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Future supply and demand of certain metals imports in South Africa: a commodities study

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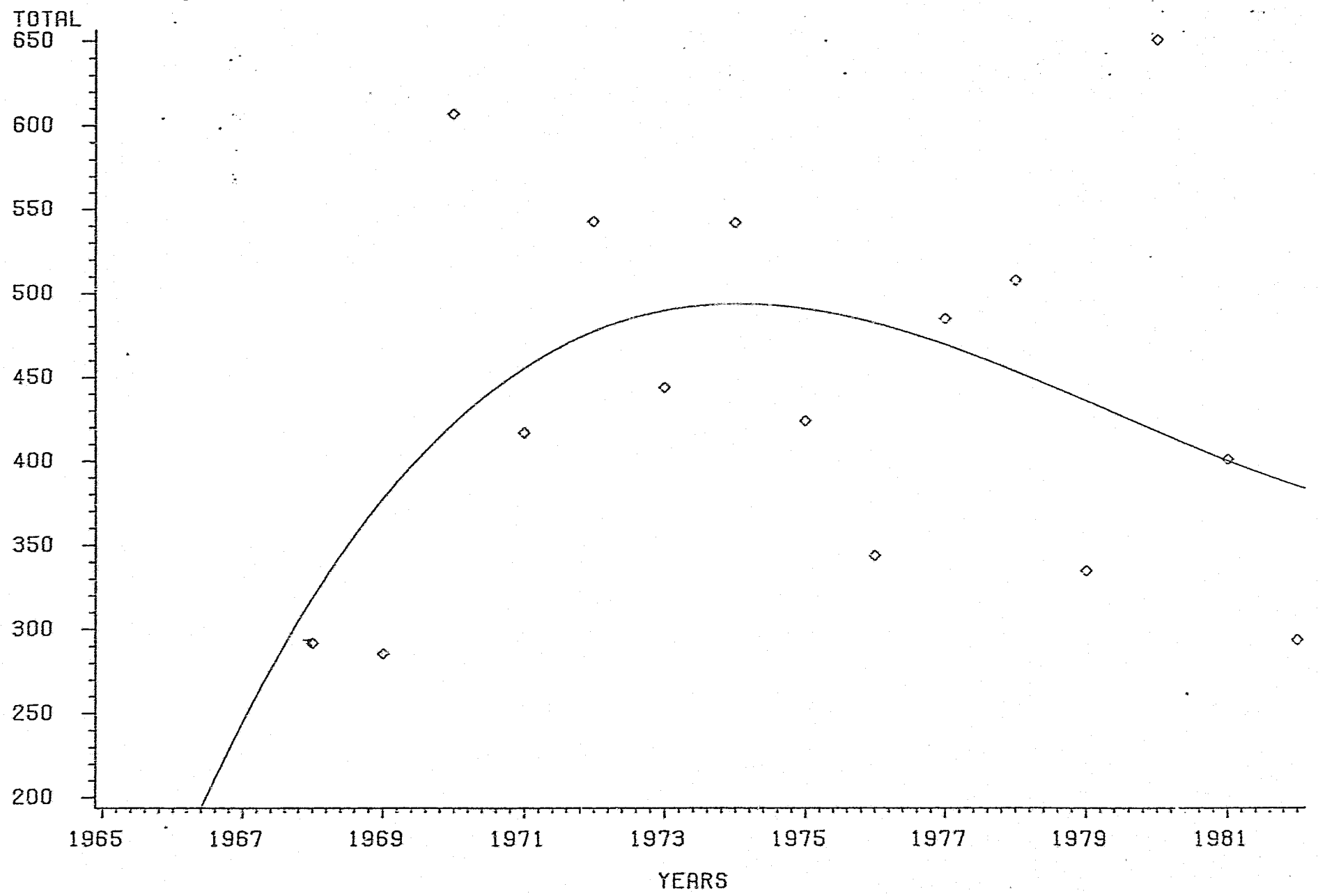
APPENDIX TWO

PRINCIPAL WORLD TUNGSTEN MINES IN 1980

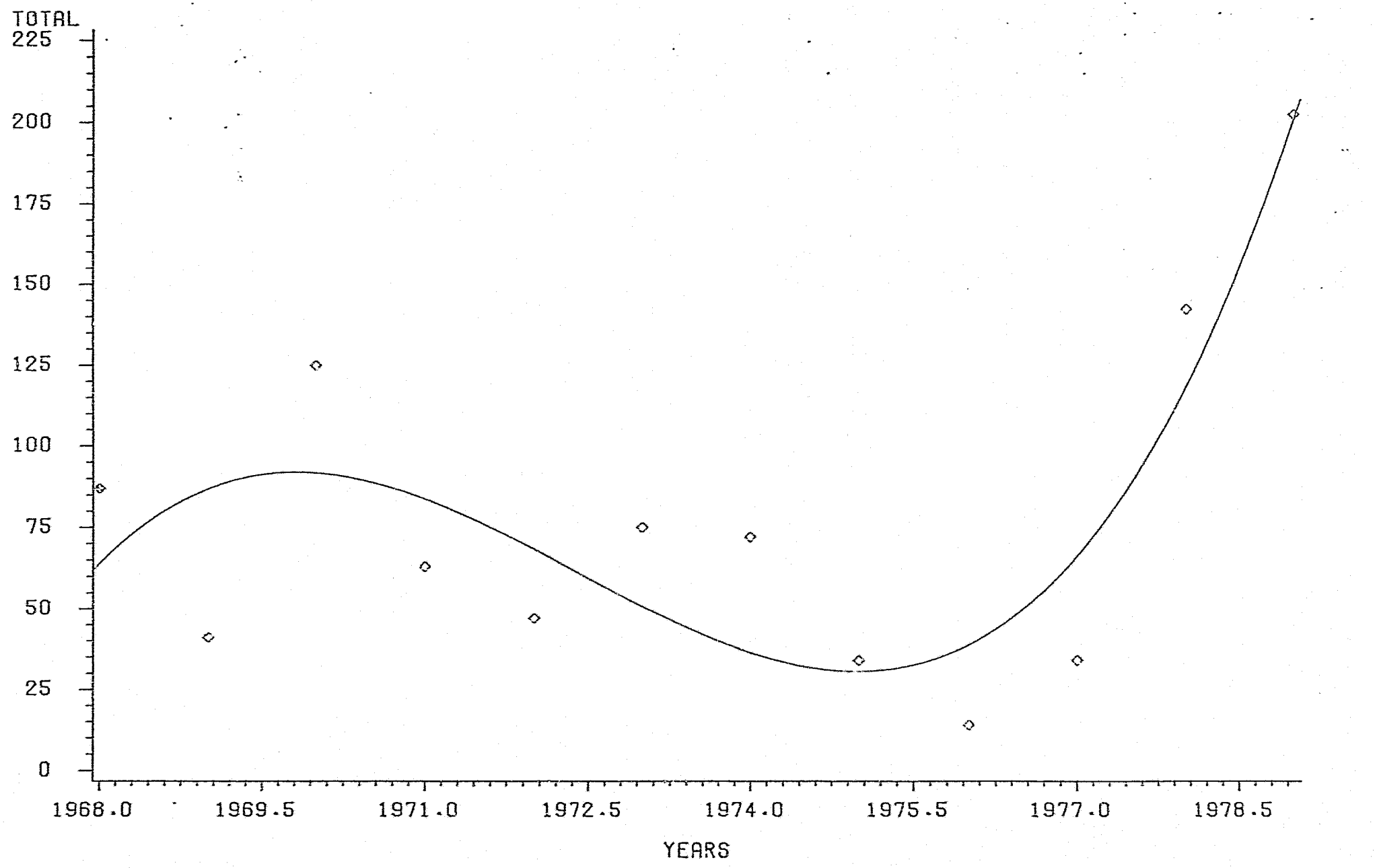
Country	Company	Mine	Ore type
Australia	Peko Wallsend	King Island	Scheelite
	Queensland Wolfram	Mount Carbine	Wolframite
Austria	Wolfram Bergbau	Mittersill	Scheelite
Bolivia	International Mining	Chojlla	Wolframite
	COMIBOL	Kani	?
Brazil	Mineracao Tomaz Salustino	Brejul	?
Canada	Canada Tungsten Mining	Cantung	Scheelite
China	Government	Jiangxi Province	?
France	Société Minière D'Anglade	Salau	Scheelite
N. Korea	Government	Various	?
Republic of Korea	Korea Tungsten Mining	Sang Dong	Scheelite
Portugal	Beralt Tin and Wolfram	Panasqueira	Wolframite
Thailand	Various private	Various	?
United States	AMAX	Climax	Wolframite
	Teledyne Tungsten	North Fork	?
	Union Carbide	Pine Creek	Scheelite
U.S.S.R.	Government	Various	?

APPENDIX THREE

GRAPHS DEPICTING IMPORT/EXPORT TRENDS OF MINOR TUNGSTEN COMMODITIES

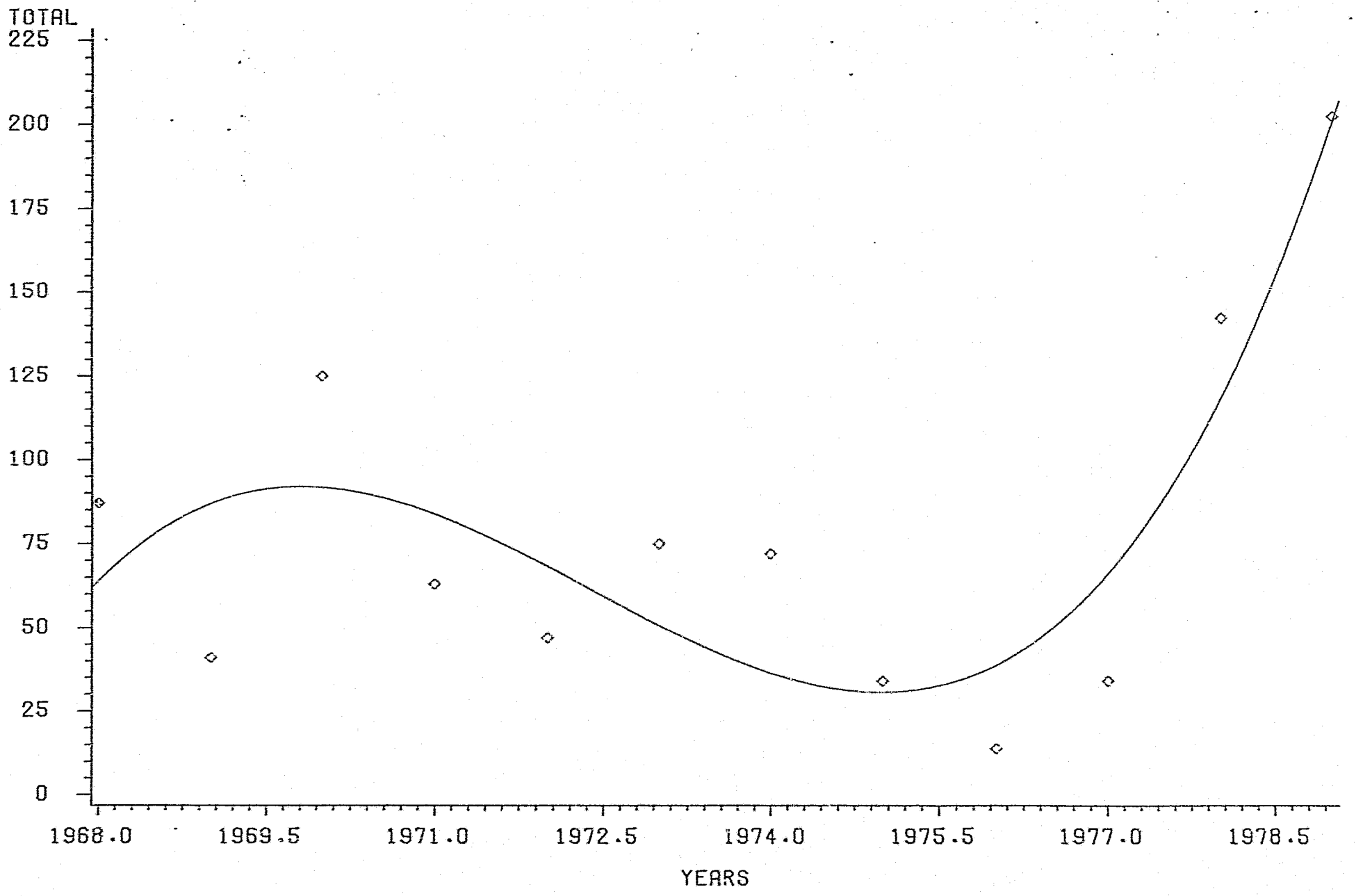


ORES AND CONCENTRATES OF TUNGSTEN
IMPORTS IN TONS

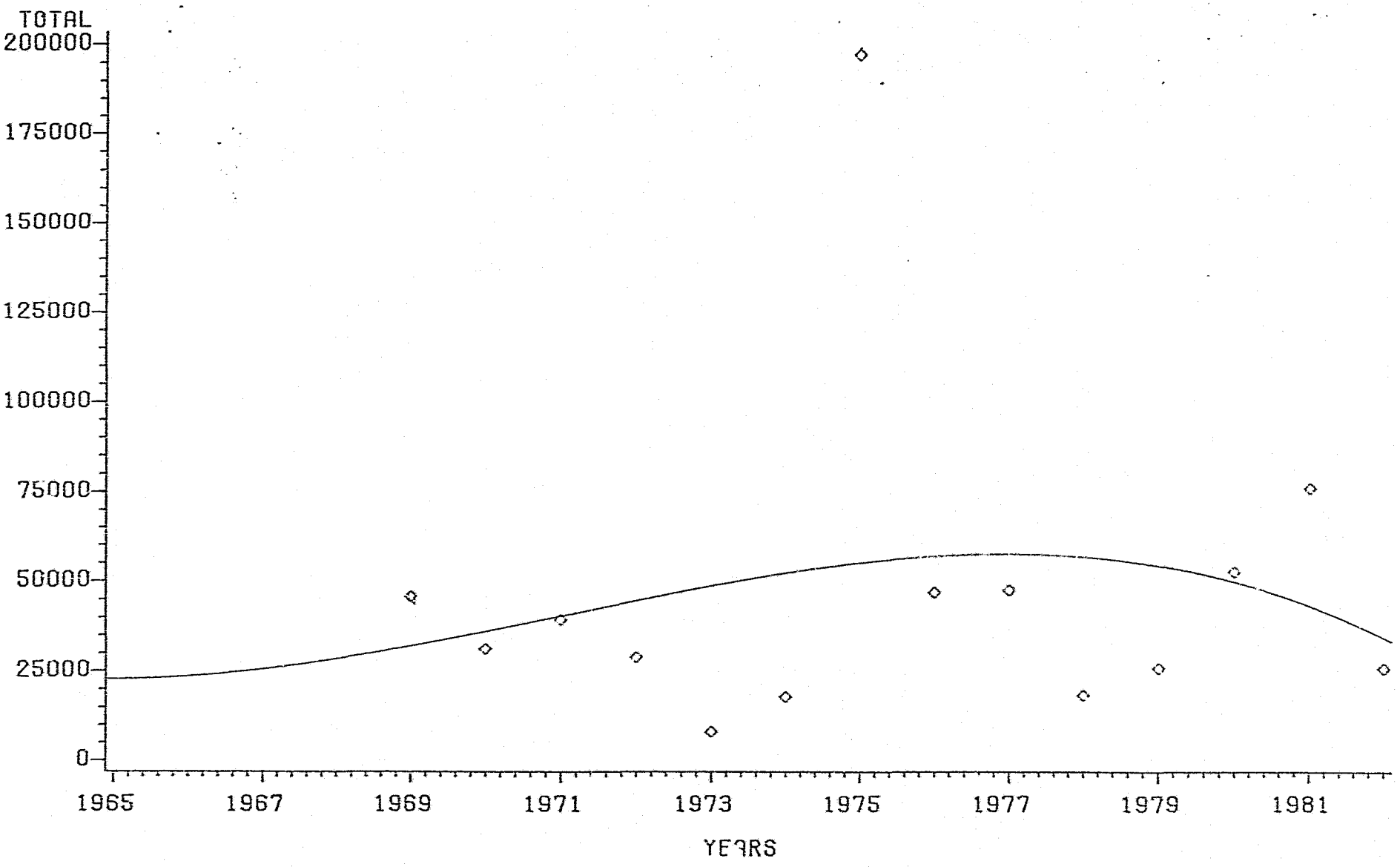


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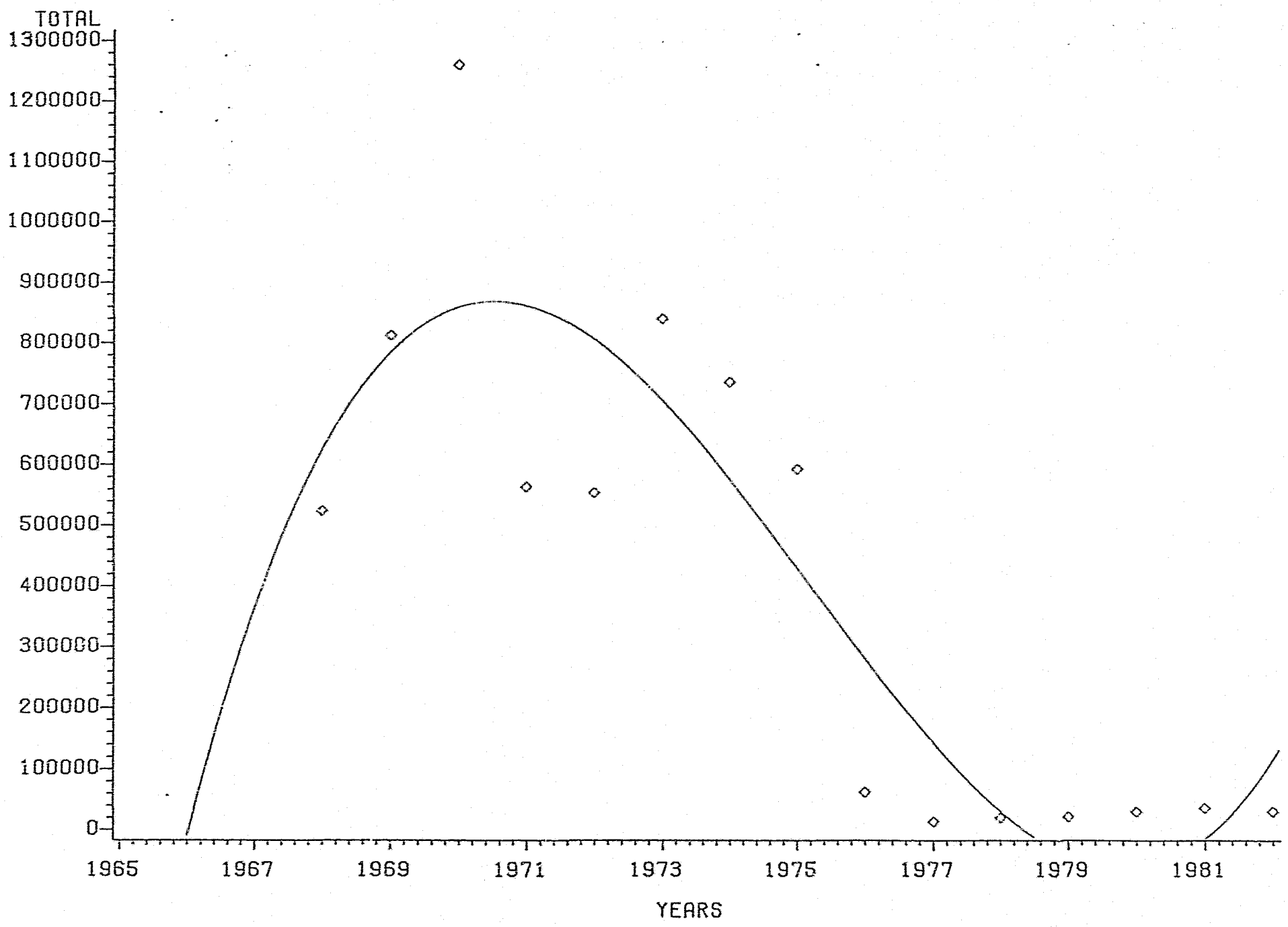
TUNGSTEN METAL ARTICLES
IMPORTS IN TONS



TUNGSTEN METAL ARTICLES
IMPORTS IN TONS



TUNGSTEN CARBIDE ROCK DRILL BITS
NUMBER OF ITEMS



TUNGSTEN TOOL TIPS AND PLATES
NUMBER OF ITEMS

APPENDIX FOUR

PRINCIPAL PRODUCERS OF COBALT[14]

1. North America

Canada

(i) Sherrit Gordon Mines, Saskatchewan - a primary producer, formerly mainly from the Lynn Lake mine, but also treating concentrates from sundry sources including South Africa.

(ii) International Nickel Company of Canada Ltd. - a primary producer of a white metal matte at Port Colbourne, shipped South Wales for refining.

(iii) Falconbridge Nickel Mines Ltd. - a primary producer, mostly shipped to Kristiansand, Norway

United States

Amax Nickel Inc. - operating the Port Nickel refinery in Louisiana using imported concentrate and mattes from various sources including Selebi-Pikwe and Zaire.

2. Europe

Belgium

Metallurgie Hoboken-Overpelt S.A. - smelters and refiners using concentrates and mattes from Gécamines S.A. in Zaire.

Finland

Outokumpu Oy - primary producer as well as refiner using pyritic concentrates from the Outokumpu mine with reserves from the Vuonos mine.

France

Pechiney Ugine Kuhlmann - smelters and refiners using concentrates largely from Morocco and New Caledonia.

West Germany

(i) Duisberger Kupferhutte

(ii) Gesellschaft für Electrometallurgie GmbH.

(iii) Herman C. Starck

All three companies use imported concentrates or mattes. Duisberg Kupferhutte make use of a wide variety of pyrite residues from Cyprus, Finland, Norway, Spain and Sweden from which various metals are recovered.

Norway

Falconbridge Nikkel A/S - Kristiansand, operating mainly on nickel-copper-cobalt matt from Falconbridge, Ontario, occasionally supplemented by concentrates from Kilembe in Uganda (if available)

United Kingdom

International Nickel Ltd. - refining matte from the Port Colborne works in Ontario, shipped to Clybach, South Wales.

3. Asia

U.S.S.R.

Principal production is from the Norilak combine, Pechenga and Monchegorsk copper-nickel sulphide deposits, but several of the cupriferous pyrite deposits of the Urals region also produce cobalt concentrates. The Khovuasky deposit, close to the border of Siberia and Mongolia is one of the few mines in which cobalt is the primary product.

Japan

(i) Nippon Mining Company - using concentrates from Australia.
(ii) Sumitomo Metal Mining Co. - using a nickel/cobalt slurry from the Marinduque Mining Co. on the Nonoc Island in the Phillipines

4. Oceania

(i) Broken Hill - small production from zinc concentrates.
(ii) Western Mining Corp. - production from nickel/cobalt concentrates from Kamabalda, at Kivinana refinery.
(iii) Great Boulder Mines Ltd. - cobalt produced from nickel concentrates from the Scotia mine.
(iv) Freeport Queensland Nickel Inc. - joint venture between Freeport Minerals and Metals Exploration Queensland Ltd. producing cobalt from basically a nickel ore. The ore is processed at Vabulu near Townsville and the cobalt, in crude form, exported mainly to Japan.

Indonesia

P T Pacific Nikkel Indonesia Ltd.

New Caledonia

(i) Penamax - joint venture between Amax and Pennarroya to work laterite nickel/cobalt deposits, the matte sent for refining at the Port Nickel refinery in Louisiana.
(ii) Société le Nickel - cobalt matte and concentrates from lateritic ores exported mainly to France.

Phillipines

(i) Marinduque Mining and Industrial Corp. - primary producer at Surigao mine, Nonoc Island exporting to Japan, although pure cobalt maybe produced at Surigao using the Sheritt Gordon process.
(ii) Acoje Mining Co. - Zambales Province with very small output.

5. Africa

Morocco

Companie de Tifnout Tiranimine - operates Bou Azzer and Graara mines as primary producers. Originally developed with Soviet aid but now operating under French control. Concentrates exported to Belgium, France and China Reserves are limited.

Botswana

Botswana Concessions Ltd. - operating the Selebi-Pikwe nickel/copper mine, sending matte to the Amax refinery at Port Nickel, Louisiana.

Uganda

Kilembe Copper Cobalt Ltd. - since nationalisation in 1975 production has declined but concentrates have occasionally been sent to Norway.

Zaire

La Générale des Carriers et des Mines (Gécamines) - formerly Union Miniére du Haut-Katanga. Main production is from Tenke-Fungurume, Kolwezi, Dikluwe and Mashamba mines. Cobalt is produced as white metal (matte), red alloy (copper-cobalt) and slags which are exported to Belgium. Electrolytic cobalt is produced from leaching concentrates at the Jadotville-Shituru refinery.

Zimbabwe

Empress Nickel Mines Ltd.

South Africa

Cobalt production is discussed in detail in section 5.5.

6. Latin America and the Caribbean

Cuba

Cubaniquel - cobalt is produced in the Oriente Province at Nicaro and Moa Bay. Prior ro nationalisation in 1960 the concentrates were shipped to the Port Nickel refinery, owned then by Freeport Sulphur Corporation.

APPENDIX FIVE

COBALT SULPHATE (cattle feed)

	Heptahydrate	Monohydrate
	Type: ((F.G.))	Pulverulent
	$CoSO_4 . 7H_2O$	$CoSO_4 . H_2O$

Chemical Analysis

Co approx.	21. - %	33. - %
Ni	0.05	0.07
Fe	0.001	0.001
Mn	0.002	0.003
Cu	$\leq$0.001	$\leq$0.001
Pb	$\leq$0.001	$\leq$0.001
SiO_2	0.002	0.003
CaO	0.08	0.12
MgO	0.07	0.10
Insoluble in H_2O	0.20	0.01

Apparent density (g/cm^3) after tapping: 1.25

Size Analysis

% fine crystals after sieving (Tyler sieve with slight brushing)

+ 35 mesh	0.05
-35 + 100 mesh	0.25
-100 + 400 mesh	0.20
-400 mesh	99.50

Standard packing

woven polypropylene bags (interior polyethylene lining)	55 x 95cm	50kg.

Other packing

metal drums (interior polyethylene bag)	Ø41 x 54 cm	50kg.
metal drums (interior polyethylene bag)	Ø35 x 49 cm	25kg.

Company: SOCIETE GENERALE DES MINERAIS
RUE DU MARAIS 31
1000 BRUXELLES

APPENDIX SIX

MINOR PRODUCERS AND EASTERN BLOC BAUXITE OUTPUT (million tons)

Western Bloc	1968	1969	1970	1971	1972	1973	1974	1975	1976
Dominican Rep.	1,0	1,1	1,1	1,0	1,2	1,4	1,0	0,6	0,5
Malaysia	1,0	1,1	1,3	1,0	1,1	1,0	1,0	0,7	0,7
Indonesia	0,8	0,9	1,0	1,2	1,3	1,2	1,3	1,0	0,9
Haiti	0,7	0,8	0,7	0,7	0,8	0,8	0,6	0,5	0,7
Sierra Leone	0,4	0,4	0,5	0,5	0,7	0,7	0,7	0,7	0,7
Ghana	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,3	0,3
Brazil	0,3	0,3	0,4	0,5	0,3	0,8	1,0	1,3	1,3
Italy	0,0	0,2	0,2	0,2	0,01	-	-	-	-
Turkey	-	-	0,05	0,1	0,2	0,3	0,7	0,6	0,5

	1977	1978	1979	1980	1981	1982
Dominican Rep.	0,7	0,6	0,5	0,5	0,4	0,4
Malaysia	0,6	0,6	0,4	0,9	0,7	0,6
Indonesia	1,3	1,0	1,1	1,3	1,2	1,0
Haiti	0,7	0,6	0,6	0,5	0,5	0,4
Sierra Leone	0,8	0,7	0,7	0,8	0,6	0,6
Ghana	0,3	0,3	0,3	0,2	0,3	0,2
Brazil	1,0	1,2	1,6	4,2	4,2	4,5
Italy	-	-	-	-	-	-
Turkey	0,6	0,5	0,2	0,4	0,5	0,5

Eastern Bloc	1968	1969	1970	1971	1972	1973	1974	1975	1976
U.S.S.R.	4,9	5,2	5,4	5,8	5,8	5,8	x	x	x
Hungary	1,8	1,9	2,0	2,1	2,4	2,7	2,7	2,8	3,0
Rumania	0,6	0,6	0,8	0,8	0,9	0,9	x	x	x
China	0,4	0,4	0,4	0,5	0,6	0,6	x	x	x
TOTAL (EAST)	7,7	8,1	8,6	9,2	9,7	10,0	2,7	2,8	3,0

	1977	1978	1979	1980	1981	1982
U.S.S.R.	x	x	x	x	x	x
Hungary	3,1	3,0	3,0	3,0	3,1	3,0
Rumania	x	x	x	x	x	x
China	x	x	x	x	x	x
TOTAL (EAST)	3,1	3,0	3,0	3,0	3,1	3,0

x figures not published

APPENDIX SIX

MINOR PRODUCERS AND EASTERN BLOC BAUXITE OUTPUT (million tons)

Western Bloc	1968	1969	1970	1971	1972	1973	1974	1975	1976
Dominican Rep.	1,0	1,1	1,1	1,0	1,2	1,4	1,0	0,6	0,5
Malaysia	1,0	1,1	1,3	1,0	1,1	1,0	1,0	0,7	0,7
Indonesia	0,8	0,9	1,0	1,2	1,3	1,2	1,3	1,0	0,9
Haiti	0,7	0,8	0,7	0,7	0,8	0,8	0,6	0,5	0,7
Sierra Leone	0,4	0,4	0,5	0,5	0,7	0,7	0,7	0,7	0,7
Ghana	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,3	0,3
Brazil	0,3	0,3	0,4	0,5	0,3	0,8	1,0	1,3	1,3
Italy	0,0	0,2	0,2	0,2	0,01	-	-	-	-
Turkey	-	-	0,05	0,1	0,2	0,3	0,7	0,6	0,5

	1977	1978	1979	1980	1981	1982
Dominican Rep.	0,7	0,6	0,5	0,5	0,4	0,4
Malaysia	0,6	0,6	0,4	0,9	0,7	0,6
Indonesia	1,3	1,0	1,1	1,3	1,2	1,0
Haiti	0,7	0,6	0,6	0,5	0,5	0,4
Sierra Leone	0,8	0,7	0,7	0,8	0,6	0,6
Ghana	0,3	0,3	0,3	0,2	0,3	0,2
Brazil	1,0	1,2	1,6	4,2	4,2	4,5
Italy	-	-	-	-	-	-
Turkey	0,6	0,5	0,2	0,4	0,5	0,5

Eastern Bloc	1968	1969	1970	1971	1972	1973	1974	1975	1976
U.S.S.R.	4,9	5,2	5,4	5,8	5,8	5,8	x	x	x
Hungary	1,8	1,9	2,0	2,1	2,4	2,7	2,7	2,8	3,0
Rumania	0,6	0,6	0,8	0,8	0,9	0,9	x	x	x
China	0,4	0,4	0,4	0,5	0,6	0,6	x	x	x
TOTAL (EAST)	7,7	8,1	8,6	9,2	9,7	10,0	2,7	2,8	3,0

	1977	1978	1979	1980	1981	1982
U.S.S.R.	x	x	x	x	x	x
Hungary	3,1	3,0	3,0	3,0	3,1	3,0
Rumania	x	x	x	x	x	x
China	x	x	x	x	x	x
TOTAL (EAST)	3,1	3,0	3,0	3,0	3,1	3,0

x figures not published

APPENDIX SEVEN

MINOR ALUMINIUM COMMODITY TRADE STATISTICS[30]

Aluminium foil of the thickness not exceeding 0,2mm (item 76.04)

YEAR	IMPORTS		EXPORTS	
	Quantity (tons)	Value(current R)	Quantity (tons)	Value(current R)
1968	×	×	×	×
1969	2 070	703 225	745	326 993
1970	3 082	1 141 428	810	324 370
1971	1 171	934 299	358	321 720
1972	1 236	1 100 502	228	230 614
1973	1 274	1 121 095	×	106 580
1974	2 066	2 135 819	×	218 996
1975	851	1 266 094	×	167 180
1976	651	1 369 372	×	214 468
1977	1 084	1 416 803	×	262 441
1978	643	2 289 717	×	298 394
1979	556	2 274 997	×	192 633
1980	1 842	6 013 175	×	259 411
1981	2 038	6 612 786	×	45 350
1982	1 076	4 911 111	×	296 367

Aluminium powders and flakes (item 76.05)[30]

1968	×	×	×	×
1969	120	27 961	202	38 729
1970	316	78 919	270	54 000
1971	65	65 594	18	9 602
1972	39	45 678	7	4 489
1973	64	74 810	×	158 417
1974	367	111 492	×	33 873
1975	39	71 367	×	28 271
1976	87	199 483	×	8 169
1977	41	125 650	×	95 026
1978	35	183 937	×	94 140
1979	54	146 291	×	784 730
1980	1 269	2 219 911	×	1 840 697
1981	1 121	2 065 405	×	486 028
1982	1 223	2 206 933	×	103 646

Tubes, pipes and blanks: hollow bars of aluminium (item 76.06)[30]

YEAR	IMPORTS		EXPORTS	
	Quantity (tons)	Value (current) R	Quantity (tons)	Value (current) R
1968	x	x	x	x
1969	509	254 030	x	386 739
1970	670	541 488	x	437 408
1971	167	402 235	x	93 421
1972	289	354 431	x	158 363
1973	119	261 503	x	294 293
1974	161	585 281	x	384 878
1975	254	733 385	x	189 060
1976	123	307 566	x	53 737
1977	57	276 670	x	189 448
1978	141	641 067	x	130 540
1979	189	935 327	x	200 836
1980	360	1 851 374	x	303 141
1981	386	2 003 601	x	233 687
1982	308	1 649 628	x	313 165

Tube and pipe fittings, of aluminium (item 76.07)[30]

1968	x	x	x	x
1969	54	62 845	x	35 374
1970	99	123 980	x	28 884
1971	30	84 497	x	13 074
1972	31	108 272	x	41 396
1973	35	126 468	x	40 594
1974	56	217 969	x	47 665
1975	57	328 515	x	266 635
1976	29	244 963	x	26 426
1977	31	239 193	x	33 874
1978	21	243 000	x	36 711
1979	29	300 755	x	10 921
1980	33	494 717	x	112 671
1981	70	823 875	x	81 747
1982	41	697 207	x	4 264

Casks, drums, cans, boxes and similar containers of aluminium for the conveyance or packing of goods (item 76.10) [30]

YEAR	IMPORTS		EXPORTS	
	Quantity (tons)	Value (current) R	Quantity (tons)	Value (current) R
1968	x	x	x	x
1969	213	193 549	50	31 978
1970	203	193 850	93	62 305
1971	164	237 482	77	75 310
1972	84	189 187	84	118 026
1973	119	274 426	x	260 040
1974	166	517 995	x	149 205
1975	127	426 132	x	124 104
1976	109	376 454	x	36 999
1977	92	373 057	x	108 347
1978	59	387 926	x	108 152
1979	87	748 069	x	206 163
1980	99	688 055	x	1 336 712
1981	89	706 271	x	222 223
1982	101	808 050	x	226 662

Containers of aluminium, for compressed or liquefied gas (item 76.11) [30]

1968	x	x	x	x
1969	x	5 895	-	-
1970	x	11 251	17	1 475
1971	x	23 862	0,7	959
1972	15	60 130	18	24 406
1973	28	91 712	x	840
1974	54	152 738	x	3 055
1975	43	187 139	-	-
1976	52	305 230	x	3 101
1977	43	201 919	x	1 008
1978	23	167 530	x	7 905
1979	37	252 419	x	52 200
1980	26	241 875	x	4 217
1981	51	341 780	x	3 895
1982	96	554 891	x	370 495

30

Structures, complete or incomplete, and parts of aluminium (item 76.08)

YEAR	IMPORTS		EXPORTS	
	Quantity (tons)	Value (current) R	Quantity (tons)	Value (current) R
1968	×	×	×	×
1969	91	70 120	20	21 595
1970	120	74 690	103	61 799
1971	86	148 083	×	76 117
1972	33	135 810	×	54 688
1973	28	75 610	×	66 281
1974	51	194 271	×	86 246
1975	74	215 048	×	112 998
1976	36	159 683	×	86 389
1977	34	137 994	×	102 894
1978	36	196 335	×	413 540
1979	65	396 753	×	2 147 414
1980	46	274 982	×	386 241
1981	207	752 070	×	97 082
1982	205	1 355 492	×	234 983

Reservoirs, tanks, vats and similar containers, for any material (excluding compressed or liquefied gas) of aluminium, of a capacity exceeding 300 litres, whether or not lined or heat insulated, but not fitted with mechanical or thermal equipment (item 76.09) 30

1968	×	×	×	×
1969	43	431	50	763
1970	38	40 234	14	1 268
1971	0,3	1 506	-	-
1972	0,4	2 772	-	-
1973	0,5	768	-	-
1974	0,1	4 139	-	-
1975	4,9	21 882	-	-
1976	32	180 698	×	2 330
1977	0,1	304	-	-
1978	0,1	2 161	×	2
1979	1,5	9 667	×	1 078
1980	2,1	19 911	×	984
1981	1,1	1 122	×	1 265
1982	14	81 725	×	42 145

Stranded wire, cables, cordage, ropes, plaited bands and the like, of aluminium wire (item 76.12)[30]

YEAR	IMPORTS		EXPORTS	
	Quantity (tons)	Value (current R)	Quantity (tons)	Value (current R)
1968	x	x	x	x
1969	77	20 643	78	21 953
1970	1 750	363 145	-	-
1971	1 134	547 817	-	-
1972	202	181 151	x	5 546
1973	253	219 411	x	11 366
1974	131	142 809	x	253 757
1975	337	447 973	x	1 637 884
1976	283	305 829	x	21 894
1977	x	245 114	x	73 628
1978	x	897	x	27 638
1979	x	13 998	x	64 895
1980	x	14 858	x	300 903
1981	x	2 142 381	x	179 107
1982	23	82 320	x	53 100

Gauze, cloth, grill, netting, reinforcing fabric and similar materials, of aluminium wire (item 76.13)[30]

1968	x	x	x	x
1969	x	17 781	-	-
1970	x	36 907	-	-
1971	x	15 273	-	-
1972	x	34 481	-	-
1973	27	47 149	x	108
1974	30	62 460	x	31 041
1975	35	103 203	x	6 235
1976*	20	71 114	x	24 608

* statistics included under item 76.16 post-1976

Expanded metal, of aluminium (item 76.14)[30]

YEAR	IMPORTS		EXPORTS	
	Quantity (tons)	Value (R current)	Quantity (tons)	Value (R current)
1968	x	x	x	x
1969	0,9	1 036	-	-
1970	1,6	3 916	0,5	450
1971	0,6	6 589	-	-
1972	0,7	2 024	0,7	1 579
1973	0,3	2 141	x	355
1974	0,4	1 315	x	19 654
1975	0,2	795	x	160
1976*	1,0	4 269	x	136

Articles of a kind commonly used for domestic purposes, sanitary ware for indoor use, and parts of such articles and ware of aluminium (item 76.15)[30]

1968	x	x	x	x
1969	614	494 089	63	37 826
1970	605	487 062	130	84 409
1971	304	531 141	69	79 391
1972	223	388 706	195	290 345
1973	390	644 955	x	125 282
1974	473	967 098	x	208 910
1975	278	770 042	x	167 926
1976	277	822 334	x	165 509
1977	205	753 315	x	225 388
1978	202	873 532	x	314 093
1979	258	1 065 955	x	298 747
1980	371	1 561 378	x	194 054
1981	447	2 253 192	x	304 790
1982	402	2 347 803	x	316 114

* statistics included under item 76.16 post 1976

Other articles of aluminium (item 76.16)[30]

YEAR	IMPORTS		EXPORTS	
	Quantity (tons)	Value (current R)	Quantity (tons)	Value (current R)
1968	x	x	x	x
1969	866	888 745	112	79 380
1970	989	1 091 106	46	56 831
1971	341	1 015 498	56	74 242
1972	369	885 673	22	61 237
1973	308	1 004 014	x	130 530
1974	423	1 527 219	x	783 246
1975	1 016	2 183 724	x	75 131
1976	657	1 490 537	x	120 799
1977	902	2 491 066	x	508 809
1978	936	3 736 843	x	348 519
1979	771	3 409 702	x	751 884
1980	967	4 694 259	x	385 552
1981	1 644	7 345 781	x	561 400
1982	1 595	9 228 731	x	1 366 992

x for all the above tables indicates figures not recorded for public use.

APPENDIX EIGHT

Components of risk assessment by country

These components are assessed on a scale from 1 (lowest) to 10 (highest) risk. Grouped together they form the basis for the country risk factor assessment.

1. AUSTRALIA (4.26)

Factor	Rating	Comment
LABOUR		
Strike incidence	6	volatile in ports and iron ore mining
Quality of labour	3	high level of skill, local and immigrant
General unrest	3	low
POLITICS		
History	3	English based, stable
Stability	6	probable constitutional change soon
External dangers	3	low, strongly pro-West
LOCATIONS		
Hostile borders	5	practically indefensible
Critical land/sea routes	2	none locally
MINERAL RESOURCES		
Adequacy of reserves	3	excellent and expanding
Costs of production	7	rising abnormally in labour sector
Development appeal	6	good in long run but difficult near term
FINANCIAL AND ECONOMIC		
Currency performance	5	subject to marginal pressures only
Vulnerability to manipulation	5	not a major constraint
External indebtedness	5	containable
Productivity	7	vulnerable in spite of excellent geology
Foreign ownerships	8	high but now subject to restriction
ENERGY AND OTHER NATURAL RESOURCES		
Domestic energy sources	6	still weak in oil and gas
Domestic energy production	7	expanding but vulnerable in oil
Sources of outside supplies	2	not necessary
DEPENDENCE ON FOREIGN NATURAL RESOURCES	2	low

2. CANADA (3.94)

Factor	Rating	Comment
LABOUR		
Strike incidence	7	high by Western standards
Quality of labour	3	high proportion of skilled workers
General unrest	6	some interprovincial
POLITICS		
History	6	some French/English conflict
Stability	6	danger of provincial fragmentation
External dangers	2	low, close to U.S. border
LOCATION		
Hostile borders	2	low, bordering to U.S.A.
Critical land/sea routes	1	none
MINERAL RESOURCES		
Adequacy of reserves	3	excellent
Costs of production	7	high
Development appeal	5	medium, history of political interference
FINANCIAL AND ECONOMIC		
Currency performance	7	very poor against the US $
Vulnerability to manipulation	7	high
External indebtedness	6	medium
Productivity	6	medium
Foreign ownerships	8	high
ENERGY AND OTHER NATURAL RESOURCES		
Domestic energy sources	1	high in all sectors
Domestic energy production	2	good, though recession effects evident
Sources of outside supplies	1	not necessary
DEPENDENCE ON FOREIGN NATURAL RESOURCES	2	low

3. CHILE (5.77)

Factor	Rating	Comment
LABOUR		
Strike incidence	6	recurrent but strict labour laws pertain
Quality of labour	7	adequate in mining sector
General unrest	6	long history of problems, currently steady
POLITICS		
History	8	troubled, predominantly right-wing
Stability	6	currently well controlled
External dangers	5	difficulties with Argentina
LOCATION		
Hostile borders	5	long border, disputes with Argentina
Critical land/sea routes	6	Cape Horn and Panama Canal for export
MINERAL RESOURCES		
Adequacy of reserves	4	very large in narrow range of minerals
Costs of production	6	containable
Development appeal	5	growing
FINANCIAL AND ECONOMIC		
Currency performance	4	large improvements since 1980
Vulnerability to manipulation	8	high with copper exports priced in US $
External indebtedness	4	reducing exchange rate fixed to US $
Productivity	5	good
Foreign ownerships	4	encouraged
ENERGY AND OTHER NATURAL RESOURCES		
Domestic energy sources	8	lacking oil and gas
Domestic energy production	7	coal being increased
Sources of outside supplies	4	wide choice, few restrictions
DEPENDENCE ON FOREIGN NATURAL RESOURCES	6	range of key minerals produced is small

4. S.W.A./NAMIBIA (6.83)

Factor	Rating	Comment
LABOUR		
Strike incidence	7	growing
Quality of labour	7	low
General unrest	9	very high
POLITICS		
History	7	uneasy
Stability	9	highly unstable
External dangers	8	high
LOCATION		
Hostile borders	7	Angola, South Africa could become hostile
Critical land/sea routes	8	high profile on both
MINERAL RESOURCES		
Adequacy of reserves	3	good and capable of expansion
Costs of production	7	low on labour, high on infrastructure
Development appeal	7	very low now, could improve
FINANCIAL AND ECONOMIC		
Currency performance	5	tied to South Africa
Vulnerability to manipulation	5	tied to South Africa
External indebtedness	4	low
Productivity	4	high through diamond sector
Foreign ownerships	8	high
ENERGY AND OTHER NATURAL RESOURCES		
Domestic energy sources	8	low but improving coal
Domestic energy production	7	very low but coal could start shortly
Sources of outside supplies	8	South African manipulation in oil
DEPENDENCE ON FOREIGN NATURAL RESOURCES	6	high but mostly coming from South Africa

5. UNITED STATES OF AMERICA (4.30)

Factor	Rating	Comment
LABOUR		
Strike incidence	3	low, good union discipline
Quality of labour	3	good, high level of mechanisation
General unrest	3	low, some ethnic problems
POLITICS		
History	3	long established democratic system
Stability	3	very good
External dangers	2	none foreseeable
LOCATION		
Hostile borders	1	none
Critical land/sea routes	2	possible problems in Gulf of Mexico
MINERAL RESOURCES		
Adequacy of reserves	6	shortage (absence of several key minerals)
Costs of production	7	medium but rising
Development appeal	6	excellent in selected industries
FINANCIAL AND ECONOMIC		
Currency performance	4	volatile but strengthening
Vulnerability to manipulation	7	high as the leading convertible currency
External indebtedness	7	high but balanced by production capacity
Productivity	7	high but trailing Japan
Foreign ownerships	3	fairly low
ENERGY AND OTHER NATURAL RESOURCES		
Domestic energy sources	4	excellent but still oil importing
Domestic energy production	3	growing rapidly
Sources of outside supplies	5	dependence on OPEC and Mexico
DEPENDENCE ON FOREIGN NATURAL RESOURCES	7	serious in some key minerals but these could mostly be developed domestically in an emergency

6. ZAIRE (6.79)

Factor	Rating	Comment
LABOUR		
Strike incidence	7	medium - high
Quality of labour	6	medium for the region
General unrest	8	recently high
POLITICS		
History	8	troubled
Stability	6	well held, rests on personalities
External dangers	8	trouble via Congo and Angola
LOCATION		
Hostile borders	7	proximity to Angola, Congo
Critical land/sea routes	8	high profile in E,W,S directions
MINERAL RESOURCES		
Adequacy of reserves	3	excellent
Costs of production	8	high
Development appeal	7	moderate, but well qualified risks
FINANCIAL AND ECONOMIC		
Currency performance	9	very poor
Vulnerability to manipulation	8	high
External indebtedness	8	high but assisted by IMF
Productivity	7	low but improving
Foreign ownerships	3	low but encouraged
ENERGY AND OTHER NATURAL RESOURCES		
Domestic energy sources	4	some oil, good hydro potential
Domestic energy production	5	low but improving
Sources of outside supplies	8	critical of forex/transport considerations
DEPENDENCE ON FOREIGN NATURAL RESOURCES	7	high but could be reduced by domestic expansion

7. ZAMBIA (6.83)

Factor	Rating	Comment
LABOUR		
Strike incidence	8	high in recent years
Quality of labour	7	slowly improving but high expatriate turnover
General unrest	8	disaffection due to low living standards
POLITICS		
History	5	same leadership since 1964
Stability	7	strains of Kuanda leadership showing
External dangers	4	lower since end of Rhodesia's U.D.I.
LOCATION		
Hostile borders	4	long term unpredictable, currently calm
Critical land/sea routes	8	land locked, rail links prone to disruption
MINERAL RESOURCES		
Adequacy of reserves	6	limited to Cu,Co,Pb,Zn low grades
Costs of production	7	high, including import dependence
Development appeal	6	low but supported by W. Bloc
FINANCIAL AND ECONOMIC		
Currency performance	8	poor, consistent downward realignments
Vulnerability to manipulation	7	high
External indebtedness	8	high
Productivity	7	medium - low
Foreign ownerships	4	now greatly reduced
ENERGY AND OTHER NATURAL RESOURCES		
Domestic energy sources	8	very low, no oil, poor coal
Domestic energy production	7	low, some hydro from Kariba Dam
Sources of outside supplies	8	limited by transport and forex
DEPENDENCE ON FOREIGN NATURAL RESOURCES	8	high

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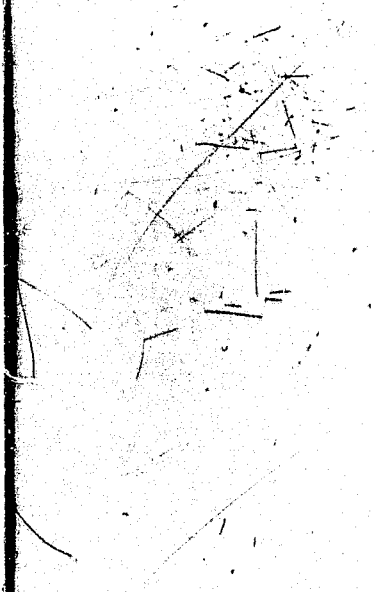
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