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THE GOLD MINING INDUSTRY IN CANADA, 1930.

Including - (a) The Alluvial Gold Mining Industry
(b) The Auriferous Quartz Mining Industry
(c) The Copper-Gold-Silver Mining Industry.

Definition of the Industry - Gold mining in Canada falls naturally into two main industries: (1) the sluicing or dredging of gold from the gravels of the rivers and streams or what is called "alluvial gold mining" and (2) the recovery of lode gold which is called auriferous quartz mining. Gold is, however, often associated with other ore deposits, more particularly with those of copper, and for that reason the review of Canada's copper-gold-silver industry is included here to complete this bulletin on Canada's gold mining industry.

Production of gold during 1930 from all sources in Canada amounted to 2,102,068 fine ounces valued at $43,453,601 as against an output of 1,928,308 fine ounces valued at $39,861,663 in 1929. This was the largest output ever recorded in Canada.

The total 1930 production was recovered from the following sources: fine gold contained in crude bullion made by gold mines, 1,782,875 fine ounces; alluvial gold, 42,324 fine ounces; fine gold in blister copper and base bullion made at Canadian smelters from Canadian ores, 172,642 fine ounces, and the estimated recovery of gold in ores, matte, slags and concentrates exported to foreign smelters, 104,227 fine ounces.

Five provinces and the Yukon produced gold as follows: Nova Scotia, 1,272 fine ounces; Quebec, 141,747 fine ounces; Ontario, 1,736,012 fine ounces; Manitoba, 23,189 fine ounces; British Columbia, 164,331 fine ounces, and the Yukon, 35,517 fine ounces. Gold from Nova Scotia was produced in the form of crude bullion and was shipped to the Royal Mint at Ottawa for refining. The greater part of the Quebec output was contained in blister copper made at the Noranda smelter, the remainder was made up from the crude bullion obtained from auriferous quartz mining in the northwest part of the province.

In Ontario the Porcupine area contributed 859,084 fine ounces; Kirkland Lake mines produced 830,733 fine ounces and Sudbury district ores yielded 23,803 fine ounces; 22,392 fine ounces came from properties operating in Red Lake, Kenora, Michipicoten and other districts.

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Manitoba's production consisted of 23,199 fine ounces which were contained in crude bullion recovered from auriferous quartz ores and in blister copper produced at the Flin Flon smelter.

The output from British Columbia consisted of 7,164 fine ounces derived from alluvial deposits, 31,177 fine ounces from lode gold mines and produced in the form of crude bullion; gold in blister copper, 25,799 fine ounces; and gold in base bullion and in ores and matte exported, 100,191 fine ounces.

In the Yukon Territory 35,517 fine ounces were recovered, chiefly from alluvial deposits. Some gold was contained in ores exported.

Gold held second place in point of value among Canada's mineral products in 1930, being surpassed only by coal; the value of gold represented 15.5 per cent of the total mineral production of the Dominion in 1930. As a world producer of gold, Canada ranked second, the Transvaal was first with a production from the Witwatersrand, Heidelberg, and outside districts of 10,719,760 fine ounces, and the United States (not including Phillipine Islands) was third with an output of 2,053,659 fine ounces. Southern Rhodesia produced 547,630 fine ounces during 1930 and the western Australia output amounted to 416,369 fine ounces. Official gold figures from Russia are not yet available for 1930, the production from that country (including Siberia) in 1929 was reported at 1,300,000 fine ounces. A new gold field is reported, in the Soviet Union Year Book, to have been discovered at the close of 1929 in the Yakutsk Republic near the rivers Indigirka and Kolyma. The gold industry in Russia is carried on mainly by three methods. There are the large state trusts doing their work on a commercial basis; concession enterprises which work the most important deposits of precious metals, and there is the small gold industry in the form of private gold mining arranged and fostered by these same trusts.

The Alluvial Gold Mining Industry.

Alluvial gold mining is carried on principally in the Yukon Territories and in the province of British Columbia; placer gold was recovered as early as 1823 from the gravels of the Chaudiere river in Quebec, there is no production from this latter source at the present time although considerable churn drilling and underground exploration of gravels were carried on here during the past year on the Gilbert River creek.

In the Yukon two companies conducted dredging operations in 1930. The Yukon Consolidated Gold Corporation, Ltd., operated electrically equipped dredges on Bear, Upper and Lower Dominion Creeks; the hydro-electric power plant of this company supplied power to the Dawson Electric Light and Power Company for lighting the city

of Dawson and to the Dawson City Water and Power Company, Ltd., for pumping; during the winter months this power heated, by means of an electric steam generator, the water circulated through the mains of Dawson. The other dredging company, employing about sixteen men, conducted dredging operations in the Glacier district. Many individuals and miners working in partnership were engaged in placer mining and experienced a successful season.

In British Columbia the principal placer mining camps are in Atlin, Cariboo and Quesnel while less important areas, such as Liard, Omineca, Clinton, Similkameen, Fort Steele and Revelstoke contribute to the provincial alluvial gold production. The output from Atlin during the last two years has been much less than normal owing to the three largest operators confining their activities to development, the Quesnel division contributed a substantially larger output in 1930 than in the previous year and future prospects are encouraging. Stream platinum associated with iridium was recovered from the Tulameen river near Coalmont, in the southern part of the province. The year witnessed a stimulated and general interest in alluvial gold mining throughout British Columbia.

In 1930 there were 78 companies or individual operators in the Yukon Territory and British Columbia engaged in winning alluvial gold. Salaried employees and wage-earners numbered 349 who received $575,574 for their services. Crude gold recovered amounted to 52,905 ounces valued at $877,007, the larger part coming from the rivers and creeks of the Yukon. In addition 17 ounces of platinum were obtained from British Columbia placer operations. The quantity of material handled amounted to 3,783,981 cubic yards.

The Auriferous Quartz Mining Industry.

In 1930 returns were received from 56 Canadian auriferous quartz mines; of these 37 produced bullion or shipped ores while 19 were engaged only in exploration or development. Four mines in Nova Scotia produced gold bullion; in Quebec gold was recovered from three properties operating in the northwest part of the province; other gold deposits in this district have been the object of development work and give promise of becoming producers. Ontario's principal producers were the Hollinger, McIntyre, Dome, Coniaurum and Vipond in the Porcupine camp, and the Lake Shore, Teck-Hughes, Wright-Hargreaves, Sylvanite and Kirkland Lake in the Kirkland Lake area. During the year the new 1,500 ton mill at the Dome commenced operations; at the McIntyre, flotation was introduced as a medium in gold recovery and a small gold mill was installed at the Cooper gold mine, Michipicoten area. In Bannockburn township, Ontario, diamond drilling of the recently discovered Ashley veins yielded encouraging

results; extensive staking of mining claims occurred in Bannockburn, Argyle, Hincks, and Montrose townships.

Only one auriferous quartz mine, the Central Manitoba, produced gold in the province of Manitoba during 1930; other quartz properties were prospected or under development.

In British Columbia the principal gold mines were the Premier, Pioneer, Union and Nickel Plate. At the Premier, the largest gold producer in the province, operations were continuous during 1930; the Union mine, located some forty-five miles north of Grand Forks, milled 36,386 tons of ore and shipped 1,104 tons of concentrates to the Trail smelter. An important development programme was carried out at the Pioneer during the year results from which indicate a considerable life for this mine; the average value of heads to the mill for the period under review was calculated at from $14 to $15 to the ton and it is planned to increase the daily capacity of the mill to 300 tons. The Hedley Gold Mining Company operated the Nickel Plate mine from April to November and produced about 39,670 tons of arsenical gold ore; a diamond drilling campaign was continued and some small minable bodies of ore were discovered.

A new discovery of gold was reported from Big Creek, about forty-six miles north of Carmacks, Yukon Territory. The vein is reported to be from four to eight feet wide and the out-cropping traced for four thousand feet; preliminary sampling returned low gold values.

Ore taken from the gold mines of Canada in 1930 totalled 4,472,603 tons of which 4,306,869 were milled. Tailings retreated amounted to 37,095 tons; gold bullion recovered by amalgamation at 10 mines amounted to 60,625 crude ounces. Shipments of bullion having a total value of $36,971,461 amounted to 2,325,769 crude ounces containing 1,782,556 fine ounces of gold and 300,408 fine ounces of silver. Ores, concentrates and high grade slags shipped to smelters totalled 142,506 tons having a net value (less freight and greatment charges) of $2,779,059. These shipments contained 101,314 fine ounces of gold, 4,478,461 fine ounces of silver, 2,471 pounds of copper, and 1,773,333 pounds of arsenic.

Capital employed in this industry in Canada in 1930 amounted to $119,758,057 as against $135,166,105 during the previous year. Payments of $14,034,620 in salaries and wages were made to 8,401 employees; of these 466 were on salary, 2,017 were wage-earners working at the surface, 5,188 underground, and 730 in the concentrators. The province of Nova Scotia engaged an average of 30 employees; Quebec, 200; Ontario, 7,387; Manitoba, 130; and British Columbia, 646.

Fuel and electricity used amounted to $2,364,103, the largest item being $1,927,263 which was paid for electrical energy. Imported bituminous coal consumed was worth $172,139, fuel oil used totalled $170,614, and wood $64,518.

The total primary power employed consisted of 1,640 units with a total rating of 86,174 h.p.; these included 16 steam engines at 1,294 h.p.; 47 gasoline, gas and oil engines rated at 7,716 h.p.; 9 hydraulic turbines at 3,246 h.p., and 1,568 electric motors rated at 73,918 h.p. operating on purchased power. There were 241 motors rated at 8,543 h.p. operating on power generated by the mines. Boilers totalled 69 rated at 5,747 h.p.

The Copper-Gold-Silver Mining Industry.

The copper-gold-silver mining industry comprises a group of mines producing ores in which copper is usually the predominating metal in both value and quantity. The precious metals in these ores, especially in periods of depressed base metal prices, are very deciding factors in the economic working of some of the deposits of this nature. In Northwestern Manitoba and in the Rouyn district of Quebec important deposits of copper-gold sulphide ores containing zinc in commercial quantities, have recently been successfully developed and mined.

In Quebec the Consolidated Copper and Sulphur Company Ltd., operating the Eustis mine, produced both copper and iron sulphide concentrates throughout 1930; at the Noranda the total tonnage of ore treated was nearly double that of 1929 and, notwithstanding the drawing of approximately 850,000 tons of ore from the mine, the ore reserves at the end of 1930 show an increase of slightly over 1,500,000 tons as compared with the ore reserves at the close of the previous year; work at this company's subsidiary, Waite-Ackerman-Montgomery mines, was almost entirely confined to exploration, this work added several hundred thousand tons to the mines' copper ore reserves. The Amulet mine was brought into production early in the year and within a few months the concentrator was handling as high as 400 tons of ore per day; owing to low copper and zinc prices the mine was closed down in October.

Construction on the copper refinery of Noranda's subsidiary, Canadian Copper Refiners, Limited, located in the town of Montreal East, Quebec, neared completion in 1930; all copper produced at Noranda smelter is now being shipped to the new refinery. This plant will possess a refining capacity of 75,000 tons of electrolytic copper per annum. Noranda acquired during 1930 a substantial interest in Canada Wire and Cable Company, Ltd. This latter company is erecting a rod mill and wire drawing plant at Leaside to the Montreal refinery.

Some small shipments of copper-gold ores were made to the Horando smelter from Ontario properties. In the Sudbury district the Treadwell Yukon Company continued mining the copper-lead-zinc ores of the Errington mine and exported a gold-bearing copper concentrate. The new electrolytic copper refinery of the Ontario Refining Company, Ltd., at Copper Cliff, was started successfully in mid-year and later produced approximately 6,000 tons of copper per month. Gold and silver contained in Frood and Garson ores are recovered at this plant and blister copper from both Ontario and British Columbia smelters is treated. Proven ore reserves of the International Nickel Company at the end of 1930 aggregated 206,704,000 tons; during the year additional ore reserves amounting to 2,416,000 tons were established below the 2,000 foot level of the Frood, this ore grades 4.93 per cent copper and 5.33 per cent nickel.

In Manitoba on June 1st, 1930, the first of the three 14,000 h.p. units of the Hudson Bay Mining and Smelting Company's power developments, situated at Island Falls, was put into operation and on June 12th the entire construction load at the Flin Flon mine was taken over by this plant. The first unit of the Flin Flon concentrator was put in operation on August 1st; in the latter part of September the roasters in the zinc plant were started and the entire plant was gradually brought into operation with the first zinc slabs being produced in November; the copper roasters and reverberatory were started near the end of October resulting in a regular production of blister copper in December. At the Sherritt Gordon mines the main working shaft in the west ore zone was sunk a total of 680 feet; the first, second, and third levels driven 550 feet each way from the shaft and the crushing installation completed under the third level; other parts of the mining plant and power system were practically completed and placed in commission during October. Construction on the concentrator progressed and eighty-five per cent of the crushing plant was completed in October.

The principal copper properties operating in British Columbia in 1930 were the Hidden Creek and Bonanza mines at Anyox, the Copper Mountain mine near Princeton and the Britannia mine on Howe Sound. The Hidden Creek-Bonanza sulphide ores went to the Granby Consolidated Mining, Smelting and Power Company's smelter at Anyox, while the concentrates made at Allenby from the Copper Mountain ores were exported to Tacoma for treatment. Operations at Copper Mountain were seriously handicapped by the falling price of copper and the mine was closed down on November 18. The Granby Company attained a very creditable reduction in per-pound cost of copper production in 1930. The ore treated at the Britannia mine exceeded 2,000,000 tons and resulted in the largest output of copper ever made by this company. Nearing the

close of the year, however, the operations were curtailed in accordance with the international policy of reduction in copper production. Considerable development work and diamond drilling were done during the year by the Coast Copper Company, Ltd., and it is stated that present ore reserves justify the construction of an adequate concentrating plant. The mine is prepared to commence production at any time.

Important discoveries of high grade copper ores were reported in 1930 to have been made in areas ad acent to Great Bear Lake and the Copper Mine River in MacKenzie district, North West Territories.

Rhodesian Congo Border Concession Ltd. state in their 1930 report that the tonnage of copper ore indicated in the N'Changa extension mine in Rhodesia is not less than 30,000,000 of an average grade of 6.6 per cent total copper; the Union Miniere du Haut Katanga report a tonnage of 2,603,000 copper ore mined in Katanga during 1930 and a production of 138,949 tons of copper. The greater part of this metal was electrolytically refined in the Oolen plants of the General Metallurgical Society of Hoboken, Belgium. The Company state that the tonnage of copper contained in their known mineral reserves at the end of 1930 is more than 5,000,000 tons.

In 1930 the average New York price for electrolytic copper was 12.982 cents per pound. The Canadian production of copper during the year amounted to 303,478,356 pounds establishing Canada in fourth position among the copper producing countries of the world.

Production of copper by provinces in 1930 was as follows: Quebec, 80,310,363 pounds; Ontario, 127,718,871 pounds; Manitoba, 2,057,609 pounds; British Columbia, 93,315,385 pounds.

Because of interplant relations, companies which mine and smelt their own ore sometimes have difficulty in making a separation of the capital employed at the mine and smelter and find it necessary to report under one or the other heading only.

With these limitations the capital employed in the copper-gold-silver mining industry in Canada in 1930 amounted to $43,644,395. Salaries and wages paid totalled $9,156,759 and employees numbered 5,694. Purchased fuel and electricity cost $1,272,262, the principal item being $998,761 for electricity. Primary power equipment included 1,752 units rated at 83,196 h.p. comprising 1,718 motors operating on purchased power, 12 hydraulic turbines or water wheels, 16 gasoline and oil engines and 6 steam engines. Motors operated by power generated at the mines numbered 146 with a total rating of 5,471 h.p.; 23 boilers were rated at 1,676 h.p.

During the year 5,768,664 tons of ore were raised, 4,926,431 tons were milled and 298,038 tons of copper concentrates, 72,112 tons of zinc concentrates and

24,913 tons of pyritos concentrates produced. Shipments to Canadian smelters consisted of 724,966 tons of copper ore, 172,772 tons of copper concentrates, and 20,800 tons of zinc concentrates; to United States smelters, 391 tons of ore, 137,332 tons of concentrates. In addition 53,453 tons of iron pyrites were shipped. These shipments, comprising 1,109,714 tons had a value of $15,629,564 and contained 168,404 ounces of fine gold, 1,485,449 ounces of fine silver, 183,858,812 pounds of copper, 26,754,200 pounds of zinc, and 27,682 tons of sulphur.

SUMMARY STATISTICS OF ALLUVIAL GOLD MINING IN CANADA, 1929 and 1930.

	British Columbia, Quebec and Yukon	
	1929	1930
Number of firms and individual operators (x)	68	79
Time in operation - months	6-8	6-8
Capital employed $	7,237,850	5,881,620
Number of employees	488	394
Salaries and wages paid $	586,193	612,369
Fuel and electricity used $	2,969	8,272
Electricity generated:-		
(a) for own use K.W.H.	9,040,492	11,696,500
(b) for sale K.W.H.	2,365,008	2,834,200
Value of electricity sold $	23,650	28,342
Crude gold recovered crude ounces	51,045	52,905
Platinum recovered crude ounces	28	17
Value of platinum recovered $	1,699	771
Quantity of material handled cu.yds.	5,836,390	3,783,981
Length of ditches miles	149	226
Total value of alluvial products $	836,006	877,778

(x) In addition to the number shown in the table there were several other small operators from whom no returns were obtainable.

PRINCIPAL STATISTICS OF THE AURIFEROUS QUARTZ MINING INDUSTRY IN CANADA, 1926-1930.

Year	No. of active operators	No. of operating plants or mines	Capital employed	No. of employees	Salaries and wages	Cost of fuel and electricity	Net value of bullion, ore, concentrates, or residues shipped from mines
			$		$	$	$
1926 ...	60	60	103,945,022	7,663	12,340,623	2,083,811	35,171,561
1927 ...	72	76	118,381,468	8,022	12,935,719	2,222,085	37,452,995
1928 ...	98	100	147,693,710	9,066	14,615,990	2,554,657	36,655,330
1929 ...	80	85	135,166,105	8,660	14,258,733	2,579,481	37,275,986
1930 ...	54	56	119,758,057	8,401	14,034,620	2,364,103	39,750,540

ORES MINED AND MILLED, CRUDE BULLION RECOVERED AND CRUDE BULLION AND CONCENTRATES SHIPPED, 1929 and 1930.

	Nova Scotia, Quebec, Manitoba	Ontario	British Columbia	CANADA
1929				
Number of producing mines	6	21	11	38
Ore mined ..... tons	88,057	3,952,027	314,660	4,354,744
Ore milled ..... tons	91,404	3,952,535	209,055	4,252,994
Tailings retreated ..... tons	...	7,290	41,417	48,707
Concentrates produced ..... tons	32	...	17,001	17,033
Bullion recovered by amalgamation - crude ounces	17,633	144,294	295	162,222
Bullion recovered by cyanidation - crude ounces	66,606	1,802,155	24,999	1,893,760
Bullion shipped ..... crude ounces	85,283	1,977,103	25,294	2,087,680
Content of bullion shipped -				
Gold ..... fine ounces	42,779	1,609,544	17,609	1,669,932
Silver ..... fine ounces	3,921	256,256	1,363	261,540
Value ..... $	862,660	33,406,105	325,342	34,594,107
Exchange premium ..... $	767	157,464	3	158,234
Net value of ores, slags and residues sold ..... $	8,796	14,076	2,500,773	2,523,645
Total value of all shipments ..... $	872,323	33,577,645	2,826,118	37,275,986
1930				
Number of producing mines	8	20	9	37
Ore mined ..... tons	115,995	3,972,692	384,116	4,472,803
Ore milled ..... tons	91,838	3,946,590	268,441	4,306,869
Tailings retreated ..... tons	...	85	37,010	37,095
Concentrates produced ..... tons	...	10	19,444	19,454
Bullion recovered by amalgamation - crude ounces	25,877	33,592	1,156	60,625
Bullion recovered by cyanidation - crude ounces	47,817	2,179,302	48,007	2,275,126
Bullion shipped ..... crude ounces	63,304	2,213,302	49,163	2,325,769
Content of bullion shipped -				
Gold ..... fine ounces	40,224	1,711,155	31,177	1,782,556
Silver ..... fine ounces	4,375	293,440	2,593	300,408
Value ..... $	832,557	35,480,663	621,554	36,934,774
Exchange premium ..... $	5	36,702	...	36,707
Net value of ores, slags and residues sold ..... $	8,013	1,723	2,769,323	2,779,059
Total value of all shipments .... $	840,575	35,519,088	3,390,877	39,750,540

PRINCIPAL STATISTICS OF THE COPPER-GOLD-SILVER MINING INDUSTRY IN CANADA, 1926-1930.

Year	No. of active operators	No. of operating plants or mines	Capital employed	No. of employees	Salaries and wages	Cost of fuel and electricity	Net value of ores, concentrates, shipped by mines
			$		$	$	$
1926 ...	76	84	27,936,685	3,403	4,546,493	541,914	9,973,049
1927 ...	118	125	24,232,169	4,083	5,260,095	596,137	9,822,881
1928 ...	164	174	50,004,340	4,777	6,764,309	731,836	15,281,519
1929 ...	144	152	52,546,697	5,243	8,498,755	1,035,133	21,859,907
1930 ...	61	68	45,844,395	5,694	9,156,759	1,272,262	15,629,564

Note:- The large increase in number of mines in 1927 without the corresponding increase in capital employed is due to the increase in development operations carried on in the province of Quebec.

SHIPMENTS FROM COPPER-GOLD-SILVER MINES OF CANADA, 1929 and 1930.

	Quantity	Net value	Total metal content as determined by settlement assay				
			Gold	Silver	Copper	Sulphur	Zinc
			fine oz.	fine oz.	pounds	tons	pounds
1929							
18 mines shipped to Canadian smelters -							
Ores	570,791	6,709,550	67,008	432,951	57,063,264	...	...
Concentrates	117,744	4,275,044	9,914	227,113	35,814,481	...	...
8 mines shipped to foreign smelters -							
Ores	3,352	57,913	192	5,876	333,719	...	...
Concentrates	145,197	10,639,950	20,054	380,834	69,554,222	...	...
Pyrites concentrates	76,581	177,450	...	....	...	38,203	...
TOTAL	913,665	21,859,907	97,168	1,046,774	162,765,686	38,203	...
1930							
13 mines shipped to Canadian smelters -							
Ores	724,966	4,049,084	109,043	437,034	70,487,335	...	1,748,920
Concentrates	193,572	4,633,673	42,453	712,825	47,668,698	...	13,478,000
9 mines shipped to foreign smelters -							
Ores	391	3,513	31	456	26,023	...	...
Concentrates.	137,332	6,798,210	16,877	335,134	65,656,756	...	11,527,280
Pyrites concentrates	53,453	145,084	...	...	...	27,682	...
TOTAL.....	1,109,714	15,629,564	168,404	1,485,449	183,838,812	27,682	26,754,200