,000.00
	\$120,000.00

Depreciation provided for 29th February, 1916—	
Buildings, plant and equipment.	\$7,895.76
Development.	3,917.74
Furniture and furnishings.	359.94
Incorporation and organization.	96.82
Preliminary and administrative	688.66
	\$ 12,958.92
	\$132,958.92

Renewals to buildings and plant.	526.94
	\$133,485.86

Balance at credit. \$476,425.15

RAMBLER-CARIBOO MINES, LTD.

Information concerning the Rambler-Cariboo Mines, Ltd., which for many years has been operating a silver-lead-zinc mine and concentrating plant in Slocan district of British Columbia, was published last month by Mining Truth, of Spokane, Washington, U.S.A.:

At a meeting of the Rambler-Cariboo Mining Co. directors held in Spokane on April 1, a dividend of one cent a share, or \$17,500, payable April 15, was declared. This is the first declaration since December 15, 1915, but it is believed that regularly monthly disbursements will be made for an indefinite period. The coming distribution will increase the grand total to \$437,500, the company having paid 22 cents a share in as many consecutive instalments prior to suspending dividend disbursements in 1903, and two amounts were paid in 1915.

The company has in hand a cash surplus of \$40,000, together with approximately 1,000 tons of zinc concentrates averaging about 37 per cent. zinc and 25 oz. silver per ton. Eight car loads of lead ore and concentrates are now at smelters or in transit, so that the company is in excellent financial shape. Orders have been given to the manager, Mr. W. A. Cameron, to push production to the limit as soon as sufficient water shall be available for full milling operations, and it is believed that soon after April 1 ore will be coming out

in larger quantity than at any previous time in the company's history.

It is believed that 150 tons of lead concentrate can be produced monthly, averaging about \$70 a ton. In addition, more than 200 tons of zinc concentrate will be made, while two or three car loads of crude ore, worth about \$3,000 a car, will also be available.

The company has closed a contract with the Kusa Spelter Co. of Dewar, Okla., for its accumulated zinc ore. The basis of sale is \$44 for a 35 per cent. zinc product containing 25 oz. silver, not more than 10 per cent. iron and one per cent. lime. The unit variation is \$2 up or down, while for each oz. of silver above or below 25, a bonus or penalty of 40 cents is provided. Allowing for freight rate of about \$10 and ad valorem duty on zinc content, it is believed the contract will net the company more than \$30 per ton.

Another report, under date April 9, also published in Spokane, attributed to the manager statements to the effect that new discoveries had been made of ore on the seventh and twelfth levels of the mine respectively, this ore having a higher zinc content than that being mined on other levels, though the silver value was similar. Mr. Cameron was reported to have said further:

"We have been producing about 150 tons each of lead and zinc concentrates and 30 tons of crude lead ore monthly for some time. The crude ore runs from 148 to 165 oz. of silver to the ton, and 50 to 58 per cent. lead, while the lead concentrate averages from 70 to 100 oz. silver and 32 to 40 per cent. lead, and the zinc concentrate runs 35 to 37 per cent. zinc, and about 25 oz. silver to the ton.

"During the winter we have been working but 40 men, but we contemplate increasing the force to not less than 50 as soon as the melting snows shall provide more water for power, and our production will thereafter be increased about 20 per cent. The company is in excellent position financially, and we have about 1,000 tons of zinc concentrate stored and ready for shipment as soon as a satisfactory contract shall be secured. Representatives of the larger zinc smelting companies now are negotiating with us for our accumulated zinc product and, too, for the future output."

The scarcity of shipping on the northern Pacific coast is seriously affecting the coal-bunkering business of Vancouver island, British Columbia. Steamers now are too much in demand to allow of time being taken for them to go from Seattle, on Puget sound, to Union bay, Vancouver island, for bunkers, so the Canadian Collieries (Dunsmuir), Limited, is sending coal to the ships and filling their bunkers while they are loading freight-paying cargo. A British tramp steamer is a rare visitor to British Columbia ports these days. Notwithstanding that fact the coal mines in Nanaimo and Extension districts are being worked full time, and conditions are improving for the Comox district mines.

The S. S. Redondo, which left Skagway, Alaska, for Puget Sound ports, Washington, about the middle of April, had included in her cargo 760 tons of copper ore from the Yukon Copper, Grafton, and Arctic Chief copper mines near Whitehorse, Yukon. The ore, no doubt, was consigned to the copper smelting works, near Tacoma, Washington.

The custom stamp-mill at Chena, Fairbanks district, Alaska, is treating tungsten ore.

PERSONAL AND GENERAL

Mr. T. W. Gibson and Dr. W. G. Miller are expected to reach Toronto shortly from England.

Mr. T. C. Denis, Superintendent of Mines of Quebec, is in France, having been called to the colors.

Mr. C. V. Corless, manager of the Mond Nickel Co., is in England.

Mr. Geo. Randolph has been appointed manager of the Adanac mine, Cobalt.

Mr. H. Foster Bain, editor of the Mining Magazine, London, is visiting mines in South Africa.

Mr. Robert Bryce is in Toronto.

Mr. A. P. Ashmore is in charge of operations at the Calumet and Montana mine, Cobalt.

Mr. G. C. Bateman is in Toronto.

Mr. C. A. Foster is in Toronto.

Mr. A. M. Bilsky is in Toronto at the King Edward Hotel.

Mr. D. E. Keeley, formerly mine superintendent at Dome Lake mine, has joined the McIntyre staff.

Capt. Jas. Alexander, principal owner of the Engineer gold mine, on Taku arm, Atlin mining division, British Columbia, was stricken with snow blindness while travelling from the mine to Carcross on his way to Skagway and thence southward to Vancouver. During four days he spent at Skagway waiting for a steamer he was unable to see.

Mr. T. M. Daulton, manager of the Placer Gold Mines Co., which operates on Ruby creek, and Mr. A. D. Hughes, for several seasons superintending the mining work of the North Columbia Gold Mining Co., on Pine creek, and of the Spruce Creek Power Co., on Spruce Creek, returned to Atlin about the middle of April to commence the season's placer-mining as soon as practicable.

Mr. Fred Jay last month took men to the Tantalus coal mine, Yukon, to prepare for resuming coal-production. Manager Milton, who was in Seattle, Washington in April, expected to reach the mine by the middle of May and to thereafter commence mining without delay.

Mr. Caspar Phair, who was appointed Provincial Government Agent at Lillooet, British Columbia, on January 7th, 1878, has been superannuated after 38 years of continuous service. Among his multifarious official duties were those of Gold Commissioner for Lillooet district. He has been succeeded by Mr. John Dunlop, of Lillooet.

Mr. Volney D. Williamson, of Spokane, Washington, well known in northwestern lode-mining camps, last month visited the Bell mine, in Ainsworth mining division, British Columbia. He is associated with Mr. A. L. White, of Spokane, and Mr. C. F. Caldwell, of Kaslo, B.C., in a zinc-mining enterprise, to prosecute which the Jackson Basin Zinc Co. has been organized. The intention is to ship about 20 tons of zinc ore a day, and the contract for hauling from Jackson basin to the Kaslo and Slocan railway at Whitewater is to be let without delay. Meanwhile ore is being sent down to the railway for shipment to the United States.

Mr. Joseph Wendle, long engaged in hydraulic gold-mining in Cariboo, B.C., is to have charge of hydraulicking operations on Slough creek, Cariboo district, during the ensuing placer-mining season. He left Barker-ville for Slough creek last month.

Mr. Wm. Noble, of New York, has been looking over mineral claims near Hope, in Yale district, British Columbia.

Mr. C. P. Dam, manager of the Golden Dream Mining Co., Bridge river, Lillooet district, British Columbia, is awaiting the arrival of plant and machinery, to be taken in as soon as all the difficulties that the winter's very heavy fall of snow brought to the Pacific Great Eastern railway shall have been overcome.

Mr. George Huston, of Wallace, Idaho, who ten or twelve years ago was proprietor and editor of a newspaper published at Sandon, Slocan, has secured under lease and bond the Calumet and Hecla mineral claims, in Slocan City mining division, British Columbia.

Last month Mr. J. P. McFadden, manager of the Surprise silver-lead-zinc mine, situate near Cody, Slocan, left British Columbia to visit Chicago where he would meet Mr. H. L. Hollis, consulting engineer to the owners of the mine. Last year approximately \$500,000 worth of ore was shipped from the Enterprise, most of it having to be concentrated at a custom mill. It is reported that the owners of the Surprise are likely to soon put in their own concentrating plant.

Major R. W. Brock, second in command of the Western Universities (196th) Battalion, left Vancouver, B.C., for the prairies to inspect companies of the battalion at Winnipeg, Edmonton and Saskatoon. He has since returned to Vancouver and reported excellent progress in recruiting for this unit, which is composed chiefly of students at the universities of the four Western provinces of the Dominion.

Mr. James Breen, of Spokane, Washington, who eighteen or nineteen years ago built the copper smeltery at Northport, Washington, for treating ores from the Le Roi and other Rossland mines, after having been for a year or two associated with those who in 1896 established the Heinze smeltery at Trail, B.C., recently visited the Consolidated Mining and Smelting Co.'s entirely transformed and modernized works at Trail, which are a striking testimony to the very considerable advance made by the mining industry of Kootenay district since Mr. Breen was actively engaged in its development.

Capt. Angus W. Davis, of Trail, B.C., for a number of years one of the Consolidated Mining and Smelting Co.'s field engineers, has been promoted to the post of major in the Royal Engineers and given command of the 3rd Canadian Engineers Tunnelling Co. A. Bruce Ritchie, also one of the Consolidated Mining Co.'s engineers, is now a captain in the same company.

Mr. Wakely A. Williams, of Anyox, Observatory inlet, B.C., superintendent of the Granby Consolidated Co.'s smelting works, was at the company's works at Grand Forks during the temporary absence of the local superintendent, Mr. W. B. Bishop, who was on a business visit to the Coast.

Lieut.-Col. Guy H. Kirkpatrick, commanding officer of the 11th C.M.R., with headquarters in Victoria, B.C., who is now actively engaged in a recruiting campaign in British Columbia, was formerly associated as a mining engineer with the Messrs. Leckie, now Brigadier-General R. G. Edwards Leckie and Lieut.-Col. J. E. Leckie, both on active service in Europe. The headquarters of these mining engineers was at Vancouver, B.C., until war conditions and an irresistible spirit of patriotism led to an abandonment of civil life and an entire surrender of their services to their country by all three members of the group.

Last month employees at Nos. 5 and 6 mines, Comox colliery of the Canadian Collieries (Dunsmuir), Limited, near Cumberland, Vancouver island, B.C., and other district residents entertained at a valedictory dinner Mr. John H. McMillan, who for about five years had been manager of the two mines mentioned, and who lately resigned on being appointed a district inspector of mines for the British Columbia Department of Mines. Late in April, Mr. McMillan left Victoria for Prince Rupert, at which town he will have his official headquarters.

Capt. Richard Halse Ley, of the 88th Victoria Fusiliers, who on April 25th was married at Christ Church Cathedral, Victoria, B.C., to Miss Theresa Mesher, also of that city, was for some time practising at Nelson, B.C., as a custom assayer, holding a Certificate of Competency and Licence under the British Columbia Bureau of Mines Act Amendment Act, 1899. Mr. Ley had the distinction of being an assayer who was not carried away by the local craze relative to the alleged occurrence of platinum in certain dikes near Nelson, and his failure to discover platinum in samples submitted to him for assay made him unpopular in certain quarters in that city and district. It is significant that not an ounce of platinum has been produced in Nelson mining division during the five years that have since elapsed. After leaving Nelson, Mr. Ley was for some time, until volunteering last year for active service, representative in Victoria and tributary territory of the Giant Powder Co. The marriage of Captain and Mrs. Ley, described at length in the local press as a "fashionable military wedding," was quite an event in Victoria society circles.

Information has been received in Victoria, B.C., that Major E. C. Musgrave, who in the years of its greatest activity and profitable production was superintendent of the Tyee Copper Co.'s gold-copper mine on Mount Sicker, Vancouver island, has been confirmed in his rank and been recommended for honors. After leaving the Tyee mine, Mr. Musgrave was several years in the United States and Mexico managing mines, and later proceeded to England, where he volunteered for active service shortly after the outbreak of the war, and received a captain's commission.

OBITUARY

Charles C. Galloway, elder brother of Mr. John D. Galloway, assistant mineralogist, Victoria, B.C., died of fever at Prestea, Gold Coast, Africa, on April 18th, where he had been for about a year in the service of the Prestea Block A. Co., a British company engaged in gold-mining. The late Mr. Galloway was born in 1884 in Christchurch, New Zealand, whence his father, Mr. C. Scott Galloway, had gone from Scotland some time previously. About 1893 the family left New Zealand for the Old Country, and in 1895 they went thence to British Columbia, going from Vancouver to Greenwood, Boundary district, in 1896. The Galloway brothers attended the public school at Greenwood, and afterward continued their education at the High School in one of the Coast cities. Later both took a mining engineering course at McGill University, Montreal. C. C. Galloway spent four seasons with Geological Survey parties in the field; three seasons in British Columbia and one in Ontario. For a while he was employed at the steel works at Sydney, Nova Scotia, and afterwards

he was with the Anaconda Copper Mining Co. at Anaconda, Montana. Later he was assayer and surveyor at the Coronation gold mine, in Lillooet district, British Columbia. On operations being suspended for a while by the Coronation Co., the late Mr. Galloway returned to Montreal, intending to take a further course in mining engineering preliminary to graduation, but on the recommendation of one of the professors he obtained appointment with the Prestea company and in the spring of 1915 proceeded to England and thence to the Gold Coast where he arrived last June. He had been getting on very well with his work at Prestea, and on intimating his desire to return to England to enlist for service at the front, was strongly urged to remain at his work where he was. This he finally consented to do, but it was not long before fever attacked him and he succumbed. No particulars relative to his illness have yet been received from Africa, only the cabled brief information that he had died of fever on the date above stated.

Leslie C. Hill, who died at Osovoos, British Columbia, on April 21st, was for a number of years engaged in directing mining operations in various parts of British Columbia and Alberta. When, in 1897 or 1898, he went from Vancouver to Greenwood to develop the Jewel gold mine, near Long lake, Boundary district, that property was controlled by Vancouver men, who were also interested in the Vancouver group, near Silverton, Slooan, and this property too, Mr. Hill developed. Later, he directed the development of the Bend d'Or mine, now included in the Coronation group, situated on Cadwallader creek, Lillooet mining division. As manager and mining engineer for the Hastings (B.C.) Exploration Syndicate, of London, England, he effected a transformation from a mining enterprise somewhat heavily burdened with debt to a productive dividend-paying undertaking. Before retiring from mining engineering to live on his ranch at Osoyoos, to which place he removed from Nelson several years ago, he did a lot of development work on some coal properties in Southwest Alberta, owned by the Head Syndicate, of London. During many years of professional activity he also did much civil engineering—he was an Associate Member of the Institute of Civil Engineers. For some years, too, he was a member of the Canadian Mining Institute. He was a good representative of the typical Old Country professional man, and it was significant that his foremen and superintendents remained in his employ for many years.

On May 1st the death occurred at Victoria, B.C., of Alexander McArthur, who was born in Auchnagat, Aberdeenshire, Scotland, in 1835, and who in 1857 crossed the Atlantic from Scotland to Canada and, after five years' residence in Ottawa, Ontario, in 1862, journeyed to New York and thence via the Isthmus of Panama and San Francisco to Victoria, on his way to the Fraser river and Cariboo gold fields. For about thirty years he was a placer-miner, and then for a while he was blacksmithing at Barkerville, Cariboo. In 1898 he removed to Lillooet, and eight years later to Vancouver, in which city he resided until about seven years ago he made his home in Victoria, where, at the age of 81 years, he died after having lived in British Columbia about 54 years. He made many friends in the Province, some of whom had known him from pioneer days, and now they mourn the loss of one who was always genial and cheery, and whom they respected and loved.

SPECIAL CORRESPONDENCE

BRITISH COLUMBIA

At the end of April a very comprehensive proposed Workmen's Compensation Act was having the close consideration of the Legislative Assembly of British Columbia, the Provincial Government having brought in a bill dealing with this important question after it had been for fully a year given the careful attention of a Commission specially appointed to conduct investigations and to make recommendations in accordance with their conclusions after having taken into account all the benefits provided by legislation elsewhere. It is significant that, speaking generally, both labor organizations and employers are freely expressing approval of the new measure submitted by the Government, changes suggested being only of details to meet the views of these vitally interested parties.

WEST KOOTENAY.

Ainsworth.—Production of silver-lead ore in this division seems to have fallen off lately, for there was only one small lot received from it at the smeltery at Trail during three weeks ended April 21st, though shipment of lead concentrate from the **Bluebell** mine, Riondel, Kootenay lake, has been continued at the normal rate. It is reported that the higher wages obtainable by miners in the Coeur d'Alene district of northern Idaho, which can be easily reached from West Kootenay via Spokane, Washington, are attracting miners from Ainsworth and Slocan. The big silver-lead and zinc mines of the Coeur d'Alene district are experiencing a time of abnormal prosperity and profit-making, so are increasing ore-production to the greatest extent possible.

Rossland.—The output of ore from **Rossland** mines is being well maintained; in fact, the average daily quantity shipped to Trail in recent weeks has been larger than in the earlier part of the year. For nearly ten weeks ended March 7th the daily average was 901 tons; for 45 days to April 21st, it was 1,030 tons a day.

The **Josie** mine report for the month of February made to the head office of the Le Roi No. 2, Ltd., in London, England, by the company's managers at the mine at Rossland, showed that during February there was shipped to Trail 1,343 tons of ore. The receipts from the smeltery were \$19,591 in payment for 1,281 tons of ore shipped, and \$333 in payment for 42 tons of concentrate shipped. Sundry receipts were \$372. Total receipts for month, \$20,296. Estimated working costs for corresponding period were \$4,200 for ore production. Other expenditures were \$2,101 on capital account, and \$10,500 for mine development, including diamond drilling. Total expenditures were, therefore, \$16,801.

BOUNDARY.

Last month the **British Columbia Copper Co.** blew in a second blast furnace at its smeltery at Greenwood, which leaves only one furnace still idle.

Shipment of ore from the **Union** mine, in Franklin camp, north of Grand Forks, is to be resumed as soon as the wagon-roads become sufficiently hard to allow of heavy loads being hauled over them. Production in 1915 was estimated at 520 tons, about 400 tons of which was shipped to the Granby Consolidated Co.'s smeltery at Grand Forks and the remainder to the Consolidated Mining and Smelting Co.'s smelting works at Trail. A good idea of the value of the ore is ob-

tainable from a report of the mine superintendent, in which it is shown that the average gold and silver contents of more than 200 tons of ore shipped to the Grand Forks smeltery was 0.85 oz. gold and 45 oz. silver to the ton. The cost of hauling in horse-drawn wagons 25 miles to the railway was \$13.50 a ton; freight by railway to smeltery was \$1.50, and charge for smelting, \$6.75; total freight and treatment costs were, therefore, \$21.75 a ton, which is rather a heavy handicap on mining in Franklin camp.

Included in the mining news published in a recent issue of the Greenwood Ledge were the following Boundary notes: Work is to be resumed on the Big Copper, in Copper camp, five miles west of Greenwood. Laurier and Loon Lake mines, Washington, are shipping ore to the Greenwood smeltery. There are 90 men working at the British Columbia Copper Co.'s smeltery at Greenwood and 125 men at its Mother Lode mine, situated three miles from the town. The Pathfinder, on the north fork of Kettle river, is shipping ore from the dump to the Granby Consolidated Co.'s smeltery at Grand Forks. During May about 200 tons of second-grade ore will be shipped from the Sally mine, on Wallace mountain, near Beaverdell, west fork of Kettle river, to the Granby Co.'s smelting works. There is a good chance for leasers on Wallace mountain, on which there should be at least 100 men working.

SIMILKAMEEN.

The Olalla country, in which there are some promising showings of mineral, is being looked over by mining men from Spokane, Washington.

Work is being continued on the Horn Silver group, situated fifteen miles south of Keremeos. Last year 115 tons of ore from this property, shipped to the Granby Consolidated Co.'s smeltery at Grand Forks, yielded an average 67.6 oz. of silver and 0.2 oz. of gold to the ton. A discovery of native silver on a neighboring mineral claim was reported recently.

It has been announced that a diamond-drill will shortly be in use on the Red Buck mineral claim, Kennedy mountain; this property is under bond to Mr. F. S. Norcross, Jun., superintendent of mines for the British Columbia Copper Co., which has been for several years doing extensive exploratory work on a large group of claims on the neighboring Copper mountain.

From the Hedley Gazette it is learned that Mr. W. N. Burke, who is associated with Mr. E. S. Campbell in the ownership of the Golden Rod mineral claim, in Camp Hedley, recently arrived at Hedley from Spokane, Washington, with three miners, to do development work on the property.

YALE.

Although lode-mining is still unimportant in several of the divisions of Yale district, prospecting, and in some cases development work, are being done in a number of places. New railway construction is expected to be followed by the exploration of a number of mining properties, a few of which are being opened with encouraging results.

In the Hope Country.—The West Yale Review, published at Hope, which is on the Canadian Pacific Transcontinental railway about thirteen miles west of the old town of Yale, famous in the early placer-gold mining days of the Fraser river, lately made the following comment: The only extensive free gold finds in Hope

district are on the creeks of the Coquihalla. These will take care of themselves. In addition to a trail up to the showing, all the owners want is the means of transportation that will be afforded by the operation of the Kettle Valley railway trains, a matter of only a short time. But the Skagit valley is in a different position. Its wealth is in copper. . . . There are several properties around the bend of the Skagit river, known as 23-Mile, on which the showings indicate very extensive orebodies and all assays give a high percentage of copper. Thus two of the requirements are met; the other is transportation. Until the mines are developed into shippers it is useless to think of railway transportation; the best that can be hoped for is a wagon-road by which supplies can be taken in and ore for test purposes be brought out at lower cost than now.

Highland Valley.—Mention was made in the Journal of April 15th of the erection of mine buildings and intention to put in a concentrating plant by the Highland Valley Mining and Development Co. This company, of which Mr. Frederic Keffer is president and Mr. Henry Johns, secretary-treasurer (both of whom were for years in charge of operating mines of the British Columbia Copper Co.), has undertaken the development and operation of the Chataway and Sanson groups of mineral claims, distant in an air line approximately 18 miles southeast of Ashcroft, a station on the main line of the Canadian Pacific railway 204 miles east of Vancouver. They are at present reached by a good wagon-road from Ashcroft 25 miles to Chataway ranch and thence by trail three miles to the mine workings. Spatum, a station of the C.P.R., 14 miles west of Ashcroft, is about eight miles in an air line from the mining property, but to get a suitable grade a wagon-road would have to be about 15 miles long. Last month a deputation from Ashcroft interviewed the Government in Victoria and since then the district road-superintendent has been instructed to report as to the feasibility and approximate cost of making the proposed road, which, as the mines are at an altitude more than 4,000 feet higher than the railway, would have a general down-grade to Spatum. As for the present only wagon-hauling transportation facilities can be hoped for, the application to the Government to give assistance to this promising mining camp in this way is generally supported in the district, from which the only lode-mine production in 1914 was the shipment of about 100 tons of high-grade copper ore from the Snowstorm and 50 tons from the Glossie group. Sufficient money for further development work, ore production and concentrating mill has already been obtained in Spokane, Washington, so the prospects of success attending the efforts of the Highland Valley Co. are promising. The ore occurring on the Chataway group is composed of quartz, feldspar, mica and copper and iron pyrites, the mica being the predominating mineral. The copper occurs entirely as copper pyrites, and as a rule is distributed through the gangue in quite large crystalline masses, thus constituting an ideal ore for concentrating, especially as the micaceous gangue is soft and easily broken.

LILLOOET.

It is reported that the first carload of ore to be shipped from Lillooet district will consist of ore from a mineral claim on which antimony is the chief valuable metal.

The Lillooet Prospector states that the prospects for ensuing season of the Bridge River part of Lillooet mining division are far brighter than most people have

any idea of. On all the mining properties where there is activity the owners are going about the work in a thorough manner and are developing their claims in a way that will prove that mineral occurs on them. The owners of some of the properties being developed are much pleased with results thus far achieved. The recent provision of railway transportation facilities will be of great assistance toward getting machinery on the ground at much less cost than under former conditions. The future of the Bridge River country looks exceptionally promising, and it is believed that in a short time much more attention will be paid to it by outside capitalists, owing to the good showings of gold occurring in different places in this part of the division.

NEWFOUNDLAND

Iron.—The output of hematite from the Wabana mines owned by the Dominion Iron and Steel Co. and the Nova Scotia Steel Co. at Bell Island has been increasing every week and now exceeds 100,000 tons weekly. During the winter the Dominion Co. maintained its four mines working at full blast, and employed a full staff of men constantly at work. No shipping has yet been done this spring from the mines, but the fullest preparations are now being made to expedite shipping when the steamers arrive. The bulk of the ore from the mines of the Dominion Steel Co. will go as usual to the smelters at Sydney, C.B., but it is likely that more ore than usual will be shipped this season to Great Britain.

Although the plant of the Nova Scotia Steel Co. has not heretofore since the war been working to its fullest extent like that of the Dominion Steel Co., yet the scale of operations at its mines just now is far greater than at this time last year, and doubtless as time goes on orders will be secured to warrant the marvellous deposits of that company once again being worked to the fullest extent.

Bell Island during the past year has grown rapidly, and has risen to be the second town of commercial importance in Newfoundland. It possesses a fine system of municipal government, every effort is being made to lay out the rapidly extending limits of the town conformable with the most up-to-date sanitary advantages. These efforts are meeting with a good measure of success, and for a mining town the floating population is surprisingly small.

Copper.—An impetus, seemingly greater even than the rise in the price of copper itself—is now being given to encourage copper mining in the country in the nature of the new electric smelter erected at St. John's, which is now working at full blast, and with every prospect of being able to handle large quantities of ore from deposits all over the country. Mr. Paul Simpson, the expert who set the plant first in motion declares it to have exceeded all his expectations. The formal opening of the plant was done by His Excellency, the Governor of Newfoundland. The plant at present working is smelting approximately 25,000 pounds of ore per day. Practically all the copper now being produced is being used locally in connection with the making of shells.

All the dumps which have lain around the many copper mines in this country which were once worked and shut down for one reason or another, have been purchased, and cargoes are now being got ready to be sent to the smelter at St. John's.

This has encouraged the numbers of holders of copper prospects to begin on a small scale to work their

holdings, and during the summer dozens of small mines will be worked, and numerous cargoes of ore shipped to be smelted locally. It is extremely likely that two more smelters will be erected during the summer at Notre Dame Bay, both these smelters will be run electrically, as water power is obtainable in abundance at a minimum cost. At this rate it seems as if Newfoundland is likely to revert to her position of twenty years ago, when she ranked as one of the great copper producing countries of the world.

Manganese.—Recently the Mines Department has been receiving numerous enquiries from American and English sources asking if manganese deposits existed in Newfoundland and to what extent. But very little information could be elicited in this regard, as very little authentic information of this nature is in the possession of the Department of Mines and Minerals. Only the scantiest amount of exploration has yet been made in Newfoundland for this mineral. During all last summer, however, one manganese mine was worked and a couple of good cargoes were shipped to Pittsburg. This mine is at Brigus, and it is, we hear, the intention of the owners to resume operations on quite an extensive scale this summer.

Marble.—The marble quarries owned and worked by the Colonial Mineral & Trading Co., Ltd., which are situated at Canada Bay, and which did such excellent work last year, both in quarrying and in shipping, continued operations right through the winter, and will ship this summer on a very large scale, and will supply all the local demand as well as its big shipments abroad. The new plant of the company is calculated to increase the output to a considerable degree. This will be the third year that the quarry has been working continually. The property extends over 1,600 acres and contains millions of tons of pure white marble. The property is owned in England and from there it is now being financed.

Prospecting.—Ever since the snow disappeared early this spring numerous prospecting parties have been out in the interior searching for minerals or examining claims with a view to starting work on the same, and by reason of the fact that until now almost nothing whatever was done to examine the interior of the country for mineral, reports are reaching the Mines Department weekly that numerous finds have been made of copper and other minerals.

His Excellency the Governor, who takes a deep and knowing interest in the development of our mineral resources, has been able to interest the Imperial authorities with the vast possibilities of our mineral development, and the Government analyst has made a most minute report of mineral deposits known to exist in this country, and this will be submitted to the Home authorities, so that very likely much good will accrue from the valuable facts it will contain.

The Newfoundland Shell Co., with a capital of \$100,000, all of which has been subscribed by local parties, has now a factory at St. John's working full blast turning out shells. A very large order is now being filled for the authorities at Ottawa, and in a few days it is expected that the first shipment of shells will be made, direct to England.

The appointment of Mr. D. H. McDougall to be general manager of the Dominion Steel Corporation, caused much gratification to the large number of Mr. McDougall's friends in Newfoundland, where he is well known, having been here at different periods in connection with the Dominion mines at Bell Island.

PORCUPINE, KIRKLAND LAKE AND BOSTON CREEK

The **Hollinger Merger** is, of course, the main subject of conversation in all mining circles of Ontario, but its details have been so thoroughly canvassed and published that it would not be fruitful to set them down further here. The decision of the Hollinger to bring about this merger will insure an extraordinary busy year around Timmins. The company has already started excavations for the extension of the mill. It has been determined to install 100 more stamps, so that the capacity of the plant will be about double. As the present capacity of the plant varies between 28,700 tons and 30,800 tons a month, it is safe to say that the new mill, with its devices for raising tonnage per machine will be able to treat 4,000 tons per day. The more active development of the Acme is assured now. It is understood that primary crushing in the new mill will still be by stamps alone. A new type of stamp is to be used, however. Ten tube mills will be ordered and a device installed in the cyanide tanks which should largely increase their settling area.

Unless some very untoward factor occurs, **Boston Creek** is going to be the most active centre for prospectors this year. The development of the Crown Reserve claims is very encouraging. The Crown Reserve was the third company to do active development work in this section, and all three have met with very promising results, considering the small amount of development undertaken. The Crown Reserve have the McCrea and O'Neil claims and so well are they pleased with their options that they have taken over the four Johnston claims, three of which adjoin their original holding, the remaining one being direct east of the R. A. P. Syndicate.

The little Nissen stamp mill at the Miller Independence Mine is now running and before this is published, the first gold bar should have been shipped from Boston Creek. Some very remarkable ore has recently been shot out of the vein on the surface at the Miller. Underground work is not making very fast progress.

Prospecting has now spread southward from Boston until prospectors find it to their advantage to go in from Krugersdorf. They find that upon many of the claims staked as homesteads in Southern Catherine, the regulations had not been complied with and they were open for staking. Many of these properties have now been staked, and there will certainly be some activity here this spring. It is quite true that a very large proportion of prospectors have gone to the war and thus the exceptional opportunities there are now for developing new mining claims will be much retarded.

LAKE SHORE.

Further development of the Lake Shore find at Kirkland Lake is proving the discovery to be of much importance. The vein was tapped at 300 feet west of the shaft in a cross-cut to the north. At the point where it was cut, it gave \$25 over a width of six feet. It was cut again at 60 feet nearer the shaft and ran about \$12 over five feet. This is a very important development and if it continues to hold out, it is probable that the company will undertake the building of a mill this year.

TOUGH-OAKES.

The settlement of the injunction proceedings in regard to the Tough-Oakes Mining Company has cleared the air to some extent. It is now certain that the con-

trol of the Tough-Oakes will remain in the hands of Mr. C. A. Foster and his associates, until the matter comes to trial, which cannot very well be before the fall. The development of the mine is continuing to be quite satisfactory. The financial statement of the Tough-Oakes for the year ending December 31st, shows that the company made excellent profit. After paying \$132,875, in dividends, there was a debit balance of \$38,607. The net profits for the year amount to no less than \$275,038. Mining cost \$101,897, milling \$83,054, or a total operating expense of \$231,128; leaving the operating profit of \$327,363. Total general and administrative expenses cost \$48,843. The report is confined entirely to financial statement. There is nothing in it of the physical condition of the property, nor are the costs per ton given. z

McINTYRE.

At the time this is being written, the exact importance of developments on the 700 and 1,000 ft. levels of the McIntyre can only be surmised, but it is known that sufficient ore has already been developed to indicate the most valuable addition to ore reserves, since the property was opened up. The cross-cut run from the shaft at the 700-ft. level, opened no less than 62 ft. of ore of a very profitable grade. At 186 ft. a cross-cut had just struck No. 5 vein. On the 1,000-ft. level the long cross-cut between the McIntyre extension and the No. 5 shaft had just entered ore. The ore-body was struck just across the line in McIntyre property and it is remarkable that gold contents were not high until the line was crossed. If development continues as promising as it appears to-day, these recent discoveries are the most significant that have been made on the McIntyre group. Jupiter ore is now being treated in the McIntyre mill. The surface tramway has been completed and 75 tons of Jupiter ore is being hauled over it, to the No. 5 shaft. The McIntyre mill is now treating about 425 tons a day.

GRANBY CONSOLIDATED.

Boston, May 6.—When Granby Consolidated closes its fiscal year on June 30th, there will have been earned during the preceding 12 months in excess of \$20 a share, according to preliminary estimates. April profits approximated \$600,000 before fixed charges as compared with \$470,000 in March. Profits for the first four months of 1916 were close to \$1,800,000.

There was treated at the Hidden Creek smelter during April 76,000 tons of ore which was well up to the highest tonnage yet put through that plant. The four furnaces will be maintained in as continuous operation as possible to insure the maximum of production.

The agglomerator, which has now been in operation for some time, has been giving a good account of itself by adding to the copper output at Anyox. This equipment has demonstrated its ability to extract four pounds of copper from each ton of flue dust at a minimum of cost.

A NOVEL ECONOMICAL AGITATOR.

The following account of what it designates "A Novel Economical Agitator." received by Mining and Engineering World from Mr. Roscoe Wheeler, mill superintendent for the Hedley Gold Mining Co., operating in Camp Hedley, Similkameen, B.C., was published recently by that journal:

"The Devereux patented agitator (a boat's propeller on the end of a vertical shaft), placed in the centre of a small or large tank, flat or conical bottom, ranks

with the best of slime agitators. On account of its ease and readiness of putting a charge in motion, it allows tanks of any size to be used as settlers as well as agitators. It will agitate pulp of almost any specific gravity thoroughly and efficiently with not an excessive horsepower. The simplicity of its few working parts, the small amount of attention needed, the effectiveness of its agitation, and the utilization of tanks of any size, are qualities hard to excel.

"In a tank 30 ft. in diameter with conical bottom of 23 deg. and vertical side 9 ft. above cone, a 4-ft. diameter, 4-bladed, right-hand propeller revolving 90 r.p.m., using 10 h.p., installed 6 ft. above apex of cone, will put in agitation a slime charge of specific gravity 1.25 to 1.50 of 100 to 165 tons dry slimes from rest to agitation in about 20 minutes.

HEDLEY GOLD MINING CO.

The annual report of the Hedley Gold Mining Co. for the year ended December 31st, 1915, shows net profits of \$374,746. Gross recovery from ore milled was \$796,592, from which there was deducted expenditures of \$421,846. The company milled during the year 74,265 tons of ore having an assay value of \$11.65 a ton. Dividends paid in 1915 totaled \$300,000, or 25 per cent. on the issued capital stock. Undivided profits, after payment of dividends, were \$435,070.

Compared with 1914, the average value of the ore mined and milled last year was 85c. a ton higher, so that, while the quantity milled in 1915 was 4,229 tons less, the total value of the gold recovered was within \$750 of that of 1914.

The following figures are totals for the period of six years, 1910-15: Tons of ore milled, 398,653; total receipts (including about \$47,000, interest on money in bank), \$4,360,500; expenditure, \$2,216,111; net profit, \$2,144,389; dividends paid on an issued capital of \$1,200,000, \$1,788,000. Since the close of last year another dividend has been paid, amounting to \$60,000, for the quarter ended March 31st last.

Included in the report for 1915 of the Trade Commissioner for Canada in South Africa, published in the Weekly Bulletin of the Canada Department of Trade and Commerce, No. 638, April 17th, is a table showing the value of the imports of mining machinery into South Africa during five years, 1910-1914, to have been in all \$20,123,000, of which only \$6,900 was from Canada. The proportion from the United Kingdom was \$13,935,000, that of the United States \$3,550,000, and that of Germany \$2,267,000.

SILVER PRICES.

		New York, London,	
		cents.	pence.
April	21.....	65½	..
"	22.....	65½	..
"	24.....	65½	..
"	25.....	67½	32
"	26.....	67½	32 1/8
"	27.....	69	33
"	28.....	71½	34 1/8
"	29.....	73½	35 1/8
May	1.....	72½	35
"	2.....	74½	36
"	3.....	77½	37 1/8
"	4.....	76½	36 1/8
"	6.....	76½	36 1/8
"	8.....	74½	35 1/2

MARKETS

NEW YORK MARKETS.

May 8, 1916—Connellsville Coke—
 Furnace, spot, \$3.75.
 Contract (nominal), \$2.50 to \$3.00.
 Foundry, prompt, \$3.75.
 Contract, \$3.50 to \$3.75.

May 8, 1916—Straits Tin, nominal, 50 cents.

Copper—
 Prime Lake, nominal, 29.75 to 30.25 cents.
 Electrolytic, nominal, 30.50 to 31.00 cents.
 Casting, nominal, 27.75 to 28.25 cents.

Lead, Trust price, 7.50 cents.
 Lead, outside, nominal, 7.37½ to 7.50 cents.
 Spelter, prompt western shipment, nominal, 17.05 to 17.30 cents.

Antimony—
 English brands, nominal.
 Chinese and Japanese, 36.00 to 37.00 cents.
 American, 36.00 to 37.00 cents.

Aluminum—nominal.
 No. 1 Virgin, 98-99 per cent., 59.00 to 61.00 cents.
 Pure 98.99 per cent. remelt., 57.00 to 59.00 cents.
 No 12 alloy remelt, 48.00 to 50.00 cents.

Nickel, 45.00 to 50.00 cents.
 Cadmium, nominal, \$1.25 to \$1.50.
 Quicksilver, \$110.00.
 Platinum, nominal, \$85.00.
 Cobalt (metallic), \$1.25.
 Silver (official), 74½ cents.

Metal Products.—All prices are nominal as follows:
 Sheet copper, base, 37.50 cents.
 Copper wire, base, 32.50 to 33.50 cents.
 High sheet brass, base, 38.00.
 Seamless brass tubing, 43.50 to 44.50 cents.
 Seamless copper tubing, 43.50 cents.
 Brazed brass tubing, 42.50 to 43.50 cents.
 Brass wire, 38.00 cents.
 Brass rods, 38.00 cents.
 Sheet zinc, f.o.b. smelter, 25.50 cents.

TORONTO MARKETS.

May 10—(Quotations from Canada Metal Co., Toronto)—
 Spelter, 22 cents per lb.
 Lead, 9 cents per lb.
 Tin, 54 cents per lb.
 Antimony, 44 cents per lb.
 Copper, casting, 32 cents per lb.
 Electrolytic, 31½ cents per lb.
 Ingot brass, yellow, 16 cents; red, 21 cents per lb.

May 10—(Quotations from Elias Rogers Co., Toronto)—
 Coal, anthracite, \$8 per ton.
 Coal, bituminous, \$5.75 per ton.

STOCK QUOTATIONS.

(Courtesy of J. P. Bickell & Co., Toronto, Ont.)

May 8th, 1916.

	New York Curb.	Bid.	Ask.
Atlantic Steel	44.62		45.00
Alta. Cons.	12.00		12.50
Butte	7.00		7.87
Curtiss Aeroplane	40.00		47.00
Chevrolet	207.00		207.50
Cosden Oil	22.75		23.25
Can. Copper	1.62		1.75
Canada Cement	64.50		65.00
Con. Ariz.	1.75		1.87
Emma Copper	47.00		48.00
First National	5.00		5.12
Houston Oil	18.50		20.00

Howe Sound	5.25	5.35
Intercontinental Rubber	15.50	16.00
International Petroleum	11.00	11.25
Manhattan Transit	1.25	1.35
Maxim Munitions	9.00	9.12
Midvale Steel	61.12	61.35
Marconi	3.18	3.35
Mother Lode	32.00	32.50
Poole Engineering	105.00	108.00
Peerless Motor	24.00	25.00
Ray Hercules	4.75	5.00
Steel of Canada	59.62	60.00
Standard Shipbuilding	11.50	12.50
Submarine Boat	35.25	35.75
Salpulpa Oil	12.50	13.00
Tonopah Extension	7.06	7.12
Triangle Film	4.25	4.37
U. S. Light	2.87	3.87
White Motors	48.00	49.00

Porcupine Stocks.

	Bid.	Ask.
Apex	.05½	.06
Dome Consolidated	.10	.14
Dome Extension	.35	.35½
Dome Lake	.24	.25
Dome Mines	27.37½	27.50
Foley O'Brien	.50	.60
Gold Reef	.01	.02½
Hollinger	29.60	30.00
Homestakes	.46	.55
Jupiter	.24	.24¼
McIntyre	1.22	1.23
Moneta	.12	.14
Porcupine Crown80
Porcupine Imperial	.03⅝	.04
Porcupine Tisdale	.01	.01⅞
Porcupine Vipond	.49	.51
Preston East Dome	.04	.04¼
Teck Hughes	.19½	.20
United	.17	.17½
West Dome	.24	.24½

Cobalt Stocks.

	Bid.	Ask.
Adanac	.66	.68
Bailey	.08¼	.09
Beaver	.45	.45½
Buffalo	1.00	1.60
Chambers Ferland	.29	.30
Coniagas	5.25	5.60
Crown Reserve	.50	.58
Foster	.09½	.10½
Gifford	.07	.07½
Gould	.00¾	.00⅝
Great Northern	.06½	.06⅝
Hargraves	.05¾	.06
Hudson Bay	.32	.38
Kerr Lake	4.75	5.12½
La Rose	.74	.76
McKinley	.65½	.66
Nipissing	7.96	8.00
Ophir	.08¼	.09
Peterson Lake	.31½	.31¾
Right of Way	.06	.06¼
Rochester04
Seneca Superior	.45	.50
Silver Leaf	.02¾	.03
Temiskaming	.68½	.69
Trethewey	.30	.30½
York Ontario	.01½	.02
Wettlaufer	.10	.11

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

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- Air Hoists—**
Canadian Ingersoll-Rand Co., Ltd.
- Amalgamators—**
Fraser & Chalmers of Canada, Limited.
Northern Canada Supply Co.
- Assayers and Chemists—**
Milton L. Hersey Co., Ltd.
Campbell & Deyell, Cobalt
Ledoux & Co., 99 John St.
New York
Thos. Heys & Son.
C. L. Constant Co.
- Assayers' and Chemists Supplies—**
C. L. Berger & Sons, 37 William St., Boston, Mass.
Lymans, Ltd., Montreal, Que.
Stanley, W. F. & Co., Ltd.
- Ball Mills—**
Fraser & Chalmers of Canada, Limited.
- Belting—Leather, Rubber and Cotton—**
Northern Canada Supply Co.
Jones & Glassco
- Blasting Batteries and Supplies—**
Can. Ingersoll-Rand Co., Ltd.
Curtis & Harvey (Canada) Ltd.
Northern Canada Supply Co.
Canadian Explosives, Limited
- Blowers—**
Fraser & Chalmers of Canada, Limited.
Northern Canada Supply Co.
- Boilers—**
Fraser & Chalmers of Canada, Limited.
Northern Canada Supply Co.
Can. Ingersoll-Rand Co., Ltd.
- Buckets—**
Hendrick Mfg. Co.
M. Beatty & Sons, Ltd.
Northern Canada Supply Co.
- Cable — Aerial and Underground—**
Fraser & Chalmers of Canada, Ltd.
Northern Canada Supply Co.
- Cableways—**
Fraser & Chalmers of Canada, Limited.
M. Beatty & Sons, Ltd.
- Cages—**
Fraser & Chalmers of Canada, Limited.
Jeffrey Mfg. Co.
Northern Canada Supply Co.
- Cables—Wire—**
Standard Underground Cable Co. of Canada, Ltd.
- Cars—**
Jeffrey Mfg. Co.
Northern Canada Supply Co.
- Cement Machinery—**
Northern Canada Supply Co.
- Chains—**
Jeffrey Mfg. Co.
Jones & Glassco
Northern Canada Supply Co.
B. Greening Wire Co., Ltd.
- Chemists**
Canadian Laboratories.
Campbell & Deyell.
Thos Heys & Sons.
Milton Hersey Co.
Ledoux & Co.
- Coal—**
Dominion Coal Co.
Nova Scotia Steel & Coal Co.
- Coal Cutters—**
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
- Coal Mining Explosives—**
Curtis & Harvey (Can.), Ltd.
Canadian Explosives, Limited
- Coal Mining Machinery—**
Can. Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Limited.
Jeffrey Mfg. Co.
Roberts & Schaefer Co.
- Coal Punchers—**
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
- Coal Washeries—**
Jeffrey Mfg. Co.
- Compressors—Air—**
Darling Bros., Ltd.
Smart-Turner Machine Co.
Fraser & Chalmers of Canada, Limited.
Sullivan Machinery Co.
Can. Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
- Concentrators and Jigs—**
Fraser & Chalmers of Canada, Limited.
- Concrete Mixers—**
Northern Canada Supply Co.
- Condensers—**
Fraser & Chalmers of Canada, Limited.
Smart-Turner Machine Co.
Northern Canada Supply Co.
- Converters—**
Fraser & Chalmers of Canada, Limited.
Jeffrey Mfg. Co.
Northern Canada Supply Co.
- Conveyor—Trough—Belt—**
Jeffrey Mfg. Co.
Hendrick Mfg. Co.
- Cranes—**
Smart-Turner Machine Co.
M. Beatty & Sons, Ltd.
- Crane Ropes—**
Allan, Whyte & Co.
B. Greening Wire Co., Ltd.
- Crushers—**
Fraser & Chalmers of Canada, Limited.
Lymans, Ltd.
Jeffrey Mfg. Co.
- Cyanide Plants—**
Fraser & Chalmers of Canada, Limited.
Roessler & Hasslacher.
- Derricks—**
Smart-Turner Machine Co.
S. Flory Mfg. Co.
M. Beatty & Sons, Ltd.
- Diamond Drill Contractors—**
Diamond Drill Contracting Co.
Smith and Travers.
- Dredging Machinery—**
M. Beatty & Sons.
- Dredging Ropes—**
Allan, Whyte & Co.
Fraser & Chalmers of Canada, Limited.
- Drills, Air and Hammer—**
Can. Ingersoll-Rand Co., Ltd.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Northern Canada Supply Co.
- Drills—Core—**
Can. Ingersoll-Rand Co., Ltd.
Standard Diamond Drill Co.
- Drills—Diamond—**
Sullivan Machinery Co.
Northern Canada Supply Co.
- Drill Steel Sharpeners—**
Can. Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
- Dump Cars**
Sullivan Machinery Co.
- Drills—Electric—**
Can. Ingersoll-Rand Co., Ltd.
- Dynamite—**
Curtis & Harvey (Canada), Ltd.
Canadian Explosives.
Northern Canada Supply Co.
- Ejectors—**
Darling Bros., Ltd.
Can. Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
- Elevators—**
Darling Bros., Ltd.
Jeffrey Mfg. Co.
M. Beatty & Sons.
Sullivan Machinery Co.
Northern Canada Supply Co.
- Engineering Instruments—**
C. L. Berger & Sons.
- Engineers and Contractors—**
Fraser & Chalmers of Canada, Limited.
- Engines—Automatic—**
Smart-Turner Machine Co.
- Engines—Gas and Gasoline**
Fraser & Chalmers of Canada, Limited.
Alex. Fleck.
Sullivan Machinery Co.
Smart-Turner Machine Co.
- Engines—Haulage—**
Fraser & Chalmers of Canada, Limited.
Can. Ingersoll-Rand Co., Ltd.
- Engines—Marine—**
Smart-Turner Machine Co.
- Engines—Steam—**
Fraser & Chalmers of Canada, Limited.
Smart-Turner Machine Co.
M. Beatty & Sons.
- Fans—Ventilating—**
Fraser & Chalmers of Canada, Limited.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
- Feeders—Ore—**
Fraser & Chalmers of Canada, Limited.
- Flights—**
Hendrick Mfg. Co.
- Forges—**
Northern Canada Supply Co., Ltd.
- Forging—**
M. Beatty & Sons.
Smart-Turner Machine Co.
- Furnaces—Assay—**
Lymans, Ltd.
- Fuse—**
Curtis & Harvey (Canada), Ltd.
Canadian Explosives.
Northern Canada Supply Co.
- Gears—**
Smart-Turner Machine Co.
Northern Canada Supply Co.
- Hangers—Cable—**
Standard Underground Cable Co. of Canada, Ltd.
- Hand Hoists—**
Darling Bros., Ltd.
Fraser & Chalmers of Canada, Limited
- High Speed Steel Twist Drills—**
Northern Canada Supply Co.
- Hoists—Air, Electric and Steam—**
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
M. Beatty & Sons.
Fraser & Chalmers of Canada, Limited.
Northern Canada Supply Co.
- Hoisting Engines—**
Sullivan Machinery Co.
Fraser & Chalmers of Canada, Limited.
Can. Ingersoll-Rand Co.
M. Beatty & Sons.
- Hose—**
Northern Canada Supply Co.
- Jacks—**
Can. Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
- Lamps—Safety—**
Canadian Explosives.
- Link Belt—**
Northern Canada Supply Co.
Jones & Glassco.
- Metal Merchants—**
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.
Consolidated Mining and Smelting Co. of Canada.
Canada Metal Co.
C. L. Constant 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.
- Pick Machines—**
Sullivan Machinery Co.
- Pipes—**
Consolidated M. & S. Co.
Northern Canada Supply Co.
Smart-Turner Machine Co.
- Pipe Fittings—**
Northern Canada Supply Co.
- Pneumatic Tools—**
Can. Ingersoll-Rand Co., Ltd.
Jones & Glassco.
- Prospecting Mills and Machinery—**
Standard Diamond Drill Co.
Fraser & Chalmers of Canada, Limited

Canadian Miner's Buying Directory.—(Continued from page 15.)

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Pumps—Boiler Feed— Darling Bros., Ltd. Smart-Turner Machine Co. Northern Canada Supply Co. Canadian Ingersoll-Rand Co. Ltd. Fraser & Chalmers of Canada, Limited	Pumps—Vacuum— Darling Bros., Ltd. Smart-Turner Machine Co.	Screens—Cross Patent Flanged Lip— Hendrick Mfg. Co.	Surveying Instruments— W. F. Stanley. C. L. Berger.
Pumps—Centrifugal— Darling Bros., Ltd. Smart-Turner Machine Co. M. Beatty & Sons. Can. Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited	Quarrying Machinery— Sullivan Machinery Co. Can. Ingersoll-Rand Co., Ltd.	Separators— Darling Bros., Ltd. Smart-Turner Machine Co.	Tanks—Cyanide, Etc.— Fraser & Chalmers of Canada, Limited Hendrick Mfg. Co.
Pumps—Electric— Darling Bros., Ltd. Smart-Turner Machine Co. Canadian Ingersoll-Rand Co., Ltd. Fraser & Chalmers of Canada, Limited	Roasting Plants— Fraser & Chalmers of Canada, Limited	Sheets—Genuine Manganese Bronze— Hendrick Mfg. Co.	Transits— C. L. Berger & Sons.
Pumps—Pneumatic— Darling Bros., Ltd. Smart-Turner Machine Co. Can. Ingersoll-Rand Co., Ltd.	Rolls—Crushing— Fraser & Chalmers of Canada, Limited	Shovels—Steam— M. Beatty & Sons.	Tube Mills— Fraser & Chalmers of Canada, Limited
Pumps—Steam— Can. Ingersoll-Rand Co., Ltd. Darling Bros., Ltd. Northern Canada Supply Co. Smart-Turner Machine Co.	Roofing— Northern Canada Supply Co.	Smelting Machinery— Fraser & Chalmers of Canada, Limited	Turbines— Fraser & Chalmers of Canada, Limited
Pumps—Turbine— Darling Bros., Ltd. Smart-Turner Machine Co. Canadian Ingersoll-Rand Co., Ltd.	Rope—Manilla and Jute— Jones & Glassco. Northern Canada Supply Co. Allan, Whyte & Co.	Stacks—Smoke Stacks— Hendrick Mfg. Co.	Winding Engines— Canadian Ingersoll-Rand Co., Ltd.
	Rope—Wire— B. Greening Wire Co., Ltd. Allan, Whyte & Co. Northern Canada Supply Co. Fraser & Chalmers of Canada, Limited	Stamp Mills— Fraser & Chalmers of Canada, Limited	Wire Cloth— Northern Canada Supply Co. B. Greening Wire Co., Ltd.
	Samplers— C. L. Constant Co. Ledoux & Co. Milton Hersey Co. Thos. Heys & Son.	Steel Barrels— Smart-Turner Machine Co.	Wire (Bare and Insulated)— Standard Underground Cable Co., of Canada, Ltd.

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