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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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Australian Mineral Industry 1967 Review

Part 1 - General Review

by

Z. Kalix

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AUSTRALIAN MINERAL INDUSTRY 1967 REVIEW

PART 1 - GENERAL REVIEW - PRELIMINARY EDITION

FOREWORD

The Australian Mineral Industry Annual Review, compiled by the Mineral Resources Branch of the Bureau, is normally published in December or February about 12 months after the completion of the calendar year; delay is inevitable because the data on which the Review is based, are not available before August and, indeed, some information is not available before October of the following year.

In an attempt to shorten this delay at least in the release of general information on the 1967 calendar year, an early edition of Part 1 of the 1967 Review, the General Review, is presented in this record.

We believe that our many clients with interest in the Australian Mineral Industry will welcome preliminary information. We hope to improve our service next year by arranging to pre-print preliminary information on the General Review 1968, and thus provide a greater number of copies in a more attractive form.

(L. C. NOAKES)
Assistant Director (Mineral Resources)

PART 1

GENERAL REVIEW

INTRODUCTION

Z. Kalix

Since the initiation of the Annual Review series in 1948, the Australian mineral industry has passed through a period of continuous expansion and, what is at least as important, a substantial degree of diversification. This expansion is not only reflected in increased production, but also in expanded trade in mineral products.

The progress of the industry is reflected in the development of this publication. It has been the primary object of the authors to present their account of the progress of the industry, and endeavour to pick out highlights and delineate those trends, at home and overseas, which appear to be of major importance. Wherever possible the general text of the Review has been extended into the first half of 1968 to supplement the statistical coverage which is necessarily limited to the calendar year 1967.

As in the past three years the detailed statistics have been the responsibility of Mr. F. J. Gibbons, Statistical Officer (Mining) of the Bureau of Census and Statistics, stationed in the Mineral Economics Section; Mr. Gibbons has been assisted by Mr. B. Gyurky. Miss E. Clayton of the Mineral Economics Section was responsible for the compilation of information on prices and material for graphs in this issue.

GENERAL SUMMARY

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The steady expansion of world mining production which averaged 5 percent per annum from 1962 to 1966 slowed down to some extent in 1967 with a rise of 2.6 percent over 1966. The United Nations index numbers (Table 1) show that the bulk of the increase was in East and South East Asia, excluding Japan. Amongst the older mining areas Northern North America showed only a 3.5 percent increase while mining production in Western Europe stood on the same level as in 1963; mining production in countries forming the European Economic Community, decreased by 2 percent compared with 1966.

TABLE 1. INDEX NUMBERS OF MINING PRODUCTION (a) (1963 = 100)

	1963	1964	1965	1966	1967
World	100	105	109	114	117
Industrialized countries ...	100	104	106	109	111
Less industrialized countries	100	109	116	124	130
Northern North America.. ...	100	104	107	113	117
Latin America...	100	105	107	108	112
East and South-East Asia ...	100	109	116	122	136
East and South-East Asia, excluding Japan	100	110	120	126	143
Europe..	100	104	103	101	100
European Economic Community	100	104	104	101	98

U.N.

(a) Excluding USSR and Eastern Europe

Regarding individual commodities, the United Nations index numbers for the more important raw materials and electricity - Table 2 - also show that 1967 was a more productive year than 1966 although there were very wide variations in the rate of growth or decline. The rate of growth varied from 3.3 percent in case of cement to 12.8 percent for tin; the rate of decline from 0.9 percent in the case of coal to 10.7 percent for copper.

The cumulative rate of growth in recent years has been greatest in aluminium - averaging just under 9 percent per year - followed by commodities like

electricity, petroleum, pig iron and steel which have shown the most growth while copper, coal and lead the least. Whilst variation in the rate of growth of production from commodity to commodity is expected, the extent of variations from one year to the other and the differences in longer term trends reflect the result of an interplay of economic and technical factors on the development of individual industries. Of particular significance are commodity production indexes (Table 2) which indicate trends in "value added" in constant U.S. dollars. Value added is defined as the gross value of output less the cost of raw materials, containers and suppliers, fuels and electricity consumer and of work contracted out. The estimates are generally at factor cost.

TABLE 2. WORLD INDEX NUMBERS OF COMMODITY PRODUCTION (1963 = 100)

	1963	1964	1965	1966	1967
Coal (a)	100	103	105	106	105
Petroleum	100	108	115	125	134
Cement	100	110	115	123	127
Pig iron (b)	100	114	120	124	130
Steel	100	113	118	122	128
Copper (c)	100	105	109	112	100
Lead (d)	100	103	105	108	106
Zinc (d)	100	108	113	119	118
Tin (f)	100	100	104	109	123
Aluminium (d)	100	113	120	130	139
Electricity	100	109	117	126	135

U.N.
(a) Including coal equivalent of brown coal and lignite
(b) Including ferro-alloys
(c) Excluding the USSR, East Germany and North Korea
(d) Excluding the USSR, East Germany, North Korea, Czechoslovakia and Romania
(f) Excluding the USSR and Eastern Europe

Mineral markets remained generally strong during 1967 though there was evidence of weakening demand for and over supply of some commodities. Among the metallics, copper supply improved during the first half of 1967 from the shortage position of 1966 but as a result of production losses resulting from industrial troubles in the United States during the second half of the year there was again evidence of short supply as the year progressed. Increased copper production

recorded in Canada, Zambia and Congo failed to offset the United States losses; there was again evidence of short supply as the year progressed and prices on LME rose to £607 at the end of December 1967 to £816 early March 1968. Lead supply and demand remained about in balance and prices were basically steady throughout the year. Prices rose again in 1968 and reached £102½ in June. There was a price decline in zinc on all markets in 1967; a condition of over supply was alleviated by voluntary production cuts originally instituted by some major producers in 1966. Tin prices showed a fair degree of stability during the January - October period in 1967; the devaluation of sterling was followed inevitably but not proportionally by new market prices and the year closed with the price at its lowest level of the year. Early in 1968 the International Tin Council confirmed, with minor adjustment, the new price ranges which had been introduced in November; prices started to ease in April and fell below £1300 in the first week in August, 1968.

Nickel remained in continuing short supply in 1967 although there was a slight price increase during the year; the short supply position is not likely to be relieved until 1969 at the earliest. Silver prices rose from the monetary price of US $1.293 per troy ounce to over US $2.00 a troy ounce after the United States announced at mid-year that it would release silver from Treasury Stocks only to recognized consumers at the market price. Towards the end of 1967 prices for silver were boosted by the distrust of all currencies as the unprecedented demand for gold spilled over into silver market; many would-be buyers of gold were precluded by the laws of their countries from buying gold and looked upon silver as an equally good hedge. Subsequent events in the gold market have changed the pattern of gold hoarding and silver prices too have reacted downward from the peak of 250d quoted mid March to 216d on mid April 1968. Most other metal prices remained firm on world markets although there was further weakening of iron ore prices in Europe and Japan due to abundant supply of good grade ore from many sources.

In the industrial mineral group, prices of asbestos and elemental sulphur were again higher with sulphur continuing in short-supply; potash prices, on the other hand, were lowered as supply became more readily available.

THE MINERAL INDUSTRY IN AUSTRALIA

Z. Kalix

The Industry in the National Economy

The Australian mineral industry continued to expand in 1967, stimulated by increasing domestic demand and opportunities for export of certain mineral products. Due to generally firm prices, ex-mine value of mineral output is estimated to have increased from $624 million in 1966 to $699 million in 1967; value of production increased from $512 million to $568 million.

Some indicators of business and industrial activity in recent years and the mineral industry's contribution to the economy are given in Tables 3 and 4.

TABLE 3. SOME INDICATORS OF AUSTRALIAN INDUSTRIAL ACTIVITY

	1963	1964	1965	1966	1967
Production -					
Black coal ('000 tons)	24,856	27,401	31,439	33,334	34,707
Brown coal ('000 tons)	18,456	19,035	20,659	21,783	23,384
Pig iron ('000 tons)	3,630	3,930	4,184	4,667	4,977
Ingot steel('000 tons)	4,580	4,968	5,376	5,797	6,189
Electricity(million Kwh)	30,605	34,054	37,077	39,743	42,904

TABLE 4. SALIENT DATA ON THE AUSTRALIAN MINERAL INDUSTRY

	1963	1964	1965	1966	1967
Mineral output (a)					
Ex-mine ($m.)	417	492	542	624	699
Index at constant prices (1959 = 100)	124	128	137	156	178
Value of production, mining and quarrying ($m.)	326	398	442	512	568

TABLE 4. cont.

	1963	1964	1965	1966	1967
Mineral exports (b)-					
Value, f.o.b. ($m.)	168	(c)226	(c)285	(c)331	(c)418
Index at constant prices (1959 = 100)	156	167	187	249	346
Value, f.o.b., plus gold production ($m.)	198	255	310	357	439
Mineral imports (b)-					
Value, f.o.b. ($m.)	231	251	301	276	303
Value, f.o.b., less crude petroleum ($m.)	55	70	105	74	92

(a) Excludes uranium oxide
(b) Excludes gold and uranium oxide shipments
(c) Excludes alumina

No definite measure of the mineral industry's contribution to the gross national product is possible as yet, but an examination of the industry's contribution on the basis of the output including domestic smelting and refining related to the gross national product is of some interest. In 1967, the Australian mineral industry's output including values added by domestic smelting and refining (Table 6) was only about 4.04 percent of the gross national product. However, the real contribution made by the mining industry to the economy extended much beyond this. The mining industry provided a wide variety of raw materials for secondary industry and this variety is being extended by diversification of production.

The mineral industry also plays a consistent role in the national economy as an earner of export income. Mineral and metal exports increased from 11 percent of total exports by value in 1963/64 to over 20 percent of total exports in 1966/67. A further sharp increase is envisaged in the near future. The industry also provides some of the raw materials for the fertilizer industry which, in turn, provides assistance to rural primary industry. In this respect, however, substantial imports of fertilizer raw materials and chemical fertilizers are needed.

The domestic industry provides the bulk of Australia's mineral requirements, as is shown in Table 5. Self-sufficiency as expressed in this table is apparent self-sufficiency i.e., the ability of domestic production to meet

current domestic requirements. The table does not reflect potential self-sufficiency, i.e., the availability of resources which may be adequate but which have not yet been fully developed or are uneconomic in existing circumstances.

TABLE 5. AUSTRALIAN SELF-SUFFICIENCY, PRINCIPAL MINERAL COMMODITIES, 1967

	Unit of Quantity	Production	Imports	Exports	Apparent or estimated consumption	Apparent self-sufficiency
Alumina	'000 tons	840.9	37.0	n.a.	175.0	100%
Aluminium (a)	'000 tons	91.3	0.4	10.5	81.2	100%
Asbestos - chrysotile	'000 short tons	0.5	39.8			
amosite	"	-	10.3	2.5	50.7	1%
others	"	-	2.5			
Barite	'000 tons	15.7	1.3	4.2	10.5	100%
Bauxite - for alumina	"	4.160.3	n.a.	n.a.	n.a.	100%
other than for alumina	"	16.2	n.a.	n.a.	n.a.	100%
Bentonite	"	0.4	20.9	-	21.3	2%
Cadmium	"	0.5	-	0.5	0.1	100%
Cement	"	3.761.0	44.4	1.7	4.188.0	99%
Chromite	"	0.1	25.1	-	(c)25.2	-
Coal - black	"	34.707.0	7.7	9.250.3	275.700	100%
- brown	"	23.357.0	-	-	23.387.0	100%
Copper (a)	"	66.1	3.1	9.3	60.0	100%
Diamonds - industrial	'000 carats	-	52.5	(d)40.0	345.0	-
Diatomite	'000 tons	8.3	4.3	-	12.5	100%
Ferro-chrome	"	2.2	3.4	-	5.6	40%
Ferro-manganese	"	56.2	5.3	0.3	51.5	100%
Ferro-silicon	"	8.8	9.3	-	18.1	48%
Fluorspar	"	-	22.4	-	22.4	-
Gold (b)	'000 oz.	808.6	145.9	561.1	393.4	100%
Graphite	'000 tons	-	2.1	-	2.0	-
Gypsum	"	777.4	-	207.7	569.7	100%
Ilmenite cons	"	537.7	-	384.3	70.0	100%
Iron ore	"	17.592	171	9017	7.900	100%
Lead (a)	"	190.9	-	147.6	42.1	100%
Limestone	"	8.188.0	265.0	-	8.453.0	97%
Magnesite - crude equivalent	"	23.7	47.7	2.2	69.2	34%
Manganese - metallurgical	"	584.4	6.6	314.8	(f)240.0	100%
dioxide for batteries	"	0.4	0.1	-	0.5	80%
dioxide for other purposes	"					

TABLE 5. cont.

	Unit of Quantity	Production	Imports	Exports	Apparent or estimated consumption	Apparent self-sufficiency
Mercury	'000 lb.	4.2	132.9	-	137.1	3%
Mica (l)	"	-	277.0	-	277.0	-%
Nickel (inc. anodes) ...	'000 tons	-	1.9	-	(g)3.0	-
Petroleum - crude	Million gal.	266.0	5040.2	-	5396.6	5%
Phosphate rock	'000 tons	11.8	3.265.0	-	2.625.0	-
Potassium fertilizers (h)	"	-	67.1	-	67.1	-
Rutile cons	"	273.4	-	258.8	2.2	100%
Salt	"	703.2	13.7	88.0	630.0	100%
Sillimanite & Kyanite ..		1.2	2.3	-	4.5	27%
Silver (b)	'000 oz.	10.000	77	4.168	6.000	100%
Sulphur	'000 tons	(j)235.4	(k)444.5	-	680.0	35%
Talc		20.5	2.2	8.6	14.1	100%
Tin	'000 tons	5.6	0.7	1.7	4.4	100%
Tungsten cons..	"	1.7	-	1.6	0.1	100%
Zinc (a)	"	194.5	-	96.5	102.5	100%
Zircon cons	"	294.8	-	247.2	4.5	100%

(a) Primary refinery shapes. (b) Primary refined. (c) Includes 3,600 tons consumed in ferro-chrome production. (d) Re-export and scrap. (f) Includes 95,000 tons consumed in ferro-manganese production. (g) Includes nickel content of nickel oxide sinter and nickel salts. (h) K_2O equivalent. (j) Acid-sulphur equivalent of indigenous sulphur in sulphuric acid production. (k) Elemental sulphur only. (l) block and splittings. (m) including steatite, pyrophyllite etc.

The main deficiency is in petroleum, but other important commodities which will continue to be imported in substantial quantities for some time include amosite asbestos, industrial diamonds and sulphur; imports of petroleum and those of chrysotile asbestos, potassium, nickel and phosphate are likely to be reduced significantly in the not-too distant future.

IMPORTANT RECENT DEVELOPMENTS

During the period under review important developments took place in several sectors of the mining industry. These are discussed in more detail in the appropriate sections of Part II of this Review, and will be reviewed only briefly here.

International Developments.

The fourth session of the Working Group of the United Nations Committee on Tungsten was held in New York in April, 1967 and dealt with statistical matters only.

Four of the largest copper producing countries Chile, Congo, Peru and Zambia at their conference in Lusaka early June 1967 agreed to form a consultative body concerned with the long-term development of the industry.

During the period under review six meetings (the third to the eighth inclusive) were held by the International Tin Council under the Third International Tin Agreement. At the seventh meeting convened in London from 16-18 January 1968, the Council confirmed, with minor amendments, the price range which it had established provisionally on 22nd November 1967 following the devaluation of sterling. At the eighth meeting held in La Paz on 22 - 24 April 1968 the Council revised the tonnages and votes of consuming members and votes and percentage allocation of export quotas (when applied) of producing members.

The eleventh session of the International Lead and Zinc Study Group was held in Geneva in early October 1967. On the basis of figures available at the time, the Statistical Committee predicted a world surplus of lead and zinc.

A United Nations ad hoc Committee on the "Peaceful Uses of the Sea-bed and Ocean Floor beyond the limits of National Jurisdiction" was held in New York at the end of June 1968.

Legislation.

In April 1967 the Minister for National Development announced a partial embargo on exports of uranium from Australia. The policy as outlined by the Minister represented a liberalisation of former policies in that for the first time, the prospecting companies were given an assurance in advance that approval would be given to the export of specified quantities of uranium from existing or newly discovered deposits.

The Minister for National Development announced in August 1967 that the Commonwealth Government had decided to liberalize its policy of control on prices of iron ore exported from Australia.

A high court judgement was handed down on 1st March, 1968 (under appeal by Commonwealth Government) regarding expenditure incurred in connection with the development of mining properties and the carrying on of mining operations on mining properties.

On 1st April, 1968 the joint Commonwealth/State Offshore Petroleum Legislation came into operation. The legislation provides for a common mining code to apply uniformly throughout all State and Territory off-shore areas including both territorial waters and the outer continental shelf. Companies holding titles, at 1st April, 1968 under existing State Legislation have the option to transition their titles on application under the joint Legislation before 1st October 1968 or to allow them to run to expiry under the State Legislation. As at 16th September 1968 transition had been sought for 65% of the areas held under off-shore titles.

Fuels. Production from Australia's third commercial oil field, at Barrow Island (Western Australia), commenced in April 1967 when the first shipment of crude left for the Kwinana refinery and by the end of the year the total production had reached 4.8 million barrels.

Commercial development of natural gas fields at Roma, Barracouta, Marlin and the Gidgealpa- Moomba fields progressed during the year.

Petroleum exploration and development was continued at a very high level and more than one million feet of drilling was undertaken.

The search was characterised by a higher proportion of offshore drilling, particularly off the coasts of Victoria, South Australia and Western Australia.

Important discoveries during the period under review were of two additional oilfields in the Gippsland basin-Kingfish, about 60 miles south-east of Bairnsdale and Halibut, about 40 miles north-east of Bairnsdale; both are regarded as major oilfields.

Production of both black and brown coal was at new record levels in 1967, and exports of black coal were also at record level. Exports of black coal, particularly to Japan should increase over the years; independent estimates have placed Australia's share of this market at about 17-18 million tons in 1971, increasing to around 20 million tons by 1976.

Metals. The more important developments in metals in 1967 and early 1968 include:- the first recorded commercial production of nickel concentrates; commencement of regular iron ore exports from the Northern Territory; the first export shipments of iron ore pellets; the commissioning of the Gladstone alumina refinery; commencement of tin production from newly-developed mines in Tasmania and N.S.W.; production of electrolytic zinc at Port Pirie and increased capacity at the zinc smelter at Cockle Creek.

Rich nickel sulphide ores were discovered in 1966 by Western Mining Corp. Ltd at Kambalda, near Kalgoorlie, Western Australia, and the mine, mill and townsite were established in record time. The first ore was treated in June 1967, and by the end of the year production had reached 15,000 tons of concentrates containing 13 percent of nickel. It was reported that the Corporation will establish a refinery with a minimum annual production capacity of 15,000 tons of metal by 1971 and will investigate the feasibility of erecting a smelter at Kambalda or Kalgoorlie.

Frances Creek Iron Mining Corp. Lty Ltd commenced exporting iron ore mined at Frances Creek (Northern Territory) from Darwin in June 1967.

Two companies commenced exports of iron ore pellets to Japanese steel mills during April 1968; Hamersley Iron Pty Ltd commenced shipments of pellets from Dampier (Western Australia), and Savage River Mines from Port Latta (Tasmania).

During the period under review long term contracts were signed for the delivery of 100 million tons of iron ore and iron ore pellets to Japan valued at $725 million. Contracts signed as at June 1968 for the export of iron ore and iron ore pellets to Japan and elsewhere now total 363 million tons valued at $2,980 million.

Hamersley Iron Pty Ltd announced plans to construct a plant at Dampier (Western Australia) to produce metallized agglomerate.

Weipa (Queensland) township was officially opened in June 1967 and the production of bauxite by Comalco Industries Pty Ltd was increased from one million tons in 1966 to 2.8 million tons in 1967; production is planned to increase to 4 million tons in 1968.

The Gladstone refinery of Queensland Alumina Ltd came on stream in March and was officially opened in early August 1967; it was announced that capacity will be lifted from 600,000 to 900,000 tons per year by late 1968.

Two major tin-projects reached production stage. Cleveland Tin N.L. developed a mine at Luima, Tasmania and commenced production in March 1968; the Gibsonvale project in New South Wales, came into production in mid 1968.

The recovery of highgrade zinc was commenced by BHAS from the slag dump at Port Pirie (South Australia) early in 1968.

Western Titanium N.L. has completed a pilot plant at Capel, Western Australia, to produce "upgraded ilmenite" containing over 90 percent TiO_2 and it was announced that the product has been tested successfully by one pigment manufacturer.

During the period under review studies on ilmenite bearing sand near Gladstone were continued by Murphyores Holdings Ltd. Subject to satisfactory pilot plant tests now under way, the company plans to construct a plant to beneficiate ilmenite to rutile grade.

Manganese ore is moving regularly from Groote Eylandt to the ferro-manganese works in Tasmania and to markets in Japan and elsewhere. Total production in 1967 has exceeded 350,000 tons.

Output from the new zinc refluxing plant at Cockle Creek, New South Wales was increased to 55,000 tons of g.o.b. zinc early in 1968 by Sulphide Corporation Pty Ltd.

Industrial Minerals

In view of the need for an accelerated search for phosphate deposits the Bureau of Mineral Resources established a new "Phosphate Group" within the Geological Branch by the beginning of 1967. The "Phosphate Group" is subdivided into Continental Subgroup and Marine Geology Subgroup. The Continental Subgroup completed the appraisal of the Lower Palaeozoic formations in the southern part of the Tasman Geosyncline for phosphorite, and was engaged in biostratigraphic field work in the Cambrian phosphate province in the Duchess district, North-West Queensland, as the first part of a programme of research in the phosphatic environment of the Georgina Basin. Testing of borehole cuttings and cores was continued, as well as the study of marine samples from the Gulf of Carpentaria and from Christmas Island. The Marine Geology Subgroup made extensive preparations for two three-month cruises planned for the 1967-68 season off the coast of north-west Australia and the Solomons Sea.

Deposits of phosphate rock discovered at Duchess in Queensland in 1966 are being evaluated by Broken Hill South Ltd and drilling is expected to confirm large tonnages of medium-grade material; a comprehensive feasibility study of the project and additional drilling are in progress. Additional deposits, about 100 miles closer to the Gulf of Carpenteria were discovered by Broken Hill South Ltd, International Minerals and Chemicals Corp., and Continental Oil Company in 1967 and exploration and assessment continue.

Several companies are establishing solar evaporation facilities on the Western Australian coast and hold contracts to supply large quantities to the Japanese market. Some observers now expect that the salt industry in Western Australia will be selling about 5 million tons by 1978.

No elemental sulphur is available in Australia, but sulphide minerals provide some 35 percent of the domestic requirements for sulphur. It was announced that Central Queensland Acid Pty Ltd is constructing a plant to produce 1,000 tons of acid per day at Gladstone from Mount Morgan pyrites.

The Mt. Lyell Mining and Railway Co. Ltd and E. Z. Industries Ltd will

build one of the world's largest sulphuric acid plants at Burnie (Tasmania) on a joint venture basis. The plant will produce 420,000 tons of sulphuric acid a year from 300,000 tons of pyrite concentrates to be supplied equally from the mines of EZ and Mt. Lyell; the plant is expected to be commissioned early in 1970.

Large deposits of calcium bentonite have been discovered by geologists of the Bureau of Mineral Resources in the Mantuan Downs area, south-west of Springsure, central Queensland. Simple chemical treatment can produce synthetic swelling bentonite from this material. Reserves in excess of 16 million tons suitable for exploitation by opencut methods have been indicated.

Production

Mining and Quarrying. The ex-mine value of minerals produced in 1967 was a record $699.0 million, an increase of $75.3 million, or 12.1 percent, compared with 1966. This was largely the result of increased production of iron ore, crude petroleum, nickel and coal. Details of production are given in Table 6A.

TABLE 6. AUSTRALIAN MINERAL PRODUCTION:

PART A. EX-MINE VALUE AND QUANTITY OF MINERALS PRODUCED

Mine product	Unit of Quantity	1965 Quantity	Value ($'000)	1966 Quantity	Value ($'000)	1967(a) Quantity	Value ($'000)
Antimony cons..	ton	55	21	150	43	154	54
Antimony in mine products ...	"	944	(b)	971	(b)	930	(b)
Asbestos...	s. ton	11,566	1,916	13,468	2,224	734	112
Barite.	ton	11,976	150	13,724	199	15,666	218
Bauxite	"	1,167,671	n.a.p.	1,798,261	n.a.p.	4,176,549	n.a.p.
Berylium ore...	"	38	8	52	14	55	20
BeO content..	unit	457	(b)	637	(b)	675	(b)
Bismuth cons...	ton	---	---	1	2	106	130
Cadmium in mine products... ...	"	1,155	(b)	1,212	(b)	1,324	(b)
Chromite...	"	23		---	---	138	7
Clays—							
Bentonite and bentonitic clay	"	1,187	14	815	12	357	10
Brick clay and shale.	'000 tons	5,056	5,560	5,118	5,918	5,805	6,346
Damourite	ton	674	8	614	6	487	6
Fullers earth	"	152	1	---	---	75	1
Kaolin and ball clay.	"	59,683	394	50,110	252	66,112	454
Other clays..	"	946,680	1,343	1,069,370	1,466	943,198	1,293
Coal--black	"	31,438,543	143,703	33,333,643	151,380	34,707,447	160,137
brown	"	20,658,856	18,436	21,782,977	20,064	23,383,607	20,686
Cobalt in mine products	"	90	(b)	84	(b)	146	(b)
Construction materials.	"	80,767,237	80,183	88,493,081	83,499	n.a.	91,926
Copper ores and cons, etc.. ...	"	431,022	50,790	532,173	87,523	447,892	75,816
Copper in copper ores,... ... cons, etc..	"	85,044	(b)	104,007	(b)	84,275	(b)
Copper in mine products.. ...	"	90,388	(b)	109,537	(b)	90,252	(b)
Diatomite..	"	6,958	43	7,148	92	8,316	56
Delomite...	"	258,661	511	256,008	579	290,615	674
Felspar	"	8,726	103	7,259	81	4,450	43
Garnet cons	"	130	2	239	4	591	4

Cont. Table 6.

Mine product	Unit of Quantity	1965 Quantity	Value ($'000)	1966 Quantity	Value ($'000)	1967(a) Quantity	Value ($'000)
Gemstone—..	value	---	3,499	---	4,396	---	3,993
Opal	"	---	277	---	345	---	432
Sapphire..	"	---	182	---	123	---	173
Other.							
Gold Bullion, etc. (c).. ...	oz.	1,118,503	25,619	1,078,587	26,371	1,001,280	24,434
Gold in mine products. ...	"	877,643	(b)	916,985	(b)	801,009	(b)
Gypsum..	ton	833,521	2,015	801,552	2,006	777,383	2,017
Ilmenite cons...	"	441,034	3,755	513,011	4,242	537,721	4,499
Iron ore	"	6,695,269	14,640	10,893,279	41,728	17,035,969	83,168
Iron oxide..	"	42,053	212	48,374	289	53,740	429
Lead ores and cons..	"	538,686	87,947	561,131	76,831	583,266	73,443
Lead in lead ores and cons	"	351,300	(b)	352,385	(b)	366,914	(b)
Lead in mine products. ...	ton	362,137	(b)	364,892	(b)	375,031	(b)
Leucoxene...	"	380	14	756	29	1,953	85
Limestone (incl. shell and.. coral)	"	7,515,645	9,397	7,729,917	10,277	8,188,000	10,647
Lithium ores	"	310	4	933	14	667	10
Loam	"	15,580	24	9,506	17	---	---
Magnesite...	"	26,362	273	19,556	196	23,653	255
Manganese ore...	"	100,369	808	312,540	3,462	548,739	7,349
Mineral pigments	ton	227	2	272	3	358	6
Molybdenite cons	lb.	44,855	49	8,844	6	----	---
Monazite cons...	ton	2,305	224	1,984	203	2,905	295
Nickel cons.	"	---	---	---	---	15,753	n.a.p.
Pebbles for grinding	"	1,049	17	1,043	19	1,305	22
Perlite.	"	764	1	1,544	3	1,389	3
Petroleum—							
Crude.	bbls.	2,621,371	5,266	3,389,324	9,148	7,600,000)	21,286
Natural gas...	'000 c. ft.	143,402	77	142,977	80	152,360)	
Natural gas liquid (cond.)	gal	4,273	1	4,232	1	n.a.	n.a.
Phosphate rock..	ton	4,519	18	5,715	23	11,770	47
Pyrite cons.	"	204,011	n.a.p.	245,998	n.a.p.	252,748	n.a.p.
Sulphur in pyrite, lead and zinc cons...	"	345,554	(b)	371,567	(b)	392,371	(b)

Cont. Table 6.

Mine product	Unit of Quantity	1965 Quantity	Value ($'000)	1966 Quantity	Value ($'000)	1967(a) Quantity	Value ($'000)
Rutile cons.	"	217,330	15,038	243,858	17,088	273,425	19,938
Salt	"	654,533	2,556	644,817	2,626	703,157	2,810
Serpentine	"	151		----	---	---	---
Silica (glass, chemical, etc.)	"	320,937	538	347,123	533	439,264	761
Sillimanite	"	2,554	61	2,664	58	1,183	29
Silver in mine products	oz.	17,280,839	(b)	18,887,691	(b)	19,714,863	(b)
Talc (inc. steatite and pyrophyllite)	ton	19,719	331	17,327	278	20,543	226
Tantalite-columbite cons.	lb.	25,581	21	10,550	19	51,229	133
Tins cons.	ton	6,237	12,237	7,604	14,332	8,567	15,605
Tin content.	"	3,849	(b)	4,807	(b)	5,600	(b)
Tungsten—							
Scheelite cons.	"	1,150	n.a.p.	1,308	n.a.p.	1,202	n.a.p.
WO_3 content.	"	822	(b)	941	(b)	861	(b)
Wolfram cons	"	487	(d) 2,692	498	(d)4,469	458	(d)4,266
WO_3 content.	"	354	(b)	366	(b)	335	(b)
Uranium oxide.	"	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Xenotime cons.	"	---	---	---	---	18	45
Zinc ores and cons	"	604,211	36,818	639,113	32,890	701,599	29,440
Zinc in zinc ores and cons.	"	321,208	(b)	336,863	(b)	368,348	(b)
Zinc in mine products	"	349,231	(b)	369,341	(b)	398,867	(b)
Zircon cons.	"	226,863	6,136	235,649	8,255	294,752	11,048
Total value.			541,575		623,708		699,030

(a) Subject to revision. (b) Included in value of mineral in which contained. (c) Includes alluvial, retorted gold, etc. (d) Includes value of scheelite cons.

TABLE 6. AUSTRALIAN MINERAL PRODUCTION

PART B. ADDED VALUE ARISING FROM PRIMARY TREATMENT (a) ($'000)

	1965	1966	1967
Copper concentrates	8,400	20,600	16,800
Lead and zinc concentrates	57,300	50,400	57,100
Tin concentrates	1,400	1,600	1,600
Iron ore	101,300	131,400	141,400
Bauxite	25,100	36,500	36,600
Total	187,500	240,500	253,500

(a) Includes value of by-products produced therefrom.

TOTAL VALUE OF OUTPUT OF AUSTRALIAN MINERAL INDUSTRY ($'000)

	1965*	1966	1967
Part A	541,575	623,708	699,030
Part B	187,500	240,500	253,500
Total	722,075	864,208	952,530

Coal mining continued as the major sector of the mining industry in 1967, accounting for nearly 26 percent of the total value of mine output. Production of black coal increased by nearly 6 percent over 1965; this compares with an increase of nearly 11 percent in 1966. Production of brown coal increased by nearly 3 percent in 1967, compared with nearly 5½ percent in 1966.

Lead and zinc together accounted for 12.2 percent, construction materials 13.0 percent, iron ore 12.3 percent, copper 10.8 percent, beach sand minerals 6.5 percent, gold 3.5 percent, tin 2.2 percent, and the remainder about 13.7 percent. The most important departures from the pattern of recent years were the substantial increase in the contribution made by iron (from 2.7 percent in 1965 to 6.6 percent in 1966 and to 12.3 percent in 1967) and the further fall in the contribution made by gold (from 5.0 percent in 1965 to 4.2 percent in 1966 and to 3.5 percent in 1967).

Minerals with an ex-mine value of output in excess of $1 million in 1967 were black coal, construction materials, iron ore, copper, lead, zinc, gold, petroleum and natural gas, brown coal, rutile cons, tin cons, zircon cons, limestone, manganese, brick, clay and shale, tungsten, ilmenite, opal, salt, pyrite cons, gypsum, and other clays.

Smelting and refining. The value added by domestic primary treatment (smelting and refining) of the more important metals was $253.5 million in 1967 compared with $240.5 million in 1966. Details are given in Part B of Table 6. The value added by domestic primary treatment of lead and zinc concentrates, iron ore and bauxite were at record levels, but decreases were recorded for copper concentrates.

TABLE 7. MINERAL OUTPUT - INDEX AT CONSTANT PRICES (a) (1959 = 100)

1965	91	1962	117
1957	96	1963	124
1958	97	1964	128
1959	100	1965	137
1960	108	1966	156
1961	109	1967	178

(a) This series is composed of two indexes linked at 1959.

The total value of output of the mineral industry, that is, mining as well as smelting and refining, is also shown in Table 6. In 1967 this was a record of $953 million, compared with $864 million in 1966.

Other Primary Treatment. It is difficult to lay down a definite line at which primary treatment of minerals may be said to cease. In metals, the accepted convention is that refinery shapes are primary mineral commodities, semi-fabricated shapes are not. But in the non-metallic field the picture is much less clear. Table 8 lists basic commodities for industry derived from the primary treatment of mine products; it includes several commodities - calcium carbide, cement, coke, sulphuric acid and superphosphate - which represent basic forms in which the minerals from which they are derived are consumed by industry.

TABLE 8. PRODUCTION FROM DOMESTIC PRIMARY TREATMENT

Commodity	Unit of quantity	1965*	1966	1967
Alumina	ton	199,248	302,121	840,923
Aluminium	"	86,379	90,412	91,326
Ammonium sulphate	"	107,830	111,000	86,920
Antimony in antimonial lead and alloys	"	465	718	751
Cadmium	"	516	518	516
Calcium carbide	"	14,051	14,061	7,158
Cement	"	3,742,000	3,626,000	3,761,000
Cobalt oxide	"	26	24	24
Coke—				
metallurgical	"	3,047,000	3,184,000	3,353,000
soft (incl. coke breeze) (a)	"	737,000	622,000	
Copper—				
blister	"	73,414	90,487	70,826
of which refined	"	59,956	89,960	66,093
copper sulphate (b)	"	5,513	(e)4,540	(e)6,092
of which copper content	"	1,378	1,135	1,523
Gold—refined	f. oz.	968,731	921,782	808,560
Iron and steel—				
pig iron	ton	4,183,678	4,666,885	4,977,334
steel ingots	"	5,376,049	5,796,813	6,188,780

Cont. Table 8.

Commodity	Unit of quantity	1965*	1966	1967
Lead—				
primary refined.	"	193,306	193,128	190,863
in bullion (for export).	"	66,907	74,295	101,167
Manganese dioxide (c).	"	790	851	207
Silver—refined...	f. oz.	8,696,288	9,034,274	9,770,000
Sulphuric acid—	mono-			
from material of domestic origin ...	ton	673,920	668,636	687,988
from imported sulphur...	"	1,002,575	1,208,983	1,299,202
Superphosphate	ton	3,725,436	4,356,958	
Tin—refined..	"	3,179	3,640	3,594
Uranium oxide.	"	n.a.	n.a.	n.a.
Zinc—				
slab	"	198,988	194,410	194,471
zinc sulphate...	"	976	915	859
of which zinc content.	"	216	206	188

(a) Ex-gasworks. (b) Includes production from scrap. (c) Sales.

Value of Production. Valuesof ex-mine output and production are shown in Table 9. The value of production is arrived at by deducting from the value of output the cost of fuel, power, light, and materials used. No figures for mineral processing comparable to those available for ex-mine output and production are available, but Table 9 also shows fiscal year figures of:

(i) The value of production in all those groups of the manufacturing industry where some primary mineral processing takes place * and

(ii) The value of production in selected categories whose claim to be regarded as part of the mineral industry is at the moment regarded as particularly strong. **

TABLE 9. VALUES OF OUTPUT AND PRODUCTION ($'000)

	1963	1964	1965*	1966	1967(a)
Value of output -					
Mining and quarrying (b)	416,682	492,800	542,371	625,101	700,875
Value of production -					
Mining and quarrying	325,596	398,224	441,525	512,500	

	1962/63	1963/64	1964/65	1965/66*	1966/67(a)
Value of production -					
Primary mineral treatment, all groups (c)	498,598	556,184	642,990	652,134	739,997
Primary mineral treatment, selected groups (d)	359,564	419,291	495,197	490,197	539,063

(a) Preliminary, subject to revision.

(b) Exceeds the value of minerals produced because of some double counting of semi-processed minerals in this series.

(c) "Treatment of non-metalliferous mine and quarry products"; Bricks, pottery, glass, etc; "Smelting, converting, refining and rolling of iron and steel"; "Extraction and refining of other metals; alloys".

(d) "Coke works"; "Lime, plaster of Paris, asphalt"; "Marble, slate, etc.";

Cement, Portland"; "Other (including briquetting and carbide)"; "Bricks and tiles"; "Smelting, converting, refining and rolling of iron and steel"; "Extraction and refining of other metals; alloys".

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* These groups are "Treatment of non-metalliferous mine and quarry products", "Bricks, pottery, glass, etc."; "Smelting, converting, refining and rolling of iron and steel"; "Extraction and refining of other metals; alloys". They appear again in the section on "Investment, Employment, Wages and Taxation" (where coke and cement are separated out from "Treatment of non-metalliferous products"). The data here and later refer not only to plants engaged in the production of basic raw materials but also to many engaged in production of a secondary nature - factories producing fibrous plaster, asbestos cement, etc., foundries and rolling mills, plants treating scrap and producing alloys.

** These are: "Coke works"; "Lime, plaster of Paris, asphalt"; "Marble, slate, etc."; "Cement, Portland"; "Other (including briquetting and carbide)"; "Bricks and tiles"; "Smelting, etc. of iron and steel"; "Extracting and refining of other metals, alloys". The reservations regarding plants engaged in production of a secondary nature apply here also.

Overseas trade

Exports. Primary mineral commodities exported from Australia are shown in Table 10. All commodities listed are the products of the domestic industry, with the exception of re-exports of a certain amount of industrial diamonds, nickel and platinum. Exports of alumina are not included in the Table as official data are not available; it is estimated that exports of alumina were estimated at $5.5 million in 1966 and at $29.5 million in 1967.

TABLE 10. EXPORTS OF MINERAL PRIMARY PRODUCTS

Commodity	Unit of Quantity	1965 Quantity	1965 Value f.o.b. ($'000)	1966 Quantity	1966 Value f.o.b. ($'000)	1967 Quantity	1967 Value f.o.b. ($'000)
Abrasives, natural	ton	66	9	n.a.	11	n.a.	17
Aluminium, pig,ingot etc.	"	21,207	9,017	16,210	7,050	10,501	4,926

Commodity	Unity of Quantity	1965 Quantity	1965 Value f.o.b. ($'000)	1966 Quantity	1966 Value f.o.b. ($'000)	1967 Quantity	1967 Value f.o.b. ($'000)
Asbestos - all types	s. ton	4,810	981	4,644	911	2,524	438
Barite	tcn	2,183	52	4,797	115	4,174	139
Beryllium cons	"	50	12	37	9	637	222
Cadmium, ingots, etc	"	291	1,319	253	980	63	317
Clays - all types	"	2,520	56	3,458	120	4,813	223
Coal - black	"	7,155,564	60,661	8,240,920	66,487	9,250,297	76,203
Copper - ores and cons	"	46,111	7,337	47,455	9,603	44,830	9,526
Copper - lead dross	"	2,833	825	3,488	1,282	2,195	599
Copper - precipitate	"	119	52	367	329	499	305
slags and residues	"	381	170	368	163	102	2
matte	"	5,855	2,608	6,298	3,665	3,892	1,914
blister	"	2,115	2,584	6,538	10,787	6,893	8,627
refined	"	20,365	21,876	7,484	9,050	9,325	8,975
in all cons dross blister etc.	"	16,030	(a)	21,888	(a)	21,030	(a)
Total Copper Content	"	36,395	(a)	29,372	(a)	30,355	(a)
Diamonds, industrial	carat	57.041	170	49,026	204	39,983	210
Gold -							
refined bar, dust sheet	f. oz.	745,125	23,265	720,527	22,562	515,928	15,985
in all ores, cons bullion, matte, etc.(b)	"	(b)83,533	(a)(b)	159,697	(a)	132,939	(a)
Total Gold Content	"	828,658	(a)	784,332	(a)		(a)
Graphite, all types	ton	21	6	n.a.	4	n.a.	(a)
Gypsum	"	138,668	747	231,510	1,100	207,674	879
Ilmenite cons	"	360,719	3,476	356,462	3,721	384,300	3,896
Iron ore	"	149,824	1,239	2,011,979	16,863	9,017,084	75,372
Iron and Steel							
pig iron	"	45,154	2,174	95,590	3,870	149,587	6,169
Ferro-alloys, ingots	"	82	32	11,797	1,198	300	52
ingots, blooms	"	10,519	605	250,659	13,194	338,637	19.353
Lead -							
ores and cons	"	108,256	20,829	109,134	19,386	124,106	23,166
slags and residues	"	5,135	802	3,981	679	2,978	415
pig (refined)	"	156,545	43,502	159,504	37,786	147,558	30,282
bullion (99.3% load)	"	69,286	21,252	79,534	21,901	100,394	26,901
antimnial lead	"	3,758	960	4,993	1,113	3,246	797
in all (ores, slags matte etc.)	"	84,466	(a)	85,641	(a)	93,727	(a)
Total Lead Content	"	313,460	(a)	328,903	(a)	344,191	(a)
Magnesite	"	1,770	146	1,596	94	2,185	163
Manganese ore-all types	"	65,793	1,536	141,934	3,370	314,762	6,933
Mica - all types	lb.	74,652	26	n.a.	30	n.a.	51
*Monazite cons	ton	2,240	223	2,092	243	1,858	443
Nickel	"	264	204	630	143		9,665
ores and cons n.e.s. (incl. Bauxite)	"	n.a.	4,044	n.a.	5,985	-	
Opal	value	-	5,324	-	7,652	-	8,635
Petroleum crude	100 gals	-	-	-	-	10,008	532
Platinum group metals	oz.	1,317	67	3,768	148	5,159	213
Pyritic cinder (incl. Sulphur (1966)	ton	76,826	282	25,729	154	164	14

Commodity	Unit of Quantity	1965 Quantity	1965 Value f.o.b. ($'000)	1966 Quantity	1966 Value f.o.b. ($'000)	1967 Quantity	1967 Value f.o.b. ($'000)
Rutile cons	"	239,454	17,134	231,289	17,844	258,791	19,692
Salt	"	113,478	608	93,355	541	87,971	463
Silver -	f. oz.						
refined ingot bar sheet, dust	"	387,724	432	345,300	404	5,249,220	7,173
in all ores and cons etc.	"	3,112,417	(a)	3,000,967	(a)	3,029,987	(a)
in lead bullion	"	4,258,098	(a)	5,289,189	(a)	7,051,430	(a)
Total Silver Content	"	7,758,239	(a)	8,298,156	(a)	10,081,417	(a)
Talc (incl. steatite)	ton	6,778	234	7,635	231	8,648	277
Tantalum and columbium cons	"	23	51	17	94	39	156
Tin -							
ores and cons	"	1,642	1,870	2,605	3,574	3,330	4,388
ingot	"	-	-	34	8	28	78
in all ores etc.	"	682	(a)	1,326	(a)	1,662	(a)
Total Tin Content	"	682	(a)	1,360	(a)	1,690	(a)
Tungsten -							
scheelite cons	"	1,495	2,035	1,295	2,842	1,239	3,316
wolfram cons	"	417	803	520	1,261	399	1,096
Zinc -							
cons	"	212,946	14,320	226,561	15,442	289,742	19,878
slags and residues	"	7,308	900	6,530	535	6,515	467
slabs	"	87,051	24,205	120,759	31,069	96,471	23,562
in all ores, cons etc.	"	116,703	(a)	128,014	(a)	161,291	(a)
Total Zinc Content	"	203,754	(a)	248,773	(a)	257,762	(a)
Zircon cons	"	216,661	6,816	210,428	8,978	247,179	10,720
(i) Total value excluding gold shipments			284,621		332,223		417,840
(ii) Total value including gold shipments			307,886		354,785		433,825
(iii) Value of (i) plus value of refinery production of newly won gold of Australian origin			310,370		357,010		438,978

(a) Already included in the item of which it is a content

(b) Gold in gold or silver bullion no longer reported seperately. From 1/7/66, amalgamated in matte. The value in 1964 rates to gold or silver bullion only in 1965, the corresponding value was less than $56.

* Includes monazite and uranium concentrate

The value of mineral exports in 1967 excluding shipments of gold and alumina, was a record $417.8 million, an increase of nearly 26 percent on the corresponding figures for 1966; if alumina is taken into account, the estimated

increase is over 32 percent. Gold shipments in 1967 were valued at $16.0 million, but as shipments vary from year to year according to the convenience of the purchaser and ruling rates of exchange it is customary to exclude these from physical mineral exports in examining the contribution of minerals to the export economy and to take into account rather the value of refinery production of newly-won gold of Australian origin as representing the contribution of the gold mining industry to the balance of payments. On this basis the value of exports of mineral primary products in 1967 was $430.0 million, compared with $357.0 million in 1966.

A four and half fold increase in exports of iron ore, an estimated five and half fold increase in exports of alumina, an increase of almost $10.0 million in value on 1966 exports of black coal mainly to Japan, increased export values of pig iron and steel, beach sand minerals and manganese are responsible for the market increase.

Including the value of by- products, the total value of exports of the lead and zinc industry fell from a record high $129.7 million in 1966 to $125.5 million in 1967 due to lower world prices. The relative importance of this sector has in general diminished in recent years (62 percent of the total exports in 1966 but only 30 percent in 1967) and on present indications will diminish further in the future, with the growth of exports of iron ore, coal, bauxite alumina and nickel to provide diversification.

The index of metal exports by volume (i.e. at constant prices, Table 11) increased by over 22 percent due largely to increases in the exports of alumina, lead bullion and ingot steel which were slightly offset by decreases in the exports of refined aluminium and pig lead. The exports of mineral index increased by over 52 percent mainly to increases in the exports of iron ore and to a lesser extent to rises in the exports of black coal, manganese ore, bauxite and the effect of including nickel for the first time in 1967.

TABLE 11. EXPORTS OF MINERAL PRIMARY PRODUCTS INDEX AT CONSTANT PRICES (a) (1959 = 100)

	Metals	Other mineral products	All mineral products
1955	87	62	76
1956	104	77	93
1957	102	101	102
1958	102	81	93
1959	100	100	100
1960	90	136	110
1961	132	153	142
1962	156	155	156
1963	157	156	156
1964	141	201	167
1965	139	248	187
1966	200	311	249
1967	245	474	346

(a) these series are composed of two indexes linked at 1959.

Imports. Primary mineral commodities imported into Australia are listed in Table 12. The values shown are f.o.b. country of shipment; no data are available on shipping and other charges to determine landed costs. Imports of petroleum do not include refined products. The total value of imports on this basis in 1967 was the highest ever at $307.0 million; to enable comparison with physical exports, a deduction for gold shipments may be made, giving a figure of $302.9 million (gold imports are largely in the form of refined bullion from nearby sources).

TABLE 12. IMPORTS OF MINERAL PRIMARY PRODUCTS

Commodity	Unity of Quantity	1965 Quantity	1965 Value f.o.b. ($'000)	1966 Quantity	1966 Value f.o.b. ($'000)	1967 Quantity	1967 Value f.o.b. ($'000)
Abrasives - natural	ton	2,265	233	1,853	168	2,120	170
Alumina	"	55,647	3,900	51,091	3,365	37,047	2,543
Aluminium - pig, ingot	"	357	312	461	353	361	232
Antimony - metal	"	193	182	129	88	-	-
Arsenic - white As_2O_3	"	1,135	83	1,484	91	1,607	118

Commodity	Unit of Quantity	1965 Quantity	1965 Value f.o.b. ($'000)	1966 Quantity	1966 Value f.o.b. ($'000)	1967 Quantity	1967 Value f.o.b. ($'000)
Asbestos - all types	s.ton	51,719	5,859	55,152	6,437	52,584	6,435
Asphalt, bitumen and pitch natural	ton	2,846	70	1,428	51	905	47
Barite	"	2,119	72	1,124	42	1,345	64
Bentonite	"	16,054	644	15,104	494	20,927	615
Bismuth - metal	lb.	14,017	49	16,706	71	14,614	59
Chromium ore	ton	8,079	133	4,025	68	25,115	482
Clays - all types	"	43,742	1,240	44,914	1,240	53,707	1,498
Coal - black	"	11,227	286	12,491	182	7,700	96
Cobalt - ingot etc.	"	50	177	52	184	65	251
oxide & hydroxide	"	24	55	27	69	37	113
Copper - ingot and other refinery shapes	"	27,548	32,103	17	19	3,061	3,667
Cryolite	"	2,387	535	187	40	237	49
Diamonds, gem	m.car.	30,437	3,786	50,512	3,796	27,520	4,301
industrial	"	408,287	1,309	445,616	1,696	525,053	1,980
Diatomite	ton	5,444	367	6,787	351	4,331	281
Fluorspar	"	11,557	288	18,031	544	22,431	474
Gold -	f. oz.						
bar,dust,ingot,sheet	"	2,186	70	3,062	106	5,505	184
in unrefined gold or silver bullion & matte	"	137,143	3,020	152,197	4,104	148,259	3,992
Graphite - all types	ton	1,594	263	2,556	225	2,096	311
Iron and steel							
ore	"	245,584	555	212,794	479	170,793	387
ingots, blooms	"	54,501	3,852	80	50	34	64
Ferro-chrome,ingots	"	5,864	1,249	2,420	607	3,430	880
ferro-manganese,ingots	"	9,896	1,639	7,844	1,164	4,955	1,008
ferro-molybdenum ingots	"	279	1,054	366	986	131	523
ferro-silicon,ingots	"	13,002	1,747	7,500	1,061	9,291	1,379
ferro-alloys,n.e.i. ingots	"	3,546	1,219	1,889	678	5,684	2,899
Kyanite	"	1,000	67	1,332	64	1,714	119
Magnesite	"	30,309	1,572	18,621	1,078	23,828	1,288
Magnesium (inc.powder)	"	467	343	1,273	725	615	435
Manganese ore all types	"	62,116	1,395	15,639	546	6,600	261
Mercury	lb.	172,443	1,045	130,015	754	132,904	847
Mica -							
block,sheet,ground etc	"	1,271,956	354	1,009,397	227	860,318	304
scrap	"	1,227,657	22	814,888	22	1,154,501	26
Nickel - pig,ingot anodes	"	1,661	2,691	973	1,585	1,536	3,068
Petroleum, crude	'000 gals	4,278,198	195,357	4,615,558	201,922	5,038,191	210,984
Phosphate rock	'000 ton	2,527	17,508	3,286	27,479	3,265	30,355
Platinum & platinum group metals	ozs.	2,093	119	9,929	612	14,614	519
Potassium fertilizers	ton	101,486	3,380	90,266	2,967	114,068	3,743

Commodity	Unit of Quantity	1965 Quantity	1965 Value f.o.b. ($'000)	1966 Quantity	1966 Value f.o.b. ($'000)	1967 Quantity	1967 Value f.o.b. ($'000)
Salt	ton	6,718	110	6,867	120	13,690	182
Sillimanite	"	489	28	386	23	572	26
Silver in unrefined silver or gold bullion and matte	ozs.	86,069	107	90,242	130	76,514	91
Sulphur, elemental	ton	387,869	7,496	434,045	11,930	513,962	17,296
Talc	"	2,366	68	2,857	62	2,164	74
Tin, ingot	"	1,582	5,259	203	661	693	2,066
Ores & cons n.e.i.	"	39,380	470	5,038	202	4,792	260
(i) Total value excluding gold shipments			300,652		275,708		302,870
(ii) Total value including gold shipments			303,742		279,918		307,046

As in previous years mineral imports were dominated by crude petroleum, whose value at $211.0 million was the highest on record and nearly 70 percent of the value of total imports. A solid increase in demand for two chief constituents of plant food - phosphorus and potassium - was reflected in the marked increase in value (up $2.9 million and nearly $0.8 million respectively) of imported commodities containing these constituents and in elemental sulphur (up $5.4 million).

Other major changes were copper ingot and refinery shapes (up $3.6 million), alumina (down $0.8 million), magnesium (down $0.3 million) and manganese ore (down $0.3 million).

Pattern of Mineral Trade. The distribution of exports according to principal destinations by quantity and value, and imports to principal sources by quantity and value in 1967 are shown in Tables 13A and B and 14A and B respectively. Table 15 presents a summary of this information for recent years. Information on exports of alumina is not available for publication and hence this, as well as gold shipments, are excluded from the Tables.

TABLE 13A DESTINATION OF EXPORTS, QUANTITY, 1967

('000 tons)

EUROPE -	Aluminium	Copper	Lead	Zinc	Iron	Iron & Steel	Manganese	Tungsten	Tin	Ilmenite & Rutile	Zircon	Coal	Other	Total	Percentage
United Kingdom	-	2	162	158	95	20	-	-	-	183	31	-	1	653	3.08
EEC	-	6	56	42	693	9	-	1	-	146	73	-	8	1034	4.88
Other Non-Communist Europe (a)	-	-	11	24		68	21	-	1	12	7	-	-	144	0.68
USSR & Communist Europe	-	-	-	-	-	7	-	-	-	6	3	-	-	15	0.07
Total Europe	-	8	228	224	788	104	21	1	1	346	113	-	9	1845	8.71
ASIA -															
Japan	2	55	30	91	8229	170	287	-	-	91	56	8874	79	17963	84.84
India	4		19	31	-	-	-	-	-	1	-	-	-	54	0.25
Hong Kong	2	-	-	2	-	47	-	-	-	-	-	-	-	50	0.24
Philippines	2	-	4	8	-	92	-	-	-	-	-	-	28	133	0.63
Malaysia & Singapore	-	-	-	3	-	10	-	-	1	-	-	-	47	61	0.29
Middle East	-	-	-	2	-	-	-	-	-	4	-	-	-	7	0.03
Mainland China	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Asian	-	-	7	21	-	59	1	-	-	1	-	142	77	309	1.46
Total Asia	9	55	59	157	8229	377	288	-	2	98	56	9016	232	18578	87.74
AMERICA -															
United States	-	4	85	4	-	-	5	-	1	179	63	-	3	345	1.63
Canada	-	-	-	-	-	-	-	-	-	4	10	-	-	15	0.07
Other American	-	-	-	-	-	-	-	-	-	2	3	-	2	8	0.04
Total America	-	4	85	4	-	-	5	-	1	186	76	-	5	368	1.74
OCEANIA															
New Zealand	1	-	5	4	-	7	-	-	-	-	-	19	98	135	0.64
Other Pacific	-	-	-	-	-	-	-	-	-	-	-	215	14	229	1.08
Total Oceania	1	-	5	4	-	8	-	-	-	-	-	234	112	364	1.72
AFRICA -															
South Africa	-	-	-	3	-	-	-	-	-	12	1	-	-	17	0.08
Other African	-	-	-	1	-	-	-	-	-	-	-	-	-	1	0.01
Total Africa	-	-	-	4	-	-	-	-	-	12	1	-	-	18	0.09
TOTAL	11 (b)	68	378	393	9017	489	315	2	3	643	247	9250	358	21173	100.00

(a) Includes Yugoslavia (b) Excludes bauxite and alumina

NOTE: Any discrepancies between totals and sums of components are due to rounding.

TABLE 13B DESTINATION OF EXPORTS, VALUE, 1967

($ '000)

	Aluminium	Copper	Lead	Zinc	Iron	Iron & Steel	Manganese	Tungsten	Tin	Ilmenite & Rutile	Zircon	Coal	Opal	Other	Total	Percentage
EUROPE -																
United Kingdom	81	2013	37904	3008	737	1172	-	623	412	3056	1302	-	204	3032	63545	15.21
E.E.C.	-	3891	11063	5096	5680	440	-	2001	196	4778	3201	-	784	2584	39714	9.51
Other Non-Communist Europe (a)	-	-	1956	1706	-	3390	509	381	1382	1110	295	-	16	51	10797	2.58
USSR & Communist Europe	-	-	-	-	-	315	-	-	-	448	134	-	-	-	897	0.21
Total Europe	81	5904	50924	19810	6417	5318	509	3006	1991	9392	4932	1	1004	5666	114953	27.51
ASIA -																
Japan	681	20677	5309	6612	68955	8426	6231	400	320	3059	2648	73293	2710	8951	208271	49.85
India	1588	-	4146	5850	-	- 4	-	-	-	51	-	-	427	94	12161	2.91
Hong Kong	689	1	-	418	-	2648	-	-	-	39	-	-	2845	160	6475	1.55
Philippines	788	-	853	1884	-	5059	-	-	1	18	-	-	3	188	8794	2.11
Malaysia & Singapore	43	-	51	661	-	527	-	-	1713	-	-	2	27	746	3769	0.90
Middle East	73	-	-	544	-	-	-	-	-	354	1	-	41	38	1051	0.25
Mainland China	127	-	-	-	-	-	-	-	-	-	-	-	7	-	134	0.03
Other Asian	254	25	1339	5251	-	3084	30	-	1	72	22	1033	62	398	11571	2.77
Total Asia	4243	20703	11698	21219	68955	19785	6260	400	2035	3592	2671	74328	5762	10575	252226	60.37
AMERICA -																
United States	20	3340	17768	981	-	-	163	355	59	9759	2475	1	1795	781	37498	8.97
Canada	-	-	-	-	-	-	-	-	-	308	415	-	62	909	1693	0.41
Other American	4	-	-	24	-	-	-	-	323	212	171	-	7	2145	2884	0.69
Total America	24	3340	17768	1005	-	-	163	355	382	10279	3060	1	1863	3835	42076	10.07
OCEANIA -																
New Zealand	571	1	1152	858	-	447	1	-	52	39	10	138	3	1114	4386	1.05
Other Pacific	7	-	11	7	-	25	-	-	3	9	-	1735	3	339	2139	0.51
Total Oceania	578	-	1163	865	-	472	1	-	55	48	10	1874	6	1453	6525	1.56
AFRICA -																
South Africa	-	-	-	731	-	1	-	651	-	277	46	-	-	27	1733	0.41
Other Africa	-	-	6	277	-	-	-	-	3	1	-	-	-	38	326	0.08
Total Africa	-	-	6	1008	-	1	-	651	3	278	46	-	-	65	2059	0.49
TOTAL	4926	29948	81561	43907	75372	25576	6933	4412	4466	23588	10720	76203	8635	21594	417840	100.00

(a) Includes Yugoslavia

NOTE: Any discrepancies between totals and sums of components are due to rounding

TABLE 14A SOURCE OF IMPORTS, QUANTITY, 1967 ('000 tons)

	Aluminium	Iron ore	Ingot steel & Ferro-alloys	Nickel	Tin	Crude petroleum	Asbestos	Clays (incl. Bentonite)	Magnesite	Phosphate Rock	Potassium Fertilizers	Sulphur	Others	Total	Percentage
ASIA -															
Middle East	-	-	-	-	-	13,394	-	-	-	-	-	-	8	13,402	56.98
Indonesia	-	-	-	-	-	4,597	-	-	-	-	-	-	-	4,597	19.54
Malaysia and Singapore	-	-	-	-	1	1,118	-	-	-	-	-	-	-	1,119	4.76
Japan	28	-	2	-	-		-	-	19	-	-	-	6	55	0.23
Mainland China & Communist Asia	-	-	-	-	-	-	-	-	-	-	-	-	23	23	0.10
Other Asian	-	-	-	-	-	4	-	-	-	-	-	-	22	26	0.11
Total Asian	28	-	2	-	1	19,113	-	-	19	-	-	-	59	19,223	81.72
AMERICA -															
U.S.A.	1	-	1	-	-	-	1	42	3	612	104	211	11	985	4.19
Canada	-	-	-	1	-	-	42	-	-	-	2	179	7	230	0.98
Other American	7	-	-	-	-	-	-	-	-	17	-	117	5	146	0.62
Total American	8	-	1	1	-	-	43	42	3	628	106	506	22	1,361	5.79
EUROPE -															
E.E.C.	1	-	1	-	-	-	-	-	-	-	8	8	4	22	0.09
U.K.	1	-	1	-	-	-	-	25	-	-	-	-	26	53	0.23
Other Non-Communist Europe (a)	-	-	7	-	-	-	-	-	1	-	-	-	-	10	0.04
USSR & Communist Europe	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Total Europe	1	-	9	1	-	-	-	25	1	-	8	8	32	85	0.36
OCEANIA -															
Nauru, Christmas and Gilbert & Ellice Islands	-	-	-	-	-	-	-	-	-	2,416	-	-	-	2,416	10.27
New Zealand	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Oceania	-	171	1	-	-	-	-	-	-	-	-	-	-	172	0.73
Total Oceania	-	171	1	-	-	-	-	-	-	2,416	-	-	-	2,588	11.00
AFRICA -															
South Africa	-	-	11	-	-	-	11	7	-	-	-	-	15	44	0.19
Other African	-	-	-	-	-	-	-	-	-	220	-	-	2	222	0.94
Total Africa	-	-	11	-	-	-	11	7	-	220	-	-	18	266	1.13
TOTAL	37	171	23	2	1	19,113	53	75	24	3,265	114	514	131	23,523	100.00

(a) Includes Yugoslavia

NOTE : Any discrepancies between totals and sums of components are due to rounding.

TABLE 14B SOURCE OF IMPORTS, VALUE 1967 ($ '000)

ASIA -	Aluminium	Iron ore	Ingot steel and Ferro-alloys	Nickel	Tin	Crude Petroleum	Asbestos	Clays (incl. Bentonite)	Diamonds	Magnesite	Phosphate Rock	Potassium Fertilizers	Sulphur	Other	Total	Percentage
Middle East	-	-	-	-	-	142,340	-	-	835	-	-	-	-	108	143,284	47.31
Indonesia	-	-	-	-	-	52,411	-	-	-	-	-	-	-	-	52,411	17.30
Malaysia & Singapore	-	-	-	-	2,065	16,198	-	-	1	-	-	-	-	12	18,276	6.03
Japan	1,733	-	622	-	-	-	-	-	3	944	-	5	-	50	3,357	1.11
Mainland China & Communist Asia	-	-	-	-	-	-	-	1	-	-	-	-	-	506	507	0.17
Other Asian	-	-	-	-	-	35	-	2	25	7	-	-	-	786	855	0.28
Total Asian	1,733	-	622	-	2,065	210,984	-	3	864	951	-	5	-	1,463	218,691	72.20
AMERICA -																
U.S.A.	206	-	352	117	-	-	66	1,304	389	251	6,007	3,322	6,927	788	19,729	6.51
Canada	1	-	185	1,413	-	-	5,104	-	-	-	-	51	6,144	323	13,221	4.37
Other American	440	-	-	-	-	-	-	-	-2	-	116	-	3,788	289	4,625	1.53
T tal American	647	-	537	1,530	-	-	5,169	1,304	391	251	6,122	3,374	16,849	1,400	37,575	12.41
EUROPE -																
E.E.C.	132	-	517	334	-	-	-	23	1,875	-	-	359	430	4,078	4,748	1.57
U.K.	220	5	490	615	-	-	15	612	705	9	-	4	17	1,082	3,775	1.24
Other Non-Communist Europe (a)	29	-	2,347	383	-	-	8	-	5	78	-	-	-	1,063	3,913	1.29
USSR & Communist Europe	-	-	6	197	-	-	-	-	29	-	-	-	-	1	233	0.08
Total Europe	381	5	3,360	1,529	-	-	23	635	2,614	87	-	363	447	3,224	12,669	4.18
OCEANIA -																
Nauru, Christmas & Gilbert & Ellice Islands	-	-	-	-	-	-	-	-	-	-	22,117	-	-	-	22,117	7.30
New Zealand	14	-	-	-	-	-	-	-	-	-	-	-	-	29	43	0.02
Other Oceania	-	382	467	-	-	-	-	-	--	-	-	-	-	66	915	0.30
Total Oceania	14	382	467	-	-	-	-	-	-	-	22,117	-	-	95	23,076	7.62
AFRICA -																
South Africa	-	-	1,769	-	-	-	1,243	163	2,235	-	-	-	-	290	5,700	1.88
Other African	-	-	-	-	-	-	-	10	179	-	2,116	-	-	2,854	5,158	1.71
Total Africa	-	-	1,769	-	-	-	1,243	172	2,414	-	2,116	-	-	3,144	10,859	3.59
TOTAL	2,775	387	6,754	3,068	2,066	210,984	6,435	2,113	6,281	1,288	30,355	3,743	17,296	9,325	302,870	100.00

(a) Includes Yugoslavia

NOTE : Any discrepancies between totals and sums of components are due to rounding.

TABLE 15. PATTERN OF MINERAL TRADE (a)

	1964		1965		1966		1967	
	$m	%	$m	%	$m	%	$m	%
Exports (b) -								
Japan	72.6	32.1	92.4	32.5	125.1	37.6	208.3	49.9
Other Asian and Pacific	25.8	11.4	30.1	10.6	41.4	12.5	50.5	12.1
United Kingdom	68.4	30.2	68.2	24.0	65.3	19.7	63.5	15.2
European Economic Community	27.8	12.3	43.8	15.4	38.7	11.7	39.7	9.5
United States	17.0	11.9	42.5	14.9	46.0	13.8	37.5	9.0
Others	5.0	2.1	7.6	2.6	15.7	4.7	18.3	4.3
Total	222.6		284.6		331.2		417.8	
Imports -								
Middle East	126.8	50.6	132.4	44.0	138.4	50.2	143.3	47.3
Indonesia	44.6	17.8	53.0	17.6	51.1	18.6	52.4	17.3
Other Asian	14.8	5.9	24.0	8.0	16.9	6.1	23.0	7.6
Pacific	15.6	6.2	14.3	4.8	19.9	7.2	23.1	7.6
United States	17.2	6.9	23.6	7.9	16.0	5.8	19.7	6.5
Canada	8.0	3.2	9.7	3.2	12.2	4.4	13.2	4.4
Europe (including U.K. & E.E.C)	12.0	4.8	31.0	10.3	8.5	3.1	12.7	4.2
Others	11.6	4.6	12.6	4.2	12.7	4.6	15.5	5.1
Total	250.6		300.6		275.7		302.9	

(a) Excludes gold and uranium oxide
(b) Excludes alumina n.s.p.

It is noted that in 1967 Japan was again the major market for Australian mineral exports, a position which it has occupied since 1960. Japan's position will be further strengthened over the next few years by the growth of exports of iron ore and coal.

In 1967 exports to Japan were dominated by coal, iron ore, copper, manganese, with iron and steel, lead, zinc, ilmenite and rutile, zircon and opan also important.

Exports to the United Kingdom were dominated by lead, zinc, ilmenite and rutile, zircon, copper and tin; exports to Europe by lead, zinc, ilmenite and rutile, zircon, copper and iron and steel; exports to the United States

were mainly lead, ilmenite and rutile, zircon, copper and opal.

As far as imports are concerned, Tables 16A and B shows Australia's principal deficiencies in minerals and the distribution of sources. The Middle East and Indonesia supply 65.5 percent and 24.0 percent respectively of crude oil requirements which predominate in the list of imports. The next important sources, the United States, Pacific Islands and Canada, are the suppliers of phosphate rock, potassium fertilizer, sulphur, tin and asbestos.

Prices

Prices of some important mineral raw materials in the United Kingdom and United States in recent years are given in Table 16, and recent Australian prices in Table 17. The movements of prices of metals traded on the London Metal Exchange are shown in the graph on page 39 together with movements in the wolfram quotation; movements in Australian prices of the four base metals are shown on the graph on page 40.

TABLE 16. AVERAGE PRICES OF THE PRINCIPAL METALS (EXCLUDING GOLD)

	United Kingdom 1965	1966	1967	United States 1965	1966	1967
	(£ per ton)			($US per ton)		
Pig iron	22.1	22.8	23.5	63.50	63.50	63.50
				($US per short ton)		
Steel	32.0	33.2	34.6	84.00	85.22	86.00
				(US cents per lb.)		
Aluminium	196.0	196.0	199.7	24.50	24.50	24.98
Copper	468.8	553.7	404.0	35.70	39.00	41.26
Lead	115.0	95.2	83.8	16.00	15.12	14.00
Nickel	642.0	652.0	731.7	78.67	79.00	87.75
Tin	1,412.7	1,295.8	1,292.9	178.20	164.07	153.63
Zinc	112.9	102.0	101.8	14.50	14.50	13.86
	(pence per oz.)			(cents per oz.)		
Silver	111.6	111.2	142.1	129.30	129.30	154.97

TABLE 17. AUSTRALIAN METAL PRICES ($ per ton)

	1966			1967			Jan.-June, 1968		
	Max.	Min.	Av.	Max.	Min.	Av.	Max.	Min.	Av.
Pig Iron. ...	49.75	45.25	47.09	49.25	49.25	49.25	49.25	49.25	49.25
Aluminium (a)	520.00	520.00	520.00	520.00	520.00	520.00	538.00	520.00	521.80
Copper... ...	790.00	680.00	730.00	1,250.00	950.00	1,043.00	1,350.00	1,000.00	1,169.00
Lead.	280.00	225.00	248.83	225.00	210.00	217.50	210.00	210.00	210.00
Tin..	3,716.00	3,131.00	3,057.51	3,270.00	2,989.00	3,113.65	3,061.00	2,899.00	2,922.00
Zinc (b). ...	286.00	266.00	270.46	266.00	256.00	260.73	256.00	256.00	256.00

(a) Domestic ingot.
(b) The pricing basis was changed in April 1968 from g.o.b. f.o.r. Cockle Creek including strapping changes to g.o.b. delivered Melbourne, Sydney, Port Kembla and Adelaide.

Despite the major political and economical events, metal prices showed less change and fluctuations than usual during the period under review.

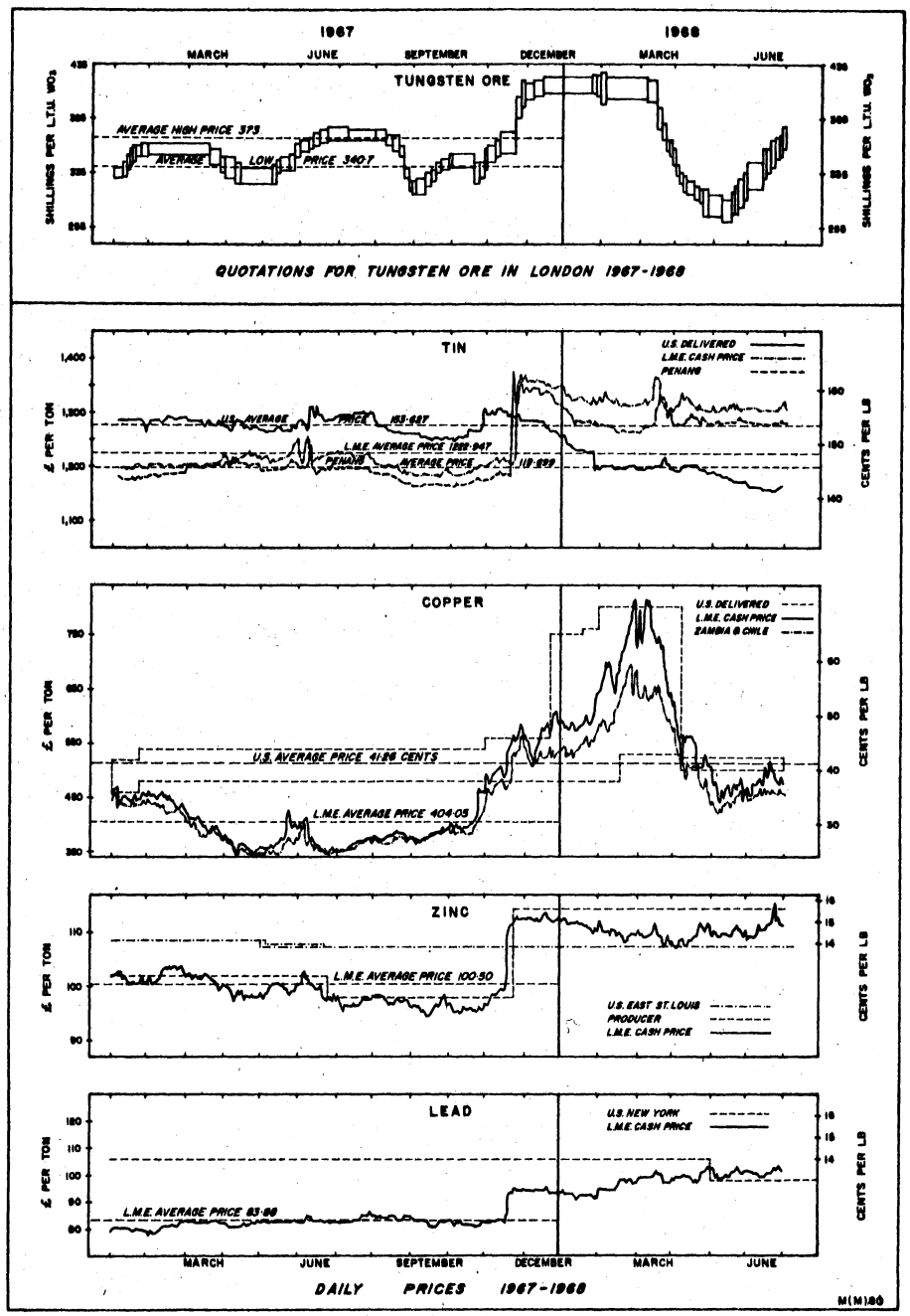
A general weakening in prices for several mineral commodities which became apparent, especially in the second half of 1967, was disturbed by the devaluation of sterling and price quotations were adjusted accordingly.

This general trend continued in the first half of 1968 with the exception of copper. Increasing pressure on the world copper markets as a result of the prolonged United States copper strike and in certain industrial markets in other major producing centres, was responsible for the elevation of world copper prices. Spot copper was quoted on the London Metal Exchange at over $600 per ton towards the end of December 1967. A record high price was reached on 7th March 1968, when quotation has reached £813$\frac{3}{4}$ per ton. Following a virtual settlement of the United States strike in late April 1968, world copper prices eased and at the end of June 1968 it was quoted at £476$\frac{1}{2}$ per ton.

Movements in prices of individual commodities are discussed in detail in the appropriate chapters of Part II.

Australian prices of the base metals are based on movements in overseas markets; however, there are variations within the group as to the pricing formula.

The lead price reflects movements in the London Metal Exchange quotation, but variations are made only when a certain minimum movement occurs. The domestic zinc price is tied to the overseas producer's price, but the quotation for g.o.b. zinc has been changed from f.o.r. Cockle Creek (including strapping charges) to delivered Melbourne, Sydney, Port Kembla and Adelaide. Domestic tin prices reflect movements in the Straits price.



QUOTATIONS FOR TUNGSTEN ORE IN LONDON 1967-1968

DAILY PRICES 1967-1968

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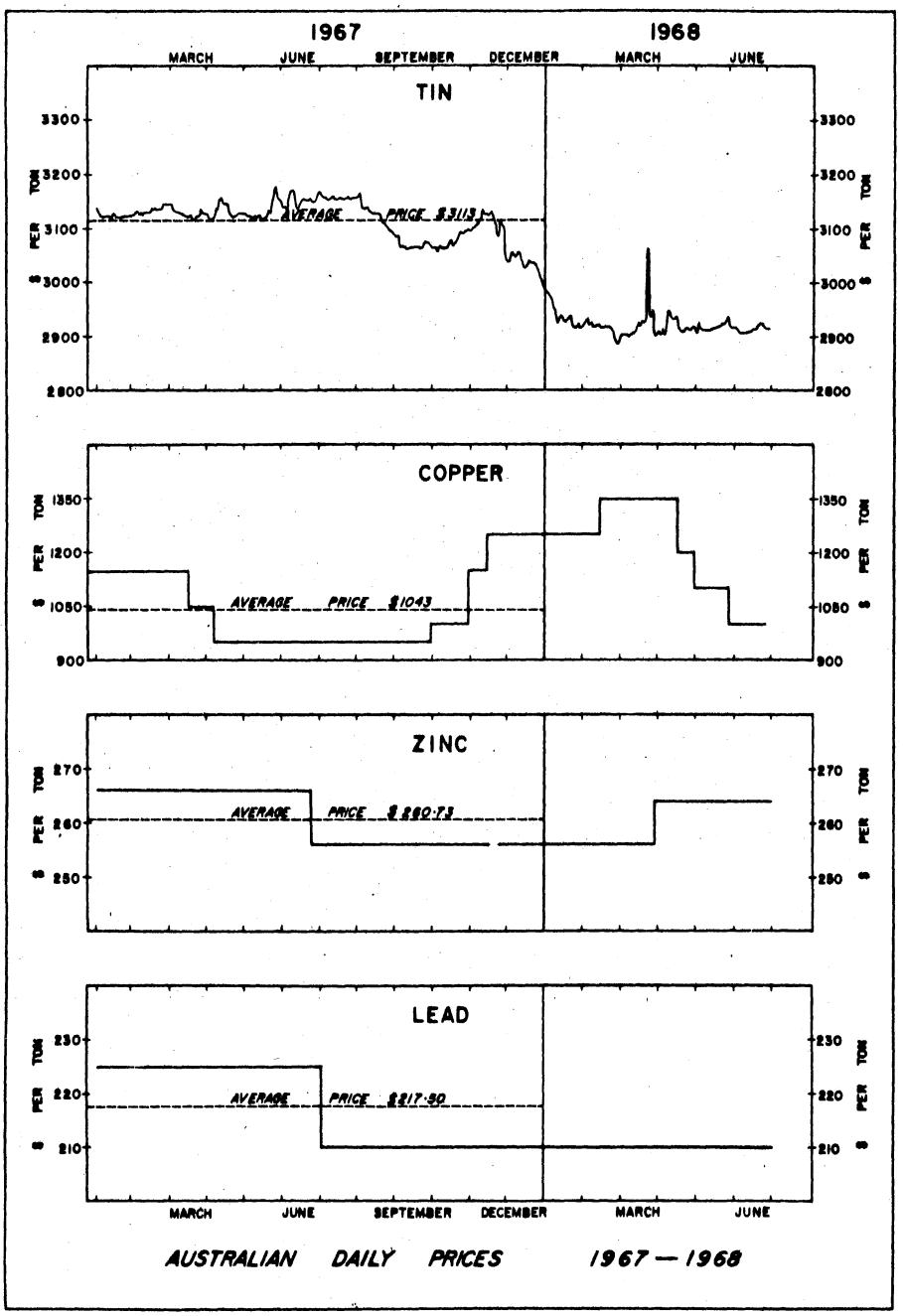
1967
1968
MARCH
JUNE
SEPTEMBER
DECEMBER
MARCH
JUNE
TIN
3300
3200
3100
3000
2900
2800
TON
PER
$
AVERAGE PRICE $3113
COPPER
1350
1200
1050
900
AVERAGE PRICE $1043
ZINC
270
260
250
AVERAGE PRICE $260·73
LEAD
230
220
210
AVERAGE PRICE $217·50
MARCH
JUNE
SEPTEMBER
DECEMBER
MARCH
JUNE
AUSTRALIAN DAILY PRICES 1967 — 1968

As from 5th August 1966, Australian producers have based their domestic price for copper on London Metal Exchange prices, initially on the three months price and since early 1967 on the daily cash settlement price.

Wholesale price indexes and export price indexes as compiled by the Commonwealth Bureau of Census and Statistics are shown in Tables 18 and 19 respectively.

TABLE 18. WHOLESALE PRICE INDEXES (1936/39 = 100)

	Metals and coal	Total basic materials	Metals
1958	395	344	406
1959	389	343	411
1960	402	349	436
1961	395	344	435
1962	389	338	432
1963	386	337	433
1964	384	342	455
1965	394	349	485
1966	392	361	484
1967	396	360	495

TABLE 19. EXPORT PRICE INDEXES (1959/60 = 100)

	Metals and coal	Gold	All Groups
1958/59	90	100	90
1959/60	100	100	100
1960 (calendar year)	100	100	96
1961	94	100	96
1962	89	100	97
1963	94	100	109
1964	114	100	112
1965	122	101	103
1966	122	101	108
1967	116	101	102

INVESTMENT, EMPLOYMENT, WAGES AND TAXATION

Investment. No realistic appraisal is available of the true position of the amount of paid up capital and shareholders funds in mining, quarrying and mineral treatment in Australia at present. However, the inflow and income payable on direct private overseas investment in the mining industry is shown in Table 20. Further information is available in the Commonwealth Statistician's Bulletin of Overseas Investments.

TABLE 20. PRIVATE OVERSEAS INVESTMENT IN THE MINING INDUSTRY ($Million)

	1965/66	1966/67
Inflow of direct private investment		
Mining and quarrying		
Undistributed income	16	8
Other direct investment	64	51
Total mining and quarrying	80	59
Oil exploration (a)	42	37
Total direct private investment	122	96
Income payable on direct private investment		
Mining and quarrying		
Undistributed income	16	8
Other income payable	9	17
Total mining and quarrying	25	24
Oil exploration (a)	-	3
Total income payable on direct private investment	25	27

(a) Separate details are not available for oil exploration
Note: Differences between totals and sums of components are due to rounding.

Quarterly surveys of new capital expenditure by private businesses in Australia are conducted by the Bureau of Census and Statistics. The statistics are based on returns obtained from a sample of businesses subject to pay-roll tax, supplemented by returns from other businesses which are known to be undertaking capital expenditure projects involving expenditure of $500,000 or more in a six-

monthly period. Annual details in respect of the mining and the extracting, refining and founding industries are shown in Table 21.

TABLE 21. NEW CAPITAL EXPENDITURE ($ million)

	1964	1965	1966	1967
Mining	71.9	179.9	223.9	294.5
Extracting, refining and founding	110.1	141.1	201.4	166.9

The number of mines and plants engaged in mining and mineral treatment is shown in Table 22. Although data on investment and total fixed assets used in the mining industry are not available, information is available on the value of additions and replacements of fixed assets in mines and mineral treatment plants; this is shown in Table 23.

Notes in Table 9 refer to Table 23 also.

TABLE 22. NUMBER OF PRODUCTION UNITS IN THE MINERAL INDUSTRY (a)

	1963*	1964	1965	1966
Metal mining	748	799	765	782
Fuel mining	193	189	177	167
Other mining (b)	792	756	802	973
Total, mining	1,733	1,744	1,744	1,922
Construction material quarrying (b)	1,044	1,148	1,234	1,276
Total, mining and quarrying	2,777	2,892	2,978	3,198
	1963/64	1964/65	1965/66	1966/67
Smelting and converting of iron and steel	30	31	32	33
Extraction and refining of other metals	68	70	74	77
Coke production	7	7	7	7
Portland cement production	16	17	17	17
Brick, pottery, glass etc. production	692	689	678	676
Treatment of other non-metal products	1,494	1,533	1,587	1,591
Total, mineral treatment	2,307	2,347	2,395	2,401

(a) Includes mines and quarries employing less than 4 persons.

(b) Incomplete owing to difficulties in coverage.

TABLE 23. VALUE OF ADDITIONS AND REPLACEMENTS TO FIXED ASSETS IN THE MINERAL INDUSTRY (a) ($'000)

	1963	1964*	1965*	1966
Metal mining	29,702	42,462	64,006	90,203
Fuel mining	27,278	25,368	34,810	50,548
Other mining (b)	1,742	3,497	2,109	3,638
Total mining	58,722	71,327	100,925	144,388
Construction material quarrying (b)	3,898	5,867	7,303	5,273
Total mining and quarrying	62,620	77,194	95,933	149,661

	1963/64	1964/65	1965/66*	1966/67
Smelting and converting of iron and steel	64,990	80,326	86,481	92,360
Extraction and refining of other metals	37,543	14,292	16,797	141,688
Coke production	5,476	12,182	13,176	5,530
Portland cement production	7,843	18,942	17,221	17,539
Brick, pottery, glass, etc production	20,224	22,029	20,632	21,996
Treatment of other non-metal products	12,620	19,638	21,368	18,555
Total mineral treatment	148,680	167,409	175,675	297,668

(a) Excludes mines and quarries employing less than 4 persons.

(b) Incomplete owing to difficulties in coverage.

TABLE 24. VALUE OF POWER, FUEL, LIGHT, AND MATERIALS CONSUMED IN MINING AND QUARRYING (a) ($'000)

	1963	1964*	1965	1966
Metal mining	47,482	48,869	50,083	57,566
Fuel mining	28,470	30,642	33,775	37,825
Other mining (b)	5,088	4,908	5,329	5,229
Total mining	81,040	84,420	89,168	100,620
Construction material quarrying (b)	8,616	8,952	10,582	11,528
Total mining and quarrying	89,656	93,372	99,768	112,148

(a) Excludes mines and quarries employing less than 4 persons.
(b) Incomplete owing to difficulties in coverage.

Table 24 shows the values of power, fuel, light and materials consumed in mining industry in recent years.

Employment. The average employment in recent years in the different mining categories and in the treatment sector of the mineral industry is already shown in Table 25, this Table again includes some employees engaged in secondary industry.

TABLE 25. EMPLOYMENT IN THE MINERAL INDUSTRY (a)

	1963	1964	1965	1966
Metal mining	18,415	18,301	18,802	20,932
Fuel mining	17,244	17,025	17,087	16,925
Other mining (b)	2,149	2,117	2,047	2,017
Total mining	38,808	37,443	37,956	39,874
Construction material quarrying (b)	4,675	4,896	5,188	4,790
Total mining and quarrying	42,483	42,339	43,144	44,664
	1963/64	1964/65	1965/66	1966/67
Smelting and converting of iron and steel	37,094	38,469	39,146	39,014
Extraction and refining of other metals	8,960	8,990	9,349	9,966
Coke production	1,883	1,877	1,932	2,098
Portland cement production	3,225	3,443	3,464	3,471
Brick, pottery, glass, etc. production	25,656	27,002	27,177	26,974
Treatment of other non-metal products	19,596	20,363	20,615	20,535
Total, mineral treatment	96,414	100,144	101,683	102,058

(a) Excludes mines and quarries employing less than 4 persons.
(b) Incomplete owing to difficulties in coverage.

Accidents. The data in Table 26 which lists mining accidents in Australia as compiled from returns by the State Departments of Mines, may not be uniform, since the basis of recording mining accidents varies from State to State.

TABLE 26. MINE ACCIDENTS (a)

	Persons killed				Persons injured			
	1964	1965	1966	1967	1964	1965	1966	1967
Coal	9	20	21	12	330	421	453	383
Copper-gold	3	2	2	2	72	76	72	46
Gold	6	8	6	5	293	268	242	242
Lead-silver-zinc	7	4	15	5	265	226	272	252
Mineral sands	-	3	1	-	30	59	42	42
Tin	-	1	1	2	38	75	24	29
Other (b)	2	6	6	9	95	108	124	151
Total	27	44	52	35	1,123	1,233	1,229	1,145
Percentage of total employment (c)	0.07	0.12	0.13	0.08	3.0	3.2	3.1	2.6

(a) Excludes uranium mining, oil drilling and construction material quarrying, particulars for which are not available.

(b) Other metal mining and non-metal (excluding coal) mining.

(c) Average whole year employment

WAGES

In June 1967 the Commonwealth Conciliation and Arbitration Commission eliminated basic wages and margins from its awards and introduced total wages to operate from July 1967.

The following table shows weighted average minimum weekly rates of wages for a full week's work, excluding overtime, as prescribed in awards, determinations and agreements. The rates shown should not be regarded as actual current averages, but as indexes expressed in money terms and indicative of trends. The data shown exclude the Northern Territory and the Australian Capital Territory; in the Mining and Quarrying series, the rates include lead bonuses, etc., and the All Industries Groups excludes rural industries.

WEEKLY WAGE RATES: ADULT MALES, AUSTRALIA

End of -	Mining and Quarrying	All Industry Groups
JUNE -	$	$
1964	46.01	39.06
1965	48.53	40.04
1966	48.69	41.11
1967	51.09	43.87
1968	52.66	46.03

The minimum weekly wage rates for surface labourers (exclusive of any bonuses) in each of the principal mining centres (other than coal) in July 1968 were:

Mount Isa (Qld).....$43.16
Mount Morgan (Qld).....$39.91
Broken Hill (N.S.W.).....$41.20
Rosebery (Tas).....$42.10
Queenstown (Tas).....$42.00
Kalgoorlie (W.A.).....$37.85

TABLE 27. WAGES AND SALARIES EARNED IN MINING AND QUARRYING (a) ($'000)

	1963	1964*	1965*	1966
Metal mining	54,792	59,986	70,177	85,696
Fuel mining	53,864	57,348	61,445	65,863
Other mining (b)	5,764	6,248	6,388	6,821
Total mining	114,420	123,582	138,010	158,380
Construction material quarrying (b)	8,684	9,364	10,751	12,256
Total mining & quarrying	123,104	132,946	148,761	169,636
Number of employees (c)	42,483	42,339	43,144	44,664
Earnings per employee (d)	$3.000	$3.266	$3.595	$3.924

(a) Excludes mines and quarries employing less than 4 persons and construction material quarries in N.S.W.

(b) Incomplete owing to difficulties in coverage

(c) Includes employees in construction material quarries in N.S.W.

(d) Calculated by excluding employees in N.S.W. construction material quarries.

On the lead-zinc fields some form of bonus is paid. The basis of assessing this bonus is not uniform and on different fields it is related to the price of lead (Broken Hill) or dividends paid to shareholders (Rosebery). At Mt. Isa, bonuses of $26 per week have been payable to all employees since September 1966.

Industrial disputes. Statistics of industrial disputes are shown in Table 28. The figures refer only to disputes involving a stoppage of work of ten man-days or more. Data relating to workers involved, working days lost and estimated loss of wages includes persons thrown out of work at the establishment where the stoppage occured but were not themselves parties to the dispute.

TABLE 28. INDUSTRIAL DISPUTES IN THE MINING INDUSTRY

	1964	1965	1966	1967
Coal mining				
Number of disputes	223	208	212	192
Workers involved	35,314	35,198	46,687	40,918
Working days lost	34,261	50,993	67,870	48,352
Estimated loss in wages ($'000)	334.4	493.9	660.0	494.9
Other mining and quarrying				
Number of disputes	7	7	17	32
Workers involved	9,084	3,818	8,417	7,169
Working days lost	31,066	122,230	19,558	10,591
Estimated loss in wages ($'000)	403.1	1571.9	304.9	127.8

General Taxation. The number of mining and quarrying organisations contributing to payroll tax, and salaries and wages which they represent is shown in Table 29 with comparable figures for the Australian industry as a whole.

Table 30 shows the income tax position of companies engaged in mining, compared with all industrial companies, in recent years.

TABLE 29. PAYROLL TAXPAYERS AND SALARIES AND WAGES PAID

	Mining & Quarrying		All Industrial Groups	
	Mean no. of taxpayers	Salaries & wages paid ($'000)	Mean no. of taxpayers	Salaries & wages paid ($'000)
1958/59	388	115,756	29,134	4,538,532
1959/60	378	121,798	29,713	5,030,280
1960/61	386	129,290	31,915	5,475,392
1961/62	393	126,438	33,588	5,612,818
1962/63	406	128,424	35,571	5,953,774
1963/64	435	135,572	37,711	6,501,668
1964/65	448	148,282	39,800	7,290,427
1965/66	453	166,943	42,915	7,877,425
1966/67	474	189,788	45,610	8,564,125

TABLE 30. COMPARISON OF INCOME TAX IN MINING AND QUARRYING AND ALL INDUSTRIES (a)

	1963/64 (b)		1964/65 (b)		1965/66 (b)	
	Mining companies	All companies	Mining companies	All companies	Mining companies	All companies
Taxable—						
No. of taxpayers.	365	60,322	392	65,678	402	68,333
Taxable income ($'000)...	49,966	2,206,638	58,875	2,485,019	30,276	2,464,125
Net tax ($'000)..	17,530	700,896	18,776	769,947	23,556	769,578
Dividends paid ($'000)...	34,641	891,950	38,836	1,077,932	32,622	992,477
Non-taxable—						
No. of taxpayers.	375	41,363	406	43,625	448	43,431
Taxable income ($'000)...	1,039	128,911	45	223,753	2,002	159,451
Loss for year ($'000) ...	6,380	140,295	4,259	157,422	5,650	188,668
Dividends paid ($'000)...	3,173	130,190	2,319	176,293	5,489	156,613

(a) Excludes special section, default, co-operative and non-profit assessments.
(b) Income year.

Royalties. The basis of royalty payments payments varies from State to State. Royalty payments in recent years were;

State	1962/63	1963/64	1964/65*	1965/66*	1966/67
New South Wales	1,633,638	5,090,622	19,946,772	24,317,168	16,326,973
Victoria (a)	-	-	454,132	475,045	526,765
Queensland	486,938	642,560	1,201,264	1,183,046	2,241,574
South Australia	727,208	860,732	926,984	985,560	1,091,582
Western Australia	248,646	243,182	291,354	478,294	2,639,894
Tasmania (b)	44,788	45,886	51,330	71,822	86,480
Total	3,141,218	6,882,982	22,871,836	27,510,935	22,913,178

(a) Royalty of Brown Coal - paid by State Electricity Commission
(b) Rent and fees from mineral lands.

GOVERNMENT ASSISTANCE AND CONTROLS

Technical Assistance. The Bureau of Mineral Resources, the Commonwealth Scientific and Industrial Research Organisation, the Australian Mineral Development Laboratories, and the Australian Atomic Energy Commission provide considerable assistance to the mineral industry. The Bureau of Mineral Resources has widespread exploration activities and in addition provides advice to the industry. The Commonwealth Scientific and Industrial Research Organisation undertakes mineragraphic, oredressing, and metallurgical work, partly in conjunction with the Melbourne University, the Institute of Technology, Adelaide, and the School of Mines, Kalgoorlie. The Australian Mineral Development Laboratories, an organisation sponsored by the Commonwealth Government, South Australian Government and the Australian Mineral Industries Research Association (an association of companies engaged in the mineral industry formed to foster and develop mineral research) undertakes sponsored investigations dealing with mineral problems. The Australian Atomic Energy Commission has stimulated the mining of uranium.

The New South Wales and Commonwealth Governments assist the New South Wales coal industry through the Joint Coal Board. The Queensland Coal Board performs a similar function in Queensland. Several of the States have laboratories undertaking similar mineral and metallurgical research on behalf of the local industry, and operate local batteries for the treatment of ore, as does the Northern Territory Administration.

Direct Financial Assistance. The Commonwealth Government has encouraged the search for oil in Australia through the Petroleum Search Subsidy Acts, which have provided financial assistance for certain classes of oil exploration activity; the current Act is discussed under Petroleum in Part II. The Commonwealth Government under the Gold Mining Industry Assistance Act and the Copper Bounty Act assists the gold and copper industries by way of payments on gold and copper production under certain circumstances; details of the assistance available are outlined in the GOLD and COPPER chapters in Part II. The Pyrites Bounty Act and the Sulphuric Acid Bounty Act provide for payment of bounty in respect of iron pyrites and sulphuric acid production under certain conditions; these are outlined under SULPHUR in Part II.

Controls on Minerals and Metals. Export controls are maintained over certain minerals and metals. These controls are enforced by the Customs (Prohibited

Exports) Regulations. In order to obtain permission to export, applications should be made to the appropriate Commonwealth Department or authority as listed in the various Schedules to the Regulations.

The responsible Departments or authorities are as follows:

DEPARTMENT OF PRIMARY INDUSTRY (Third Schedule)-

Phosphate rock, phosphate and superphosphate, and fertilizers containing phosphorus or superphosphate.

DEPARTMENT OF NATIONAL DEVELOPMENT (Seventh Schedule)-

Mineral sands (whether treated or untreated) and concentrates of mineral sand, containing zircon, rutile, or ilmenite; lithium ores and concentrates (control lifted as from 14th September 1967); beryllium ores and concentrates; manganese ores; iron ores; beneficiated iron ores, and iron concentrates; copper scrap and copper alloy scrap; copper and copper-bearing materials.

AUSTRALIAN ATOMIC ENERGY COMMISSION (Ninth Schedule)-

Beryllium, calcium, hafnium, and lithium metals; minerals, raw and treated (including residues and tailings), containing more than 0.05% of uranium or thorium, singly or together; thorium, uranium and zirconium metals.