The largest steel producers of the world in 1970, 77 and 84
(Production of raw steel in Mt and share of world production, ranked according to 1984 production)

Corporations		1970		1977		1984	
		Mt	%	Mt	%	Mt	%
European corporations	Finsider (Italy)	9.7	1.6	12.9	1.9	13.5	1.9
	British Steel (UK)	25.2	4.2	17.2	2.5	12.7	1.8
	Arbed group (Luxembourg)	6.1	1.0	9.4	1.4	11.0	1.5
	Thyssen (FRG)	12.6	2.1	11.5	1.7	10.9	1.5
	Usinor (France)	8.0	1.3	6.8	1.0	9.4	1.3
	Sacilor[1] (France)	8.2	1.4	6.7	1.0	8.3	1.2
	Hoogovens (Netherlands)	4.6	0.8	4.6	0.7	5.5	0.8
	Cockerill[2] (Belgium)	6.1	1.0	4.9	0.7	4.8	0.7
	Vöest-Alpine[3] (Austria)	2.7	0.5	3.9	0.6	4.7	0.7
	Krupp (FRG)	4.2	0.7	3.9	0.6	4.4	0.6
	Klöckner (FRG)	3.4	0.6	4.0	0.6	4.3	0.6
	Ensidesa (Spain)	1.7	0.3	5.0	0.7	4.1	0.6
	Hoesch (FRG)	6.8	1.1	4.8	0.7	4.1	0.6
	Mannesmann (FRG)	3.9	0.7	3.9	0.6	4.0	0.6
	Salzgitter (FRG)	2.8	0.5	3.7	0.5	3.6	0.5
	SSAB[4] (Sweden)	—	—	—	—	2.7	0.4
	Total, 16 (15) largest corp	**106.0**	**17.7**	**103.2**	**15.3**	**108.0**	**15.2**
	Total Europe	**160.6**	**26.8**	**153.5**	**22.7**	**152.5**	**21.5**
North American corporations	US Steel (USA)	28.8	4.8	26.1	3.9	13.7	1.9
	Bethlehem (USA)	18.7	3.1	15.1	2.2	11.1	1.6
	LTV[5] (USA)	6.3	1.1	6.4	0.9	9.1	1.3
	Inland (USA)	6.4	1.1	7.0	1.0	5.9	0.8
	Armco (USA)	7.2	1.2	7.2	1.1	5.4	0.8
	Stelco (Canada)	4.4	0.7	5.0	0.7	4.7	0.7
	National[6] (USA)	7.6	1.3	8.5	1.3	4.4	0.6
	Dofasco (Canada)	2.1	0.4	3.0	0.4	4.1	0.6
	Wheeling-Pittsburgh[7] (USA)	3.4	0.6	3.4	0.5	2.5	0.4
	Algoma (Canada)	2.3	0.4	2.0	0.3	2.3	0.3
	Republic[8] (USA)	8.8	1.5	8.4	1.2	—	—
	Youngstown[9] (USA)	4.7	0.8	4.1	0.6	—	—
	Total, 10 (12) largest corp	**100.7**	**16.8**	**96.2**	**14.3**	**63.2**	**9.4**
	Total North America	**133.3**	**22.3**	**129.4**	**19.2**	**99.2**	**14.0**
Japanese corporations	Nippon Steel	33.6	5.6	32.4	4.8	29.4	4.1
	Nippon Kokan Kaisha[8]	12.9	2.2	13.8	2.0	12.5	1.8
	Sumitomo	11.2	1.9	12.5	1.9	11.3	1.6
	Kawasaki	11.0	1.8	12.5	1.9	11.3	1.6
	Kobe	5.1	0.9	7.4	1.0	6.6	0.9
	Nisshin	2.7	0.5	2.7	0.4	3.0	0.4
	Total, 6 largest corp	**76.5**	**12.8**	**81.3**	**12.0**	**74.1**	**10.4**
	Total Japan	**93.3**	**15.6**	**102.4**	**15.2**	**105.6**	**14.9**

The material has been compiled by Andreas Tegen, Raw Materials Report.

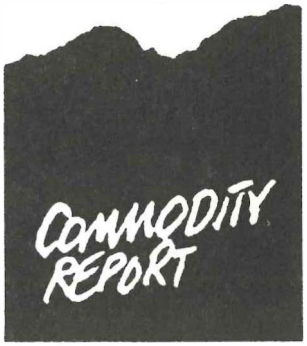
		1970		1977		1984	
		Mt	%	Mt	%	Mt	%
Australian corporations	Broken Hill Pty	6.8	1.1	7.3	1.1	6.1	0.9
	Total Australia/Oceania	**7.1**	**1.2**	**7.5**	**1.1**	**6.4**	**0.9**
South African corporations	Iscor	3.4	0.6	5.8	0.9	5.8	0.8
	Total South Africa	**4.8**	**0.8**	**7.4**	**1.1**	**7.7**	**1.1**
Third world corporations	Siderbras[10] (Brazil)	1.5	0.3	4.7	0.7	11.4	1.6
	Posco (Rep of Korea)	—	—	2.6	0.4	9.2	1.3
	SAIL[11] (India)	3.7	0.6	6.1	0.9	6.3	0.9
	Sidermex[12] (Mexico)	1.5	0.3	2.2	0.3	4.3	0.6
	China Steel (Taiwan)	—	—	1.4	0.2	3.3	0.5
	Sidor (Venezuela)	0.8	0.1	0.7	0.1	2.5	0.4
	Tata Iron & Steel (India)	1.7	0.3	1.6	0.2	2.1	0.3
	Total, 7 (5) largest corp	**8.9**	**1.5**	**19.3**	**2.9**	**39.1**	**5.5**
	Total Third world	**23.4**	**3.9**	**43.1**	**6.4**	**74.5**	**10.6**
Total, 41 (40, 42) largest corp		**302.3**	**50.5**	**313.1**	**46.4**	**296.3**	**41.7**
Total, Western world		**422.4**	**70.6**	**443.3**	**65.7**	**445.9**	**62.8**
Producers in socialist countries	USSR	115.9	19.3	146.7	21.7	155.0	21.8
	China	17.8	3.0	23.7	3.5	43.4	6.1
	Others	42.4	7.1	60.9	9.0	66.0	9.3
	Total socialist countries	**176.1**	**29.4**	**231.3**	**34.3**	**264.4**	**37.2**
World total		**599**	**100.0**	**675**	**100.0**	**710**	**100.0**

Sources:
IISI, Metal Bulletin and corporate sources.

Notes:

[1] Prior to 1973 Wendel-Siledor.
[2] Cockerill merged with Sambre in 1981.
[3] Vöest merged with Alpine-Montan in 1973. Only Vöest's production in 1970.
[4] SSAB was formed in 1978.
[5] LTV, which owns steel producer Jones & Laughlin, acquired Lykes—Youngstown in 1978 and Republic Steel in 1984.
[6] Nippon Kokan Kaisha acquired 50 per cent of the shares of National Steel in 1984.
[7] Wheeling-Pittsburgh went bankrupt in April 1985.
[8] Republic Steel was acquired by LTV in 1984.
[9] Youngstown, which was owned by Lykes, was acquired by LTV in 1978.
[10] In 1970 the production of CSN (Cia Siderurgica Nacional) only.
[11] In 1970 the production of Hindustan Steel.
[12] In 1970 and 1977 the production of AHMSA (Altos Hornos de Mexico).

Alcoa workers inspecting alumina storage facilities at the company's new Wagerup plant in Western Australia.



Geopolitics of aluminium – the strategy of the actors

By GRESEA

In their second article on the aluminum industry GRESEA looks at the geography of bauxite, alumina and aluminium production, and how the strategies of the main actors, the TNCs and the nation-states, are influencing the structure of the industry.

The article is a synthesis of a larger research report published by GRESEA, an independent Belgian research group.
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The localisation of production in the aluminium chain

Bauxite

Over the 1971—1983 period great changes took place in the geographical repartition of bauxite production:

- Following the discovery of large economically profitable reserves, Australia's bauxite production went from 70 kt in 1960 to 12 733 kt in 1971, reaching a high of 27 583 kt in 1979, to drop to 24 539 kt in 1983. Australia thus became the largest world producer of bauxite, with 31.2 per cent of world production in 1983.
- Production in Africa has also grown considerably thanks to the rise in Guinean production, which went from 2 630 kt in 1971 to 13 911 kt in 1980, to drop to 12 986 kt in 1983, or 16.5 per cent of world production. Recent discoveries of bauxite reserves in Guinea and in the Cameroon should make these countries important producers in the future.
- The share of the traditional Carribean bauxite exporters in the world production of bauxite has dropped considerably. Jamaica went from 25 per cent in 1960 to 18.8 per cent in 1971 and 9.8 per cent in 1983; Surinam from 15 per cent in 1960 to 10 per cent in 1971 and 3.8 per cent in 1983; Guyana from 11.1 per cent in 1960 to 6.3 per cent in 1971 and 1.4 per cent in 1983.

Brazil and Venezuela, however, will see their share increase, thanks to the size of the reserves discovered there.

- In 1971, the developing countries provided nearly half of the world's supply of bauxite (49.8 per cent); today their share is relatively lower (43.6 per cent) as a result of the size of Australian production.

Alumina

Here as well, the geographical repartition has been considerably modified. In 1960, the United States and Canada produced 65 per cent of Western world alumina. In 1971, they produced 31.1 per cent and in 1983 17.2 per cent. This movement has been mainly to the benefit of Australia which has become the largest producer of alumina with 23.3 per cent of world production in 1983.

It should be observed, however, that apart from Australia, the large bauxite producers process very little alumina (Guinea 1.8 per cent, Jamaica 6.1 per cent).

Aluminium

In 1960 the production of primary aluminium in the United States and Canada represented nearly 72 per cent of Western world production. These two countries have seen their share of world production drop considerably: the United States has gone from 32.6 per cent in 1971 to 23.4 per cent in 1983. Canada's production has stayed at roughly 7 per cent for the same period except for a fall to 4.8 per cent in 1976 following strikes in the Alcan factories in Quebec.

On the other hand, the European share of production has grown slightly, going from 21.2 per cent in 1971 to 25.2 per cent in 1983 (due basically to the growth of production in the FRG, Norway and Spain).

Japan, which reached 8 per cent of world production in 1971, has dropped to 1.8 per cent following its policy of reduction in overseas investment and production.

Finally, a number of new producer countries have made their appearance in the last decade. In general, they are former developing countries with important energy resources (Bahrein, Venezuela), bauxite reserves, or in the case of Australia, bauxite reserves as well energy possibilities (coal) and great political stability.

New projects

The following table gives an all-over view of the proposed investments in the aluminium sector, distinguishing those projects already underway from those which have been delayed, postponed or cancelled.

Table 1

Bauxite mine and alumina and aluminium plant expansions 1985

Company	Location	Project	Capacity (kt) Planned	Now		Investment	Start	Class
North & Central America								
Pechiney(50%) SFG(25%) Alumax(25%)	Becancour, Que, Can	sm	230		Al	1 500	1986	A
Arco Metals	Newfoundland, Canada	sm	272		Al	1 000		C
Alcan	Laterriere, Que, Can	sm	248		Al	1 000	1988	A
Altasa	Altamira, Mexico	pl	218		alumina	800		C
Alumax	Umatilla, OR, US	sm	181		Al	660		D
Reynolds	Baie Comeaus, Que Canada	sm	300	175	Al	500	1985	A
Alcoa	Wenatchee, WA, US	sm				19.2	1985	E
South America and Caribbean								
CVRD/Nippon	Albras, Brazil	sm	80		Al	1 800	1985	A
VAW	Alune, Recife, Pernambucco, Brazil	sm	220		Al	750		C
CVRD/Nippon	Alunorte, Barcanera, Brazil	re	800		alumina	715	1988	AB
Government	Cauca, Colombia	sm	240		Al	700		C
Trinidad and Tobago	Trinidad	sm	180		Al	700		C
Reynolds/Government	Paraguay	sm	127		Al	660		C
Brasileria de Aluminio	Para, Brazil	sm	170	86	Al	600	1985	A
Government	Manchester, Jamaica	re	600		alumina	600		A
Bauxiven	Los Piliguaos, Venezuela	OPmi	3 Mt		bauxite	550	1985	BC
Martin Marietta	St Croix, Virgin Islands	re	1.5 Mt	700	alumina	500		C
Col/Jamaica Governments	Colombia	sm	140		Al	400-500	1990	C
Mineracao Rio do Norte/CVRD	Trombetas,Brazil	OPmi	7 Mt	bauxite	450		D	
Jamaico	Halse Hall, Jamaica	re	850		alumina	350		A
Alcoa	Orixirana, Para, Brazil	OPmi	4 Mt		bauxite	256	1988	B
Alcoa/Royal Dutch Shell	Alumar, San Luis, Brazil	re/sm	245	100	Al	240	1986	B
Votorantim Group	Parana, Brazil	re	200		alumina	200	1988	C
Alpart	Elizabeth Valley, Jamaica	mi/re	1.3 Mt	900	alumina	150		A
Venalum	Puerto Ordaz, Venezuela	sm	350	280	Al	170		C
Votorantim Group	Soracaba, Brazil	sm	170	90	Al	131	1986-87	B
CVRD	Docegeo, Almerim, Brazil	OPmi	100		bauxite	40		B
Aluminio de Caroni	Alcasa, Venezuela	sm	320	130	Al		1986	C
Aluminio Argentina	Puerto Madryn, Argentina	sm	175	140	Al		1986	A
Europe								
Bauxites Parnasse	Itea, Greece	re	600		alumina	450	1989	C
Government	Hungary	sm	100		Al	400		C
Gränges Aluminium	Piteå, Sweden	sm	82		Al	250	late -80s	B
Norsk Hydro	Karmøy, Norway	sm	100	66	Al	174		BC
Pechiney	Delphi, Greece	re	600	500	alumina	170		A
Boris Kidric	Kidricevo, Yugoslavia	sm	60	45	Al	43	1985	A
Pechiney	Labraque, France	mi	300		bauxite	1.6		B
Pechiney	St Jean de Maurienne, France	sm	120	40	Al			BC
Government	Fenyöfö, Hungary	mi	1 Mt		bauxite		1985	B
Rudnik Boksita	Bosnia, Yugoslavia	mi	900		bauxite			C

Company	Location	Capacity (kt) Project	Planned	Now		Investment	Start	Class
Africa								
Government	Sangaredi, Guinea	mi/re	1.3 Mt	700	alumina	3 000		C
Government	Kibi, Ghana	mi/re	800		alumina	1 000		C
Consortium	Banana, Zaire	sm	210		Al	1 000	1990	C
Government	Zuwarah, Libya	sm	120		Al	800		C
Serbercam	Kribi, Cameroun	OPmi	1 Mt		bauxite		1986	C
Asia								
Government	Orissa State, India	cx	218		Al	2 100	1986	AB
Hindustan aluminium	Renukoot, India	re	300	170	alumina	190	1985	A
Gujarat Mineral Develop	Gujarat, India	mi/re	300		alumina	170	1987	C
Etibank/Dubai	Milas region, Turkey	re	250		alumina	170		C
Aluminium Bahrain	Alba, Bahrain	sm	250	170	Al			C
Government	Shanxi Province, China	sm	200-300		Al			C
Iranian Aluminium	Arak, Iran	sm	120	45	Al			C
Government	Saudi Arabia	re	2 Mt		alumina			C
Etibank	Seydisehir, Turkey	sm	120	60	Al		1986	BC
Australia and Oceania								
Alcoa of Australia(60%) Government(40%)	Portland, Vic, Australia	sm	135		Al	1 500	1986	A
Alcoa/Intern Construction	Bunbury, WA, Australia	sm	220		Al	1 200 AUD	1986	C
Consortium led by CRA	Kimberley, WA, Australia	mi/re				1 100 AUD	1987	C
Mitchell Plateau Bauxite	Mitch. Plateau, WA,Australia	mi/re						C
Alcan	Bundaberg, QN, Australia	sm	296		Al	1 050		D
Indonesian Government	Bintan Island, Indonesia	re	600		alumina	900	1987	A
Kukje/ICC, Reynolds Griffin Coal	Kemerton, WA, Australia	sm	220		Al	741	1988	C
Fletcher Holdings/CSR/ Alusuisse	Dunedin, New Zealand	sm	200		Al	650	1988	C
W Pacific Alumina	Mindanao, Philippines	mi/re	800		alumina	500		C

Source:

Engineering & Mining Journal, January 1985 and corporate sources.

Abbreviations

JV	joint venture	sx/ew	solvent extraction/ electrowinning
UG	underground	sl mi	solution mining
OP	open pit	MM	millions
OR	ore reserves	M	thousands
co	concentrator	st/yr	short tons per year
cx	complex	mt/yr	metric tons per year
mi	mine	mt/mo	metric tons per month
pl	plant	lb5yr	pounds per year
pp	pellet plant	yd^3	cubic yards
re	refinery	m^3	cubic meters
sm	smelter	bbl/d	barrels per day
av mi	alluvial mining	kg	kilograms
hp l	heap leaching		

Class symbols

A	Projects now under construction
B	Projects with development program but for which further financing may be required and for which construction has not yet begun.
C	Projects in the initial proposal stage.
D	Project suspended or deferred.
E	Routine capital expenditure to maintain production capacity.

Note:

Classifications were made on the basis of published information, and firm classification was not always possible. Where uncertainty existed, double letter classification has been made.

These proposed investments amount to 39 256 M USD. They aim at installing a new aluminium production capacity of 15.9 Mt, a bauxite production reaching 243 Mt, owing to the enormous reserves of Worsley in Australia.

A large number of these projects in all three segments of the chain have either been delayed, postponed or cancelled, notably those in Guinea, Zaire and Brazil as well as the opening of the mine at Worsley.

The projects already underway in 1984 involve investments equal to 13 268 M USD.

As to *aluminium*, the projects amount to a new production capacity of 1 720 kt, distributed as follows:

Canada	587 kt	34 per cent
Brazil	544 kt	31 per cent
Australia	263 kt	15 per cent
Indonesia	225 kt	13 per cent

The proposed new production capacity of alumina is 6 155 kt divided as follow:

Australia	1 900 kt	31 per cent
Jamaica	1 325 kt	21 per cent
Brazil	800 kt	13 per cent
Ghana	800 kt	13 per cent
Indonesia	600 kt	9 per cent

Finally, concerning bauxite, only the Trombetas project in Brazil, which will increase the mine's capacity to 7 Mt is underway.

What conclusions can be drawn as to future localization of the products in the chain?

1. The big producers of *bauxite* will be Australia and Brazil, whilst the Caribbean countries will see their production diminish. Africa's production is already stagnating.

However, the aluminium producers desire to diversify their sources of supply means that reserves in other countries may be chosen. Nevertheless, the present producers have an advantage in that the cost of a "new capacity" per ton is lower for an already existing mine than for a new mine, above all if the latter necessitates large investments in infrastructure. This factor should help the current producers to keep their share of the market.

2. In the *alumina* stage, a movement towards transformation in the bauxite producing countries is favoured because of the economy in transport costs and because of the growing desire of the producer countries to increase downstream integration. However, if one examines the proposed location of the refineries being proposed at present, the share of the developing countries will not rise above 20 per cent of world production.

3. As far as the *aluminium* stage is concerned, it is likely that a larger share of world production will take place outside the main consumer countries, where energy costs have greatly increased and where there is more and more concern about the pollution of the environment.

In Japan, for example, numerous smelters have been closed down definitively. In the United States the number of new smelters proposed is low. However, this tendency will probably be weakened after 1985 (as is indicated already by the distribution of projects which have been dropped) by certain constraints:

- Investment in new smelting capacity necessitates more and more capital and a green field factory costs up to 50 per cent more than the extension of an already existing facility.
- Although the costs for infrastructure is usually taken on by the host government, it will also demand increasing control over the activities of the aluminium producing company, thus reducing the TNC interest relative to the investment.

It is also significant that 34 per cent of aluminium production capacities being constructed today are located in Canada, an industrialized country with abundant energy resources, and at the same time close to the large American markets.

Change of location, yes, but not too far away from the big markets. This line of reasoning goes equally for Australia, Brazil, Indonesia and, although to a lesser extent, for Europe with project developments in Ireland, Greece, Italy and Spain.

4. One of the priorities in the industrialization policies of the developing nations is to deal with the unemployment problem. It is not obvious that an industry as capital intensive as the electrolysis of aluminium is a good way of creating jobs, leaving aside the financial and technological independence which may be the result. A manufacturing industry on the other hand creates, for each dollar invested, 10 to 15 times more employment.

5. The political risks will hold back the investors from committing themselves in operations which they do not control. It is worth noting that in all the new large projects, the producers cover themselves by combining their efforts and/or in committing the states by the creation of mixed consortia. What will the bauxite producing countries do? Who will control and buy their resources?

6. In 1982, 43.8 per cent of world bauxite, 15.7 per cent of alumina and 13.2 per cent of aluminium were produced in the third world, which thus remains largely a raw material producer. This is particularly true in the case of Africa which produces 16 per cent of the world ore, but only 1.9 per cent of alumina and 2.8 per cent of aluminium (1982).

The projects underway do not show any indication of a desire of the multinationals' to promote integration of the chain in the traditional bauxite countries, such as Guinea or the Caribbean.

Would not the creation of a home aluminium industry be the means for these countries to raise the value of their natural resources in the face of the compa-

Table 2

IBA shares of world reserves of bauxite 1978, and of world production of bauxite and alumina 1971 and 1983.
(in %)

		1971	1983	1971	1983
Australia	19.5	19.1	31.2	11.9	23.3
Guinea	15.8	3.9	16.5	2.9	1.8
Jamaica	9.4	18.8	9.8	8.2	6.1
Surinam	6.3	10.2	3.8	5.6	3.7
Guyana	4.7	6.3	1.4	1.4	—
India	4.2	2.3	2.4	1.6	1.4
Indonesia	3.3	1.8	1.0	—	—
Ghana	1.8	0.5	0.1	—	—
Yugoslavia	1.3	3.0	4.5	0.5	3.3
Sierra Leone	0.3	0.9	1.0	—	—
Dominican Republic	—	1.5	—	—	—
Total	**66.6**	**68.3**	**71.7**	**32.1**	**39.6**
Total less Australia	47.1	49.2	40.5	20.2	16.3
Total less Australia & Guinea	31.3	45.3	24.0	17.3	14.5

nies' intransigence on the price policy of bauxite and their rejection of the producer countries' demands. On the other hand, the creation of an aluminium industry might establish a dependence detrimental to real economic development (high investment costs at the start, outside debts, technological dependence, dependence in relation to the market, etc . . .).

One can conclude on this point by a synthesis of the report delivered by the representative of Guyana in the name of the producer countries at the United Nations' Council of Commerce and Development in November 1982 (Integrated programme for basic products):

- the prices practised in bauxite and alumina dealings are invisible, which puts the producer countries at a disadvantage in their attempts to determine the real prices;
- vertical integration, technological factors and the industrial concentration restrict access to the market;
- for want of the technological acquirements and the knowledge of the market, the producer countries are unable to discern neither the scope of the regional markets nor the demand for aluminium, alumina or bauxite. Given that for several producer countries, exports of these products represent a considerable proportion of their total earnings in foreign currency, their situation is precarious.
- the risks felt concerning investment in developing countries put those producers at a disadvantage when they have to compete with other countries to obtain the scantily available investment capital;
- the problem of the transfer of technology remains as does that of the training of the workforce and also of the management.
- the mechanism of the transfer price and other analogous formulas diminish the receipts by governments of producer countries.

The strategies of the actors

The bauxite producer countries confronted with the multinationals

The exploitation of bauxite reserves in developing countries, their processing and their commercialization in the developed countries are ensured to a very large degree by multinationals, based in the Western world.

As these companies are vertically integrated, the majority of their sales take place between enterprises of the same group, which allows them to use internal price tarifs.

If one excludes the producers of secondary importance and those from countries with a planned economy, only 13 per cent of bauxite production and 23 per cent of that of alumina are sold on the market, the rest within the groups.

The large companies ensure, according to various formulas, the transport of 87 per cent of all bauxite and alumina imported by the industrialized countries, whether it be by their own ships or by freight contracts[1].

What room for manaeuvre do the member countries of the IBA have in these conditions?

The International Bauxite Association (IBA): a brief history

The bauxite producing countries first envisaged an association in the early 1970s. It was the nationalization in 1971 of Demba, the Alcan subsidiary in Guyana, which demonstrated that it was possible to break away from the traditional domination of the big groups (the Demba company had existed since 1916).

The change of government in Jamaica in 1972 was a second determining factor in the creation of the IBA:

> "The first English-speaking country to gain its independence (in 1962), Jamaica was governed until 1972 by the Labour Party of conservative leanings. Endowed with archaic structures which favoured foreign companies to the detriment of the majority of the population . . . the new state saw its social problems increase. Brought to power in the parliamentary elections, Michael Manley tried . . . to redress the situation"[2].

The very obvious success of OPEC in 1973—74 was also an important factor in the creation of IBA in 1974, with the stimulus of Jamaica.

At its formation, the IBA brought together Australia, Guyana, Guinea, Jamaica, Surinam, Sierra Leone and Yugoslavia. In November 1974, Ghana, Haiti and the Dominican Republic joined the organization, followed by Indonesia in 1975.

Jamaica began the offensive in May 1974, by putting a tax on the export of bauxite fixed at 7.5 per cent of the American market ingot price. As a result, the tax receipts Jamaica drew from bauxite rose from 25 M USD to 170 M USD. This tax was increased to 8 per cent in 1975 and to 8.5 per cent in 1976.

So as not to lose its share of the market due to the rise in its prices, Jamaica imposed minimum production levels on the companies operating on its territory. In the months that followed, the other four producers in the Caribbean plus Guinea fixed similar taxes and minimum levels of production:

- Surinam: 6 per cent increase in bauxite production, following an agreement with Alcoa;
- Guyana: 5.9 per cent increase in bauxite production;
- Dominican Republic: 5.5 per cent increase following an agreement with Alcoa in December 1974.

Australia did not join in with these measures.

The aims of the IBA

The IBA, under the stimulus of Jamaica, wanted to establish a common front of bauxite exporters who would act collectively. To enable them to do so, a three-point strategy was worked out:

- *The creation of a data bank.*

The acquisition by each members of a complete knowledge of the industry's workings. It is known that the monopoly of information is one of the multinationals' principal strategic weapons. It was therefore considered necessary to create a data bank on the industry. The data should be available to all members of the association. To get access to this data, in general available only within the companies, profitable, it must not be forgotten that existing investment in aluminium production based on bauxite, is such that the producers not easily replace plants in working order by other units.

IBA members had to acquire a majority shareholding in the local subsidiaries of the multinationals.

However, this strategy has been rarely used, except in countries where it was already practised (Ghana, Guinea, Indonesia and Yugoslavia). Only Guyana opened negotiations with Reynolds concerning the nationalization of its property on Guyanan territory.

The government of Jamaica was able to acquire 51 per cent of the capital of Kaiser's and Reynolds' local bauxite mining operations. 7 and 6 per cent of the alumina operations of Alcan and Alcoa, but failed in its negotiations with Revere Copper and Brass, which then left the country.

- *The coordination of prices*

As no market price for bauxite existed, with the majority of transactions taking place between subsidiaries of the same group, it was considered important to establish a common market price, based on information collected in the data bank.

The companies retorted by saying that it was impossible to establish a common price, given the large number of bauxite varieties, as well as the differences in transportation costs.

The IBA then suggested a price policy based on a reference price (as the price of oil was fixed in relation to the price of Saudi Arabian unrefined oil). This suggestion was accepted by two thirds of the IBA members, but with Australia again refusing to join in.

- *The coordination of production levels*

This third recommendation of the IBA, indispensable in establishing a price policy, was little followed. In fact, the companies' production units are adapted to specific bauxitetypes: the North American industry to Jamaican bauxite, the French industry to Guinean bauxite, etc. To adapt to other types of bauxite would cost the companies considerable sums. They are thus relatively tied to certain workings.

A coordination of production aimed at avoiding fluctuations in the bauxite market is thus largely beside the point, these movements being unlikely to occur. On the other hand, the setting-up of production lines linked to the use of "new bauxites" seems to be more and more a strategy of the companies. This is the case of companies active in Australia, and also of new producers, linked with "non-IBA" bauxites, eg Brazil and the Arab states.

The obstacles: three substitutions

- *The substitution of other sources of bauxite supply*

Bauxite is one of the most plentiful materials in the earth's crust (the SiAl: silicum and aluminium). There is therefore no question of future shortages, as in the case of other raw materials.

However, its increase in price due to the imposition of export tax and the increase in transport costs linked to the energy crisis, renders non-IBA workings profitable or at least potentially so. Australia, a rather special member of the IBA, is the big beneficiary of this counter-strategy. All the other IBA producers have seen their share of production stagnate or diminish. New "non-IBA" producers have appeared: Brazil, Venezuela.

- *The substitution of other raw materials*

Many other raw materials than bauxite can be used to produce aluminium. The US State Department has listed at least five alternative ores available in large quantities in the USA: alunite, anortho-

site, the "Georgia" clays, coal waste and danusonite. There are also abundant reserves of these ores in Europe.

Pechiney has perfected a processing method which is adaptable to a series of ores (i a clays, shale, coal waste). The alumina obtained is of very high quality but the process requires more energy. However, even if this process could be made economically profitable, it must not be forgotten that existing investment in aluminium production based on bauxite, is such that the producers do not easily replace plants in working order by other units.

The producer countries have also attempted to reassure the aluminium producers as to their reliability as bauxite and alumina suppliers. They stated that they would not impose a fixed price, but that they were determined to obtain an increase in their revenues from the industry in proportion to the price rises the companies obtained for the aluminium ingot on the American market. They noted that the export taxes increased their revenues without undue pressure on the companies.

In 1980 the IBA recommended an increase in the minimum price of a ton of aluminium, for 1981 16—19 per cent of the average American market price for the ingot. It also recommended that the price of a ton of bauxite should be kept within 2 per cent of the average price of the American ingot. However, it also considered that a floor price should be established between 20 and 30 USD/ton.

The IBA member countries met again in Kingston in November 1983 to prepare for the 10th ordinary session to be held in Conakry in December 1983. As a result of the feeble demand, the IBA recommended that bauxite and alumina prices should remain stable for 1984 and be kept at the 1983 rate. For a ton of bauxite, this meant 2 to 3 per cent of the average price of the American ingot and for a ton of alumina 14 to 18 per cent of this same ingot.

It is clear that the aluminium producers have made use of the economic crisis affecting the aluminium sector to pressure the IBA to keep the prices down. It is also clear that to obtain "just and fair" prices, as demanded by Jamaica under Manleys government, the IBA has to work for a total revision of the present pricing structure for bauxite and alumina.

The pressure against the IBA works so much the better because Australia, the leading world producer of alumina, does not feel tied to IBA recommendations. As a result the organization presents a divided front to the big companies. Nevertheless, the pricing policy is of prime importance in view of the enormous investments necessary and growing debts that will be accumulated by third world countries to realize the alumina and aluminium industries projected in the third world. What benefits will they be able to draw from this change in location (at first view, positive), if the aluminium producers stay in control of pricing and of the commercialization circuits, not to speak of their technological control.[3]This change of location is worth a closer look.

Only new projects in the fairly long-term future (1985—95) could replace the present process, provided that the bauxite price continues to increase.

A study by the US State Department gives three reasons for which the aluminium companies do not actively try to replace bauxite with domestic raw materials:

- the high level of investment in the existing bauxite-adapted units;
- their ability to make the consumers bear the price increase in bauxite. In fact, the increase of the bauxite tax accounts for less than 25 per cent of the increase in aluminium prices in 1974;
- their fear that the setting-up of production based on domestic ores leads to new competition.

These factors explain the lack of a more determined reaction by the companies, who have been "satisfied" to turn away, little by little, from the IBA countries and look towards Australia or towards "non-IBA" producers.

- *Substitution of aluminium*

Finally, aluminium can be replaced in many of its uses by other materials (steel, copper, plastic), given certain technical and financial conditions.

The IBA and price-setting

Ever since its creation, the IBA has looked for a way of obtaining "just and fair" prices for the producer countries of bauxite and alumina.

Although the IBA set out originally with the idea of a minimum price, it moved away from this position in 1977, whilst continuing to work for the establishment of a common priceing policy for bauxite and alumina. In February 1979, during the 5th session of the IBA, held in Surinam, the Council of Ministers of the member countries decided to link the minimum price for bauxite to the American market price for the aluminium ingot (at 99.5 per cent instead of demanding a fixed price.

In August 1979, the minimum price for a ton of bauxite sold in the USA and Canada was 24 USD/ton (cif price). At this time the conference recommended a rise in this minimum price and demanded that the same type of formula be found for alumina. Australia objected to these minimum prices:

> "the IBA is an example of a cartel of producers attempting to draw from natural riches a profit above what is just and this association is killing the goose with the golden eggs"[4].

The role that the USA and the big aluminium companies played in the defeat of the Manley government in 1980 in Jamaica is well known.

In December 1980, an event without precedent took place, when the members of the IBA and representatives of the big companies met in Kingston. ■