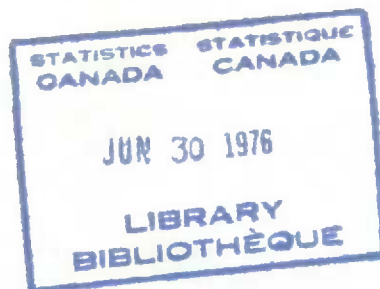


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SILVER-LEAD-ZINC MINES

1964

Part A of this report includes statistics for industry 056—Silver-Lead-Zinc Mines and Part B includes data for industry 055—Silver-Cobalt Mines of the Standard Industrial Classification Manual (Catalogue No. 12-501). For statistical purposes, the former is defined as including establishments primarily engaged in mining silver-lead-zinc ores and in dressing and beneficiating such ores. The latter is defined as including establishments primarily engaged in mining silver-cobalt ores and beneficiating such ores.

Data presented in this report under the heading of Silver-Lead-Zinc Mines (Tables 1-8) and under the heading of Silver-Cobalt Mines (Tables 36-43) reflect the full implementation of the revised Standard Industrial Classification (S.I.C.) and the new establishment concept including an extension of the latter

to cover total activities of mining establishments (see Explanatory Notes section of this report). Commodity statistics reflecting total production from all sources, relevant technological details, etc. are presented along the same general lines as in the earlier issues of this report.

The introduction of the final stage of the establishment concept in the annual Census of Mining resulted in many changes. The effect of these changes on the two industries under review in this report is reflected in the comparative series of statistics shown in the tables for each industry (Tables 1, 2 and 36, 37)—see Explanatory Notes. In addition, the tables reflect a reduction in the number of establishments because of the exclusion of non-producers. These latter are no longer being included as establishments under the new definition.

A. SILVER-LEAD-ZINC MINES

Silver mining is not a distinct mining industry in Canada inasmuch as the silver-bearing minerals usually occur in association with other metals of economic value—with lead and zinc; with copper, nickel and arsenic; with lode and placer free gold; in copper-gold and nickel-copper ores. Silver-lead-zinc mining is a very important industry in British Columbia, Yukon and Northwest Territories. In eastern Canada lead and zinc ores have been mined in

Ontario, Quebec, Nova Scotia, Newfoundland and New Brunswick.

It should be noted that, in addition to its recovery from silver-lead-zinc ores, zinc is produced in large quantities from copper-gold-silver ores mined in New Brunswick, Quebec, Manitoba, Saskatchewan and British Columbia.

SYMBOLS

The following standard symbols are used in Dominion Bureau of Statistics publications:

- .. figures not available.
- ... figures not appropriate or not applicable.
- nil or zero.
- amount too small to be expressed.
- preliminary figures.
- * revised figures.
- x confidential to meet secrecy requirements of the Statistics Act.

TABLE 1. Principal Statistics, Silver-Lead-Zinc Mines, 1957-63
Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Establishments	Employees	Salaries and wages	Cost of fuel and electricity	Cost of materials and supplies	Value of production	Value added ¹
	number		dollars				
1957	83	5,844	26,256,837	2,992,834	11,360,204	115,961,445	59,485,349
1958	67	4,485	20,763,855	2,208,845	9,092,759	98,152,340	46,166,133
1959	52	4,241	19,843,990	1,992,494	6,244,399	101,873,270	53,554,292
1960	47	4,215	21,304,035	2,245,901	8,517,725	111,986,518	61,377,333
1961	68	4,352	22,098,610	2,446,827	6,628,804	111,037,882	61,422,497
1962	59	4,532	23,545,985	2,790,474	7,947,054	111,258,068	59,098,858
1963	61	4,636	24,885,947	3,720,769	8,689,242	125,777,854	70,252,882

¹ Value of Production less the value of fuel, purchased electricity, process supplies, freight and treatment charges.

See footnote Table 2.

TABLE 2. Principal Statistics, Silver-Lead-Zinc Mines,¹ 1961-64
Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Estab- lish- ments	Mining activity							Total activity				
		Production and related workers			Cost of fuel and elec- tricity	Cost of materials and supplies	Value of produc- tion	Value added	Working owners and partners		Employees		Value added
		Number	Man- hours paid	Wages					Number	With- drawals	Number	Salaries and wages	
	No.		'000	\$'000						\$'000		\$'000	
1961	15	3,335	7,059	16,560	2,371	41,720	104,150	60,060	—	—	4,024	20,908	61,791
1962	16	3,437	7,202	17,244	2,703	43,970	104,770	58,096	—	—	4,137	21,849	59,814
1963	19	3,704	8,163	18,909	3,535	48,380	118,964	67,049	x	x	4,510	24,169	69,770
1964	19	4,221	9,286	21,790	4,455	76,701	219,772	138,616	—	—	5,224	28,360	141,255

¹ Refer to Explanatory Notes for description of concepts and definitions and an explanation of differences in Tables 1 and 2. See also text page 3.

TABLE 3. Employment and Payroll, Silver-Lead-Zinc Mines, 1961-63
Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Employees										Salaries and wages				
	Production and related workers				Adminis- trative and office		Sales and distribution		Total		Production and related workers		Adminis- trative and office	Sales and distribution	Total
	Mining		Other												
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Mining	Other			
	number										\$'000				
1961	3,570	48	—	—	681	53	—	—	4,251	101	17,705	—	4,393	—	22,098
1962	3,738	48	—	—	693	53	—	—	4,431	101	18,900	—	4,646	—	23,546
1963	3,761	47	—	—	771	57	—	—	4,532	104	19,494	—	5,392	—	24,886

See footnote Table 2.

TABLE 4. Employment and Payroll, Silver-Lead-Zinc Mines, 1961-64

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Employees										Salaries and wages				
	Production and related workers				Adminis- trative and office		Sales and distribution		Total		Production and related workers		Adminis- trative and office	Sales and distribution	Total
	Mining		Other												
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Mining	Other			
	number										\$'000				
1961	3,288	47	—	—	636	53	—	—	3,924	100	16,560	—	4,348	—	20,908
1962	3,390	47	—	—	651	49	—	—	4,041	96	17,244	—	4,605	—	21,849
1963	3,657	47	—	—	753	53	—	—	4,410	100	18,909	—	5,260	—	24,169
1964	4,173	48	22	—	915	66	—	—	5,110	114	21,790	99	6,472	—	28,360

See footnote Table 2.

TABLE 5. Production and Related Workers, Silver-Lead-Zinc Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year and month	Mine			Mill	
	Surface		Underground	Male	Female
	Male	Female	Male		
1963	number				
January	945	33	2,025	596	10
February	941	33	2,024	582	11
March	944	33	2,028	575	10
April	967	33	2,016	573	9
May	1,031	36	2,009	576	11
June	1,094	39	2,019	579	11
July	1,133	44	2,063	593	12
August	1,091	39	2,074	602	11
September	1,042	37	2,036	585	10
October	1,062	36	2,065	601	10
November	1,037	36	2,034	609	11
December	978	35	2,126	632	10
Averages	1,022	36	2,043	592	11
1964					
January	1,058	35	2,130	692	9
February	996	35	2,109	671	9
March	968	27	1,967	668	9
April	1,058	31	2,100	715	9
May	1,191	37	2,226	768	10
June	1,309	44	2,236	820	9
July	1,336	46	2,239	828	9
August	1,345	47	2,246	859	10
September	1,285	42	2,250	841	9
October	1,242	41	2,345	818	8
November	1,200	42	2,405	823	8
December	1,155	42	2,381	821	9
Averages	1,179	39	2,219	777	9

TABLE 6. Purchased Fuel and Electricity Used, Silver-Lead-Zinc Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description		1963		1964	
		Quantity	Cost \$'000	Quantity	Cost \$'000
Bituminous coal:					
(a) From Canadian mines	ton	12,841	315	11,143	176
(b) Imported	"	2,897	50	960	18
Sub-bituminous coal (from Alberta mines only)	"	10,584	82	11,713	54
Anthracite coal	"	2	—	1	—
Lignite coal	—	—	—	—	—
Coke	—	—	—	—	—
Gasoline (including gasoline used in cars and trucks)	Imp. gal.	305,121	127	349,251	147
Fuel oil including kerosene or coal oil	"	4,810,796	1,144	6,023,817	1,081
Wood	—	—	—	—	—
Gas:					
(a) Liquefied petroleum gases	Imp. gal.	9,316	3	15,628	6
(b) Other manufactured gas	—	—	—	—	—
(c) Natural gas	—	—	—	—	—
Other fuel	—	—	—	—	—
Electricity purchased	kwh.	328,766,658	1,814	489,646,686	2,973
Steam purchased	—	—	—	—	—
Total fuel and electricity used			3,535		4,455
Electricity generated:					
(a) For own use	kwh.	35,810,007	..	21,971,705	..
(b) For sale	"	110,000	..	105,000	..

TABLE 7. Materials and Supplies,¹ Silver-Lead-Zinc Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	Cost	
	1963	1964
	\$'000	
Ore or other semi-processed materials purchased and used in mine/mill operations	—	—
Containers, shipping materials and supplies used	2	4
Operating, maintenance and repair supplies used (excluding fuel)	12,704	16,677
Amount paid out to others for work done on materials owned by establishments:		
To smelters and/or refineries	35,170	58,922
To others (mining, milling, etc.)	503	1,098
Totals	48,380	76,701

¹ Refer to Explanatory Notes, for explanation of differences in Tables 7 and 8 with data published in earlier years.

TABLE 8. Value of Production, Silver-Lead-Zinc Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	Value	
	1963	1964
	\$'000	
Value of production	118,068	218,245
Amount received in payment for work done on materials and products owned by others	895	1,527
Total value of production and work done	118,964	219,772

See footnote Table 7.

TABLE 9. Ores Mined, Milled, and Concentrates Produced, by Silver-Lead-Zinc Mines, 1955-64

Year	Ore mined	Ore milled	Lead concentrates produced	Zinc concentrates produced	Copper-lead concentrates produced	Iron pyrite concentrates produced	Precipitates and other produced
	tons						
1955	7,526,352	7,420,586	266,123	593,144	37,436	59,966	327
1956	7,651,006	7,637,267	239,261	617,189	37,364	267,352	621
1957	6,714,538	6,667,061	242,337	610,246	32,181	240,405	2,606
1958	5,889,872	5,866,977	254,665	582,779	33,686	—	2,648
1959	5,708,625	5,689,218	277,530	547,212	29,654	—	1,687
1960	5,831,613	5,802,525	298,920	520,992	39,483	—	515
1961	5,872,303	5,859,086	257,275	516,463	41,350	—	663
1962	6,234,523	6,227,566	301,902	573,019	52,382	—	438
1963	6,385,357	6,249,603	289,743	583,023	68,135	—	2,545
1964	8,759,797	8,943,614	323,244	1,055,944	97,195	—	343

TABLE 10. Destination of Shipments from Silver-Lead-Zinc Mines, 1963 and 1964

	Tons shipped	Total metal content (without deductions)				
		Gold	Silver	Lead	Zinc	Copper
		troy ounces			pounds	
1963						
To Canadian smelters:						
Lead ore	337	21	14,220	76,480	30,731	—
Lead concentrates	191,197	647	4,498,579	246,946,888	13,129,329	1,109,000
Zinc concentrates ¹	387,220	193	1,122,194	44,057,538	386,394,752	31,200
Miscellaneous ore	1,921	—	—	—	—	—
Copper concentrates	56,986	5,693	545,073	—	—	26,589,565
Silver-lead ore	3,011	37	20,877	660,936	1,234,882	—
Total Canadian	640,672	6,591	6,290,943	291,741,842	400,789,694	27,729,765
To foreign smelters:						
Lead concentrates	147,174	15,130	8,220,367	98,856,423	14,517,989	3,875,361
Zinc concentrates ¹	142,182	1,619	475,338	5,147,832	222,879,308	1,015,090
Tin concentrates	610	—	—	—	1,220,000 ²	—
Copper concentrates	14,551	2,686	416,186	1,128,050	1,129,626	6,662,119
Silver-lead ore	105	634	9,800	6,306	8,818	56
Tailings	—	—	—	—	—	—
Precipitates	40	193	361,588	40,926	—	—
Total foreign	304,662	20,262	9,483,279	105,179,537	238,535,741	11,552,626
Total shipments	945,334	26,853	15,684,222	396,921,379	639,325,435	39,282,391
1964						
To Canadian smelters:						
Lead-zinc ore	17,131	—	—	6,250,600	8,711,800	—
Lead concentrates	153,703	621	3,272,186	197,247,430	10,983,182	914,600
Zinc concentrates ¹	491,881	190	1,073,258	47,076,036	487,882,601	19,800
Copper concentrates	87,024	16,309	1,008,161	—	—	34,093,684
Total Canadian	749,739	17,120	5,353,605	250,574,066	507,577,583	35,028,084
To foreign smelters:						
Lead concentrates	157,301	9,656	8,404,486	144,206,909	13,534,824	7,006,751
Zinc concentrates ¹	538,161	1,493	363,283	7,291,677	570,139,893	1,114,610
Tin concentrates	303	—	—	—	411,956 ²	—
Copper concentrates	9,447	2,297	357,466	1,197,487	1,101,357	5,005,409
Silver-gold concentrates	11	8,703	166,092	—	—	—
Precipitates, bullion	30	114	240,240	34,362	—	—
Total foreign	705,253	22,263	9,531,567	152,730,435	584,776,074	13,146,770
Total shipments	1,454,992	39,383	14,885,172	403,304,501	1,092,353,657	48,174,854

¹ Does not include any zinc concentrates produced from copper-gold-zinc ores in Quebec, Manitoba, Saskatchewan or British Columbia.² Tin content in pounds.

Note: In addition to the metals contained in shipments listed in Table 10, there are considerable quantities of lead and silver contained in ores shipped from certain gold mines in British Columbia. Cadmium, bismuth, antimony, tin and sulphur are also recovered from the silver-lead-zinc ores produced in this industry.

TABLE 11. Drilling Completed on Silver-Lead-Zinc Deposits, 1964

	Footage drilled
Diamond drilling for exploration and testing:	
By mining companies with their own personnel and equipment	72,481
By diamond drilling contractors	410,072
Other diamond drilling:	
Blast hole diamond drilling:	
By mining companies with their own personnel and equipment	452,440
By diamond drilling contractors	184,927
Drilling by percussion or other machines ¹	10,749,954

¹ Not complete as records are unobtainable at certain mines.

TABLE 12. Taxes Paid by Companies Engaged in Silver-Lead-Zinc Operations,¹ 1962-64

Tax paid	1962	1963	1964
	dollars		
Dominion income tax	10,728,843	12,148,708	16,780,735
Provincial tax	5,715,248	6,977,108	8,019,907
Municipal tax	1,296,153	1,394,896	1,745,138

¹ Includes smelting and refining operations and other related corporate activities associated with operations of silver-lead-zinc mines.

TABLE 13. Specified Miscellaneous Expenditures by Companies Engaged in Silver-Lead-Zinc Operations,¹ 1964

	Dollars
(a) Workmen's compensation	1,078,552
(b) Silicosis assessment	241,543
(c) Unemployment insurance	672,237
(d) Aggregate cost of structures, roads, machinery, equipment, etc., built by or purchased from outside contractors or suppliers and chargeable to Fixed Assets Account	15,512,178
(e) Book value of fixed assets (new structures, roads, machinery, equipment, etc., including major repairs and alterations) produced by own employees and chargeable to Fixed Assets Account	1,166,965
(f) Other capital expenditures not reported in (d) and (e)	873,040
(g) Cost of materials and supplies used in the production of machinery and equipment and in the construction of roads and new structures (including major repairs and alterations by own employees and chargeable to Fixed Assets Account)	865,680
(h) Cost of office supplies used during the year, not chargeable to Fixed Assets Account. Excludes cost of stamps and meter expenses	116,150

¹ Includes smelting and refining operations and other related corporate activities associated with Canadian operations of silver-lead-zinc mines not allocable separately elsewhere.

SILVER

Statistics on silver production are computed as follows: (a) recoverable silver in ores, concentrates and matte shipped for export; (b) silver in crude gold bullion produced; (c) silver in blister and anode copper made at Canadian smelters; (d) silver in base bullion made by the Consolidated Mining and Smelting Company of Canada Limited, at Trail, British Columbia, which is the only lead smelter in Canada; (e) silver bullion produced from the treatment of cobalt-silver ores by the cobalt Refinery Ltd., at Cobalt, Ontario.

Silver production in 1964 amounted to 29,902,611 troy ounces valued at \$41,863,655 compared with 29,932,003 troy ounces worth \$41,425,891 in the preceding year.

Ontario produced over 9.9 million troy ounces; Yukon moved up into second place with 5.6 million ounces; British Columbia was in third place with 5.3 million ounces.

TABLE 14. Production of Silver (All Forms) from Canadian Ores, 1955-64

Year	Troy ounces	Value	Year	Troy ounces	Value
		\$			\$
1955	27,984,204	24,676,472	1960	34,016,829	30,244,363
1956	28,431,847	25,497,681	1961	31,381,977	29,580,651
1957	28,823,298	25,182,915	1962	30,422,972	35,442,761
1958	31,163,470	27,053,007	1963	29,932,003	41,425,891
1959	31,923,969	28,022,860	1964	29,902,611	41,863,655

Note: The above and subsequent tables include data on commodities produced by operators, which are classified to other industries. As an example: silver is produced by firms classified as Gold Quartz, Copper-Gold-Silver, Nickel-Copper, Silver-Cobalt, Silver-Lead-Zinc, and Other Metal Mines.

TABLE 15. Production of Silver (All Forms) by Months, 1963 and 1964

Month	1963	1964	Month	1963	1964
	troy ounces			troy ounces	
January	2,289,478	2,522,880	August	2,898,512	2,708,598
February	2,232,734	1,956,365	September	2,304,911	2,590,752
March	2,574,882	2,194,207	October	2,721,581	2,345,269
April	2,392,732	2,342,059	November	2,820,473	2,558,378
May	2,672,495	2,642,951	December	2,399,633	2,959,522
June	2,408,273	2,677,990			
July	2,216,299	2,403,637	Totals	29,932,003	29,902,611

See Note Table 14.

TABLE 16. Refinery Production of Silver (All Sources) 1955-64

Year	Troy ounces	Year	Troy ounces
1955	19,997,617	1960	22,564,397
1956	22,109,419	1961	18,239,803
1957	20,533,053	1962	16,749,356
1958	25,430,204	1963	19,772,408
1959	22,362,533	1964	20,744,682

See Note Table 14.

TABLE 17. Silver Production (Recoverable) according to Nature of Ore, by Provinces, 1961^r and 1964

Province	Crude placer gold	Auriferous quartz ores	Copper-gold-silver ores	Nickel-copper ores	Silver-lead-zinc ores	Silver-cobalt and other ores	Total
	troy ounces						
1961^r							
Newfoundland	—	—	—	—	1,145,105	—	1,145,105
Nova Scotia	—	—	—	—	—	—	—
New Brunswick	—	—	—	—	—	—	—
Quebec	64	125,263	2,806,583	—	1,383,934	—	4,315,844
Ontario	—	404,693	1,545,426	1,785,643	454,104	4,680,536	8,870,402
Manitoba	—	5,382	743,863	18,298	—	—	767,543
Saskatchewan	—	—	876,450	—	—	—	876,450
Alberta	17	—	—	—	—	—	17
British Columbia	431	32,506	154,866	—	8,203,837	—	8,391,640
Yukon	13,556	—	3,332	—	6,920,198	—	6,937,086
Northwest Territories	—	77,890	—	—	—	—	77,890
Canada	14,068	645,734	6,130,520	1,803,941	18,107,178	4,680,536	31,381,977
1964							
Newfoundland	—	—	27,388	—	1,062,360	—	1,089,748
Nova Scotia	—	—	—	—	544,224	—	544,224
New Brunswick	—	—	979,300	—	489,892	—	1,469,192
Quebec	37	95,305	2,903,875 ¹	873	1,564,469	—	4,564,559
Ontario	—	364,977	2,293,635	1,454,404	502,548	—	9,929,858
Manitoba	—	5,168	668,867	53,607	—	—	727,642
Saskatchewan	—	—	593,320	—	—	—	593,320
Alberta	4	—	—	—	—	—	4
British Columbia	232	56,129	324,701	—	4,899,067	—	5,280,129
Yukon	11,548	—	—	—	—	5,627,164	5,638,712
Northwest Territories	—	65,223	—	—	—	—	65,223
Totals	11,821	586,802	7,791,086	1,508,884	14,689,724	5,314,294	29,902,611

¹ Contains a small quantity recovered from gold ores.

TABLE 18. Production of Silver, by Provinces and by Point of Computation, 1963 and 1964

	1963		1964	
	Quantity	Value	Quantity	Value
	troy ounces	\$	troy ounces	\$
Newfoundland:				
In ores and concentrates exported	981,005	1,357,711	1,089,748	1,525,647
Nova Scotia:				
In concentrates	423,189	585,694	544,224	761,914
New Brunswick:				
In ores and concentrates exported	332,472	460,141	1,469,192	2,056,869
Quebec:				
In anode copper	2,680,353	3,709,608	3,186,835	4,461,569
In gold bullion made and in concentrates exported	1,761,291	2,437,627	1,377,724	1,928,814
Totals	4,441,644	6,147,235	4,564,559	6,390,383
Ontario:				
In silver recovered in Canada from cobalt ores	3,148,933	4,358,123	4,028,552	5,639,973
In gold bullion	339,221	469,482	316,421	442,989
In blister copper	3,903,400	5,402,305	3,908,150	5,471,410
In ores, concentrates, residues, matte, etc., exported	2,210,067	3,058,733	1,676,735	2,347,429
Totals	9,601,621	13,288,643	9,929,858	13,901,801
Manitoba:				
In blister copper	497,635	688,727	640,175	896,245
In gold bullion (gold mines) and in ores exported	269,341	372,768	87,467	122,454
Totals	766,976	1,061,495	727,642	1,018,699
Saskatchewan:				
In blister copper	746,683	1,033,409	593,320	830,648
Alberta:				
In alluvial gold	12	17	4	6
British Columbia:				
In alluvial gold	651	901	232	325
In gold bullion	20,001	27,681	17,786	24,900
In base bullion and in ores, etc., exported	6,430,506	8,899,820	5,262,111	7,366,955
Totals	6,451,158	8,928,402	5,280,129	7,392,180
Yukon:				
In alluvial gold	10,936	15,135	11,548	16,167
In silver-lead ores to smelters	6,095,101	8,435,620	5,627,164	7,878,029
Totals	6,106,037	8,450,755	5,638,712	7,894,196
Northwest Territories:				
In gold bullion, placer gold, and exports	81,206	112,389	65,223	91,312
Canada	29,932,003	41,425,891	29,902,611	41,863,655

See Note Table 14.

TABLE 19. Source of Silver Production, by Percentages, 1960-64

Source	1960	1961	1962	1963	1964
In silver-cobalt ores	21.04	14.92	15.47	16.88	17.77
In base bullion ¹	23.58	25.50	19.91	21.32	16.86
In gold ores (bullion and placer)	2.05	2.17	2.15	2.05	1.83
In blister and anode copper ²	23.52	24.38	26.46	26.27	31.45
In matte, copper ores and silver-lead ores, etc., exported (other than silver-cobalt ores)	29.81	33.03	36.01	33.48	32.09
Totals	100.0	100.0	100.0	100.0	100.0

¹ Includes some silver bullion from silver-lead ores.² From copper-gold-silver and nickel copper ores.

See Note Table 14.

TABLE 20. Estimated Consumption of Fine Silver in Canada, for Industrial Purposes, 1962-64

Used for	1962	1963	1964
	troy ounces		
Coinage	10,882,071	13,012,204	13,726,413
Silverware	1,499,891	1,256,044	1,456,945
Photography	1,618,650	1,668,784	384,541
Wire and rod	18,536	13,353	13,354
Silver alloys	275,844	331,350	346,718
Miscellaneous ¹	1,124,350	1,292,893	2,845,430
Totals accounted for	15,419,342	17,574,628	18,775,807

¹ Includes sheet, anodes for electroplating and silver used in manufacture of electrical equipment and jewellery.

TABLE 21. Imports and Exports of Silver and Specified Silver Products, 1963 and 1964

	1963		1964	
	Quantity	Value	Quantity	Value
	troy ounces	\$	troy ounces	\$
Imports:				
Silver, unmanufactured	7,949,829	10,819,587	...	...
Silver, manufactures of, n.o.p. ....	...	717,122	...	...
Tollit articles of which the most important component in value is sterling silver .....	...	13,395	...	...
Precious metals fabricated materials n.e.s. ....	...	..	69,025	151,635
Silver .....	..	..	5,197,764	7,271,478
Silverware and goldware n.e.s. ....	..	..	...	788,525
Totals accounted for .....	..	11,550,104	...	8,211,638
Exports:				
Silver contained in ore, concentrates, etc.	8,286,756	9,643,385	9,478,317	10,759,530
Silver bullion	10,834,629	14,782,600	10,583,439	14,723,511
Silver and goldware n.e.s. ....	...	256,641	...	410,785
Totals accounted for .....	...	24,682,626	...	25,893,826

Source: Trade of Canada, Imports by Commodities, Catalogue No. 65-007 and Exports by Commodities, Catalogue No. 65-004.

TABLE 22. Silver Production of the World
(From the Annual Report of the American Bureau of Metal Statistics)

Country	1960	1961	1962	1963	1964
	line ounces				
North America:					
United States	36,800,000	34,900,000	36,345,000	35,000,000	37,000,000
Canada	34,016,829	31,168,415	30,669,028	29,839,756	29,902,611
Mexico	44,523,435	40,341,466	41,249,399	42,760,484	41,716,259
Totals, North America, as reported	115,342,264	106,409,881	108,263,427	107,600,240	108,618,870
Central America and West Indies	4,155,959	4,539,284	3,806,864	4,857,220	3,655,886
South America:					
Argentina	1,671,838	1,430,675	1,318,150	1,546,160	1,514,300
Bolivia (exports)	4,887,113	3,900,206	3,760,381	4,869,034	4,810,938
Brazil	252,914	231,930	237,915	220,000	200,000
Chile	1,679,062	2,156,718	2,184,271	2,372,305	3,074,993
Colombia	134,333	127,549	131,599	106,278	130,353
Ecuador	126,419	101,192	127,739	121,784	117,126
Peru	30,754,786	33,581,222	32,930,781	36,800,348	36,818,256
Totals, South America, as reported	39,506,465	41,529,492	40,690,836	46,035,909	46,665,966
Europe:					
Austria	58,192	58,192	68,480	68,803	73,947
Finland	390,365	456,144	380,495	579,967	607,906
France	778,030	868,050	690,276	730,111	726,607
Germany, Federal Republic of	1,842,077	1,879,790	1,957,562	2,067,325	1,990,935
Italy	943,956	973,116	929,832	1,006,318	1,073,770
Portugal	52,245	55,000	52,920	48,419	48,775
Spain	1,739,677	4,526,599	5,684,123	4,955,201	4,955,201
Sweden	2,659,448	2,825,246	3,367,777	3,582,200	3,060,751
United Kingdom	7,097	4,744	4,700	—	—
Yugoslavia	3,024,763	3,454,003	3,750,941	3,791,923	4,036,879
Totals, Europe, as reported	11,486,866	15,100,884	16,881,005	18,832,262	16,574,711
Oceania:					
Australia (commonwealth)	15,198,923	14,300,000	17,250,000	19,580,823	18,275,000
Philippines	31,319	37,712	39,955	40,879	50,564
New Guinea ¹	33,037	30,243	24,500	23,696	23,199
New Zealand	1,353	804	416	286	141
Totals, Oceania, as reported	15,264,632	14,368,758	17,313,851	19,631,675	18,358,904
Asia:					
Burma	1,984,263	1,743,302	1,980,038	1,511,001	1,395,183
India	132,718	191,008	126,706	128,314	152,204
Japan	10,419,911	12,159,580	14,753,088	15,213,730	15,966,958
Korea, Republic of	329,641	460,411	412,783	444,002	404,456
Philippines	1,133,343	812,793	675,570	767,249	851,814
Taiwan (Formosa)	54,850	77,301	80,129	61,440	60,633
Totals, Asia, as reported	14,054,726	15,444,395	18,028,314	18,125,736	18,831,248
Africa:					
Algeria	300,000	300,000	300,000	275,000	275,000
Congo, Republic of the	4,305,014	3,457,797	1,189,577	1,097,176	1,480,252
Ghana (exports)	14,160	7,027	3,187	4,827	4,827
Kenya	33,865	37,836	46,307	52,422	47,702
Morocco	1,097,183	907,905	826,338	772,743	604,080
Republic of South Africa	2,226,204	2,288,279	2,549,206	2,736,868	2,916,660
Southern Rhodesia	392,026	106,801	83,500	83,742	88,463
South West Africa	1,004,920	1,833,437	1,253,200	634,134	328,808
Tanganyika (exports)	614,279	64,144	23,959	22,669	25,329
Tunisia	34,401	69,766	24,325	9,131	12,635
Zambia ²	698,127	744,084	697,054	111,079	1,001,262
Totals, Africa, as reported	10,720,179	9,817,076	6,996,653	5,799,791	6,785,018
Russia³	25,000,000	25,000,000	27,000,000	27,000,000	27,000,000
World totals, as reported	235,540,080	232,209,770	238,986,954	245,900,838	246,490,663
Estimated world totals⁴	241,300,000	237,000,000	243,600,000	250,800,000	249,500,000

¹ Year ended May 31, of year following that stated.

² Recovered from an accumulation of refinery slimes.

³ Conjectural.

⁴ Other silver producing countries, not listed in this table, are included in the estimate for the total.

LEAD

Lead production is calculated as the lead in base bullion made from Canadian ores at the smelter of Consolidated Mining & Smelting Co. of Canada Ltd., at Trail, British Columbia, plus the recoverable lead content in ores and concentrates exported. The value is computed on the basis of the average price, in Canadian dollars, for refined lead.

The silver-lead-zinc mines of British Columbia produce the major portion of the nation's lead. Some of the lead-silver ores from the Yukon territory were smelted at Trail in British Columbia and part were exported to foreign smelters. In eastern Canada

most of the lead concentrates were shipped to foreign smelters for treatment. High grade lead-zinc ores were shipped from Pine Point, Northwest Territories to smelters in British Columbia and the United States.

Production of lead, in all forms, during 1964 amounted to 203,717 short tons valued at \$54,759,110 compared with 201,165 tons valued at \$44,256,199 in the preceding year.

Refined lead output, which included some lead recovered from imported ores, amounted to 151,372 tons in 1964 compared with 155,000 tons in 1963.

TABLE 23. Production¹ of Lead (All Forms) from Canadian Ores, 1955-64

Year	Tons	Value	Average price per pound (Canadian funds)	Year	Tons	Value	Average price per pound (Canadian funds)
		\$	¢			\$	¢
1955	202,762	58,314,500	14.38	1960	205,650	43,926,888	10.68
1956	188,854	58,582,651	15.51	1961	230,435	47,054,765	10.21
1957	181,484	50,670,407	13.96	1962	215,329	42,721,341	9.92
1958	186,680	42,413,805	11.36	1963	201,165	44,256,199	11.00
1959	186,696	39,616,835	10.61	1964	203,717	54,759,110	13.44

¹ Primary lead in base bullion produced, plus recoverable lead in ores exported.

See Note Table 14.

TABLE 24. Production of Lead, by Months, 1963 and 1964

Month	Lead (all forms)		Refined lead ¹	
	1963	1964	1963	1964
	short tons			
January	15,919	18,247	15,740	12,367
February	15,225	14,833	12,991	11,763
March	17,880	14,779	13,367	13,470
April	17,483	15,355	13,533	14,614
May	18,320	13,654	14,929	14,001
June	17,445	16,777	13,391	14,450
July	15,015	13,249	7,907	4,985
August	18,771	19,965	13,476	12,997
September	15,445	19,028	12,772	13,863
October	17,686	17,581	13,635	13,596
November	17,948	20,892	12,262	11,794
December	14,028	19,357	10,997	13,472
Totals.....	201,165	203,717	155,000	151,372

¹ Includes lead refined from foreign ores.

See Note Table 14.

TABLE 25. Production of Lead (All Forms)¹ by Provinces 1963-64

Province	1963		1964	
	Pounds	Value	Pounds	Value
		\$		\$
Newfoundland.....	46,784,221	5,146,264	50,829,256	6,831,452
Nova Scotia.....	2,800,480	308,053	3,337,628	448,577
New Brunswick.....	3,566,150	392,277	43,431,670	5,837,216
Quebec.....	8,673,195	954,051	7,908,961	1,062,964
Ontario.....	3,077,814	338,560	4,054,865	544,974
Manitoba.....	5,474,570	602,203	2,589,971	348,092
British Columbia.....	314,974,034	34,647,144	268,737,504	36,118,321
Yukon.....	16,978,607	1,867,647	20,418,415	2,744,235
Northwest Territories.....	—	—	6,125,588	823,279
Totals.....	402,329,071	44,256,199	407,433,858	54,759,110

¹ Primary lead in base bullion produced, plus recoverable lead in ores exported.

See Note Table 14.

TABLE 26. Imports and Exports of Lead and Specified Lead Products, 1963-64

	1963		1964	
	Short tons	Value	Short tons	Value
		\$		\$
Imports:				
Lead in pig and block and shot.....	1,741	289,734	73	26,462
Lead, old and scrap.....	55	7,936	..	..
Lead acetate (not ground).....	41	13,776	..	..
Lead nitrate (not ground).....	69	14,949	..	..
Lead manufactures n.o.p.....	..	297,089	..	..
Lead tetraethyl, compounds of.....	..	..	..	..
Lead capsules for bottles.....	..	87,632	..	..
Lead pigments:				
Litharge.....	1,084	292,386	..	..
Dry white lead.....	13	5,031	..	..
Dry red lead and orange mineral.....	159	39,086	..	..
Pigments, colour lakes, and toners n.e.s.....	..	..	1,795	1,896,276
Lead oxide, red lead and orange mineral.....	..	..	1,520	469,890
Lead arsenate, formulated.....	..	..	702	450,220
Lead, fabricated materials n.e.s.....	97	33,116	347	280,018
Exports:				
Lead, scrap.....	3,989	479,319	5,278	1,078,535
Lead, contained in ore.....	53,756	7,206,741	80,357	14,262,739
Lead pigs, blocks, shot.....	97,144	15,546,270	95,867	21,858,039
White lead.....	..	..	..	..
Lead manufactures, n.o.p.....	..	..	..	..
Lead pipe.....	..	..	..	..
Lead fabricated materials, n.e.s.....	854	251,951	1,869	637,495

Source: Trade of Canada, Imports by Commodities, Catalogue No. 65-007 and Exports by Commodities, Catalogue No. 65-004.

TABLE 27. Consumption of Refined Lead by Principal End-uses, 1963-64

Used for or in the production of	1963		1964	
	Primary lead	Secondary lead ¹	Primary lead	Secondary lead ¹
	short tons			
Antimonial lead.....	1,488	16,561	867	16,941
Batteries and battery oxides.....	15,961	619	17,094	811
Cable covering.....	4,612	1,470	4,559	1,582
Chemical uses, n.e.s. (white lead, red lead, litharge, tetraethyl lead, etc.).....	15,106	2,557	16,251	1,958
Copper alloys (brass, bronze, etc.).....	227	123	419	137
Lead alloys:				
Solders.....	1,574	2,717	1,717	2,540
Other (including babbitts, type metal, etc.).....	604	1,827	198	2,070
Semi-finished products (pipe, sheets, traps, bends, block for caulking, ammunition, foil and collapsible tubes, etc.).....	6,276	3,695	9,485	3,790
Other.....	924	1,617	1,051	1,266
Totals accounted for.....	46,772	31,186	51,641	31,095

¹ Includes all remelt scrap lead and scrap lead used to make antimonial lead.

TABLE 28. World Production of Lead on Mine Basis, 1960-64

(From the Annual Report of the American Bureau of Metal Statistics)

Country	1960	1961	1962	1963	1964
	short tons				
United States ¹	246,669	261,921	236,956	253,369	286,010
Canada ^{1,2}	205,650	230,435	211,270	202,398	200,793
Greenland	7,635	10,104	891	—	—
Guatemala	5,918	12,972	1,067	825	30
Mexico	210,176	199,876	213,072	209,423	192,708
Totals, North America	676,048	715,308	663,256	666,015	679,541
Argentina	26,000	29,700	31,700	28,990	26,455
Bolivia ³	23,610	22,378	20,504	22,226	19,491
Brazil	10,800	10,800	10,600	10,600	16,500
Chile	2,694	2,252	1,603	1,704	1,230
Peru	145,096	150,352	141,288	162,266	162,308
Totals, South America	208,200	215,482	205,695	225,156	225,984
Austria	5,758	6,592	5,855	5,504	5,726
Finland	1,755	3,439	3,161	1,262	2,084
France	19,107	20,062	15,102	8,818	13,007
Germany, Federal Republic of	54,998	54,630	55,264	57,150	53,943
Greece	19,707	14,550	14,187	14,550	9,899
Ireland	1,480	279	—	—	—
Italy ¹	52,144	49,219	43,206	34,440	34,787
Norway	2,780	2,524	3,153	3,297	3,945
Spain ¹	77,583	83,777	74,309	68,556	64,356
Sweden	58,753	68,453	74,726	77,051	71,871
United Kingdom ¹	1,549	1,655	447	276	198
Yugoslavia	100,553	106,571	112,429	111,969	111,880
Totals, Europe	396,167	411,751	401,839	382,873	371,806
Burma ⁴	19,820	17,905	19,669	20,190	18,558
India ⁴	4,130	4,039	3,140	3,899	3,995
Japan	43,576	51,014	58,923	58,110	59,770
Korea, Republic of	1,012	1,014	1,554	2,113	3,691
Philippines	134	111	90	78	114
Totals, Asia	68,672	74,083	83,376	84,390	85,918
Algeria	11,529	10,031	9,957	8,840	10,224
Congo, Republic of	4,741	3,628	965	364	300
Morocco	104,263	97,299	99,501	81,539	77,635
South West Africa ¹	68,973	77,683	83,081	83,220	104,045
Tunisia	19,753	18,554	15,806	13,400	14,799
Zambia ⁴	16,160	16,953	16,848	20,863	14,691
Totals, Africa	225,419	224,148	226,158	208,226	221,694
Australia ¹	325,034	281,389	394,203	437,709	412,057
Russia ^{5,6}	385,800	413,400	438,000	440,900	452,000
Bulgaria ⁵	92,600	88,000	90,000	98,000	100,600
Czechoslovakia ⁵	7,200	7,200	7,200	10,000	14,000
Germany East ⁵	7,700	7,700	7,700	8,300	10,000
Poland ^{5,6}	43,800	43,900	41,800	42,600	42,300
Rumania ^{5,6}	13,500	13,500	13,500	13,800	14,000
China ⁷	75,000	80,000	80,000	80,000	90,000
Korea, North ¹	25,000	27,500	27,500	30,000	40,000
Totals, Soviet Sphere	650,600	681,200	705,700	723,600	762,900
World totals, as reported⁷	2,550,140	2,603,361	2,680,227	2,727,969	2,759,900

¹ Calculated as recoverable.² Base bullion from domestic ores, plus recoverable content of ores exported.³ Exports.⁴ Same as pig lead production.⁵ Conjectural.⁶ Smelter production.⁷ In addition there is production in Honduras, Colombia, Ecuador, Iraq, Thailand, Turkey, Republic of South Africa and United Arab Republic; the total of all these countries is estimated to be about 42,000 tons in 1964.

ZINC

Zinc production is calculated as the refined zinc recovered from domestic ores at Canadian smelters, plus the recoverable zinc in ores and concentrates shipped for export. The quantity arrived at in this way is valued at the average price, in Canadian dollars, for Grade A electrolytic zinc.

New zinc in all forms produced in 1964 amounted to 684,513 short tons valued at \$193,990,897 compared with 473,722 tons valued at \$121,083,466 in 1963. Refined zinc output, including zinc refined from foreign ores, amounted to 337,734 tons in 1964 and 280,159 tons in 1962.

TABLE 29. Production¹ of Zinc from All Types of Canadian Ores, 1955-64

Year	Short tons	Value	Average price per pound (Canadian funds)	Year	Short tons	Value	Average price per pound (Canadian funds)
		\$	¢			\$	¢
1955	433,357	118,306,466	13.65	1960	406,873	108,635,003	13.35
1956	422,632	125,437,344	14.84	1961	416,004	104,749,879	12.59
1957	413,741	100,042,533	12.09	1962	463,145	112,080,981	12.10
1958	425,099	92,501,496	10.88	1963	473,722	121,083,466	12.78
1959	396,008	96,942,663	12.24	1964	684,513	193,990,897	14.17

¹ Refined zinc made in Canada, plus recoverable zinc in ores, etc., exported.

TABLE 30. Production of Zinc, by Months, 1963 and 1964

Month	Primary zinc in all forms		Refined zinc ¹	
	1963	1964	1963	1964
	short tons			
January	36,450	52,305	23,999	27,935
February	33,945	46,425	21,673	25,626
March	37,958	48,448	25,013	27,411
April	37,528	53,204	24,368	27,197
May	41,493	54,829	24,575	29,070
June	41,326	60,549	22,703	28,284
July	45,433	56,565	22,885	26,039
August	36,651	58,307	21,887	26,936
September	39,128	60,334	21,186	25,296
October	40,036	68,924	24,513	32,125
November	43,848	62,590	25,778	30,668
December	39,926	62,033	25,440	31,147
Totals	473,722	684,513	284,020	337,734

¹ Includes zinc refined from foreign ores.

TABLE 31. Production of Zinc (All Forms),¹ by Provinces, 1963-64

Province	1963		1964	
	Pounds	Value	Pounds	Value
		\$		\$
Newfoundland	68,970,834	8,814,473	77,963,350	11,047,407
Nova Scotia	—	—	1,189,458	168,546
New Brunswick	21,228,005	2,712,939	108,743,309	15,408,927
Quebec	150,168,758	19,191,567	473,080,673	67,035,531
Ontario	132,939,970	16,989,728	144,152,666	20,426,433
Manitoba	92,784,466	11,857,855	85,289,404	12,085,508
Saskatchewan	66,639,117	8,516,479	56,874,692	8,059,144
British Columbia	402,863,104	51,485,905	400,796,562	56,792,873
Yukon	11,850,706	1,514,520	13,094,653	1,855,512
Northwest Territories	—	—	7,840,620	1,111,016
Totals	947,444,960	121,083,466	1,369,025,387	193,990,897

¹ Refined zinc, plus recoverable zinc in ores etc., exported.

See Note Table 14.

TABLE 32. Imports and Exports of Zinc, and Specified Zinc Products 1963 and 1964

	1963		1964	
	Short tons	Value	Short tons	Value
		\$		\$
Imports:				
Zinc dust and granules	1,171	353,148	1,845	606,641
Zinc in blocks, pigs, slabs, anodes	639	167,347	22	8,400
Zinc in bars, rods, plates, sheets, strip	788	465,688	832	530,605
Zinc slugs, discs, and shells .....	...	138,547	482	192,701
Zinc white (zinc oxide)	2,232	458,191	..	..
Zinc sulphate	1,682	178,216	..	..
Zinc chloride	207	43,936	..	..
Zinc, fabricated materials n.e.s. ....	...	3,798,285	1,318	1,142,177
Lithopone .....	...	...	..	..
Zinc dross and zinc scrap	234	17,956	..	..
Exports:				
Zinc, fabricated materials, n.e.s.	1,318	611,691	1,868	619,039
Zinc contained in ore concentrates	213,044	18,194,079	403,101	53,687,566
Zinc, scrap, dross and ashes	5,722	610,622	..	..
Zinc, blocks, pigs, slabs	200,002	41,664,512	238,075	61,725,638
Zinc oxide .....	...	...	403,102	53,687,566

Source: Trade of Canada "Imports by Commodities", Catalogue No. 65-007 and "Exports by Commodities", Catalogue No. 65-004.

TABLE 33. Consumption of Refined Zinc, by End-uses, 1963-64

Used for or in the production of	1963		1964	
	Primary zinc	Secondary zinc	Primary zinc	Secondary zinc
	short tons			
Copper alloys (brass, bronze, etc.)	7,296	95	10,166	101
Galvanizing:				
Electro	770	43	830	74
Hot dip	37,070	326	43,283	326
Zinc diecast alloy	14,919	—	17,966	—
Other (including rolled and ribbon zinc, zinc oxide, etc.)	13,598	1,474	16,249	2,030
Totals accounted for	73,653	1,938	88,494	2,558

TABLE 34. World Production of Zinc Ore, by Countries, 1960-64
 (From the Annual Report of the American Bureau of Metal Statistics)
 in tons of 2,000 pounds of zinc content, either by assay or estimated as recoverable

Country	1960	1961	1962	1963	1964
United States ^{1,2}	435,427	464,390	505,491	529,254	574,858
Canada ^{1,3}	430,049	443,099	501,937	497,180	729,939
Greenland	11,155	7,498	2,402	—	—
Guatemala	11,070	8,746	899	1,289	—
Mexico ⁴	299,192	296,489	276,328	264,351	259,705
Totals, North America	1,186,893	1,220,222	1,287,057	1,292,074	1,564,502
Argentina ⁵	31,500	33,300	36,400	31,600	24,300
Bolivia ⁶	4,439	5,878	4,020	5,122	10,756
Peru ¹	196,344	191,656	178,837	216,390	254,631
Totals, South America	232,283	230,834	219,257	253,112	289,687
Austria ⁷	7,250	6,651	7,264	7,816	8,004
Finland	46,327	51,175	57,508	73,144	69,434
France ⁸	19,073	17,196	17,747	18,739	18,849
Germany, Federal Republic ⁷	95,158	96,188	95,633	102,958	105,636
Greece ¹	15,621	19,342	18,939	20,062	14,135
Ireland	1,377	184	...	...	...
Italy ¹	122,264	134,642	124,532	101,312	106,143
Norway ¹	11,394	10,284	13,058	14,383	13,771
Spain ¹	83,866	97,964	83,417	101,117	97,508
Sweden ¹	77,492	82,893	69,856	89,728	78,925
Yugoslavia	62,150	66,008	67,366	67,534	72,830
Totals, Europe	541,972	582,527	555,320	596,793	585,235
Burma	11,128	7,865	9,036	8,865	8,438
India	5,880	5,637	6,073	6,613	6,520
Japan ⁹	172,768	185,472	212,172	218,207	238,599
Philippines	5,487	3,652	4,916	4,291	2,355
Totals, Asia	195,263	202,626	232,197	237,976	255,912
Algeria ¹	44,240	48,171	45,913	40,000	38,933
Congo, Republic of the	120,217	109,828	105,530	114,139	115,352
Morocco, Southern zone ¹	54,199	44,951	37,941	38,902	47,950
South West Africa ¹	13,119	14,906	25,201	36,715	35,312
Tunisia ¹	4,212	3,709	4,709	4,806	3,575
Zambia ¹	44,317	45,073	45,658	54,461	51,487
Totals, Africa	280,304	266,638	264,952	289,023	292,609
Australia ¹	273,043	271,135	287,344	298,400	294,919
Free world totals, as reported	2,709,758	2,773,982	2,846,127	2,967,378	3,282,884
Russia ¹⁰	441,000	446,400	451,900	463,000	480,000
Germany, East	7,700	7,700	7,700	7,700	8,000
Poland	158,800	153,800	160,000	162,100	166,200
Bulgaria	64,700	61,300	65,000	81,500	70,800
China	88,000	90,000	90,000	90,000	95,000
Korea, North	83,000	83,000	83,000	83,000	88,000
Totals, Soviet Sphere, as reported¹¹	843,200	842,200	857,600	887,300	908,000
World totals, as reported¹²	3,552,958	3,616,182	3,703,727	3,854,678	4,190,884

¹ Calculated as recoverable.

² U.S. Bureau of Mines.

³ Dominion Bureau of Statistics.

⁴ Metal content by assay of ore and concentrates exported in that form plus smelter production.

⁵ Calculated as zinc content by assay.

⁶ Exports.

⁷ In addition, production from pyrites, estimated in recent years to be about 22,000 tons.

⁸ Smelter production.

⁹ In addition, there is production in East Germany, and other Eastern Europe; the total of all these countries is estimated to be about 8,000 tons in 1963.

¹⁰ In addition there is production in Honduras, Chile, Columbia, Iran, Republic of Korea, Thailand and Turkey; the total of all these countries is estimated to be about 8,000 tons in 1963.

¹¹ In addition there is production in Honduras, Chile, Columbia, Iran, Republic of Korea, Thailand and Turkey; the total of all these countries is estimated to be about 8,000 tons in 1963.

CADMIUM

Cadmium is recovered from the silver-lead-zinc ores treated by the smelter of the Consolidated Mining and Smelting Company of Canada Limited, Trail, British Columbia, and from the copper-gold-zinc ores processed at the smelter of the Hudson Bay Mining and Smelting Company Limited, Flin

Flon, Manitoba. Production in 1964 was 2,772,984 pounds compared with 2,475,485 pounds in the preceding year. These figures include recoverable cadmium in exported concentrates, but do not include cadmium recovered in Canada from foreign ores.

TABLE 35. Production of Cadmium (Recoverable), from Canadian Ores, 1955-64

Year	From copper-gold- silver-zinc ores	From silver-lead- zinc ores	Total	
			Quantity	Value
		pounds		\$
1955	191,691	1,727,390	1,919,081	3,262,439
1956	208,327	2,131,094	2,339,421	3,977,016
1957	286,044	2,082,086	2,368,130	4,025,821
1958	355,602	1,400,448	1,756,050	2,669,195
1959	334,029	1,826,334	2,160,363	2,765,265
1960	466,200	1,891,297	2,357,497	3,347,646
1961	307,757	1,914,193	2,221,950	3,555,128
1962	405,317 ¹	2,199,656 ²	2,604,973	4,730,957
1963	389,185	2,086,300	2,475,485	5,941,166
1964	673,317	2,099,667	2,772,984	8,984,487

See Note Table 14.

TABLE 36. Production, Exports and Domestic Consumption of Cadmium Metal, 1955-64

Year	Production ¹	To domestic consumers ²	Exports ³
		tons (2,000 pounds)	
1955	857	174	694
1956	966	144	827
1957	1,009	117	844
1958	817	172	607
1959	1,264	496	828
1960	1,119	368	680
1961	1,117	747	327
1962	1,218	282	962
1963	1,177	230	915
1964	610	194	706

¹ Includes cadmium recovered from foreign ores.

² Producers' shipments to domestic consumers.

³ Producers' shipments for export.

See Note Table 14.

B. SILVER-COBALT MINES

The silver-cobalt mining industry is centered in the Temiskaming district in Ontario. Mining started in the Cobalt area early in this century

when the silver discovery was made during the construction of a railway.

TABLE 37. Principal Statistics, Silver-Cobalt Mines, 1957-63

Basis: Revised Standard Industrial Classification

Year	Establishments	Employees	Salaries and wages	Cost of fuel and electricity at plant	Cost of materials and supplies	Value of production	Value added ¹
	number						
1957	12	598	2,209,805	256,694	353,026	4,314,088	3,105,688
1958	12	570	2,115,670	241,027	320,403	4,792,545	3,633,390
1959	11	486	1,647,687	185,883	229,554	5,006,541	4,118,972
1960	7	520	2,077,281	253,243	297,067	5,643,143	4,526,714
1961	20	560	2,216,805	295,788	375,186	4,515,717	3,424,158
1962	21	611	2,517,012	305,341	292,566	6,107,978	5,011,493
1963	21	705	3,003,602	345,897	412,612	6,956,626	5,591,773

¹ Value of production less the value of fuel, electricity, process supplies, freight and treatment charges.

TABLE 38. Principal Statistics, Silver-Cobalt Mines,¹ 1961-64

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Establishments	Mining activity							Total activity				
		Production and related workers			Cost of fuel and electricity	Cost of materials and supplies	Value of production	Value added	Working owners and partners		Employees		Value added
		Number	Man-hours paid	Wages					Number	Withdrawals	Number	Salaries and wages	
	No.		'000			'000				'000		'000	
1961	6	423	906	1,643	275	1,071	4,588	3,243	—	—	500	2,063	3,314
1962	8	452	969	1,797	266	1,484	5,953	4,203	—	—	532	2,185	4,269
1963	11	545	1,234	2,223	322	1,754	7,493	5,418	—	—	653	2,803	5,476
1964	15	559	1,211	2,281	414	2,271	8,216	5,532	—	—	674	2,961	5,594

¹ Refer to Explanatory Notes for description of concepts and definitions and an explanation of differences in Tables 37 and 38. See also text page 5.

TABLE 39. Employment and Payroll, Silver-Cobalt Mines, 1961-63

Basis: Revised Standard Industrial Classification

Year	Employees										Salaries and wages				
	Production and related workers				Adminis- trative and office		Sales and distribution		Total		Production and related workers		Adminis- trative and office	Sales and distrib- ution	Total
	Mining		Other												
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Mining	Other			
number										\$'000					
1961	475	6	—	—	76	3	—	—	551	9	1,810	—	407	—	2,217
1962	515	5	—	—	85	6	—	—	600	11	2,119	—	398	—	2,517
1963	579	6	—	—	107	13	—	—	686	19	2,360	—	643	—	3,003

See footnote Table 38.

TABLE 40. Employment and Payroll, Silver-Cobalt Mines, 1961-64

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year	Employees										Salaries and wages				
	Production and related workers				Adminis- trative and office		Sales and distribution		Total		Production and related workers		Adminis- trative and office	Sales and distribution	Total
	Mining		Other												
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Mining	Other			
number										\$'000					
1961	417	6	—	—	73	4	—	—	490	10	1,643	—	420	—	2,063
1962	447	5	—	—	75	5	—	—	522	10	1,797	—	388	—	2,185
1963	542	3	—	—	102	6	—	—	644	9	2,223	—	580	—	2,803
1964	555	4	—	—	109	6	—	—	664	10	2,282	—	679	—	2,961

See footnote Table 38.

TABLE 41. Production and Related Workers, Silver-Cobalt Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Year and month	Mine			Mill	
	Surface		Underground	Male	Female
	Male	Female	Male		
	number				
1963					
January	70	3	366	74	—
February	77	3	393	73	—
March	77	3	406	74	—
April	77	3	400	76	—
May	81	3	431	83	—
June	83	3	398	86	—
July	84	3	376	89	—
August	83	3	403	93	—
September	82	3	376	91	—
October	80	3	372	91	—
November	63	3	347	75	—
December	55	3	346	73	—
Averages	76	3	384	82	—
1964					
January	91	4	392	68	—
February	97	4	396	67	—
March	98	4	393	69	—
April	94	3	379	71	—
May	98	3	375	76	—
June	113	3	376	80	—
July	102	5	385	87	—
August	106	5	371	85	—
September	99	4	364	85	—
October	103	5	353	84	—
November	102	5	375	76	—
December	102	5	375	68	—
Averages	100	4	378	76	—

TABLE 42. Purchased Fuel and Electricity Used, Silver-Cobalt Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	1963		1964	
	Quantity	Cost	Quantity	Cost
		\$'000		\$'000
Bituminous coal:				
(a) From Canadian mines	ton 2	--	205	5
(b) Imported	" 512	12	473	11
Sub-bituminous coal (from Alberta mines only)	" --	--	--	--
Anthracite coal	" 169	4	21	1
Lignite coal	" --	--	--	--
Coke	" --	--	--	--
Gasoline (including gasoline used in cars and trucks)	Imp. gal. 29,885	13	53,745	24
Fuel oil including kerosene or coal oil	" 202,600	39	465,006	96
Wood	cord --	--	20	--
Gas:				
(a) Liquefied petroleum gases	Imp. gal. 8,344	2	12,856	4
(b) Other manufactured gas	M cu. ft. --	--	--	--
(c) Natural gas	" --	--	--	--
Other fuel	" --	64	--	59
Electricity purchased	kwh. 23,518,466	188	26,000,478	213
Steam purchased	--	--	--	--
Total fuel and electricity used .....	...	322	...	414
Electricity generated:				
(a) For own use	--	...	--	...
(b) For sale	--	...	--	...

TABLE 43. Materials and Supplies, Silver-Cobalt Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	Cost	
	1963	1964
	\$'000	
Ore or other semi-processed materials purchased and used in mine/mill operations	--	--
Containers, shipping materials and supplies used	--	--
Operating maintenance and repair supplies used (excluding fuel)	1,031	1,280
Amount paid out to others for work done on materials owned by establishments:		
To smelters and/or refineries	445	601
To others (mining milling etc.)	278	390
Totals	1,754	2,271

¹ Refer to Explanatory Notes for explanation of differences in Tables 43 and 44 with data published in earlier years.

TABLE 44. Value of Production, Silver-Cobalt Mines, 1963 and 1964

Basis: Revised Standard Industrial Classification and New Establishment Concept

Description	Value	
	1963	1964
	\$'000	
Value of production	7,421	8,012
Amount received in payment for work done on materials and products owned by others	72	204
Total value of production and work done	7,493	8,216

See footnote Table 43.

TABLE 45. Summary¹ of Operations of Silver-Cobalt Mines and Mills, 1962-64

	1962	1963	1964
	short tons		
Ore mined	230,412	307,095	263,964
Ore salvaged from surface ²	4,209	—	—
Ore and tailings treated (milled)	233,242	292,585	305,222
Concentrates produced	5,737	6,800	5,903

¹ Partly estimated as data are unobtainable from some small shippers.² Complete data not available.

TABLE 46. Mines and Mill Shipments of Canadian Silver-Cobalt Ores and Concentrates, 1963 and 1964

	Gross weight	Metal content			
		Silver	Cobalt	Nickel	Copper
	short tons	ounces	pounds		
1963					
To Canadian smelters	6,122	3,215,110	241,554	34,585	230,545
To foreign plants	739	1,996,764	79,485	19,315	7,840
Totals	6,861	5,211,874	321,039	53,900	238,385
1964					
To Canadian smelters	12,983	4,719,707	351,930	79,344	236,599
To foreign plants	493	1,183,841	13,517	3,932	835
Totals	13,476	5,903,548	365,447	83,276	237,434

TABLE 47. Specified Miscellaneous Expenditures by Companies Engaged in Silver-Cobalt Operations,¹ 1964

	Dollars
(a) Workmen's compensation	67,940
(b) Silicosis assessment	5,928
(c) Unemployment insurance	25,870
(d) Aggregate cost of structures, roads, machinery, equipment, etc., built by or purchased from outside contractors or suppliers and chargeable to Fixed Assets Account	212,753
(e) Book value of fixed assets (new structures, roads, machinery, equipment, etc., including major repairs and alterations) produced by own employees and chargeable to Fixed Assets Account	89,008
(f) Other capital expenditures not reported in (d) and (e)	68,936
(g) Cost of materials and supplies used in the production of machinery and equipment and in the construction of roads and new structures (including major repairs and alterations by own employees and chargeable to Fixed Assets Account)	49,867
(h) Cost of office supplies used during the year, not chargeable to Fixed Assets Account. Excludes cost of stamps and meter expenses	21,712

¹ Includes related corporate activities associated with silver-cobalt mines not allocable elsewhere.

COBALT

A large portion of the cobalt output is produced at Port Colborne, Ontario, by the International Nickel Company of Canada, as electrolytic cobalt and cobalt oxide. This cobalt originates in the nickel-copper ores of the Sudbury area. The cobalt in the ores of the Falconbridge Nickel Mines Ltd. is contained in the nickel-copper matte which that firm ships to Norway. This matte also contains cobalt which originated in Quebec mines.

At Thompson, Manitoba the International Nickel Company recovers cobalt from its nickel-copper ores. The nickel-copper concentrates from Lynn Lake, Manitoba are shipped to the refinery of Sherritt-Gordan Mines Ltd, at Fort Saskatchewan, Alberta.

Some of the silver-cobalt ores from the Cobalt and Gowganda areas are processed at Cobalt Refinery Ltd., Cobalt, Ontario.

Arsenic

Data on arsenious oxide formerly included in this bulletin are now given in the report on the Miscellaneous Non-metal mining Industry.

TABLE 48. Production of Cobalt from Canadian Ores, 1955-64

Year	Quantity	Value	Year	Quantity	Value
	pounds	\$		pounds	\$
1955	3,318,637	8,563,700	1960	3,568,811	6,763,016
1956	3,516,670	9,065,493	1961	3,182,897	4,751,543
1957	3,922,649	7,784,423	1962	3,481,922	6,345,205
1958	2,710,429	5,308,298	1963	3,024,965	6,122,169
1959	3,150,027	5,954,916	1964	3,184,983	5,990,973

TABLE 49. Imports and Exports of Cobalt, 1963-64

	1963		1964	
	Quantity	Value	Quantity	Value
	pounds	\$	pounds	\$
Imports:				
Cobalt ore	—	—	—	—
Oxide of cobalt	28,291	34,747	..	..
Exports:				
Cobalt contained in ore	739,227	1,214,975	593,607	1,071,497
Cobalt metallic	1,098,300	1,508,328	1,654,900	2,190,826
Cobalt alloys				
Cobalt oxides and hydroxides				

Source: Trade of Canada, Imports by Commodities, Catalogue No. 65-007 and Exports by Commodities, Catalogue No. 65-004.

TABLE 50. World Production of Cobalt

(From the Annual Report of the American Bureau of Metal Statistics)

Country	1960	1961	1962	1963	1964
	pounds				
Canada ¹	3,568,811	3,236,323	3,481,922	3,024,965	3,184,983
Zambia ²	3,860,000	3,402,000	1,896,000	1,556,448	1,426,000
Congo, Republic of ²	18,348,886	18,356,000	21,230,000	16,093,580	17,062,000
Mexico ³	2,802,047	2,844,000	3,166,000	3,022,507	3,700,000
United States ³	..	..	..	..	..

¹ Metal recovered from smelter products, plus cobalt contained in cobalt residues exported.

² Cobalt content of alloys.

³ Content of ore.

List of Establishments classified to This Industry, 1964

(Does not include establishments classified to other industries, which as a secondary activity, recover products typical of this industry)

Name of operator	Head office address	Location of mine
(a) Silver-Lead-Zinc Mines		
Newfoundland:		
American Smelting & Refining Co.	Buchans	Buchans
New Brunswick:		
Brunswick Mining & Smelting Corp. Ltd.	330 Bay St., Toronto, Ontario	Bathurst
Heath Steele Mines Ltd.	Box 1390, Newcastle	Newcastle
Quebec:		
Coniagus Mines Ltd.	330 Bay St., Toronto, Ontario	Lesueur Twp.
Manitou Barvue Mines Ltd.	407-25 Adelaide St. W., Toronto, Ontario	Bourlamaque Twp.
Mattagami Lake Mines Ltd.	44 King St. W., Toronto, Ontario	Galinee Twp.
New Calumet Mines Ltd.	355 St. James St. W., Montreal	Calumet
Orchan Mines Ltd.	366 Bay St., Toronto Ontario	Mattagami
Ontario:		
Willroy Mines Ltd.	25 Adelaide St. W., Toronto	Manitouwadge
British Columbia:		
Canadian Exploration Ltd.	700 Burrard Bldg., Vancouver	Salmo
Consolidated Mining & Smelting Co. of Canada Ltd, The	Trail	Bluebell Mine, Riondel
Consolidated Mining & Smelting Co. of Canada Ltd, The	Trail	H.B. Mine, Salmo
Consolidated Mining & Smelting Co. of Canada Ltd, The	Trail	Sullivan Mine, Riondel
Mastodon-Highland Bell Mines Ltd.	1200 W. Pender St., Vancouver	Revelstoke
New Cronin Bahine Mines Ltd.	844 W. Hastings St., Vancouver	Omineca
Reeves MacDonald Mines Ltd.	837 W., Hastings St., Vancouver	Nelson
Sheep Creek Mines Ltd.	6-490 Baker St., Nelson	Toby Creek
Northwest Territories:		
Pine Point Mines Ltd.	Trail	Pine Point
Yukon:		
United Keno Hill Mines Ltd.	7 King St. E., Toronto, Ontario	Mayo
(b) Silver-Cobalt Mines		
Ontario:		
Agnico Mines Ltd.	711-62 Richmond St. W., Toronto	Coleman Twp.
Chitroni Minerals Ltd.	10 Prospect Ave., Cobalt	Brady Lake
Dean, J.C.	Cobalt	Cobalt
Deer Horn Mines Ltd.	62 Richmond St. W., Toronto	Coleman Twp.
Glen Lake Silver Mines Ltd.	365 Bay St., Toronto	Coleman Twp.
Hiho Silver Mines Ltd.	503-365 Bay St., Toronto	Coleman Twp.
Keeley Frontier Mines Ltd.	911-159 Bay St., Toronto	Silver Centre
Langis Silver & Cobalt Mining Co., Ltd.	25 Adelaide St. W., Toronto	Casey & Harris Twp.
McIntyre Porcupine Mines Ltd. (Castle Div.)	25 King St. W., Toronto	O'Brien
Rix-Athabasca Uranium Mines, Ltd.	15 King St. W., Toronto	Coleman Twp.
Rusty Lake Mining Corp.	1015 Beaver Hall Hill, Montreal, Quebec	Leith Twp.
Silver Miller Mines Ltd.	62 Richmond St. W., Toronto	Coleman Twp.
Silver Summit Mines Ltd.	365 Bay St., Toronto	Coleman Twp.
Silver Town Mines Ltd.	503-365 Bay St., Toronto	Coleman Twp.
Silverfields Mining Corp. Ltd.	914-111 Richmond St. W., Toronto	Coleman Twp.
Silverco Metals of Ontario Ltd.	300 Dominion Square Bldg., Montreal 2, Quebec	O'Brien

EXPLANATORY NOTES

(Including Concepts and Definitions)

INTRODUCTION

The Census of Mines, Quarries and Oil Wells is an annual survey covering Canada's Mineral Industries based on the Standard Classification of Industries. While principal statistics are collected and compiled for all mineral industries not all can be published separately by province because of the confidential nature of the data in certain provinces.

The reporting unit for the Census is designated as the establishment (see definition of Establishment in following section) and a return is requested from every establishment classified to a mineral industry. When an establishment is operated for only part of a year a report is required covering the period of operation.

There are four different questionnaires used in this Census: (a) short form (introduced in 1965) (b) long form (c) head office questionnaire and (d) commodity questionnaire. The short and long forms are used to obtain principal statistics and commodities shipped from establishments classified to mineral industries and differ only in the amount of detail requested.

The head office questionnaire is generally used for company head offices and/or auxiliary units separately located from the mineral establishment(s), (see following notes on Head offices and auxiliary units). The Commodity questionnaire is used to survey certain establishments to collect information on the quantity and value of goods of own production shipped or used by such establishments in order to achieve full coverage of domestically produced commodities. (See the following note under Value of production).

General

This report is one in a series of 18 publications which relate to the operations of industries comprising Major Groups 1, 3, and 4 of Division 4, Mines (including Milling) Quarries and Oil Wells of the revised Standard Industrial Classification (S.I.C.). These groups are respectively Metal Mines, Non-metal Mines and Quarries and Sand Pits, Industries comprising Major Group 2 (Mineral Fuels) are covered in a separate series of reports. The industries included in Major Group 5, Services Incidental to Mining are not covered by separate reports. However, certain relevant statistics are published in various publications, for example, "Contract Drilling for the Mining Industry" (Catalogue No. 26-207), "Construction in Canada" (Catalogue No. 64-201) and a special report "Private and Public Investment in Canada" (available on request from the Bureau or the Queen's Printer). The Bureau has also developed a new survey "Annual Survey of Mining and Exploration Companies". This survey is being introduced for the 1967 reporting period and will attempt to bring together details on exploration, development and capital and repair expenditures for the mining universe (excluding oil and gas).

The publication of this series of 18 reports constitutes the final phase of the implementation of the revised Standard Classification for these three Major Groups (see above). Because of its size and complexity, this project has to be carried out in several stages and over a period of years. These stages were as follows: (a) reclassification of establishments according to the revised S.I.C. (b) implementation of a new establishment definition (c) an extension of the establishment definition to cover the non-mining activities of mining establishments. The first stage was completed with the 1960 Census of Mines, etc. and the results were published in the 1960 and 1961 reports on the basis of the revised Standard Industrial Classification. This part of the project was confined entirely to a re-coding of existing reporting units. Under the revised Standard Industrial Classification reporting establishments are classified or allotted to specific industries in the classification system on the basis of the value of principal products made or shipped. Full details concerning the revised classification system are contained in the "Standard Industrial Classification Manual", Catalogue No. 12-501, which is available from either the Queen's Printer or the Dominion Bureau of Statistics.

The second stage in the project consisted of the implementation of the new definition of the reporting unit i.e. "establishment" as it applied to **mining activities** of mining establishments (see following note on Establishment). Results of the 1962 Census of Mining reflected this change in concept and, in order to provide comparability of data for previous years, the 1962 reports contained principal statistics on the basis of the new establishment definition for years back to 1957. This naturally included the projection of stage one.

The third stage in the project which was the extension of the definition of the establishment to cover **total activities** of mining establishment, is reflected in the 1964 data presented in the present report. By definition "total activity" relates to all operational data and excludes such non-operational items as rent, interest and dividends. Statistics on man-hours included in the earlier publications for the mining industry will continue to be included as part of the regular series but will be confined to production and related workers as in the reports for the Census of Manufactures. Adjustments and revisions made in the statistics for mining activities covering the period 1961-63 and carried in the mining series of publications for this period were further revised in the course of the final stage of the programme to bring them in line with reporting procedures followed in the 1964 Census of Mining which reflect the final application of the new concept. The 1961-63 statistics on mining statistics on the new basis are thus not comparable with those published in earlier issues in this series. However, the 1961-63 statistics are shown in this publication in both their previously published and revised forms in order to provide a link with the immediate past.

Reference has already been made to changes implemented and in the course of implementation in the mining industries in reports published in this series prior to the 1964 issues; however a more complete account of the changes and additions and brief descriptions of the principal industry statistics are given in the following sections of those notes. This latter includes as well a special section dealing specifically with the impact of a new concept in the treatment of the Smelting and Refining industry on the metal mines industries. A description of conceptual and definitional changes appropriate to the statistics for Major Group 4, Mineral Fuels will be included in the relevant industry reports for this group.

Metal Mines

The effect of the application of a special concept to the reporting procedures followed by plants carrying on integrated mining/smelting/refining operations will be evident in the comparison of the 1961-64 data particularly for the items Materials and supplies and Value of production shown in the publications on Metal Mines and the data published in reports prior to 1964. The industries in which the application of this concept had a major effect are those included in S.I.C. Major Group 1 - Metal Mines of the Annual Census of Mining (Mines (including Milling) Quarries and Oil Wells) but more particularly the following:

Copper-Gold-Silver Mines
Nickel-Copper Mines
Silver-Lead-Zinc Mines

These industries which are dominated by a sector of vertically integrated companies involved in mining and manufacturing (smelting and refining) operations have historically created significant distortions in the statistics for these industries. These were caused, for the most part, as a result of applying a value to the ores, concentrates, etc. which were part of the materials (inputs) of the Smelting and Refining industry. The method of valuation used was based on the recoverable metal content of these materials, that is, ores, concentrates, etc. A similar procedure was followed in valuing the output portion of these mines. Since the major output of the mines served as an input to the Smelting and

Refining industry and in turn became a part of the output of the Smelting and Refining industry there was, in effect, a duplication of values for recoverable metal content in the mining and manufacturing sector (smelting and refining). The procedure followed also tended to understate the total output value of the mines sector because the recoverable metal content was valued at a lower level in the processing operations that is, as ores, concentrates, etc. before smelting and/or refining.

Prior to the full implementation of the establishment concept to include total activities, the "Materials and supplies" section included primarily a limited number of consumable materials such as explosives, drill steel, lubricants, etc. Many kinds of supplies, for example, maintenance and repair supplies were not reported. The extension of the Materials and supplies section in accordance with the total activities concept to provide for a more complete coverage of materials and supplies accounts for a major part of the increase in the total cost of Materials and supplies used. In the case of the vertically integrated companies the procedure followed omitted treatment charges such as milling, smelting refining, etc. from the input side of the mines sector involving these companies as well as from the output side of the Smelting and Refining industry. As a result the cost of materials (inputs) reported, particularly for the industries in the mines sector mentioned above was considerably understated.

As a result of the foregoing it was necessary to find some statistical device which would eliminate the above practices and permit the derivation of more meaningful principal statistics - for both the metal mines and for the smelting and refining industry.

While it has been suggested that smelting and refining should be treated as part of the metal mines, and that the statistics should be compiled on this basis, this would be difficult to justify from the statistical viewpoint. Smelting and refining by the nature of its operations constitutes a

manufacturing activity and is considered such, not only in the Canadian and International classification systems but also in the systems of most foreign countries. To include it as part of the mining universe would not only make international comparisons virtually impossible but would affect the importance of Canada's manufacturing industries even more drastically than the changes which resulted from the approach adopted.

After a thorough study of these problems and consultations with the firms involved, it was found that the only satisfactory solution was to continue to consider smelting and refining as a manufacturing industry and to treat such operations of vertically integrated companies as "custom" operations regardless of whether or not the smelting and refining plants (establishments) of such companies were concerned solely with the smelting and refining of ore, concentrates, etc. of their own company. This procedure eliminated the need to arbitrarily value the ores, concentrates, etc. transferred to the smelter and to value the output of the smelter and refinery in terms of commodities produced. Although, for the purpose of commodity statistics, these are still valued on the basis of recoverable metal content, the revenue from integrated operations accrues to the mines concerned and is not duplicated, as in the past, in both the mining and the smelting and refining industries. Thus the revenue from smelting and refining in such integrated operations now consists primarily of treatment costs of own ores, etc. plus any revenue from toll charges of non-company ores, by-products, etc.

The effects of allocating the final revenues of the vertically integrated companies included in this industry to the metal mining industries and the broadening of coverage for materials used, as well as any changes resulting from the implementation of the revised Standard Industrial Classification and the New Establishment Concept, are reflected in the tables of principal statistics for the years 1961 to 1964. Additionally, these tables reflect the inclusion of the non-smelting activities, i.e. the total activity concept.

CONCEPTS AND DEFINITIONS

Establishment

A mining establishment is typically a mine, mine/mill (concentrator), quarry, pit, bog, or plant principally engaged in commercial production activities. In many cases a mining company consists of a single establishment but it is not uncommon for a company to consist of a number of establishments some of which may be in mining i.e. mine/mill and others in manufacturing i.e. smelter, cement plant, etc. In addition a number of locations may be involved. Such firms are requested to submit a separate Census of Mining report for each mineral establishment which can meet the reporting requirements embodied in the following definition of the "establishment".

"The smallest unit which is a separate operating entity capable of reporting the following principal statistics:

- Materials and supplies used
- Goods purchased for resale as such
- Fuel and power consumed
- Number of employees and salaries and wages
- Man-hours worked and paid
- Inventories
- Shipments or sales."

Each establishment is required to report on all the activities carried out within its accounting boundaries (except non-operating revenues such as rent, interest and dividends) and data on the different activities (mining etc., trading in goods not of own manufacture, construction by own labour force, revenue from services, etc.) are requested to be reported separately. It should be noted that the statistics for separate activities are not completed consistent since some respondents cannot distinguish, in their records, materials, shipments and inventories relating solely to their own mining activities. For example, inventory of commodities purchased

for re-sale may not be distinguishable from inventory of own mineral commodities. Complete consistency, therefore, can be obtained only at the "all operations" (total activity) level and for studies or statistical measures requiring accurate coordinated data, the "total activity" statistics should be used.

The number of establishments represents the number of operating units that are principally engaged in the activities of the mineral industries to which they have been classified. These units do not necessarily represent the total number engaged in the production of a commodity mainly produced in a certain industry. Some commodities are produced as secondary products in other mineral and non-mineral industries. It should be noted that head offices and auxiliary units which are surveyed separately are not included in the establishment count, (see following notes on Head offices and auxiliary units).

Head Offices and Auxiliary Units

Head offices and auxiliary units of companies classified to the mineral industries such as sales offices, administrative offices, warehouses, laboratories, etc. are now surveyed as part of the Census of Mining.

These head offices and auxiliary units are either included in an establishment report or are surveyed by means of the head office questionnaire. The former is the most common case where a single establishment firm has its executive personnel, sales office, etc. located at the site of the mine (establishment). The special head office questionnaire is generally used where a firm, regardless of the number of establishments, has separately located offices or auxiliary units. Such offices or units do not constitute establishments within the Census of Mining as they do not normally generate operational revenues, but give rise only to cost of operations

(mainly salaries and wages) which are automatically included in the value of shipments or sales. Although not considered as establishments, and hence, not included in the "establishment" count for an industry, the operational costs are reflected in either the "Industry" statistics (3 or 4 digit level) or the "Major group" statistics (2 digit level) according to the following rules:

- (a) In the case of single establishment firms, statistics of offices and units located in a different municipality to the mining establishment are classified to the same industry (3 or 4 digit) as the mining establishment;
- (b) In the case of multi-establishment firms, the statistics for such offices and units are coded to the same industry as the establishments of the firm, when all establishments are in the same industry (3 or 4 digits). When establishments of such firms are coded (1) to different industries within a major group, (2) to industries in different major groups or (3) to industries in different divisions of the Standard Industrial Classification, then the statistics are included in the major group totals (2 digit level) in which the major part of the company's operations are classified. Although this may result in some distortion of major group statistics in the case of (2) and (3) the statistics at the industry (3 or 4 digit) level in all cases will be left free of these company-wide data.

Employees

(a) Production and related workers – Mining activities

In addition to those engaged directly in mining production activities, they include those employed in storing, inspecting handling, packing, warehousing, etc. They also include employees engaged in maintenance, repair, janitorial and watchman services and line supervisors (working foremen) engaged in similar work to that of the employees they supervise. For those establishments reporting on the "long" form, production and related workers engaged in mining activity are reported as those receiving pay during the last pay period of each month, an average for the year being obtained by summing the monthly figures and dividing by 12. This procedure is followed even though the establishment did not operate in all months in order to arrive at equivalent annual full-time employment. The numbers are somewhat affected by turnover, in that employment is overstated when an employee changes employment during a pay period. The man-hours of production and related workers in mining activity represent total man-hours paid (total hours at work during the calendar year plus hours not worked but nevertheless paid for, such as paid vacations, sick leave, statutory holidays, etc.). In reporting overtime hours, respondents are requested to report only hours actually at work. It should be noted that the division of hours paid into production and related workers payrolls results in average hourly earnings and does not represent hourly wage rates which are collected and published by the Department of Labour and which are based on selected occupations.

(b) Production and related workers – Non-mining activities

Such employees include those on mining establishments' payrolls engaged in activities such as construction undertaken for the use of these establishments and any other production workers who are not engaged directly in the production of ore and/or concentrates.

(c) Administrative and office employees

This category includes all executive and supervisory officials such as presidents, vice-presidents, comptrollers, secretaries, treasurers, etc., together with managers, professional, technical and research employees, superintendents and plant supervisors above the line supervisor or working foreman level, and clerical staff. Also included are employees in activities such as advertising, credit collections, purchasing, personnel, legal, medical, etc. It should be noted that prior to 1961 this category also included working owners and partners. Also included in this category are employees located at head offices or auxiliary units separately located from the establishment; in accordance to the rules outlined under "Head offices and auxiliary units" above.

(d) Sales and distribution workers

This category includes office personnel whose salaries are charged to selling expense, e.g. travelling salesmen. It may also include some sales employees who are reported as part of a mining establishment but are not working at the establishment. These are generally broken down by location in cases where more than 15 employees are involved in any one location. The figures exclude persons working on a commission basis who are not considered regular employees of the establishment.

(e) Total employees

This total comprises the foregoing categories including employees located at separately located head offices and auxiliary units. The numbers of employees included under categories (b), (c) and (d) are reported in the form of annual averages and represent as closely as possible full time employment; adjustments are made when reported figures indicate the existence of part-time or seasonal employment.

Working Owners or Partners

These are not now included in the statistics of employees and salaries and wages. There is some duplication in numbers when a person owns more than one establishment and is reported as a working owner on each Census return. Withdrawals of working owners are defined as amounts withdrawn by owners or partners for normal living expenses excluding withdrawals for payment of income tax.

Salaries and Wages

Salaries and wages refer to gross earnings of employees before deductions for income tax and employees contributions to social services such as sickness, accident and unemployment insurance, pensions, etc. They include all salaries, wages, bonuses, profits shared with employees, the value of room and board where provided, commissions (paid to regular employees only) as well as any other allowance forming part of the worker's earnings. Payments for over-time are included.

Fuel and Electricity

Figures for fuel refer to amounts actually used (including fuel used in cars, trucks, locomotives, etc.), not to purchases unless the quantities are substantially the same. Any fuel and electricity produced by establishments for internal consumption are not included in the total cost. Values represent laid down cost at the establishment including freight, duty, etc. Although fuel and electricity used is considered part of mining activity it should be noted that it also includes relatively small amounts used in non-mining activities since these cannot be reported separately.

Materials and Supplies

(a) Mining activities

Figures represent quantities and laid down cost values, at the establishment, of materials, supplies and purchased components owned and used during the year in mining activities and related processes. These statistics represent only commodity items or physical goods (cost of services or overhead charges such as advertising, insurance, depreciation, etc. are not included) whether purchased from others or received as transfers (in the form of materials, components or semi-processed goods) from other establishments of the reporting company. Included are maintenance and repair supplies not chargeable to fixed assets accounts and any amounts charged by other establishments for work done on materials owned by the reporting establishment. Cost of repairs or maintenance done by outside contractors and cost of returnable containers are not included.

(b) Non-mining activities

1. Purchases for re-sale as such

Figures represent cost of materials or products purchased from others by the reporting establishment (or received as transfers from other establishments of the reporting company) for re-sale as such in the same condition as purchased. Included are any finished products received on consignment from other countries.

2. Other materials and supplies used

Figures represent the cost of materials and supplies, if any, used in new construction and in the production of machinery and equipment (for the use of the reporting establishment) by the establishment's own employees. Included are materials used for any capital repairs and alterations carried out by the establishment's employees. Amounts paid to outside contractors for construction and repair work are not included nor is the cost of purchased machinery and equipment. Also included is the cost of office supplies not chargeable to fixed assets accounts and the cost of such other items of materials and supplies used as food, beverages and supplies for establishment-operated cafeterias and lunch counters, first aid and medical supplies, laboratory supplies, etc.

Value of Production

(a) Value of production of goods produced in the establishment

These figures represent the values in Canadian dollars of products shipped by the reporting establishments adjusted by changes in value between closing and opening inventory values of goods-in-process and finished products on hand. Included are revenues from repairs and custom work performed for other establishments and the cost (book value) of any goods produced by the mining establishment and shipped on a rental basis.

All products and by-products of own production shipped from the establishment are covered, including transfer shipments to sales outlets, distributing warehouses or to other processing plants of the reporting firm, when such units are treated as separate establishments. Production values are net of returned goods, discounts, returns, allowances, sales tax, excise taxes and duties, returnable containers and charges for outward transportation by common or contract carriers. Transportation or delivery expense incurred by the reporting establishment's own carriers are included.

Shipments of goods of own production of establishments which are coded to some other division of the Standard Industrial Classification (on the basis of principal activity) but which are engaged in mining as a subsidiary activity are collected by means of the Commodity questionnaire referred to earlier. Such shipments together with shipments of goods of own production of establishments forming the universe of mineral industries are compiled and recorded under appropriate headings in the various mineral industry publications; however, operational details relating to the production of such commodities are **not** included in the **principal** statistics shown in the reports for individual mineral industries.

(b) Shipments of goods not of own manufacture

These figures represent the net selling value at establishment (net of discounts, returns, allowances, sales

taxes and excise duties and taxes and transportation charges by common or contract carriers) of all products or materials (including products transferred from other establishments of the reporting firm) sold as such in the same condition as purchased or received as transfers. All sales of consignment goods from other countries are included.

(c) Other revenue

Figures represent the book value of fixed assets, if any, (new construction and machinery and equipment including major repairs, alterations, additions, modifications, installation and assembly work) produced during the year for the use of reporting establishments by the establishment's own employees and for which depreciation accounts are maintained. Included also are any revenues from the sale of electricity, servicing revenues, commissions on sales (when not included in value of sales), revenue for company-operated cafeterias and lunch counters and revenue from outside installation or construction work not related to the establishment's own products, sale of used materials (excluding sale of used fixed assets) research and development work, etc. As mentioned previously the figures do not include non-operating revenue such as rent, dividends, interest, etc.

Value Added

(a) By mining activities

Figures are compiled by deducting the cost of operating materials, supplies, etc. and fuel and electricity consumed from the value of production.

(b) By non-mining activities

The figures are compiled by deducting the cost of goods purchased for re-sale (adjusted for changes in the value of inventories of goods purchased for re-sale) and the cost of non-mining materials and supplies used from the value of shipments of goods not of own manufacture, plus other revenue.

(c) By total activities

The figures consist of value added by mining activities plus value added by non-mining activities. "Value added" is sometimes referred to as net output or net production. However, to arrive at the National Accounts concept of net production, or Gross Domestic Product at "Factor cost" it would be necessary to subtract also the cost of advertising, insurance and other business expenses which are not collected as part of the annual Census of mining. "Value added" figures for the primary industries, manufacturing and construction are published in DBS publication Catalogue No. 61-202. "Survey of Production".

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