

CHAPTER XXVII.

MINERAL INDUSTRY.

§ 1. The Mineral Wealth of Australia.

1. **Place of Mining in Australian Development.**—Population was first attracted to Australia in large numbers by the discovery of gold in payable quantities. This discovery was thus a significant factor in Australia's early development. In more recent times, the rapid growth of Australia's secondary industries has been associated with considerable expansion in mining for silver-lead-zinc, copper and iron ores, and coal. The value of mineral production, however, has lagged behind that recorded for Australia's large rural industries and in 1954 represented only about 11 per cent. of the net value of production of all primary industries.

2. **Extent of Mineral Wealth.**—The extent of the mineral wealth of Australia, as of any country, is not determined fully at any point of time. Regional and detailed investigations are being carried out by the Commonwealth Bureau of Mineral Resources, Geology and Geophysics, by the Geological Surveys of the State Governments and by the exploration departments of mining companies, but large areas of the country still await geological survey. Important prospects of copper, iron, lead and zinc, oil, uranium ore, bauxite (aluminium ore) and some other minerals have been recorded recently and are being investigated in detail.

3. **Standardization of Mineral Statistics.**—At the 1945 Conference of Australian Statisticians, consideration was given to the defective nature of Australian mineral production statistics arising from the widely differing methods adopted by individual States in collecting, compiling and publishing the data. Further attention was given to the problem by a conference in 1948 of officers of the Bureau of Mineral Resources, Geology and Geophysics, State Mines Departments and State and Commonwealth Statistical Bureaux. Following work subsequently undertaken by the Bureau of Mineral Resources, the Commonwealth Bureau of Census and Statistics and other authorities concerned, a specific plan for standardization of Australian mineral production statistics was adopted in 1950. In accordance with the plan, numerous improvements have been introduced and with the introduction of annual Australia-wide industrial censuses for mining and quarrying.

in 1952, Australian mineral statistics are now considered to be adequate for present needs. It should be noted that the statistics included in this chapter omit particulars relating to uranium-bearing minerals.

The fundamental provision of the plan for standardization of Australian mineral statistics is that quantities and values of individual minerals produced should be reported in terms of the products in the form in which they are despatched from the locality of each mine. This involves the inclusion in the mining industry of ore-dressing and elementary smelting of metallic minerals (e.g., in the case of gold) and miscellaneous treatment of non-metallic minerals, where these operations are carried out in an associated plant at or near the mine. For example, in the case of a metal mine, the output is recorded as ore when no treatment is undertaken at the mine or as a concentrate where ore-dressing operations are carried out in associated works in the locality of the mine. In addition to the basic quantity data, the plan provides for the reporting of contents of metallic minerals and of contents or average grade of selected non-metallic minerals. Wherever practicable, contents (based on assay) of metallic minerals are shown for each metal which is a "pay-metal" or a "refiners' prize" when present in the particular mineral.

For the purpose of compiling and publishing data relating to employment, value of output, value of production, etc., a detailed statistical classification for the mining industry has been used in Australia from 1950. For the purpose of this classification, the "Mining Industry" includes all mining and quarrying and the recovery of minerals from ore dumps, tailings, etc. As mentioned above, ore dressing and miscellaneous treatment of non-metallic minerals (where these are carried out in an associated plant at or near the mine) are included in the Mining Industry. However, establishments primarily engaged in smelting and/or refining (including the smelting and refining sections of the large plants operated at Mt. Morgan and Mt. Isa in Queensland and at Mt. Lyell in Tasmania) are omitted and classified to the Manufacturing Industry. The classification divides the industry into four major groups, namely, Metal Mining, Fuel Mining, Non-metal (excluding Fuel) Mining and Construction Material Quarrying.

The adoption of revised methods of compiling and presenting mineral statistics in 1950 caused a break in continuity of the data published for earlier years, and the introduction of industrial censuses of the mining and quarrying industry in all States in 1952 has caused a further break in continuity of data, particularly those relating to values.

In the main, the data consist of official statistics of Mines Departments furnished to this Bureau by the Statisticians of the several States and by the Northern Territory Mines Branch. These statistics have been supplemented, as necessary, by data obtained from the Australian Mines and Metals Association (Inc.) the Bureau of Mineral Resources, Geology and Geophysics and several other sources. The particulars shown have been compiled as far as practicable on the standardized basis. This has involved some re-arrangement of official statistics published by Mines Departments for some States.

In the tables, individual minerals are arranged in four groups, Metallic Minerals, Fuel Minerals, Non-metallic (excluding Fuel) Minerals and Construction Materials, to correspond with the major groups of the statistical classification of the mining industry.

4. Quantity and Value of Minerals Produced in 1955.—(i) *Quantities.* In the following table particulars of the quantities of principal minerals produced are shown for each State and the Northern Territory for 1955.

QUANTITIES OF PRINCIPAL MINERALS PRODUCED, 1955.

Mineral.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Aust.
METALLIC MINERALS.									
Antimony Ore and Concentrate	ton	(a) 419	4	23	..	204	..	..	650
Bauxite	"	2,847	2,991	1,725	..	..	..	..	7,563
Beryllium Ore	"	7	..	..	..	199	..	..	206
Copper Ore, Concentrate and Precipitate	"	3,647	..	157,867	..	12	38,105	12,020	211,651
Gold Ore, Concentrate, etc.	"	165	6	..	..	..	..	..	171
Gold—Other Forms(b)	oz.	18,813	44,479	(c)	(c)	(c)	(c)	(c)	(c)
Iron Ore	'000 tons	..	..	..	3,044	529	..	..	3,573
Lead Ore, Concentrate	ton	339,235	..	155,488	7	1,416	12,278	..	508,424
Manganese Ore	"	1,622	..	78	..	44,194	..	1,462	47,356
Monazite Concentrate	"	(a) 117	..	47	..	..	..	..	164
Pyritic Ore and Concentrate	"	22,850	..	77,400	28,730	49,485	45,010	..	223,475
Rutile Concentrate	"	34,403	..	25,210	..	..	..	..	59,613
Tantalite-Columbite Concentrate	lb.	..	..	..	..	..	..	..	..
Tin Concentrate	ton	(a) 378	3	1,092	..	180	1,232	5	27,139
Tungsten Concentrates—Scheelite Concentrate	"	9	..	(d)	..	8	1,432	..	1,449
Wolfram Concentrate	"	2	..	79	..	..	578	129	788
Zinc Ore and Concentrate	"	408,321	..	33,539	..	..	50,689	..	492,549
Zircon Concentrate	"	32,827	..	15,846	..	..	..	..	48,673
FUEL MINERALS.									
Coal, Black—									
Semi-Anthracite	'000 tons	2	..	80	..	..	2	..	84
Bituminous	"	14,718	133	2,460	..	..	298	..	17,609
Sub-Bituminous	"	16	..	207	455	904	..	..	1,582
Total	"	14,736	133	2,747	455	904	300	..	19,275
Coal, Brown (including Lignite)	"	..	10,112	..	..	..	..	..	10,112
NON-METALLIC (EXCLUDING FUEL) MINERALS.									
Asbestos	ton	590	..	..	..	4,762	..	..	5,352
Barite	"	2,086	..	..	4,168	10	..	..	6,264
Clays—									
Brick Clay and Shale	'000 tons	1,589	(e) 889	265	306	(e) 434	(e) 73	..	3,556
Other	"	497	(f) 137	(f) 10	(f) 81	(f) 43	(f) 10	..	(f) 778
Corundum	ton	..	..	..	..	9	..	..	9
Cupreous Ore and Concentrate—For Fertilizer .. ..	"	..	..	..	..	7,731	..	..	7,731
Diatomite	"	3,629	882	531	..	..	..	..	5,042
Dolomite	"	6,354	..	5,318	97,398	81	2,266	..	111,417
Emery .. ..	"	..	..	..	..	8	..	..	8
Felspar (including Cornish Stone)	"	11,608	..	..	5,660	3,565	..	..	20,833
Garnet .. ..	"	..	..	85	..	..	..	..	85
Glauconite .. ..	"	..	..	..	..	197	..	..	197
Gypsum	"	136,356	89,190	..	204,522	39,946	..	..	470,014
Limestone(g)	'000 tons	1,690	714	121	987	280	206	(d)	3,998
Magnesite	ton	57,262	..	..	412	..	..	..	57,674
Mica—Muscovite	lb.	20,160	..	..	..	..	..	56,649	76,809
Salt	ton	..	e 67,000	(e) 4,500	291,323	(e) 6,500	..	..	h 369,323
Silica (Glass, Chemical, etc.)	"	103,682	..	10	23,443	6,759	5,657	..	139,551
Talc (including Steatite)	"	817	..	..	9,163	2,587	..	..	12,567
CONSTRUCTION MATERIALS. (f)									
Sand	'000 tons	1,362	1,041	(c)	1,319	10	(c)	..	3,732
Gravel and Gravel Boulders, River Origin	"	1,514	229	(c)	..	..	..	..	1,743
Dimension Stone	"	111	12	4	59	88	..	..	274
Crushed and Broken Stone	"	2,265	3,935	798	5,459	775	135	..	13,367
Other (Decomposed Rock, etc.)	"	10,215	536	..	..	7	..	..	10,758

(a) Despatches from the mine (or sales) as distinct from production. (b) Bullion, alluvial, retorted gold, etc. (c) Not available. (d) Less than half the unit of quantity shown. (e) Estimated. (f) Incomplete. (g) Excludes quantities used directly as a building or road material. (h) Partly estimated.

(ii) *Principal Contents of Metallic Minerals.* The following table provides a summary of the principal contents of metallic minerals produced in 1955. Further particulars, including data for earlier years, are shown in the several sections dealing with individual minerals later in this chapter.

PRINCIPAL CONTENTS OF METALLIC MINERALS PRODUCED, 1955.

Content of Metallic Minerals Produced.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Aust.
Antimony ..	ton	850	3	10	..	59	..	..	922
Cadmium ..	"	795	..	..	..	..	49	..	844
Cobalt ..	"	61	..	..	..	..	..	..	61
Copper ..	"	3,492	..	30,738	..	3	8,394	2,869	45,496
Gold ..	fine oz.	30,067	38,035	64,322	50	834,326	16,882	65,357	1,049,039
Iron ..	'000 tons	..	..	..	1,979	325	..	..	2,304
Lead ..	ton	234,854	..	48,814	2	1,007	11,267	..	295,944
Silver ..	'000 fine oz.	8,823	2	4,363	..	201	1,166	..	14,555
Sulphur(a) ..	ton	142,888	2,381	47,515	14,152	22,004	38,243	..	267,183
Tin ..	"	270	2	770	..	119	853	3	2,017
Tungsten(b) ..	"	8	..	51	..	5	1,337	81	1,482
Zinc ..	"	211,478	..	17,138	..	..	27,948	..	256,564

(a) Sulphur content of zinc concentrate, pyrite and spent oxide.

(b) In terms of WO₃.

(iii) *Values.* Particulars of the estimated values of minerals (mine and quarry products) produced in 1955 are shown in the following table. The values represent the estimated selling value at the mine or quarry of minerals produced during the year.

VALUE OF MINERALS PRODUCED, 1955.

(£'000.)

Mineral.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Aust.
METALLIC MINERALS.								
Copper Ore, Concentrate and Precipitate ..	289	..	10,200	..	(b)	(b)	611	15,018
Gold Ore, Concentrate, etc. ..	5	(a)	..	..	..	..	..	5
Gold—Other Forms ..	275	638	296	1	13,450	5	866	15,531
Iron Ore ..	..	..	..	(b)	(b)	..	..	4,004
Lead-Silver and Lead-Silver-Zinc Ores ..	295	..	..	(a)	20	93	..	408
Lead Concentrate ..	25,075	..	5,799	..	49	977	..	31,900
Manganese Ore ..	15	..	2	..	147	..	28	192
Pyritic Ore and Concentrate ..	118	..	239	(b)	(b)	(b)	..	1,091
Rutile Concentrate ..	1,856	..	1,139	..	..	..	..	2,995
Tin Concentrate ..	216	1	575	..	90	669	3	1,554
Tungsten Concentrates ..	10	..	69	..	7	3,171	118	3,375
Zinc Concentrate ..	6,191	..	820	..	..	868	..	7,879
Zircon Concentrate ..	246	..	146	..	..	..	..	392
Other Metallic Minerals ..	72	21	18	..	60	8	..	179
<i>Total, Metallic Minerals</i> ..	<i>34,663</i>	<i>660</i>	<i>19,303</i>	<i>3,703</i>	<i>14,725</i>	<i>9,843</i>	<i>1,626</i>	<i>84,523</i>

FUEL MINERALS.

Coal, Black ..	41,715	815	6,729	778	3,089	611	..	53,737
Coal, Brown ..	..	4,382	..	..	..	..	..	4,382
<i>Total, Fuel Minerals</i>	<i>41,715</i>	<i>5,197</i>	<i>6,729</i>	<i>778</i>	<i>3,089</i>	<i>611</i>	..	<i>58,119</i>

NON-METALLIC (EXCLUDING FUEL) MINERALS.

<i>Total, Non-metallic (excluding Fuel) Minerals</i>	<i>2,338</i>	<i>1,128</i>	<i>493</i>	<i>2,137</i>	<i>1,050</i>	<i>194</i>	<i>65</i>	<i>7,405</i>
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CONSTRUCTION MATERIALS.(c)

<i>Total, Construction Materials</i> ..	<i>5,528</i>	<i>3,932</i>	<i>367</i>	<i>3,894</i>	<i>882</i>	<i>96</i>	..	<i>(d)14,824</i>
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TOTAL.

<i>Total, All Minerals and Construction Materials</i>	<i>84,244</i>	<i>10,917</i>	<i>26,892</i>	<i>10,512</i>	<i>19,746</i>	<i>10,744</i>	<i>1,691</i>	<i>d164,871</i>
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(a) Less than £500.

(b) Not available for publication.

(c) Incomplete.

(d) Includes Australian Capital Territory, £125,000.

5. Mine Production of Principal Metals and Production of Coal and Sulphur, 1951 to 1955.—Particulars of the mine production of principal metals (i.e., metallic contents of minerals produced) and production of coal and sulphur in the years 1951 to 1955 are shown in the following table.

MINE PRODUCTION OF PRINCIPAL METALS AND PRODUCTION OF COAL AND SULPHUR.

Particulars.	Unit.	1951.	1952.	1953.	1954.	1955.
Metallic Content of Minerals Produced(a)—						
Copper	ton	17,926	18,578	36,585	40,857	45,496
Gold	fine oz.	895,551	980,435	1,075,181	1,117,742	1,049,039
Lead	ton	212,013	228,196	269,344	284,862	295,944
Iron(b)	"	1,605,400	1,883,087	2,131,865	2,274,330	2,304,165
Silver	fine oz.	10,243,691	11,278,374	12,539,152	13,827,038	14,555,412
Tin	ton	1,559	1,611	1,353	2,075	2,017
Tungsten(c)	"	1,112	1,282	1,406	1,372	1,482
Zinc	"	189,227	196,450	239,324	252,659	256,564
Production of—						
Coal—Black	"	17,608,428	19,404,047	18,410,845	19,763,039	19,274,751
Brown	"	7,836,056	8,103,764	8,257,299	9,331,255	10,112,206
Sulphur(d)	"	183,126	217,242	225,197	254,403	267,183

(a) Mine production of metals. (b) Estimated. (c) In terms of WO₃. (d) Total sulphur content of zinc concentrate and pyrite produced and of spent oxide roasted.

6. Value of Output and Value of Production for Mining and Quarrying.—(i) *Individual Industries, 1954 and 1955.* The following two tables show particulars of the value of output and value of production of individual mining and quarrying industries and for all mining and quarrying for the years 1954 and 1955. The data were obtained from industrial censuses of the mining and quarrying industry which were made on a substantially uniform basis in all States and Territories.

MINING AND QUARRYING : VALUE OF OUTPUT.(a)
(£'000.)

Industry.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
1954.									
<i>Metal Mining—</i>									
Gold Mining	329	880	277	1	13,381	..	839	..	15,707
Silver-Lead-Zinc Mining	26,672	..	(b)	(b)	(b)	2,374	..	..	38,905
Copper-Gold Mining	16	..	(b)	..	..	(b)	114	..	5,568
Tin Mining	212	..	549	..	67	1,068	13	..	1,909
Mineral Sands Mining	990	..	943	..	..	..	..	..	1,933
Other Metal Mining	89	7	(b)	(b)	(b)	(b)	55	..	7,128
<i>Total, Metal Mining</i>	<i>28,308</i>	<i>887</i>	<i>14,304</i>	<i>3,300</i>	<i>15,218</i>	<i>8,112</i>	<i>1,021</i>	<i>..</i>	<i>71,150</i>
<i>Fuel Mining—</i>									
Black Coal Mining	42,762	886	6,474	650	3,589	523	..	..	54,884
Brown Coal Mining .. .. .	..	3,945	..	..	..	..	..	..	3,945
<i>Total, Fuel Mining</i>	<i>42,762</i>	<i>4,831</i>	<i>6,474</i>	<i>650</i>	<i>3,589</i>	<i>523</i>	<i>..</i>	<i>..</i>	<i>58,829</i>
<i>Non-metal (excluding Fuel) Mining—</i>									
Clays(c)	773	459	92	266	281	48	..	(d)	1,919
Gypsum	165	54	..	182	32	..	..	..	433
Limestone	817	544	(b)	640	(b)	143	..	..	2,678
Salt(c) .. .. .	..	..	(b)	(b)	..	..	..	..	621
Other Non-metal (excluding Fuel) Mining	341	6	7	(b)	(b)	13	124	..	1,391
<i>Total, Non-metal (excluding Fuel) Mining</i>	<i>2,096</i>	<i>1,063</i>	<i>518</i>	<i>1,959</i>	<i>1,078</i>	<i>204</i>	<i>124</i>	<i>(d)</i>	<i>7,042</i>
<i>Total, All Mining</i>	<i>73,166</i>	<i>6,781</i>	<i>21,296</i>	<i>5,909</i>	<i>19,885</i>	<i>8,839</i>	<i>1,145</i>	<i>(d)</i>	<i>137,021</i>
<i>Construction Material Quarrying(c)</i>									
<i>Total, All Mining and Quarrying</i>	<i>78,202</i>	<i>10,080</i>	<i>21,603</i>	<i>8,580</i>	<i>20,736</i>	<i>8,955</i>	<i>1,145</i>	<i>103</i>	<i>149,404</i>

For footnotes see next page.

MINING AND QUARRYING: VALUE OF OUTPUT(a)—*continued.*
(£'000.)

Industry.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
1955.									
<i>Metal Mining—</i>									
Gold Mining ..	283	640	295	1	13,449	..	866	..	15,534
Silver-Lead-Zinc Mining ..	31,950	..	(b)	(e)	(b)	2,669	..	..	49,143
Copper-Gold Mining ..	23	..	(b)	(e)	(b)	(b)	611	..	6,559
Tin Mining ..	216	..	575	..	90	1,128	3	..	2,012
Mineral Sands Mining ..	2,120	..	1,295	..	..	..	..	..	3,415
Other Metal Mining ..	78	20	(b)	3,702	1,116	(b)	146	..	7,867
<i>Total, Metal Mining</i>	<i>34,670</i>	<i>660</i>	<i>19,303</i>	<i>3,703</i>	<i>14,725</i>	<i>9,843</i>	<i>1,626</i>	<i>..</i>	<i>84,530</i>
<i>Fuel Mining—</i>									
Black Coal Mining ..	41,715	815	6,729	778	3,089	611	..	..	53,737
Brown Coal Mining ..	..	4,382	..	..	..	..	..	..	4,382
<i>Total, Fuel Mining</i>	<i>41,715</i>	<i>5,197</i>	<i>6,729</i>	<i>778</i>	<i>3,089</i>	<i>611</i>	<i>..</i>	<i>..</i>	<i>58,119</i>
<i>Non-metal (excluding Fuel) Mining—</i>									
Clays(c) ..	845	474	92	241	254	51	..	(d)	1,957
Gypsum ..	191	87	..	243	30	..	..	..	551
Limestone ..	842	561	(b)	775	(b)	131	..	..	2,835
Salt(c) ..	..	(b)	(b)	(b)	(b)	..	..	..	592
Other Non-metal (excluding Fuel) Mining	439	6	11	(b)	(b)	12	65	..	1,440
<i>Total, Non-metal (excluding Fuel) Mining</i>	<i>2,317</i>	<i>1,128</i>	<i>493</i>	<i>2,128</i>	<i>1,050</i>	<i>194</i>	<i>65</i>	<i>(d)</i>	<i>7,375</i>
<i>Total, All Mining</i>	<i>78,702</i>	<i>6,985</i>	<i>26,525</i>	<i>6,609</i>	<i>18,864</i>	<i>10,648</i>	<i>1,691</i>	<i>(d)</i>	<i>150,024</i>
<i>Construction Material Quarrying(c) ..</i>	<i>5,542</i>	<i>3,932</i>	<i>367</i>	<i>3,903</i>	<i>882</i>	<i>96</i>	<i>..</i>	<i>125</i>	<i>14,847</i>
<i>Total, All Mining and Quarrying</i>	<i>84,244</i>	<i>10,917</i>	<i>26,892</i>	<i>10,512</i>	<i>19,746</i>	<i>10,744</i>	<i>1,691</i>	<i>125</i>	<i>164,871</i>

(a) Selling value at point of sale of mine or quarry products, less transport costs from mine or quarry to point of sale, i.e., value of output at mine or quarry. (b) Not available for publication. (c) Incomplete. (d) Not available for publication; included with "Construction Material Quarrying". (e) Not available for publication; included with "Other Metal Mining".

MINING AND QUARRYING: VALUE OF PRODUCTION.(a)
(£'000.)

Industry.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
1954.									
<i>Metal Mining—</i>									
Gold Mining ..	240	615	218	(b) —3	8,785	..	790	..	10,645
Silver-Lead-Zinc Mining ..	21,115	..	(c)	(c)	(e)	2,131	(b) (c)	..	30,186
Copper-Gold Mining ..	10	..	(c)	..	..	(c)	78	..	3,760
Tin Mining ..	181	..	421	..	43	903	10	..	1,558
Mineral Sands Mining ..	772	..	715	..	..	..	(b) (c)	..	1,487
Other Metal Mining ..	75	7	(c)	(c)	(e)	(c)	40	..	6,217
<i>Total, Metal Mining</i>	<i>22,393</i>	<i>622</i>	<i>10,151</i>	<i>3,047</i>	<i>10,350</i>	<i>6,379</i>	<i>911</i>	<i>..</i>	<i>53,853</i>
<i>Fuel Mining—</i>									
Black Coal Mining ..	34,811	728	5,192	501	2,989	432	..	..	44,653
Brown Coal Mining ..	..	3,534	..	..	..	..	..	..	3,534
<i>Total, Fuel Mining</i>	<i>34,811</i>	<i>4,262</i>	<i>5,192</i>	<i>501</i>	<i>2,989</i>	<i>432</i>	<i>..</i>	<i>..</i>	<i>48,187</i>
<i>Non-metal (excluding Fuel) Mining—</i>									
Clays(d) ..	773	417	..	241	280	43	..	(e)	1,754
Gypsum ..	128	37	..	134	32	..	..	..	331
Limestone ..	546	289	(c)	501	(e)	95	..	..	1,902
Salt(d) ..	..	..	(c)	(c)	..	..	..	..	523
Other Non-metal (excluding Fuel) Mining	278	5	7	(c)	(e)	11	117	..	1,110
<i>Total, Non-metal (excluding Fuel) Mining</i>	<i>1,726</i>	<i>748</i>	<i>395</i>	<i>1,609</i>	<i>877</i>	<i>149</i>	<i>117</i>	<i>(e)</i>	<i>5,620</i>
<i>Total, All Mining</i>	<i>58,929</i>	<i>5,632</i>	<i>15,738</i>	<i>5,157</i>	<i>14,216</i>	<i>6,960</i>	<i>1,028</i>	<i>(e)</i>	<i>107,660</i>
<i>Construction Material Quarrying(d) ..</i>	<i>5,036</i>	<i>2,514</i>	<i>197</i>	<i>1,944</i>	<i>560</i>	<i>97</i>	<i>..</i>	<i>80</i>	<i>10,428</i>
<i>Total, All Mining and Quarrying</i>	<i>63,965</i>	<i>8,146</i>	<i>15,935</i>	<i>7,101</i>	<i>14,776</i>	<i>7,057</i>	<i>1,028</i>	<i>80</i>	<i>118,088</i>

For footnotes see next page.

MINING AND QUARRYING: VALUE OF PRODUCTION(a)—continued.
(£'000.)

Industry.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
1955.									
<i>Metal Mining—</i>									
Gold Mining	171	431	249 (b)	—3 (f)	9,117 (c)	691 ..	..	..	10,656
Silver-Lead-Zinc Mining ..	25,749	..	(c)	(f)	(c)	2,388 ..	..	..	40,471
Copper-Gold Mining ..	10	..	(c)	(f)	(c)	477 ..	..	..	4,506
Tin Mining	181	..	437	..	50	983 3	..	..	1,654
Mineral Sands Mining ..	1,807	..	994	..	..	..	..	..	2,801
Other Metal Mining ..	60	20	(c)	3,292	900	(c)	141	..	6,666
<i>Total, Metal Mining</i>	<i>27,978</i>	<i>451</i>	<i>15,733</i>	<i>3,289</i>	<i>10,099</i>	<i>7,892</i>	<i>1,312</i>	<i>..</i>	<i>66,754</i>
<i>Fuel Mining—</i>									
Black Coal Mining ..	33,962	668	5,475	611	2,457	496 ..	..	..	43,669
Brown Coal Mining ..	..	3,929	..	..	..	..	..	..	3,929
Oil Mining .. ..	..	(b) —2	..	..	..	..	..	..	(b) —2
<i>Total, Fuel Mining</i>	<i>33,962</i>	<i>4,595</i>	<i>5,475</i>	<i>611</i>	<i>2,457</i>	<i>496</i>	<i>..</i>	<i>..</i>	<i>47,596</i>
<i>Non-metal (excluding Fuel) Mining—</i>									
Clays(d)	734	442	66	211	253	46 ..	..	(e)	1,752
Gypsum	145	75	..	174	30	..	..	..	424
Limestone	539	287	(c)	640	(c)	92 ..	..	..	1,914
Salt(d) .. ..	..	(c)	(c)	(c)	(c)	..	..	..	443
Other Non-metal (excluding Fuel) Mining	362	5	11	(c)	(c)	11	65	..	1,236
<i>Total, Non-metal (excluding Fuel) Mining</i>	<i>1,780</i>	<i>809</i>	<i>314</i>	<i>1,711</i>	<i>941</i>	<i>149</i>	<i>65</i>	<i>(e)</i>	<i>5,769</i>
<i>Total, All Mining</i> ..	<i>63,720</i>	<i>5,855</i>	<i>21,522</i>	<i>5,611</i>	<i>13,497</i>	<i>8,537</i>	<i>1,377</i>	<i>(e)</i>	<i>120,119</i>
<i>Construction Material Quarrying(d)</i> ..	<i>5,542</i>	<i>3,012</i>	<i>210</i>	<i>2,841</i>	<i>646</i>	<i>75</i>	<i>..</i>	<i>63</i>	<i>12,389</i>
<i>Total, All Mining and Quarrying</i> ..	<i>69,262</i>	<i>8,867</i>	<i>21,732</i>	<i>8,452</i>	<i>14,143</i>	<i>8,612</i>	<i>1,377</i>	<i>63</i>	<i>132,508</i>

(a) Value of output at mine, less cost of power, fuel, light and other materials and stores used; depreciation and maintenance costs have not been deducted. (b) Cost of materials used, etc., exceeds value of output. (c) Not available for publication. (d) Incomplete. (e) Not available for publication; included with "Construction Material Quarrying". (f) Not available for publication; included with "Other Metal Mining".

(ii) *States, 1939 and 1951 to 1955.* Values for individual minerals produced based on estimated selling value at the mine or quarry are shown for the year 1955 in para. 4 (iii) above. Australian State and Commonwealth Statisticians have for many years used values for mine and refinery products as recorded by Mines Departments and other relevant data (including censuses of the industry in some States) to estimate value of output and value of production for the mining and quarrying industry as a whole. The following table shows estimates on this basis for the years 1939 and 1951 together with the values ascertained from the Australia-wide mineral industry censuses of 1952, 1953, 1954 and 1955. The estimates shown for 1939 and 1951 are approximate, and as value added in ore-dressing and similar treatment plants situated at or near the mine was excluded in some cases, they are not strictly comparable with later valuations which consistently include the value of such mine treatment. Northern Territory figures are not available for years prior to 1952 nor are Australian Capital Territory figures for years prior to 1953.

MINING AND QUARRYING : VALUE OF OUTPUT AND VALUE OF PRODUCTION.
(£'000.)

Year.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
VALUE OF OUTPUT.(a)									
1939	12,914	2,789	3,438	3,648	12,496	2,145	(b)	(b)	37,430
1951	67,877	6,949	10,922	4,938	13,474	10,552	(b)	(b)	114,712
1952	77,097	8,535	17,429	6,047	17,704	8,750	1,282	(b)	136,844
1953	72,346	9,329	17,284	6,203	20,011	8,037	1,221	111	134,542
1954	78,202	10,080	21,603	8,580	20,736	8,955	1,145	103	149,404
1955	84,244	10,917	26,892	10,512	19,746	10,744	1,691	125	164,871
VALUE OF PRODUCTION.(c)									
1939	10,927	2,111	2,688	3,444	9,268 (d)	2,145	(b)	(b)	30,583
1951	59,385	4,209	8,632	4,646	9,775 (d)	10,552	(b)	(b)	97,199
1952	63,166	6,632	13,860	5,153	12,410	7,325	1,125	(b)	109,671
1953	58,042	7,277	12,906	5,051	13,998	6,392	1,117	92	104,875
1954	63,965	8,146	15,935	7,101	14,776	7,057	1,028	80	118,088
1955	69,262	8,867	21,732	8,452	14,143	8,612	1,377	63	132,508

(a) Selling value of mine and quarry products at the mine or quarry. (b) Not available.
(c) Value of output less cost of power, fuel, light and other materials and stores used; depreciation and maintenance costs have not been deducted. (d) Value of output; value of production not available.

7. Industrial Census of the Mining and Quarrying Industry, 1954 and 1955.—Industrial censuses of the mining and quarrying industry (covering employment, salaries and wages paid, fixed assets, value of output, costs of materials used, etc.) have been taken in some Australian States for many years, but on different bases. Since 1952, censuses have been taken in all States and Territories on a substantially uniform basis, thus providing important Australian statistics on mining and quarrying operations which were not previously available. A summary of the statistics collected in 1954 and 1955 is shown in the following table.

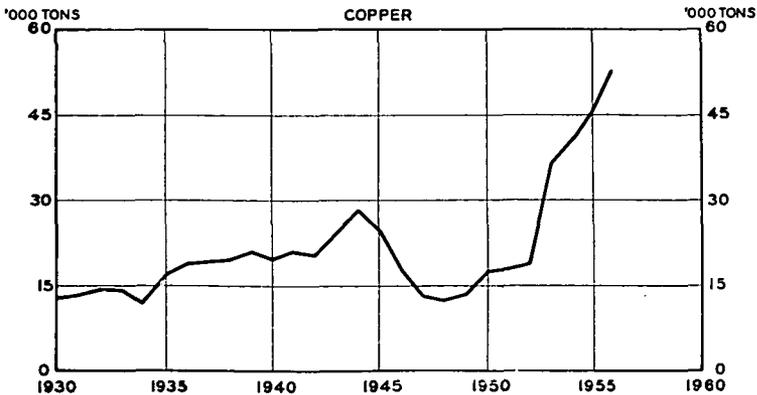
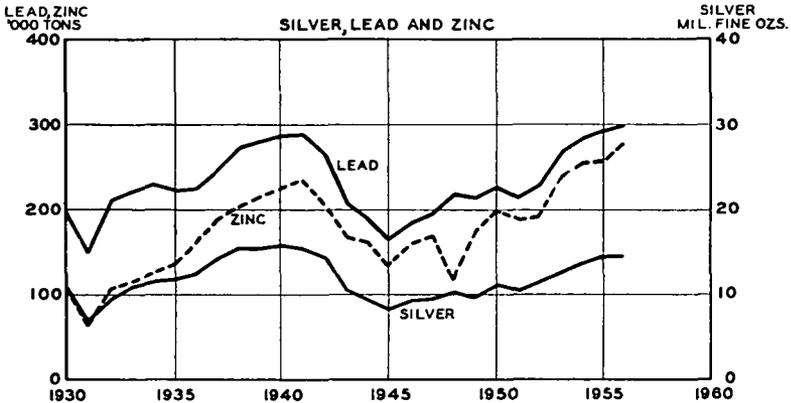
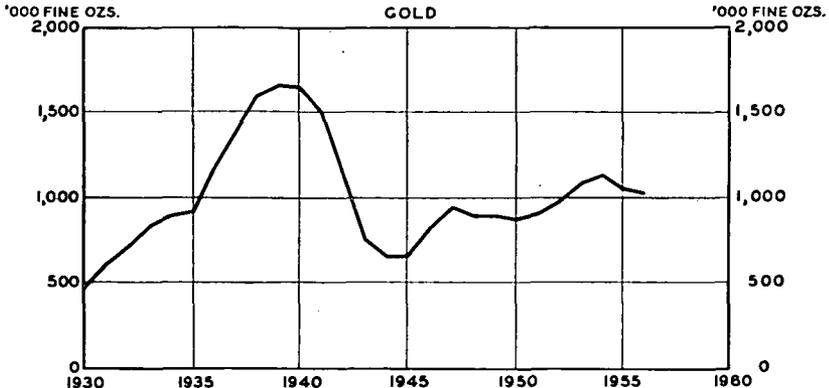
MINING AND QUARRYING : SUMMARY OF OPERATIONS, AUSTRALIA.

Particulars.	Unit.	Metal Mining.	Fuel Mining.	Non-metal (excluding Fuel) Mining. (a)	Total All Mining.	Construction Material Quarrying.(b)	Total All Mining and Quarrying.
1954.							
Mines and Quarries ..	No.	818	306	683	1,807	687	2,494
Persons Employed(c) ..		21,366	28,268	2,858	52,492	4,121	56,613
Salaries and Wages Paid(d)(e)	£'000	23,308	27,545	1,693	52,546	2,045	54,591
Value of Output(f) ..	"	71,150	58,829	7,042	137,021	12,383	149,404
Total Fuel, Materials, etc., Used	"	17,297	10,642	1,422	29,361	1,955	31,316
Value of Production(g) ..	"	53,853	48,187	5,620	107,660	10,428	118,088
Value of Additions and Replacements to Fixed Assets(d)	"	6,834	8,008	549	15,391	256	15,647
1955.							
Mines and Quarries ..	No.	870	277	743	1,890	712	2,602
Persons Employed(c) ..		21,992	27,214	2,875	52,081	4,197	56,278
Salaries and Wages Paid(d)(e)	£'000	26,246	27,826	2,270	56,342	2,439	58,781
Value of Output(f) ..	"	84,530	58,119	7,375	150,024	14,847	164,871
Total Fuel, Materials, etc., Used	"	17,776	10,523	1,606	29,905	2,458	32,363
Value of Production(g) ..	"	66,754	47,596	5,769	120,119	12,389	132,508
Value of Additions and Replacements to Fixed Assets(d)	"	7,816	7,649	1,560	17,025	304	17,329

(a) Incomplete for some industries outside the normal administrative control of State Mine Departments (e.g., clays and salt). (b) Incomplete in some States. (c) Average number employed (including working proprietors) during whole year. (d) Excludes mines and quarries employing less than four persons (less than five persons in Western Australia). (e) Excludes drawings by working proprietors; the amounts are net after deducting value of explosives sold to employees. (f) Value at mine or quarry. (g) Value of output less cost of power, fuel, light and other materials and stores used; depreciation and maintenance costs have not been deducted.

MINE PRODUCTION OF PRINCIPAL METALS (METALLIC CONTENT OF MINERALS)

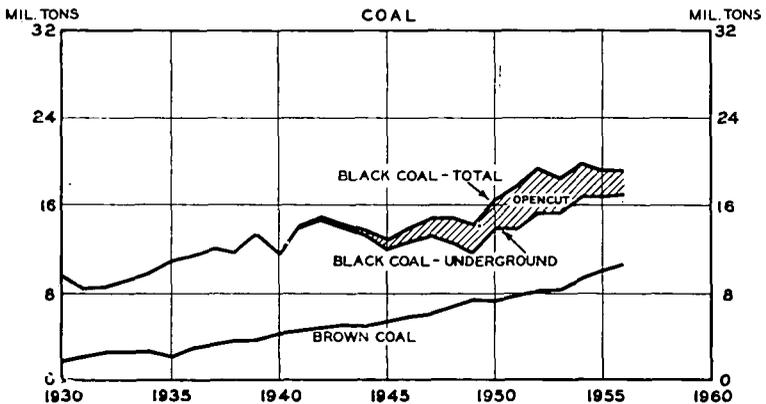
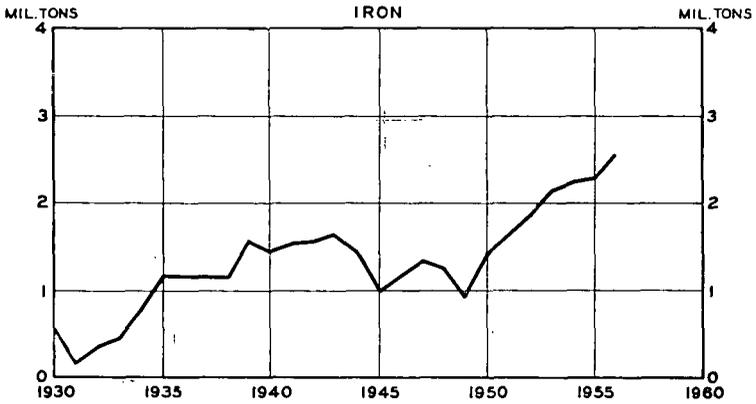
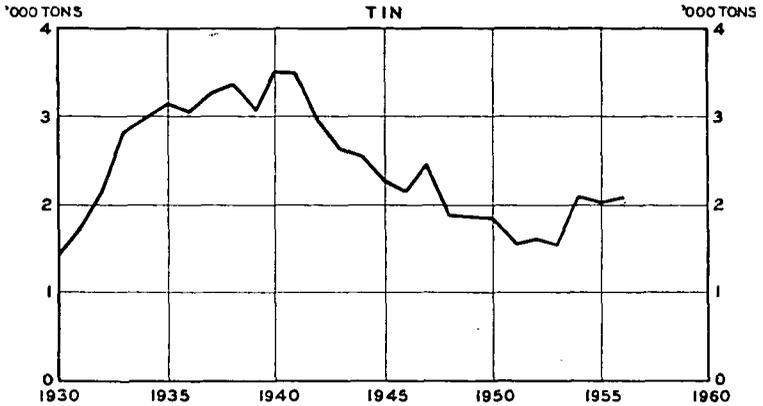
AUSTRALIA, 1930 TO 1956



MINE PRODUCTION OF PRINCIPAL METALS AND PRODUCTION OF COAL

(METALLIC CONTENT OF MINERALS)

AUSTRALIA, 1930 TO 1956



In the next table, statistics of numbers of mines and quarries, persons employed, value of output and value of production are shown for each State, the Northern Territory and the Australian Capital Territory for the years 1954 and 1955.

MINING AND QUARRYING : SUMMARY OF OPERATIONS.

State or Territory.	Mines and Quarries.	Persons Employed. (a)	Salaries and Wages Paid. (b)(c)	Value of Output. (d)	Total Fuel, Materials, etc., Used.	Value of Production. (e)	Value of Additions and Replacements to Fixed Assets.
1954.							
	No.	No.	£'000.	£'000.	£'000.	£'000.	£'000.
New South Wales ..	856	29,405	29,981	78,202	14,237	63,965	6,677
Victoria ..	267	4,707	4,031	10,080	1,934	8,146	1,811
Queensland ..	479	8,328	7,264	21,603	5,668	15,935	2,412
South Australia ..	488	2,018	1,436	8,580	1,479	7,101	1,121
Western Australia ..	254	8,887	8,651	20,736	5,960	14,776	2,157
Tasmania ..	65	2,861	2,791	8,955	1,898	7,057	840
Northern Territory ..	82	371	408	1,145	117	1,028	629
Aust. Cap. Territory ..	3	36	29	103	23	80	(f)
Australia ..	2,494	56,613	54,591	149,404	31,316	118,088	15,647
1955.							
	No.	No.	£'000.	£'000.	£'000.	£'000.	£'000.
New South Wales ..	846	29,207	31,450	84,244	14,982	69,262	7,015
Victoria ..	243	4,508	4,439	10,917	2,050	8,867	1,942
Queensland ..	570	8,694	9,287	26,892	5,160	21,732	3,213
South Australia ..	475	2,230	1,714	10,512	2,060	8,452	1,500
Western Australia ..	272	8,283	8,345	19,746	5,603	14,143	2,213
Tasmania ..	71	2,820	2,983	10,744	2,132	8,612	673
Northern Territory ..	121	501	534	1,691	314	1,377	763
Aust. Cap. Territory ..	4	35	29	125	62	63	10
Australia ..	2,602	56,278	58,781	164,871	32,363	132,508	17,329

(a) Average number employed (including working proprietors) during whole year. (b) Excludes mines and quarries employing less than four persons (less than five persons in Western Australia). (c) Excludes drawings by working proprietors; the amounts are net after deducting value of explosives sold to employees. (d) Value at mine or quarry. (e) Value of output less cost of power, fuel, and light and other materials and stores used; depreciation and maintenance costs have not been deducted. (f) Less than £500.

§ 2. Gold.

1. **Discovery in Various States.**—A detailed account of the discovery of gold in the various States appears under this section in Official Year Books Nos. 1 to 4.

2. **Production.**—The following table shows the recorded mine production of gold (i.e., gold content of minerals produced) in the several States and in Australia as a whole during each of the ten decennial periods from 1851 to 1950, and in single years from 1951 to 1955. Owing to defective information in the earlier years it is likely that the recorded production falls considerably short of the actual totals.

GOLD : MINE PRODUCTION.(a)

('000 fine oz.)

Period.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Aust.
1851-60	2,714	21,973	3	..	..	186	..	24,876
1861-70	3,220	15,327	489	..	..	3	..	19,039
1871-80	2,019	9,564	2,527	136	..	165	19	14,430
1881-90	1,014	6,689	3,259	58	42	357	168	11,587
1891-1900	2,432	7,040	5,648	52	5,252	550	214	21,188
1901-10	2,253	7,095	5,512	73	17,784	604	111	33,432
1911-20	1,145	3,067	2,263	55	10,671	202	23	17,426
1921-30	204	593	434	10	4,357	43	2	5,843
1931-40	569	1,052	1,021	53	8,474	130	84	11,383
1941-50	572	800	750	13	6,683	157	148	9,123
1951	49	66	79	(b)	648	15	39	896
1952	39	68	85	(b)	727	16	45	980
1953	26	64	92	(b)	823	17	53	1,075
1954	32	53	98	(b)	862	19	54	1,118
1955	30	38	64	(b)	835	17	65	1,049
Total, 1851-1955	16,318	73,489	22,324	450	57,358	2,481	1,025	173,445

(a) Gold content of minerals produced.

(b) Less than 500 fine oz.

The amount of gold won in Australia in any one year attained its maximum in 1903, when Western Australia also reached its highest point. For the other States, the years in which the greatest yields were obtained were as follows:—New South Wales, 1852; Victoria, 1856; Queensland, 1900; South Australia, 1904; and Tasmania, 1899. In recent years, output has expanded to record levels in the Northern Territory which is now the second largest producer in Australia.

Owing to the exhaustion of the more easily worked deposits and increased costs due to deep mining, the production of gold in Australia declined from 3,837,979 fine oz. in 1903 to 427,160 fine oz. in 1929, the lowest output since its discovery.

Increased activity in prospecting due to prevailing economic conditions resulted in some improvement in 1930, but the marked development between that year and 1939 was caused by the heavy depreciation of Australian currency in terms of gold. Following the outbreak of the 1939-45 War, there was a sharp fall in gold production to 656,867 fine oz. in 1944 and 657,213 fine oz. in 1945, but with the release of man-power after the war there has been a slight upward trend in mine production of gold, which, in 1953, exceeded 1,000,000 fine oz. for the first time since 1942. The devaluation of Australian currency in September, 1949 gave an impetus to gold production, but this was offset in the following years by increasing costs which brought about the closing of several large producers in New South Wales, Victoria and Western Australia. To enable the industry to meet the increase in costs, sales of gold on overseas premium markets at prices in excess of the official price were permitted from December, 1951. During 1952 and 1953, premium sales of gold brought an additional return to the industry amounting to about £1,800,000, but towards the end of 1953 the price of gold on overseas premium markets fell sharply and subsequent sales have been made at prices very little above the official price. This had an adverse effect on the financial position of the gold-mining industry and the Commonwealth Government passed the Gold-Mining Industry Assistance Act in 1954 to prevent any serious decline in gold-mining activity. The operation of this Act has since been extended from two years to five years. The production of gold in Australia increased from 1951 to 1954 but fell back in 1955 under the pressure of rising costs.

3. Sources of Production.—(i) *New South Wales.* Gold production in 1955 was 30,067 fine oz. The only gold producer of any significance was Wellington Alluvials Ltd., who operate a dredge on the Macquarie River, but other small quantities were won in conjunction with silver, lead and zinc at Broken Hill and at Captain's Flat, and by small prospecting parties throughout the State.

(ii) *Victoria.* The gold yield in Victoria further declined in 1955 to 38,035 fine oz., the lowest output since 1930. Only five producers—four quartz mines and one dredge—produced more than 1,000 fine oz. during the year, the largest of these being the Wattle Gully mine at Chewton in central Victoria.

(iii) *Queensland.* The output of 64,322 fine oz. during 1955 was considerably lower than the previous year owing to the lower output from Mt. Morgan, the main producer. The only other major producer is Golden Plateau N.L. at Cracow.

(iv) *South Australia.* Only 50 fine oz. of gold were won in 1955 by prospectors in central and northern parts of the State.

(v) *Western Australia.* Production of gold during 1955 was 834,326 fine oz. This was lower than production in 1954 and was due in some measure to the closing of the Big Bell mine early in 1955 and the Blue Spec mine later in the year. More than half the year's total production of gold in Western Australia came from the Coolgardie goldfields, most of the remaining production coming from the Murchison, Dundas, Yilgarn and Mt. Margaret goldfields. The Lake View and Star mine at Fimiston maintained its position as the largest gold producer in Australia, winning 166,318 fine ozs. during 1955, and ten other mines each produced over 20,000 fine ozs. in the same period.

(vi) *Tasmania.* Production of gold in Tasmania during 1955 was 16,882 fine oz. Almost all of this production was won as a by-product of lead-zinc mining at Rosebery and of copper mining at Mt. Lyell in western Tasmania. A small amount was also won in tin dredging operations in the north-eastern area of the State.

(vii) *Northern Territory.* Gold production in Northern Territory which has been steadily increasing in recent years, reached a record level of 65,357 fine oz. in 1955. Production is centred around Tennant Creek where the Nobles Nob mine is the main producer.

4. *Refinery Production.*—The quantities and values of the refinery production of new gold of Australian origin are shown in the following table for each of the years 1946 to 1955. The value of the refined new gold is based on the price fixed by the Commonwealth Bank, but allowance is made, from 1952 onwards, for premiums on sales of gold overseas and for industrial purposes in Australia.

GOLD : REFINERY PRODUCTION OF NEWLY WON GOLD OF AUSTRALIAN ORIGIN.

Year.			Quantity.	Value.	Year.			Quantity.	Value.
			'000. fine oz.	£'000.			'000. fine oz.	£'000.	
1946	..	..	820	8,830	1951	..	850	13,172
1947	..	..	969	10,430	1952	..	979	16,037
1948	..	..	884	9,517	1953	..	1,053	16,780
1949	..	..	879	10,670	1954	..	1,063	16,589
1950	..	..	844	13,077	1955	..	1,055	16,503

The unit value of refinery production of newly won gold of Australian origin rose to £12 2s. 10d. in 1949 as a result of the increase in the price to £15 9s. 10d. per fine oz. fixed by the Commonwealth Bank on 19th September, 1949, consequent upon alteration in the rate of exchange. In 1950 and 1951, the unit values were the Bank's price of £15 9s. 10d. per fine oz., and since 1952 allowance has been made for premiums on gold sold for industrial purposes in Australia and on premium markets overseas, the average value per fine oz. being £16 7s. 7½d. in 1952; £15 18s. 9¼d. in 1953; £15 12s. 0d. in 1954; and £15 12s. 11¼d. in 1955. From 1st May, 1954, the official price of gold in Australia was raised to £15 12s. 6d. per fine oz. The previous gold price was based on the price for which gold could be sold abroad in official markets less costs of movement; the new price reflects the "parity" value of Australian currency established by the International Monetary Agreement Act 1947. Further information regarding the price of gold realized, including particulars of prices for newly won gold sold on overseas premium markets since December, 1951, is given in Chapter XX.—Private Finance.

5. *Changes in Stocks of Gold held in Australia.*—The following table shows particulars of production, imports and exports of gold and changes in stocks of gold held in Australia for each of the years 1951–52 to 1955–56.

CHANGES IN STOCKS OF GOLD HELD IN AUSTRALIA.

(Fine oz.)

Particulars.	1951-52.	1952-53.	1953-54.	1954-55.	1955-56.
Mine Production of Gold(a)	908,813	1,037,885	1,111,420	1,080,249	1,032,546
Imports of Gold(b)(c) ..	208,143	228,407	189,628	175,166	175,649
<i>Total</i>	<i>1,116,956</i>	<i>1,266,292</i>	<i>1,301,048</i>	<i>1,255,415</i>	<i>1,208,195</i>
Exports of Gold(b)	416,652	1,250,162	863,464	864,391	531,664
Gold Content of Ores and Concentrates Exported ..	14,503	12,441	12,526	11,133	13,427
Net Industrial Absorption of Gold	33,838	37,816	51,543	45,253	34,678
<i>Total</i>	<i>464,993</i>	<i>1,300,419</i>	<i>927,533</i>	<i>920,777</i>	<i>579,769</i>
Changes in Stocks of Gold held in Australia(d)	+ 651,963	- 34,127	+ 373,515	+ 334,638	+ 628,426

(a) Gold content of minerals produced in Australia. (b) Includes gold contained in matte.
(c) Excludes gold imported in some minor minerals. (d) Includes gold content of mineral products awaiting refining; excludes gold specie.

6. **Production in Principal Countries.**—The quantities of gold produced in the principal producing countries and the estimated world total production in each of the years 1951 to 1955 are shown in the table hereunder.

GOLD : PRODUCTION IN PRINCIPAL COUNTRIES AND WORLD TOTAL.

('000 fine oz.)

Country.	1951.	1952.	1953.	1954.	1955
Union of South Africa ..	11,516	11,819	11,941	13,237	14,601
Canada	4,393	4,472	4,056	4,366	4,556
United States of America ..	1,981	1,893	1,958	1,832	1,884
Australia	896	980	1,075	1,118	1,049
Gold Coast	699	691	731	787	687
Rhodesia	488	499	504	538	527
Philippines	394	469	481	416	419
Mexico	393	459	483	387	383
Colombia	431	422	437	377	381
Belgian Congo	352	369	371	365	369
<i>Estimated World Total</i> ..	<i>23,700</i>	<i>24,300</i>	<i>24,200</i>	<i>25,700</i>	<i>26,900</i>

7. **Employment in Gold Mining.**—Particulars of the numbers of persons employed in gold mining are shown in § 13 (p. 1007).

8. **Assistance to Gold-mining Industry.**—In 1939, a tax was imposed on gold produced in Australia or any Australian Territory but this tax was suspended in 1947. Further relief was given to the gold-mining industry in 1952 and 1953 by permitting sales of gold on overseas premium markets, but with the disappearance of high premium prices overseas in late 1953, many producers were faced with the prospect of closing down. To meet this situation, the Gold-Mining Industry Assistance Act was assented to on 18th November, 1954. The

purpose of this Act was to assist the gold-mining industry by the payment of subsidy subject to certain conditions on the production and sales of gold during the two financial years 1954-55 and 1955-56. The subsidy payable to small producers whose annual output does not exceed 500 fine oz. of gold is a flat rate of £1 10s. 0d. per fine oz. For large producers, the formula for determining the amount of subsidy payable is :—

Three-quarters of the excess of average cost of production per fine oz. over £13 10s. 0d.

The maximum rate of subsidy which may be paid is £2 per fine oz. Where a producer receives an amount in excess of the official price of £15 12s. 6d. per fine oz. as a result of sales on overseas premium markets or otherwise, the subsidy payable shall be reduced by the amount of the excess. The subsidy will also be limited to the extent that the annual net profit of a producer will not, with the addition of the subsidy, exceed 10 per cent. of the capital investment in the company. A further condition of the Act is that the recovery rate of the mine shall be maintained at the level of the year previous to the Act. In 1956, the operation of the Act was extended for a further three years to 1958-59.

Payments under the Act commenced in March, 1955 and the amounts paid to gold producers in the various States and Territories of Australia during 1955 are shown in the following table.

NET SUBSIDY PAYMENTS TO GOLD PRODUCERS : 1955.

(£.)

New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Papua and New Guinea.	Total.
225	29,657	966	..	199,051	..	441	6,606	236,946

§ 3. Silver, Lead and Zinc.

1. **Production.**—The following table shows for 1954 and 1955 the mine production (metallic content of ores and concentrates produced) of silver, lead and zinc in Australia, and the respective minerals in which these metals were contained.

SILVER, LEAD AND ZINC : CONTENT OF ORES AND CONCENTRATES PRODUCED.

Minera in which contained.	Silver (fine oz.).		Lead (tons).		Zinc (tons).	
	1954.	1955.	1954.	1955.	1954.	1955.
Copper Ore and Concentrate.	1,069,600	854,722	2,845	2,171	..	..
Gold Concentrate, etc.	245,691	211,332	..	..	..	..
Lead-Silver Ore	27,398	587,387	627	3,357	..	..
Lead-Silver-Zinc Ore	2,118	..	93	..	74	..
Lead Concentrate	11,838,567	12,291,854	275,955	283,701	..	..
Zinc Concentrate	643,664	610,117	5,342	6,715	252,585	256,564
Total	13,827,038	14,555,412	284,862	295,944	252,659	256,564

The following table shows the mine production of silver, lead and zinc in Australia for the years 1951 to 1955 compared with 1939.

SILVER, LEAD AND ZINC : CONTENT OF ORES AND CONCENTRATES PRODUCED, AUSTRALIA.

Metal.	Un't.	1939.(a)	1951.	1952.	1953.	1954.	1955.
Silver	'000 fine oz.	15,320	10,244	11,278	12,539	13,827	14,555
Lead	ton	280,003	212,013	228,196	269,344	284,862	295,944
Zinc	„	217,256	189,227	196,450	239,324	252,659	256,564

(a) Source: Australian Mines and Metals Association.

The following table shows the quantities of silver, lead and zinc contained in minerals won in the several States of Australia in the years 1954 and 1955:—

SILVER, LEAD AND ZINC : CONTENT OF ORES AND CONCENTRATES PRODUCED, STATES.

State.	Silver (fine oz.).		Lead (tons).		Zinc (tons).	
	1954.	1955.	1954.	1955.	1954.	1955.
New South Wales ..	8,680,114	8,823,211	230,392	234,854	202,646	211,478
Victoria ..	3,443	1,633	..	..	..	..
Queensland ..	3,583,776	4,363,371	41,424	48,814	19,615	17,138
South Australia ..	625	142	14	2	..	..
Western Australia ..	237,639	200,748	1,497	1,007	74	..
Tasmania ..	1,321,385	1,166,307	11,533	11,267	30,324	27,948
Northern Territory ..	56	..	2	..	..	..
Australia ..	13,827,038	14,555,412	284,862	295,944	252,659	256,564

Particulars of the values ascribed to the various minerals containing silver, lead and zinc for the year 1955 are shown in the detailed table relating to mineral production on p. 972.

2. Sources of Production.—(i) *New South Wales.* By far the most silver-lead-zinc ore in Australia is won from the massive silver-lead-zinc sulphide deposit at Broken Hill. The companies concerned in operating this gigantic lode are North Broken Hill Ltd., which mines the northern limb of the ore-bearing structure, Broken Hill South Ltd., and Zinc Corporation Ltd. (with which is associated New Broken Hill Consolidated), which are conducting operations on the southern limb.

The present-day sulphide ores are concentrated by gravity and flotation methods at Broken Hill. The lead (galena) concentrates are railed to Port Pirie and smelted to produce lead bullion which is later refined by a continuous lead refining process for the elimination of arsenic and antimony and the recovery of silver and gold. About half of the zinc concentrate produced at Broken Hill is exported from Australia. Most of the remainder is treated at Risdon in Tasmania and a small proportion is roasted by fertilizer plants in South Australia for the recovery of sulphur dioxide for sulphuric acid manufacture.

At Captain's Flat, Lake George Mines Ltd. is operating a lode of similar constitution. Concentration of the ore is carried out at the mine itself, after which process, individual concentrates of zinc and lead (containing silver) are despatched to Port Kembla, New South Wales, for further treatment. Concentrates of copper, pyrite and gold are also produced at this mine.

Silver-lead-zinc ore has been mined in small quantities in various other parts of the State, the more important localities being Howell, Yerranderie and Kangiara. The Conrad Mine at Howell in northern New South Wales has been re-opened and production commenced again in May, 1955.

(ii) *Victoria.* Small quantities of lead sulphide ore occur on most of Victoria's gold-fields and in minor amounts in the Omeo, Bethanga and Cassilis districts. There has been no production of lead ore in recent years, the total recorded production being about 800 tons valued at £5,892.

The whole of the Victorian mine production of silver, 1,633 fine oz. in 1955, was won as a by-product of the gold mining industry.

(iii) *Queensland.* Silver produced in Queensland is obtained mainly as a by-product of ores of other metals such as lead-zinc and copper ores at Mt. Isa and copper-gold ore at Mt. Morgan. An exception is the ore at the Silver Phantom Mine in the Cloncurry district, which produced 32,269 oz. of silver from 12 tons of ore during 1955.

Nearly all the output of lead in Queensland is produced at Mt. Isa in the far north-west of the State, where mining is carried out on extensive silver-lead-zinc ore and copper ore bodies. After concentration by flotation in the concentrating mill, the silver-lead concentrate is converted to bullion in the smelter. All Mt. Isa lead bullion is exported overseas, where certain impurities, such as antimony, arsenic and copper, as well as silver, are removed to yield a pure lead suitable for commercial use.

Zinc concentrates produced by Mt. Isa are also exported overseas. During the 1939-45 War, operations on silver-lead-zinc ores at Mt. Isa were suspended while the mine was engaged in mining copper, but in 1946 copper mining ceased, and operations on silver-lead-zinc ores were resumed. Copper mining re-commenced at Mt. Isa with the opening there of a new copper smelting plant in 1953.

(iv) *South Australia.* Output of lead from local ores has been very small in recent years. In 1955, 7 tons of lead-silver ore were produced, containing 2 tons of lead and 142 fine oz. of silver. There has been no recorded zinc production since 1903.

(v) *Western Australia.* During recent years, lead-silver-zinc ore and lead concentrates have been produced in Western Australia. Main centres of production have been the Northampton area, the Ashburton area and the West Kimberley district.

The bulk of the mine production of silver in Western Australia is obtained as a by-product of the gold-mining industry.

(vi) *Tasmania.* There are two large centres of silver-lead-zinc mining in Tasmania, the more important being that operated by the Electrolytic Zinc Company of Australasia Ltd. at Read-Rosebery. This company also operates the electrolytic zinc reduction works at Risdon near Hobart. Although the product of this field is primarily zinc, lead and copper-lead concentrates are also produced.

The lead concentrates and copper-lead concentrates produced at Rosebery are exported overseas, while the zinc concentrates, containing some lead, are sent to Risdon for roasting and refining. The Risdon plant also treats considerable quantities of zinc concentrates from the Broken Hill mines.

Of secondary importance to Rosebery is the Mount Farrell field, situated 6 miles north-east of Rosebery. These ore-bodies are mainly silver-lead lodes which yield a lead concentrate with high silver content. The zinc content is insufficient to warrant recovery.

Most of the State's silver is contained in concentrates produced at Rosebery and Mount Farrell but some is obtained from the Mount Lyell copper refinery tank house slimes which are treated at Port Kembla in New South Wales.

(vii) *Northern Territory.* There was no production of lead-silver ore in the Northern Territory in 1955.

3. **Production and Sales of Refined Silver, Lead and Zinc.**—In the following table, details are given of the production and sales of refined primary silver, lead and zinc as recorded from data received from the Australian Mines and Metals Association and the Bureau of Mineral Resources. The figures shown for refined silver production include small quantities recovered from imported materials. The data relating to lead production for the year 1939 include small quantities recovered from scrap.

REFINED SILVER, LEAD AND ZINC : PRODUCTION AND SALES, AUSTRALIA.

Part'culars.	1939.	1951.	1952.	1953.	1954.	1955.
SILVER ('000 fine oz.).						
Production (a)	9,552	6,879	6,773	6,595	8,474	7,818
Sold to Australian consumers (b) ..	1,794	1,939	1,045	1,447	1,977	1,928
Exported or sold for export (b) ..	7,518	4,924	5,876	4,735	6,989	5,793
LEAD (tons).						
Refined Lead—						
Production (a)	199,437	165,758	156,639	172,468	200,409	187,134
Sold to Australian consumers (b) ..	32,217	54,629	31,566	31,663	42,088	45,851
Exported or sold for export (b) ..	164,684	111,332	119,648	141,007	153,847	148,189
Lead Bullion—						
Produced for export (a)	43,955	31,872	37,709	34,050	38,146	37,392
ZINC (tons).						
Production (a)	71,220	77,010	87,438	90,178	104,523	101,090
Sold to Australian consumers (b) ..	31,088	45,950	50,174	58,524	61,478	71,355
Exported or sold for export (b) ..	43,137	29,411	38,132	32,881	36,130	34,049

(a) Source: Bureau of Mineral Resources.

(b) Source: Australian Mines and Metals Association.

4. **Silver, Lead and Zinc: Production in Principal Countries and World Total, 1954 and 1955.**—The following table shows, for the years 1954 and 1955, particulars of silver, lead and zinc production (mine basis) in principal producing countries, together with the estimated world total, according to data published by the Mineral Resources Division of the Colonial Geological Surveys.

SILVER, LEAD AND ZINC: MINE PRODUCTION IN PRINCIPAL COUNTRIES AND WORLD TOTAL, 1954 AND 1955.

Country.	1954.	1955.
SILVER (fine oz.).		
Mexico	39,896,467	47,957,655
United States of America	36,941,384	36,734,565
Canada	31,117,949	27,901,427
Peru	20,405,883	20,954,823
Australia	13,827,038	14,555,412
Japan	6,162,815	5,948,627
Bolivia	6,624,950	5,851,242
Belgian Congo	4,533,000	4,083,000
<i>Estimated World Total</i>	189,000,000	192,000,000
LEAD (long tons).		
United States of America	290,560	297,704
Australia	284,862	295,944
U.S.S.R.	(a) 275,000	(a) 290,000
Mexico	213,203	207,486
Canada	195,085	173,191
Peru	108,328	113,845
<i>Estimated World Total</i>	2,028,000	2,091,000
ZINC (long tons).		
United States of America	422,742	459,528
Canada	336,153	381,220
Mexico	220,215	265,144
Australia	252,659	256,564
U.S.S.R.	(a) 240,000	(a) 255,000
Peru	156,058	170,042
Poland	139,900	153,700
<i>Estimated World Total</i>	2,560,000	2,770,000

(a) Estimated.

5. Prices of Silver, Lead and Zinc.—The following table shows average prices in Australia and on the London Metal Exchange during the years 1938 and 1951 to 1955. Lead and zinc prices were controlled in Australia and the United Kingdom after the outbreak of war in 1939, but were decontrolled in Australia on 21st April, 1953. Free trading in lead in the United Kingdom, after thirteen years of Government control, was resumed on 1st October, 1952, while the fixing by regulation of the price of zinc was abandoned from 1st January, 1953. Silver prices have not been controlled in Australia and the United Kingdom.

PRICES OF SILVER, LEAD AND ZINC.

Metals	1938.	1951.	1952.	1953.	1954.	1955.
Australian Prices, in Australian currency—						
Silver, per fine oz. (a) ..	s. d. 2 2	s. d. 8 2	s. d. 7 9	s. d. 7 8	s. d. 7 8	s. d. 8 1
	£	£	£	£	£	£
Lead, per ton	(b)(c) 22	(b) 65	(b) 75	(d) 104	114	127
Zinc, per ton	(b)(c) 22	(b) 65	(b) 75	(d) 92	101	114
London Metal Exchange Prices, in sterling—						
Silver, per fine oz. (e) ..	s. d. 1 9	s. d. 6 6	s. d. 6 2	s. d. 6 2	s. d. 6 2	s. d. 6 4
	£	£	£	£	£	£
Lead, per ton	(b) 15	(b) 162	(e) 135	91	96	106
Zinc, per ton	(b) 14	(b) 172	(b) 150	75	78	91

(a) Silver prices have not been fixed by regulation in Australia, the prices shown represent export parity calculated from London Metal Exchange prices. (b) Prices fixed by regulation. (c) From February, 1940. (d) Price regulation was abandoned from 21st April, 1953; average market prices have been used thereafter. (e) Price regulation was abandoned from 1st October, 1952; average market prices have been used thereafter.

6. **Employment in Silver, Lead, and Zinc Mining.**—Particulars of the number of persons employed in mining for these metals are shown in § 13, p. 1007.

§ 4. Copper.

1. **Production.**—Copper is widely distributed throughout Australia. However, the principal producing States in 1955 were Queensland, Tasmania and New South Wales, in that order of magnitude. The opening of a new smelting plant at Mt. Isa in Queensland early in 1953 doubled the output of copper in Australia over the previous year, and production in 1955 was 45,496 tons. The table hereunder shows the quantity of mine production of copper (copper content of ores and concentrates produced) in Australia for the years 1951 to 1955. It should be noted that the minerals shown below contain, in addition to copper, certain other metals.

COPPER : CONTENT OF ORES AND CONCENTRATES PRODUCED, AUSTRALIA (Tons.)

Mineral in which Contained.	1951.	1952.	1953.	1954.	1955.
Copper Ore, Concentrate and Precipitate	15,739	16,125	33,007	37,041	41,674
Gold Ore, Concentrate, etc.	5	1	1	(a)	..
Lead Ore and Concentrate	1,874	2,163	3,037	3,241	3,224
Zinc Concentrate	308	289	540	575	598
Total	17,926	18,578	36,585	40,857	45,496

(a) Less than half a ton.

Particulars of the copper content of ores and concentrates produced in each producing State and the Northern Territory, as published by the Australian Mines and Metals Association for the year 1939, and as recorded by this Bureau from data obtained from the several State Mines Departments and other sources for the years 1951 to 1955, are shown in the table below.

COPPER : CONTENT OF ORES AND CONCENTRATES PRODUCED, STATES. (Tons.)

State.	1939.	1951.	1952.	1953.	1954.	1955.
New South Wales	1,155	3,679	3,562	3,626	3,182	3,492
Queensland	5,798	5,432	6,966	23,955	27,207	30,738
South Australia	110	(a)	2	1	(a)	..
Western Australia	1	7	7	15	..	3
Tasmania	13,453	8,657	7,722	8,902	9,880	8,394
Northern Territory	43	151	319	86	588	2,869
Australia	20,560	17,926	18,578	36,585	40,857	45,496

(a) Less than half a ton.

2. **Sources of Production.**—(i) *New South Wales.* The copper content of all ores and concentrates produced in New South Wales amounted to 3,492 tons in 1955. The only producer of copper concentrate in the State was the Lake George mine at Captain's Flat, but the major production of copper was as a by-product of lead and zinc mining at Broken Hill.

(ii) *Queensland.* In 1955, mine production of copper amounted to 30,738 tons. The main centre of production is the Cloncurry field in the north-western part of the State. Since the opening of the new copper smelter at Mt. Isa in February, 1953, copper production in Queensland has more than quadrupled and the Mt. Isa mine now produces about half of the present total Australian output. Lead bullion and zinc concentrate are also produced at Mt. Isa. The only other major copper producer is Mt. Morgan, just south of Rockhampton, where copper is produced in conjunction with gold.

(iii) *South Australia.* Deposits of copper were found in the past over a large portion of South Australia, but the principal fields have been exhausted and output in recent years has been negligible.

(iv) *Western Australia.* The ore sent to smelters in 1955 amounted to 12 tons, containing 3 tons of copper. Cupreous ore is mined in Western Australia for use in fertilizers as a trace-element and details of its production are given in § 12. Non-metallic Minerals (*see p. 1006*).

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1955 was 8,394 tons, the Mount Lyell Mining and Railway Co. Ltd. providing the greater part thereof. The remainder consisted mainly of copper in copper-lead concentrates exported from Read-Rosebery.

(vi) *Northern Territory.* The greatest part of the output of 2,869 tons of copper in the Northern Territory during 1955, came from the Peko mine at Tennant Creek. Although originally worked as a gold mine, high-grade copper ore was discovered there, and since the new milling plant came into operation in June, 1954, the mine has become the major producer of copper in the Northern Territory. Copper concentrate is also produced at Rum Jungle by Territory Enterprises Pty. Ltd. but details are not available for publication and are not included in the Northern Territory total.

3. Production and Sales of Refined Copper.—There are two refining plants in Australia, one operated by the Electrolytic Refining and Smelting Co., Port Kembla, New South Wales, and the other by The Mount Lyell Mining and Railway Co. Ltd., Mount Lyell, Tasmania. The Port Kembla plant is a custom smelter and refinery and treats copper ore, concentrates and metal in all stages. It has an annual capacity of 27,000 tons of electrolytic copper, and fire-refinery which is a cheaper process, is done on a smaller scale when materials are amenable to that treatment. There is also a refinery for the recovery of precious metals from tank house slimes. At Mount Lyell, the electrolytic process of refining copper is employed, and apart from that sold in Tasmania, the cathode copper produced is shipped to Port Kembla for casting into merchant shapes. Construction of a new copper refinery commenced in October, 1956 near Townsville, Queensland. When it comes into operation it will treat the whole output of blister copper from Mount Isa, part of which is at present refined at Port Kembla, the balance being refined in the United States. In the following table, details are given of the production and sales of refined copper, as recorded from data received from the Australian Mines and Metals Association and the Bureau of Mineral Resources.

REFINED COPPER^(a) : PRODUCTION AND SALES, AUSTRALIA.

(Tons.)

Particulars.	1939.	1951.	1952.	1953.	1954.	1955.
Production ^(b)	17,867	13,543	19,623	16,682	29,287	28,148
Sold to Australian consumers ^(c)	18,808	14,806	17,884	15,415	29,361	27,366
Exported or sold for export ^(c) ..	100	..	..	2,607	..	..

(a) Refined from domestic primary copper.

(b) Source: Bureau of Mineral Resources.

(c) Source: Australian Mines and Metals Association.

4. Production in Principal Countries and World Total.—The following table shows the mine production of copper during 1954 and 1955 from the principal producing countries as published by the Minerals Resources Division of the Colonial Geological Surveys and their estimate of total world production in 1954 and 1955.

**COPPER: MINE PRODUCTION IN PRINCIPAL COUNTRIES AND WORLD TOTAL,
1954 AND 1955.
(Long Tons.)**

Country.	1954.	1955.
United States of America	745,957	886,250
U.S.S.R.	(a) 355,000	(a) 400,000
Chile	357,912	385,116
Rhodesia	392,000	354,016
Canada	270,296	289,825
Belgian Congo	220,257	231,394
Japan	65,228	71,845
Mexico	53,940	53,812
Australia	40,857	45,496
Union of South Africa	41,641	43,963
Peru	37,818	41,309
<i>Estimated World Total</i>	<i>2,810,000</i>	<i>3,050,000</i>

(a) Estimated.

5. **Prices.**—From the outbreak of war in 1939 to August, 1953 in the United Kingdom and October, 1954 in Australia, the price of copper was fixed by regulation. Private trading has now been resumed in both countries. Details of the average price for the years shown are given in terms of Australian currency and sterling in the following table:—

**AVERAGE PRICE PER TON OF ELECTROLYTIC COPPER IN AUSTRALIA AND
THE UNITED KINGDOM.
(£.)**

Country.	December, 1939.	1951.	1952.	1953.	1954.	1955.
Australia—in Australian currency(a)	64	254	309	330	(b) 310	437
United Kingdom—in sterling ..	62	220	259	(c) 253	249	352

(a) Ex works Port Kembla. (b) Average market prices from 26th October, 1954. (c) Average market prices from 5th August, 1953.

6. **Employment in Copper Mining.**—Particulars of the numbers of persons engaged in the mining of copper and copper-gold ores are shown in § 13, p. 1007.

§ 5. Tin.

1. **Production.**—The following table shows the tin content of concentrates produced in each State and the Northern Territory for the year 1939 as published by the Australian Mines and Metals Association, and the years 1951 to 1955 as recorded by this Bureau.

**TIN: CONTENT OF TIN CONCENTRATES PRODUCED: STATES.
(Tons.)**

State.	1939.	1951.	1952.	1953.	1954.	1955.
New South Wales ..	775	413	396	342	272	270
Victoria	148	36	39	31	26	2
Queensland	867	340	330	292	730	770
Western Australia ..	7	41	65	76	80	119
Tasmania	1,250	706	772	788	947	853
Northern Territory ..	20	23	9	24	20	3
Australia	3,067	1,559	1,611	1,553	2,075	2,017

2. Sources of Production.—(i) *New South Wales.* Production of tin concentrates in 1955 was 378 tons, with a tin content of 270 tons, compared with 377 tons (tin content 272 tons) in 1954. A large proportion of the output in this State is obtained by dredging and sluicing, principally in the New England district.

(ii) *Victoria.* With the closing down of the Eldorado gold dredge in July, 1954, the production of tin in Victoria virtually ceased. Production in the State during 1955 amounted to 3 tons of concentrates, with a tin content of 2 tons, compared with 36 tons (tin content, 26 tons) in 1954.

(iii) *Queensland.* The chief districts in Queensland producing tin concentrates during 1955 were Herberton, 941 tons; Cooktown, 47 tons; Kangaroo Hills, 45 tons; Chillagoe, 19 tons; and Stanthorpe, 13 tons. The total production in 1955 amounted to 1,092 tons, compared with 1,034 tons in 1954. The tin content in 1955 and 1954 was 770 tons and 730 tons respectively. It is interesting to compare these production figures with those recorded in this State in the early years of this century when the output ranged between 2,000 and 5,000 tons per annum.

(iv) *Western Australia.* The quantity of tin concentrates reported in this State in 1955 amounted to 180 tons with a tin content of 119 tons, compared with 121 tons in 1954 (tin content, 80 tons). Production was mainly in the Pilbara and Greenbushes fields.

(v) *Tasmania.* For 1955, the output amounted to 1,232 tons of tin concentrates, a decrease of 142 tons on the output of the previous year. The tin content for 1955 was 853 tons and for 1954, 947 tons.

(vi) *Northern Territory.* The production for 1955 amounted to 5 tons of concentrates compared with 32 tons of concentrates produced during 1954. The tin content for 1955 and 1954 was 3 tons and 20 tons respectively.

3. Production of Refined Tin.—There are two firms engaged in the smelting of tin in Australia, both located in Sydney, New South Wales. The following table shows details of refined tin produced in Australia during the years 1939, and 1951 to 1955.

REFINED TIN PRODUCTION (a): AUSTRALIA.
(Tons.)

	1939.	1951.	1952.	1953.	1954.	1955.
Production of Refined Tin	3,294	1,459	1,700	1,443	2,063	2,004

(a) Source: Bureau of Mineral Resources.

4. Production in Principal Countries and World Total.—The production of tin reached its maximum in 1941 when 241,400 tons were recorded. The chief producing countries of the world are—Federation of Malaya, Bolivia, Indonesia, Belgian Congo, Thailand and Nigeria and in recent years these countries have produced approximately 90 per cent. of the total production. Australia's share of the world's tin production is about 1 per cent.

The production of tin ore, *in terms of metal*, as published by the International Tin Study Group and other authorities, for the principal producing countries in 1954 and 1955, was as follows.

TIN : PRODUCTION IN PRINCIPAL COUNTRIES.
(Long Tons.)

Country.	Production.		Country.	Production.	
	1954.	1955.		1954.	1955.
Malaya	60,690	61,244	Australia	2,075	2,017
Indonesia	35,861	33,368	Portugal	1,283	1,390
Bolivia	28,849	27,921	Union of South Africa	1,315	1,284
Belgian Congo	15,084	15,028	United Kingdom ..	920	1,034
Thailand	9,776	11,023			
Nigeria	7,926	8,158	<i>Estimated World</i>		
China	7,500	8,400	<i>Total(a)</i>	176,800	177,000

(a) Excludes U.S.S.R.

5. Prices.—At the outbreak of war in September, 1939, the price of tin in Australia and in London was fixed by regulation. London control of tin prices ceased on 14th November, 1949, while the Australian price was decontrolled on the 21st April, 1953. Details of the movement in average prices for the years shown are given in terms of Australian currency and sterling in the following table:—

AVERAGE PRICE PER TON OF TIN IN AUSTRALIA AND THE UNITED KINGDOM.
(£.)

Country.	December, 1939.	1951.	1952.	1953.	1954.	1955.
Australia—in Australian currency (a)	299	1,222	1,151	919	911	947
United Kingdom—in sterling (b) ..	(c) 271	1,080	965	731	720	741

(a) Prices fixed by regulation ex smelters for sales of 10 cwt. or more or in ingots of 70 lb. or more to 21st April, 1953; average market prices thereafter. (b) Average spot market prices for standard tin. (c) Price fixed by regulation for standard tin.

6. Employment in Tin Mining.—The number of persons employed in tin mining is shown in § 13 (p. 1007).

§ 6. Iron.

1. General.—Although iron ore is widely distributed throughout Australia, the only known ore bodies of large extent and high grade which are easily accessible are those situated at Iron Knob, South Australia and at Yampi Sound, Western Australia. Estimates of the high grade reserves at these centres place the quantities available at approximately 200 million tons and 100 million tons respectively. Bearing in mind the expansion of the iron industry in Australia, and the limitations of these reserves the Commonwealth Government prohibited the export of iron ore from 1st July, 1938.

2. Production.—(i) *Australia.* Production of iron ore for smelting purposes and estimated iron ore content are shown below for the years 1939 and 1951 to 1955:—

IRON ORE : PRODUCTION, AUSTRALIA.
(Tons.)

Particulars.	1939.	1951.	1952.	1953.	1954.	1955.
Production of Iron Ore ..	2,575,758	2,436,229	2,907,754	3,298,718	3,518,804	3,572,609
Estimated Iron Content ..	1,548,031	1,605,400	1,883,087	2,131,865	2,274,330	2,304,165

(ii) *New South Wales.* Since 1945, no iron ore has been mined in this State for conversion into pig-iron. For many years the chief source of supply for New South Wales blast furnaces has been South Australia.

Small quantities of iron oxide produced in New South Wales are used by the various gas-works for purifying gas, and also in the manufacture of paper, and for pigments. These supplies are drawn chiefly from the deposits in the Port Macquarie Division. During 1955, 3,405 tons of oxide were won. Of this total, 3,222 tons were used for gas purification and the remaining 183 tons were used for coal washing.

(iii) *Victoria.* Deposits of iron ore exist in the Nowa Nowa area of East Gippsland, but much larger quantities of ore than are at present known will have to be proved if the area is to become an economic source of iron ore. In 1955, approximately 2,000 tons of limonite (iron oxide) were produced at Buchan for gas purification purposes.

(iv) *Queensland.* Extensive deposits of iron ore are known to exist in Queensland. Their location and size, however, in comparison with the more favourable deposits of South Australia and Western Australia, preclude their exploitation. The output of 924 tons of iron oxide for 1955 came from the Townsville district.

(v) *South Australia.* The main production of iron ore in Australia is from the deposits worked by The Broken Hill Proprietary Co. Ltd. at Iron Knob in the Middleback Ranges near Whyalla. Production in 1955 reached a record level of 3,043,979 tons (estimated iron content, 1,978,586 tons).

(vi) *Western Australia.* Plans drawn up in 1927 to develop the rich iron ore deposits on Koolon and Cockatoo Islands in Yampi Sound were realized on 24th July, 1951, when regular shipments of ore for smelting at the steelworks at Newcastle and Port Kembla commenced from Yampi Sound. Iron ore is also obtained from deposits at Wundowie and Koolyanobbing. Production of iron ore during 1955 amounted to 496,882 tons at Yampi Sound and 31,748 tons at Koolyanobbing giving a total production of 528,630 tons with an estimated iron content of 325,579 tons. There was no production of iron ore at Wundowie during the year.

The whole iron pyrite production of Western Australia is won at the Iron King and Norseman mines and is railed, in the form of ores and concentrates, to superphosphate manufacturers in Perth.

(vii) *Tasmania.* There has been no production of ironstone in Tasmania since 1943 when 7 tons were produced. The iron pyrite concentrate produced, which in 1955 amounted to 45,010 tons (sulphur content, 22,023 tons), is a by-product from the flotation of copper ores at Mount Lyell. This product is exported to the mainland, where it is used in the manufacture of chemical fertilizers.

In 1955, 106 tons of iron oxide were produced for gas purification and 6,476 tons for fluxing and other purposes.

3. **Production of Iron and Steel.**—(i) *Australia.* The production of pig-iron and steel in Australia, of which New South Wales is the main producing State, is shown in the following table for each of the years ended 31st May, 1947 to 1956.

PIG-IRON AND STEEL : PRODUCTION, AUSTRALIA.
(Tons.)

Year Ended 31st May.	Pig-iron. (a)	Steel Ingots.	Year Ended 31st May.	Pig-iron. (a)	Steel Ingots.
1947	1,143,132	1,312,439	1952	1,430,027	1,521,386
1948	1,235,574	1,344,692	1953	1,691,693	1,801,028
1949	1,044,957	1,178,010	1954	1,826,711	2,116,813
1950	1,097,635	1,217,971	1955	1,868,841	2,208,708
1951	1,313,332	1,443,831	1956	1,909,839	2,338,621

(a) Includes pig-iron for castings; excludes ferro-alloys.

The principal producers in Australia, both in New South Wales, are the Broken Hill Proprietary Co. Ltd. at Newcastle and Port Kembla and Australian Iron and Steel Ltd. at Port Kembla. The expansion of the steelworks at Port Kembla was carried a step further in October, 1956 when two new open hearth steel furnaces, each of 275 tons capacity, were brought into operation. In January, 1957, the iron ore sintering plant was completed at a cost of nearly £5,000,000. This ore beneficiation plant has been installed to handle the fine friable iron ore from Yampi Sound in Western Australia and it has been erected in a position where it will be able to receive iron ore directly from ships berthed in the inner harbour now under construction at Port Kembla. Work on the new tin-plate mill is expected to be completed in mid-1957; initially it will produce 70,000 tons of tin-plate annually by the hot dip method, but the electrolytic method will be used later and its capacity increased to 150,000 tons a year. At Newcastle, construction of the new skelp mill is proceeding, and it is scheduled for completion by the end of 1957. This mill will produce high quality steel strip for processing into tubes and it will have a capacity of 400,000 tons annually. During 1956, plans were announced for the construction of an additional blast furnace at Port Kembla. When completed in 1959, its productive capacity of 600,000 tons of pig iron annually will at least equal the world's largest blast furnace. At the end of 1956, eight blast furnaces were operating in Australia; three at Newcastle and three at Port Kembla, in New South Wales, one at Whyalla, South Australia, and one at Wundowie, Western Australia. In 1956, the B.H.P. Central Research Organization commenced activities at Newcastle. It has been specially designed to investigate problems in coal and ore beneficiation, fuel technology, iron and steel making, fabrication and heat treatment of steel, and the chemistry and physics of materials used in modern industry.

At Whyalla in South Australia, in addition to the blast furnace production, The Broken Hill Proprietary Co. Ltd. produces a small quantity of steel ingots from an electric furnace.

In Western Australia, the State-owned Wundowie Wood Distillation, Charcoal Iron and Steel Industry produces pig iron using charcoal for smelting instead of the non-coking

local coal. This high grade iron is used for the manufacture of spheroidal graphite cast iron. The output of pig iron during the year 1954-55 amounted to 11,243 tons, and during 1955-56 to 12,028 tons. At Kwinana in Western Australia, the recently built merchant steel rolling mill commenced operations in July, 1956. Previously, production, mainly of steel fencing posts, had been on a limited scale. The annual output of this mill is to be 50,000 tons of steel sections.

(ii) *Principal Countries.* Particulars of the production in the principal countries and the estimated world total production during the years 1954 and 1955 according to figures published by the Mineral Resources Division of the Colonial Geological Surveys, are shown in the next table.

IRON AND STEEL: PRODUCTION IN PRINCIPAL COUNTRIES.
(^{'000} Tons.) (a)

Country.	Pig-iron and Ferro-alloys.		Steel Ingots and Castings.	
	1954.	1955.	1954.	1955.
U.S. of America	53,398	70,771	78,850	104,497
U.S.S.R.	29,500	32,800	40,700	44,600
Germany—				
Federal Republic	12,314	16,222	17,159	20,999
Eastern	1,282	1,492	2,307	2,460
United Kingdom	11,883	12,470	18,520	19,791
France	8,701	10,787	10,459	12,393
Japan	4,679	5,345	7,628	9,259
Belgium	4,552	5,302	4,894	5,807
Italy	1,324	1,706	4,140	5,304
Czechoslovakia	2,760	2,950	4,360	4,430
Poland	2,621	3,063	3,887	4,357
Canada	2,078	3,018	2,853	4,044
Luxemburg	2,756	3,036	2,783	3,174
Saar	2,458	2,833	2,760	3,115
China	3,100	3,700	2,190	2,740
Australia	1,849	1,889	2,144	2,240
Sweden	985	1,226	1,811	2,092
India	1,962	1,895	1,685	1,704
<i>Estimated World Total</i> ..	156,100	189,400	219,800	264,800

(a) Long tons.

§ 7. Other Metallic Minerals.

1. *Tungsten.*—Tungsten ores occur in all States. Particulars of scheelite concentrates from King Island, in Bass Strait, the major producer, are included in Tasmanian production. Other important deposits of tungsten ores occur in Queensland, New South Wales, the Tasmanian mainland and the Northern Territory, but production from Victoria, South Australia and Western Australia has been comparatively unimportant. In recent years the largest producer has been Tasmania. Production of tungsten concentrates and contents during 1955 in each State and Territory is shown below:—

TUNGSTEN CONCENTRATES : PRODUCTION, 1955.
(Tons.)

Particulars.	N.S.W.	Q'land.	W. Aust.	Tas.	N. Terr.	Australia.
Scheelite Concentrate	9	(a)	8	1,432	..	1,449
WO ₃ Content	7	(a)	5	948	..	960
Wolfram Concentrate	2	79	..	578	129	788
WO ₃ Content	1	51	..	389	81	522

(a) Less than half a ton.

The following table shows production for Australia for the years 1939 and 1951 to 1955:—

TUNGSTEN CONCENTRATES : PRODUCTION, AUSTRALIA.
(Tons.)

Particulars.	1939.	1951.	1952.	1953.	1954.	1955.
Scheelite Concentrate.	191	1,031	989	1,185	1,331	1,449
WO ₃ Content	124	632	602	729	861	960
Wolfram Concentrate.	726	697	1,035	1,008	722	788
WO ₃ Content	482	467	672	672	511	522

2. **Mineral Sands.**—The recovery of mineral sands from beaches in northern New South Wales and Queensland commenced in 1934. The industry was expanded considerably following the 1939–45 War and Australia is now one of the world's largest producers of the two principal minerals obtained from treatment of the sands, namely, rutile and zircon. Small quantities of ilmenite and monazite are also produced, but most producers either prepare a low-grade concentrate which is stockpiled or make no attempt to recover the ilmenite and monazite from the beach sands, the tailings being dumped after extraction of rutile and zircon. Late in 1956, operations commenced near Bunbury in Western Australia on beach dune deposits, and chromium-free ilmenite suitable for pigment manufacture is being produced. It is hoped later to recover the rutile, zircon and monazite content of the beach sands being treated. Particulars of the quantity of rutile and zircon concentrates produced are shown in the following table for the years 1951 to 1955.

RUTILE AND ZIRCON PRODUCTION, AUSTRALIA.
(Tons.)

Year.	Rutile Concentrates.		Zircon Concentrates.	
	Quantity.	TiO ₂ Content.	Quantity.	Zircon Content.
1951	35,189	33,432	42,410	41,420
1952	38,014	36,861	27,696	27,371
1953	38,039	37,067	27,207	26,858
1954	44,659	43,011	41,453	40,920
1955	59,613	57,232	48,673	48,209

3. **Cadmium and Cobalt.**—The sources of cadmium in Australia are lead and zinc concentrates. The cadmium content of these concentrates produced during 1954 was 903 tons and in 1955, 844 tons. Most of the concentrates are treated at Risdon, Tasmania, and at Port Pirie, South Australia, for the extraction of cadmium. The remainder are exported.

Cobalt is present in zinc concentrate produced at Broken Hill, New South Wales, and at Rosebery, Tasmania. The cobalt is recovered in the form of cobalt oxide at the zinc refining plant at Risdon, Tasmania, and is sold as such to industry. The cobalt metal content of zinc concentrate produced in 1954 was estimated at 69 tons and in 1955 at 61 tons.

Production of refined cadmium and cobalt oxide for the years 1939 and 1951 to 1955 is shown in the following table:—

CADMIUM (REFINED) AND COBALT OXIDE : PRODUCTION.(a)
(Tons.)

Year.	Cadmium (Refined).			Cobalt Oxide. Extracted from Ores Mined in New South Wales.(b)
	Extracted from Ores Mined in—			
	New South Wales.	Tasmania.	Total.	
1939	124	48	172	20
1951	195	36	231	13
1952	245	41	286	16
1953	257	40	297	17
1954	239	49	288	18
1955	261	40	301	18

(a) Source: Bureau of Mineral Resources.

(b) Excludes less than a ton of cobalt oxide produced from Tasmanian ores in each of the years shown.

The figures shown in the table above refer to production in Australia only and do not include the metallic contents of cadmium and cobalt oxide contained in the ores and concentrates exported overseas.

4. **Manganese.**—There has been considerable expansion of manganese ore production in recent years, due mainly to increased output in Western Australia at Ragged Hills, 250 miles south-east of Port Hedland, and at Horseshoe, north of Meekatharra. In 1955, the mining of manganese commenced near Muchetty in the Northern Territory and 1,462 tons of ore with a manganese dioxide content of 975 tons were produced during the year.

The following table shows the production of metallurgical grade and battery and other grades of manganese ore for the years 1939 and 1951 to 1955.

MANGANESE ORE PRODUCTION: AUSTRALIA.
(Tons.)

Year.	Metallurgical Grade.					Battery and Other Grades.
	New South Wales.	Queensland.	South Australia.	Western Australia.	Australia.	
1939	146	..	7	..	153	(a)
1951	1,054	..	..	5,257	6,311	(b) 1,658
1952	981	..	..	5,045	6,026	(c) 1,043
1953	1,015	43	..	30,457	31,515	(c) 1,428
1954	749	138	..	26,448	27,335	(c) 867
1955	1,071	78	..	44,194	45,343	(d) 2,013

(a) Included with "Metallurgical Grade" 27 tons. (b) New South Wales, 1,631 tons; South Australia, 1,462 tons. (c) New South Wales only. (d) New South Wales, 551 tons; Northern Territory,

5. **Other.**—The production, in 1955 (1954 shown in parentheses) of other metallic minerals worthy of note, is as follows:—

Antimony. The antimony content of antimony-bearing minerals produced was 922 tons (731 tons). Of this amount, 615 tons (614 tons) were in lead concentrate and 307 tons (117 tons) in 650 tons (222 tons) of antimony ore and concentrate.

Bauxite. 7,563 tons (5,487 tons) of bauxite ore were produced mainly in New South Wales and Victoria. During 1956, the existence of extensive deposits of bauxite on the west coast of Cape York Peninsula, Queensland was announced. Bauxite has been found in an area about 150 miles north and south around Albatross Bay. In December, 1956, the Commonwealth Aluminium Corporation Pty. Ltd. was registered, and its authority to prospect embraces an area of about 2,500 square miles. Two separate areas, at Weipa and Pera Head, each containing 200,000,000 tons of commercial grade bauxite have already been proved. It is at present planned to produce annually 1,500,000 tons of bauxite yielding 500,000 tons of alumina which will be exported.

Beryllium. Production of beryl ore was 206 tons (149 tons) which came mainly from Western Australia where the Pilbara gold field was the main producing area. The beryllium oxide content of the beryl ore was 2,428 units (1,723 units).

Tantalite-Columbite. The production of tantalite-columbite concentrate was 27,139 lb. (117,767 lb.) and the whole of this output, excepting 1,048 lb. produced in the Northern Territory in 1954, came from Western Australia. The tantalum pentoxide and columbium pentoxide content of the concentrates was 15,454 lb. (60,348 lb.).

Other. Other metallic minerals produced in Australia in small quantities during 1955, were molybdenite concentrate, native osmiridium, and platinum concentrate.

§ 8. Coal.

1. **Total Production of Coal.**—An account of the discovery of coal in each State appears in earlier issues of the Official Year Book (see No. 3, pp. 515–16). The quantity and value of the production in each State in Australia for 1939, and for each of the years 1951 to 1955 are shown in the following table. Of the total production of black coal in 1955, 83,864 tons were classified as semi-anthracite, 17,608,498 tons as bituminous and 1,582,389 tons as sub-bituminous.

COAL PRODUCTION.

Year.	Black Coal.							Brown Coal.
	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	Australia.	Victoria.
QUANTITY ('000 tons).								
1939	11,196	365	1,317	..	558	99	13,535	3,651
1951	13,513	148	2,474	388	848	237	17,608	7,836
1952	15,022	144	2,742	418	830	248	19,404	8,104
1953	14,174	152	2,517	448	886	234	18,411	8,257
1954	15,083	141	2,761	495	1,019	264	19,763	9,331
1955	14,737	133	2,747	455	904	299	19,275	10,112
VALUE(a) (£'000).								
1939	7,027	260	1,168	..	363	74	8,892	386
1951	29,326	601	4,490	400	1,717	305	36,839	2,755
1952	43,283	728	5,956	430	2,457	475	53,329	3,255
1953	41,630	946	5,861	461	3,073	453	52,424	3,628
1954	42,762	886	6,474	650	3,589	523	54,884	3,945
1955	41,715	826	6,858	778	3,132	605	53,914	4,394

(a) At the mine.

The mining of black coal on a large scale by open-cut methods first began in Australia at Blair Athol in Queensland, where in 1937, the first year of production, 18,494 tons were produced. Open-cut mining of black coal was introduced in New South Wales in 1940, in Western Australia in 1943, in South Australia in 1944, and in Tasmania in 1950. The output from open-cuts rose slowly up to 1943 when 119,406 tons were produced, increasing rapidly from 1944 and reaching an output of over four million tons in 1952. Since then however, the output from open-cut mining has declined and in 1955 it was 2,315,568 tons only. This decline has been mainly due to the closing down of large open-cuts in New South Wales, as overproduction of coal began to occur late in 1952 and it is the policy of the Joint Coal Board that open-cut mining should provide the quantity of coal by which underground mine production fails to meet total requirements.

The production of black coal from underground and open-cut mines in each State for the years 1939 and 1951 to 1955 is shown in the following table.

BLACK COAL PRODUCTION : UNDERGROUND AND OPEN-CUT.
(*000 Tons.)

Year.	Method of Mining.	N.S.W.	Vic.	Qld.	S.A.	W.A.	Tas.	Aust.
1939	Underground	11,196	365	1,274	..	558	99	13,492
	Open-cut	..	..	43	..	..	..	43
	Total	11,196	365	1,317	..	558	99	13,535
1951	Underground	11,224	148	1,857	..	480	231	13,940
	Open-cut	2,289	..	617	388	368	6	3,668
	Total	13,513	148	2,474	388	848	237	17,608
1952	Underground	12,492	144	2,006	..	419	240	15,301
	Open-cut	2,530	..	736	418	411	8	4,103
	Total	15,022	144	2,742	418	830	248	19,404
1953	Underground	12,452	152	1,941	..	493	234	15,272
	Open-cut	1,722	..	576	448	393	(a)	3,139
	Total	14,174	152	2,517	448	886	234	18,411
1954	Underground	13,703	141	2,067	..	608	254	16,773
	Open-cut	1,380	..	694	495	411	10	2,990
	Total	15,083	141	2,761	495	1,019	264	19,763
1955	Underground	13,835	133	2,108	..	600	284	16,960
	Open-cut	902	..	639	455	304	15	2,315
	Total	14,737	133	2,747	455	904	299	19,275

(a) Less than 500 tons.

2. **Production of Coal in Each State.**—(i) *New South Wales.* The coal deposits of New South Wales are the most important and extensively worked in Australia. The principal fields are known as the Northern, Southern and Western, and are situated in the vicinity of Newcastle, Bulli and Lithgow respectively.

The coal from the various districts differs in quality or, geologically speaking, rank—that from the Northern district being especially suitable for gas-making, household purposes and steam, while the product of the Southern and Western districts is essentially a steaming coal. The Permian Coal Measures in the Northern division are being worked extensively in the Hunter River Valley area, particularly in the vicinity of Maitland, Cessnock and, more recently, Muswellbrook. This district is the most important, from the aspect of coal mining, in Australia.

The following table shows particulars of New South Wales coal production classified according to rank and type of mining during the five years 1951 to 1955:—

COAL : PRODUCTION, NEW SOUTH WALES.
(Tons.)

Particulars.	1951.	1952.	1953.	1954.	1955.
Semi-anthracite ..	234	420	..	..	1,658
Bituminous ..	13,508,460	15,008,489	14,164,603	15,065,979	14,718,426
Sub-bituminous ..	4,550	13,191	9,228	17,281	16,313
<i>Total</i> ..	<i>13,513,244</i>	<i>15,022,100</i>	<i>14,173,831</i>	<i>15,083,260</i>	<i>14,736,397</i>
Underground mines ..	11,224,212	12,491,904	12,451,741	13,703,289	13,834,824
Open-cut mines ..	2,289,032	2,530,196	1,722,090	1,379,971	901,573

(ii) *Victoria.* (a) *Black Coal.* Production of black coal in Victoria is restricted to the Gippsland district. The State Coal Mine at Wonthaggi is the main producer, the remaining production coming from small privately-owned mines. In 1955, production of bituminous coal was 132,888 tons compared with 141,318 tons in 1954.

(b) *Brown Coal.* The mining of brown coal in Australia is carried on only in Victoria, where extensive deposits exist; estimates place the available reserves at 40,000 million tons. Large-scale developmental projects are in progress and these, when completed, will greatly reduce the dependence on fuel from other States. In the past ten years, the output of brown coal in Victoria has doubled, and in 1955 it exceeded ten million tons for the first time. Of the 10,112,206 tons of brown coal produced in 1955, 9,236,978 tons, or 93 per cent., were won at the State open-cuts at Yallourn.

The briquetting plant of the State Electricity Commission at Yallourn started operations in November, 1924, and the output, which in 1926 was 95,477 tons, had increased to 180,905 tons in 1930 and to 635,716 tons in 1955. Approximately two and a half tons of brown coal are required to make one ton of briquettes. In December, 1956, the Lurgi high pressure brown coal gasification plant at Morwell was opened. This plant is operated by the Gas and Fuel Corporation of Victoria and produces town gas which is sent to Melbourne through 103 miles of pipeline.

The table following shows the production and distribution of brown coal and the production of briquettes in Victoria for the years 1950-51 to 1954-55.

BROWN COAL : PRODUCTION AND UTILIZATION, VICTORIA.
(’000 Tons.)

Year.	Production.	Consumption as Fuel.			Consumption as Raw Material in Briquette Manufacture.	Balance (available for consumption and accumulation of stocks).	Briquettes Manufactured.
		Electricity Generation.	Briquette Factory.	Other Factories. (a)			
1950-51 ..	7,300	4,338	696	746	1,391	129	511
1951-52 ..	8,096	4,784	776	876	1,553	107	568
1952-53 ..	8,075	4,933	729	837	1,457	119	545
1953-54 ..	8,731	5,307	780	920	1,560	164	587
1954-55 ..	9,668	5,899	842	1,088	1,684	155	631

(a) Recorded consumption.

(iii) *Queensland.* The production of coal classified according to rank and type of mining during the years 1951 to 1955 was as follows:—

COAL : PRODUCTION IN QUEENSLAND.
(Tons.)

Particulars.	1951.	1952.	1953.	1954.	1955.
Semi-anthracite ..	80,722	83,373	80,979	72,459	80,442
Bituminous ..	2,137,994	2,312,167	2,215,078	2,377,883	2,459,727
Sub-bituminous ..	255,059	346,696	220,755	310,468	206,996
<i>Total</i> ..	<i>2,473,775</i>	<i>2,742,236</i>	<i>2,516,812</i>	<i>2,760,810</i>	<i>2,747,165</i>
Underground mines ..	1,856,842	2,006,321	1,941,631	2,066,788	2,108,065
Open-cut mines ..	616,933	735,915	575,181	694,022	639,100

The principal coal-producing districts in Queensland are Ipswich, Clermont, Mount Morgan and Bowen; output from these areas in 1955 amounted to 2,296,110 tons or 84 per cent. of the total.

The open-cut method of mining for black coal has advanced considerably in Queensland in recent years. In 1946, 106,444 tons (or 7 per cent. of total production) were won from open-cuts while in 1954, 694,022 tons (25 per cent.) were mined in this manner. In 1955, the output from open-cuts declined to 639,100 tons, or 23 per cent. of the total.

(iv) *South Australia.* Coal mined in South Australia is won by open-cut methods at Leigh Creek, some 380 miles by rail north of Adelaide. This important deposit yields a low grade sub-bituminous coal of Triassic age, and has known reserves of about 380 million tons. However, this State relies to a great degree on bituminous coal from New South Wales to supplement the demand created by industrial expansion. In the first year of major production of the Leigh Creek mine in 1944, 34,620 tons were won. Production has risen considerably in more recent years, and amounted to 455,287 tons in 1955.

(v) *Western Australia.* The only coal deposits which have been developed on a commercial scale are at Collie in the south-west of the State. Collie coal is sub-bituminous in rank. Production in 1955 was 903,793 tons, compared with 1,018,343 tons in 1954. Although a large proportion of the coal produced in Western Australia comes from open-cut mines, the amount available from these mines is limited, as present surveys estimate that only 8,000,000 tons can be extracted by open-cut methods. In 1955, 304,130 tons, or about one-third of the total production, were won by open-cut mining.

(vi) *Tasmania.* Two periods of coal formation are represented in Tasmania. The older (Permo-Carboniferous) seams contain fairly high ranking semi-anthracitic coal, with a high sulphur content, but production from these mines, 1,764 tons in 1955, represents less than one per cent. of Tasmanian black coal output. The more recent Mesozoic coal of bituminous rank is mined in the north-east of the island, the Cornwall and Mt. Nicholas mines being the most prolific producers. In 1955, output amounted to 299,221 tons of which 15,478 tons came from open-cut mining.

(vii) *Australia's Coal Reserves.* The latest available estimate of the actual and probable coal reserves of Australia is that prepared by the Coal and Lignites Panel of the Power Survey Sectional Committee of the Standards Association of Australia, and is shown in the following table.

COAL RESERVES OF AUSTRALIA.
(Million Tons.)

State.	Anthracitic and Bituminous Coal.	Sub-bituminous Coal.	Lignites and Brown Coal.
New South Wales	11,000	500	..
Victoria	12	..	40,000
Queensland	4,000	3	50
South Australia .. ..	..	380	225
Western Australia .. ..	..	1,000	2
Tasmania	240	..	2

3. **Production in Principal Countries.**—The following table shows the production of the principal countries in 1955 as published by the Mineral Resources Division of the Colonial Geological Surveys.

COAL : PRODUCTION IN PRINCIPAL COUNTRIES, 1955.
(⁰⁰⁰ Tons.)(a).

Country.	Black Coal.		Brown Coal and Lignite.	
	1954.	1955.	1954.	1955.
United States of America ..	371,917	449,342	3,788	4,200
U.S.S.R.	239,900	271,700	101,800	113,100
United Kingdom	224,090	221,601	..	..
Germany—				
Federal Republic	127,713	130,452	86,426	88,930
Eastern	3,000	3,000	179,100	198,200
Poland	90,200	93,000	5,800	5,900
China	82,000	91,000	..	..
France	53,546	54,461	1,880	2,021
Japan	42,045	41,750	1,422	1,346
India	36,881	38,213	..	..
Union of South Africa ..	28,852	31,639	..	..
Belgium	28,787	29,503	..	..
Czechoslovakia	21,200	21,800	38,100	40,100
Australia	19,763	19,275	9,331	10,112
Saar	16,552	17,056	..	..
Spain	12,403	12,188	1,727	1,795
Netherlands	11,881	11,707	248	251
Canada	11,426	11,175	1,890	2,048
Hungary	2,397	2,649	18,799	19,314
Yugoslavia	972	1,119	12,475	13,848
<i>Estimated World Total</i> ..	<i>1,462,600</i>	<i>1,584,000</i>	<i>478,400</i>	<i>518,000</i>

(a) Long tons.

4. **Exports.**—(i) *General.* The quantities and values of the oversea exports of Australian coal and of bunker coal for oversea vessels for the five years 1951–52 to 1955–56 are shown in the following table. These shipments were made mainly from New South Wales.

COAL : OVERSEA EXPORTS AND BUNKER, AUSTRALIA.

Year.	Oversea Exports (a)		Bunker-Coal for Oversea Vessels.	
	Quantity.	Value.	Quantity.	Value.
	Tons.	£	Tons.	£
1951–52	139,140	608,045	54,207	246,258
1952–53	255,832	1,178,466	42,623	215,776
1953–54	385,812	1,528,788	31,718	129,977
1954–55	291,226	1,147,441	25,363	111,625
1955–56	193,813	780,284	38,749	165,224

(a) Excludes bunker coal.

(ii) *New South Wales.* New South Wales is the principal Australian coal-producing State and in addition to meeting requirements within the State, supplies considerable quantities of coal to other States and for export overseas as well as bunker coal for vessels calling at New South Wales ports. Of the total New South Wales coal production in 1955–56 (14,630,702 tons), 12,048,715 tons (82 per cent.) were available for consumption in the State, 2,148,044 tons (15 per cent.) were exported interstate and 433,943 tons (3 per cent.) were exported overseas or supplied as bunker coal for interstate and oversea vessels.

5. **Consumption in Australia.**—Details of the production of black coal and its disposal in Australia are given in the following table for the years 1950–51 to 1954–55.

BLACK COAL : PRODUCTION AND DISPOSAL.
(^{'000} Tons.)

Particulars.	1950-51.	1951-52.	1952-53.	1953-54.	1954-55.
Production(a)	16,418	19,170	18,545	19,424	19,352
Imports	598	285	146	2	5
Total	17,016	19,455	18,691	19,426	19,357
Disposals—					
<i>Consumption as Fuel—</i>					
Electricity Generation ..	4,672	5,042	5,071	5,590	5,916
Factories	2,967	3,090	3,097	3,367	3,329
Railway Locomotives(b)..	3,183	3,291	3,110	3,208	3,112
Bunker Coal—					
Oversea Vessels ..	69	54	43	32	25
Interstate Vessels ..	225	227	229	228	218
Total	11,116	11,704	11,550	12,425	12,600
<i>Consumption as raw material—</i>					
Gas works	1,964	2,097	2,081	2,047	2,063
Coke works	2,618	2,835	3,071	3,252	3,314
Total	4,582	4,932	5,152	5,299	5,377
Exports (Oversea) ..	72	139	256	386	291
Balance—Unrecorded consumption, other purposes(c)	1,246	2,680	1,733	1,316	1,089
Grand Total ..	17,016	19,455	18,691	19,426	19,357

(a) Includes miners' and colliery coal. (b) Government railways only. (c) Includes net change in stocks.

After the 1939-45 War, it was found necessary to augment local supplies of black coal in Australia by increasing imports. The quantity imported reached a post-war peak of 597,866 tons in 1950-51, but since then has declined, as in recent years production has expanded considerably. Since 1952-53, exports have exceeded imports by a wide margin; in 1955-56, exports of black coal were 193,813 tons and imports were 4,117 tons.

6. **Coal Value at the Mine in New South Wales.**—Particulars of the average values at the mine (or at screens where these are at a distance from the mine) of saleable coal for each district and for New South Wales as a whole are shown in the following table for the years 1951 to 1955. Saleable coal is taken to exclude miners' coal, coal consumed at the mines and other producer-consumed coal. Stocks of coal held at grass by the Commonwealth Government are also excluded. No deduction has been made in respect of excise duty operative from 1st November, 1949.

**AVERAGE SELLING VALUE AT THE MINE PER TON OF SALEABLE COAL :
NEW SOUTH WALES.**

(s. d.)

Year.	Northern District.	Southern District.	Western District.	Average for State.
1951.. .. .	51 5	50 8	42 10	49 8
1952.. .. .	62 3	60 3	56 7	61 2
1953.. .. .	62 1	61 0	56 9	61 1
1954.. .. .	59 11	59 0	57 1	59 3
1955.. .. .	59 3	58 10	55 3	58 7

7. **Values in New South Wales, Great Britain and the United States of America.**—The following table shows, for the years 1951 to 1955, average values of coal produced in New South Wales, Great Britain and the United States of America. The figures give an indication of changes in average value or price within each country but they do not necessarily show the relative levels as between the countries concerned.

PRODUCTION VALUES OF COAL PER TON : NEW SOUTH WALES, GREAT BRITAIN AND UNITED STATES OF AMERICA.

Country.	1951.	1952.	1953.	1954.	1955.
	<i>s. d.</i>	s. d.	s. d.	s. d.	s. d.
New South Wales—Bituminous(a) ..	49 8	61 2	61 1	59 3	58 7
Great Britain—Deep mined(b)	51 2½	57 3	61 1½	63 6	68 0½
United States of America—Bituminous and lignite(c) ..	\$ 4.92	\$ 4.90	\$ 4.92	\$ 4.82	\$ (d)

(a) Average selling value at the mine per ton of 2,240 lb.; the figures relate to saleable coal and include excise duty from November, 1949. (b) Average value in sterling at the mine per ton of 2,240 lb. (c) Average value in United States currency at the mine per ton of 2,000 lb. (d) Not yet available.

8. **Employment in Coal-mines.**—The number of persons employed, both above and below ground, in coal-mines in each State for each of the years 1952 to 1955 is shown in the following table.

COAL-MINES : PERSONS EMPLOYED.

Year.	New South Wales.	Victoria.		Queensland.	South Australia.	Western Australia.	Tasmania.	Australia.
		Black.	Brown.					
1952	20,151	848	1,694	3,715	220	1,326	349	28,303
1953	19,961	900	1,598	3,673	250	1,478	344	28,204
1954	19,979	786	1,598	3,638	270	1,583	358	28,212
1955	19,260	687	1,502	3,618	280	1,432	367	27,146

The year of maximum employment was 1926 when 31,774 persons were engaged in the coal-mines of Australia. Shortly after that year, the industrial depression and a prolonged stoppage of work on one of the principal fields of New South Wales during 1929 and 1930 seriously affected the figures of employment. Since 1933 there has been a gradual increase, but the numbers employed in 1953 were only 86 per cent. of the maximum figure already quoted. In New South Wales in 1955, 8,787,538 tons of coal, or 60 per cent. of the total output of underground coal, were cut by machinery, compared with 3,594,000 tons or 32 per cent. in 1939. Similar details for other States are not available.

9. **Production of Black Coal per Man-shift.**—(i) *Underground Mines.* The following table shows particulars of estimated black coal output per man-shift worked (a) at the coal face and (b) by all employees in respect of underground mines for each State concerned and for Australia for the years 1951 to 1955. These estimates have been calculated by the Joint Coal Board from data collected fortnightly in respect of coal production and the number of man-shifts actually worked. In South Australia, black coal is won only by open-cut mining.

PRODUCTION OF BLACK COAL PER MAN-SHIFT : UNDERGROUND MINES.
(Tons.)

Year.	N.S.W.	Vic.	Q'land.	W. Aust.	Tas.	Australia.
PRODUCTION PER MAN-SHIFT WORKED AT COAL FACE.						
1951	10.82	2.43	6.40	8.22	6.01	9.39
1952	10.06	2.24	6.36	6.82	6.03	8.88
1953	9.72	2.09	6.37	4.86	6.15	8.49
1954	10.16	2.03	6.54	4.82	5.95	8.81
1955	10.76	2.13	6.61	4.74	6.54	9.24
PRODUCTION PER MAN-SHIFT WORKED BY ALL EMPLOYEES.						
1951	2.96	0.93	2.55	1.85	3.03	2.78
1952	3.00	0.83	2.55	1.64	3.01	2.81
1953	3.08	0.81	2.53	1.67	3.00	2.84
1954	3.25	0.82	2.61	1.92	3.07	3.00
1955	3.39	0.86	2.66	2.06	3.08	3.14

(a) In April, 1952, the definition of persons working "at coal face" was clarified resulting in a considerable increase in the number of persons assigned to this category in New South Wales.

(ii) *Open-cut Mines.* In the next table, the Joint Coal Board's estimates of production of black coal per man-shift worked by all employees in open-cut mines are shown for the years 1951 to 1955. There are no open-cuts producing black coal in Victoria.

PRODUCTION OF BLACK COAL PER MAN-SHIFT : OPEN-CUT MINES.(a)
(Tons.)

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tas.	Australia.
1951	8.02	11.80	3.05	6.73	5.28	7.03
1952	7.92	11.78.	3.22.	6.13.	4.63	7.07
1953	8.51	10.97	3.57	5.37	..	6.92
1954	8.97	12.27	(a) 4.52	4.71	7.91	7.31
1955	9.18	11.42	6.02	5.77	7.78	8.11.

(a) Figures prior to July, 1954 include manshifts on other than mine work:

10. **Joint Coal Board.**—After the 1939–45 War, the Governments of the Commonwealth and New South Wales agreed to create jointly a coal authority with powers similar to and in some respects wider than those possessed under Commonwealth war-time legislation. Following this agreement, the Joint Coal Board was created and has functioned as from 1st March, 1947. Briefly, it is the responsibility of the Board to ensure that the coal of the State is conserved, developed, worked, distributed and used to the best advantage in the public interest, and to promote the welfare of the workers in the industry. Further details of the powers and functions of the Board are contained in earlier issues of the Official Year Book.

§ 9. Coke and Other By-products from Coal.

1. **Coke.**—The production of metallurgical coke in Australia was limited to about 250,000 tons per annum prior to the 1914–18 War. This was below local requirements and necessitated an annual import of about 27,000 tons. By 1920, production had risen to more than 500,000 tons, by 1938–39 to 1,164,873 tons, and in 1954–55 it reached the record level of 2,046,790 tons. Imports exceeded exports prior to 1952–53 but in 1952–53 and later years there has been a net export surplus. In 1954–55, exports amounted to 21,885 tons and 5,900 tons were imported, while in 1955–56 exports further increased to 66,590 tons (61,093 tons to New Caledonia) and imports amounted to 3,444 tons.

In addition to metallurgical coke referred to above (which is produced by specialized coke works), considerable quantities of coke are produced in gas works as a by-product of the manufacture of gas. Production in gas works in 1954–55 was 1,099,859 tons.

In order to avoid duplication with coal values, the figures for coke have not been included in the general tables of mineral production in the early part of this chapter.

In the following table, particulars of the production of coke in coke works and gas works in Australia are shown for the years 1950–51 to 1954–55. The figures exclude output of coke breeze, which in 1954–55 amounted to 331,602 tons.

COKE PRODUCTION : AUSTRALIA.

(Tons.)

Industry.	1950–51.	1951–52.	1952–53.	1953–54.	1954–55.
Coke Works	1,515,782	1,636,982	1,858,428	2,010,404	2,046,790
Gas Works	1,111,854	1,203,602	1,071,106	943,344	1,099,859
Total	2,627,636	2,840,584	2,929,534	2,953,748	3,146,649

2. **Other By-products from Coal.**—In addition to coke, other products are obtained from the treatment of coal by coke and gas works. Details of some of these are given in the following table for the years 1950–51 to 1954–55.

OTHER BY-PRODUCTS FROM COAL : AUSTRALIA.

Commodity.	1950–51.	1951–52.	1952–53.	1953–54.	1954–55:
Tar—Crude(a) '000 gals	41,239	42,886	44,408	46,517	46,609
Refined(a) "	12,449	12,514	15,699	17,725	17,120
Tar Oils (crude) "	3,960	4,101	3,674	3,799	4,631
Ammoniacal Liquor "	24,210	23,449	21,950	22,263	26,543
Ammonium Sulphate(a) tons	57,893	63,815	70,174	70,811	78,434

(a) Includes production in works other than coke and gas works.

§ 10 Mineral Oils.

1. **Australia.**—Natural oil has been proved to exist in Queensland and Victoria and also in Western Australia, where, in 1953, potential oil production was found at Rough Range. Many of the conditions favourable to the accumulation of oil in commercial quantities have been shown to be present in Queensland, Western Australia and New South Wales.

Reference is made in § 15 p. 1010, to the assistance afforded by the Commonwealth Government in the search for oil.

Structure control drilling has been carried out following the Rough Range discovery and field exploration increased enormously. The drilling of a number of wells has commenced at various places in all States of the Commonwealth except Tasmania and in the Northern Territory. Operations throughout the States and Territories of Australia during 1956 are briefly outlined below.

2. **New South Wales.**—Australian Oil & Gas Corporation Ltd. suspended the Kurralong well near Sydney and commenced drilling at Dural. Clarence River Basin Oil Exploration Co. N.L. completed operations on their Grafton well.

3. **Victoria.**—Woodside (Lakes Entrance) Oil Co. N.L. drilled 3 wells to 6,008 feet, 6,108 feet and 5,985 feet respectively. Evidence of oil was reported at several depths in these wells. A scout boring programme was initiated by Frome Lakes Pty. Ltd.

4. **Queensland.**—No drilling for oil was carried out in this State during the year.

5. **South Australia.**—Australian Oil & Gas Corporation Ltd. drilled near Loxton, South Australia and Murray Basin Oil Syndicate were drilling at Pinnaroo. Santos Ltd. have been engaged in an extensive shallow drilling campaign near Wilkatana, and have reported evidence of petroleum from a number of wells.

6. **Western Australia.**—West Australian Petroleum Pty. Ltd. drilled a number of structure holes in the Rough Range area in an attempt to solve the complicated geology of that area. Scout boring was also undertaken on the northerly plunge of the Rough Range structure and an extensive scout boring programme was carried out on Dirk Hartog Island. Cape Range 2 was completed as a dry hole at 15,170 feet and 2 further dry holes were drilled on this structure. Frazer River No. 1 was completed as a dry hole at 10,144 feet.

Associated Freney Oilfields N.L. abandoned their Myroodah No. 1 at 6,001 feet.

The Bureau of Mineral Resources, Geology and Geophysics undertook a scout boring programme in the Kimberley area of the Fitzroy Basin. Three bores were drilled for the purpose of obtaining geological information. West Australian Petroleum Pty. Ltd. also drilled one 4,000 foot bore for geological information at Roebuck Bay and a second was in progress at Dampier Downs at the end of the year.

7. **Northern Territory.**—A small flow of gas encountered at a shallow depth at Amaroo Station was found to contain hydrocarbons and geological surveys are now in progress.

8. **Papua.**—Australasian Petroleum Co. Pty. Ltd. and Island Exploration Co. Pty. Ltd. continued extensive geological and geophysical surveys over their permit areas in western Papua. Considerable trouble was experienced in Kuru No. 1 when high pressure gas was encountered at 998 feet, and a serious blow out occurred. A relief well had to be drilled before the blow-out was brought under control. Drilling was in progress at Kuru and Barikewa by Island Exploration Co. Pty. Ltd. and at Morehead by Australasian Petroleum Co. Pty. Ltd.

Papuan Apinaipi Petroleum Co. Ltd. and Enterprise of New Guinea Gold and Petroleum Development N.L. carried out geological surveys on their permits.

9. **General.**—During 1939, efforts were made to secure greater uniformity in State legislation governing the search for oil. A draft Bill based on modern legislation in other countries was prepared by the Commonwealth and submitted to the State Governments. As a result, amending legislation was passed in Victoria, Queensland, South Australia and Western Australia. In 1956, New South Wales also amended its petroleum legislation.

Further details of action taken by the Commonwealth Government in connexion with the search for oil will be found in § 15, Government Aid to Mining, and Mineral Control (p. 1010).

§ 11. Sulphur.

Sulphur, although produced in Australia as a content of certain metallic minerals, is itself non-metallic in character. Sulphides such as zinc concentrate and pyrite, which contain sulphur, are produced in appreciable quantities. There is no production of elemental sulphur (brimstone) in Australia. A large proportion of zinc concentrate produced is exported and therefore lost to Australia for utilization of the sulphur content.

The sulphur recovered in Australia is in the form of acid, most of which is used in the manufacture of fertilizers, mainly superphosphate. As this recovery does not at present satisfy local requirements, it is necessary to import elemental sulphur to meet the balance.

Production of pyrite concentrate at Nairne in South Australia commenced early in 1955. The output from this mine is supplied to the new sulphuric acid plant which was opened at Port Adelaide in August, 1955. This new plant has an annual capacity of 100,000 tons of sulphuric acid and will require 70,000 tons of pyrite concentrate from Nairne annually.

The following table shows for the years 1939 and 1951 to 1955 the sulphur content of sulphur-bearing minerals produced, quantities of sulphur recoverable therefrom, production of monohydrate acid (100 per cent. sulphuric acid), and sulphur content of monohydrate acid produced. Particulars regarding spent oxide roasted have been included to complete the statistics relating to recovery of sulphur and monohydrate acid production.

SULPHUR PRODUCTION : AUSTRALIA.
(Tons.)

Item.	1939.	1951.	1952.	1953.	1954.	1955.
<i>Sulphur contained in—</i>						
Zinc concentrate	123,968	113,964	119,515	141,954	152,074	155,836
Pyrite	27,040	65,962	93,516	77,811	97,649	105,836
Spent Oxide Roasted (a) ..	(b)	3,200	4,211	5,432	4,680	5,511
<i>Total Sulphur Content ..</i>	<i>151,008</i>	<i>183,126</i>	<i>217,242</i>	<i>225,197</i>	<i>254,403</i>	<i>267,183</i>
Recoverable Sulphur (a)	129,709	159,050	189,436	195,471	221,265	232,552
<i>Monohydrate Acid Produced ..</i>	<i>(c) 484,493</i>	<i>652,125</i>	<i>628,302</i>	<i>671,471</i>	<i>778,008</i>	<i>895,765</i>
<i>Quantity of Sulphur in Mono-</i>						
<i>hydrate Acid produced from—</i>						
Sulphur (Elemental) (d) ..	(a) 114,500	135,683	112,225	123,469	154,337	187,015
Zinc concentrate	25,300	32,850	33,115	31,270	33,564	30,412
Pyrite	27,040	50,300	57,891	60,811	62,533	71,179
Spent Oxide	(b)	2,230	3,231	3,973	3,973	4,295
<i>Total</i>	<i>166,840</i>	<i>221,063</i>	<i>206,462</i>	<i>219,523</i>	<i>254,407</i>	<i>292,901</i>

(a) Estimated.

(b) Not available.

(c) Year ended 30th June, 1939.

(d) All imported..

§ 12. Non-metallic Minerals.

1. *Asbestos.*—The production of asbestos in Australia at present is only sufficient to meet about one-sixth of domestic requirements. Production of asbestos in Australia in recent years has been of two types, chrysotile and crocidolite, the former being the most important type economically, but the deposits of chrysotile are relatively small and widely scattered. The principal deposits of asbestos are of crocidolite, and they occur in the Hammersley Ranges in Western Australia, about 200 miles south-east of Roebourne. Large scale operations were commenced there in 1943 at Wittenoom Gorge by Australian-Blue Asbestos Ltd. and reserves in seams over which the Company holds leases are estimated at two million tons. However, high costs of production due to heavy freight charges and the difficulty of retaining labour in an isolated community have prevented greater development of the project.

The production of chrysotile and crocidolite in Australia during the five years 1951 to 1955 is shown in the following table:—

PRODUCTION OF ASBESTOS : STATES.
(Tons.)

Year.	Chrysotile.			Crocidolite.		
	New South Wales.	Western Australia.	Australia.	South Australia.	Western Australia.	Australia.
1951 ..	432	727	1,159	6	1,393	1,399
1952 ..	466	652	1,118	..	2,940	2,940
1953 ..	569	606	1,175	..	3,795	3,795
1954 ..	616	303	919	..	3,794	3,794
1955 ..	590	275	865	..	4,487	4,487

2. Clays.—Statistics of clay production in Australia are not entirely satisfactory, mainly because of differences between States in the classification of the various types of clays. In the following table, the recorded production of the main types of clays produced in each State of Australia is shown for the year 1955.

PRODUCTION OF CLAYS : STATES, 1955.
(Tons.)

Type.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Total.
Bentonite ..					647		647
Brick Clay and Shale ..	1,589,262	(a)889,000	264,711	306,215	(a)434,000	(a) 73,000	3,556,188
Cement Clay and Shale ..	114,483	..	..	17,465	34,924	..	166,872
Damourite ..	..	..	..	436	..	..	436
Fireclay ..	65,421	25,033	8,812	13,668	6,912	..	119,846
Fuller's Earth ..	60	..	..	..	11	..	71
Kaolin ..	27,352	2,945	220	4,721	76	9,740	45,054
Stoneware Clay ..	138,924	..	356	44,529	..	..	183,809
Tile Clay ..	142,945	..	..	..	..	..	142,945
Other Clays ..	9,040	108,764	..	..	..	..	117,804

(a) Estimated.

3. Gypsum.—There are very extensive deposits of gypsum in Australia, but only the more accessible and easily worked deposits have been exploited. These deposits lie in four main regions, (a) in New South Wales stretching from around Griffith to near Broken Hill, (b) the north-west corner of Victoria, the south-west corner of New South Wales and adjoining parts of South Australia, (c) in South Australia on both sides of Gulf St. Vincent and extending to Lake MacDonnell in the west, and (d) between Perth and Kalgoorlie in Western Australia. The South Australian deposits are the most important and about two-thirds of the total Australian production of gypsum to 1954 came from this State, where the main centres of production are Stenhouse Bay on Yorke Peninsula and Lake MacDonnell.

The building industry is the main user of the gypsum produced in Australia, principally in the manufacture of plaster and the remainder in cement manufacture. A small amount is also used as fertilizer. A considerable quantity is exported, mainly to New Zealand for use in the plaster industry, and to New Caledonia for use in nickel smelting operations.

The production of gypsum in Australia is set out in the following table for the five years 1951 to 1955.

PRODUCTION OF GYPSUM : STATES.
(Tons.)

Year.	New South Wales.	Victoria.	South Australia.	Western Australia.	Australia.
1951	104,697	41,126	147,701	70,823	364,347
1952	89,226	47,295	164,825	50,332	351,678
1953	71,819	36,286	181,640	40,247	329,992
1954	128,790	75,012	194,772	41,142	439,716
1955	136,356	89,190	204,522	39,946	470,014

4. Limestone.—Limestone is quarried in all States, but statistics of production are incomplete, none being collected in Western Australia, while in Queensland figures do not include limestone quarried for cement manufacture. Limestone is used mainly for the manufacture of cement, other uses being in the steel industry as a metallurgical flux, in the chemical industry, and in agriculture.

The recorded statistics of limestone production in each State of Australia during 1955 are shown in the following table:—

PRODUCTION OF LIMESTONE(a) : STATES, 1955.
(Tons.)

New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Total.
1,689,630	714,228	120,962	986,701	(b)280,000	206,138	37	3,997,696

(a) Includes shell and coral.

(b) Estimated.

5. **Magnesite.**—The major sources of magnesite at present are deposits at Fifield and Thuddungra in central New South Wales. Most of the output of magnesite in Australia is used for refractory purposes, particularly in the steel industry, and small amounts are used in chemical, paper, glass, rubber, and ceramic industries. Particulars of the production of magnesite in each State for the years 1951 to 1955, are set out in the table below.

PRODUCTION OF MAGNESITE : STATES.
(Tons.)

Year.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Australia.
1951	35,963	398	13	998	762	38,134.
1952	40,333	164	13	572	1,055	42,137
1953	45,769	572	..	36	20	46,397
1954	42,825	..	..	235	92	43,152
1955	57,262	..	..	412	..	57,674

6. **Mica.**—Almost all Australian production of muscovite mica has come from the Northern Territory, though small quantities of inferior grades have been obtained from most of the States. The centre of mica production in the Northern Territory is the Harts Range area about 130 miles north-east of Alice Springs, where mining has been carried on intermittently since 1892, and the Plenty River field, 50 miles north-east of Harts Range.

The Commonwealth Mica Pool—details of which are given in § 15, Government Aid to Mining, on p. 1012—purchases all mica which is in accordance with certain specifications. The following table shows the quantity of muscovite mica produced in Australia during the five years 1951 to 1955.

MUSCOVITE MICA PRODUCTION.
(lbs.)

Particulars.	1951.	1952.	1953.	1954.	1955.			
New South Wales—								
Scrap .. ..	..	..	..	15,680	20,160
Northern Territory—								
Trimmed	48,034	} 71,929	{ 70,684	84,619	56,649			
Crude and Film	2,634					} 1,542
Scrap	82,880								..	65,184	..

7. **Salt.**—Salt is obtained in Australia from evaporation of saline lakes and clay pans. Production satisfies local requirements and provides a considerable surplus for export. Recorded production in South Australia (the chief producing State) is shown in the following table for the years 1951 to 1955. Available estimates of total Australian production are also shown.

SALT PRODUCTION.
(’000 Tons.)

Particulars.	1951.	1952.	1953.	1954.	1955.
South Australia	219	203	239	304	291
Estimated Australian Total ..	300	277	310	380	370

8. **Other Non-metallic Minerals.**—(i) *General.* Many other non-metallic minerals are produced in Australia in considerable quantities, and are listed separately in the following paragraphs.

(ii) *Barite.* The principal producing centre of barite is at Orparinna in the north Flinders Range in South Australia where the deposits are of first-grade quality. The production of barite in Australia during 1955 was 6,264 tons, of which 4,168 tons came from South Australia, 2,086 tons from New South Wales, and 10 tons from Western Australia.

(iii) *Cupreous Ore and Concentrate.* Cupreous ore is mined in Western Australia for mixing with superphosphate fertilizer. The quantity produced in 1955 was 7,731 tons with an average grade of 8.65 per cent.

(iv) *Diatomite.* Production of diatomite is carried on mainly in the eastern States of Australia. In 1955, 5,042 tons were produced in Australia, and of this total, New South Wales produced 3,629 tons.

(v) *Dolomite*. Up to 1950, New South Wales was the main producer of dolomite, but in that year the Broken Hill Pty. Co. Ltd. opened up a large deposit of dolomite at Ardrossan in South Australia which now produces about 90 per cent. of the total output. In 1955, New South Wales produced 6,354 tons; Queensland, 5,318 tons; South Australia, 97,398 tons; Western Australia, 81 tons; and Tasmania, 2,266 tons, making an Australian total of 111,417 tons.

(vi) *Felspar*. The main demand for felspar comes from the glass and ceramic industries. About half the Australian production of felspar comes from New South Wales which produced 11,608 tons of the Australian total of 20,833 tons in 1955. Of the remainder, 5,660 tons came from South Australia and 3,565 tons from Western Australia.

(vii) *Gemstones*. (a) *Diamonds*. Gem quality diamonds are not produced in Australia, but 731 carats of industrial diamonds valued at £7,081 were recovered during gold dredging operations on the Macquarie River in New South Wales.

(b) *Opals*. Most of the opals won in recent years came from the Coober Pedy and Andamooka fields in South Australia which produced opals worth £71,200 in 1955. Other production in 1955 was from the Quilpie district in Queensland valued at £1,350, and £1,000 from Lightning Ridge in New South Wales.

(c) *Sapphires*. The Anakie field in Central Queensland is the only Australian producer of sapphires. Output in 1955 was valued at £3,412.

(viii) *Silica*. The production of silica is not recorded in Victoria and Queensland. The output of silica, which includes glass sand, quartz, quartzite, sand, sandstone, and silicious abrasives, was 103,682 tons in New South Wales; 23,443 tons in South Australia; 6,759 tons in Western Australia; and 5,657 tons in Tasmania, giving a total of 139,541 tons for those States during 1955.

(ix) *Sillimanite*. In 1955, 2,679 tons of sillimanite were produced in Australia. New South Wales contributed 1,987 tons and the remaining 692 tons came from South Australia.

(x) *Talc*. The Australian output of talc (including steatite), was 12,567 tons in 1954. New South Wales produced 817 tons, South Australia 9,163 tons and Western Australia 2,587 tons.

(xi) *Other*. Other non-metallic minerals produced in Australia in small quantities during 1955 were corundum, emery, fluorite, garnet, graphite, glauconite, mineral pigments, pebbles for grinding, phosphate rock, pyrophyllite, serpentine, slate and spodumene.

§ 13. Persons Engaged, Wages Paid and Accidents in Mining.

1. **Total Employment in Mining.**—The number of persons engaged in the mining industry in Australia fluctuates according to economic conditions generally, the price of industrial metals, the state of the labour market, and according to the permanence of new finds and the development of the established mines. The following table shows the numbers engaged in the various mining industries in each State and Australia as a whole in 1955.

EMPLOYMENT IN MINING, 1955. (a)

Industry.	N.S.W.	Vic.	Q'land.	S.A.	W.A.	Tas.	N.T.	A.C.T.	Aust.
Metal Mining—									
Gold Mining ..	119	418	114	10	5,822	..	270	..	6,753
Silver-Lead-Zinc Mining ..	6,710	..	(b)	(c)	(b)	727	..	..	10,078
Copper-Gold Mining ..	45	..	(b)	(c)	(b)	(b)	145	..	2,065
Tin Mining ..	132	..	250	..	106	438	11	..	937
Mineral Sands Mining ..	485	..	406	..	..	..	..	..	891
Other Metal Mining ..	66	6	(b)	377	311	(b)	51	..	1,268
Total, Metal Mining	7,557	424	4,570	387	6,326	2,251	477	..	21,992
Fuel Mining—									
Black Coal Mining—									
Underground ..	18,840	687	3,415	..	1,432	367	..	..	25,644
Open-cut ..	420	..	203	280	..	..	..	..	..
Total ..	19,260	687	3,618	280	1,432	367	..	..	25,644
Brown Coal Mining ..	..	1,502	..	..	..	..	..	..	1,502
Oil Mining ..	(d)	16	52	..	..	..	..	..	68
Total, Fuel Mining	19,260	2,205	3,670	280	1,432	367	..	..	27,214
Non-metal (excluding Fuel)									
Mining ..	1,145	292	236	707	323	148	24	(e)	2,875
Total, All Mining	27,962	2,921	8,476	1,374	8,081	2,766	501	(e)	52,081
Construction Material									
Quarrying ..	1,245	1,587	218	856	202	54	..	35	4,197
Total, All Mining and Quarrying ..	29,207	4,508	8,694	2,230	8,283	2,820	501	35	56,278

(a) Average employment during whole year. (b) Not available for publication. (c) Not available for publication; included with "Other Metal Mining". (d) Not available for publication; included with "Non-Metal Mining". (e) Not available for publication; included with "Construction Material Quarrying".

The following table shows particulars of mining employment in Australia for the years 1952 to 1955. The figures show for 1952 the average number of persons employed during the period worked by individual mines or quarries, and for 1953 and later years the average number of persons employed during the whole year.

EMPLOYMENT IN MINING : AUSTRALIA.

Industry.	1952.	1953.	1954.	1955.
<i>Metal Mining—</i>				
Gold Mining	6,583	7,050	7,192	6,753
Silver-Lead-Zinc Mining	9,497	9,686	9,397	10,078
Copper-Gold Mining	2,112	2,025	1,957	2,065
Tin Mining	999	1,063	969	937
Mineral Sands Mining	619	597	598	891
Other Metal Mining	1,601	1,601	1,253	1,268
<i>Total, Metal Mining</i>	<i>21,411</i>	<i>22,022</i>	<i>21,366</i>	<i>21,992</i>
<i>Fuel Mining—</i>				
Black Coal Mining	26,612	26,606	26,614	25,644
Brown Coal Mining	1,691	1,598	1,598	1,502
Oil Mining	112	(a)	56	68
<i>Total, Fuel Mining</i>	<i>28,415</i>	<i>28,204</i>	<i>28,268</i>	<i>27,214</i>
<i>Non-metal (excluding Fuel) Mining</i>	<i>3,070</i>	<i>(b) 2,946</i>	<i>2,858</i>	<i>2,875</i>
<i>Total, All Mining</i>	<i>52,896</i>	<i>53,172</i>	<i>52,492</i>	<i>52,081</i>
<i>Construction Material Quarrying</i>	<i>4,162</i>	<i>3,803</i>	<i>4,121</i>	<i>4,197</i>
<i>Total, All Mining and Quarrying</i>	<i>57,058</i>	<i>56,975</i>	<i>56,613</i>	<i>56,278</i>

(a) Not available separately; included with "Non-metal (excluding Fuel) Mining". (b) Includes "Oil Mining".

2. **Salaries and Wages Paid in Mining.**—Statistics of total salaries and wages paid in the mining and quarrying industry are now available from the annual industrial censuses of the industry taken from 1952 onwards. Salaries and wages paid in the mining industries and quarrying in Australia during each year 1952 to 1955, are shown in the following table. Information regarding rates of wages paid in the mining industry is shown in Chapter VI. —Labour, Wages and Prices (p. 159) and also in the *Labour Report*.

SALARIES AND WAGES PAID IN MINING : AUSTRALIA.
(£'000.)

Industry.	1952.	1953.	1954.	1955.
<i>Metal Mining—</i>				
Gold Mining	5,952	6,291	6,450	6,344
Silver-Lead-Zinc Mining	12,690	12,359	12,761	15,154
Copper-Gold Mining	1,655	1,608	1,786	1,867
Tin Mining	562	715	704	734
Mineral Sands Mining	481	362	412	819
Other Metal Mining	1,027	1,380	1,195	1,328
<i>Total, Metal Mining</i>	<i>22,367</i>	<i>22,715</i>	<i>23,308</i>	<i>26,246</i>
<i>Fuel Mining—</i>				
Black Coal Mining	23,565	24,171	25,988	26,065
Brown Coal Mining	1,450	1,483	1,557	1,761
Oil Mining	44	(a)	(a)	(a)
<i>Total, Fuel Mining</i>	<i>25,059</i>	<i>25,654</i>	<i>27,545</i>	<i>27,826</i>
<i>Non-metal (excluding Fuel) Mining</i>	<i>1,617</i>	<i>1,684</i>	<i>1,693</i>	<i>2,270</i>
<i>Total, All Mining</i>	<i>49,043</i>	<i>50,053</i>	<i>52,546</i>	<i>56,342</i>
<i>Construction Material Quarrying (b)</i>	<i>2,020</i>	<i>2,007</i>	<i>2,045</i>	<i>2,439</i>
<i>Total, All Mining and Quarrying</i>	<i>51,063</i>	<i>52,060</i>	<i>54,591</i>	<i>58,781</i>

(a) Not available for publication; included with "Non-metal Mining". (b) Incomplete.

3. **Accidents in Mining.**—Particulars of numbers of persons killed and injured in accidents in mines and associated treatment plants are recorded by State Mines Departments. Numbers injured are not reported on a uniform basis from State to State as varying criteria are used in determining what constitutes injury for the purpose of these

records. In 1955, 62 persons were recorded as having been killed and 1,788 as having been injured in mining and quarrying accidents. Of the total of 63 persons killed, 25 were in black coal mines, 11 in gold mines and 8 in silver-lead-zinc mines. Reported injuries were highest in black coal mines (552), gold mines (504), and silver-lead-zinc mines (398).

§ 14. Oversea Trade in Minerals and Metals.

Particulars of the quantity and value of imports and exports of the principal minerals and metals for Australia are shown in the following table for the years 1953-54, 1954-55 and 1955-56. In addition to the unfabricated metals shown, considerable quantities of partly fabricated metals (bars, rods, wire, etc.) enter into Australia's overseas trade.

IMPORTS AND EXPORTS OF PRINCIPAL MINERALS AND METALS : AUSTRALIA.

Item.	Unit of Quantity.	1953-54.		1954-55.		1955-56.	
		Quantity.	Value. (£A.f.o.b.)	Quantity.	Value. (£A.f.o.b.)	Quantity.	Value. (£A.f.o.b.)
IMPORTS.							
Minerals—							
Antimony ore and concentrate	cwt.	13,119	69,419	27,094	142,821	10,639	52,570
Asbestos	"	528,899	1,988,691	853,811	3,246,480	646,156	2,394,810
Chromium ore and concentrate	"	83,517	67,097	99,242	59,296	146,246	94,776
Coal	ton	2,051	9,816	4,994	26,185	4,117	29,973
Coke	"	10,981	144,566	5,900	71,114	3,444	53,191
Diatomite	cwt.	38,413	54,628	78,873	123,182	87,879	139,095
Industrial diamonds	carat	102,572	188,920	265,144	531,968	258,321	543,657
Mica	lb.	307,277	64,800	1,021,777	93,450	764,347	56,049
Sulphur	cwt.	3,836,254	2,644,504	3,851,674	2,720,089	4,117,595	2,740,044
Metals—							
Aluminium (pigs, ingots, etc.)	"	185,152	1,900,542	255,250	2,748,466	240,651	2,924,968
Copper—							
Blister	"	2,000	30,086	10,000	150,597	..	..
Pigs, ingots, powder, etc.	"	67,199	935,867	562,505	9,549,183	94,791	2,087,810
Gold bullion (ingots, bar, etc.)	fine oz.	189,628	2,955,517	175,166	2,720,834	175,649	2,745,143
Iron and Steel—							
Bar and rod	cwt.	133,198	1,166,863	1,198,833	3,935,534	2,040,376	6,734,571
Ingots, blooms, slabs, etc.	"	4,405	35,609	10,319	56,140	14,761	76,597
Nickel (pigs, ingots, etc.)	"	11,898	363,537	10,299	320,280	14,732	528,299
Tin	"	16,928	693,592	11,582	515,711	10,358	471,761
EXPORTS.							
Minerals—							
Asbestos	cwt.	46,743	376,315	66,013	380,383	138,958	693,521
Coal	ton	385,812	1,528,788	291,226	1,147,441	193,813	780,284
Coke	"	28,223	240,138	21,885	180,321	66,590	537,841
Copper—							
Ore and concentrate	cwt.	2,530	5,911	110,924	352,068	63,809	314,767
Copper-lead dross, etc.	"	68,012	303,942	163,349	902,594	152,130	1,174,004
Lead and silver-lead ore and concentrate	"	1,508,627	4,269,732	1,217,112	3,933,923	1,312,432	4,369,378
Rutile concentrates	"	626,499	1,365,836	1,116,966	2,375,165	1,394,970	4,627,553
Tungsten (scheelite and wolfram concentrates)	"	43,524	2,952,684	41,776	3,188,416	47,537	3,708,473
Zinc ore and concentrate	"	5,358,065	3,411,246	4,076,586	2,837,629	5,823,602	4,647,977
Zircon concentrates	"	566,517	278,312	931,104	518,150	1,094,007	596,022
Metals—							
Copper, blister	"	253,290	3,537,588	102,463	1,513,844	291,170	5,845,048
Gold bullion (ingot, bar, dust, sheet, etc.)	fine oz.	863,464	13,769,222	864,391	13,716,622	531,664	8,323,118
Iron and Steel—							
Bar and rod	cwt.	507,333	906,939	266,182	567,727	143,476	362,369
Ingots, blooms, slabs, etc.	"	2,121,216	2,990,038	156,131	228,149	19,742	22,587
Pig iron	"	2,326,220	2,053,886	1,205,561	1,021,107	291,659	324,051
Lead—							
Pig	"	3,404,226	18,550,238	2,805,126	17,182,339	2,922,883	19,560,181
Bullion	"	682,485	4,392,514	816,369	6,133,238	596,231	4,639,155
Silver bullion (ingot, bar, dust, sheet, etc.)	fine oz.	6,851,797	2,592,377	6,147,155	2,356,908	6,485,356	2,620,905
Zinc, ingots	cwt.	749,966	3,504,174	654,180	3,408,244	674,295	4,107,141

Considerable quantities of metallic ores, concentrates, slags and residues are exported from Australia for refining overseas. The following table shows the quantities of such items exported during 1955-56 and their principal metallic content as estimated by assay.

PRINCIPAL METALLIC CONTENT OF ORES AND CONCENTRATES EXPORTED FROM AUSTRALIA DURING 1955-56.

Ore, Concentrate, etc.	Quantity Ex-ported.	Estimated Metallic Contents.						
		Copper.	Gold.	Lead.	Silver.	Tin.	Tungstic Oxide.	Zinc.
	cwt.	cwt.	fine oz.	cwt.	fine oz.	cwt.	cwt.	cwt.
Copper Ore, Concentrate, Slag and Residues ..	83,290	15,974	894	4,312	23,912	99	..	..
Lead Bullion ..	596,231	..	..	592,057	2,683,035	..	..	..
Lead Ore, Concentrate, Slag and Residues(a) ..	1,445,081	63,000	12,533	881,514	1,756,009	424	..	..
Scheelite Ore and Concentrate ..	23,012	..	..	..	..	1	15,575	..
Tin Ore and Concentrate ..	2,623	..	..	..	..	1,923	..	..
Wolfram Ore and Concentrate ..	24,525	..	..	..	..	10	15,736	..
Zinc Ore, Concentrate, Slag and Residues ..	5,823,602	..	..	42,203	86,945	..	..	3,049,697

(a) Includes copper-lead dross and speiss.

§ 15. Government Aid to Mining, and Mineral Control.

1. **Aid to Mining.**—(i) *Commonwealth.* (a) *Assistance to marginal and sub-marginal gold mines.* Under the terms of the Gold-Mining Industry Assistance Act 1954, a large producer may receive a subsidy of up to three-quarters of that portion of the cost of production in excess of £13 10s. 0d. per fine oz.; the subsidy will not exceed £2 0s. 0d. per fine oz. A person producing less than 500 fine oz. per year receives a flat rate subsidy of £1 10s. 0d. per fine oz. regardless of the cost of production. The Act remained in force for two years from 1st July, 1954 and has since been extended for a further three years.

(b) *Rewards for Discovery of Uranium Ore.* To encourage the search for and discovery of deposits of uranium ore, the Commonwealth Government has approved the granting of monetary rewards up to a maximum of £25,000 for any one deposit.

(c) *Bureau of Mineral Resources, Geology and Geophysics.* The Bureau of Mineral Resources, Geology and Geophysics has sections dealing with geology, geophysics, mining engineering, petroleum technology and mineral economics. The geological section provides geologists to conduct all surveys required in Commonwealth Territories, makes detailed and regional surveys in conjunction with or by arrangement with the State Mines Departments, surveys of possible oil-fields in Australia and New Guinea, surveys of mines for which financial assistance is sought, and investigations of deposits of radio-active minerals. The geophysical section conducts investigations throughout Australia and New Guinea connected with the search for metalliferous, radio-active and other mineral deposits; investigations connected with exploration for coal, oil and water; regional magnetic and gravity surveys; engineering and military geophysics; and the operation of geophysical (magnetic and seismic) observatories. The Bureau works in close co-operation with the Mines Departments of the States. It has assumed full responsibility for geological and geophysical surveys in Commonwealth Territories, but suitable arrangements have been made to ensure that the local Administrations have the necessary technical advice directly available to them.

(d) *Diamond Drills.* The drilling plant operated by the Bureau of Mineral Resources consists of two heavy, two medium and five light prospecting drills. These drills are used mainly in connexion with the Bureau's comprehensive programme of prospecting by aerial, geological, geophysical and geochemical methods.

(e) *Search for Oil.* No variation has been made in the policy described in Official Year Book No. 37, p. 850, regarding the search for petroleum throughout Australia and its Territories. In addition to its activities set out in that Year Book, the Bureau of Mineral Resources, Geology and Geophysics in Melbourne test bore cores for porosity and permeability on behalf of companies engaged in drilling for oil. The Bureau also maintains two portable rotary plants for scout boring for geological information.

The Commonwealth Government has encouraged the search for oil in Australia, Papua and New Guinea; details of the efforts made are outlined in earlier issues of the Official Year Book and in § 10, Mineral Oils (p. 1003).

(f) *Survey of North Australia.* Reference to this survey which was completed at the end of 1940 appears in Official Year Book No. 35, p. 744.

(g) *Ore-dressing and Mineragraphic Investigations.* These investigations are conducted by the Commonwealth Scientific and Industrial Research Organization as required by the industry. Ore-dressing investigations are carried out conjointly with appropriate State institutions, the three laboratory centres being the School of Mines, Kalgoorlie, the School of Mines and Industries, Adelaide, and the University of Melbourne.

Since 1947, funds for these investigations have been included in the investigational vote approved annually for the Commonwealth Scientific and Industrial Research Organization; in 1955 the Commonwealth Government expended approximately £18,000 on ore-dressing and £10,500 on mineragraphic investigations.

(h) *Petroleum Legislation.* The petroleum ordinances of Papua and New Guinea, have been amended and combined in a single ordinance entitled Petroleum (Prospecting and Mining) Ordinance 1951. Further minor amendments were passed early in 1954. A new Petroleum Ordinance for the Northern Territory was brought into force on 27th May, 1954. New legislation covering petroleum was brought down in New South Wales under the Petroleum Act, 1955, and several amendments to the Petroleum Act, 1951, were passed in Western Australia.

(ii) *States. (a) General.* In addition to free assays and determinations of rocks and minerals carried out for prospectors by the Mines Departments of the States and Territories, technical officers of these departments provide advice to the mining and allied industries where required, carry out field examinations of mining prospects, advise on exploration and development, select sites for water supply, and in general give a free technical service to the mining industry.

(b) *New South Wales.* State aid to assist metalliferous mining consisted of grants to assist the prospecting and/or mining for gold and minerals and for the purchase, removal and installation of mining plant or equipment.

(c) *Victoria.* Loans may be granted to assist prospecting and development or the purchase of machinery. The Mines Department has stamp batteries in different parts of the State to crush ore for prospectors at nominal rates. Small mining companies may avail themselves of these facilities. Drilling with diamond, rotary and percussion drills is carried out by the Mines Department for mining companies and for general mineral exploration. A survey of the States' underground water reserves is in progress, in conjunction with the opening up of town water supplies from underground sources for which new deep drilling equipment is on order.

(d) *Queensland.* The Mines Department maintains a treatment works for tin ores, etc., at Irvinebank, an assay office at Cloncurry and diamond-drilling plants in several parts of the State. The Venus State Mill at Charters Towers is available for the treatment of gold-bearing ores. In addition, many departmental compressor plants, pumping plants and other mining equipment are provided and made available on hire on the principal mining fields.

(e) *South Australia.* The Department of Mines provides the following services and facilities to the mineral industry:—(i) Hire of boring plants and mining equipment; boring and testing of mineral deposits; financial subsidies in approved cases for prospecting and mining development; development of sub-surface water supplies for farming, pastoral, irrigation and mining purposes; purchase of basic metal ores from prospectors. (ii) Geological examination of mineral deposits, water supply, dam, foundation and drainage problems; guidance on mining legislation; publication and issue of geological bulletins and maps. (iii) Chemical and metallurgical analytical and assay investigation; testing and treatment of ores and minerals; petrographic, mineragraphic and radiometric determinations. Pilot scale metallurgical and chemical treatment plants are maintained and operated for the development of mineral extraction processes.

(f) *Western Australia.* Assistance is given to prospectors to the extent of £4 10s. 0d. per week south of the 28th parallel of latitude, and of £5 10s. 0d. per week north of that parallel; also provision is made of some tools required for prospecting.

There are eighteen State batteries operating throughout the gold-fields for the treatment of ore from prospectors and small mine-owners, at a nominal charge. A cartage subsidy is also granted to such operators sending ore to State batteries for treatment.

Provision is made for loans to mine-owners who require assistance to develop mines. The Government has a drilling scheme, financing mine-owners on a £1 for £1 basis.

(g) *Tasmania.* The Department of Mines provides financial assistance to mining lessees for the purchase of plant and machinery, for sinking, repairing or dewatering of shafts, for construction of dams and water races, for testing and proving a deposit of any mining product, for developmental work and for diamond and other types of drilling.

Other assistance is rendered to the industry by geological and engineering advice and through ore-dressing research into metallurgical recoveries and the selection and design of treatment plant.

(h) *Northern Territory.* In order to encourage the development of the mining industry, the Northern Territory Administration provided Government batteries at Tennant Creek, Hatches Creek, and Maranboy for the treatment of miners' ores. The Hatches Creek

battery is the only one in operation at the present time. Pending reconstruction, the Tennant Creek battery has been shut down for a short time, but the re-opening of the Maranboy battery will depend on a revival of tin mining at that centre. The crushing charges are subsidized by Government grants. In addition, the Administration provides cartage subsidies and financial advances to encourage miners to carry out development work. Roads and water supply services are provided and maintained for mines under active development throughout the Territory.

2. **Control of Minerals.**—(i) *Mica Production.* The Commonwealth Mica Pool purchases mica won in the Harts Range, Northern Territory, thus ensuring the miners a ready market for their output at fixed prices and also permitting an orderly distribution of mica to the trade. The Pool is controlled by a Committee of Management consisting of representatives of the Commonwealth Government, producers and consumers.

(ii) *Control of Exports of Metals and Minerals.* Certain metals and minerals produced in Australia are subject to export control for one or more of the following reasons:—

- (a) the necessity to conserve resources (e.g., iron ore and manganese);
- (b) inadequacy of local production to fulfil domestic demand (e.g., mica, manganese ore, copper, iron and steel);
- (c) the strategic importance of the minerals (e.g., beryllium ores, concentrates and metal; monazite; tantalite and tantalum products; uranium ore, concentrates, residues and metal; mica).

Mixed concentrates of beach sand minerals are prohibited exports, but rutile, zircon and ilmenite may be exported. Some non-ferrous scrap is also subject to control.

(iii) *Radio-active Minerals.* Since the discovery of the possibility of using atomic energy considerable attention has been paid to the occurrence of uranium in Australia. To encourage the search for and discovery of deposits of uranium ore, the Commonwealth Government has approved the granting of monetary rewards for such discoveries.

Up to the end of 1949, important deposits had been found only in the north-eastern part of South Australia where the Mt. Painter and Radium Hill fields had been investigated, largely by the South Australian Government, but in that year the presence of uranium was discovered in the Rum Jungle district of the Northern Territory, and investigations carried out by the Commonwealth Bureau of Mineral Resources, Geology and Geophysics in the years 1949–1952 proved that these deposits are of substantial importance.

Towards the end of 1952, the Commonwealth Government placed the Rum Jungle deposits under the control of Territory Enterprises Pty. Ltd., a subsidiary of Consolidated Zinc Corporation Limited, to carry on the investigations on its behalf and to mine and treat the ore. The treatment plant at Rum Jungle was officially opened by the Prime Minister on 17th September, 1954. Investigation of an area adjacent to Rum Jungle was carried out by the Bureau, using an airborne scintillometer. This survey indicated the presence of many radio-active anomalies, and demonstrated the effectiveness of this method of search. During 1952, arrangements were completed between the Governments of the United States of America, South Australia and the Australian Commonwealth, for the purchase of ores by the United States.

In South Australia, the South Australian Government extensively explored the Radium Hill deposit by underground development and diamond drilling. A primary treatment plant was erected at the mine and went into operation in November, 1954; the concentrate is transported to a plant at Port Pirie, completed in mid-1955, where it is further reduced.

During 1956, the construction of a plant for the extraction of uranium oxide at Mary Kathleen in north-west Queensland commenced. This deposit is being developed by private interests.

The Bureau of Mineral Resources is carrying out further airborne scintillometer surveys and extensive geological, geophysical and geochemical surveys and diamond drilling operations, with a view to discovering further deposits and to assessing the value of known deposits.

During 1953, Commonwealth Legislation was enacted to set up an Atomic Energy Commission which is responsible, in an overall sense, for the production and utilization of uranium in Australia. This Act, the Atomic Energy Act of 1953, supersedes the Atomic Energy (Control of Materials) Act of 1946, but contains a provision of that Act which provides for control of substances which could be used for production or use of atomic energy. It gives the Commonwealth power to acquire such substances in their natural state and in waste materials from mining operations, to carry on mining and other operations necessary for the recovery of such substances, and to pay compensation for such acquisition. It also gives the Commonwealth power to obtain possession of such substances held by any person.

Further reference to the Atomic Energy Commission appears in Chapter XXX.—Miscellaneous.