



Basic facts on the world copper industry

By John Dryden and Andreas Tegen, the Raw Materials Group

Over the past 35 years the structure of the international copper-mining industry has changed considerably. The most important changes have been a decreasing concentration and, recently, the takeover of a large number of mining companies by leading energy companies. John Dryden and Andreas Tegen have compiled some background data on this development.

The decline of the »Big seven«

In 1948 the seven largest transnational copper mining corporations controlled 70 per cent of total market economy output. In 1982 the share of the seven leading TNCs was down to 36 per cent. (See Table 4 p 62–63). There are several reasons for this dramatic decline in concentration:

First, the *nationalizations* of foreign copper mining corporations in Zaire (1966 - 67), Zambia (1969 - 70), Chile (1971) and Peru (1974). In this way around 25 per cent of total market economy output was withdrawn from direct TNC control. (See Table 2 p 60).

Secondly, a number of smelting, refining and fabricating corporations, mainly in the US (e.g. Asarco and Amax) have *integrated backwards* into new copper mines to secure a stable supply of raw materials. Also Japanese and West German corporations have strengthened their positions by financing new copper mines with long term contracts on deliveries to their smelters in return.

Thirdly, there has been an *ongoing discovery of large sources of copper*, mainly through extensive prospecting by a number of large *transnational energy corporations*, which have *diversified into the copper industry* on a massive scale (see table

Fourthly, the *diffusion of mining technology* needed to work low-grade orebodies successfully on a large scale.

Fifthly, *economic and technological development in the socialist countries* has given independent producers in the »Third World« a possibility to start up production without TNC-controlled finance and technology and given them a possibility to sell their production to a market outside TNC control.

Another challenge to the copper industry is the increasingly hard *competition from the aluminium industry*, with a growing market share being taken over by aluminium products.

The corporate response

The major traditional copper TNCs have responded to the competition from new mining companies and the aluminium industry in several ways:

First, by *forward integration*. Phelps Dodge, Asarco, Inco and Noranda have all established or expanded fabricating subsidiaries.

Secondly, by forming *joint ventures with state-owned corporations*. About 15 per cent of market economy production of copper comes from such joint ventures.

Thirdly, by forming *joint ventures with other TNCs*.

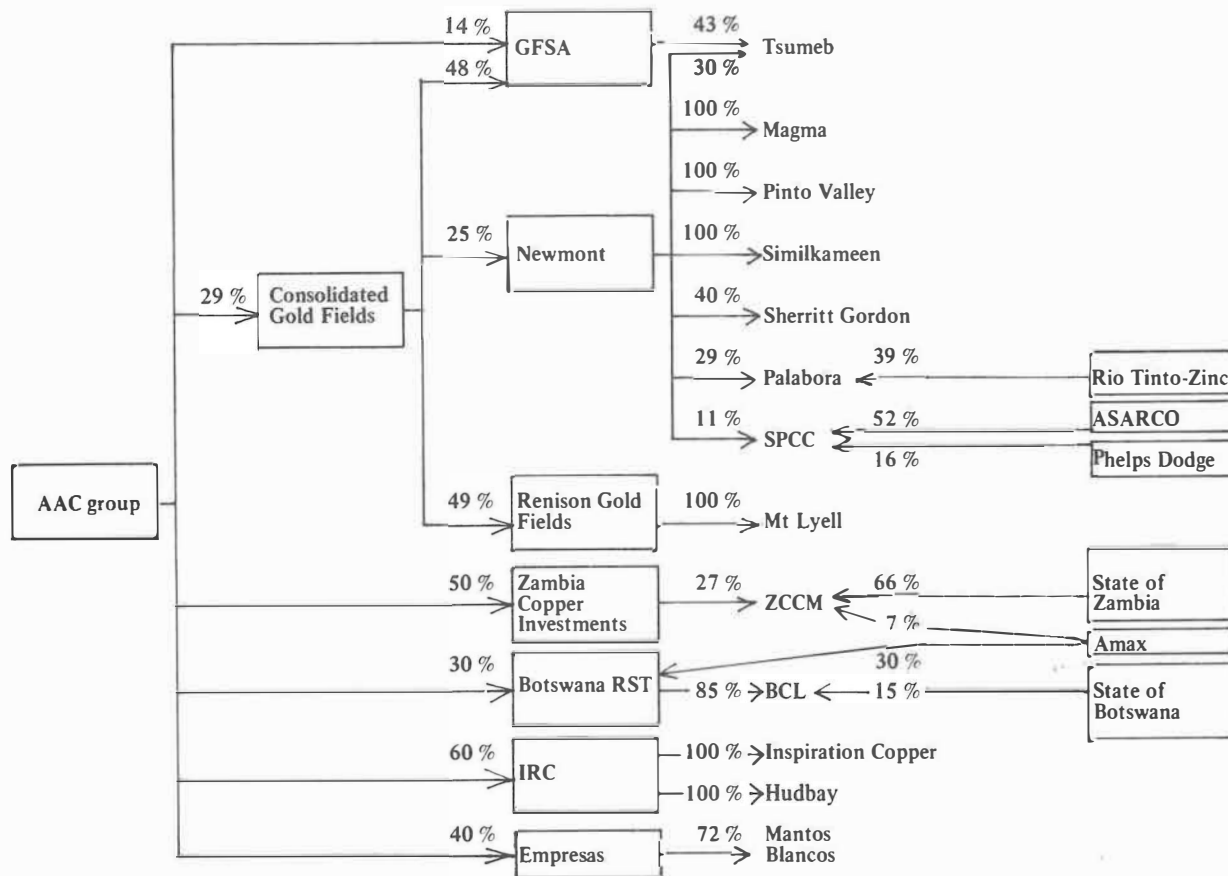
Fourthly, by re-establishing *technological and financial control over »Third World« mines* through management contracts, service contracts, co-production agreements, project financing and other forms of factoring and through supplier credits.

The new market configuration

Overall the traditional copper TNCs, often in collaboration with the new entrants (the energy corporations), have been successful in halting the advances of state controlled producers in the »Third World«. No new nationalizations have taken place since the mid-70s and

Table 1

Energy company	Acquired company	Year
Pennzoil	Duval	1968
Shell	Billiton	1970
Socal	Amax (20%)	1975
Atlantic Richfield	Anaconda	1977
Louisiana Land & Exploration	Copper Range	1977
Exxon	Disputada	1978
Amoco	Cyprus	1979
BP	Selection Trust	1980
Sohio (BP: 53%)	Kennecott	1981
Elf-Aquitane	Texasgulf	1981
Occidental	Cities Service	1982



the deepening economic crisis in the capitalist world has increased rivalry among »Third World« producers and forced them - notably Chile and Peru - to adopt new liberal mining laws, once again opening up their countries to direct investments by the TNCs.

Important changes have also taken place among the TNCs recently. Already mentioned is the entrance of the energy TNCs. Worth noting is also the strengthening of two traditional mining corporations.

Anglo American, which was threatened by the nationalizations in Zambia, is establishing itself as the largest copper mining corporation in the market economies through the large share purchases in Consolidated Gold Fields and Newmont.

The chart above shows the structure of Anglo group interests in the copper industry in November 1983. Companies in squares are holding companies, the others producers. Figures indicate share of ownership. The abbreviations are explained on page 63.

The most important structural changes in recent years are:

- The AAC group (MINORCO) bought

29 per cent of CGF in 1980.

- CGF has successively increased its ownership in Newmont to 25 per cent.
- The Anglo holdings in Inspiration Copper and Hudbay were strengthened in 1983 by the formation of IRC, in which the AAC group (MINORCO) holds 60 per cent of the capital (46 per cent of the votes).
- Pinto Valley was purchased from Cit-

ies Service in March 1983.

- The GFSA stake in Tsumeb was increased to 43 per cent in 1983.

A major new entrant is *Rio Tinto-Zinc*, with its large Bougainville mine, which came on stream in the late 1960s and is one of the world's largest single producers of copper concentrate. (See article on page 52 - 58)

Table 2

Shares of world copper production 1982

The major state-owned corporations outside the socialist countries

State	Corporation (ownership %)	Production share	
		mine %	metal %
Chile	Total	11.9	7.6
	Codelco (100)	10.7	7.6
	Empresa Nacional de Minería (100)	1.2	—
Zaire	Gecamines	5.6	3.8
Zambia	ZCCM (66)	4.4	3.0
Peru	Centromin	0.3	0.6
Finland	Outokumpu	0.5	0.5
Yugoslavia	Bor, Majdanpek, Veliki Krivelj, Bucim	1.3	1.6
Total		24.0	17.9

Table 3

Geographical distribution (per cent) of world copper mine and refined metal production and consumption 1971, 1976 and 1981

		Mine production			Metal production			Consumption		
		1971	1976	1981	1971	1976	1981	1971	1976	1981
Industrialized capitalist countries		42.1	37.4	36.9	60.3	55.2	53.5	73.5	69.2	67.7
Africa	South Africa	2.4	2.5	2.6	1.1	1.0	1.5	0.6	0.7	0.9
Asia	Japan	1.9	1.0	0.6	9.6	9.8	10.9	11.0	12.3	13.2
Europe	Total	3.6	3.8	3.9	17.0	17.1	13.6	32.3	31.5	28.1
	Belgium/Luxemburg	—	—	—	4.3	5.2	2.8	2.0	2.7	2.8
	France	—	—	—	0.4	0.4	0.5	4.7	4.4	4.5
	FRG	—	—	—	5.5	5.1	4.0	8.6	8.7	7.8
	Italy	—	—	—	—	0.3	0.2	3.7	3.9	3.9
	Spain	0.5	0.6	0.7	1.1	1.6	1.6	1.5	1.6	1.1
	Sweden	0.5	0.6	0.6	0.7	0.7	0.6	1.2	1.0	1.1
	Yugoslavia	1.5	1.5	1.4	1.3	1.5	1.4	1.0	1.6	1.6
	United Kingdom	—	—	—	2.4	1.6	1.4	7.1	5.4	3.5
	Others	1.1	1.1	1.2	1.3	1.0	1.1	2.5	2.2	1.8
North America	Total	31.5	29.5	29.1	30.5	25.2	25.5	28.0	23.4	24.0
	Canada	10.1	9.1	8.6	6.5	5.8	4.9	3.0	2.5	2.6
	USA	21.4	18.4	18.5	24.0	19.4	20.6	25.0	20.9	21.4
Oceania	Australia	2.7	2.6	2.7	2.1	2.1	2.0	1.6	1.3	1.5
»Third world»		37.2	39.9	41.1	18.6	20.2	22.6	4.6	6.3	8.9
Africa	Total	17.6	15.8	14.2	10.3	9.0	9.2	0.2	0.3	0.3
	Namibia	0.4	0.5	0.5	—	—	—	—	—	—
	Zambia	10.0	8.9	7.1	7.2	8.0	5.8	—	—	—
	Zaire	6.3	5.6	6.0	2.8	0.7	3.2	—	—	—
	Zimbabwe	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.3	—
	Others	0.5	0.4	0.3	—	—	—	—	—	0.3
Asia	Total	4.1	5.3	5.1	0.5	1.2	2.2	1.4	2.0	4.0
	India	0.2	0.3	0.3	—	0.2	0.2	0.8	0.7	0.8
	Indonesia	—	0.9	0.8	—	—	—	—	—	0.2
	Philippines	3.1	3.0	3.6	—	—	—	—	—	—
	Others	0.8	1.1	0.4	—	1.0	2.0	—	1.3	2.0
Latin America	Total	15.5	16.6	19.8	7.8	10.0	11.2	3.0	4.0	4.6
	Brazil	—	—	0.1	0.3	0.4	0.3	1.3	2.1	1.9
	Chile	11.0	12.7	13.0	6.3	7.1	8.0	0.4	0.5	0.4
	Mexico	1.0	1.0	2.7	0.7	0.9	0.7	0.7	0.9	1.5
	Peru	3.2	2.7	3.9	0.5	1.6	2.2	—	—	0.2
	Others	0.3	0.2	0.1	—	—	—	0.6	0.5	0.6
Oceania	Papua New Guinea	—	2.2	2.0	—	—	—	—	—	—
Socialist countries		20.7	22.7	22.0	21.1	24.6	23.9	21.9	24.5	23.4
	China/North Korea	2.0	2.0	2.2	2.3	2.9	3.1	3.5	4.0	3.6
	Poland	1.9	3.9	3.7	1.3	3.1	3.4	1.3	1.9	2.0
	Soviet Union	15.3	15.1	13.7	15.5	16.3	15.1	13.4	14.6	13.9
	Others	1.5	1.7	2.4	2.0	2.3	2.3	3.7	4.0	3.9
Total		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
World total production (Mt)		6459	7943	8323	7398	8830	9645	7332	8535	9492

Source: Annuaire Statistique Minimet; Metallstatistik.

Geographical distribution

As is evident from the table, the industrialized capitalist countries and the "Third World" countries account for — in approximate terms — 40 per cent each of world copper *mine production*. The socialist countries complete the picture with 20 per cent of world production.

USA and Canada, the two largest producers among the industrialized capitalist countries account for 75 per cent of production within this zone. Zambia, Zaire and Chile together account for 75 per cent of "Third World" production.

Production of *refined copper*, although clearly dominated by industrialized capitalist countries, is showing a modest shift towards the "Third World" countries. Over the last decade production in the industrialized capitalist countries has declined by seven per cent (Cf Table 3).

Much of mine production in the "Third World" is shipped to Japanese and European refineries.

The most significant new mining undertaking during the last decade is the Bougainville copper mine in Papua New Guinea. In 1982 output was 2 per cent of total world production.

While mine production in the industrialized countries and the "Third World" is approximately the same, *consumption* is far higher in the industrialized capitalist countries — 68 and 8 per cent respectively.

Production and consumption within the socialist countries is well balanced. Their share of world mine and refined metal production and consumption lie in the region of 22 per cent. The USSR is by far the leading producer and consumer with approximately 14 per cent in all three sectors.

Table 4
Corporate shares (per cent) of world copper production 1982

Corporation	Producer (ownership %)	Production share		
		index ¹	mine %	metal %
Anglo group interests² (South Africa)	Total		7.5	5.5
	AAC group		3.7	3.2
	ZCCM (27)	South Africa		
	Inspiration Copper (60)	Zambia	P 1.8	1.6
	Mantos Blancos (72)	USA	W 0.7	0.7
	Hudbay (60)	Chile	W 0.6	0.2
	BCL (30)	Canada	W 0.5	0.7
	Gold Fields group	Botswana	P 0.2	—
	Mount Lyell (49)	UK	0.4	0.1
	Tsumeb (43)	Australia	W 0.2	—
	Newmont	Namibia	P 0.1	—
	Magma Copper (100)	USA	3.4	2.2
	Pinto Valley (100)	USA	W 1.1	1.5
	Palabora (29)	USA	W 0.9	—
	Sherritt Gordon (40)	South Africa	P 0.4	0.4
	SPCC (11)	Canada	W 0.3	—
	Similkameen (100)	Peru	P 0.3	0.3
	Tsumeb (30)	Canada	W 0.3	—
		Namibia	P 0.1	—
Asarco³ (USA)	Total		4.4	8.1
	Mount Isa (44)	Australia	W 2.1	1.5
	SPCC (52)	Peru	P 1.4	1.2
	Asarco (100)	USA	W 1.4	3.8
	Copper Refineries Pty (44)	Australia	W —	1.5
BP⁴ (UK)	Kennecott	USA	4.1	3.5
Rio Tinto-Zinc⁵ (UK)	Total		4.1	2.1
	Bougainville Copper (54)	Papua New Guinea	W 2.0	—
	Lornex (68)	Canada	W 0.9	—
	Rio Tinto Minera (49)	Spain	W 0.6	1.1
	Palabora (39)	South Africa	P 0.6	0.5
	Electrolytic Refining & Smelting (57)	Australia	W —	0.5
	Duisburger Kupferhütte (99)	FRG	W —	0.1
Phelps Dodge (USA)	Total		3.9	4.7
	Phelps Dodge (100)	USA	W 3.5	4.3
	SPCC (16)	Peru	P 0.4	0.4
Noranda/Placer⁶ (Canada)	Total		2.4	6.4
	Noranda (100)	Canada	W 1.1	6.4
	Noranda-controlled: Brenda (49), Brunswick (64), Heath Steele	Canada	W 0.4	—
	Placer Development-controlled: Gibraltar (72)	Canada	W 0.5	—
	Marcopper (40)	Philippines	W 0.4	—
Atlas (Philippines)		Philippines	1.7	
Atlantic Richfield (USA)	Total		1.6	1.6
	Anaconda (100)	USA	W 0.9	1.4
	Anamax (50)	USA	P 0.7	0.2
Pennzoil (USA)	Duval (100)	USA	1.4	—
Inco (Canada)		Canada	1.3	1.2

Amax (USA)	Total			1.2	1.8
	Anamax (50)	USA	P	0.7	0.2
	ZCCM ⁷ (7)	Zambia	P	0.5	0.4
	BCL ⁷ (30)	Botswana	P	0.2	—
	US Metals Refining (100)	USA		—	1.2
Amoco (USA)	Total			1.2	0.5
	Cyprus Bagdad (100)	USA	W	0.8	0.5
	Cyprus Pima ⁸ (75)	USA	W	0.4	—
Boliden (Sweden)		Sweden		0.9	0.6
Freeport McMoRan (USA)	Freeport Indonesia (81)	Indonesia	W	0.8	—
Union Miniere (Belgium)	Total			—	4.1
	Hoboken Overpelt (62)	Belgium	W	—	3.7
	Cie Generale d'Electrolyse du Palais (42)	France	W	—	0.5
Nippon Mining (Japan)		Japan		—	2.6
Mitsubishi (Japan)		Japan		—	2.5
Norddeutsche Affinerie⁹ (FRG)		FRG		—	2.2
Sumitomo Metals (Japan)		Japan		—	1.5
Mitsui Mining & Smelting (Japan)		Japan		—	1.4
Total				36.5	50.3

Abbreviations:

AAC	Anglo American Corporation of South Africa.
AAC group	The group of companies controlled by AAC. The most important holding companies are MINORCO (Bermuda), De Beers (South Africa) and Charter Consolidated (UK). The copper investments are held mainly by MINORCO.
BCL	Bamangwato Consession Ltd (Botswana).
BRST	Botswana RST Ltd (Botswana).
CGF	Consolidated Gold Fields PLC (UK) (also called Gold Fields).
GFSA	Gold Fields of South Africa Ltd (South Africa).
Hudbay	Hudson Bay Mining and Smelting Co Ltd (Canada).
IRC	Inspiration Resources Corporation (USA).
SPCC	Southern Peru Copper Corporation (USA).

ZCCM Zambia Consolidated Copper Mines (Zambia).

Notes:

¹ The index shows the way of calculating the production share. *W* means that the *whole* production is accounted for, *P* means that only a *part*, the owners equity interest in the producing company is accounted for.

² The Anglo (AAC) group interests are shown in a separate chart..

³ Asarco owns 44 per cent of MIM Holdings, Australia, which in turn has a 19.3 per cent holding in Asarco. Mount Isa Mines Ltd and Copper Refineries Pty Ltd are wholly-owned by MIM Holdings.

⁴ BP owns 53 per cent of the US energy corporation Sohio, which owns Kennecott Corporation. BP is 51 per cent owned by the British state.

⁵ RTZ owns 57 per cent of CRA Ltd, Australia (ownership will be reduced to 53 per cent), which in turn owns 54 per cent of Bougainville Copper Ltd. CRA also owns Australia Mining & Smelting Ltd (100 per cent), which in turn owns Electrolytic Refining & Smelting Co of Australia Ltd (100 per cent). RTZ owns 53

per cent of Rio Algom Ltd, Canada, which in turn owns 68 per cent of Lornex Mining Corporation Ltd. Duisburger Kupferhutte GmbH and the Rio Tinto Minera SA interests are owned through RTZ Bristol Ltd. The Palabora Mining Co stake is owned through Rio Tinto South Africa Ltd. AAC group owns 4 per cent of RTZ through Charter Consolidated. According to some sources, e.g. H M Thompson (see p 35 in this issue) the real interest is higher, around 10 per cent.

⁶ Noranda Mines Ltd owns 33 per cent of Placer Development Ltd, both Canadian corporations.

⁷ These Southern African interests are jointly owned with the AAC group, see chart.

⁸ Operations were suspended in October 1982.

⁹ Owners are: Metallgesellschaft (40 per cent), British Metal Corp (20 per cent) and Degussa (40 per cent).

Sources:

Roskill's Metal Databook 1983, Mining Annual Review 1983, Mining International Yearbook 1983, Mining Journal and corporate annual reports. ■