

CHAPTER XVIII.

MINERAL INDUSTRY.

(NOTE.—A table showing particulars of mineral production for the year 1937 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 1936.*—The quantities (where available) and the values of the principal minerals produced in each State, and in Australia as a whole, during the year 1936 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, 1936.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Antimony ..	ton	92	194	9	..	..	..	..	295
Arsenic ..	..	122	..	..	..	3,470	..	..	3,592
Asbestos ..	cwt.	..	..	..	80	3,180	..	..	3,260
Barytes ..	ton	147	..	..	1,977	..	..	33	2,157
Bi-muth ..	cwt.	1	..	364	..	..	..	..	365
Brown Coal ..	ton	..	3,044,897	..	..	..	..	..	3,044,897
Coal ..	..	9,199,466	426,725	1,046,879	..	565,075	132,264	..	11,370,409
Copper (ingot, matte, etc.) ..	..	1,373	..	3,828	451	2	13,030	198	18,882
Diatomaceous earth ..	..	2,303	104	371	..	..	..	..	2,778
Gold ..	fine oz.	60,739	117,596	121,174	7,681	846,208	17,600	8,753	1,179,751
Gypsum ..	ton	4,321	7,461	..	107,151	6,661	..	..	125,594
Ironstone ..	..	3,440	..	2,301	1,887,298	..	..	..	1,893,039
Kaolin ..	..	29,950	5,186	..	200	..	..	..	35,336
Lead ..	..	(b)	..	35,763	10	..	7,563	..	(d) 43,336
Lead and silver-lead ore, concentrates, etc. ..	..	255,998	..	..	..	1,535	..	..	257,533

(b) See letterpress preceding this table.

(c) Year ended 30th June.

(d) Incomplete.

MINERAL PRODUCTION.—QUANTITIES, 1936—continued.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Limestone flux ..	ton	118,428	..	15,230	13,622	..	262,301	..	409,581
Magnesite ..	..	17,183	216	100	116	..	..	..	17,615
Manganese ore ..	..	72 ¹	..	..	..	..	..	..	72
Molybdenite ..	cwt.	3	..	400	..	..	..	..	403
Osmiridium ..	oz.	..	..	..	..	..	281	..	281
Phosphate ..	ton	175	..	..	..	..	..	..	175
Pigments ..	..	623	..	..	53	..	..	..	676
Platinum ..	oz.	47	..	..	..	..	..	..	47
Salt ..	ton	..	(a)	..	66,326	..	..	..	(d) 66,326
Sapphires ..	oz.	37 ²	..	..	..	..	..	..	37 ²
Shale (oil) ..	ton	..	..	..	..	..	..	..	..
Silver ..	fine oz. (b)	56,994	7,964	3,084,008	1,560	105,219	906,458	..	d4,162,203
Tin and tin ore ..	ton	1,114	86	1,108	..	50	1,004	30	3,392
Wolfram ..	cwt.	105	..	404	..	..	4,143	1,721	6,373
Zinc and concentrates ..	ton	220,767	..	30,443	..	..	18,769	..	269,979

(a) Not available for publication.
ended 30th June.

(b) See letterpress preceding this table.

(c) Year

(d) Incomplete.

The values of the minerals raised in each State in 1936 are given in the following table:—

MINERAL PRODUCTION.—VALUE, 1936.

Minerals.	N.S.W. (a)	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas. (a)	N.T. (d)	Australia.
	£	£	£	£	£	£	£	£
Antimony ..	1,772	1,866	366	..	..	..	..	4,004
Arsenic ..	4,063	..	..	..	62,460	..	..	66,525
Asbestos ..	..	..	..	714	3,479	..	..	4,193
Barytes ..	216	..	..	2,380	..	66	..	2,662
Bismuth ..	17	..	8,150	..	..	..	..	8,167
Brown Coal ..	..	323,914	..	..	..	..	..	323,914
Coal ..	5,126,850	253,835	858,732	..	331,565	92,269	..	6,663,251
Copper (ingot and matte) ..	53,687	..	161,688	22,609	97	556,734	1,871	796,686
Diamonds ..	650	..	..	..	..	..	..	650
Diatomaceous earth ..	4,605	429	1,155	..	..	..	..	6,190
Gems ..	198	..	2,038	..	..	..	..	2,236
Gold ..	525,792	1,018,670	1,048,748	66,523	7,326,309	152,291	76,001	10,214,404
Gypsum ..	2,160	2,338	..	80,363	7,569	..	..	92,430
Ironstone ..	2,091	..	1,351	2,170,392	..	..	..	2,173,834
Kaolin ..	18,319	5,144	629,253	600	..	..	..	24,063
Lead ..	(b)	..	..	200	..	134,413	..	763,866
Lead and silver-lead ore, concentrates, etc. ..	3,815,643	..	..	..	2,228	..	..	3,817,871
Limestone flux ..	22,349	..	12,461	5,108	..	71,243	..	111,161
Magnesite ..	30,070	821	325	143	..	..	..	31,359
Manganese ore ..	243	..	..	..	..	..	..	243
Molybdenite ..	71	..	3,353	..	..	..	..	3,374
Opal ..	6,110	..	150	9,363	..	..	..	15,623
Osmiridium ..	..	..	..	..	..	3,862	..	3,862
Phosphate ..	131	..	..	..	..	..	..	131
Pigments ..	934	..	..	124	..	..	..	1,058
Platinum ..	410	..	..	..	..	..	..	410
Salt ..	..	(f)	..	149,234	..	..	..	(g) 149,234
Shale (oil) ..	..	..	..	..	..	..	..	..
Silver ..	(b) 5,142	525	269,848	157	11,773	81,036	..	(h) 368,481
Tin and tin ore ..	268,454	14,750	157,889	..	6,882	206,656	4,176	658,807
Wolfram ..	560	..	1,889	..	..	28,323	8,748	39,520
Zinc and concentrates ..	198,460	..	453,356	..	..	283,105	..	934,921
Unenumerated ..	(c) 47,839	711	2,759	5,379	19,092	14,038	(e) 7,805	97,623
Total ..	10,136,789	1,623,003	3,613,511	2,513,359	7,771,454	1,624,036	98,601	27,380,753

(a) For items excluded see letterpress below.

(b) See letterpress above preceding table.

(c) Includes dolomite £0,790, silica £15,249, breccia £11,870, and zircon-rutile-ilmenite £4,863.

(d) Year ended 30th June.

(e) Mica.

(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 1936 consisted of—lime, £70,439, building stone, £115,162; Portland cement, £986,331; coke, £800,632; road material and gravel, £963,566; shell grit, £10,777; sulphur and sulphuric acid, £52,880; and brick and pottery clays, £271,220. Carbide, £137,100, and cement, £210,489, have been excluded from the Tasmanian figures.

4. **Value of Production, 1932 to 1936.**—The values of the minerals produced in the various States for the years 1932 to 1936 are given in the table hereunder:—

MINERAL PRODUCTION.—VALUE.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
1932 ..	6,533,191	908,991	1,818,701	837,896	4,731,740	739,058	13,811	15,583,391
1933 ..	6,964,834	1,060,437	2,373,251	1,076,434	5,269,194	845,668	18,150	17,607,968
1934 ..	7,766,501	1,092,029	2,713,135	1,713,537	5,884,430	750,389	28,806	19,948,830
1935 ..	9,210,820	1,391,253	2,887,440	2,498,617	6,107,990	1,071,507	76,900	23,247,527
1936 ..	10,136,789	1,623,003	3,613,511	2,513,359	7,771,454	1,624,036	98,601	27,380,753

The value of the mineral production in 1936 exceeded that of 1935 by more than £4,100,000. All of the States recorded increases in values, mainly through the agency of gold, zinc and concentrates, silver-lead ores and concentrates, lead, coal and copper. Of these gold was the most important; the production increased by 269,259 fine oz., which, at its enhanced price, accounted for nearly £2,200,000 of the increase mentioned above.

Zinc and concentrates followed gold in the order of increase during 1936, the value of production rising by £635,000 mainly owing to increases in Queensland and Tasmania. In the latter State production was resumed in 1936 after a lapse of five years.

The production of silver-lead ores and concentrates in New South Wales increased by 12,181 tons, and as the price rose also by nearly £2 per ton the value of output exceeded that of 1935 by £634,000.

The quantities of lead and copper were also greater in 1936 and were likewise accompanied by increases in values.

Coal also increased in quantity, but no variation in price was recorded.

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 1936.**—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1936. 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 £58,000,000 of that published by the State Department of Mines, the principal items excluded being coke, £17,799,000; cement, £22,619,000; lime, £1,884,000; 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 1936.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	Million. £
Gold ..	65,741,723	307,045,073	89,821,437	1,920,368	196,221,350	9,383,787	2,423,535	673
Silver and lead ..	133,643,442	267,112	8,287,586	383,904	2,328,363	9,549,591	66,324	155
Copper ..	15,760,645	216,686	27,330,574	33,193,613	1,810,057	22,893,160	235,474	101
Iron ..	7,753,690	15,641	503,590	16,520,167	36,722	91,193	..	25
Tin ..	15,799,472	1,011,967	11,869,541	..	1,634,547	18,294,551	651,475	49
Wolfram ..	200,647	11,885	1,076,314	301	1,441	328,731	244,721	2
Zinc ..	25,469,368	..	535,679	15,993	5,437	1,279,182	..	27
Coal ..	217,428,620	16,592,046	23,984,657	..	8,427,208	2,387,722	..	269
Other ..	8,723,901	924,623	2,898,560	5,727,140	568,815	2,373,453	116,211	21
Total ..	490,611,508	326,085,033	166,307,938	57,761,486	211,033,940	66,581,370	3,737,740	1,322

(a) To 30th June, 1936.

The "other" minerals in New South Wales include alunite, £211,000; antimony, £370,000; arsenic, £194,000; bismuth, £245,000; chrome, £132,000; diamonds, £147,000; magnesite, £306,000; molybdenite, £215,000; opal, £1,619,000; scheelite, £196,000; and oil shale, £2,695,000. In the Victorian returns antimony ore was responsible for £614,000. The value for coal in this State includes £3,032,000 for brown coal. Included in "other" in the Queensland production were opal, £188,000; gems, £642,000; bismuth £138,000; cobalt, £158,000; molybdenite, £606,000; limestone flux, £803,000; and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £3,658,000; limestone flux, £311,000; gypsum, £1,055,000; phosphate, £135,000; and opal, £148,000. In the Tasmanian returns osmiridium was responsible for £614,000, scheelite for £112,000, and iron pyrites for £167,000.

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 values 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	13,843,081	246,668	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..	9,560,492	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..	940,946	2,721,309	1,976,715	47,564	20,462,957	193,833	9,894	26,353,218
1926 ..	82,551	208,471	43,914	3,219	1,857,716	17,936	594	2,214,401
1927 ..	76,595	163,609	161,321	1,776	1,734,571	20,646	468	2,159,076
1928 ..	54,503	144,068	56,395	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	4,413,800	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	507,040	982,635	58,582	5,534,491	48,139	8,124	7,536,674
1935 ..	439,140	768,401	904,755	64,109	5,677,328	73,143	44,458	7,971,334
1936 ..	525,792	1,018,670	1,048,748	66,593	7,326,300	152,291	76,001	10,214,404
1937 ..	595,855	1,266,507	1,104,760	60,372	8,688,921	170,130	91,543	11,984,088
Total—								
1851-1937	66,337,817	308,311,580	90,926,203	1,980,201	204,910,271	9,559,825	2,515,078	684,540,975

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 1,381,135 ozs. in 1937, 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. 1½d. in 1935, £8 13s. 2d. in 1936 and £8 13s. 8d. in 1937. 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 1903, 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 quantities of gold raised in the various States and in Australia during each of the five years ending 1937. A separate line is added showing the total production in thousands of fine ounces from 1851 to 1937 :—

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 pzs.	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	989	886,609
1935 ..	50,102	87,609	102,990	7,333	649,049	8,343	5,066	910,492
1936 ..	60,739	117,596	121,174	7,681	840,208	17,600	8,753	1,179,751
1937 ..	68,607	145,799	127,281	6,962	1,000,647	20,276	10,521	1,380,093
Total (b)								
1851-1937	15,294	71,920	20,730	425	43,206	2,179	564	154,318

(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, until its production was surpassed by that of Western Australia in 1898. From that year onward Western Australia contributed 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 seven 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	19,038,661	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 ..	29,447,353	910,492	3.09
1936 ..	32,922,013	1,179,751	3.58

For the year 1936 the world's production of gold in fine ounces was 32,922,000, as compared with a return of 29,447,000 fine ounces in 1935. It is estimated that the world's production in 1937 approximated 37,688,543 fine ounces, of which Australia's share amounted to 1,380,093 fine ounces or 3.66 per cent.

The quantities of gold produced in the ten chief producing countries in each of the five years 1932 to 1936 are given in the table hereunder. Particulars of the quantities and values of the gold production for all countries for the ten years 1927-36 will be found in the *Australian Production Bulletin* No. 31 Part II., Primary Industries and Total Recorded Production, issued by this Bureau.

GOLD.—PRODUCTION, CHIEF COUNTRIES.

Country.	1932.	1933.	1934.	1935.	1936.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
Union of South Africa	11,558,532	11,013,712	10,479,857	10,773,991	11,336,214
Soviet Union	1,990,000	2,814,000	3,700,000	4,500,000	5,500,000
Canada	3,044,387	2,949,309	2,972,074	3,284,890	3,748,028
United States	2,210,198	2,276,682	2,742,161	3,163,166	3,713,187
Australia	714,135	830,267	886,609	910,492	1,179,751
Rhodesia	580,484	645,087	693,265	727,928	801,513
Mexico	584,198	637,727	662,000	682,319	753,950
Japan	462,251	502,875	531,371	673,475	742,135
India	329,600	336,100	322,100	327,600	333,300
Gold Coast	278,782	305,908	326,040	358,835	428,144

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 1927-1936 :—

GOLD.—AVERAGE ANNUAL PRODUCTION, CHIEF COUNTRIES, 1927 TO 1936.

Country.	Quantity.	Country.	Quantity.
	Fine ozs.		Fine ozs.
Union of South Africa	10,764,552	Mexico	668,930
Canada	2,646,633	Rhodesia	626,326
Soviet Union	2,489,957	Japan	469,230
United States	2,474,663	India	343,249
Australia	698,146	Gold Coast	275,668

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.

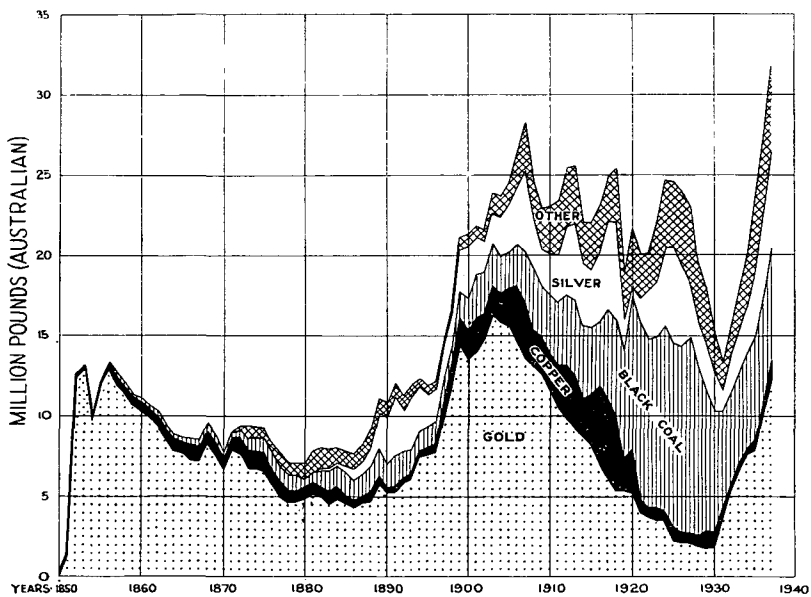
GOLD MINING.—PERSONS EMPLOYED.

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)	11,247	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
1930	4,229	942	903	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	7,983	250	89	26,600
1933	6,913	6,126	4,161	231	9,900	229	95	27,655
1934	7,080	6,943	3,867	804	12,523	275	115	31,607
1935	6,652	6,960	3,931	243	14,708	216	403	33,113
1936	5,204	6,959	3,983	283	15,696	230	372	32,727

(a) Estimated.

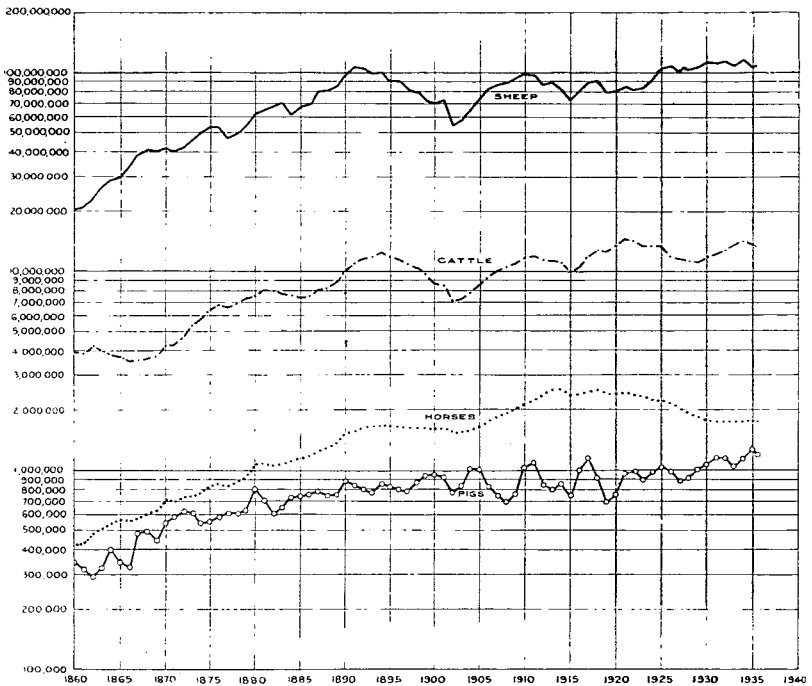
(b) Year of Maximum Production.

VALUE OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1850 TO 1937.



EXPLANATION.—The upper curve represents the total value of mineral production while the vertical distances between the curves represent the value of production of each mineral.

LIVESTOCK—AUSTRALIA, 1860 TO 1935.



(See page 646.)

EXPLANATION.—This is a ratio graph, the vertical scale being logarithmic and the curves rise and fall according to the rate of increase or decrease. Actual numbers are indicated by the scale at the side of the graph.

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. In 1936, however, the number declined for the first time 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 1936 amounted to 47 ozs., valued at £410 as compared with 98 ozs., valued at £649 in the preceding year, while the total production recorded to the end of 1936 amounted to 20,140 ozs., valued at £128,037.

(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 281 ozs. in 1936 valued at £3,862 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 £12 10s. per oz. in 1936, 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 values of the production of silver, silver-lead ore and lead from the various States during the five years ending 1936 are given hereunder:—

SILVER AND LEAD.—PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	£
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
1936 ..	3,820,785	525	899,101	357	14,001	215,449	..	4,950,218

(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 1936 include silver to the value of £5,142 and silver-lead ore and concentrates valued at £3,815,643. 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 1936 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 overlooked. The next table, however, which indicates the quantities of these materials locally produced, and the contents by assay of concentrates exported during the year 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 ..	5,908,638	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
1932 ..	5,896,193	131,422	52,200	3,001,005	178,034	1,222	30,164	124,719
1933 ..	7,439,479	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	180,958	67,666	4,933,492	660,630	11,947	72,285	424,029
1936 ..	7,778,514	157,755	57,744	4,608,888	779,289	18,569	68,011	549,319

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 1936 the amount won from ores of New South Wales origin was given as 214 tons, valued at £59,978. 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 1936.

Mine.	Value of Output to end of 1936.	Dividends and Bonuses Paid to end of 1936.
	£	£
Broken Hill Proprietary Co. Ltd.	53,524,883	15,251,833
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)	28,239,105	3,635,625
Broken Hill South Ltd.	26,174,159	6,375,000
North Broken Hill Ltd.	22,291,194	6,760,190
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.	12,828,021	4,092,248
Barrier South Ltd.	151,517	50,000
Total	163,462,372	39,347,767

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 1936, 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 £170.7 millions and £42.4 millions respectively. The authorized capital of the various companies amounted to £11,418,000. In 1936 the dividends and bonuses paid amounted to £1,978,667 shared in by the Companies controlling the principal mines as follows: Zinc Corporation, £251,375; North Broken Hill, £560,000; Broken Hill South, £500,000; Broken Hill Proprietary, £513,542, and Sulphide Corporation, £153,750.

(b) *Other Areas.* Silver is found in various other localities in New South Wales, but the production therefrom in 1936 was unimportant: operations were either suspended or restricted to developmental work and prospecting.

(iii) *Victoria.* The silver produced in 1936 amounted to 7,964 oz., valued at £525, and was obtained in the refining of gold at the Melbourne Mint.

(iv) *Queensland.* The production of silver increased by nearly 700,000 fine oz. to about 3.1 million fine oz., and lead increased by 2,811 tons to 35,763 tons practically all of which was won from the mine and works at Mount Isa.

(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 until 1936, when 1,560 fine oz. of silver valued at £157 was produced. In addition 10 tons of lead were mined for a value of £200.

(vi) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1936 was 105,219 oz., valued at £11,773.

(vii) *Tasmania.* The silver produced in 1936 amounted to 906,458 oz., valued at £81,036, and the lead to 7,563 tons, valued at £134,413. This represents a very great increase on that of the previous year. About 803,000 oz. of the total silver output were contained in silver-lead, while 103,000 oz. 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 hindered, however, 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, 1935 and 1936. In 1933, 24 tons of silver-lead ores valued at £410 were raised whilst the production amounted to 8 tons valued at £111 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 quantities 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.	1936.	1937.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
Metal recovered by—					
Smelters	4,020,904	7,529,845	8,583,133	8,360,673	9,279,983
Mints	226,019	101,368	91,416	138,001	230,526
Metallic contents in ores and concentrates exported ..	8,901,212	2,242,170	2,579,082	3,477,416	4,267,571
Total Production ..	13,148,135	9,873,383	11,253,631	11,976,090	13,778,080

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.	1932.	1933.	1934.	1935.	1936.
World's production in 1,000 fine ozs. ..	171,600	172,000	193,000	223,000	247,000

The world's production of silver in millions of fine ounces during the years 1916, 1926 and 1936 amounted respectively to 180, 254 and 247, of which Australia contributed 9.9 million, 10.3 million and 13.8 million fine ounces, or 5.5 per cent., 4.1 per cent. and 5.6 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 1936 from the chief silver producing countries were as follows :—

SILVER.—PRODUCTION, CHIEF COUNTRIES, 1936.

Country.	Production.	Country.	Production.
	Fine ozs. (‘000 omitted.)		Fine ozs. (‘000 omitted.)
Mexico	77,462	Germany	(a) 6,751
United States	60,721	India	5,977
Peru	19,000	Soviet Union	5,000
Canada	18,334	Belgian Congo	2,782
Australia	11,976	Yugoslavia	1,786
Bolivia	10,723	Spain and Portugal	(a) 1,450
Japan	9,605	Union of South Africa	1,076

(a) Figures quoted are for 1935.

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.			1934.			1935.			1936.			1937.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Silver (Standard)															
per oz.	0	1	6.14	0	1	9.22	0	2	4.95	0	1	8.06	0	1	8.07
Lead .. per ton	11	16	4	11	1	0	14	5	7	17	13	4	23	4	3
Spelter per ton	15	14	10	13	15	6	14	3	6	15	0	9	22	5	9

A marked recovery in the prices of lead and spelter occurred between November, 1936, and March, 1937, when the price of lead rose from £22 to £33 per ton and that of spelter from £16 to more than £33 per ton. Prices receded after that month and by December, 1937, were quoted at £16 and £15 per ton respectively. By June, 1938, these prices had declined further to £14 and £13. Silver at that date remained about 1s. 7d. 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. (a) No.	Q'land. No.	S. Aust. No.	W. Aust. (b) No.	Tasmania. (a) No.	Nor. Ter. No.	Australia. No.
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
1936 ..	4,163	601	3	32	1,386	..	6,185

(a) Silver, lead and zinc.

(b) Principally lead and silver-lead ore.

§ 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 1923 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 an improvement in price during 1935 and 1936, the output in the latter year increasing to 18,882 tons of metal, concentrates and ore. The values of the local production as reported and credited to the mineral industry for the years 1932 to 1936 are 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.	1932.	1933.	1934.	1935.	1936.
	£	£	£	£	£
New South Wales ..	21,785	26,775	25,398	30,071	53,687
Queensland ..	108,858	105,031	95,903	101,489	161,688
South Australia ..	..	2,928	8,475	11,065	22,609
Western Australia ..	..	1,132	..	..	97
Tasmania ..	399,762	395,286	267,342	464,007	556,734
Northern Territory (a) ..	137	..	..	..	1,871
Australia ..	530,542	531,152	397,118	606,632	796,686
Ingots, Matte, etc. .. tons	14,763	14,493	12,003	16,992	18,069
Ore .. tons	20	..	96	56	(b) 813

(a) Year ended 30th June.

(b) Including 615 tons of Concentrates.

2. Sources of Production.—(i) *New South Wales*. The production during 1936 amounted to 758 tons of electrolytic copper and 56 tons of concentrates, the latter being exported overseas. Practically all of the copper was obtained at Port Kembla from the treatment of 1,714 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 1936 to 3,828 tons valued at £161,688, 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 1936 were as follows: Cloncurry, 1,862 tons, £78,649; Herberton, 133 tons, £5,611; and Mount Morgan, 1,675 tons, £70,770.

(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. The production of copper in this State in 1936 amounted to 451 tons, valued at £22,609.

(iv) *Western Australia*. Thirty-five tons of copper valued at £1,132 were recovered in this State during 1933, and the only production since that year was 2 tons valued at £97 exported in 1936.

(v) *Tasmania*. The quantity of copper produced in Tasmania during 1936 was 13,040 tons, valued at £556,734, the whole of the production being by the Mount Lyell Mining and Railway Co. Ltd. This Company treated 58,966 tons of ore and concentrates and produced 13,136 tons of blister copper, containing copper, 13,040 tons; silver, 103,189 oz.; and gold, 7,046 oz., the whole being valued at £A773,083.

(vi) *Northern Territory*. Copper has been found at various places, but the development of these deposits is hindered by low prices and the difficulties of transport. For the year ended June, 1936, 198 tons of ore were raised. This was the first production recorded since 1932-33.

3. Prices.—The great variation in price that the metal has undergone is shown in the following table, which gives the average prices 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.
1932	..	..	..	31.68	5.56
1933	..	..	..	32.52	7.02
1934	..	..	..	30.28	8.43
1935	..	..	..	31.87	8.65
1936	..	..	..	38.44	9.47

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. Following that month prices receded to about £35 in June, 1938, but increased to more than £45 by October, 1938.

4. **World's Production of Copper.**—The world's production of copper during the five years 1932–1936 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.	1932.	1933.	1934.	1935.	1936.
World's production—tons ..	881,000	1,040,000	1,300,000	1,500,000	1,700,000

The yields from the chief copper-producing countries in 1936 were as follows :—

COPPER.—PRODUCTION, CHIEF COUNTRIES, 1936.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	583,285	Germany	58,700
Chile	241,407	Yugoslavia	38,778
Canada	170,676	Peru	32,250
Rhodesia	142,333	Mexico	27,942
Belgian Congo	94,156	Australia	16,083
Soviet Union	82,000	Union of South Africa ..	9,865
Japan	76,505	United Kingdom	9,300

During the five years ending in 1936 the share of the United States in the world's copper production amounted to nearly 25 per cent., while the Australian proportion was only about 1 per cent.

A recovery in the world consumption of copper which commenced in 1935, continued in 1936. This had the effect of reducing stocks to a more reasonable figure and, at the same time, stimulated production particularly in the United States of America.

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.
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
1936	9	196	54	..	1,610	4	1,873

(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 receded somewhat during 1936 and production responded accordingly. The next table shows the values of the production as reported to the Mines Departments in each of the States during the five years 1932 to 1936. A separate line is appended showing the recorded tonnage for Australia during each of the specified years :—

TIN.—PRODUCTION.

State.	1932.	1933.	1934.	1935.	1936.
	£	£	£	£	£
New South Wales	120,124	218,244	328,130	287,890	268,454
Victoria	404	1,350	3,886	14,475	14,750
Queensland	66,174	123,620	179,404	187,234	157,889
Western Australia	3,295	4,557	6,765	8,829	6,882
Tasmania	109,767	190,041	219,246	258,919	206,656
Northern Territory (a) ..	2,322	2,519	9,566	6,036	4,176
Total	302,086	540,331	746,997	763,383	658,807
Tonnage	2,396	3,020	3,323	3,602	3,392

(a) Year ended 30th June.

2. **Sources of Production.**—(i) *New South Wales.* The production in 1936 was estimated at 1,076 tons of ingots valued at £262,661 and 38 tons of concentrates valued at £5,793 were exported to the United Kingdom and Belgium. A large proportion of the output in this State is obtained in normal years by dredging, principally in the New England district, the quantity of stream tin won in 1936 being 421 tons, valued at £67,553. The Tingha area was the principal contributor to the output in 1936 the yield from this district comprising 406 tons of concentrates. Amongst other areas, Emmaville produced 266 tons of concentrates, Ardlathan 223 tons, while the lode mines at Torrington returned an increased yield of 222 tons of concentrates.

(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 1936 amounted to 86 tons, valued at £14,750.

(iii) *Queensland.* The chief producing districts in Queensland during 1936 were Herberton, 679 tons, valued at £95,280; Cooktown, 77 tons, £11,501; Stanthorpe, 180 tons, £28,605; Chillagoe, 77 tons, £9,982 and Kangaroo Hills, 91 tons, £11,819. The total production, 1,108 tons, £157,889, showed a decrease on that for 1935, which 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 quantity of tin reported in this State in 1936 amounted to 50 tons, valued at £6,882, and was obtained in the Pilbara and Greenbushes fields. The Mines Department carried out a programme of boring during 1936 in the hope of locating payable deep alluvial deposits, but the results were discouraging. Towards the close of the year, however, increased activity in the field was noted.

(v) *Tasmania.* For 1936, the output amounted to 1,004 tons of tin, valued at £206,656, a decrease of 127 tons in quantity and £52,263 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 considerable attention during 1936 and although there was a reduction in output in 1936, there is every prospect that a substantial increase will take place in 1937. By this time a number of mines will be in full production.

(vi) *Northern Territory.* The production for the year amounted to 30 tons of concentrates valued at £4,176. Twenty-two tons were produced on the Maranboy field and the balance was made up of small parcels from various other localities.

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

TIN.—WORLD'S PRODUCTION.

1932.	1933.	1934.	1935.	1936.
Tons. 96,100	Tons. 89,000	Tons. 117,000	Tons. 139,000	Tons. 178,000

The world production of tin showed a considerable increase in 1936 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 1936. 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 1936 were as follows :—

TIN.—PRODUCTION, CHIEF COUNTRIES, 1936.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Malaya	66,698	Belgian Congo	7,303
Netherlands East Indies	30,769	India	4,547
Bolivia	24,091	Australia	2,968
Siam	12,526	Great Britain	2,099
China	10,400	Indo-China	1,381
Nigeria	9,739	Union of South Africa	634

Australia's share of the world's tin production, estimated at 178,000 tons in 1936, would appear to be a little less than 2 per cent.

4. **Prices.**—The average prices of the metal in the London market for the years 1932 to 1937 were as follows :—

TIN.—PRICES, LONDON.

Year.	Average Price Per Ton.	Year.	Average Price Per Ton.
	£ s. d.		£ s. d.
1932	135 18 10	1935	225 14 5
1933	194 11 11	1936	204 12 8
1934	230 7 5	1937	242 6 7

The price of tin exceeded £204 per ton in 1936 compared with £118 in 1931—the peak depression year—and £230 in 1934. The price rose to an average of £242 in 1937, but had receded to £177 12s. in June, 1938.

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.
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
1936	1,762	6	1,270	48	1,284	37	4,407

(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 1936 the zinc concentrates produced amounted to 220,767 tons, valued at £198,460. Portion of the zinc concentrates produced is treated at Risdon in Tasmania, and the balance is exported overseas.

The re-opening of the mine at Captain's Flat by the Lake George Mines Ltd. was an important development in 1937. Production is expected to commence early in 1939 and an increase of 20,000 tons in the annual output for Australia is forecast.

(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 1932 to 1936 will be found in § 17 hereinafter.

(ii) *Queensland.* The production of zinc in the Cloncurry district of Queensland during 1936 was 30,443 tons valued at £453,356, compared with 4,411 tons valued at £68,863 obtained in 1935. The metal was produced by the Mount Isa Mines Ltd.

(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 from Tasmanian ores was suspended from 1931 to 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 1936 on raw materials obtained wholly from Broken Hill in New South Wales. Production amounted to 57,744 tons of slab zinc valued at £1,119,713, and 214 tons of cadmium, valued at £59,978.

2. **World's Production.**—The world's production of zinc during the five years 1932–36 was as follows :—

ZINC.—WORLD'S PRODUCTION.

1932.	1933.	1934.	1935.	1936.
Tons. 780,000	Tons. 986,000	Tons. 1,162,000	Tons. 1,328,000	Tons. 1,440,000

The yields from the chief producing countries in 1936 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 next four 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, 1936.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	439,400	France	53,000
Belgium	194,600	Norway	44,300
Australia	145,900	Japan	35,600
Canada	134,900	Mexico	31,700
Germany	134,000	Italy	27,000
Poland	91,100	Rhodesia	20,700
Great Britain	65,000	Netherlands	15,200
Soviet Union	65,000	Spain	7,700

The figures for Australia have been taken from returns supplied by the Australian Mines and Metals Association. On a world's production of £1,440,000 tons Australia's output of 145,900 tons represents 10 per cent.

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

§ 8. Iron.

1. General.—Iron ore is widely distributed throughout Australia, but the extent of the deposits has never been determined. The only two known ore bodies of large extent, high grade and easy access are those situated at Yampi Sound, Western Australia and at Iron Knob, South Australia. Estimates of the reserves at these centres place the quantities available at approximately 100 million tons and 150 million tons respectively. In a report submitted to the Government the Commonwealth Geologist stated that, bearing in mind the expansion of the iron industry in Australia, these reserves were sufficient for not more than two generations and that unless supplies were conserved Australia would, by that time, become an importer of iron ore. As the result of this advice, the Commonwealth Government prohibited the export of iron ore from 1st July, 1938. A survey of the iron ore resources of Australia is now in progress.

2. Production.—(i) *New South Wales*. The production from ores mined in New South Wales amounted to 4,580 tons in 1935, valued at £18,320. This is the only 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 the chief source of supply has been South Australia.

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 1936 the iron oxide raised amounted to 3,440 tons, valued at £2,091. 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 1936, when 1,887,298 tons of ore were raised valued at £2,170,392. 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 continued on the deposits at Yampi Sound and at the end of 1937, 40 men were employed. These have not yet reached the production stage.

(iv) *Tasmania.* The production of iron pyrites during 1936 amounted to 33,711 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 have displaced imported sulphur in the manufacture of chemical fertilizers. The output has grown considerably since 1932. 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 1936–37 the bounties paid under the Iron and Steel Products Bounty Act on articles manufactured from locally produced materials were as follows: Wire-netting, £8,467; traction engines, £20,503. Corresponding amounts paid during 1937–38 were £6,741 and £25,556 respectively.

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 production in the principal countries during the latest available three years was as follows:—

PIG IRON AND STEEL.—WORLD'S PRODUCTION.

Country.	Pig Iron.			Steel Ingots and Castings.		
	1934.	1935.	1936.	1934.	1935.	1936.
	Thousands of Tons.			Thousands of Tons.		
United States ..	16,139	21,373	30,217	26,468	34,550	48,478
Germany ..	8,742	12,539	15,303	11,886	16,096	19,158
Soviet Union ..	10,329	12,493	14,400	9,394	12,520	16,300
United Kingdom ..	8,742	6,426	7,686	8,859	9,842	11,698
France ..	6,155	5,799	6,237	6,148	6,264	6,562
Belgium ..	2,907	3,060	3,207	2,900	2,966	3,105
Japan ..	2,404	2,716	2,869	3,742	4,532	5,368
Luxemburg ..	1,955	1,872	1,987	1,932	1,837	1,981
Saar Territory ..	1,826	(a)	(a)	1,950	(a)	(a)
India ..	1,297	1,056	1,541	798	912	880
Czechoslovakia ..	590	811	1,140	936	1,197	1,559
Italy ..	521	622	816	1,696	2,171	2,328
Canada ..	407	600	679	759	936	1,115
Australia ..	430	572	668	461	615	717
Sweden ..	523	566	585	858	895	1,022
Poland ..	382	394	582	844	946	1,143
Spain ..	348	350	281	407	560	471
China ..	225	250	..	50	60	60
Austria ..	134	193	248	309	364	418
Total—All Countries	64,240	72,111	89,802	80,797	97,887	124,374

(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, 39,275,000 tons; steel, 50,029,000 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 whilst an extension of the industry to South Australia is also contemplated.

(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.
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
1932 ..	190,132	221,488	178,740	1937 ..	913,406	1,073,479	837,445

§ 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 1936, 6,373 cwt. of wolfram valued at £39,520 were raised in Australia, of which New South Wales produced 105 cwt. valued at £560; Queensland, 404 cwt., £1,889; Tasmania, 4,143 cwt., £28,323; and Northern Territory, 1,721 cwt., £8,748. New South Wales was the only State in which the production of scheelite was recorded in 1936; the quantity raised amounted to 245 cwt. valued at £1,631. With a recovery in prices, Australia would become 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.

1. *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
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
1936 ..	9,199,466	426,725	1,046,879	..	565,075	132,264	11,370,409
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
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	5,869,605
1935 ..	4,887,341	282,253	843,034	..	318,013	86,204	6,416,845
1936 ..	5,126,850	253,835	858,732	..	331,565	92,269	6,663,251

(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 quantities and values of which 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	1933	2,580,060	271,360
1921	79,224	31,074	1934	2,617,534	264,192
1926	957,935	188,899	1935	2,221,515	317,444
1931	2,194,453	251,511	1936	3,044,897	323,914

(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 worked extensively 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 1932 to 1936 :—

COAL.—PRODUCTION IN DISTRICTS, NEW SOUTH WALES.

District.	1932.	1933.	1934.	1935.	1936.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	4,398,253	4,651,483	5,227,647	5,679,802	6,197,554
Southern	1,112,686	1,218,014	1,344,669	1,558,282	1,626,143
Western	1,273,283	1,248,940	1,300,864	1,460,495	1,375,769
Total	6,784,222	7,118,437	7,873,180	8,698,579	9,199,466
Total Value (a) £ ..	4,376,453	4,306,799	4,541,923	4,887,341	5,126,850
Average value per ton (a) ..	12s. 11d.	12s. 1d.	11s. 6d.	11s. 3d.	11s. 2d.

(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 overseas 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 9,199,000 tons in 1936. Of the total quantity of coal won in New South Wales since the inception of operations to the end of the year 1936, viz., 403,500,000 tons, about 274,000,000 or 68 per cent. was obtained in the Northern District, 83,125,000 tons or 21 per cent. came from the Southern District, and 46,375,000 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 Mine.	Other Coal Mines.	Total Production.	Total Value. (a)	Average Value per ton. (a)
		Tons.	Tons.	Tons.	£	s. d.
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
1936	.. ..	355,605	71,120	426,725	253,835	11 11

(a) At the pit's mouth.

(b) *Brown Coal.*—(i) *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 1936 amounted to 3,044,897 tons, all but 2,000 tons being procured at the State open cut at Yallourn. During the year 1936–37, 3,099,784 tons of brown coal were produced by the State Electricity Commission, of which 1,684,019 tons went to the power station and 1,415,765 tons to the briquette factory.

(ii) *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 355,088 tons in 1936. The Yallourn briquettes are considered to be equal in quality to those produced in the best German factories.

(iii) *Queensland.* The distribution of production during the year 1936 was as follows :—

COAL PRODUCTION.—QUEENSLAND, 1936.

District.		Production.	District.		Production.
		Tons.			Tons.
Ipswich .. ..	.. ..	499,732	Clermont .. ..	.. ..	81,650
Darling Downs .. ..	.. ..	74,704	Bowen .. ..	.. ..	213,267
Wide Bay and Maryborough	.. ..	71,405	Mount Mulligan (Chillagoe)	.. ..	20,451
Rockhampton (Central) ..	.. ..	77,379	Other .. ..	.. ..	8,291
			Total .. ..	.. ..	1,046,879

The production in 1936 was maintained at the 1935 level, but it is still 23 per cent. below the peak production of 1,369,000 tons in 1929. The distribution of the 1,046,879 tons raised in 1936 was as follows : Railway Department, 414,474 tons ; other industries within the State, 560,980 tons ; exported, 71,425 tons. There were 49 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 five collieries operating on the Collie field amounted in 1936 to 565,075 tons, an increase of nearly 28,000 tons on the return for 1935. The deposits at Wilga again remained unworked during the year.

(vi) *Tasmania*. The production in 1936 amounted to 132,264 tons, being 8,550 tons more than the total for 1935. The improved industrial demand for coal was sustained during the year and increased outputs were recorded. About 56,000 tons of the total output in 1936 were contributed by the Cornwall Coal Company, 30,000 tons by the Mt. Nicholas Proprietary and 19,000 tons by the Jubilee Company. The three mines combined raised 105,000 tons or about 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 1936 amounted to about 1,420 million tons, towards which Australia contributed about 14.4 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.
1933 ..	207,112,000	19,789,000	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
1936 ..	228,454,000	22,611,000	10,146,000	11,370,000	859,000	14,607,000

BROWN COAL, LIGNITE.

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	..
1936 ..	..	..	3,451,832	3,044,897	1,281,000	..

COAL PRODUCTION.—FOREIGN COUNTRIES.

Year.	Germany.	Austria.	Hungary.	Belgium.	France. (b)	Czecho- slovakia.	Yugoslavia.
BLACK COAL.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
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	10,701,000	394,000
1936 ..	155,878,000	240,500	814,000	27,433,000	44,512,000	12,040,000	434,000
Year.	Spain.	Poland.	Nether- lands.	Soviet Union.	Japan.	China. (c)	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1933 ..	5,904,000	26,924,000	12,375,000	74,730,000	32,010,000	18,505,000	342,118,000
1934 ..	5,838,000	28,771,390	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
1936 ..	(d)	29,278,000	12,600,000	120,897,000	37,466,000	(d)	436,456,000

BROWN COAL, LIGNITE.

Year.	Germany.	Austria.	Hungary.	Belgium.	France.	Czecho- slovakia.	Yugoslavia.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
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	3,866,000
1935 ..	145,028,000	2,924,000	6,612,000	..	885,000	14,977,000	3,971,000
1936 ..	159,148,000	2,851,000	6,993,000	..	905,000	15,697,000	3,971,000
Year.	Spain.	Poland.	Nether- lands.	Soviet Union.	Japan.	China.	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1933 ..	296,000	32,900	95,500	(a)	114,000	..	(a)
1934 ..	294,000	26,000	91,032	(a)	125,000	..	(a)
1935 ..	290,000	18,000	85,000	(a)	(d)	..	(a)
1936 ..	(d)	13,000	87,000	(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, 11,139,000 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 1936 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 297,000,000 tons in 1936, an increase of 9,000,000 tons or 3.1 per cent. on that of 1935. The production of foreign countries increased by 110,000,000 tons to 1,120,000,000 tons, or by 10.9 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 1936–37 was 340,388 tons, valued at £300,457. New South Wales exported 340,083 tons, Queensland, 301 tons, and Victoria

2 tons. The quantities and values of the overseas 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	1933-34 ..	292,416	269,296
1921-22 ..	1,028,767	1,099,899	1934-35 ..	305,139	273,305
1931-32 ..	344,015	341,800	1935-36 ..	307,540	276,553
1932-33 ..	282,977	281,512	1936-37 ..	340,388	300,457

(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	1933-34 ..	523,014	495,032
1921-22 ..	1,498,035	2,178,101	1934-35 ..	575,418	544,875
1931-32 ..	506,140	534,897	1935-36 ..	614,333	576,549
1932-33 ..	562,442	550,277	1936-37 ..	605,425	564,071

(a) Calendar Year.

(ii) *New South Wales.* The total export of coal from New South Wales in 1936 amounted to 3,077,417 tons, valued at £2,621,810 of which 2,662,376 tons, valued at £2,136,046 were shipped from Newcastle. Interstate exports amounted to 2,166,241 tons, valued at £1,814,776 and were divided as follows :—Cargo, 1,836,766 tons, £1,564,357; bunker, 329,475 tons, £250,419. Oversea exports totalled 911,176 tons, valued at £807,034, representing 609,327 tons of bunker coal, valued at £535,964 and 301,849 tons of cargo coal, valued at £271,070.

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

COAL.—DISTRIBUTION OF OUTPUT, NEW SOUTH WALES.

Year.	Exports to Australian Ports. (a)	Exports to Foreign Ports. (a)	Local Consumption.	Total.
	Tons.	Tons.	Tons.	Tons.
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
1936	2,166,241	911,176	6,122,049	9,199,466

(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.			
	1931-32.		1936-37.	
BLACK COAL.				
Production of Saleable Coal (a)	Tons. 9,834,002		Tons. 9,927,970	
Imports	190,224		14,121	
Total Supplies	10,024,226		9,942,091	
Exported overseas	385,825	% 3.84	305,692	% 3.07
Exported as bunker, overseas	643,062	6.42	576,128	5.79
Total	1,028,887	10.26	881,820	8.86
Consumed as fuel in—				
Electric Light and Power Works ..	1,523,342	15.20	1,627,338	16.37
Factories (b)	1,778,186	17.73	1,705,688	17.16
Railways	3,117,380	31.10	2,761,050	27.77
Total	6,418,908	64.03	6,094,076	61.30
Consumed as raw material in—				
Gas Works	1,212,964	12.10	1,039,908	10.46
Coke Works	645,346	6.44	1,127,307	11.34
Total	1,858,310	18.54	2,167,215	21.80
Domestic consumption and all other purposes (c)	718,121	7.17	798,980	8.04
Grand Total	10,024,226	100.00	9,942,091	100.00

BROWN COAL.

Production of Brown Coal	Tons. 1,878,485		Tons. 2,667,888	
Utilization—				
As fuel in Electric Light and Power Works	1,058,595	% 56.35	1,385,261	% 51.92
As raw material in Briquette Works (d)	819,890	43.65	1,282,627	48.08
Total	1,878,485	100.00	2,667,888	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 three years the average price in the southern fields was slightly in excess of that prevailing in the northern area. The average price at 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.
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
1936	.. ..	11 6	11 8	8 9	11 2

(ii) *Victoria*. In Victoria the average price of coal per ton at the pit's mouth in 1932 was 12s. 9d.; in 1933, 12s. 7d.; in 1934, 12s. 1d.; in 1935, 11s. 10d.; and in 1936, 11s. 11d. These averages are exclusive of brown coal, which in 1936 cost 2s. 2d. 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.				
	1932.	1933.	1934.	1935.	1936.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich	15 2	14 9	14 11	15 5	16 0
Darling Downs	18 4	18 2	18 4	18 3	18 10
Wide Bay and Maryborough	22 10	22 7	22 11	23 1	23 9
Rockhampton	17 6	16 6	16 7	16 7	17 4
Clermont	14 0	13 11	12 11	12 5	12 8
Bowen	14 9	13 9	13 6	13 10	14 0
Mount Mulligan (Chillagoe)	27 1	28 5	26 0	29 0	28 9
Average for State ..	16 3	15 10	15 11	16 0	16 5

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 : 1932, 13s.; 1933, 12s. 8d.; 1934, 11s. 2d.; 1935, 11s. 10d.; and 1936, 11s. 9d.

(v) *Tasmania*. The average prices per ton of coal at the pit's mouth in Tasmania for the last five years were : 1932, 15s. 6d.; 1933, 14s. 9d.; 1934, 14s. 4d.; 1935, 13s. 11d.; and 1936, 13s. 11d. per ton.

7. **Prices in the United Kingdom.**—During the five years 1932 to 1936 the average selling prices of coal per ton at the pit's mouth in the United Kingdom were: 1932, 13s. 3d.; 1933, 13s.; 1934, 12s. 11d.; 1935, 13s.; and 1936, 14s. 0½d. 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 1932 to 1936:—

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
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
1936 ..	14,221	1,367	419	2,432	768	334	19,541

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

The maximum number was employed 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. It would appear that the growth of mechanization has depressed employment in the industry for, notwithstanding an additional output of nearly 3,000,000 tons since 1932 the number employed in 1936 was practically the same as in the earlier year; in 1936 the output of coal per employee averaged 582 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, 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, 1936.

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 ..	14,221	13	60	0.91	4.22	707,651	153,327
Victoria ..	1,786	1	8	0.56	4.48	3,471,622	433,953
Queensland ..	2,432	8	195	3.29	80.18	130,860	5,369
Western Australia ..	768	..	325	..	423.18	..	1,739
Tasmania ..	334	..	2	..	5.99	..	66,132
Total ..	19,541	22	590	1.13	30.19	516,836	19,271

The next table shows the average number of miners employed, number of fatalities, and rate per 1,000 during the quinquennium 1932-36 :—

COAL MINING.—FATALITIES, 1932 TO 1936.

State.	Average No. of Coal Miners Employed.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	13,731	12.40	0.90
Victoria	1,869	.40	0.21
Queensland	2,422	2.80	1.16
Western Australia	662	.20	0.30
Tasmania	342	.20	0.58
Total	19,026	16.00	0.84

(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 1932-36 was 1.11, the rates varying between 1.35 in 1934 and 1.02 in 1936 while the rate for Australia for the same period was 0.84.

§ 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 1936-37 the coke imported amounted to 16,277 tons, of which 13,160 tons were obtained from the United Kingdom and 3,112 tons from Germany, Western Australia being the chief importing State. The quantity exported was 21,671 tons, valued at £31,672, of which 19,564 tons, valued at £26,584, 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.	1932.	1933.	1934.	1935.	1936.
Quantity .. tons	356,495	473,427	688,621	857,875	893,201
Value, total .. £	403,177	512,693	636,346	802,887	800,632
Value, per ton ..	22s. 7d.	21s. 8d.	18s. 6d.	18s. 9d.	17s. 11d.

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 893,201 tons in 1936.

A small quantity of coke is made in Queensland, the quantity returned in 1936 being 23,326 tons, of which 19,815 tons were 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, the output is 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.	1932.	1933.	1934.	1935.	1936.
Quantity .. tons	1,933	15,096	25,655	24,877	23,326

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 a series of reports in connexion therewith have been issued. In 1937 negotiations were completed between the two Governments and the National Oil Proprietary Ltd., in which the latter company undertook to develop the shale oil industry in the Newnes-Capertee district. The Commonwealth Government agreed to protect the industry by exempting from excise up to 10 million gallons of the Company's output of petrol for a period of 25 years. 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 technicians. Production is expected to commence in January, 1939.

(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. The plant operated by the Tasmanian Shale Oil Company 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. Further reference is made in § 16 hereinafter to the search for oil.

(ii) *Victoria*. The production of crude petroleum oil in the year 1936 amounted to 3,783 gallons valued at £94. The total production to the end of that year amounted to 90,931 gallons worth £2,272.

(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 1936 by several companies in localities situated in various parts of the State.

(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 1936, oil geologists examined territories under the direction of three companies. The reports furnished all recommended additional work and expenditure. Legislation governing petroleum prospecting was passed during the year.

§ 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 quantities and values in § 1 of this Chapter will show the production of the principal items in this class for each State during the year 1936.

§ 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 1936 in New South Wales was estimated at 650 carats, valued at £650. These were won by fossickers in the Inverell district. The total production to the end of 1936 is given at 205,000 carats, valued at £147,000.

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 has been restricted owing to the unfavourable market.

In Queensland, gems to the value of £2,038 were purchased on the Anakie sapphire fields in 1936. 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 76 in 1936. 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 1936 was £6,110, 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 £1,619,000, 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 1936 was estimated at £150, and up to the end of that year at about £188,000. 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 4 persons were engaged during 1936. 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. Since 1935, however, production has recovered and in 1936 amounted to £9,363. 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, chialtolite, 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 1936, the number so employed was as follows:—

NUMBER OF PERSONS ENGAGED IN MINING, 1936.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	5,204	4,163	9	1,762	14,221	1,231	26,590
Victoria ..	6,959	..	..	6	1,786	77	8,828
Queensland ..	3,983	601	196	1,270	2,432	348	8,830
South Australia ..	283	3	54	..	..	703	1,043
Western Australia ..	15,696	32	..	48	768	108	16,652
Tasmania ..	230	1,386	1,610	1,284	334	210	5,054
Northern Territory ..	372	..	4	37	..	95	508
 Australia ..	 32,727	 6,185	 1,873	 4,407	 19,541	 2,772	 67,505

Included in the figures for "other" in South Australia were 432 engaged in mining iron ore, 56 gypsum miners, 110 salt gatherers, and 50 opal miners. The Tasmanian figures include 44 osmiridium miners, and those for the Northern Territory, 40 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 Popu-lation.	Miners employed.	No. per 100,000 of Popu-lation.	Miners employed.	No. per 100,000 of Popu-lation.
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.		1935.		1936.	
	Miners employed.	No. per 100,000 of Popu-lation.	Miners employed.	No. per 100,000 of Popu-lation.	Miners employed.	No. per 100,000 of Popu-lation.
New South Wales	30,682	1,200	26,655	1,008	26,590	997
Victoria	6,463	359	9,064	492	8,828	478
Queensland	6,753	730	8,540	884	8,830	902
South Australia	518	90	974	166	1,043	178
Western Australia	7,147	1,653	15,557	3,493	16,652	3,700
Tasmania	3,397	1,512	5,079	2,212	5,054	2,187
Northern Territory	145	2,918	566	11,096	508	9,667
Australia	55,105	844	66,435	988	67,505	996

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 9,000 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, 2,700, and copper, 50. These increases were offset to some extent by the decrease in coal-mining from 21,400 in 1931 to 19,500 in 1936, 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, 1936.**—The following table gives particulars of the number of men killed or injured in mining accidents during the year 1936 :—

MINING ACCIDENTS, 1936.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED.								
Coal ..	13	1	8	..	..	..	..	22
Copper ..	..	..	..	..	..	..	..	..
Gold ..	2	5	5	..	38	..	..	50
Silver, lead and zinc ..	7	..	3	..	..	2	..	12
Tin ..	2	..	..	..	..	..	..	2
Other minerals ..	2	..	..	1	..	..	..	3
Total ..	26	6	16	1	38	2	..	89
INJURED.								
Coal ..	60	8	192	..	325	2	..	587
Copper ..	..	..	73	2	..	60	..	135
Gold ..	15	21	41	2	1,081	..	5	1,165
Silver, lead and zinc ..	159	..	48	..	..	14	..	221
Tin ..	1	..	3	..	..	16	..	20
Other minerals ..	3	..	..	55	..	..	..	58
Total ..	238	29	357	59	1,406	92	5	2,186

§ 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. This survey was conducted during the three years ended 1937, and has now been extended to the end of 1940. The total cost of the survey will involve an expenditure of £252,000, of which the Commonwealth Government will contribute £140,000, Queensland £67,500 and Western Australia £44,500. The latest report was in respect of the period ending 30th June, 1938, and a number of reports on individual areas have been issued as appendices.

(ii) *Metalliferous Mining.* 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.

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.

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	1,250	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 was 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.

In addition to the amounts shown 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 was 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 was appropriated during 1937-38. On account of heavy financial commitments no further grants have been made by the Commonwealth Government.

(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 to assist in the search for oil 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.

(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-fields 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.

(v) *Standing Committee on Liquid Fuels.* The Commonwealth Government recently appointed a Standing Committee on Liquid Fuels to Co-ordinate knowledge concerning the production of liquid fuels and the use of substitutes therefor, and to furnish information which will enable Australia to obtain greater independence in regard to fuel supplies. This Committee is investigating such matters as the production of oil from coal, benzol, power alcohol, shale oil and the use of producer gas in road vehicles.

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 years 1935-36 and 1936-37, 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 £29,462 but the actual expenditure in respect of work completed amounted to £27,655. 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 £15,527 were approved. No rewards were paid in connexion with the discovery of new mineral fields.

3. **Victoria.**—During the year 1936 expenditure in connexion with mining amounted to £41,197. Of this amount £11,521 consisted of advances to prospectors and £13,647 was advanced to companies on a £ for £ basis under conditions of Commonwealth Grant for assistance to metalliferous mining. The balance of £16,029 was provided for operation of State Batteries and boring operations, etc.

4. **Queensland.**—State assistance to the mining industry in 1936-37 amounted to £16,886, of which £14,146 was advanced to prospectors, the balance consisting of grants under the Mining Machinery Advances Act £1,264, and £1,476 for the provision of transport facilities, etc., to mineral fields. In addition to the above amounts, a sum of £12,890 was spent in connexion with the aerial survey of North Australia.

Mining operation 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 1936 the total amount of subsidy paid was £70,915, of which £16,696 has been repaid, and £4,700 written off, leaving a debit of £49,519. 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, Mongolatta and Tarcoola, and assays for public purposes are made at the School of Mines. Advances to prospectors in 1936 amounted to £2,716.

6. **Western Australia.**—Under the Mining Development Act of 1902 assistance was granted in 1936 in accordance with the subjoined statement:—Aid to prospectors, £9,512; subsidies on stone crushed for the public, £272; advances in aid of mining work and equipment of mines with machinery, £2,832. Other assistance granted from the vote on various matters during the year amounted to £1,341. The total amount involved was £13,957.

In 1936 there were 24 State batteries in operation of which three were leased. The amount expended thereon up to the end of 1936 was £91,981 from revenue, £374,763 from loan fund and £29,354 from other sources giving a total of £496,098. The working expenditure up to the end of 1936 exceeded the revenue by £102,241. The total value of gold and tin produced to the end of 1936 at the State plants was £9,071,819. 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 1936 amounted to £5,874, of which £5,376 was expended under the Aid to Mining Act 1927 on drilling and assistance and sustenance to prospectors, and the balance of £498 was paid from The Unemployment Relief Act. The amount received from ore sales was £74, the bulk of which was paid to tributers. Receipts amounted to £152.

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 1935–36 the assistance granted to prospectors amounted to £1,078. In addition a sum of £14,484 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 1933 to 1937 were as follows:—

REFINED METALS PRODUCED IN AUSTRALIA.

Metal.		1933.	1934.	1935.	1936.	1937.
Silver ..	ozs.	7,957,148	8,674,549	8,983,950	8,498,674	9,510,509
Lead, pig ..	tons	159,393	160,201	181,211	159,504	186,757
Zinc ..	"	53,956	54,629	67,666	70,509	69,750
Copper ..	"	11,238	7,970	11,768	13,313	17,400
Tin ..	"	2,360	2,330	2,837	2,717	2,907

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 the 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 1933–34 to 487,259 tons, in 1934–35 to 698,493 tons, in 1935–36 to 783,233 tons, and in 1936–37 to 913,406 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 1933 to 1937, 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—	1933.	1934.	1935.	1936.	1937.
Silver	ozs. { Lead-Silver-Gold Bullion	2,177,633	1,819,546	2,506,015	2,810,828	3,505,293
	Lead Concentrates and Ores	447,943	612,014	275,154	444,052	557,438
	Zinc Concentrates and Ores	319,870	147,522	217,266	222,536	204,840
	Copper and Gold Ores ..	..	..	..	..	..
	Total	2,945,446	2,579,082	2,998,435	3,477,416	4,267,571
Lead	tons { Lead-Silver-Gold Bullion	45,871	35,804	36,723	33,450	41,773
	Lead Concentrates and Ores	16,019	21,075	9,619	17,497	10,086
	Zinc Concentrates and Ores	2,196	803	1,658	1,587	1,420
	Total	64,086	57,682	48,000	52,534	53,279
Zinc	tons { Lead Concentrates and Ores	586	..	..	..	..
	Zinc Concentrates and Ores	60,142	26,963	54,693	75,391	76,990
	Total	60,728	26,963	54,693	75,391	76,990
Copper	tons Ores, Matte, etc. ..	1,109	1,122	1,361	2,770	2,389
Tin	tons Concentrates and Ores ..	130	108	280	246	192

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

The following table shows the quantities and values 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 1936-37:—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1936-37.

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	34,084	1,106	29,849	399	2,730	..	..	..
Silver and Silver-lead ..	21,984	1,051	..	16,870	4,063	..	..	..
Iron	5,342,585	805	1,376,760	72,020	..	3,890,084	706	2,210
Wolfram	7,380	530	2,416	1,163	2,483	..	..	788
Tin	1,595	397	..	946	..	..	..	(b) 252
Zinc .. ..	..	..	..	..	..	..	..	..
Other	97,654	4,281	86,213	1,437	4,433	145	40	1,105
Concentrates—								
Silver and Silver-lead ..	559,537	10,003	..	508,928	40,606	..	..	..
Zinc	2,845,954	2,693,116	..	106,409	..	..	..	(c) 46,429
Copper	213,363	435	210,472	23	1,727	..	..	706
Tin	7,515	632	..	6,883	..	..	..	..
Lead Slime Residue ..	725	327	398	..	..	..	..	..
Gold Ore, Quartz and Concentrates ..	19,595	1,670	17,616	309	..	..	..	..
Other	2,796	787	2	2,007	..	..	..	..
Cadmium—Blocks, Ingots, etc. ..	3,810	2,942	..	..	..	291	10	567
Copper—								
Matte	34,139	..	..	34,139	..	..	..	..
Ingot	34,883	34,002	..	..	423	36	421	1
Tin—Ingot	13,524	8,367	1,100	..	..	..	3,970	87
Lead—								
Pig	3,426,736	3,301,495	..	..	..	77,975	33,835	13,431
Matte	54,140	19,800	34,340	..	..	..	..	..
Zinc—Bars, Blocks, etc. ..	955,501	276,576	..	..	..	392,883	2,222	(d) 283,820
Platinum, Osmium, etc. ..	(a) 576	576	..	..	..	..	..	..
Gold—								
Bar, Dust, etc. ..	1,341,988	689,626	650,820	..	..	..	..	(e) 1,542
Silver—								
Bar, Ingot, etc. ..	5,063,715	1,64,820	500	..	132,190	..	1,455	(f) 4,764,723
VALUE.								
Ores—	£	£	£	£	£	£	£	£
Copper	16,566	560	9,180	835	5,991	..	..	..
Silver and Silver-lead ..	11,583	220	..	10,901	462	..	..	..
Iron	144,143	107	37,575	1,891	..	103,974	79	517
Wolfram	58,160	3,989	23,512	6,531	18,541	..	..	5,593
Tin	4,473	2,170	..	568	..	..	..	(b) 1,735
Zinc .. ..	..	..	..	..	..	..	..	..
Other	54,232	9,300	19,159	6,604	10,379	7,638	16	1,136
Concentrates—								
Silver and Silver-lead ..	487,918	6,722	..	440,292	40,904	..	..	..
Zinc	874,309	859,379	..	9,386	..	..	..	(c) 5,342
Copper	378,928	924	371,737	200	4,330	..	..	1,737
Tin	67,048	4,280	..	62,768	..	..	..	..
Lead Slime Residue ..	188	158	30	..	..	..	..	..
Gold Ore, Quartz and Concentrates ..	25,873	2,126	23,515	237	..	..	..	..
Other	8,385	4,365	5	4,015	..	..	..	..
Cadmium—Blocks, Ingots, etc. ..	70,547	55,359	..	..	..	5,059	162	9,967
Copper—								
Matte	39,725	..	..	39,725	..	..	..	..
Ingot	96,904	93,787	..	..	1,512	153	1,448	4
Tin—Ingo	193,928	120,363	13,911	..	..	..	58,640	1,014
Lead—								
Pig	4,736,992	4,539,805	..	..	..	129,158	48,828	19,201
Matte	80,757	26,009	54,748	..	..	..	..	..
Zinc—Bars, Blocks, etc. ..	1,314,026	375,522	..	..	..	533,106	3,031	(d) 402,367
Platinum, Osmium, etc. ..	8,533	8,533	..	..	..	..	..	..
Gold—								
Bar, Dust, etc. ..	11,660,562	5,995,013	5,652,119	..	..	..	..	(e) 13,430
Silver—								
Bar, Ingot, etc. ..	578,213	18,940	53	..	14,814	..	178	(f) 544,228
Total	20,911,999	12,127,631	6,205,544	584,150	96,933	779,088	112,382	1,006,271

(a) Mainly osmiridium exported from Tasmania and platinum from New South Wales. (b) Malaya (British). (c) France. (d) India, 271,068 cwt., £384,047; China, 10,296 cwt., £15,095. (e) Ceylon, 3,978,876 fine ozs., £451,666; India, 784,506 fine ozs., £92,404.