

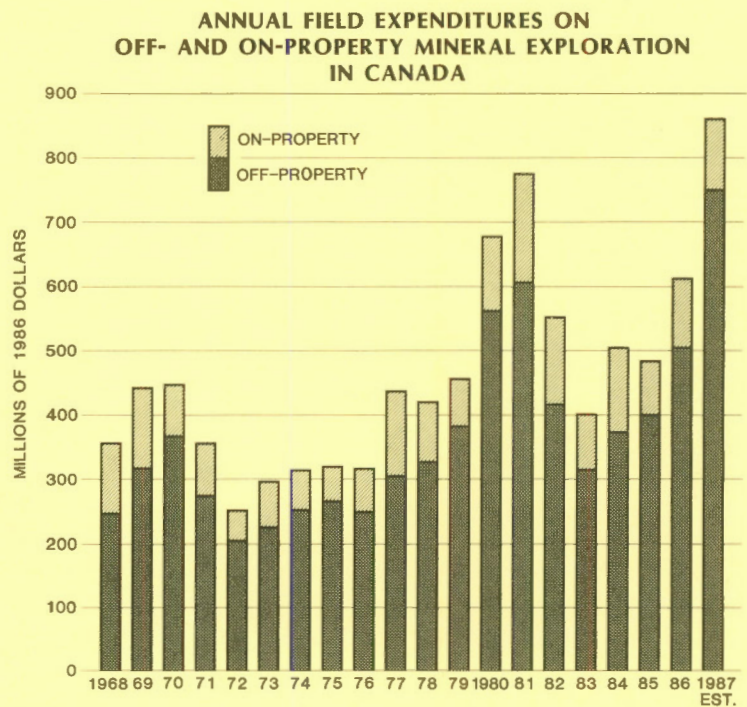
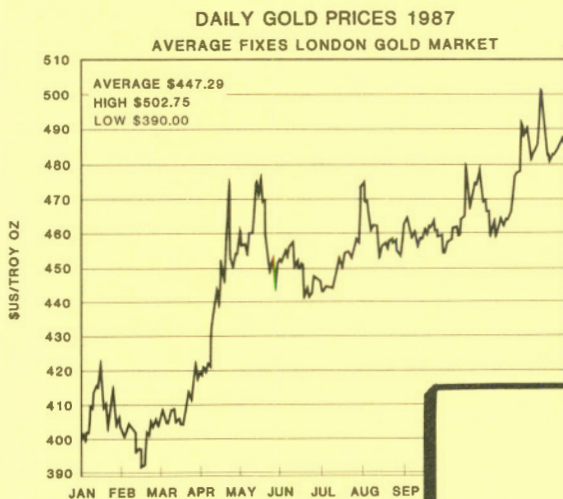
# THE CANADIAN MINERAL INDUSTRY MONTHLY REPORT

MARCH 1988

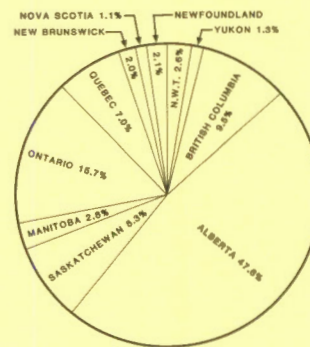
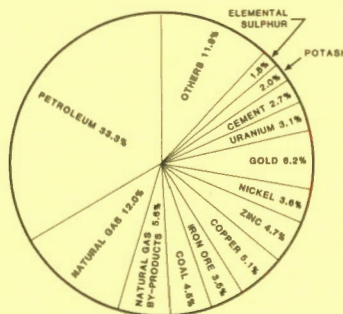
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# **THE CANADIAN MINERAL INDUSTRY**

## **MONTHLY REPORT**



Energy, Mines and  
Resources Canada

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Minister of State  
(Forestry and Mines)

Énergie, Mines et  
Ressources Canada

L'Hon. Gerald S. Merrithew,  
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## **PREFACE**

This publication is prepared in the Mineral Policy Sector of the Department of Energy, Mines and Resources. It is compiled from many sources using the best information available to us. This report is intended to be a general review of the more important current developments that affect, or may affect the Canadian mineral industry. It should not be considered an authority for exact quotation or an expression of the official views of the Government of Canada.

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## THE CANADIAN MINERAL INDUSTRY FOR MARCH

The following constitutes a brief summary of the Canadian mineral industry based on information that became available in March.

### HIGHLIGHTS

1. Aluminum prices during the first quarter of 1988 climbed to record highs as a result of continuing strong demand and relatively low inventory levels. On March 31, the cash price for high-grade aluminum on the London Metal Exchange reached US\$1.34/lb. The average price for the month was \$1.15/lb., compared to \$0.98 in February and \$0.91 in January.
2. Mitsubishi Metal Corporation confirmed that it is studying the possibility of building a copper smelter in the United States. The company has an interest in both the undeveloped Escondida deposit in Chile and the Cox Creek refinery and rod plant.
3. Nickel prices soared to record highs on the London Metal Exchange, reaching US\$10.84 on March 28, 1988, compared to US\$4.99 at the beginning of the month. Strong demand combined with tight supply to push prices to these record levels.
4. World production of potash in 1987 was 29 251 000 t  $K_2O$ , an increase of 2.9% over 1986. Production in Canada in 1987 was 7 267 000 t.
5. Kalium Chemicals has been sold by PPG Industries, Inc. for US\$165 million. The new owners are KAC Holdings Inc. (80%) and Sullivan and Proops (20%). Kalium holds the only potash solution mine in Canada, at Belle Plaine in Saskatchewan.
6. Through its new subsidiary, Premier Sask. Inc., Les Entreprises Premier Canada Ltée of Rivière-du-Loup has purchased, from Saskatchewan Minerals, the peat extraction operation located in Carrot River, Saskatchewan.
7. Cominco Ltd. is to undertake a \$272 000 research study on the treatment of sulphur-sulphidic residues from hydrometallurgical processes to investigate ways to eliminate gas and dust emissions and to recover metals and sulphur.
8. Westcoast Transmission Company Limited and C-I-L Inc. have agreed to an \$8 million expansion project at C-I-L's chemical plant in Prince George, British Columbia. The project includes construction of a new sulphur dioxide facility (30 000 t/y) and expansion of the existing sulphuric acid plant by 10 000 t/y.



## ECONOMIC TRENDS

Table 1 provides information on the volume of production of Canada's leading minerals. This table shows that most commodities experienced a decrease in production during January, 1988 compared to December, 1987. The largest decreases were experienced by iron ore (48.6%), cement (38.8%), lead (29.2%), clay products (28.9%) and salt (23.1%). Only copper, molybdenum, zinc and gypsum showed increases over the previous month, led by gypsum with a 14.6 % increase.

Table 2 provides information on Canada's Gross Domestic Product at factor cost in 1981 prices by industry. The data is also annualized and seasonally adjusted.

The annual rate shown for any given month is calculated by multiplying the figure for that month by twelve. It is important to note however, that if a particular month has been influenced by special factors such as a strike, the annualized data will reflect this bias.

Factor cost refers to output which is valued exclusive of excise taxes and duties, and provincial and municipal sales tax. Factor cost does however, include subsidies and other taxes which are not a function of the level of output or sale.

Seasonally adjusted data removes from time series data, the affects of repetitive and clearly defined seasonal fluctuations. Such a practice permits the isolation of trends in the economy which might otherwise be obscured. Seasonal factors include such items as climate, trade practices and social institutions such as Christmas and Easter.

The GDP data is subject to ongoing revision.

GDP at Factor Cost in 1981 prices increased 0.1% in January. Output of service producing industries rose 0.2% in January, while goods producing industries declined 0.1%.

Table 3 shows the prices of selected minerals for January.

Tables 4 through 6 inclusive show consumption and its relationship to production of various minerals.

Tables 7 and 8 show exploration and capital expenditures in the mining industry from 1986 to 1988. It should be noted that the data for 1987 are preliminary, while those for 1988 reflect intentions only. Outside or general exploration expenditures in the mining industry may increase in 1988 to \$891.0 million, up from \$849.6 million in 1987 (Table 8). Total expenditures related to capital and exploration are anticipated to be \$4.9 billion in 1988, up somewhat from \$4.6 billion in 1987 (Table 8).

Tables 9 through 14 record capital and repair expenditures from a variety of perspectives. Detail is provided for mining, mineral manufacturing and also for petroleum, natural gas and allied industries. Table 10 indicates that capital and repair expenditures are expected to show a significant increase this year, to \$11.3 billion, up from \$9.2 billion in 1987.

TABLE 1. CANADA, PRODUCTION OF LEADING MINERALS ('000 TONNES EXCEPT WHERE NOTED)

		1986	1987	1987	1988	Percentage Changes	
		December	January	December	January	January 1988 January 1987	January 1988 December 1987
<b>Metals</b>							
Copper		60.6	59.4 <sup>r</sup>	65.1	65.5	10.3	0.6
Gold	kg	8 415.7	8 118.4 <sup>r</sup>	10 533.3	9 348.2	15.1	-11.3
Iron ore		3 562.4	2 512.0 <sup>r</sup>	4 246.2	2 181.4	-13.2	-48.6
Lead		36.6	20.7	42.0	29.7	43.5	-29.2
Molybdenum	t	1 200.1	1 103.0 <sup>r</sup>	851.9	914.5	-17.1	7.3
Nickel		16.3	17.4	18.9	16.0	-8.0	-15.3
Silver	t	85.6	77.2 <sup>r</sup>	114.3	108.4	40.4	-5.2
Uranium <sup>1</sup>	t	844.5	1 387.4	1 359.3	1 149.0	-17.2	-15.5
Zinc		103.4	73.4	100.2	102.5	39.6	2.3
<b>Nonmetals</b>							
Asbestos		62.2	48.2	56.2	47.2	-2.1	-16.0
Clay products	\$000	10 535.6	10 920.4	11 891.0	8 454.1	-22.6	-28.9
Gypsum		606.2	583.9 <sup>r</sup>	618.4	708.8	21.4	14.6
Potash K <sub>2</sub> O		692.1	606.3	763.9	602.7	-0.6	-21.1
Cement		631.8	422.8	728.5	445.5	5.4	-38.8
Lime		189.8	194.7	198.0	194.0	-0.4	-2.0
Salt		1 017.4	866.3 <sup>r</sup>	1 047.8	805.4	-7.0	-23.1
<b>Fuels</b>							
Coal		4 993.7	4 874.7 <sup>r</sup>	5 699.4	..	..	..
Natural gas	million m <sup>3</sup>	9 561.0	9 784.0 <sup>r</sup>	10 516.0	..	..	..
Crude oil and equivalent	000 m <sup>3</sup>	7 730.0	7 802.0 <sup>r</sup>	8 522.0	..	..	..

<sup>1</sup> Tonnes uranium (1 tonne U = 1.2999 short tons U<sub>3</sub>O<sub>8</sub>).<sup>r</sup> Revised; .. Not available.

**TABLE 2. CANADA, REAL GROSS DOMESTIC PRODUCT AT FACTOR COST BY INDUSTRY, IN 1981 PRICES, MONTHLY  
(SEASONALLY ADJUSTED AT ANNUAL RATES)**

Industry Sector	1987	1987		1988	Percentage Change January 1988 January 1987
	January	November	December	January	
	(\$ million)				
Total Economy	368 209.9	386 416.4	387 774.7	388 011.7	5.4
Primary Industries					
Agriculture	11 909.4	11 769.0	11 869.8	11 863.2	-0.4
Forestry	2 344.5	2 721.8	2 790.7	2 578.8	10.0
Fishing and Trapping	824.5	579.2	522.5	548.4	-33.5
Mines, Quarries and Oil Wells	21 041.2	22 665.6	22 640.2	22 411.2	6.5
Mining Industries	7 853.1	8 469.9	8 644.4	8 533.2	8.7
Gold Mines	1 176.2	1 514.2	1 458.8	1 412.4	20.1
Iron Mines	547.8	517.7	605.6	578.4	5.6
Other Metal Mines	4 208.4	4 179.5	4 316.5	4 252.8	1.1
Nonmetal Mines	649.1	775.2	774.0	812.4	25.2
Asbestos Mines	238.2	165.8	158.8	171.6	-27.9
Mineral Fuels					
Coal Mines	941.1	1 209.6	1 220.4	1 206.0	28.1
Crude Petroleum and Natural Gas	11 778.9	12 333.1	12 456.6	12 301.2	4.4
Secondary Industries					
Manufacturing	71 889.0	77 075.0	77 520.8	77 656.8	8.0
Non-durable Manufacturing	103.2	116.7	104.2	106.4	3.1
Durable Manufacturing	112.4	141.3	125.0	125.9	12.0
Primary Metal Industries	5 722.5	6 227.9	6 460.0	6 399.6	11.8
Primary Steel Industries	2 250.4	2 427.6	2 555.8	2 502.0	11.2
Steel, Pipe and Tube Industry	275.0	420.7	456.3	417.6	51.8
Iron Foundries	403.6	442.0	461.2	442.8	9.7
Smelting and Refining	2 180.3	2 259.8	2 288.6	2 346.0	7.6
Nonmetallic Mineral Products	2 470.8	2 493.6	2 536.5	2 553.6	3.4
Clay Products Industry	104.7	94.0	91.6	85.4	-18.4
Cement Industry	416.5	336.0	340.7	373.2	-10.4
Ready-mix Concrete Industry	445.1	440.3	449.9	439.2	-1.3
Construction Industry	26 072.1	27 819.4	27 824.3	27 644.4	6.0
Transportation and Storage	16 512.7	17 159.0	17 068.0	17 338.8	5.0
Communications	10 516.8	11 081.8	11 091.4	11 160.0	6.1
Other Utilities	11 002.6	11 226.7	11 209.9	11 472.0	4.3
Wholesale Trade	19 426.0	21 312.9	21 191.7	21 344.4	9.9
Retail Trade	23 831.4	26 121.3	26 401.3	26 265.6	10.2
Finance, Insurance and Real Estate	52 515.7	54 588.3	55 104.2	54 988.8	4.7
Community, Business and Personal Service	37 437.4	38 908.1	39 047.2	39 190.9	4.7

TABLE 3. METAL PRICES - 1988

	January
<b>Copper</b>	
Electrolytic, U.S. producer f.o.b. refinery, cents (U.S.)	131.096
Electrolytic, Comex, 1st pos. plus 5¢, cents (Cdn.)	164.795
Electrolytic, Standard, LME cash, cents (U.S.)	115.928
<b>Lead</b>	
New York, cents (U.S.)	38.000
Montreal, cents (Cdn.)	49.250
LME cash, cents (U.S.)	30.206
<b>Silver</b>	
New York, cents (U.S.) per troy oz.	673.250
Toronto, cents (Cdn.) per troy oz.	895.060
LME cash, cents (U.S.) per troy oz.	670.525
<b>Zinc</b>	
St. Louis, H.G., cents (U.S.)	44.439
Montreal, Electrolytic, cents (Cdn.)	59.500
LME cash, cents (U.S.)	39.810
<b>Tin</b>	
New York, Straits, cents (U.S.)	318.237
Metals Week, composite, cents (U.S.)	426.591
<b>Gold</b>	
London, p.m., US\$ per troy oz.	476.660 <sup>r</sup>
Average, (Sharps Pixley) US\$ per troy oz.	477.169
High, (Sharps Pixley) US\$ per troy oz.	483.900
Low, (Sharps Pixley) US\$ per troy oz.	458.000
<b>Mercury</b>	
US\$ per flask	351.053
<b>Nickel</b>	
Major Producer Cathode, cents (Cdn.)	-LPS-
Major Producer Cathode, cents (U.S.)	-LPS-
LME cash, US\$	3.662
<b>Antimony</b>	
New York, dealers, cents (U.S.)	113.474
<b>Platinum</b>	
New York, refined, US\$ per troy oz.	600.000
<b>Cadmium</b>	
New York, producers, US\$	3.063
<b>Aluminum</b>	
LME cash, cents (Cdn.)	116.744
LME cash, cents (U.S.)	90.830
<b>Cobalt</b>	
Shot/cathode/250 kg., US\$	6.080
U.S. spot cathode, US\$	6.925
<b>Tungsten</b>	
LMB ore, low, US\$/MTU	49.000
GSA domestic, US\$/STU	-LPS-
<b>Molybdenum</b>	
M.W. dealer oxide, US\$	3.122
<b>Uranium</b>	
Nuexco, US\$ U <sub>3</sub> O <sub>8</sub>	16.650

Average U.S. Exchange Rate for December = 1.30743333, January = 1.285300.

Note: Prices are per pound unless otherwise stated.

<sup>r</sup> Revised; LPS List Price Suspended.



**TABLE 4. CANADA, APPARENT CONSUMPTION<sup>1</sup> OF SOME MINERALS AND RELATION TO PRODUCTION<sup>2</sup>, 1985-87**

	1985			1986			1987 <sup>P</sup>		
	Apparent Consumption	Production	Consumption as % of Production	Apparent Consumption	Production	Consumption as % of Production	Apparent Consumption	Production	Consumption as % of Production
	(tonnes)			(tonnes)			(tonnes)		
Asbestos	28 561	750 190	3.8	-	662 381	-	16 702	665 300	2.5
Cement	8 079 543 <sup>r</sup>	10 192 442 <sup>r</sup>	79.3	8 465 932	10 611 223	79.8	9 988 189	12 205 000	81.8
Gypsum	2 002 921 <sup>r</sup>	7 760 783 <sup>r</sup>	25.8 <sup>r</sup>	3 102 467	8 802 805	35.2	3 324 306	8 811 536	37.7
Iron ore	12 978 150 <sup>r</sup>	39 501 601	32.9 <sup>r</sup>	10 354 224	36 166 884	28.6	12 777 871	37 552 400	34.0
Lime	2 040 539 <sup>r</sup>	2 211 580 <sup>r</sup>	92.3	2 099 987	2 242 577	93.6	2 151 024	2 270 500	94.7
Potash (K <sub>2</sub> O)	593 592	6 661 077	8.9	735 687	6 752 709	10.9	779 491	7 464 930	10.4
Quartz silica	3 550 246	2 668 650	133.0	3 620 295	2 640 436	137.1	3 349 191	2 560 411	130.8
Salt	9 077 131	10 084 697	90.0	9 157 575	10 331 846	88.6	9 481 133	10 293 700	92.1

<sup>1</sup> "Apparent consumption" is production, plus imports, less exports. <sup>2</sup> "Production" refers to producers' shipments.

<sup>P</sup> Preliminary; <sup>r</sup> Revised; - Nil.

**TABLE 5. CANADA, REPORTED CONSUMPTION OF MINERALS AND RELATION TO PRODUCTION, 1984-86**

	Unit of Measure	1984			1985			1986		
		Consumption	Production	Consumption as % of Production	Consumption	Production	Consumption as % of Production	Consumption	Production	Consumption as % of Production
Metals										
Aluminum	t	379 249	1 221 985	31.0	346 033	1 282 316	27.0	405 485	1 355 161	29.9
Antimony	kg	342 705 <sup>r</sup>	553 875	61.9 <sup>r</sup>	184 993 <sup>r</sup>	1 075 627	17.2 <sup>r</sup>	539 655	3 805 138	14.2
Bismuth	kg	9 398	166 177	5.7	7 284	201 489	3.6	6 617	152 930	4.3
Cadmium	kg	24 010 <sup>f</sup>	1 605 286	1.5 <sup>f</sup>	29 682 <sup>f</sup>	1 716 731	1.7 <sup>f</sup>	16 072	1 483 907	1.1
Chromium (chromite)	t	21 059	-	..	17 555	-	..	20 935	-	..
Cobalt	kg	112 972	2 123 333	5.3	101 167	2 066 815	4.9	96 172	2 297 178 <sup>r</sup>	4.2
Copper <sup>1</sup>	t	205 476	721 826	28.5	203 335	738 637	27.5	204 685	698 527	29.3
Lead <sup>2</sup>	t	111 642 <sup>f</sup>	264 301	42.2 <sup>f</sup>	101 507 <sup>r</sup>	268 292	37.8 <sup>f</sup>	79 612	334 342	23.8
Magnesium	t	6 846	..	..	6 582	..	..	6 731	..	..
Manganese ore	t	109 113	-	..	160 241	-	..	197 012	-	..
Mercury	kg	42 013	-	..	41 462	-	..	52 076	-	..
Molybdenum (Mo content)	t	737	11 557	6.4	772	7 852	9.8	684	11 251	6.1
Nickel	t	7 290	173 725	4.2	5 932 <sup>f</sup>	169 971	3.5	6 605	163 639	4.0
Selenium	kg	9 845	463 188	2.1	13 940	360 641	3.9	14 021	353 464	4.0
Silver	kg	299 440	1 326 720	22.6	217 613	1 197 072	18.2	312 905	1 087 989	28.8
Tellurium	kg	..	18 964	..	..	19 470	..	..	20 490	..
Tin	t	4 076	209	1 950.2	3 966 <sup>f</sup>	120	3 305.0 <sup>f</sup>	3 655	..	..
Tungsten (W content)	kg	659 665	4 195 785	15.7	707 271	4 030 574	17.5	647 139	2 469 990	26.2
Zinc	t	119 573	1 062 701	11.3	123 256	1 049 275	11.7	126 085	988 173	12.8
Nonmetals										
Barite	t	71 568 <sup>r</sup>	64 197	111.5 <sup>r</sup>	59 284 <sup>f</sup>	71 049	83.4 <sup>f</sup>	22 701	40 335	56.3
Feldspar	t	2 106	-	..	2 014	-	..	2 248	-	..
Fluorspar	t	176 852	-	..	151 091 <sup>r</sup>	-	..	147 140	..	..
Mica	kg	2 474	..	..	3 105	..	..	3 334	..	..
Nepheline syenite	t	91 555	520 640	17.6	81 530	467 186	17.5	94 404	467 491	20.2
Phosphate rock	t	3 267 428	-	..	2 738 387	-	..	2 356 892	-	..
Potash (K <sub>2</sub> O)	t	213 896	7 527 347	2.8	296 810	6 661 077	4.5	315 975	6 752 709	4.7
Sodium sulphate	t	235 504	389 086	60.5	241 143	366 217	65.8	228 360	370 726	61.6
Sulphur	t	1 169 849	9 197 254	12.7	1 110 683 <sup>f</sup>	8 924 522	12.4	1 059 906	7 724 006	13.7
Talc, etc.	t	59 189	122 992	48.1	64 774	126 860	51.1	64 640	123 037	52.5
Fuels										
Coal	000 t	50 364	57 402	87.7	47 946 <sup>f</sup>	60 737	78.9 <sup>f</sup>	44 767	57 048	78.5
Natural gas <sup>3</sup>	million m <sup>3</sup>	47 574	76 053	62.6	50 164	82 218	61.0	48 085	71 898	66.9
Crude oil <sup>4</sup>	000 m <sup>3</sup>	82 552	83 532	98.8	79 808	85 400	93.5	78 220	85 357	91.6

<sup>1</sup> Consumption defined as producers' domestic shipments of refined metal. <sup>2</sup> Consumption includes primary and secondary refined metal. <sup>3</sup> Consumption defined as domestic sales.

<sup>4</sup> Consumption defined as refinery receipts.

<sup>r</sup> Revised; - Nil; .. Not available or not applicable.

Note: Unless otherwise stated, consumption refers to reported consumption of refined metals or nonmetallic minerals by consumers. Production of metals, in most cases, refers to production in all forms, and includes the recoverable content of ores, concentrates, matte, etc. and metal content of primary products recoverable at domestic smelters and refineries. Production of nonmetals refers to producers' shipments. For fuels, production is equivalent to actual output less waste.

**TABLE 6. . CANADA, DOMESTIC CONSUMPTION OF PRINCIPAL REFINED METALS IN RELATION TO REFINERY PRODUCTION<sup>1</sup>, 1980-86**

	Unit of Measure	1980	1981	1982	1983	1984	1985	1986
<b>Aluminum</b>								
Domestic consumption <sup>2</sup>	t	329 400	336 989	273 523	332 389	379 249	346 033	405 485
Production	t	1 068 197	1 115 691	1 064 795	1 091 213	1 221 985	1 282 316	1 355 161
Consumption of production	%	30.8	30.2	25.7	30.5	31.0	27.0	29.9
<b>Copper</b>								
Domestic consumption <sup>3</sup>	t	195 124	216 759	130 559	170 443	205 476	203 335	204 685
Production	t	505 238	476 655	337 780	464 333	504 262	499 626	493 445
Consumption of production	%	38.6	45.5	38.6	36.7	40.7	40.7	41.5
<b>Lead</b>								
Domestic consumption <sup>4</sup>	t	106 836	110 931	103 056	88 579	111 642'	101 507'	79 612
Production	t	162 463	168 450	174 310	178 043	174 987	173 220	169 934
Consumption of production	%	65.8	65.9	59.1	49.7	63.8'	58.6'	46.8
<b>Zinc</b>								
Domestic consumption <sup>4</sup>	t	116 618	113 061	100 233	116 257	119 573	123 256	126 085
Production	t	591 565	618 650	511 870	617 033	682 976	692 406	570 981
Consumption of production	%	19.7	18.3	19.6	26.9	17.5	17.8	22.1

<sup>1</sup> Production of refined metal from all sources, including metal derived from secondary materials at primary refineries. <sup>2</sup> Consumption of primary refined metal, reported by consumers. <sup>3</sup> Producers' domestic shipments of refined metal. <sup>4</sup> Consumption of primary and secondary refined metal, reported by consumers.

' Revised.

TABLE 7. CANADA, EXPLORATION AND CAPITAL EXPENDITURES IN THE MINING INDUSTRY<sup>1</sup> BY PROVINCES AND TERRITORIES, 1986-88

		Capital									Total Capital and Repair	Outside or General Exploration	Total, all Expenditures
		Construction				Machinery and Equipment	Total Capital	Repair					
		On-property Exploration	On-property Development	Structures	Total			Construction	Machinery and Equipment	Total Repair			
(\$ million)													
Newfoundland	1986	(2)	34.3	(2)	35.4	31.2	66.6	(2)	(2)	114.7	181.2	11.4	192.6
	1987 <sup>p</sup>	(2)	39.7	(2)	115.4	14.3	129.7	7.4	100.3	107.7	237.4	7.3	244.7
	1988 <sup>i</sup>	(2)	(2)	50.5	79.0	30.3	109.3	7.6	102.1	109.7	219.0	6.7	225.7
Prince Edward Island	1986	-	-	-	-	-	-	-	-	-	-	-	-
	1987 <sup>p</sup>	-	-	-	-	-	-	-	-	-	-	-	-
	1988 <sup>i</sup>	-	-	-	-	-	-	-	-	-	-	-	-
Nova Scotia	1986	(2)	(2)	57.1	169.7	53.1	222.8	1.5	23.1	24.6	247.4	20.5	267.9
	1987 <sup>p</sup>	(2)	73.5	(2)	91.2	49.8	141.0	4.4	36.3	40.7	181.7	15.2	196.9
	1988 <sup>i</sup>	(2)	25.5	(2)	33.0	57.5	90.5	3.9	36.5	40.4	130.9	19.4	150.3
New Brunswick	1986	1.5	39.2	20.4	61.1	24.5	85.6	9.4	59.8	69.2	154.8	9.3	164.1
	1987 <sup>p</sup>	(2)	(2)	6.4	30.0	39.5	69.5	7.6	67.9	75.5	145.0	9.0	154.0
	1988 <sup>i</sup>	(2)	(2)	(2)	25.4	30.3	55.7	7.9	74.2	82.1	137.8	13.6	151.4
Quebec	1986	27.9	172.0	61.6	261.5	60.8	322.3	29.1	193.1	222.2	544.5	236.8	781.3
	1987 <sup>p</sup>	44.8	199.3	66.2	310.3	82.9	393.2	30.1	190.4	220.5	613.7	432.7	1 046.4
	1988 <sup>i</sup>	53.7	198.4	75.7	327.8	86.3	414.1	29.9	192.5	222.4	636.5	478.8	1 115.3
Ontario	1986	33.3	309.3	91.3	433.9	154.0	587.9	40.5	324.5	365.0	952.9	127.1	1 080.0
	1987 <sup>p</sup>	32.9	350.6	69.5	453.0	200.2	653.2	38.9	357.4	396.3	1 049.5	171.4	1 220.9
	1988 <sup>i</sup>	38.3	336.5	110.9	485.7	286.0	771.7	46.1	368.7	414.8	1 186.5	151.4	1 337.9
Manitoba	1986	7.6	41.2	11.5	60.3	40.2	100.5	(2)	(2)	40.3	140.8	21.9	162.7
	1987 <sup>p</sup>	10.7	36.2	21.1	68.0	25.1	93.1	(2)	(2)	39.0	132.1	17.3	149.4
	1988 <sup>i</sup>	10.5	46.6	11.6	68.7	22.7	91.4	(2)	(2)	43.0	134.4	21.8	156.2
Saskatchewan	1986	5.8	54.9	47.9	108.6	87.2	195.8	6.5	135.9	142.4	338.2	32.6	370.8
	1987 <sup>p</sup>	4.3	111.0	11.1	126.4	43.5	169.9	7.3	128.7	136.0	305.9	36.7	342.6
	1988 <sup>i</sup>	(2)	92.8	(2)	150.5	52.8	203.3	6.9	130.7	137.6	340.9	38.5	379.4
Alberta	1986	(2)	(2)	5.4	22.2	26.0	48.2	2.8	73.0	75.8	124.0	11.5	135.5
	1987 <sup>p</sup>	(2)	8.5	(2)	13.8	26.1	39.9	0.4	73.7	74.1	114.0	4.0	118.0
	1988 <sup>i</sup>	(2)	14.2	(2)	25.4	49.8	75.2	0.4	81.8	82.2	157.4	4.9	162.3
British Columbia	1986	9.4	228.9	32.9	271.2	92.5	363.7	22.3	367.9	390.2	753.9	74.9	828.8
	1987 <sup>p</sup>	15.5	247.5	79.8	342.8	95.1	437.9	21.2	379.6	400.8	838.7	105.3	944.0
	1988 <sup>i</sup>	14.2	234.4	50.6	299.2	96.4	395.6	22.3	390.3	412.6	808.2	118.7	926.9
Yukon	1986	1.8	0.9	0.1	2.8	1.1	3.9	(2)	(2)	4.2	8.1	16.7	24.8
	1987 <sup>p</sup>	0.6	(2)	(2)	13.4	5.6	19.0	(2)	(2)	24.2	43.2	16.8	60.0
	1988 <sup>i</sup>	0.9	9.8	-	10.6	12.3	22.9	(2)	(2)	21.5	44.4	15.1	59.5
Northwest Territories	1986	19.9	16.9	18.7	55.5	5.4	60.9	4.5	54.4	58.9	119.8	26.5	146.3
	1987 <sup>p</sup>	2.1	20.6	9.0	31.7	18.2	49.9	2.8	45.2	48.0	97.9	33.9	131.8
	1988 <sup>i</sup>	(2)	22.3	(2)	50.3	67.3	117.6	14.9	47.1	62.0	179.6	21.9	201.5
Canada	1986	108.6	1 026.1	347.4	1 482.1	576.0	2 058.1	130.8	1 376.7	1 507.5	3 565.6	589.3	4 154.9
	1987 <sup>p</sup>	121.5	1 115.7	359.0	1 596.1	600.0	2 196.2	120.4	1 442.4	1 562.8	3 759.1	849.6	4 608.7
	1988 <sup>i</sup>	154.7	1 027.5	373.8	1 556.0	791.8	2 347.6	141.0	1 488.1	1 629.0	3 976.8	891.0	4 867.8

<sup>1</sup> Excludes crude oil and natural gas industries. (2) Confidential, included in total.<sup>p</sup> Preliminary; <sup>i</sup> Intentions; - Nil.

Note. Components may not add due to rounding.



TABLE 8. CANADA, EXPLORATION AND CAPITAL EXPENDITURES<sup>1</sup> IN THE MINING INDUSTRY BY TYPE OF MINING, 1986-88

		Capital						Repair			Total Capital and Repair	Outside or General Exploration	Total, all Expenditures	
		Construction				Machinery and Equipment	Total Capital	Repair						
		On-property Exploration	On-property Development	Structures	Total			Construction	Machinery and Equipment	Total Repair				
(\$ million)														
Metal Mines														
Copper-gold-silver	1986	28.2	91.9	52.4	172.5	50.9	223.4	22.0	203.1	225.1	448.5	16.0	464.5	
	1987 <sup>p</sup>	18.9	90.9	72.8	182.6	47.1	229.7	19.0	240.5	259.6	489.3	20.8	510.1	
	1988 <sup>i</sup>	15.8	85.5	26.5	127.8	65.9	193.7	18.0	239.3	257.3	451.0	15.3	466.3	
Gold	1986	51.3	223.1	121.5	395.9	120.1	516.0	22.5	103.5	126.0	642.0	69.2	711.2	
	1987 <sup>p</sup>	65.5	337.2	179.2	581.9	155.2	737.0	17.0	119.6	136.6	873.6	95.2	968.8	
	1988 <sup>i</sup>	64.5	269.8	189.3	523.6	219.1	742.7	34.4	138.2	172.5	915.2	86.5	1 001.7	
Iron	1986	(4)	69.4	(4)	76.6	41.7	118.3	12.7	189.5	202.2	320.5	4.8	325.3	
	1987 <sup>p</sup>	(4)	93.2	(4)	102.0	14.6	116.7	10.4	168.4	178.8	295.4	(4)	(4)	
	1988 <sup>i</sup>	(4)	94.0	(4)	102.9	20.2	123.1	10.5	170.1	180.5	303.6	(4)	(4)	
Silver-lead-zinc	1986	9.0	33.6	12.0	54.6	8.1	62.7	11.9	72.8	84.7	147.4	15.5	162.9	
	1987 <sup>p</sup>	5.7	50.7	13.9	70.3	48.0	118.3	9.1	99.3	108.5	226.7	16.9	243.6	
	1988 <sup>i</sup>	4.5	42.5	6.5	53.5	43.6	97.1	9.1	109.9	119.1	216.2	21.7	237.9	
Uranium	1986	5.2	107.2	1.9	114.3	29.2	143.5	5.9	118.1	124.0	267.5	16.9	284.4	
	1987 <sup>p</sup>	(4)	74.4	(4)	82.8	23.5	106.3	8.6	123.1	131.8	238.0	17.8	255.8	
	1988 <sup>i</sup>	(4)	89.8	(4)	117.5	41.3	158.8	9.1	121.5	130.7	289.5	(4)	(4)	
Other metal <sup>1</sup> mining	1986	(4)	109.8	(4)	156.4	65.5	221.9	24.2	115.1	139.3	361.2	3.9	365.1	
	1987 <sup>p</sup>	10.0	89.8	12.7	112.5	59.6	172.1	25.9	124.5	150.4	322.5	(4)	(4)	
	1988 <sup>i</sup>	12.2	135.6	22.4	170.3	96.4	266.6	27.9	126.4	154.3	421.0	(4)	(4)	
Total metal mining	1986	100.5	635.0	234.8	970.3	315.5	1 285.8	99.2	802.1	901.3	2 187.1	126.3	2 313.4	
	1987 <sup>p</sup>	104.0	736.2	292.0	1 132.1	348.0	1 480.1	90.0	875.4	965.7	2 445.5	156.6	2 602.1	
	1988 <sup>i</sup>	102.1	717.2	276.2	1 095.6	486.5	1 582.0	109.0	905.4	1 014.4	2 596.5	154.7	2 751.2	
Nonmetal Mines														
Asbestos	1986	(4)	36.3	(4)	41.4	2.2	43.6	1.9	37.3	39.2	82.8	-	82.8	
	1987 <sup>p</sup>	(4)	34.5	(4)	40.0	11.2	51.2	(4)	(4)	47.0	98.2	-	98.2	
	1988 <sup>i</sup>	(4)	20.3	(4)	23.1	5.3	28.4	(4)	(4)	54.9	83.3	-	83.3	
Coal	1986	2.5	307.8	29.6	339.9	89.2	429.1	15.9	310.9	326.8	755.9	20.5	776.4	
	1987 <sup>p</sup>	2.1	236.6	19.9	258.6	96.5	355.0	13.2	300.8	314.0	669.0	8.4	677.4	
	1988 <sup>i</sup>	(4)	198.6	(4)	240.6	127.6	368.2	13.7	302.0	315.7	683.9	10.4	694.3	
Other nonmetal mining <sup>1</sup>	1986	(4)	46.6	(4)	121.1	165.2	286.3	13.4	217.2	230.6	516.9	1.6	518.5	
	1987 <sup>p</sup>	(4)	101.5	(4)	121.4	133.6	255.0	(4)	(4)	232.2	487.2	3.0	490.2	
	1988 <sup>i</sup>	0.8	69.6	18.7	89.1	159.2	248.3	(4)	(4)	238.8	487.1	5.4	492.5	
Total nonmetal mining	1986	8.1	390.7	103.6	502.4	256.6	759.0	31.2	565.4	596.6	1 355.6	22.1	1 377.7	
	1987 <sup>p</sup>	6.4	372.6	41.0	420.0	241.3	661.2	27.5	565.7	593.2	1 254.4	11.4	1 265.8	
	1988 <sup>i</sup>	28.1	288.5	36.3	352.8	292.1	644.9	28.4	581.0	609.4	1 254.3	15.8	1 270.1	
Metal and Nonmetal Exploration Companies														
	1986	-	0.4	8.9	9.4	3.9	13.3	0.4	9.2	9.6	22.9	440.9	463.8	
	1987 <sup>p</sup>	11.1	6.9	26.0	44.0	11.0	54.9	3.2	1.4	4.6	59.5	681.6	741.1	
	1988 <sup>i</sup>	24.4	21.8	61.3	107.6	13.2	120.7	3.6	1.7	5.2	126.0	720.5	846.5	
Total mining	1986	108.6	1 026.1	347.4	1 482.1	576.0	2 058.1	130.8	1 376.7	1 507.5	3 565.6	589.3	4 154.9	
	1987 <sup>p</sup>	121.5	1 115.7	359.0	1 596.1	600.0	2 196.2	120.4	1 442.4	1 562.8	3 759.1	849.6	4 608.7	
	1988 <sup>i</sup>	154.6	1 027.5	373.8	1 556.0	791.8	2 347.6	141.0	1 488.1	1 629.0	3 976.8	891.0	4 867.8	

<sup>1</sup> Excludes expenditures in the petroleum and natural gas industries. <sup>2</sup> Includes nickel-copper mines, silver-cobalt mines and other metal mines. <sup>3</sup> Includes gypsum mines, salt mines, potash mines, quarries, sand and gravel pits and other nonmetal mines. (4) Confidential, included in total.

<sup>p</sup> Preliminary; <sup>i</sup> Intentions; - Nil.

Note: Components may not add due to rounding.

**TABLE 9. CANADA, CAPITAL AND REPAIR EXPENDITURES BY SELECTED INDUSTRIAL SECTOR, 1986-88**

		Capital Expenditures			Repair Expenditures			Capital and Repair Expenditures		
		Construction	Machinery and Equipment	Total	Construction	Machinery and Equipment	Total	Construction	Machinery and Equipment	Total
		(\$ million)								
Agriculture	1986	781.3	1 980.0	2 761.3	241.6	1 217.3	1 458.9	1 022.9	3 197.3	4 220.2
	1987 <sup>p</sup>	739.1	1 875.0	2 614.1	254.1	1 271.4	1 525.5	993.2	3 146.4	4 139.6
	1988 <sup>f</sup>	761.0	1 888.4	2 649.4	267.8	1 360.1	1 627.9	1 028.8	3 248.5	4 277.3
Construction	1986	289.0	1 155.0	1 444.0	59.1	924.2	983.3	348.1	2 079.2	2 427.3
	1987 <sup>p</sup>	315.0	1 262.0	1 577.0	60.4	915.6	976.0	375.4	2 177.6	2 553.0
	1988 <sup>f</sup>	337.0	1 431.0	1 768.0	64.4	1 069.8	1 134.2	401.4	2 500.8	2 902.2
Forestry	1986	108.7	121.8	230.5	78.8	219.1	297.9	187.5	340.9	528.4
	1987 <sup>p</sup>	111.1	118.9	230.0	75.2	225.4	300.6	186.3	344.3	530.6
	1988 <sup>f</sup>	136.7	155.1	291.8	76.1	230.3	306.4	212.8	385.4	598.2
Housing	1986	25 764.3	-	25 764.3	3 121.0	-	3 121.0	28 885.3	-	28 885.3
	1987 <sup>p</sup>	32 803.3	-	32 803.3	3 200.0	-	3 200.0	36 003.3	-	36 003.3
	1988 <sup>f</sup>	32 351.1	-	32 351.1	3 300.0	-	3 300.0	35 651.1	-	35 651.1
Manufacturing	1986	2 525.5	11 723.8	14 249.3	868.9	5 651.4	6 520.3	3 394.4	17 375.2	20 769.6
	1987 <sup>p</sup>	2 703.2	12 250.3	14 953.5	935.6	5 837.7	6 773.3	3 638.8	18 088.0	21 726.8
	1988 <sup>f</sup>	2 877.4	15 484.6	18 362.0	973.2	6 128.3	7 101.5	3 850.6	21 612.9	25 463.5
Mining <sup>1</sup>	1986	6 624.5	1 072.4	7 696.9	447.3	2 082.2	2 529.5	7 071.8	3 154.6	10 226.4
	1987 <sup>p</sup>	5 621.9	1 080.6	6 702.5	432.9	2 110.5	2 543.4	6 054.8	3 191.1	9 245.9
	1988 <sup>f</sup>	7 081.1	1 476.8	8 557.9	492.4	2 223.2	2 715.6	7 573.5	3 700.0	11 273.5
Trade	1986	780.4	1 853.1	2 633.5	256.5	407.0	663.5	1 036.9	2 260.1	3 297.0
	1987 <sup>p</sup>	813.7	1 929.3	2 743.0	239.0	370.1	609.1	1 052.7	2 299.4	3 352.1
	1988 <sup>f</sup>	859.3	2 133.7	2 993.0	249.6	378.6	628.2	1 108.9	2 512.3	3 621.2
Utilities	1986	6 412.0	6 906.2	13 318.2	2 046.6	5 158.2	7 204.8	8 458.6	12 064.4	20 523.0
	1987 <sup>p</sup>	6 930.0	7 676.9	14 606.9	1 978.6	5 311.6	7 290.2	8 908.6	12 988.5	21 897.1
	1988 <sup>f</sup>	8 129.5	9 771.3	17 900.8	2 082.4	5 552.2	7 634.6	10 211.9	15 323.5	25 535.4
Other <sup>2</sup>	1986	17 830.9	11 156.7	28 987.6	3 462.8	1 683.2	5 146.0	21 293.7	12 839.9	34 133.6
	1987 <sup>p</sup>	19 585.8	12 712.8	32 298.6	4 056.6	1 818.1	5 874.7	23 642.4	14 530.9	38 173.3
	1988 <sup>f</sup>	20 973.7	13 692.9	34 666.6	4 264.2	1 906.7	6 170.9	25 237.9	15 599.6	40 837.5
Total	1986	61 116.6	35 969.0	97 085.6	10 582.6	17 342.6	27 925.2	71 699.2	53 311.6	125 010.8
	1987 <sup>p</sup>	69 623.1	38 905.8	108 528.9	11 232.4	17 860.4	29 092.8	80 855.5	56 766.2	137 621.7
	1988 <sup>f</sup>	73 506.8	46 033.8	119 540.6	11 770.1	18 849.2	30 619.3	85 276.9	64 883.0	150 159.9
Mining as a percentage of total	1986	10.8	3.0	7.9	4.2	12.0	9.1	9.9	5.9	8.2
	1987 <sup>p</sup>	8.1	2.8	6.2	3.9	11.8	8.7	7.5	5.6	6.7
	1988 <sup>f</sup>	9.6	3.2	7.2	4.2	11.8	8.9	8.9	5.7	7.5

<sup>1</sup> Includes mines, quarries and oil wells. <sup>2</sup> Includes finance, real estate, insurance, commercial services, institutions and government departments.

<sup>p</sup> Preliminary; <sup>f</sup> Forecast; - Nil.

TABLE 10. CANADA, CAPITAL AND REPAIR EXPENDITURES IN MINING<sup>1</sup> BY GEOGRAPHICAL REGION, 1986-88

		Capital Expenditures			Repair Expenditures			Capital and Repair Expenditures		
		Construction	Machinery and Equipment	Total	Construction	Machinery and Equipment	Total	Construction	Machinery and Equipment	Total
		(\$ million)								
Atlantic Region	1986	950.8	108.8	1 059.6	18.0	190.7	208.7	968.8	299.5	1 268.3
	1987 <sup>p</sup>	506.6	104.6	611.2	19.4	204.6	224.0	526.0	309.2	835.2
	1988 <sup>f</sup>	409.8	123.3	533.1	19.4	212.9	232.3	429.2	336.2	765.4
Quebec	1986	261.5	60.8	322.3	29.1	193.1	222.2	290.6	253.9	544.5
	1987 <sup>p</sup>	310.5	82.9	393.4	30.1	190.4	220.5	340.6	273.3	613.9
	1988 <sup>f</sup>	328.6	86.3	414.9	29.9	192.5	222.4	358.5	278.8	637.3
Ontario	1986	460.0	154.9	614.9	42.2	326.2	368.4	502.2	481.1	983.3
	1987 <sup>p</sup>	498.2	200.5	698.7	40.6	359.1	399.7	538.8	559.6	1 098.4
	1988 <sup>f</sup>	544.6	287.0	831.6	47.9	370.3	418.2	592.5	657.3	1 249.8
Prairie Region	1986	3 897.4	646.6	4 544.0	301.8	918.7	1 220.5	4 199.2	1 565.3	5 764.5
	1987 <sup>p</sup>	3 536.5	570.2	4 106.7	303.2	882.8	1 186.0	3 839.7	1 453.0	5 292.7
	1988 <sup>f</sup>	5 025.1	798.2	5 823.3	338.4	966.7	1 305.1	5 363.5	1 764.9	7 128.4
British Columbia	1986	493.5	94.0	587.5	45.9	389.1	435.0	539.4	483.1	1 022.5
	1987 <sup>p</sup>	540.2	97.1	637.3	36.6	400.0	436.6	576.8	497.1	1 073.9
	1988 <sup>f</sup>	569.1	98.7	667.8	41.7	411.7	453.4	610.8	510.4	1 121.2
Yukon and Northwest Territories	1986	561.3	7.3	568.6	10.3	64.4	74.7	571.6	71.7	643.3
	1987 <sup>p</sup>	229.9	25.3	255.2	3.0	73.6	76.6	232.9	98.9	331.8
	1988 <sup>f</sup>	203.9	83.3	287.2	15.1	69.1	84.2	219.0	152.4	371.4
Canada, total	1986	6 624.5	1 072.4	7 696.9	447.3	2 082.2	2 529.5	7 071.8	3 154.6	10 226.4
	1987 <sup>p</sup>	5 621.9	1 080.6	6 702.5	432.9	2 110.5	2 543.4	6 054.8	3 191.1	9 245.9
	1988 <sup>f</sup>	7 081.1	1 476.8	8 557.9	492.4	2 223.2	2 715.6	7 573.5	3 700.0	11 273.5

<sup>1</sup> Includes mines, quarries and oil wells.<sup>p</sup> Preliminary; <sup>f</sup> Forecast.



**TABLE 11. CANADA, CAPITAL AND REPAIR EXPENDITURES IN THE MINERAL MANUFACTURING INDUSTRIES, 1982-88**

	1982	1983	1984	1985	1986	1987 <sup>P</sup>	1988 <sup>f</sup>
	(\$ million)						
<b>Primary Metal Industries<sup>1</sup></b>							
Capital							
Construction	278.3	112.5	318.6	593.8	400.2	230.7	290.8
Machinery	927.5	550.6	712.6	1 019.0	1 333.6	1 272.8	1 587.7
Total	1 205.8	663.1	1 031.2	1 612.8	1 733.8	1 503.5	1 878.5
Repair							
Construction	99.2	111.4	119.6	125.2	126.9	152.1	165.3
Machinery	1 021.6	1 053.1	1 215.7	1 231.1	1 279.0	1 347.4	1 472.4
Total	1 120.8	1 164.5	1 335.3	1 356.3	1 405.9	1 499.5	1 637.7
Total capital and repair	2 326.6	1 827.6	2 366.5	2 969.1	3 139.7	3 003.0	3 516.2
<b>Nonmetallic Mineral Products<sup>2</sup></b>							
Capital							
Construction	32.0	14.8	26.6	39.2	36.0	54.1	48.8
Machinery	134.4	125.5	151.0	193.2	295.1	272.0	401.1
Total	166.4	140.3	177.6	232.4	331.1	326.1	449.9
Repair							
Construction	20.7	20.7	26.3	21.2	24.7	19.8	19.7
Machinery	211.1	204.1	236.5	270.6	285.7	271.2	276.0
Total	231.8	224.8	262.8	291.8	310.4	291.0	295.7
Total capital and repair	398.2	365.1	440.4	524.2	641.5	617.1	745.6
<b>Petroleum and Coal Products</b>							
Capital							
Construction	890.8	629.6	321.4	248.3	272.3	437.2	516.9
Machinery	333.7	211.2	111.0	87.4	125.9	222.6	245.0
Total	1 224.5	840.8	432.4	335.7	398.2	659.8	761.9
Repair							
Construction	218.5	196.0	230.3	213.0	212.0	254.6	244.3
Machinery	101.2	68.6	79.3	74.9	91.9	120.1	115.0
Total	319.7	264.6	309.6	287.9	303.9	374.7	359.3
Total capital and repair	1 544.2	1 105.4	742.0	623.6	702.1	1 034.5	1 121.2
<b>Total Mineral Manufacturing Industries</b>							
Capital							
Construction	1 201.1	756.9	666.6	881.3	708.5	722.0	856.5
Machinery	1 395.6	887.3	974.6	1 299.6	1 754.6	1 767.4	2 233.8
Total	2 596.7	1 644.2	1 641.2	2 180.9	2 463.1	2 489.4	3 090.3
Repair							
Construction	338.4	328.1	376.2	359.4	363.6	426.5	429.3
Machinery	1 333.9	1 325.8	1 531.5	1 576.6	1 656.6	1 738.7	1 863.4
Total	1 672.3	1 653.9	1 907.7	1 936.0	2 020.2	2 165.2	2 292.7
Total capital and repair	4 269.0	3 298.1	3 548.9	4 116.9	4 483.3	4 654.6	5 383.0

<sup>1</sup> Includes smelting and refining. <sup>2</sup> Includes cement, lime and clay products manufacturing.<sup>P</sup> Preliminary; <sup>f</sup> Forecast.



TABLE 12. CANADA, CAPITAL AND REPAIR EXPENDITURES IN THE MINING INDUSTRY<sup>1</sup>, 1982-88

	1982	1983	1984	1985	1986	1987 <sup>p</sup>	1988 <sup>f</sup>
	(\$ million)						
<b>Metal Mines</b>							
Capital							
Construction	1 099.4	839.1	942.2	1 053.5	979.7	1 176.0	1 202.9
Machinery	370.6	312.0	372.7	322.4	319.4	359.1	499.7
Total	1 470.0	1 151.1	1 314.9	1 375.9	1 299.1	1 535.1	1 702.6
Repair							
Construction	112.4	93.3	99.6	104.5	99.6	93.0	112.4
Machinery	805.1	728.0	861.1	846.4	811.3	877.0	906.8
Total	917.5	821.3	960.7	950.9	910.9	970.0	1 019.2
Total capital and repair	2 387.5	1 972.4	2 275.6	2 326.8	2 210.0	2 505.1	2 721.8
<b>Nonmetal Mines<sup>2</sup></b>							
Capital							
Construction	888.6	1 123.3	658.6	573.6	502.4	420.0	352.7
Machinery	563.3	433.9	571.7	350.1	256.6	241.2	292.0
Total	1 451.9	1 557.2	1 230.3	923.7	759.0	661.2	644.7
Repair							
Construction	28.6	25.5	47.2	39.3	31.2	27.4	28.2
Machinery	431.8	401.5	454.8	529.5	565.4	565.4	580.9
Total	460.4	427.0	502.0	568.8	596.6	592.8	609.1
Total capital and repair	1 912.3	1 984.2	1 732.3	1 492.5	1 355.6	1 254.0	1 253.8
<b>Mineral Fuels</b>							
Capital							
Construction	6 019.2	6 034.1	6 643.5	7 645.9	5 142.4	4 025.9	5 525.5
Machinery	1 420.5	880.6	686.7	959.7	496.4	480.3	685.1
Total	7 439.7	6 914.7	7 330.2	8 605.6	5 638.8	4 506.2	6 210.6
Repair							
Construction	484.4	427.4	283.4	374.3	316.5	312.5	351.8
Machinery	698.3	656.7	709.5	761.3	705.5	668.1	735.5
Total	1 182.7	1 084.1	992.9	1 135.6	1 022.0	980.6	1 087.3
Total capital and repair	8 622.4	7 998.8	8 323.1	9 741.2	6 660.8	5 486.8	7 297.9
<b>Total Mining</b>							
Capital							
Construction	8 007.2	7 996.5	8 244.3	9 273.0	6 624.5	5 621.9	7 081.1
Machinery	2 354.4	1 626.5	1 631.1	1 632.2	1 072.4	1 080.6	1 476.8
Total	10 361.6	9 623.0	9 875.4	10 905.2	7 696.9	6 702.5	8 557.9
Repair							
Construction	625.4	546.2	430.2	518.1	447.3	432.9	492.4
Machinery	1 935.2	1 786.2	2 025.4	2 137.2	2 082.2	2 110.5	2 223.2
Total	2 560.6	2 332.4	2 455.6	2 655.3	2 529.5	2 543.4	2 715.6
Total capital and repair	12 922.2	11 955.4	12 331.0	13 560.5	10 226.4	9 245.9	11 273.5

<sup>1</sup> Does not include cement, lime and clay products (domestic clays) manufacturing, smelting and refining. <sup>2</sup> Includes coal mines, asbestos, gypsum, salt, potash, miscellaneous nonmetals, quarrying and sand pits.

<sup>p</sup> Preliminary; <sup>f</sup> Forecast.

TABLE 13. CANADA, CAPITAL AND REPAIR EXPENDITURES IN MINING<sup>1</sup> AND MINERAL MANUFACTURING INDUSTRIES, 1986-88

	1986			1987 <sup>p</sup>			1988 <sup>f</sup>		
	Capital	Repair	Total	Capital	Repair	Total	Capital	Repair	Total
	(\$ million)								
<b>Mining Industry</b>									
Metal mines									
Copper-gold-silver	223.4	225.1	448.5	229.8	259.5	489.3	193.6	257.3	450.9
Gold	516.0	126.0	642.0	737.1	136.7	873.8	742.7	172.5	915.2
Iron	118.3	202.2	320.5	116.7	178.7	295.4	123.2	180.5	303.7
Silver-lead-zinc	62.7	84.7	147.4	118.3	108.4	226.7	97.2	119.0	216.2
Other metal mines	378.7	272.9	651.6	333.2	286.7	619.9	545.9	289.9	835.8
Total metal mines	1 299.1	910.9	2 210.0	1 535.1	970.0	2 505.1	1 702.6	1 019.2	2 721.8
Nonmetal mines									
Asbestos	43.6	39.2	82.8	51.2	46.9	98.1	28.4	54.9	83.3
Other nonmetal mines <sup>2</sup>	715.4	557.4	1 272.8	610.0	545.9	1 155.9	616.3	554.2	1 170.5
Total nonmetal mines	759.0	596.6	1 355.6	661.2	592.8	1 254.0	644.7	609.1	1 253.8
Mineral fuels									
Oil, crude and gas <sup>3</sup>	5 638.8	1 022.0	6 660.8	4 506.2	980.6	5 486.8	6 210.6	1 087.3	7 297.9
Total mining industries	7 696.9	2 529.5	10 226.4	6 702.5	2 543.4	9 245.9	8 557.9	2 715.6	11 273.5
<b>Mineral Manufacturing</b>									
Primary metal industries									
Aluminum rolling, casting and extruding	48.2	59.3	107.5	46.8	53.4	100.2	92.9	57.2	150.1
Copper and copper alloy, rolling, casting and extruding	8.6	9.7	18.3	13.9	14.5	28.4	9.2	14.2	23.4
Iron and steel mills	843.2	793.5	1 636.7	774.8	828.0	1 602.8	828.8	942.8	1 771.6
Iron foundries	51.4	62.3	113.7	42.3	57.3	99.6	26.5	58.6	85.1
Metal rolling, casting and extruding	28.9	22.6	51.5	25.4	16.8	42.2	21.9	17.5	39.4
Smelting and refining	583.1	403.6	986.7	541.3	467.1	1 008.4	841.1	479.9	1 321.0
Steel pipe and tube mills	170.4	54.9	225.3	59.0	62.4	121.4	58.1	67.5	125.6
Total primary metal industries	1 733.8	1 405.9	3 139.7	1 503.5	1 499.5	3 003.0	1 878.5	1 637.7	3 516.2
Nonmetallic mineral products									
Abrasives	5.3	13.3	18.6	7.0	11.3	18.3	8.3	11.7	20.0
Cement	52.2	85.7	137.9	42.0	86.8	128.8	99.6	94.0	193.6
Clay products	12.2	6.0	18.2	26.8	8.5	35.3	19.4	8.0	27.4
Concrete products	50.0	31.2	81.2	34.5	29.9	64.4	33.2	29.0	62.2
Glass and glass products	95.9	30.4	126.3	97.0	27.7	124.7	91.2	29.2	120.4
Lime	9.1	8.6	17.7	5.6	5.9	11.5	6.6	6.6	13.2
Ready-mix concrete	60.2	65.9	126.1	61.2	60.9	122.1	86.2	57.7	143.9
Stone products	2.2	0.4	2.6	7.2	1.5	8.7	1.8	1.6	3.4
Other nonmetallic mineral products	44.0	68.9	112.9	44.8	58.5	103.3	103.6	57.9	161.5
Total nonmetallic mineral products	331.1	310.4	641.5	326.1	291.0	617.1	449.9	295.7	745.6
Petroleum and coal products									
Petroleum refineries	392.8	288.1	680.9	650.8	359.6	1 010.4	754.3	344.2	1 098.5
Petroleum and coal products	5.4	15.8	21.2	9.0	15.1	24.1	7.6	15.1	22.7
Total petroleum and coal products	398.2	303.9	702.1	659.8	374.7	1 034.5	761.9	359.3	1 121.2
Total mineral manufacturing industries	2 463.1	2 020.2	4 483.3	2 489.4	2 165.2	4 654.6	3 090.3	2 292.7	5 383.0
Total mining and mineral manufacturing industries	10 160.0	4 549.7	14 709.7	9 191.9	4 708.6	13 900.5	11 648.2	5 008.3	16 656.5

<sup>1</sup> Does not include cement, lime and clay products (domestic clay) manufacturing, smelting and refining. <sup>2</sup> Includes coal mines, gypsum, salt, potash and miscellaneous nonmetal mines and quarrying. <sup>3</sup> The total of capital expenditures shown under "petroleum and gas" is equal to the total capital expenditure under the columns entitled "petroleum and natural gas extraction", "natural gas processing plants" and "oil and gas drilling contractors" of Table 14.

<sup>p</sup> Preliminary; <sup>f</sup> Forecast.

**TABLE 14. CANADA, CAPITAL EXPENDITURES IN THE PETROLEUM, NATURAL GAS AND ALLIED INDUSTRIES<sup>1</sup>, 1981-88**

	Petroleum and Natural Gas Extraction	Transportation Including Rail, Water and Pipelines	Marketing (Chiefly Outlets of Oil Companies)	Natural Gas Distribution	Petroleum and Coal Products Industries	Natural Gas Processing Plants	Oil and Gas Drilling Contractors	Total Capital Expenditures
	(\$ million)							
1981	6 444.9	1 745.7	264.1	408.7	844.9	311.6	274.9	10 294.8
1982	6 743.4	1 994.3	320.5	517.6	1 224.5	522.8	173.5	11 496.6
1983	6 563.5	660.5	374.5	516.8	840.8	195.8	155.4	9 307.3
1984	6 946.4	795.4	422.9	604.1	432.4	340.0	43.8	9 585.0
1985	8 187.6	664.2	356.8	603.5	335.7	337.7	80.1	10 565.6
1986	5 401.1	586.9	344.9	573.9	398.2	207.8	29.9	7 542.7
1987 <sup>p</sup>	4 331.6	528.6	426.1	534.0	659.8	160.9	13.6	6 654.6
1988 <sup>f</sup>	5 967.1	779.3	479.6	532.4	761.9	225.4	18.0	8 763.7

<sup>1</sup> The petroleum and natural gas industries in this table include all companies engaged in whole or in part in oil and gas activities.

<sup>p</sup> Preliminary; <sup>f</sup> Forecast.

## METALLIC MINERALS AND PRODUCTS

### Aluminum

G. Bokovay

Aluminum prices during the first quarter of 1988 have climbed to record highs as a result of continuing strong demand and relatively low inventory levels. The threat of a strike at Kaiser Aluminum & Chemical Corporation in the United States has also bolstered price levels. On March 31, the cash price for high-grade aluminum (99.7%) on the LME reached US\$1.34/lb. The average price for the month was \$1.15 compared to \$0.98 in February and \$0.91 in January.

The International Primary Aluminum Institute (IPAI) has reported that total inventories of aluminum (including scrap, primary and secondary ingot, metal in process and finished mill products) increased in January to 3.168 Mt from a level of 3.035 Mt in December 1987. Despite the reversal of the downward trend in inventory levels, it is widely believed that the January figure was an aberration and that aluminum stocks will continue to decline.

The IPAI also reported that western world average daily primary aluminum output increased marginally in February to 35 500 t from 35 400 t in January.

During March, 6 000 members of the Fédération des syndicats du secteur de l'aluminium inc. (FSSA) ratified a new collective agreement with Alcan Smelters and Chemicals Limited, a unit of Alcan Aluminium Limited. The agreement covers operations of three aluminum smelters in Quebec. Meanwhile, 485 workers at the company's Shawinigan smelter, members of the Confederation of National Trade Unions, also ratified a new collective agreement in March. The 84 000 t/y Shawinigan plant was idled at the end of October when Alcan implemented a lock-out of employees following several work stoppages.

Also in March, Alcan announced that its Alcan Rolled Products Company (Canada) subsidiary, would invest in excess of US\$60 million to modernize its Terre Haute, Indiana foil rolling plant. This will include the construction of a new foil mill to be completed by the second quarter of 1990.

In South America, Suriname Aluminum Company (Suralco) announced at the end of March that it would restart one of two potlines at its aluminum smelter in July 1988. The smelter was closed in early 1987 following the destruction of power lines by guerilla forces. In Venezuela, Aluminio del Caroni SA (Alcasa) signed an agreement with Austria Metall A.G. and Aluminium Pechiney S.A. for the construction of a new 180 000 t/y aluminum smelter at Puerto Ordaz. The smelter is expected to be completed in 1991. Ownership of the facility will be Austria Metall 40%, while Pechiney and Alcasa will have 30% each. It has also been reported that there has been some discussion between the Venezuelan government and the two foreign companies regarding a possible swap of government debt for an equity stake in the smelter project.



# **Copper** W. McCutcheon

## Metal Prices - US Cents/lb.

	London Metal Exchange (LME) Grade A Cash Settlement March 1-31	Commodities Exchange, Inc. (COMEX) 1st Position March 1-30
High	115.8	114.0
Low	97.8	93.1
Average	106.9	103.7
Year to date average	110.7	108.7
Year to date average cents Canadian	140.6	137.9

Between February 26 and March 25, the combined LME and COMEX stocks declined from 77 869 t to 66 855 t.

Hudson Bay Mining and Smelting Co., Limited (HBM&S) agreed to sell a 49% interest in the Callinan property to Manitoba Mineral Resources Ltd. (MMRL) for C\$9.7 million. The orebody, located 300 m from its main orebody, has reserves estimated at 2.4 Mt at 4% Zn, 1.5% Cu, 0.055 oz/st gold and 0.66 oz/st silver. Expenses to develop the orebody will be shared on a 51/49 basis between HMB&S and MMRL. Production should begin in 1989 at a rate of about 450 000 t/y.

Cyprus Twin Buttes Corp., a newly formed subsidiary of Cyprus Minerals Company, will reopen the Twin Buttes mine near Tuscon Ariz. Reserves at the property are estimated at 37 Mst at 0.92% Cu sulphide and 10.6 Mst of 0.73% acid soluble copper, with some molybdenum and silver present. Some ore will be processed on site and some will be transported to Cyprus's nearby Sierrita mine.

Corporacion Nacional del Cobre de Chile (CODELCO-CHILE) will produce 1.128 Mt in 1988 compared to 1.168 Mt in 1987. The 40 000 t shortfall is due to the problems at El Teniente.

Empresa Nacional de Minería (ENAMI) of Chile reported its 1987 refined copper output at 200 156 t, up 14% from the 1986 production of 175 659 t.

Mitsubishi Metal Corporation confirmed that it was studying the possibility of building a copper smelter in the United States. Cox Creek, Maryland; Tampa, Florida; and a site in Texas are being studied. The company has an interest in both the undeveloped Escondida deposit in Chile and the Cox Creek refinery and rod plant. The results of the study may be made public in April.

Escondida partners, RTZ Escondida, BHP-Utah Escondida and the Japan Escondida Project (JECO) Corporation signed a foreign investment contract with the State of Chile. The contract allows earnings to be remitted and capital repatriated after 3 years. Profit taxes are fixed at 45.4%. The partners committed themselves to finalizing the financing of the project before the end

of 1991. Construction could begin in late 1988 for a 1991 startup if financing can be completed. Financing is expected to be obtained from:

	<u>\$ million</u>
Equity	400
Japanese export-import bank	175
Japanese smelters	175
Federal Republic of Germany	180
Finland	40
International Finance Corporation	80
Supplier credits	50

The Neves Corvo operation finalized long-term contracts for its mine output. Production will be divided:

	<u>000 t/y</u>
Noranda Inc.	60
Norddeutsche Affinerie AG	140
Sumitomo Metal Mining Co. Ltd.	60
Rio Tinto Minera SA	100

The contracts with Noranda and Rio Tinto Minera have 15-year terms. The contract with Sumitomo Metal is an evergreen contract.

## Nickel

R. Telewiak

Nickel prices soared to record highs on the London Metal Exchange (LME) reaching US\$10.84 on March 28. Nickel prices had progressed rapidly upward from \$4.99 at the beginning of March. Strong demand combined with tight supply to push prices to these record levels.

Demand continues to increase from the record levels achieved in 1987, led by strong demand from the stainless steel sector. Producers are operating at their effective capacities but, partially due to some supply disruptions, supplies remain tight. One of the factors affecting the supply of nickel, is the curtailment of exports by Falconbridge Dominicana, C. por A. as a result of a dispute over the imposition of an export tax on nickel. Discussions between the government and Falconbridge continued during the month but were not resolved by month-end. The government permitted Falconbridge to export 1 360 t of nickel but stocks continued to accumulate, since Falconbridge is producing at rates of about 2 600 t/m. Stocks at the end of the month were about 6 000 t.

Production of about 1 300 t of contained nickel in concentrate was lost as a result of a strike at Western Mining Corporation Limited operations at Kambalda, Southwestern Australia. Underground miners went on strike for 12 days, starting March 15, in a dispute over the proposed use of non-unionized employees at the complex. Union workers at the surface facilities at Kambalda staged a sympathy strike for 10 days to back the demands of the miners.

The rising price of nickel has resulted in higher prices for stainless steel and some producers are instituting a nickel surcharge. In Germany, the large stainless steel producer, Krupp Stahl AG, announced that it also plans to institute a surcharge and Thyssen Edelstahlwerke AG, the other major German stainless steel producer, announced that it is considering similar action.

In Japan, the Ministry of International Trade and Industry (MITI), in response to concerns from the nickel consuming sector about the tight market, announced that it would not be releasing nickel from its stockpile. MITI currently holds stocks for about 30 days of consumption, with a goal to increase the level to 90 days by 1992. MITI indicated that the recent surge in nickel prices does not constitute an emergency.

## INDUSTRIAL MINERALS AND PRODUCTS

### Potash George Barry

#### World Production

World production of potash in 1987 was 29 251 000 t K<sub>2</sub>O, an increase of 2.9% over 1986. The reported 1987 production by country, with an estimate for the U.S.S.R. is as follows:

	000 t K <sub>2</sub> O
Brazil	37
Canada	7 267
China	25
France	1 545
Germany, Dem. Rep.	3 500
Germany, Fed. Rep.	2 200
Israel	1 265
Italy	120
Jordan	722
Spain	740
U.S.S.R.	10 200
United Kingdom	428
United States	1 202
<b>TOTAL</b>	<b>29 251</b>

#### Kalium Chemicals - Ownership Change

Kalium Chemicals holds the only potash solution mine in Canada, at Belle Plaine west of Regina, Saskatchewan. The company also holds a promising deep deposit in Michigan. At Belle Plaine, Kalium produces approximately 1.0 Mt/y K<sub>2</sub>O. The capacity of the mine is rated at 1.245 Mt K<sub>2</sub>O.

The new owners of Kalium are KAC Holdings Inc. (80%) and Sullivan and Proops (20%). KAC Holdings Inc. is a holding company for Kaiser Agricultural Chemicals (KAC). KAC is a subsidiary of Great American Management and Investment, Inc. (GAMI). Sullivan and Proops (S & P) holds the operational responsibility for Kalium Chemicals as management consultants for GAMI. Kalium Chemicals was purchased from PPG Industries, Inc., for US\$165 million.



## **Peat**

Michel Prud'homme

### **Saskatchewan**

Les Entreprises Premier Canada Ltée of Rivière-du-Loup has acquired certain assets of Saskatchewan Minerals Corp., a Saskatchewan Crown corporation. Through its new subsidiary, Premier Sask. Inc., Les Entreprises Premier Canada Ltée has purchased, for \$3.4 million, the peat extraction operation located in Carrot River. Premier Sask. Inc. also announced that it intends to invest \$2.5 million in the construction of a new plant and \$500 000 in setting up research facilities. This purchase follows the common share issue staged by Les Entreprises Premier Canada Ltée in the summer of 1987.

## **Sodium Sulphate**

George Barry

### **Sodium Sulphate Inc. - Ownership Change**

Saskatchewan Minerals Corp. (SMC), a Crown corporation, owns three plants producing sodium sulphate from briny lakes. The corporation produces more than half of the province's 300 000 t/y or more of sodium sulphate valued at about \$25 million. SMC operations employ about 130.

The corporation's sodium sulphate operations were sold for \$12.5 million to Kam-Kotia Mines Limited., a division of Dickenson Mines Limited of Toronto. Medium-term job security guarantees were negotiated. Dickenson apparently intends to infuse new capital over the next few years.

## **Sulphur**

Michel Prud'homme

Cominco Ltd. is to undertake a research study on the treatment of sulphur - sulphidic residues from hydrometallurgical processes. Cominco Ltd. and the Government of Canada are sharing the cost of the \$272 000 study which will be carried out at Cominco's Trail plant in British Columbia. The projects will investigate ways to eliminate gas and dust emissions from the hydrometallurgical process and to recover metals and sulphur.

## **Sulphuric Acid**

Michel Prud'homme

### **British Columbia**

Westcoast Transmission Company Limited and C-I-L Inc. have agreed in February to construct an \$8 million expansion at C-I-L's chemical plant in Prince George, British Columbia. The expansion involves the construction of a new 30 000 t/y sulphur dioxide facility and the expansion of the existing 35 000 t/y sulphuric acid plant by 10 000 t/y of acid.

Westcoast Transmission Company Limited is to finance the construction and operate both facilities while C-I-L will market the chemicals exclusively. Products will be sold to the pulp and paper industry in both western Canada and the United States markets. The expansion is scheduled to be completed by late 1988.

## **SPECIAL ITEMS**

### **New Gold Mines: Employment Generators**

by André Lemieux, (613) 992-2709

During the past year, the Canadian mining industry announced plans to bring on-stream more than 30 new gold operations (listed in the December 1987 issue). Most of these will be in production within two years.

Three out of four new operations will be conventional gold mines characterized by underground workings and surface concentration plants; the remaining operations will reprocess low-grade gold-bearing mine waste left behind during previous decades of mining.

The magnitude of gold operations varies widely, involving anywhere from a very few to 350 new jobs. At full production, these new operations would together provide some 2 400 direct full-time ongoing jobs.

It takes a lot of work to end up with pure gold: for every tonne of gold recovered, which could easily fit into a modest suitcase, an irregular underground mass of ore equivalent in size to a hundred fair-sized houses has to be mined and processed. Conventional gold-mining operations announced during the past year call for about 70 person-years of employment per tonne of recoverable gold. Gold mine waste-processing operations, much less common but growing in number, appear to require less than half that number of person-years per tonne of recoverable gold.

Individual new operations promise work for as few as one to as many as fifteen years. Over time, the mining of currently established reserves of gold in the new operations will result in some 18 000 person-years of employment, mostly in conventional mines. But initial ore reserves in conventional mines generally don't define mine life. Historical experience shows that further ore extensions found during mining roughly triple the initially projected life of a conventional gold mine. Therefore, employment associated with the new gold operations announced during the past year may ultimately add up to some 50 000 person-years.

## **Mineral Outlook Conference**

The sixth annual Mineral Outlook Conference (MOC '88), co-hosted by Energy, Mines and Resources Canada and The Mining Association of Canada, will be held on Wednesday, May 25 at the Westin Hotel, Ottawa.

Information: Jan Zwartendyk (613) 992-6406  
Conference Coordinator

## **Technology Trends '88**

This conference, being held on Tuesday, May 24 from 1:15 pm to 4:30 pm at the Westin Hotel, Ottawa, will be presented by CANMET and MITEC.

Information: Mrs. Diane Loucks (613) 996-0181  
'88 Secretariat  
CANMET



## **NEW PUBLICATIONS**

### **Sourcebook on Advanced Industrial Materials**

A new sourcebook has just been completed for the Interdepartmental Working Group on Advanced Industrial Materials. It contains summary information on the research and development activities of Canadian companies, universities, government laboratories, and provincial research organizations engaged in research and development in the field of advanced industrial materials.

Copies of **Advanced Industrial Materials: 1988 Canadian Sourcebook**, which is intended as an information resource for those interested in the fields of advanced industrial materials and advanced materials processing technologies are available from:

Advanced Industrial Materials  
Ministry of State (Science and Technology)  
240 Sparks Street  
8th Floor West  
Ottawa, Ontario  
K1A 1A1

### **Mineral Publications**

The following publications were recently published by Energy, Mines and Resources Canada. Copies may be obtained from the indicated distribution centre.

MR 217 - Canadian Mines: Perspective from 1987

Catalogue No.: M38-2/217  
ISBN: 0-660-54066-5  
Price: \$9.00

Canadian Government Publishing Centre  
Supply and Services Canada  
Ottawa, Ontario  
K1A 0S9

Gold Deposits and Occurrences in Canada

Publication Distribution Office  
Mineral Policy Sector  
Department of Energy, Mines and Resources  
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Ottawa, Ontario  
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