

CHAPTER XVIII. MINERAL INDUSTRY.

(NOTE.—A table showing particulars of mineral production for the year 1936 will be found in the Appendix. With the exception of gold this information was not available at the time of compilation of this chapter. Details of gold production are included in § 2 hereinafter.)

§ 1. The Mineral Wealth of Australia.

1. *Place of Mining in Australian Development.*—The value of production from the mineral industry is now considerably less than that returned by the agricultural or the pastoral industry, nevertheless it was the discovery of gold in payable quantities that first attracted population to Australia in large numbers and thus accelerated its national development.

2. *Extent of Mineral Wealth.*—The extent of the total mineral wealth of Australia cannot yet be regarded as completely ascertained, as large areas of country still await systematic prospecting. More detailed reference to this matter will be found in preceding Official Year Books. (See No. 22, p. 755.)

3. *Quantity and Value of Production in 1935.*—The quantities (where available) and the values of the principal minerals produced in each State, and in Australia as a whole, during the year 1935 are given in the tables immediately following. It must be clearly understood that the figures quoted in these tables refer to the quantities and values of the various minerals in the form in which they were reported to the State Mines Departments, and represent amounts which the Mines Departments consider may fairly be taken as accruing to the mineral industry as such. They are not to be regarded as representative of Australia's potentiality as a producer of *metals*, this matter being dealt with separately in § 17 hereinafter. New South Wales is, of course, in normal times, a large producer of iron and steel from ironstone mined in South Australia. As the table shows, the latter State receives credit for this ironstone in its mineral returns. The iron and steel produced therefrom cannot be assigned to the mineral industry of New South Wales, but the value of the transformation from ore to metal is credited to the manufacturing industry of that State. Similarly lead, silver-lead and zinc are credited in the form reported to the State of origin—chiefly New South Wales—although the actual metal extraction is carried out principally in South Australia and Tasmania.

MINERAL PRODUCTION.—QUANTITIES, 1935.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Antimony ..	ton	49	11	..	..	..	..	..	60
Arsenic ..	..	370	..	..	..	3,728	..	..	4,098
Asbestos ..	cwt.	..	..	..	35	2,820	..	..	2,855
Barytes ..	ton	204	..	..	2,310	..	..	..	2,514
Bismuth ..	cwt.	95	..	368	..	..	6	..	469
Brown Coal ..	ton	..	2,221,515	..	..	..	..	..	2,221,515
Coal ..	..	8,698,579	176,493	1,051,978	..	537,188	123,714	..	10,887,954
Copper (ingot, matte, etc.) ..	..	856	..	2,900	256	..	13,036	..	17,048
Diatomaceous earth ..	..	2,712	302	..	..	..	..	..	3,014
Gold ..	fine oz.	50,102	87,609	102,990	7,333	649,049	8,343	5,066	910,492
Gypsum ..	ton	1,695	8,712	..	102,268	5,462	..	..	118,137
Ironstone ..	..	12,069	..	1,110	1,868,719	..	25,555	..	1,907,462
Kaolin ..	..	0.975	4,500	..	186	..	..	..	14,661
Lead ..	(b)	..	..	32,952	..	..	1,488	(c)	34,440
Lead and silver- lead ore, concen- trates, etc. ..	..	213,817	..	..	..	..	..	..	213,817

(b) See letterpress preceding this table.

(c) Year ended 30th June.

(e) Incomplete.

MINERAL PRODUCTION.—QUANTITIES, 1935—continued.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Limestone flux	..	104,953	..	12,413 ¹	11,663	..	254,438	..	383,467
Magnesite	..	15,688	330	..	50	..	..	..	16,068
Manganese ore	..	148	..	..	..	..	..	..	148
Molybdenite	cwt.	..	..	212	..	..	..	..	212
Osmiridium	oz.	..	..	..	..	..	235	..	235
Phosphate	ton	235	..	..	..	..	..	..	235
Pigments	..	456	..	..	46	..	..	..	502
Platinum	oz.	98	..	..	..	..	..	..	98
Salt	ton	..	(a)	..	78,003	..	..	(e)	78,003
Sapphires	oz.	55	..	(d)	..	..	..	(e)	55
Shale (oil)	ton	..	..	..	..	..	30	..	30
Silver	fine oz.	(b) 62,198	3,948	2,409,165 ¹	..	79,875	323,901	..	2,879,091
Tin and tin ore	ton	1,096	88	1,189	..	6c	1,131	38	3,602
Wolfram	cwt.	1,095	..	480	..	..	4,640	1,846	8,061
Zinc concentrates	ton	243,604	..	4,411	..	..	..	..	248,015

(a) Not available for publication. (b) See letterpress preceding this table. (c) Year ended 30th June. (d) Quantity not stated. (e) Incomplete.

The values of the minerals raised in each State in 1935 are given in the following table:—

MINERAL PRODUCTION.—VALUE, 1935.

Minerals.	N.S.W. (a)	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas. (a)	N.T. (d)	Australia.
	£	£	£	£	£	£	£	£
Antimony	780	270	..	..	..	..	..	1,050
Arsenic	14,571	..	..	..	67,108	..	..	81,679
Asbestos	..	..	..	359	2,889	..	..	3,248
Barytes	306	..	..	6,061	..	..	..	6,367
Blismuth	285	..	7,039	..	..	146	..	8,070
Brown Coal	..	317,444	..	..	..	..	..	317,444
Coal	4,887,341	282,253	843,034	..	318,013	86,201	..	6,416,845
Copper (ingot and matte)	30,071	..	101,489	11,065	..	464,007	..	606,632
Diamonds	..	..	..	..	..	..	..	..
Diatomaceous earth	5,424	1,246	..	..	..	..	..	6,670
Gold	439,140	768,401	904,755	64,109	5,677,328	73,143	44,458	7,971,334
Gypsum	847	2,629	..	76,701	6,888	..	..	87,065
Ironstone	5,338	..	677	2,149,027	..	25,555	..	2,181,097
Kaolin	7,625	4,573	..	744	..	..	..	12,942
Lead	(b)	..	471,221	..	..	21,390	..	(g) 492,611
Lead and silver-lead ore, concentrates, etc.	13,181,278	..	..	..	..	..	..	3,181,278
Limestone flux	20,990	..	9,969	4,374	..	68,357	..	103,690
Magnesite	27,454	1,254	..	75	..	..	..	28,783
Manganese ore	444	..	..	..	..	..	..	444
Molybdenite	..	..	1,953	..	..	..	..	1,953
Opal	5,070	..	200	3,228	..	..	..	8,498
Osmiridium	..	..	..	..	..	2,103	..	2,103
Phosphate	176	..	..	..	..	..	..	176
Pigments	684	..	..	80	..	..	..	764
Platinum	649	..	..	..	..	..	..	649
Salt	..	(f)	..	175,507	..	..	..	(g) 175,507
Sapphires	..	..	1,805	..	..	..	..	1,937
Shale (oil)	132	..	..	..	..	15	..	15
Silver	(b) 8,110	642	284,678	..	12,687	42,323	..	(g) 348,440
Tin and tin ore	287,890	14,475	187,234	..	8,829	258,919	6,036	763,383
Wolfram	5,604	..	2,888	..	..	29,345	10,380	48,307
Zinc concentrates	230,890	..	68,863	..	..	..	..	299,753
Unenumerated	(c) 49,131	1,066	1,035	7,287	14,248	..	616,226	88,793
Total	9,210,820	1,394,253	2,887,440	2,498,617	6,107,990	1,071,507	76,900	23,217,527

(a) For items excluded see letterpress below. (b) See letterpress above preceding table. (c) Includes dolomite £8,960, silica £10,837, fireclay £10,443, and zircon-rutile-ilmenite £12,691. (d) Year ended 30th June. (e) Mica, £15,762. (f) Not for publication. (g) Incomplete.

It may be pointed out in connexion with the figures given in the above table that the totals are exclusive of certain commodities, such as stone for building and industrial uses, sand, gravel, brick and pottery clays, lime, cement and slates which might be included under the generic term "mineral." Valuations of the production of some of these may be obtained from the reports of the various Mines Departments, but in regard to others it is impossible to obtain adequate information. In certain instances, moreover, the published information is of little value. Some of the items excluded, such as cement, carbide and sulphuric acid are included in manufacturing production, and, in any case, only the raw material could properly be included in mineral production. The items excluded from the total for New South Wales in 1935 consisted of—lime, £47,777; building stone, £90,032; Portland cement, £902,377; coke, £802,887; road materials, £875,451; shell grit, £13,630; sulphur and sulphuric acid, £75,132; and brick and pottery clays, £303,838. Carbide, £115,350, and cement, £214,542, have been excluded from the Tasmanian figures.

4. Value of Production, 1931 to 1935.—The value of the mineral production in each State for the five years 1931 to 1935 is given in the table hereunder:—

MINERAL PRODUCTION.—VALUE.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia
	£	£	£	£	£	£	£	£
1931 ..	6,517,703	882,334	1,274,953	548,204	3,110,472	707,234	11,416	13,352,316
1932 ..	6,533,191	908,994	1,818,701	837,896	4,731,740	730,058	13,811	15,553,301
1933 ..	6,904,834	1,660,137	2,373,251	1,076,434	5,269,104	545,668	18,150	17,607,268
1934 ..	7,766,504	1,093,029	2,713,135	1,713,537	5,884,430	750,389	28,806	19,048,830
1935 ..	9,210,820	1,391,253	2,887,440	2,198,617	6,107,990	1,071,507	76,900	21,247,527

The value of the mineral production in 1935 exceeded that of 1934 by nearly £3,300,000. All of the States recorded increases in values, mainly through the agency of silver-lead ores and concentrates, ironstone, coal, gold, copper or silver. Of these silver-lead ores and concentrates were the most important; the production increased by 2,331 tons, which together with an increase in price accounted for nearly £1,000,000 of the £3,300,000 mentioned above.

Greater activity in the iron and steel industry accounted for the improvement recorded in the output of ironstone which followed next in importance after silver-lead ores and concentrates. South Australia, the principal producing State, raised its output from 1,200,000 tons to 1,900,000 tons.

The output of black coal increased by 1,100,000 tons, valued at £547,000 the improvement being practically confined to New South Wales although all States reported increased outputs.

The production of gold increased by 23,883 fine ounces during 1935. The increase was not as great as that of the previous year owing to industrial trouble in Western Australia and at Mount Coolon in Queensland.

Copper production rose by nearly 5,000 tons and £210,000 in value. This development was practically confined to Tasmania.

Increased production at enhanced values was also recorded for silver, zinc and zinc concentrates, and the output of tin was also larger although the price declined slightly during the year.

Particulars of the variations in production, etc., by States, will be found in greater detail in the various sections hereinafter.

5. Total Production to end of 1935.—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1935. The items mentioned as excluded from the preceding table are also omitted in the following table. Thus the total for New South Wales falls short by £55,000,000 of that published by the State Department of Mines, the principal items excluded being coke, £16,998,000; cement, £21,633,000; lime, £1,814,000; and considerable values for marble, slate, granite, chert, gravels, etc., which the Department now includes in the returns for quarries.

MINERAL PRODUCTION.—VALUE TO END OF 1935.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia (a)
	£	£	£	£	£	£	£	Million. £
Gold ..	65,215,931	306,026,403	88,772,689	1,853,775	188,895,041	9,231,496	2,347,534	662
Silver and lead ..	129,822,657	266,587	7,388,185	383,547	2,314,362	9,334,142	66,324	150
Copper ..	15,796,958	216,686	27,168,886	33,171,004	1,809,960	22,336,426	233,603	100
Iron ..	7,751,599	15,641	502,230	11,349,775	36,722	61,193	..	23
Tin ..	75,531,818	997,217	11,711,652	..	1,627,665	18,087,865	647,299	49
Wolfram	290,687	11,885	1,074,425	301	1,441	300,408	235,973	2
Zinc ..	25,270,968	..	82,323	15,993	5,437	966,077	..	26
Coal ..	212,361,770	16,014,297	23,125,925	..	8,095,643	2,295,453	..	262
Other ..	8,583,791	913,314	2,867,803	5,473,732	476,215	2,284,244	108,406	21
Total ..	480,474,719	324,462,030	162,694,427	55,248,127	203,262,486	64,957,331	3,639,139	1,295

(a) To 30th June, 1935.

The "other" minerals in New South Wales include alunite, £210,000; antimony, £368,000; arsenic, £190,000; bismuth, £245,000; chrome, £131,000; diamonds, £147,000; magnesite, £276,000; molybdenite, £215,000; opal, £1,613,000; scheelite, £195,000; and oil shale, £2,695,000. In the Victorian returns antimony ore was responsible for £612,000. The value for coal in this State includes £2,708,000 for brown coal. Included in "other" in the Queensland production were opal, £187,000; gems, £640,000; bismuth, £130,000; cobalt, £158,000; molybdenite, £603,000; limestone flux, £791,000; and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £3,508,000; limestone flux, £306,000; gypsum, £975,000; phosphate, £135,000; and opal, £139,000. In the Tasmanian returns osmiridium was responsible for £610,000, scheelite for £112,000, and iron pyrites for £133,000.

6. Quarries.—Hitherto the data published in the Official Year Book relating to the mineral industry has contained no reference to quarrying. At the Conference of Australian Statisticians held in March, 1935, it was resolved that the values of quarry products should be included with mining. Steps are now being taken to give effect to this resolution, but some time must elapse before material can be collected in all States

7. Geophysical Methods for Detection of Ore Deposits.—Reference to the application of geophysical survey methods in Australia will be found in Official Year Book No. 24, p. 570. See also § 16 hereinafter.

§ 2. Gold.

1. Discovery in Various States.—The discovery of gold in payable quantities was an epoch-making event in Australian history, for, as one writer aptly phrases it, this event "precipitated Australia into nationhood." A more or less detailed account of the finding of gold in the various States appears under this section in Official Year Books Nos. 1 to 4

2. Production at Various Periods.—In the following table will be found the value of the gold raised in the several States and in Australia as a whole during each of the eight decennial periods from 1851 to 1930, and in single years from 1925 to 1936. Owing to the defective information in the earlier years the figures fall considerably short of the actual totals, for during the first stages of mining development large quantities of gold were taken out of Australia by successful diggers who preferred to keep the amount of their wealth secret.

GOLD.—VALUE OF PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Australia.
	£	£	£	£	£	£	£	£
1851-60..	11,530,583	93,337,052	14,565	..	..	788,564	..	105,670,764
1861-70..	13,676,103	65,106,264	2,076,494	..	..	12,174	..	80,871,035
1871-80..	8,576,654	40,625,188	10,733,048	579,068	..	700,048	79,022	61,293,028
1881-90..	4,306,541	28,413,792	13,813,081	216,668	178,473	1,514,921	713,345	49,216,821
1891-1900	10,332,120	29,904,152	23,989,359	219,931	22,308,524	2,338,336	906,988	89,999,410
1901-10..	9,569,492	30,136,686	23,412,395	310,080	75,540,415	2,566,170	473,871	142,009,109
1911-20..	4,988,377	13,354,217	9,876,677	238,808	46,808,351	873,302	100,652	76,240,384
1921-30..	949,946	2,721,309	1,976,715	47,564	20,462,957	193,833	9,894	26,353,218
1925 ..	82,498	200,901	197,118	3,535	1,874,320	14,969	1,939	2,375,280
1926 ..	82,551	208,471	43,914	3,219	1,857,716	17,936	594	2,214,401
1927 ..	76,595	163,600	161,321	1,776	1,734,571	20,646	468	2,159,076
1928 ..	54,503	144,068	59,395	2,258	1,671,093	15,306	431	1,944,054
1929 ..	31,842	111,609	40,250	4,289	1,602,142	23,772	553	1,814,457
1930 ..	53,066	102,456	33,224	5,569	1,773,500	18,976	57	1,986,848
1931 ..	118,623	262,488	79,652	17,328	3,054,743	28,150	2,535	3,563,519
1932 ..	203,622	351,586	173,144	22,018	4,413,809	43,137	4,196	5,211,512
1933 ..	226,068	448,228	710,168	49,619	4,915,950	51,579	4,449	6,406,061
1934 ..	307,662	597,040	982,636	58,582	5,534,491	48,139	8,124	7,536,674
1935 ..	439,419	768,401	904,755	64,109	5,677,328	73,143	44,458	7,971,334
1936 ..	525,792	987,004	1,018,718	66,593	7,320,309	152,201	76,001	10,182,738
Total ..								
1851-1936	65,741,062	307,013,407	89,821,143	1,919,829	196,721,350	9,383,695	2,423,535	672,525,221

The values quoted on this page are in Australian currency throughout.

Owing to the exhaustion of the more easily worked deposits and the unprofitableness of gold-mining during the era of high prices following the Great War, the production of gold in Australia declined from 3,838,029 ozs. in 1903 to 427,159 ozs. in 1929, the lowest output since the discovery of the precious metal.

Increased activity in prospecting due to prevailing economic conditions resulted in some improvement in 1930, but the marked development since that year received its impetus from the heavy depreciation of Australian currency in terms of gold. Oversea and local capital has been attracted to the industry and the employment of advanced geological methods and technical improvements have brought many difficult or extinct propositions into profit. The output of gold rose from 466,593 ozs. in 1930 to 1,176,095 ozs. in 1936, and further increases are forecast as new units are approaching production and many existing ones are being extensively developed. Values in Australian currency assigned to the production of gold during recent years in the above table are £5 19s. 9d. in 1931, £7 5s. 11½d. in 1932, £7 14s. 3½d. in 1933, £8 10s. 0½d. in 1934, £8 15s. 1¼d. in 1935 and £8 13s. 2d. in 1936. Monthly fluctuations in the price of gold in London and in Australia are shown in Chapter XXVII.—Public Finance. Reference to the bounty paid by the Commonwealth Government on local production will be found in § 16 *par. 1* hereinafter.

The amount of gold raised in Australia in any one year attained its maximum in 1936, in which year 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, 1894; and Tasmania, 1899.

The following table shows the quantity in fine ounces of gold raised in each State and in Australia during each of the five years ending 1936. A separate line is added showing the total production in thousands of fine ounces from 1851 to 1936:—

GOLD.—QUANTITY PRODUCED.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Ter. (a)	Australia
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
1932 ..	27,941	47,745	23,263	3,014	605,561	5,937	674	714,135
1933 ..	29,252	58,183	91,997	6,361	637,207	6,673	594	830,267
1934 ..	36,123	70,196	115,471	6,870	651,338	5,622	980	886,609
1935 ..	50,102	87,609	102,900	7,333	649,049	8,343	5,066	910,492
1936 ..	60,739	113,940	121,174	7,681	846,268	17,600	8,753	1,176,095
Total (b) 1851-1936	15,225	71,770	20,602	419	42,205	2,159	554	152,934

(a) Year ended 30th June.

(b) '000 omitted in each case

3. Changes in Relative Positions of States as Gold Producers.—The figures in the table showing the value of gold raised explain the enormous increase in the population of Victoria during the period 1851 to 1861, when an average of over 40,000 persons reached the Colony each year. With the exception of the year 1889, when its output was exceeded by that of Queensland, Victoria maintained its position as the chief gold-producer for a period of forty-seven years, or up to 1898, when its production was surpassed by that of Western Australia, the latter State from this year onward contributing practically half, and so far as the last ten years are concerned nearly four-fifths of the entire yield of Australia.

4. Place of Australia in the World's Gold Production.—The table given below shows the world's gold production, and the share of Australia therein in decennial periods since 1851 and during each of the last six years for which returns are available. The figures given in the table have been compiled from the best authoritative sources of information.

GOLD.—WORLD'S PRODUCTION.

Period.	World's Production of Gold.	Gold Produced in Australia.	Percentage of Australia on Total.
	Fine ozs.	Fine ozs.	%
1851-60 ..	61,352,295	24,877,013	40.55
1861-70 ..	53,675,679	19,938,661	35.47
1871-80 ..	50,473,314	14,429,599	28.59
1881-90 ..	51,998,060	11,586,626	22.28
1891-1900 ..	102,695,748	21,187,661	20.63
1901-10 ..	182,891,525	33,434,069	18.28
1911-20 ..	206,114,773	17,426,466	8.45
1921-30 ..	186,091,278	5,841,902	3.14
1930 ..	20,832,783	467,742	2.25
1931 ..	22,786,773	595,123	2.61
1932 ..	24,204,275	714,135	2.95
1933 ..	25,568,779	830,267	3.25
1934 ..	27,063,639	886,609	3.28
1935 ..	29,450,347	910,492	3.09

For the year 1935 the world's production of gold in fine ounces was 20,450,000, as compared with a return of 27,063,000 fine ounces in 1934. It is estimated that the world's production in 1936 approximated 35,000,000 fine ounces, of which Australia's share amounted to 1,176,095 fine ounces or 3.36 per cent.

The quantity of gold produced in the ten chief producing countries in each of the five years 1931 to 1935 is given in the table hereunder. Particulars of the quantity and value of the gold production for all countries for the ten years 1926-35 will be found in the Australian Production Bulletin No. 30 issued by this Bureau

GOLD.—PRODUCTION, CHIEF COUNTRIES.

Country.	1931.	1932.	1933.	1934.	1935.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
Union of South Africa	10,877,777	11,558,532	11,013,712	10,479,857	10,773,991
Soviet Union	1,700,960	1,900,000	2,814,000	3,700,000	4,500,000
Canada	2,693,892	3,044,387	2,949,309	2,972,074	3,284,890
United States	2,213,741	2,210,108	2,276,682	2,742,161	3,231,608
Australia	595,123	714,135	830,267	886,609	910,492
Rhodesia	532,111	580,484	645,087	693,265	727,928
Mexico	623,003	584,198	637,727	662,000	682,319
Japan	425,000	462,251	502,875	531,371	673,475
India	330,484	329,600	336,100	322,100	348,000
Gold Coast	261,651	278,782	305,008	326,040	358,835

The next table shows the average yearly production in order of importance of the yield in the chief gold-producing countries for the decennium of 1926-1935:—

GOLD.—AVERAGE ANNUAL PRODUCTION, CHIEF COUNTRIES, 1926 TO 1935.

Country.	Quantity.	Country.	Quantity.
	Fine ozs.		Fine ozs.
Union of South Africa	10,626,406	Australia	632,421
Canada	2,447,253	Rhodesia	605,517
United States	2,322,434	Japan	425,259
Soviet Union	2,039,173	India	348,200
Mexico	670,803	Gold Coast	252,808

5. Employment in Gold Mining.—The number of persons engaged in gold mining in each State at various intervals since 1901 is shown in the following table. The figures are inclusive of prospectors, etc., so far as they are ascertainable and include those who may not have worked during the whole of the year.

GOLD MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Total.
	No.	No.	No.	No.	No.	No.	No.	No.
1901	12,064	27,387	9,438	(a)1,000	19,771	1,112	(a) 200	70,972
1903 (b)	11,447	25,208	9,229	(a)1,000	20,716	973	(a) 200	68,573
1913	3,570	11,931	3,123	800	13,445	481	175	33,525
1923	1,141	2,982	603	32	5,555	119	30	10,462
1929	684	864	326	58	4,108	63	5	6,108
1930	4,229	942	993	114	4,452	43	4	10,687
1931	9,944	4,258	2,751	180	6,344	166	70	23,713
1932	8,154	6,089	3,893	142	7,083	250	80	20,600
1933	6,913	6,126	4,161	231	9,900	220	95	27,655
1934	7,080	6,943	3,867	804	12,523	275	115	31,607
1935	6,052	6,960	3,931	243	14,708	216	403	33,113

(a) Estimated.

(b) Year of Maximum Production.

Owing to causes referred to earlier in this section, the number employed in gold-mining had dwindled to the comparatively small figure of 6,108 in 1929. Stimulated by the enhanced price of gold in recent years a revival has occurred in the industry and employment therein has increased more than five-fold since 1929.

6. **Bounty on Production.**—A reference to the bounty provided by the Commonwealth on gold production in Australia will be found in § 16 par. 1 hereinafter.

§ 3. Platinum and Platinoid Metals.

1. **Platinum.**—(i) *New South Wales.* The deposits at present worked in the State are situated in the Fifield division, near Parkes, and the production in 1935 amounted to 98 ozs., valued at £640 as compared with 180 ozs., valued at £1,271 in the preceding year, while the total production recorded to the end of 1935 amounted to 20,093 ozs., valued at £127,627.

(ii) *Victoria.* In Gippsland the metal has been found in association with copper and 127 ozs. were produced in 1913, but there was no production in recent years.

(iii) *Queensland.* Platinum, associated with osmiridium, has been found in the beach sands between Southport and Currumbin, in creeks on the Russell gold-field near Innisfail, and in alluvial deposits on the Gympie gold-field, but no production has been recorded.

2. **Osmium, Iridium, etc.**—(i) *New South Wales.* Small quantities of osmium, iridium and rhodium are found in various localities. Platinum, associated with iridium and osmium, has been found in the washings from the Aberfoil River, about 15 miles from Oban; on the beach sands of the northern coast: in the gem sand at Bingara, Mudgee, Bathurst and other places. In some cases, as for example in the beach sands of Ballina, the osmiridium and other platinoid metals amount to as much as 40 per cent. of the platinum, or about 28 per cent. of the whole metallic content.

(ii) *Victoria.* In Victoria, iridosmine has been found near Foster, and at Waratah Range, South Gippsland.

(iii) *Tasmania.* The yield of osmiridium was returned as 235 ozs. in 1935 valued at £2,103 compared with the record production of 3,365 ozs. in 1925 valued at £103,570. The decrease in later years was largely due to the decline in price from £31 in 1925 to £9 per oz. in 1935, but the depletion of the known alluvial deposits was also a factor.

§ 4. Silver, Lead and Zinc.*

1. **Occurrence in Each State.**—Particulars regarding the occurrence of silver and associated metals in each State were given in Official Year Books, Nos. 1 to 5.

2. **Production.**—(i) *General.* The value of the production of silver, silver-lead ore and lead from each State during the five years ending 1935 is given hereunder:—

SILVER AND LEAD.—PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	£
1931 ..	1,079,359	9	306,393	5	3,103	54,778	160	1,443,897
1932 ..	1,566,912	208	756,546	..	5,716	69,941	..	2,399,323
1933 ..	1,783,207	198	708,804	..	6,860	70,795	410	2,570,274
1934 ..	2,199,823	370	671,255	..	7,199	43,850	11	2,922,508
1935 ..	3,189,388	642	755,899	..	12,687	63,713	..	4,022,329

(a) Year ended 30th June.

* Further details in regard to zinc are given in § 7 hereinafter.

(ii) *New South Wales.* The figures quoted above for New South Wales for the year 1935 include silver to the value of £8,110 and silver-lead ore and concentrates valued at £3,181,278. Since the Sulphide Corporation Ltd. ceased smelting operations in 1922 the silver (metal) is obtained chiefly in the refining of gold and copper ores, and there has been no production of lead (pig) in the State. It may be noted here that the bulk of the carbonate and siliceous ore from the Broken Hill field is sent for treatment to Port Pirie in South Australia, while the remainder of the ore is concentrated on the field and then dispatched to Port Pirie for refining. The output for 1935 showed an increase both in quantity and value over that of the previous year and was due to the improvement in the prices of silver and lead.

It must be understood that the totals for New South Wales in the above table represent the *net* value of the product (excluding zinc) of the silver-lead mines of the State. In explanation of the values thus given, it may be noted that, as previously mentioned, the metallic contents of the larger portion of the output from the silver-lead mines in the State are extracted outside New South Wales, and the Mines Department considers, therefore, that the State should not take full credit for the finished product. The real importance of the State as a producer of silver, lead and zinc is thus to some extent lost sight of. The next table, however, which indicates the quantity of these materials locally produced, and the contents by assay of concentrates exported during the years 1903, 1913, 1923 and for each of the last five years, will show, as regards New South Wales, the estimated total production and the value of the metal contents of all ore mined:—

SILVER-LEAD MINES.—NEW SOUTH WALES, TOTAL PRODUCTION.

Year.	Metal Produced within Australia.				Contents of Concentrates Exported.			
	Silver.	Lead.	Zinc.	Value.	Silver.	Lead.	Zinc.	Value.
	oz. fine.	tons.	tons.	£	oz. fine.	tons.	tons.	£
1903 ..	6,489,689	92,293	286	1,790,929	1,736,512	29,706	14,625	308,714
1913 ..	5,008,638	106,432	4,121	2,709,867	8,596,251	117,903	184,149	3,759,691
1923 ..	7,233,236	124,570	41,153	5,707,739	4,834,718	40,906	149,319	1,813,287
1931 ..	6,177,863	129,819	53,832	2,995,029	460,958	13,405	43,629	257,705
1932 ..	5,896,193	131,422	53,200	3,001,005	178,034	1,222	30,164	124,719
1933 ..	7,430,479	158,475	53,956	3,579,886	790,792	18,344	63,849	475,161
1934 ..	7,380,624	153,641	54,629	3,384,193	826,896	22,142	34,016	345,350
1935 ..	8,422,316	189,958	67,666	4,933,192	669,630	11,947	72,285	424,029

The figures given above are quoted on the authority of the Mines Department of New South Wales. Accurate details in regard to gold, copper, antimony, cadmium and cobalt contained in the silver-lead ores are not available. Cadmium was first extracted in 1922 at Risdon, in Tasmania, and in 1935 the amount won from ores of New South Wales origin was given as 219 tons, valued at £48,980. As pointed out previously, credit for the value is not taken in the New South Wales returns, the value accruing to the State being taken as that of the declared value of the concentrates at the time of their dispatch.

(a) *Broken Hill.* Broken Hill, in New South Wales, is the chief centre of silver production in Australia. A description of the silver-bearing area in this district is given in earlier issues of the Official Year Book. (See No. 4, page 506.)

Although the returns are not complete in all cases, the following table relating to the companies controlling the principal mines at Broken Hill will give some idea of the richness of the field:—

SILVER.—BROKEN HILL RETURNS TO END OF 1935.

Mine.	Value of Output to end of 1935.	Dividends and Bonuses Paid to end of 1935
	£	£
Broken Hill Proprietary Co. Ltd.	53,324,074	14,738,291
Broken Hill Proprietary Block 14 Co. Ltd.	4,750,508	670,160
British-Australian Broken Hill Co. Ltd.	5,858,998	821,280
Broken Hill Proprietary Block 10 Co. Ltd.	4,946,989	1,432,500
Sulphide Corporation Ltd. (Central and Junction Mines)	27,995,954	3,481,875
Broken Hill South Ltd.	25,065,159	5,875,000
North Broken Hill Ltd.	20,947,778	6,200,190
Broken Hill Junction Lead Mining Co.	1,185,058	87,500
Junction North Broken Hill Mine	3,511,940	171,431
The Zinc Corporation Ltd.	11,842,299	3,840,873
Barrier South Ltd.	151,517	50,000
Total	159,490,274	37,369,100

The returns relating to dividends and bonuses paid are exclusive of £1,744,000, representing the nominal value of shares in Block 14, British, and Block 10 companies, allotted to shareholders of Broken Hill Proprietary Company. If the output of the companies which were, prior to 1935, engaged in treating the tailings, etc., be taken into consideration, the totals for output and dividends shown in the table would be increased to about 166.8 millions and 40.4 millions respectively. The authorized capital of the various companies amounted to £10,818,000. In 1935 the dividends and bonuses paid amounted to £1,172,000 shared in by the Companies controlling the principal mines as follows: Zinc Corporation, £116,000; North Broken Hill, £385,000; Broken Hill South, £320,000; Broken Hill Proprietary, £336,000, and Sulphide Corporation, £15,000.

(b) *Other Areas.* Silver is found in various other localities in New South Wales, but the production therefrom in 1935 was unimportant: operations were either suspended or restricted to development work and prospecting.

(iii) *Victoria.* The silver produced in 1935 amounted to 3,948 ozs., valued at £642, and was obtained in the refining of gold at the Melbourne Mint.

(iv) *Queensland.* The prices of lead and silver improved during 1935 and the production of silver was well maintained at about 2.4 million fine ozs. Lead, however, again declined by 0,500 tons to 32,952 tons. The production of the mine and works at Mount Isa, which operated throughout the year, amounted to 2,351,135 ozs. of silver and 32,900 tons of lead. The production for the rest of the State was very small.

(v) *South Australia.* Silver ore has been discovered at Miltalie and Poonana, in the Franklin Harbour district, also at Mount Malvern and Olivaster, near Rapid Bay, and in the vicinity of Blinman and Farina, at Baratta, and elsewhere. There has been no production in recent years.

(vi) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1935 was 79,879 ozs., valued at £12,687.

(vii) *Tasmania.* The silver produced in 1935 amounted to 323,901 ozs., valued at £42,323, and the lead to 1,488 tons, valued at £21,390. This represents a slight increase in the production of silver and a small decline in lead. About 191,000 ozs. of the total silver output were contained in silver-lead, while 133,000 ozs. were contained in the blister copper produced by the Mount Lyell Co.

(viii) *Northern Territory.* A rich deposit of silver-lead and copper ore was located in 1930 at the Jervois Range about 200 miles east of Alice Springs. Development is, however, hindered by transport difficulties and lack of permanent water. Rich sulphides have been found at Barrow Creek. There was no record of production in 1931, 1932, and 1935. In 1933, 24 tons of silver-lead ores valued at £410 were raised whilst the production amounted to 8 tons valued at £11 in 1934.

3. *Production of Silver in Australia.*—The following table sets out as fully as possible the total production of silver in Australia. It is based on the data published by the Australian Mines and Metals Association and shows the quantity of refined silver recovered by smelters and mints and the estimated metallic contents of ores and concentrates exported:—

SILVER.—PRODUCTION IN AUSTRALIA.

Particulars.	1914.	1924.	1934.	1935.	1939.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
Metal recovered by—					
Smelters	4,020,904	7,529,845	8,583,133	8,880,823	8,360,673
Mints	226,019	101,368	91,416	103,127	138,001
Metallic contents in ores and concentrates exported ..	8,901,212	2,242,170	2,579,082	2,998,435	3,477,416
Total Production ..	13,148,135	9,873,383	11,253,631	11,982,385	11,976,090

4. *World's Production.*—The world's production of silver during the last five years for which particulars are available is estimated to have been as follows:—

SILVER.—WORLD'S PRODUCTION.

Total.	1931.	1932.	1933.	1934.	1935.
World's production in 1,000 fine ozs. ..	201,042	171,600	172,000	192,000	222,000

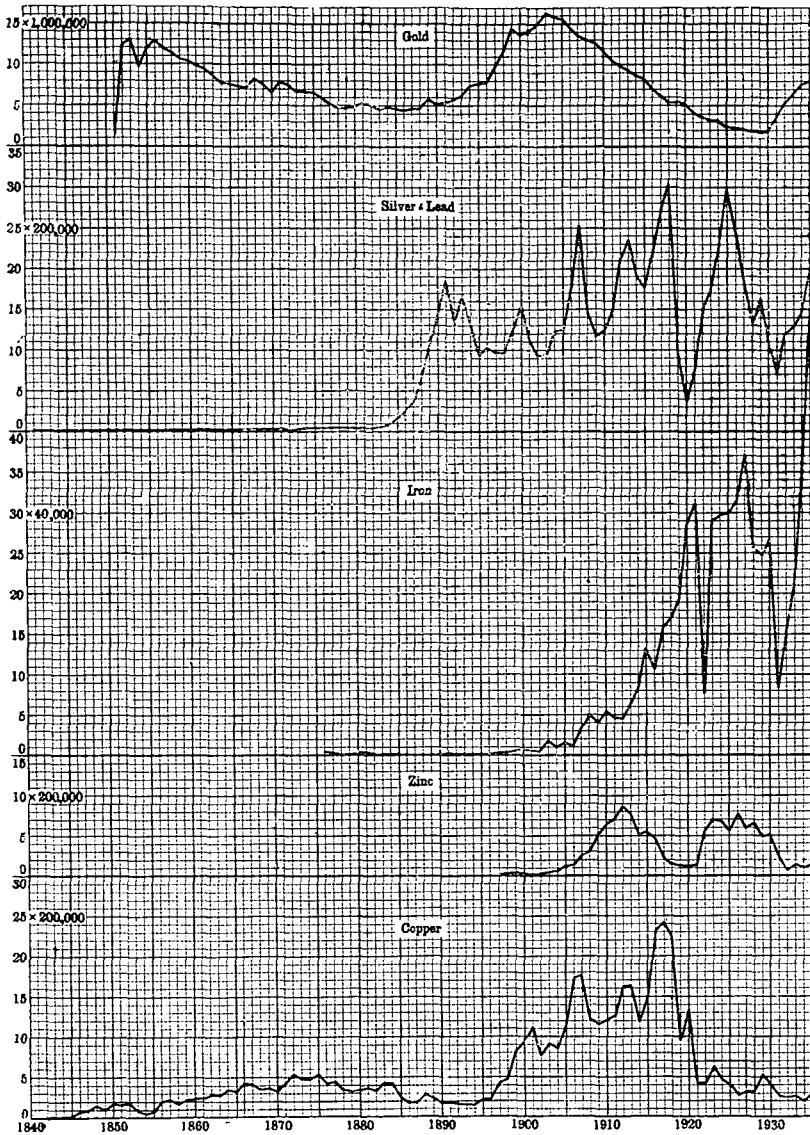
The world's production of silver in millions of fine ounces during the years 1915, 1925 and 1935 amounted respectively to 185.4, 245.2 and 222.0, of which Australia contributed 9.6 million, 10.9 million and 12.0 million fine ounces, or 5.2 per cent., 4.4 per cent. and 5.4 per cent. respectively. The production for Australia includes an estimate of the silver contents of the ores, bullion and concentrates exported.

Arranged in order of importance the estimated yields in 1935 from the chief silver producing countries were as follows:—

SILVER.—PRODUCTION, CHIEF COUNTRIES, 1935.

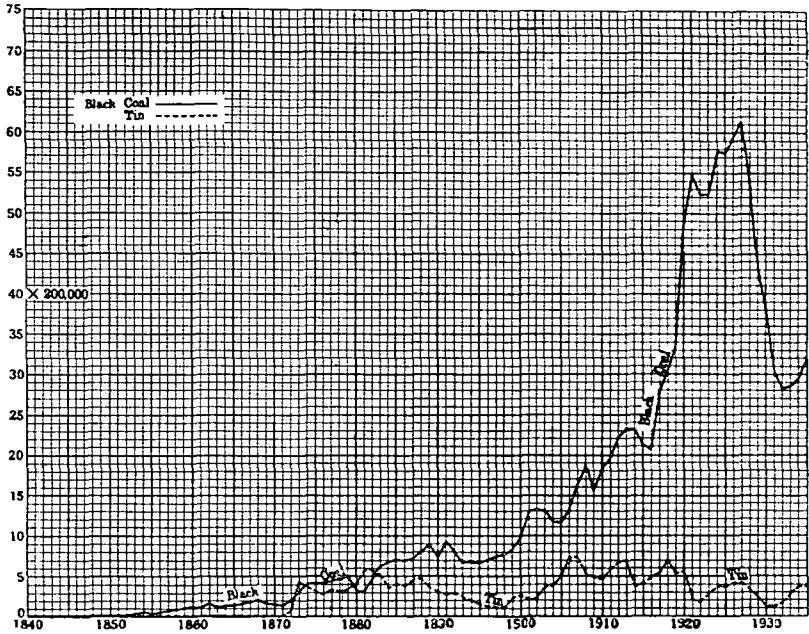
Country.	Production.	Country.	Production.
	Fine ozs. (^{'000 omitted.})		Fine ozs. (^{'000 omitted.})
Mexico	75,587	Germany	6,751
United States	48,511	India	5,850
Canada	16,619	Soviet Union	3,900
Peru	15,800	Belgian Congo	3,800
Australia	11,982	Yugoslavia	2,060
Japan	8,154	Spain and Portugal	1,450
Bolivia	7,951	Union of South Africa	1,042

VALUES OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1935.

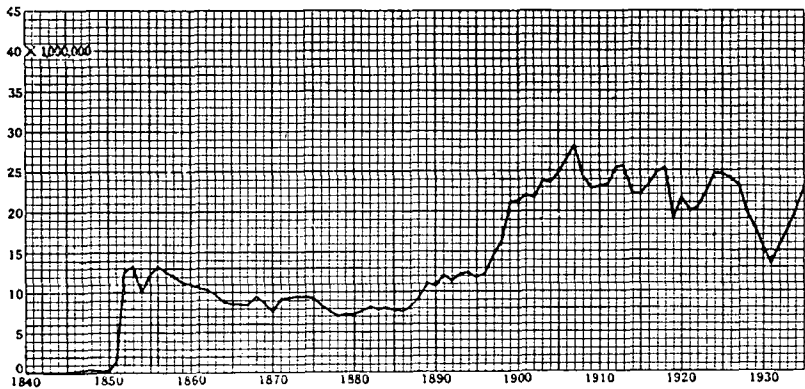


EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 onwards.

The base of each small square represents an interval of one year, and the vertical height represents in the case of gold £1,000,000; in the case of silver and lead, zinc and copper £200,000; and in the case of iron £40,000.

VALUES OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1935—*continued.*

Total Mineral Production



EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 onwards.

The base of each small square represents an interval of one year, and the vertical height represents in the case of coal and tin £200,000, and in the case of total mineral production £1,000,000.

5. Prices of Silver, Lead and Zinc.—In view of the close association in Australia, particularly in New South Wales, of ores containing these metals, the average prices of each metal during the last five years have been incorporated in the table hereunder:—

PRICES OF SILVER, LEAD AND SPELTER.

Metal.	1932.			1933.			1934.			1935.			1936.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Silver (Standard)															
per oz.	0	1	5.84	0	1	6.14	0	1	9.22	0	2	4.95	0	1	8.07
Lead .. per ton	12	0	6	11	16	4	11	1	0	14	5	7	17	12	6
Spelter per ton	13	13	10	15	14	10	13	15	6	14	3	6	15	0	8

A marked recovery in the price of lead and spelter has been noted during recent months. Between November, 1936, and March, 1937, the price of lead rose from about £22 to £33 per ton whilst that of spelter rose from £16 to more than £33 per ton. Prices receded somewhat following that month and by June, 1937 were quoted at £23 and £22 per ton respectively. Silver at that date was about 18s. 8½d. per oz.

6. Employment in Silver, Lead and Zinc Mining.—The average number of persons employed in mining for these metals during each of the last five years is given below:—

SILVER, ETC., MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Ter.	Australia.
	(a) No.	No.	No.	(b) No.	(a) No.	No.	No.
1931 ..	2,812	351	2	15	299	4	3,483
1932 ..	3,145	443	1	16	932	1	4,538
1933 ..	3,197	553	..	10	962	..	4,722
1934 ..	3,237	523	..	4	958	1	4,723
1935 ..	3,536	544	..	..	1,046	..	5,126

(a) Silver, lead and zinc.

(b) Principally lead and silver-lead ore.

With the development of the great silver-lead field at Mount Isa in Queensland and a recovery in the price of metal, it is expected that the employment returns for that State will in future assume considerable importance. The actual number of men employed at the end of 1935 on this field totalled 1,138, including 531 engaged in mining operations, 78 in milling and 179 in smelting.

§ 5. Copper.

1. Production.—The production of copper in the various States has been influenced considerably by the ruling prices, which have undergone extraordinary fluctuations. In 1925 when copper was worth £65 18s. 1d. per ton the production of metal amounted to 17,012 tons exclusive of 4,534 tons of ore. During the three years ended 1934 the price averaged little more than £31 per ton and the production dropped to an average of about 13,800 tons. Production responded to a slight improvement in price during 1935 and amounted to 17,000 tons. The value of the local production as reported and credited to the mineral industry for the years 1931 to 1935 is shown hereunder. Quantities for Australia as a whole as returned by the several State Mines Departments are appended on separate lines at the foot of the table:—

COPPER.—PRODUCTION.

State.	1931.		1932.		1933.		1934.		1935.	
		£		£		£		£		£
New South Wales .. ..	..	23,948	..	21,785	..	26,775	..	25,398	..	30,071
Queensland .. ..	..	126,342	..	108,858	..	105,031	..	95,903	..	101,489
South Australia .. ..	..	934	..	..	..	2,928	..	8,475	..	11,065
Western Australia .. ..	..	..	..	..	..	1,132	..	..	..	..
Tasmania .. ..	..	416,309	..	399,762	..	395,286	..	267,342	..	464,007
Northern Territory (a) ..	..	25	..	137	..	..	..	..	..	..
Australia .. ..	..	567,558	..	530,542	..	531,152	..	397,118	..	606,632
Ingot, Matte, etc.	tons	13,453	..	14,763	..	14,493	..	12,003	..	16,992
Ore	tons	79	..	20	..	..	..	96	..	56

(a) Year ended 30th June.

2. Sources of Production.—(i) *New South Wales*. The production during 1935 amounted to 800 tons of electrolytic copper and 56 tons of ore, the latter being exported overseas. Practically all of the copper was obtained at Port Kembla from the treatment of 1,953 tons of copper matte forwarded by the Broken Hill Smelters and derived from Broken Hill silver-lead ores. Copper mines operated in the State during the year but the outputs were very small. Since 1919 the production in New South Wales has rarely exceeded 1,000 tons, whilst previously it had ranged from 2,500 tons in 1915 to 10,600 tons in 1911.

(ii) *Queensland*. The yield in this State amounted in 1935 to 2,900 tons valued at £101,489, and showed a serious decline as compared with 1920 when nearly 16,000 tons valued at £1,552,000 were raised. The falling-off in the yield in recent years was due primarily to the low prices realized for copper. Returns from the chief producing areas in 1935 were as follows: Cloncurry, 1,417 tons, £49,609; Herberton, 148 tons, £5,174; and Mount Morgan, 1,166 tons, £40,809.

(iii) *South Australia*. Deposits of copper are found over a large portion of South Australia and its total production easily exceeds that of any other State. Compared with the output of previous years the production of South Australia has dwindled during recent times to very small dimensions, and is now exceeded by that of Tasmania and Queensland. A short account of the discovery, etc., of some of the principal mining areas, such as Kapunda, Burra Burra, Wallaroo and Moonta, was given in earlier issues of the Official Year Book. The Moonta and Wallaroo copper field, which was opened in 1860, was worked continuously and up to the close of 1931, £20,500,000 of copper was produced. Since 1933 the field has been worked on a co-operative basis known as the Moonta Mining Scheme which was referred to in previous issues of the Official Year Book. Plans for the development of this area are contemplated by private interests.

(iv) *Western Australia*. Thirty-five tons of copper valued at £1,132 were recovered in this State during 1933, but no production has since been recorded.

(v) *Tasmania*. The quantity of copper produced in Tasmania during 1935 was 13,036 tons, valued at £464,007, the whole of the production being by the Mount Lyell Mining and Railway Co. Ltd. This Company treated 59,690 tons of ore and concentrates and produced 13,136 tons of blister copper, containing copper, 13,036 tons; silver, 132,857 oz.; and gold, 7,030 oz., the whole being valued at £541,520.

(vi) *Northern Territory*. Copper has been found at various places, but lack of capital, low prices and difficulty of transport prevent the development of the deposits. There was no production in 1935.

3. Prices.—The great variation in price that the metal has undergone is shown in the following table, which gives the average price in London and New York during each of the last five years. The figures are given on the authority of *The Mineral Industry* :—

COPPER.—PRICES, LONDON AND NEW YORK.

Year.	Average London Price per Ton Standard Copper.	Average New York Price in Cents per lb. Electrolytic Copper.
	£	Cents.
1931	38.34	8.12
1932	31.68	5.56
1933	32.52	7.02
1934	30.28	8.43
1935	31.87	8.65

As evidence of the tremendous variation in the price of copper it may be noted that in December, 1916, the average London price of standard copper was £145.32 per ton, while in June, 1927, it was quoted at £54.03. In 1930 the average price was about the same, i.e., £54. During the succeeding five years the price averaged nearly £33 per ton but by June, 1937, it had risen to more than £60. If the latter price holds it will lead to considerable activity in copper mining in Australia.

4. **World's Production of Copper.**—The world's production of copper during the five years 1931–1935 is estimated to have been as follows. The figures have been taken from the statistical summary prepared by the Imperial Institute.

COPPER.—WORLD'S PRODUCTION.

Year.	1931.	1932.	1933.	1934.	1935.
World's production—tons ..	1,328,600	881,000	1,040,000	1,300,000	1,480,000

The yields from the chief copper-producing countries in 1935 were as follows :—

COPPER.—PRODUCTION, CHIEF COUNTRIES, 1935.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	372,646	Germany	55,100
Chile	255,821	Yugoslavia	38,384
Canada	172,678	Mexico	37,592
Rhodesia	143,501	Peru	29,907
Belgian Congo	105,981	United Kingdom	12,400
Japan	68,727	Union of South Africa	11,449
Soviet Union	60,000	Australia	11,168

During the five years ending in 1935 the share of the United States in the world's copper production amounted to over 24 per cent., while the Australian proportion was only about 1 per cent.

A recovery in the world consumption of copper and the consequential reduction of stocks was recorded during 1935. In addition, prices showed an upward tendency. These factors are reflected in the increased production which is shown in nearly all of the copper producing countries of the world.

5. **Employment in Copper Mining.**—The number of persons employed in copper mining during each of the last five years was as follows :—

COPPER MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1931	35	287	61	..	1,442	3	1,828
1932	(a) 3	278	51	..	1,518	3	1,853
1933	(a) 13	175	54	..	1,483	1	1,726
1934	4	151	45	..	1,471	..	1,671
1935	7	170	54	..	1,758	..	1,989

(a) No production from copper mines.

In 1917 over 9,000 persons were engaged in copper mining.

§ 6. Tin.

1. **Production.**—The price of tin during 1935 was nearly equal to the high level recorded in 1934 and production responded accordingly. Compared with the latter year, the yield of tin increased by 279 tons during 1935. The next table shows the value of the production as reported to the Mines Departments in each of the States during the five years 1931 to 1935. A separate line is appended showing the recorded tonnages for Australia during each of the specified years :—

TIN.—PRODUCTION.

State.	1931.	1932.	1933.	1934.	1935.
	£	£	£	£	£
New South Wales	103,111	120,124	218,244	328,130	287,890
Victoria	440	404	1,350	3,886	14,475
Queensland	35,744	66,174	123,620	179,404	187,234
Western Australia	3,945	3,295	4,557	6,765	8,829
Tasmania	70,634	109,767	190,041	219,246	258,919
Northern Territory (a) ..	2,331	2,322	2,519	9,566	6,036
Total	216,205	302,086	540,331	746,997	763,383
Tonnage	1,938	2,396	3,020	3,323	3,602

(a) Year ended 30th June.

2. **Sources of Production.**—(i) *New South Wales.* The production in 1935 was estimated at 1,075 tons of ingots valued at £284,764 and 21 tons of concentrates valued at £3,126 were exported overseas. A large proportion of the output in this State is obtained in normal years by dredging, principally in the New England district, the quantity so won in 1935 being 502 tons, valued at £87,790. The Tingha area was the principal contributor to the output in 1935, the yield from this district comprising 424 tons of concentrates. Amongst other areas, Emmaville produced 257 tons, Ardlethan 269 tons, while the lode mines at Torrington returned a yield of 166 tons.

(ii) *Victoria.* The production of tin in Victoria is small, being chiefly obtained by dredging in the Beechworth district and by mining in the Toora district in Gippsland. The production in 1935 amounted to 88 tons, valued at £14,475.

(iii) *Queensland.* The chief producing districts in Queensland during 1935 were Herberton, 801 tons, valued at £123,923; Cooktown, 55 tons, £9,203; Stanthorpe, 209 tons, £34,696; Chillagoe, 15 tons, £2,411 and Kangaroo Hills, 104 tons, £16,404. The total production, 1,189 tons, £187,234, showed an advance on that for 1934, but it is far below that of the early years of this century, when the production ranged between 2,000 and 5,000 tons per annum.

(iv) *Western Australia.* The export of tin from the State in 1935 amounted to 60 tons, valued at £8,829. This quantity won during the year was obtained in the Pilbara and Greenbushes fields. The Mines Department proposes to test certain areas by boring for deep leads, but these operations were not commenced in 1935.

(v) *Tasmania.* For 1935 the output amounted to 1,131 tons of tin, valued at £258,919, an increase of 179 tons in quantity and £39,673 in value over the return for the previous year. Operations at Mount Bischoff, the principal producer, were mainly carried on by the tributers. The development of the tin deposits received more attention than any other mineral during 1935. New capital has been introduced and preparations made for large scale operations. These consist of the installation of machinery, water conservation and constructional work generally. It is expected that the output will be increased considerably when the production stage is reached.

(vi) *Northern Territory*. The production for the year amounted to 38 tons of concentrates valued at £6,036. Thirty-one tons were produced on the Maranboy field and the balance was made up of small parcels from various other localities.

3. **World's Production.**—According to *The Mineral Industry* the world's production of tin during each of the last five years was as follows :—

TIN.—WORLD'S PRODUCTION.

1931.	1932.	1933.	1934.	1935.
Tons.	Tons.	Tons.	Tons.	Tons.
147,900	96,100	89,000	117,000	146,500

The world production of tin showed a considerable increase in 1935 and is due principally to the increased output of the chief producing countries—Malaya, Bolivia, Netherlands East Indies, Siam and Nigeria. These countries produced more than three-quarters of the world's total production in 1935. A further extension of the agreement to control production and export of tin has been effected by these countries for a period ending in 1941. There has been no concerted restriction of production in Australia.

The yields from the chief producing countries in 1935 were as follows :—

TIN.—PRODUCTION, CHIEF COUNTRIES, 1935.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Malaya	45,919	Belgian Congo	6,447
Bolivia	27,168	India	4,102
Netherlands East Indies	24,613	Australia	3,602
Siam	9,779	Great Britain	2,053
China	9,742	Indo-China	1,421
Nigeria	6,949	Union of South Africa	594

Australia's share of the world's tin production, estimated at 146,500 tons in 1935, would appear to be a little less than 3 per cent.

4. **Prices.**—The average price of the metal in the London market for the years 1931 to 1936 was as follows :—

TIN.—PRICES, LONDON.

Year.	Average Price Per Ton.	Year.	Average Price Per Ton.
	£ s. d.		£ s. d.
1931	118 9 1	1934	230 7 5
1932	135 18 10	1935	225 14 5
1933	194 11 11	1936	(a) 204 12 8

(a) Price in June, 1937, £249 19s. 11d. per ton.

The price of tin reached the low level of £118 per ton in 1931 compared with £179 per ton, the average for the quinquennium 1909-13. Prices have since recovered and the industry has made progress during recent years.

5. **Employment in Tin Mining.**—The number of persons employed in tin mining during the last five years is shown below :—

TIN MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Victoria. (a)	Q'land.	W. Aust.	Tas.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1931	994	3	548	17	625	29	2,216
1932	1,201	27	597	41	870	27	2,763
1933	1,448	..	818	63	1,007	33	3,369
1934	1,903	10	1,214	73	1,247	120	4,567
1935	1,807	5	1,122	58	1,452	30	4,474

(a) The tin produced in Victoria was raised by a dredging company operating primarily for gold.

§ 7. Zinc.

1. **Production.**—(i) *New South Wales.* (a) *Values Assigned.* The production of zinciferous concentrates is confined chiefly to the Broken Hill district of New South Wales, where zincblende forms one of the chief constituents in the enormous deposits of sulphide ores. During the earlier years of mining activity on this field a considerable amount of zinc was left in tailings, but from 1909 onwards improved methods of treatment resulted in the profitable extraction of the zinc contents of the accumulations at the various mines.

As the metallic contents of the bulk of the concentrates, etc., produced in the Broken Hill district are extracted outside New South Wales, the mineral industry of that State is not credited by the Mines Department with the value of the finished product. During 1935 the zinc concentrates produced amounted to 243,604 tons, valued at £230,890. Portion of the zinc concentrates produced is treated at Risdon in Tasmania, and the balance is exported overseas.

(b) *Local and Foreign Extraction.* A statement of the quantity of zinc extracted in Australia and the estimated zinc contents of concentrates exported overseas during the five years 1931 to 1935 will be found in § 17 hereinafter.

(ii) *Queensland.* The production of zinc was reported in the Cloncurry district of Queensland during 1935 and amounted to 4,411 tons valued at £68,863. This was the first production recorded since 1926, when 200 tons of metal valued at £6,827 were produced.

(iii) *South Australia.* Zinc is known to exist in various localities in South Australia, but there has been no production during recent years.

(iv) *Tasmania.* The production of zinc ores remained suspended during 1935. Developmental work on the Mount Read and Roseberry districts was continued during that period and production which commenced in 1936 amounted to 18,769 tons valued at £283,175.

The Electrolytic Zinc Co. at Risdon operated during 1935 on raw materials obtained wholly from Broken Hill in New South Wales. Production amounted to 67,666 tons of slab zinc valued at £1,244,840, and 219 tons of cadmium, valued at £48,980.

2. **World's Production.**—According to *The Mineral Industry* the world's production of zinc during the five years 1931–35 was as follows :—

ZINC.—WORLD'S PRODUCTION.

1931.	1932.	1933.	1934.	1935.
Tons.	Tons.	Tons.	Tons.	Tons.
989,000	780,000	986,000	1,162,000	1,328,000

The yields from the chief producing countries in 1935 were as given hereunder, the figures referring to slab zinc produced in the various countries, irrespective of the source of the ore. In common with the other industrial metals zinc suffered from a combination of low prices and reduced demand during the years 1931 and 1932. Compared with the last-named year, world production and consumption showed a substantial increase during the past three years, despite the fact that prices still remained at a low level. The International Zinc Cartel which was organized in 1931 continued to operate until December, 1934, when it automatically went out of existence.

ZINC.—PRODUCTION, CHIEF COUNTRIES, 1935.

Country.		Production.	Country.		Production.
		Tons.			Tons.
United States	.. ..	385,000	Soviet Union	.. ..	45,300
Belgium	.. ..	179,700	Norway	.. ..	44,300
Canada	.. ..	133,000	Mexico	.. ..	39,400
Australia	.. ..	122,400	Japan	.. ..	33,200
Germany	.. ..	122,200	Italy	.. ..	25,800
Poland (a)	.. ..	83,600	Rhodesia	.. ..	20,600
Great Britain	.. ..	60,400	Netherlands	.. ..	13,500
France	.. ..	50,600	Spain	.. ..	7,500

(a) Including Upper Silesia.

The figures for Australia have been taken from returns supplied by the Australian Mines and Metals Association. On a world's production of 1,328,000 tons Australia's output of 122,400 tons represents 9 per cent.

3. Prices.—Information regarding prices of zinc will be found in the table in § 4 par. 5, *ante*.

§ 8. Iron.

1. **General.**—The wide distribution of iron ore throughout Australia has long been known, extensive deposits having been discovered at various places throughout the States, but the conversion of these deposits to the production of iron and steel is, at present, confined to New South Wales.

2. **Production.**—(i) *New South Wales.* The production from ores mined in New South Wales in 1935 amounted to 4,580 tons, valued at £18,320. This is the first occasion since 1929 that ore of New South Wales origin has been used in the production of pig iron in that State. For many years now the chief source of supply has been South Australia. The figures quoted, therefore, do not represent the total production of pig iron.

Small quantities of iron oxide produced in New South Wales are used by the various gasworks 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 1935 the iron oxide raised amounted to 4,546 tons, valued at £2,546. Ironstone flux amounting to 2,432 tons valued at £950 was raised in the Goulburn Division during 1933. This is the only production recorded since 1922.

(ii) *South Australia.* The production from the deposits worked by the Broken Hill Pty. Co. Ltd., at Iron Knob and at Middlebank reached its maximum in 1935, when 1,868,719 tons of ore were raised valued at £2,149,027. The extent of the recovery that has been made in the iron and steel industry may be gauged from a comparison with the output of 289,179 tons in 1931.

(iii) *Western Australia.* Development works were in progress on the deposits at Yampi Sound but these have not yet reached the production stage.

(iv) *Tasmania.* The production of iron pyrites during 1935 amounted to 25,555 tons valued nominally at £1 per ton. This is produced as a by-product from the Mount Lyell flotation plant and is exported to the mainland, where the sulphur contents are used in the manufacture of chemical fertilizers displacing sulphur imported from overseas. A marked increase in the production for 1935 is noted compared with that of 1934, 12,030 tons, 1933, 1,498 tons and 1932, 274 tons. Apart from this pyritic ore there has been no production of iron ore since the year 1908.

(v) *Other States.* Reference to the iron ore deposits in the other States will be found in preceding issues of the Official Year Book (see No. 22, page 779).

3. *Iron and Steel Bounties.*—During the year 1935–36 the bounties paid under the Iron and Steel Products Bounty Act on articles manufactured from locally produced materials were as follows: wire-netting, £10,659; traction engines, £9,814.

4. *World's Production of Iron and Steel.*—(i) *General.* The Australian production of iron and steel at present forms a very small proportion of the world's output. According to *The Mineral Industry*, the world's production of each commodity in the years specified distributed over principal countries was as follows:—

PIG IRON AND STEEL.—WORLD'S PRODUCTION.

Country.	Pig Iron.			Steel Ingots and Castings.		
	1933.	1934.	1935.	1933.	1934.	1935.
	Thousands of Tons.			Thousands of Tons.		
United States ..	13,346	16,139	21,373	23,232	26,468	34,550
Germany ..	5,267	8,742	12,539	7,586	11,886	16,096
Soviet Union ..	7,250	10,329	12,493	6,920	9,394	12,520
United Kingdom ..	4,124	8,742	6,426	7,003	8,859	9,842
France ..	6,327	6,155	5,799	6,526	6,148	6,264
Belgium ..	2,744	2,907	3,060	2,689	2,900	2,966
Japan ..	2,032	2,404	2,716	3,047	3,742	4,532
Luxemburg ..	1,888	1,955	1,872	1,845	1,932	1,837
Saar Territory ..	1,592	1,826	(a)	1,676	1,950	(a)
India ..	913	1,297	1,056	694	798	912
Czechoslovakia ..	499	590	811	747	936	1,197
Italy ..	517	521	622	1,784	1,696	2,171
Canada ..	229	407	600	408	759	936
Australia ..	350	430	572	375	461	615
Sweden ..	319	523	566	628	858	895
Poland ..	306	382	394	817	844	946
Spain ..	347	348	350	468	407	560
China ..	200	225	250	40	50	60
Austria ..	88	134	193	226	309	364
Total—All Countries	48,781	64,240	72,111	67,081	80,797	97,887

(a) Included with Germany.

In regard to both iron and steel the figures for world production reached an exceptionally low ebb in 1932, namely, pig iron, 39,275 tons; steel, 50,029 tons. In 1933, practically all steel producing nations recorded increased production which has since continued to expand. The principal producers in Australia are the Broken Hill Proprietary and the Australian Iron and Steel Co., the former situated at Newcastle and the latter at Port Kembla in New South Wales. Additional plant has been authorized at both of these works in order to meet the increasing demand for steel in Australia.

(ii) *Australia.* The production of steel and pig iron in New South Wales, which is the only producing State, is shown during each of the last ten years.

PIG IRON AND STEEL.—AUSTRALIAN PRODUCTION.

Year ended 30th June—	Pig Iron.	Steel Ingots.	Steel Rails, Bars and Sections.	Year ended 30th June—	Pig Iron.	Steel Ingots.	Steel Rails, Bars and Sections.
	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.
1927 ..	468,899	410,728	360,212	1932 ..	190,132	221,488	178,740
1928 ..	428,404	405,590	350,941	1933 ..	336,246	392,666	295,523
1929 ..	461,110	432,773	353,921	1934 ..	487,259	518,326	431,765
1930 ..	308,369	314,917	256,696	1935 ..	698,493	696,861	585,838
1931 ..	232,783	228,363	188,708	1936 ..	783,233	820,395	671,244

§ 9. Other Metallic Minerals.

Tungsten ores—wolfram and scheelite—occur in several of the States, in the Northern Territory and on King Island in Bass Strait, the last-named being the subject of an investigation in 1934. On account of the low prices during recent years, mining activities have been restricted and production intermittent. During 1935, 8,061 cwts. of wolfram valued at £48,307 were raised in Australia, of which New South Wales produced 1,095 cwts. valued at £5,694; Queensland, 480 cwts., £2,888; Tasmania, 4,640 cwts., £29,345; and Northern Territory, 1,846 cwts., £10,380. New South Wales and Queensland were the only States in which the production of scheelite was recorded in 1935: the quantities raised amounted to 50 cwts. and 22 cwts. valued at £381 and £120 respectively. With a recovery in prices, Australia will probably be an important contributor to the world's output of tungsten ore.

Detailed information in regard to the occurrence and production of other metallic minerals in each of the States will be found in Official Year Book No. 22, pp. 780-3 and preceding issues.

§ 10. Coal.

i. Production in each State.—An account of the discovery of coal in each State will be found in preceding issues of the Official Year Book. (See No. 3, pp. 515-6.) The quantity and value of the production in each State and in Australia during the years specified are given in the table hereunder:—

COAL.—PRODUCTION.

Year.	N.S.W.	Victoria. (a)	Q'land.	S. Aust.	W. Aust.	Tasmania.	Australia.
QUANTITY.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1913 ..	10,414,165	593,912	1,037,944	..	313,818	55,043	12,414,882
1921 ..	10,793,387	514,859	954,763	..	468,817	66,476	12,798,302
1931 ..	6,432,382	571,342	841,308	..	432,400	123,828	8,401,260
1932 ..	6,784,222	432,353	841,711	..	415,719	111,853	8,585,858
1933 ..	7,118,437	523,000	875,567	..	458,399	116,573	9,091,976
1934 ..	7,873,180	356,958	956,558	..	500,343	113,633	9,800,672
1935 ..	8,698,579	476,495	1,051,978	..	537,188	123,714	10,887,954
VALUE. (b)							
	£	£	£	£	£	£	£
1913 ..	3,770,375	274,371	403,767	..	153,614	25,367	4,627,494
1921 ..	9,078,388	603,323	831,483	..	407,117	63,446	10,983,757
1931 ..	4,607,343	362,284	699,926	..	336,178	98,004	6,103,735
1932 ..	4,376,453	274,903	684,555	..	270,630	86,733	5,693,274
1933 ..	4,306,799	328,704	693,383	..	289,806	85,848	5,704,540
1934 ..	4,541,923	215,413	752,303	..	278,704	81,262	5,860,605
1935 ..	4,887,341	282,253	843,034	..	318,013	86,204	6,416,845

(a) Exclusive of brown coal, shown in next table.

(b) At the pit's mouth.

The figures for Victoria already quoted are exclusive of brown coal, the quantity and value of which for the years specified were as follows. The reduced output for 1935 is attributable to floods which retarded production during the early months of the year.

BROWN COAL.—PRODUCTION, VICTORIA.

Year.	Quantity.	Value. (a)	Year.	Quantity.	Value. (a)
	Tons.	£		Tons.	£
1913	2,984	569	1932	2,612,512	274,903
1921	79,224	31,074	1933	2,580,060	271,360
1926	957,935	188,899	1934	2,617,534	264,192
1930	1,831,507	173,713	1935	2,221,515	317,444

(a) Cost of Production.

2. Distribution and Production of Coal in each State.—(i) *New South Wales.*—

The coal deposits of New South Wales constitute the most important and extensively worked in Australia. The principal fields are known as the Northern, Southern and Western, and are situated at Newcastle, Bulli and Lithgow respectively.

The coal from the various districts differs considerably in quality—that from the Northern district being especially suitable for gas-making and household purposes, while the product of the Southern and Western is an excellent steaming coal. At the present time the Greta coal seams in the Northern division are being extensively worked between West Maitland and Cessnock, and this stretch of country, covering a distance of 15 miles, is now the most important coal-mining district in Australasia.

The table hereunder gives the yields in each of the three districts during the five years 1931 to 1935 :—

COAL.—PRODUCTION IN DISTRICTS, NEW SOUTH WALES.

District.	1931.	1932.	1933.	1934.	1935.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	4,161,798	4,398,253	4,651,483	5,227,647	5,679,802
Southern	981,964	1,112,686	1,218,014	1,344,669	1,558,282
Western	1,288,620	1,273,283	1,248,940	1,300,864	1,460,495
Total	6,432,382	6,784,222	7,118,437	7,873,180	8,698,579
Total Value (a) £ ..	4,607,343	4,376,453	4,306,799	4,541,923	4,887,341
Average value per ton (a) ..	14s. 4d.	12s. 11d.	12s. 1d.	11s. 6d.	11s. 3d.

(a) At the pit's mouth.

During the five years ended 1927, the average annual production of coal in New South Wales exceeded 11,000,000 tons, but in 1928 the output declined to 9,448,000 tons owing to a reduction of oversea and interstate orders. A prolonged stoppage of work in the Northern mines during the next two years and the advent of the industrial depression reduced the yield to 6,430,000 tons in 1931 since when it has gradually risen to 8,699,000 tons in 1935. Of the total quantity of coal won in New South Wales since the inception of operations to the end of the year 1935, viz., 394,000,000 tons, about 267,750,000 or 68 per cent. was obtained in the Northern District, 81,500,000 tons or 21 per cent. came from the Southern District, and 45,000,000 tons or 11 per cent. was contributed by the mines in the Western District.

(ii) *Victoria. (a) Black Coal.* The deposits of black coal in Victoria occur in the Jurassic system, the workable seams, of a thickness ranging from two feet three inches to six feet, being all in the Southern Gippsland district.

The output of black coal in Victoria during the last five years was as follows :—

BLACK COAL.—PRODUCTION, VICTORIA.

Year.	State Coal Minc.	Other Coal Mines.	Total Production.	Total Value. (a)	Average Value per ton. (a)
	Tons.	Tons.	Tons.	£	s. d.
1931	532,003	39,339	571,342	362,284	12 8
1932	359,011	73,342	432,353	274,903	12 9
1933	444,868	78,132	523,000	328,704	12 7
1934	268,861	88,097	356,958	215,413	12 1
1935	393,532	82,963	476,495	282,253	11 10

(a) At the pit's mouth.

(b) *Brown Coal.*—(1) *General.* Some account of the brown coal deposits and of the operations of the State Electricity Commission in connexion therewith will be found in preceding Official Year Books (*see* No. 22, page 785). The brown coal produced in Victoria in 1935 amounted to 2,221,515 tons, all but 1,000 tons being procured at the State open cut at Yallourn. During the year 1935-36, 2,988,430 tons of brown coal were produced by the State Electricity Commission, of which 1,584,858 tons went to the power station and 1,403,572 tons to the briquette factory.

(2) *Production of Briquettes.* The briquetting plant started operations in November, 1924, and the output for fourteen months ending December, 1925, was 77,945 tons. In 1926 the output was 95,477 tons which had increased to 180,905 tons in 1930 and to 357,601 tons in 1935. The Yallourn briquettes are considered to be equal in quality to those produced in the best German factories.

(iii) *Queenstown.* The distribution of production during the year 1935 was as follows :—

COAL PRODUCTION.—QUEENSLAND, 1935.

District.	Production.	District.	Production.
	Tons.		Tons.
Ipswich	496,411	Clermont	84,047
Darling Downs	78,945	Bowen	216,008
Wide Bay and Maryborough	82,707	Mount Mulligan (Chillagoe)	20,320
Rockhampton (Central) ..	64,753	Other	8,787
		Total	1,051,978

The production in 1935 continues to show an improvement on that of recent years but it is still 23 per cent. below the peak production of 1,369,000 tons in 1929. The distribution of the 1,051,978 tons raised in 1935 was as follows: Railway Department, 433,551 tons; other industries within the State, 543,091 tons; exported, 75,326 tons. There were 50 collieries operating in the Ipswich district, 7 in the Darling Downs, 8 in the Maryborough area, 4 in Clermont district, 4 in Rockhampton district, 1 in Chillagoe district 1 at Mount Morgan, 1 at Mackay, and 2 in the Bowen district. State coal mines are in operation at Collinsville in the Bowen field, at Styx in the Central area, and at Mount Mulligan.

(iv) *South Australia.* So far no coal has been worked in South Australia (*see* Official Year Book No. 22, page 786).

(v) *Western Australia.* The production from the six collieries operating on the Collie field amounted in 1935 to 537,188 tons, an increase of nearly 37,000 tons on the return for 1934. The deposits at Wilga again remained unworked during the year.

(vi) *Tasmania*. The production in 1935 amounted to 123,714 tons, about 10,000 tons more than the total for 1934. The industry is being carried on under difficulties owing to restricted markets and consequently operations are *not continuous*. About 57,000 tons of the total output in 1935 were contributed by the Cornwall Coal Company, 27,000 tons by the Mt. Nicholas Proprietary and 15,000 tons by the Jubilee Company. The three mines combined raised 99,000 tons or 80 per cent. of the total output.

(vii) *Australia's Coal Reserves*. The latest available estimate of the actual and probable coal reserves of Australia is shown in the Report of the Royal Commission on the Coal Industry 1929-1930, and is based upon that prepared by the Coal and Lignites Panel of the Power Survey Sectional Committee of the Standards Association of Australia. The following table shows the actual and probable coal reserves as determined by that Committee:—

ACTUAL AND PROBABLE COAL RESERVES OF AUSTRALIA.

(Millions of Tons.)

State.	Black Coal.	Sub-bituminous and Brown Coal.
New South Wales	13,929	..
Victoria	40	37,000
Queensland	2,238	67
South Australia .. .. .	..	57
Western Australia .. .. .	..	3,500
Tasmania	244	..
Total	16,451	40,624

3. *Production in Various Countries*.—The total known coal production of the world in 1935 amounted to about 1,290 million tons, towards which Australia contributed about 13.1 million tons, or 1 per cent. The following tables show the production of the chief British and foreign countries during each of the last four years where the returns are available:—

COAL PRODUCTION.—BRITISH EMPIRE.

Year.	Great Britain.	British India.	Canada.	Australia.	New Zealand.	Union of S. Africa.
BLACK COAL						
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1932	208,733,000	20,153,000	7,386,000	8,586,000	928,200	9,704,400
1933	207,112,000	19,780,000	7,619,000	9,092,000	843,800	10,545,200
1934	220,728,000	22,057,000	9,461,000	9,801,000	832,000	12,002,000
1935	222,252,000	23,017,000	9,193,000	10,888,000	825,000	13,360,000
BROWN COAL, LIGNITE.						
1932 .. .. .	..	..	3,093,000	2,612,500	913,700	..
1933 .. .. .	..	..	3,009,000	2,580,000	977,400	..
1934 .. .. .	..	..	2,870,000	2,618,000	1,228,600	..
1935 .. .. .	..	..	3,186,000	2,221,515	1,290,000	..

COAL PRODUCTION.—FOREIGN COUNTRIES.

Year.	Germany.	Austria.	Hungary.	Belgium.	France. (b)	Czecho- slovakia.	Yugoslavia.
BLACK COAL.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1932 ..	103,086,300	217,800	880,700	21,075,000	45,536,000	10,788,000	362,200
1933 ..	107,960,000	235,200	787,000	24,878,400	46,113,200	10,471,800	377,400
1934 ..	122,885,000	246,900	744,000	25,972,000	46,880,000	10,519,000	381,000
1935 ..	140,744,000	246,500	810,000	26,087,000	46,363,000	10,791,000	394,000
Year.	Spain.	Poland.	Nether- lands.	Soviet Union.	Japan.	China. (c)	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1932 ..	6,746,000	28,379,200	12,555,000	63,299,000	27,610,300	18,370,000	321,040,000
1933 ..	5,904,000	26,924,000	12,375,000	74,750,000	32,010,000	18,505,000	342,118,000
1934 ..	5,838,000	28,771,300	12,146,000	92,456,000	35,358,000	20,568,000	371,907,000
1935 ..	6,905,000	28,091,945	11,690,000	102,770,000	34,354,000	12,000,000	375,292,000

BROWN COAL, LIGNITE.

Year.	Germany.	Austria.	Hungary.	Belgium.	France.	Czecho- slovakia.	Yugoslavia.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1932 ..	120,709,600	3,055,000	5,837,800	..	975,700	15,508,000	4,042,000
1933 ..	124,792,000	2,966,900	5,815,000	..	1,076,100	14,825,000	3,711,500
1934 ..	135,098,000	2,806,000	6,081,000	..	1,009,000	14,932,000	3,566,000
1935 ..	145,028,000	2,924,000	6,612,000	..	885,000	14,977,000	3,971,000
Year.	Spain.	Poland.	Nether- lands.	Soviet Union.	Japan.	China.	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1932 ..	331,000	32,900	122,000	(a)	106,800	..	(a)
1933 ..	296,000	32,900	95,500	(a)	114,000	..	(a)
1934 ..	294,000	26,000	91,032	(a)	125,000	..	(a)
1935 ..	299,000	18,000	85,000	(a)	(d)	..	(a)

(a) Included with black coal. (b) Exclusive of Saar District, which produced 10,273,200 tons in 1932, 10,394,400 tons in 1933, 11,130,000 tons in 1934, and 1,673,000 tons from 1st January to 17th February, 1935. From this date production has been included with that of Germany. (c) Includes about 300,000 tons of lignite yearly. (d) Not available.

Compared with the previous year the production for 1935 showed a satisfactory increase in practically all of the major producing countries of the world. Any decrease which did occur was very small. The production of the British Empire amounted to 288,000,000 tons in 1935 or an increase of 5,000,000 tons or 1.8 per cent. on that of 1934. The production of foreign countries increased by 20,000,000 tons to 1,000,000,000 tons, or by 2 per cent. in the same period.

4. Exports.—(i) General. The quantity of coal of Australian production (exclusive of bunker coal) exported to other countries in 1935-36 was 307,540 tons, valued at £276,553. New South Wales exported 306,356 tons, Queensland, 1,153 tons, and Victoria,

31 tons. The quantity and value of the oversea exports of Australian coal for the years specified are shown in the appended table :—

COAL.—OVERSEA EXPORTS, AUSTRALIA.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913 (a) ..	2,098,505	1,121,505	1932-33 ..	282,977	281,512
1921-22 ..	1,028,767	1,099,899	1933-34 ..	292,416	269,296
1930-31 ..	387,851	411,612	1934-35 ..	305,139	273,305
1931-32 ..	344,015	341,800	1935-36 ..	307,540	270,553

(a) Calendar Year.

Australian coal taken for bunker purposes during the same years was as follows :—

COAL.—BUNKER, AUSTRALIA.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913 (a) ..	1,647,870	1,018,375	1932-33 ..	562,442	550,277
1921-22 ..	1,498,035	2,178,101	1933-34 ..	523,014	495,032
1930-31 ..	509,303	607,537	1934-35 ..	575,418	544,875
1931-32 ..	506,140	534,897	1935-36 ..	614,333	576,549

(a) Calendar Year.

(ii) *New South Wales.* The total export of coal from New South Wales in 1935 amounted to 2,765,865 tons, valued at £2,367,537, of which 2,387,101 tons, valued at £1,996,078, were shipped from Newcastle. Interstate exports amounted to 1,899,274 tons, valued at £1,581,697, and were divided as follows :—Cargo, 1,581,589 tons, £1,350,181; bunker, 304,685 tons, £231,516. Oversea exports totalled 876,591 tons, valued at £785,840, representing 552,765 tons of bunker coal, valued at £495,377, and 323,826 tons of cargo coal, valued at £290,463.

The distribution of the total output from New South Wales collieries during the last five years was as follows, the particulars given of quantity exported including coal shipped as bunker coal :—

COAL.—DISTRIBUTION OF OUTPUT, NEW SOUTH WALES.

Year.	Exports to Australian Ports.	Exports to Foreign Ports.	Local Consumption.	Total.
	(a)	(a)		
	Tons.	Tons.	Tons.	Tons.
1931	1,460,039	802,760	4,169,583	6,432,382
1932	1,501,598	792,750	4,489,874	6,784,222
1933	1,623,840	831,338	4,663,259	7,118,437
1934	1,882,873	807,154	5,183,153	7,873,180
1935	1,889,274	876,591	5,932,714	8,698,579

(a) Including Bunker.

For the period of five years shown in the table above, 23 per cent. of the total output was exported to other States, 11 per cent. was sent overseas, and 66 per cent. was consumed locally.

The figures quoted in the table above are given on the authority of the New South Wales Mines Department.

5. **Consumption in Australia.**—It is possible from the information available to show with reasonable accuracy the disposal of the coal produced in Australia and the quantity retained for home consumption.

Under normal circumstances the production and consumption of coal move in the same direction, but in times of industrial troubles large consumers may be compelled to rely upon accumulated stocks, and, consequently, annual figures may be thrown out

of alignment. For this reason the following table has been prepared on a quinquennial basis in order to smooth out any departures from the normal:—

PRODUCTION AND UTILIZATION OF COAL, AUSTRALIA.

Particulars.	Average for Five Years ending.			
	1930-31.		1935-36.	
BLACK COAL.				
Production of Black Coal (a)—	Tons.		Tons.	
Gross	11,219,510		9,650,459	
Salcable (a)	10,781,637		9,277,441	
Imports	190,932		13,135	
Total Supplies	10,972,569		9,290,576	
Exported overseas	478,452	4.36%	306,417	3.30%
Exported as bunker, overseas	747,596	6.81	556,271	5.99
Total	1,226,048	11.17	862,688	9.29
Consumed as fuel in—				
Electric Light and Power Works	1,552,550	14.15	1,562,069	16.81
Factories (b)	2,021,588	18.42	1,500,513	16.15
Railways	3,256,301	29.68	2,706,542	29.13
Total	6,830,439	62.25	5,769,124	62.09
Consumed as raw material in—				
Gas Works	1,270,126	11.58	1,017,248	10.95
Coke Works	778,741	7.10	919,184	9.89
Total	2,048,867	18.68	1,936,432	20.84
Domestic consumption and all other purposes (c)	867,215	7.90	722,332	7.78
Grand Total	10,972,569	100.00	9,290,576	100.00
BROWN COAL.				
Production of Brown Coal	Tons. 1,599,420		Tons. 2,560,612	
Utilization—				
As fuel in Electric Light and Power Works	958,207	59.91%	1,290,232	50.39%
As raw material in Briquette Works (d)	641,213	40.09	1,270,380	49.61
Total	1,599,420	100.00	2,560,612	100.00

(a) Estimated. (b) Approximate, not including Brown Coal. see NOTE (d). (c) Including bunker coal for Interstate and Intrastate Shipping. (d) A portion of the briquette output is consumed in factories.

The production of coal is ascertained only in calendar years and to relate it to the other factors in the table, it was necessary to have recourse to estimates which in all probability differ but slightly from the actual figures.

6. Prices.—(i) *New South Wales*. The price of New South Wales coal depends on the district from which it is obtained, the northern district coal generally realizing a somewhat higher rate than the southern or western product, although during the last two years the average price in the southern fields was slightly in excess of that prevailing in the northern area. The average price on the mine in each district and for the State as a whole during the last five years was as follows :—

COAL.—PRICES, NEW SOUTH WALES.

Year.	Northern District.		Southern District.		Western District.		Average for State.	
	Per ton. s. d.		Per ton. s. d.		Per ton. s. d.		Per ton. s. d.	
1931	15	2	13	11	12	0	14	4
1932	13	8	12	5	10	8	12	11
1933	12	9	12	6	9	5	12	1
1934	12	0	12	2	8	10	11	6
1935	11	9	11	10	8	8	11	3

(ii) *Victoria*. In Victoria the average price of coal per ton at the pit's mouth in 1931 was 12s. 8d. ; in 1932, 12s. 9d. ; in 1933, 12s. 7d. ; in 1934, 12s. 1d. ; and in 1935, 11s. 10d. These averages are exclusive of brown coal, which in 1935 cost 2s. 10d. per ton to produce.

(iii) *Queensland*. Prices in the principal coal-producing districts during the last five years were :—

COAL.—PRICES, QUEENSLAND.

District.	Value at Pit's Mouth.									
	1931.	1932.	1933.	1934.	1935.					
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.					
Ipswich	15	8	15	2	14	9	14	11	15	5
Darling Downs	18	6	18	4	18	2	18	4	18	3
Wide Bay and Maryborough	22	10	22	10	22	7	22	11	23	1
Rockhampton	16	8	17	6	16	6	16	7	16	7
Clermont	14	7	14	0	13	11	12	11	12	5
Bowen	15	1	14	9	13	9	13	6	13	10
Mount Mulligan (Chillagoe)	28	10	27	1	28	5	26	0	29	0
Average for State ..	16	8	16	3	15	10	15	11	16	0

In 1901 the average value at the pit's mouth was 7s. per ton, and the average for the ten years 1901 to 1910 was about 6s. 8d.

(iv) *Western Australia*. The average prices of the Collie (Western Australia) coal during the last five years were : in 1931, 15s. 7d. ; in 1932, 13s. ; in 1933, 12s. 8d. ; in 1934, 11s. 2d. ; and in 1935, 11s. 10d. per ton.

(v) *Tasmania*. The average prices per ton of coal at the pit's mouth in Tasmania for the last six years were : in 1930, 15s. 11d. ; in 1931, 15s. 10d. ; in 1932, 15s. 6d. ; in 1933, 14s. 9d. ; in 1934, 14s. 4d. ; and in 1935, 13s. 11d. per ton.

7. Prices in the United Kingdom.—During the five years 1931 to 1935 the average selling value of coal per ton at the pit's mouth in the United Kingdom was: in 1931, 13s. 6d.; in 1932, 13s. 3d.; in 1933, 13s.; in 1934, 12s. 11d.; and in 1935, 13s. per ton.

8. Employment in Coal Mines.—The number of persons employed in coal mines, both above and below ground, in each of the producing States is given in the following table for the years 1913, 1923, and for each of the years 1931 to 1935:—

COAL MINES.—PERSONS EMPLOYED.

Year.	New South Wales.	Victoria.		Queensland.	Western Australia.	Tasmania.	Total.
		Black.	Brown.				
	No.	No.	No.	No.	No.	No.	No.
1913 ..	18,843	1,377	(a)	2,548	559	136	23,463
1923 ..	22,969	2,131	(a)	2,662	713	268	28,743
1931 ..	15,667	1,897	259	2,362	752	363	21,300
1932 ..	14,275	1,663	281	2,392	604	381	19,596
1933 ..	13,349	1,517	272	2,448	626	313	18,525
1934 ..	13,465	1,502	319	2,385	624	342	18,637
1935 ..	13,337	1,397	615	2,455	689	340	18,833

(a) Production prior to 1924 was of little importance.

The maximum number employed was attained in 1926 when 31,774 persons were engaged in the coal mines of Australia. Shortly after that year a slackening in the demand for coal and a prolonged cessation of activities on one of the principal fields of New South Wales during 1929 and 1930 seriously affected the figures of employment, while the reduction to their present level of about 18,800 was the result of the reaction of the industry to the industrial depression of recent years. It would also appear that the growth of mechanization has depressed employment in the industry for, notwithstanding an additional output of more than 2,000,000 tons since 1932, the number employed declined by approximately 800. In 1935 the output of coal per employee averaged 578 tons, compared with 418 tons in 1926.

9. Accidents in Coal Mining.—(i) Australia. The following table gives the number of persons killed or injured, with the proportion per 1,000 employed, and in relation to the quantity of coal raised, this being a factor which must be reckoned with in any consideration of the degree of risk attending mining operations. Although no precise definition of an accident is available it would appear that any disablement from misadventure which rendered the injured unfit for work for fourteen or more days has been uniformly adopted by the State Departments of Mines. A further table gives the rate of fatalities during the last five years.

COAL MINING.—EMPLOYMENT AND ACCIDENTS, 1935.

State.	Persons Employed in Coal Mining.	No. of Persons.		Proportion per 1,000 Employed.		Tons of Coal raised for each Person.	
		Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
New South Wales ..	13,337	11	61	0.82	4.50	790,780	142,600
Victoria ..	2,012	..	5	..	2.49	..	539,602
Queensland ..	2,455	2	197	0.81	80.24	525,989	5,340
Western Australia ..	689	..	287	..	416.55	..	1,872
Tasmania ..	340	..	..	..	..	..	..
Total ..	18,833	13	550	0.69	29.21	837,535	23,835

The next table shows the average number of miners employed, number of fatalities, and rate per 1,000 during the quinquennium 1931-35 :—

COAL MINING.—FATALITIES, 1931 TO 1935.

State.	Average No. of Coal Miners Employed.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	14,020	11.20	0.80
Victoria	1,943	0.60	0.31
Queensland	2,408	1.20	0.50
Western Australia	659	0.40	0.62
Tasmania	348	1.00	2.87
Total	19,378	14.40	0.72

(ii) *Other Countries.* According to the report of the Chief Inspector of Mines, the average death rate per 1,000 miners from accidents in coal mines in Great Britain during the quinquennium 1931-35 was 1.10, the rates varying between 1.35 in 1934 and 0.98 in 1931, while the rate for Australia for the same period was 0.72. In the United States during the two years 1933 and 1934 the death rate per 1,000 employees averaged 3.5 for bituminous coal miners, and 3.6 for anthracite miners. Rates for other coal-producing countries for the same period were—Canada, 1.6; Union of South Africa, 2.6; Germany, 1.7; Spain, 1.3; Poland, 1.6; Belgium, 1.2; and France, 0.8. In comparing these rates, allowance must be made for the circumstance that the methods of calculation are not identical in all countries.

§ 11. Coke.

Notwithstanding the large deposits of excellent coal in Australia, the production of coke was limited to about 250,000 tons prior to the war. This was below local requirements and necessitated a fairly considerable import from abroad. During recent years, however, a high standard of excellence has been attained in the local product and imports have almost ceased, while Australian coke is being shipped to New Zealand and other islands in the Pacific. For the year 1935-36 the coke imported amounted to 2,230 tons, of which 227 tons were obtained from the United Kingdom and 2,003 tons from Germany, Western Australia being the chief importing State. The quantity exported was 15,866 tons, valued at £23,331, of which 13,342 tons, valued at £17,886, was sent to New Caledonia.

The table hereunder gives the production in New South Wales during the last five years :—

COKE.—PRODUCTION, NEW SOUTH WALES.

Items.	1931.	1932.	1933.	1934.	1935.
Quantity	tons 217,509	356,495	473,427	688,621	857,875
Value, total	£ 297,318	403,177	512,693	636,346	802,887
Value, per ton .. .. .	.. 27s. 4d.	22s. 7d.	21s. 8d.	18s. 6d.	18s. 9d.

The figures quoted refer to the product of coke ovens, and are exclusive of coke produced in the ordinary way at gas works. Prior to the depression the maximum production of coke was 709,000 tons in 1927; the output fell to 217,509 tons in 1931, but with the general recovery of trade the figure rose to 857,875 tons in 1935.

A small quantity of coke is made in Queensland, the quantity returned in 1935 being 24,877 tons, of which 20,785 tons, was produced at Bowen State Coke Works. The greater proportion of the output of these works was consigned to the Mount Isa Mines Ltd. and to the Chillagoe State Smelters. Hitherto the coke used at these ore treatment works was imported from New South Wales, but now that the battery of 45 ovens is in operation, it is anticipated that the output will be sufficient to meet the requirements of the State. The following table shows the amount manufactured locally during the last five years:—

COKE.—PRODUCTION, QUEENSLAND.

Year.	1931.	1932.	1933.	1934.	1935.
Quantity tons	2,280	1,933	15,096	25,655	24,877

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

§ 12. Oil Shale and Mineral Oil.

1. **Oil Shale.**—(i) *General.* Reference to the deposits of oil shale and the search for mineral oil in Australia will be found in Official Year Book No. 22, pages 791 to 793.

(ii) *New South Wales.* The establishment of the oil shale industry in Australia by the development of the deposits at Newnes in New South Wales has received the serious consideration of both the Commonwealth and the New South Wales Governments. The project has been the subject of a number of investigations, and reports in connexion therewith have been issued. In 1937 negotiations were completed between the two Governments and a leading business man of New South Wales, in which the latter undertook to develop the shale oil industry in the Newnes-Capertee district. An agreement is now being concluded in which provision is to be made for the exemption from excise duty on petrol produced up to 10 million gallons per annum for a period of 25 years. Amongst other things to be provided for is the production of fuel oil in cases of national emergency. The successful establishment of this project will probably lead to an expansion of the industry in Australia; it should provide another avenue for employment and serve as a valuable training ground for purposes of research. In 1934, 200 tons of shale were mined for experimental purposes at an estimated value of £100 but no production was recorded in 1935.

(iii) *Tasmania.* About 38,000 gallons of crude oil were produced in 1934 from shale treated in Tasmania, while the total quantity of oil distilled from shale up to the end of 1934 was set down at 357,000 gallons. There was no production during 1935. An amalgamation of interests was effected in 1931, under the name of the Tasmanite Shale Oil Company. The plant operated by this syndicate closed down at the end of January, 1935.

2. **Coal Oil.**—Attention has been directed to the production of oil from coal by a number of processes. A committee consisting of nominees of the Commonwealth and State Governments, excepting Western Australia, and of Imperial Chemical Industries Ltd. was appointed to advise on specific questions submitted to it. In a report submitted in June, 1937, it was stated that the stage had not been reached when Australia could establish plants for the production of oil from coal. The committee recommended, however, that close touch be kept with developments abroad.

3. **Well Oil.**—(i) *Australia.* The Commonwealth Government encourages the search for oil by placing at the disposal of companies and individuals the advice and experience of its technical staff appointed for this purpose. In co-operation with the Air Board useful aerial reconnaissances have already been made in Queensland by the Commonwealth Geological Adviser, the photographs and mosaics produced proving of great value in conjunction with the ground geological surveys. A further aerial reconnaissance was undertaken to cover most of the possible oil producing regions in Australia.

In February, 1936, the Commonwealth Government announced that information of a much more encouraging nature had been received, indicating that structures favourable to well oil production have been located in New South Wales and probably in Victoria, Queensland and Western Australia. In the circumstances it was decided to evolve a plan of operations to test the possibilities of flow oil in the various selected localities with the least possible delay. Further reference is made in § 16 hereinafter to the search for oil.

(ii) *Victoria.* The production of crude petroleum oil in the year 1935 amounted to 4,320 gallons valued at £108. The total production to the end of that year amounted to 87,148 gallons worth £2,178.

(iii) *Queensland.* Great hopes were at one time entertained in regard to the petroliferous area in Queensland, but while gas and light to medium gravity oils have been found at Roma, and gas and oily wax at Longreach, structural conditions for accumulations on a commercial scale have not yet been located in the drilled areas. The search for oil was continued during 1935 by three companies in localities situated nearer to the coast.

(iv) *South Australia.* Under prescribed conditions, the South Australian Government offers a bonus of £5,000 to the person or body corporate which first obtains from a local bore or well 100,000 gallons of crude petroleum containing not less than 90 per cent. of products obtainable by distillation.

(v) *Western Australia.* During 1935, oil geologists examined territories under the direction of the Freney Kimberley Oil Company Ltd. and Oil Search Ltd. Future operations will depend upon the recommendations arising from these investigations.

§ 13. Other Non-metallic Minerals.

A more or less detailed statement regarding the occurrence and production of other non-metallic minerals is given in preceding Official Year Books (*see* No. 22, pages 793 to 796). The tables of quantity and value in § 1 of this Chapter will, however, show the production of the principal items in this class for each State during the year 1935.

§ 14. Gems and Gemstones.

1. *Diamonds.*—It is difficult to secure accurate returns in connexion with the production of precious stones, but the yield of diamonds in 1934 in New South Wales was estimated at 49 carats, valued at £52, obtained at Copeton in the Tingha division, while the total production to the end of 1934 is given at 204,000 carats, valued at £147,000. There was no production recorded in 1935.

2. *Sapphires.*—The production of sapphires in New South Wales during 1929 was returned as 65 ozs., valued at £450, obtained wholly at Sapphire in the Inverell division, but no output has been recorded since. Production during recent years was restricted owing to the unfavourable market.

In Queensland, gems to the value of £1,805 were purchased on the Anakie sapphire fields in 1935. It is probable that many were sold privately or held for better prices. For these reasons the returns are considered to be very incomplete. There were about 120 miners operating on the fields during 1934 but their number decreased to 64 in 1935. Production has declined very considerably since 1920, when the yield was valued at £66,000.

3. *Precious Opals.*—The estimated value of the opal won in New South Wales during the year 1935 was £5,070, obtained on the Lightning Ridge, White Cliffs and Grawin fields. The figures quoted, however, do not represent the total output, as in many instances miners, buyers and collectors leave the fields before a record of their production or purchases can be secured. Some very fine stones are at times obtained, one weighing 5 ozs. and valued at £300 being found in 1911. Three finds of large stone were made in 1928, the gems weighing 790, 590 and 232 carats respectively, and showing fine fire and lustre. Occasionally black opals of very fine quality are found, one specimen from the Wallangulla field, weighing 6½ carats, being sold in 1910 for £102, while in the early part of 1920 a specimen realized £600. It is stated that this locality is the

only place in the world where the "black" variety of the gem has been found. The total value of opal won in New South Wales since the year 1890 is estimated at £1,613,000, but as pointed out above the figures are to some extent understated.

Small quantities of precious opal are found in the Beechworth district in Victoria.

The opaliferous district in Queensland stretches over a considerable area of the western interior of the State, from Kynuna and Opalton as far down as Cunnamulla. The yield in 1935 was estimated at £200, and up to the end of that year at about £187,000. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. Production during recent years has been limited by the paucity of demand and only 6 persons were engaged during 1935. The greatest recorded output was for the year 1895 when the yield was valued at £32,750.

Owing to the poor market for gems, production from the Coober Pedy opal field situated in the Stuart Range in South Australia fell from £11,056 in 1929 to £1,517 in 1934. In 1935, production recovered somewhat and amounted to £3,228. The field is extremely prolific, a large quantity of precious white opal having been raised therefrom, while only a small portion of the known opal-bearing area has been thoroughly tested. The greatest yield for the State in any one year was obtained in 1920 when the value of production was returned at £24,000.

According to a report a few years ago by the Australian Trade Commissioner in the East there is a good sale for the gems in China. It is stated that there is no difficulty in cutting and polishing, as the Chinese method of dealing with jade, dating back many centuries, can also be applied to opal.

4. **Other Gems.**—Various other gems and precious stones have from time to time been discovered in the different States, the list including agates, amethysts, beryls, chialstolite, emeralds, garnets, olivines, moonstones, rubies, topazes, tourmalines, turquoises and zircons. In Western Australia, 609 carats (rough) of emeralds, valued at £278, were produced during 1929 in the Cue district on the Murchison gold-field. The value of the 3,750 carats reported from the same area in 1930 was not ascertainable, as there were no sales during the year. There has been no recorded production since 1930.

§ 15. Numbers 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 the season, the price of industrial metals, the state of the labour markets, and according to the permanence of new finds and the development of the established mines. During the year 1935 the number so employed was as follows:—

NUMBER OF PERSONS ENGAGED IN MINING, 1935.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	6,652	3,536	7	1,807	13,337	1,316	26,655
Victoria ..	6,900	..	..	5	2,012	87	9,064
Queensland ..	3,931	544	170	1,122	2,455	318	8,540
South Australia ..	243	..	54	..	..	677	974
Western Australia ..	14,708	..	..	58	689	102	15,557
Tasmania ..	216	1,046	1,758	1,452	340	267	5,079
Northern Territory ..	403	..	..	30	..	133	566
Australia ..	33,113	5,126	1,989	4,474	18,833	2,900	66,435

Included in the figures for "other" in South Australia were 412 engaged in mining iron ore, 54 gypsum miners, 125 salt gatherers, and 50 opal miners. The Tasmanian figures include 44 osmiridium miners, and those for the Northern Territory, 80 mica miners.

The following table shows the number of persons engaged in mining in each State at intervals since 1901 and the proportion so employed to the total population :—

NUMBER ENGAGED IN MINING PER 100,000 OF POPULATION.

State.	1901.		1911.		1921.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales	36,615	2,685	37,017	2,225	29,701	1,410
Victoria	28,670	2,381	15,986	1,210	5,211	339
Queensland	13,352	2,664	13,201	2,147	5,847	766
South Australia	7,007	1,931	6,000	1,457	2,020	406
Western Australia	20,895	11,087	16,596	5,787	7,084	2,122
Tasmania	6,923	4,017	5,247	2,760	3,170	1,486
Northern Territory .. ..	..	..	715	21,595	131	3,356
Australia	113,462	2,992	94,762	2,109	53,164	974
State.	1931.		1934.		1935.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales	30,682	1,200	26,788	1,021	26,655	1,008
Victoria	6,463	359	8,825	482	9,064	492
Queensland	6,753	730	8,597	900	8,540	884
South Australia	518	90	1,175	201	974	166
Western Australia	7,147	1,653	13,307	3,013	15,557	3,493
Tasmania	3,397	1,512	4,539	1,981	5,079	2,212
Northern Territory	145	2,918	378	7,663	566	11,096
Australia	55,105	844	63,609	952	66,435	988

The general falling-off since 1901 is largely due to the causes mentioned in each section hereinbefore. The proportion to population shows increases since 1931 in all States excepting New South Wales, and is attributable mainly to the larger numbers engaged in the search for gold. Since that year the increase in the number so employed was approximately 10,000 persons. The number engaged in mining for tin increased by 2,200, while increases were also recorded in the mining for silver, lead and zinc, 1,700, and copper, 100. These increases were offset to some extent by the decrease in coal-mining from 21,400 in 1931 to 18,800 in 1935, which decline is largely responsible for the lower proportion employed in New South Wales.

2. Wages Paid in Mining.—Information regarding rates of wages paid in the mining industry, which in earlier issues of the Official Year Book was given in this chapter, is now contained in the Labour Report issued by this Bureau.

3. **Accidents in Mining, 1935.**—The following table gives particulars of the number of men killed or injured in mining accidents during the year 1935 :—

MINING ACCIDENTS, 1935.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED.								
Coal ..	11	..	..	..	2	..	..	13
Copper ..	..	..	2	..	..	1	..	3
Gold ..	3	5	2	..	28	..	..	38
Silver, lead and zinc ..	6	..	1	..	..	..	..	7
Tin ..	1	..	..	..	..	..	..	1
Other minerals ..	..	..	..	1	..	..	..	1
Total ..	21	5	5	1	30	1	..	63
INJURED.								
Coal ..	61	5	197	..	287	..	..	550
Copper ..	..	..	53	2	..	104	5	164
Gold ..	19	4	23	3	666	1	..	716
Silver, lead and zinc ..	91	..	52	..	..	2	..	145
Tin ..	3	..	5	..	..	29	1	38
Other minerals ..	1	..	..	22	..	3	..	26
Total ..	175	9	330	27	953	139	6	1,639

§ 16. Government Aid to Mining.

1. **Commonwealth.**—(i) *General.* Assistance to mining has been given by the Commonwealth under the provisions of the Precious Metals Prospecting Act 1926, the Gold Bounty Act of 1930, the Petroleum Oil Search Acts 1936, which superseded the Petroleum Prospecting Acts of 1926, 1927 and 1928, the Loan Appropriation (Unemployment Relief) Act 1934 and the Northern Australia Survey Act 1934.

In addition to this financial assistance considerable sums have been spent by the Commonwealth Government in an endeavour to locate new mineral fields. In conjunction with the Empire Marketing Board a sum of £32,000 was made available to provide for geophysical prospecting in Australia. This survey was begun in April, 1928, and completed in February, 1930. A report in connexion therewith was issued.

In 1934 the Northern Australia Survey Act was passed. Under this Act the Governments of the Commonwealth and the States of Queensland and Western Australia agreed to co-operate in the conduct of an aerial, geological and geophysical survey of certain areas in Australia north of the 22nd parallel of south latitude at a cost of £150,000. Half of the cost is being borne by the Commonwealth and the other half equally between the two States. The survey, which is expected to extend over a period of three years, is now in full progress. Geological and geophysical parties are in the field, and the aerial photographic survey has covered an area of approximately 9,000 square miles. The latest report was in respect of the period ending 31st December, 1936, and a number of reports on individual areas have been issued as appendices.

(ii) *Metalliferous Mining.* (a) The Precious Metals Prospecting Act 1926 provided a sum of £40,000 of which £15,000 was to be expended in the Northern Territory, and the balance allocated to the States in such proportions as the Minister determined. The total expenditure under this Act amounted to £27,000 but no further assistance is contemplated from this fund.

(b) The Gold Bounty Act 1930 provided that for a period of ten years from 1st January, 1931, a bounty of £1 per ounce would be payable under prescribed conditions by the Commonwealth on each ounce of fine gold produced in excess of the average

production for the three years 1928-30. Under the Financial Emergency Act 1931 the Bounty was reduced to 10s. per ounce, subject to increases of 1s. for each decrease of 3s. per cent. in the average rate of exchange. The rate of exchange on which the reduction to 10s. per ounce was based was taken as 30 per cent. Under the Financial Emergency Act of 1932 the bounty was temporarily suspended.

(c) Grants to States for Assistance to Metalliferous Mining. Under the Loan Appropriation (Unemployment Relief) Act 1934 a sum of £283,750 was made available to the States as grants for assistance to metalliferous mining. The amount granted to each State and the purpose to which it was applied are set out in the table below. In addition to this the sum of £45,000 was allocated to the Northern Territory and £5,000 to Papua, making a total of £333,750. At the 30th June, 1937, the whole of this sum had been distributed.

COMMONWEALTH GRANTS TO STATES FOR ASSISTANCE TO METALLIFEROUS MINING.

Particulars.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Total.
	£	£	£	£	£	£	£
Staff and Administration	5,000	8,000	3,000	..	1,000	..	17,000
Prospecting	5,000	10,000	17,000	..	50,000	2,500	84,500
Plants and Operation thereof	10,000	4,000	20,000	6,000	..	7,500	47,500
Advances (a)	17,500	20,000	5,000	17,500	..	9,250	69,250
Metallurgical Investigations .. ..	..	..	5,000	..	..	1,250	6,250
Batteries .. ..	..	..	..	10,000	5,000	..	16,250
Roads and Tracks .. ..	..	2,000	..	..	..	4,000	6,000
Other	5,000	6,000	20,000	..	6,000	..	37,000
Total	42,500	50,000	70,000	33,500	62,000	25,750	283,750

(a) This provision is contingent upon the States providing a similar amount.

The funds were administered by a Trust comprising representatives of the State and one representative of the Commonwealth who in each instance is the Sub-Treasury Accountant in the State.

(d) In addition to the amounts shown in (c) above, a sum of £210,000 has been advanced by the Commonwealth Government to the States to aid the metalliferous mining industry during the years ending June, 1937 and 1938. This amount is to be distributed as follows: New South Wales, £33,200; Victoria, £45,700; Queensland, £60,500; South Australia, £12,800; Western Australia, £44,400; and Tasmania, £13,400. £140,000 was made available during 1936-37 and the balance of £70,000 is to be appropriated during 1937-38.

(iii) *Search for Oil.* The Commonwealth Government has encouraged the search for oil in Australia, Papua and New Guinea and considerable sums have been spent during the past ten years in geological surveys and in drilling operations. Details of efforts made during that period are shown in previous issues of the Official Year Book.

In 1936 the Petroleum Oil Search Act was passed which repealed all previous enactments. Under this Act a sum of £250,000 was appropriated for the purpose of assisting drilling operations in Australia and the Territories of Papua and New Guinea. Considerable preliminary geological surveys have already been conducted and attention is now being directed to the testing of approved sites by drilling. A technical committee known as the Commonwealth Oil Advisory Committee was appointed to act in an advisory capacity and to deal with applications for assistance.

The Commonwealth Oil Refineries Ltd. of which the Government of the Commonwealth of Australia is the principal shareholder has undertaken an extensive programme of prospecting for oil. The investigation is under the control of an Australian Advisory Committee of Geologists appointed by the Company, the personnel of which comprises the Commonwealth Geological Adviser, the Government Geologist of South Australia and two other members. Two oil geologists, in company with the

Commonwealth Geological Adviser, carried out an aerial reconnaissance of likely areas during 1935. This reconnaissance was a preliminary to a more detailed examination of areas and a study of all the data which have been collected over a period of years. This detailed investigation is now being carried out by one of the geologists.

(iv) *Appointment of Geological Staff.* In 1927 a small geological staff, including a palaeontologist, was appointed. The Geological Adviser visited the United States and Argentine Republic in 1930 to study oil-field conditions on the spot, and submitted a comprehensive report, which was published as a Parliamentary Paper in 1931. Experimental aerial photographic surveys have been carried out in conjunction with the Royal Australian Air Force to determine whether similar methods were applicable under Australian conditions, and a report on the investigations has been issued.

2. **New South Wales.**—The chief aid given by the Government of New South Wales has been in the assistance to prospectors, but there were no appropriations from the Prospecting Vote for the year 1935-36, all claims being met from Unemployment Relief Funds and the Commonwealth Grant. Aid is granted on a footage basis to sink, drive, etc., on approved sites to which a valid mining title is held. Grants approved during the year amounted to £41,036 but the actual expenditure in respect of work completed amounted to £28,875. Loans are also made to assist in the erection of crushing batteries or reduction plants on which interest at the rate of 4 per cent. is charged. During the year loans totalling £8,817 were approved. No rewards were paid in connexion with the discovery of new mineral fields.

3. **Victoria.**—During the year 1935 expenditure in connexion with mining amounted to £19,892, of which £18,822 consisted of advances to prospectors, while the balance of £1,070 was spent in other forms of assistance.

4. **Queensland.**—State assistance to the mining industry in 1935-36 amounted to £20,982, of which £20,000 was advanced to prospectors, the balance consisting of grants under the Mining Machinery Advances Act £584, and £398 for the provision of transport facilities, etc., to mineral fields. In addition to the above amounts, a sum of £10,321 was spent in connexion with the aerial survey of North Australia.

Mining operations conducted by the State include three coal mines situated at Bowen, Styx and at Mt. Mulligan, three batteries at Kidston, Charters Towers and Bamford, an assay office at Cloncurry, smelting works at Chillagoe, coke works at Bowen, and the State treatment works at Irvinebank. The battery at Charters Towers continued to be leased privately.

5. **South Australia.**—Aid is given to the mining industry under the terms of the Mining Act of 1893, and previous measures. Up to the end of 1935 the total amount of subsidy paid was £70,815, of which £13,795 has been repaid, and £4,549 written off, leaving a debit of £52,471. Portion of this amount is represented by machinery that has fallen into the hands of the Government. Repayments must be provided from profits, but in only two instances have the profits enabled a full return to be made. The State maintains batteries and cyanide works at Mount Torrens, Peterborough, Mongolata and Tarcoola, and assays for public purposes are made at the School of Mines. Advances to prospectors in 1935 amounted to £1,999.

6. **Western Australia.**—Under the Mining Development Act of 1902 assistance was granted in 1935 in accordance with the subjoined statement:—Aid to prospectors, £15,268; subsidies on stone crushed for the public, £187; advances in aid of mining work and equipment of mines with machinery, £1,794. Other assistance granted from the vote on various matters during the year amounted to £27,542. The total amount involved was £44,791.

In 1935 there were 25 State batteries in operation of which four were leased. The amount expended thereon up to the end of 1935 was £91,981 from revenue and £363,101 from loan fund giving a total of £455,082. The working expenditure up to the end of 1935 exceeded the revenue by £118,722. The total value of gold and tin produced to the end of 1935 at the State plants was £7,771,687. Free assays and determinations of mineral values for prospectors are made at the Kalgoorlie School of Mines and at the Government laboratory at Perth.

7. *Tasmania*.—Aid to Mining in 1935 amounted to £2,693, of which £2,118 was expended under the Aid to Mining Act 1927 on drilling and assistance and sustenance to prospectors, and the balance of £575 was paid from The Unemployment Relief Act. The amount received from ore sales was £438, the bulk of which was paid to tributers. Receipts amounted to £161.

Tributers' assays are made at a nominal charge, and all tribute surveys are carried out free of charge by the Assay and Survey Office at Zeehan.

8. *Northern Territory*.—During the year 1934-35 the assistance granted to prospectors amounted to £110. In addition a sum of £8,961 was also granted to assist gold mining companies.

The Government maintains batteries at Marranboy, Pine Creek and Tennant Creek. Government Assayers situated at Darwin and Alice Springs make free assays for prospectors, and arrange for the sampling, storage and sale of ores.

§ 17. Metallic Contents of Ores, etc., Produced and Exported.

1. *Local Production*.—According to returns compiled from various sources by the Australian Mines and Metals Association, the quantities of the principal metals (exclusive of gold) extracted in Australia during the five years 1931 to 1935 were as follows:—

REFINED METALS PRODUCED IN AUSTRALIA.

Metal.		1931.	1932.	1933.	1934.	1935.
Silver	ozs.	7,349,794	6,499,495	7,957,148	8,674,549	8,983,950
Lead, pig	tons	133,306	134,499	159,393	160,201	181,211
Zinc	"	53,832	53,200	53,956	54,629	67,666
Copper	"	12,936	13,307	11,238	7,970	11,768
Tin	"	1,690	1,958	2,360	2,330	2,837

The local production of pig iron during the quinquennium 1923-27 ranged between 330,000 tons in 1923 and 517,000 tons in 1927. Complete information for later years is not available from the returns published by the Association, but according to the metal extraction returns published in the Statistical Register of New South Wales, the production of pig iron in that State amounted in 1931-32 to 190,132 tons, in 1932-33, 336,246 tons, in 1933-34 to 487,259 tons, and in 1934-35 to 698,493 tons. As pointed out previously, the iron ore used is now obtained from South Australia.

2. *Metallic Contents of Ores, Concentrates, etc., Exported*.—The estimated metallic contents of ores, concentrates, etc., exported during the five years 1931 to 1935, as supplied by the Australian Mines and Metals Association, are given in the following table:—

METALLIC CONTENTS OF ORES, CONCENTRATES, ETC., EXPORTED.

Metal.	Contained in—	1931.	1932.	1933.	1934.	1935.
Silver	ozs. { Lead-Silver-Gold Bullion Lead Concentrates and Ores Zinc Concentrates and Ores Copper and Gold Ores ..	1,018,359	2,470,807	2,177,633	1,819,546	2,506,015
		393,397	..	447,943	612,014	275,154
		183,111	23,366	319,870	147,522	217,266
	
	Total	1,594,777	2,494,173	2,945,446	2,579,082	2,998,435
Lead	tons { Lead-Silver-Gold Bullion Lead Concentrates and Ores Zinc Concentrates and Ores	17,130	51,857	45,871	35,804	36,723
		10,982	..	16,019	21,075	9,610
		1,878	1,159	2,196	803	1,658
	
	Total	29,990	53,016	64,086	57,682	48,000
Zinc	tons { Lead Concentrates and Ores Zinc Concentrates and Ores	557	..	586	..	..
		41,917	31,542	60,142	26,963	54,693
	
	Total	42,474	31,542	60,728	26,963	54,693
Copper	tons Ores, Matte, etc. ..	2,765	1,099	1,109	1,122	1,361
Tin	tons Concentrates and Ores ..	17	101	139	198	289

§ 18. Oversea Exports of Ores, Metals, etc.

The following table shows the quantity and value of the principal oversea exports of ores, concentrates and metals, the produce of Australia, together with the countries to which the respective products were forwarded, for the year 1935-36 :—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1935-36.

Article.	Total Exports.	Exports to—						
		United Kingdom.	U.S. America.	Belgium.	Germany.	Japan.	New Zealand.	Other Countries.
QUANTITY.								
Ores—	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.
Copper	6,952	999	..	..	..	..	..	5,953
Silver and Silver-lead	42,816	..	400	40,168	2,248	..	..	1,354
Iron	8,646,843	..	2,116,540	380,220	..	5,830,220	163	310,700
Wolfram	7,566	469	1,709	2,449	1,585	..	..	..
Tin	3,105	889	..	..	..	..	..	(b) 2,216
Zinc	..	..	..	..	..	..	..	..
Other	50,507	7,092	36,416	200	337	102	4,458	1,902
Concentrates—	..	..	..	..	..	..	..	..
Silver and Silver-lead	301,779	..	..	301,779	..	..	..	..
Zinc	3,862,579	3,457,592	..	144,042	122,641	..	..	(c) 138,304
Copper	196,948	300	174,431	15,542	3,455	..	..	220
Tin	6,353	1,003	..	5,350	..	..	..	..
Lead Slime Residue	..	..	..	..	..	..	..	..
Gold Ore, Quartz and Concentrates	16,351	679	5,182	10,490	..	..	..	..
Other	855	593	..	..	..	..	..	262
Cadmium—Blocks, Ingots, &c.	4,333	3,940	..	..	..	30	3	360
Copper—	..	..	..	..	..	..	..	..
Matte	20,004	..	..	20,004	..	..	..	..
Ingot	288	..	..	..	..	..	288	..
Tin—Ingot	16,012	11,198	1,100	..	..	..	3,475	239
Lead—	..	..	..	..	..	..	..	..
Pig	3,856,214	3,780,948	..	..	..	33,431	31,822	10,013
Matte	20,531	20,000	6,531	..	..	..	..	..
Zinc—Bars, Blocks, etc.	846,264	348,175	..	..	..	226,462	1,900	(d) 269,718
Platinum, Osmium, etc.	(e) oz. 317	oz. 317	oz. ..	oz. ..	oz. ..	oz. ..	oz. ..	oz. ..
Gold—	..	..	..	..	..	..	..	..
Bar, Dust, etc.	1,062,448	844,657	202,804	..	..	..	..	(e) 14,987
Silver—	..	..	..	..	..	..	..	..
Bar, Ingot, etc.	6,372,759	1,937,227	87	..	..	..	622	(e) 4,434,823
VALUE.								
Ores—	£	£	£	£	£	£	£	£
Copper	1,048	441	..	..	..	..	..	607
Silver and Silver-lead	17,091	..	137	16,734	220	..	..	..
Iron	231,810	..	55,662	9,907	..	158,064	18	8,159
Wolfram	47,742	2,813	12,525	15,488	9,540	..	..	7,376
Tin	26,502	6,203	..	..	..	..	..	(b) 20,299
Zinc	..	..	..	..	..	..	..	..
Other	27,711	8,091	11,174	57	1,992	4,444	1,564	389
Concentrates—	..	..	..	..	..	..	..	..
Silver and Silver-lead	204,204	..	..	204,204	..	..	..	..
Zinc	534,244	468,290	..	38,787	14,721	..	..	(c) 12,446
Copper	337,501	440	321,025	11,146	4,495	..	..	395
Tin	51,028	8,591	..	42,437	..	..	..	..
Lead Slime Residue	..	..	..	..	..	..	..	..
Gold Ore, Quartz and Concentrates	9,727	571	3,838	5,318	..	..	..	..
Other	3,190	1,302	..	..	..	..	..	1,888
Cadmium—Blocks, Ingots, etc.	81,139	74,249	..	..	..	364	62	6,164
Copper—	..	..	..	..	..	..	..	..
Matte	24,674	..	..	24,674	..	..	..	..
Ingot	743	..	..	..	..	..	743	..
Tin—Ingot	200,807	137,743	11,811	..	..	..	48,335	2,918
Lead—	..	..	..	..	..	..	..	..
Pig	3,811,689	3,734,035	..	..	..	31,850	34,900	10,895
Matte	25,692	15,992	9,700	..	..	..	..	..
Zinc—Bars, Blocks, etc.	905,125	372,413	..	..	..	241,727	2,029	(d) 288,956
Platinum, Osmium, etc.	3,098	3,098	..	..	..	..	..	..
Gold—	..	..	..	..	..	..	..	..
Bar, Dust, etc.	9,225,136	7,335,802	1,758,808	..	..	..	..	(e) 130,526
Silver—	..	..	..	..	..	..	..	..
Bar, Ingot, etc.	863,671	224,863	12	..	..	..	104	(e) 638,692
Total	16,633,572	12,394,957	2,184,692	368,752	30,968	436,458	87,755	1,130,010

(a) Mainly osmium exported from Tasmania and platinum from New South Wales. (b) Malaya (British). (c) France. (d) India. 267,317 cwt., £286,305; Egypt, 2,401 cwt., £2,651. (e) Ceylon, 4,158,988 fine ozs., £598,095; India, 275,479 fine ozs., £40,561.