CHAPTER XVIII.
MINERAL INDUSTRY.

(NOTE.—A table showing particulars of mineral production for the year 1935 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 1934.**—The quantities (where available) and the values of the principal minerals produced in each State, and in Australia as a whole, during the year 1934 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 in carried out principally in South Australia and Tasmania.

MINERAL PRODUCTION.—QUANTITIES, 1934.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Antimony ..	ton	11	..	..	..	..	..	..	11
Arsenic	,,	622	..	..	..	1,608	..	..	2,230
Asbestos ..	cwt.	..	..	..	..	3,400	..	..	3,400
Barytes ..	ton	184	..	..	2,308	..	..	..	2,492
Bismuth ..	cwt.	55	..	237	5	..	..	..	297
Brown Coal ..	ton	..	2,617,534	..	..	..	..	..	2,617,534
Coal	,,	7,873,180	356,958	956,558	..	500,343	113,633	..	9,800,672
Copper (ingot, matte, etc.) ..	,,	777	..	2,906	207	..	8,209	..	12,099
Diatomaceous earth	,,	2,602	753	..	..	..	..	..	3,355
Gold	fine oz.	36,123	70,196	115,471	6,870	651,338	5,622	989	886,609
Gypsum ..	ton	2,710	6,396	..	75,241	5,307	..	..	89,654
Ironstone ..	,,	4,213	..	3,230	1,244,235	..	12,030	..	1,263,708
Kaolin	,,	8,566	3,292	..	220	..	..	..	12,078
Lead	,,	(b)	..	42,462	..	..	1,507	..	(b) 43,969
Lead and silver-lead ore, concentrates, etc. ..	,,	241,486	..	..	..	10	..	8	241,504
Limestone flux ..	,,	91,757	..	20,571	13,875	..	174,757	..	300,960
Magnesite ..	,,	15,651	26	41	205	..	..	..	15,923
Manganese ore ..	,,	103	..	..	2	..	..	..	105
Molybdenite ..	cwt.	65	..	24	..	..	..	..	89
Osmiridium ..	oz.	..	..	..	..	..	488	..	488
Phosphate ..	ton	207	..	..	..	..	..	..	207
Pigments ..	,,	417	..	..	..	26	..	..	443
Platinum ..	oz.	180	..	..	..	..	..	..	180
Salt	ton	..	(a)	..	61,083	..	..	..	(e) 61,083
Sapphires ..	oz.	..	..	(d)	..	..	..	..	(d)
Shale (oil) ..	ton	200	..	..	..	..	3,276	..	3,476
Silver	fine oz.	(b) 55,358	3,106	2,259,574	..	61,394	284,687	..	b2,664,119
Tin and tin ore ..	ton	1,179	23	1,056	..	47	952	66	3,323
Wolfram ..	cwt.	950	..	740	..	..	3,884	800	6,374
Zinc concentrates	ton	231,780	..	..	..	..	..	..	(b) 231,780

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

The values of the minerals raised in each State in 1934 are given in the following table :—

MINERAL PRODUCTION.—VALUE, 1934.

Minerals.	N.S.W. (a)	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas. (a)	N.T. (d)	Australia.
	£	£	£	£	£	£	£	£
Antimony ..	440	..	..	..	..	..	..	440
Arsenic	14,890	..	..	..	37,705	..	..	52,595
Asbestos ..	..	..	..	..	2,601	..	..	2,601
Barytes ..	276	..	..	5,897	..	..	..	6,173
Bismuth ..	482	..	3,992	86	..	..	..	4,560
Brown Coal ..	..	264,192	..	..	..	..	..	264,192
Coal	4,541,923	215,413	752,303	..	278,704	81,262	..	5,869,605
Copper (ingot and matte) ..	25,398	..	95,903	8,475	..	267,342	..	397,118
Diamonds ..	52	..	..	..	..	..	..	52
Diatomaceous earth	5,204	4,210	..	..	..	..	..	9,414
Gold	307,662	597,040	982,636	58,582	5,534,491	48,139	8,124	7,536,674
Gypsum ..	1,355	1,916	..	56,431	7,210	..	..	66,912
Ironstone ..	2,304	..	2,996	1,430,877	..	12,030	..	1,448,207
Kaolin	4,961	3,952	..	880	..	..	..	9,793
Lead	(b)	..	463,255	..	..	16,723	..	(b) 479,978
Lead and silver lead ore, concentrates, etc. ..	2,194,538	..	..	..	86	..	11	2,194,635
Limestone flux ..	32,115	..	11,855	5,203	..	44,877	..	94,050
Magnesite ..	39,127	98	150	179	..	..	..	39,554
Manganese ore ..	309	..	..	10	..	..	..	319
Molybdenite ..	563	..	195	..	..	..	..	758
Opal	3,283	..	300	1,517	..	..	..	5,100
Osmiridium ..	..	..	..	..	..	4,622	..	4,622
Phosphate ..	155	..	..	..	..	..	..	155
Pigments ..	625	..	..	..	68	..	..	693
Platinum ..	1,271	..	..	..	..	..	..	1,271
Salt	..	(f)	..	137,437	..	..	..	(g) 137,437
Sapphires ..	..	..	3,055	..	..	..	..	3,055
Shale (oil) ..	100	..	..	..	..	1,630	..	1,730
Silver	(b) 5,285	370	208,000	..	7,113	27,127	..	(b) 247,895
Tin and tin ore ..	328,130	3,886	179,404	..	6,765	219,246	9,566	746,997
Wolfram ..	6,506	..	5,049	..	..	27,375	3,114	42,044
Zinc concentrates ..	208,511	..	..	..	..	..	..	(b) 208,511
Unenumerated ..	(c) 41,039	952	4,042	7,963	9,687	16	e 7,991	71,690
Total ..	7,766,504	1,092,029	2,713,135	1,713,537	5,884,430	750,389	28,806	19,948,830

(a) For items excluded see letterpress below. (b) See letterpress above preceding table. (c) Includes dolomite £10,848, silica £10,872, fireclay £9,130, and chromite £4,240. (d) Year ended 30th June. (e) Mica, £7,926. (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 1934 consisted of—lime, £34,196; building stone, £130,599; Portland cement, £756,214; coke, £636,346; road materials, £837,060; shell grit, £13,630; sulphur and sulphuric acid, £85,965; and brick and pottery clays, £158,444. Carbide, £138,500, and cement, £157,671, have been excluded from the Tasmanian figures.

4. Value of Production, 1930 to 1934.—The value of the mineral production in each State for the five years 1930 to 1934 is given in the table hereunder :—

MINERAL PRODUCTION.—VALUE.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
1930 ..	8,504,034	1,088,343	1,241,125	1,263,398	2,191,393	1,050,923	16,656	15,355,872
1931 ..	6,517,703	882,334	1,274,953	548,204	3,410,472	707,234	11,416	13,352,316
1932 ..	6,533,191	908,994	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 ..	7,766,504	1,092,029	2,713,135	1,713,537	5,884,430	750,389	28,806	19,948,830

The value of the mineral production in 1934 exceeded that of 1933 by nearly £2,300,000. With the exception of Tasmania all of the States recorded increases in values, mainly through the agency of gold, ironstone, silver lead ores and concentrates, tin and coal. Of these gold was the most important; the production increased by 56,342 fine oz., which together with an increase in price accounted for £1,100,000 of the £2,300,000 mentioned above.

Greater activity in the iron and steel industry following a period of depression accounted for the improvement recorded in the output of ironstone which followed next in importance after gold. South Australia, the principal producing State, raised its output from 721,000 tons to 1,200,000 tons. Silver-lead ores and concentrates followed next, the output advancing by 16,000 tons and the value by £415,500, this being almost wholly confined to New South Wales.

Tin advanced further in price during 1934 and this factor, coupled with heavier yields, was responsible for substantial gains in the values of the production from New South Wales and Queensland.

The output of coal increased by 710,000 tons, valued at £165,000, the improvement being practically confined to New South Wales. Decreased outputs were recorded in Victoria and Tasmania.

Copper declined by £134,000 as the result of decreases in both price and yield, while the reduction of £75,000 in the value of zinc concentrates was wholly due to a fall in price as the yield was slightly in excess of that of the previous year.

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

5. Total Production to end of 1934.—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1934. 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 £52,000,000 of that published by the State Department of Mines, the principal items excluded being coke, £16,195,000 ; cement, £20,641,000 ; lime, £1,766,000 ; 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 1934.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	Million. £
Gold ..	64,776,791	305,258,002	87,867,934	1,789,666	183,217,713	9,158,353	2,303,076	654
Silver and lead ..	126,633,269	265,945	6,632,586	383,547	2,301,675	9,270,429	66,324	146
Copper ..	15,676,887	216,686	27,067,397	33,159,939	1,809,960	21,872,419	233,603	100
Iron ..	7,745,761	15,641	501,562	12,200,748	36,722	65,638	..	20
Tin ..	15,243,128	982,742	11,524,418	..	1,618,836	17,828,976	641,263	48
Wolfram	284,393	11,885	1,071,537	301	1,441	271,063	225,593	2
Zinc ..	25,040,018	..	13,460	15,993	5,437	996,077	..	26
Coal ..	207,414,429	15,414,600	22,282,891	..	7,777,630	2,209,249	..	255
Other ..	8,449,223	902,276	2,845,202	5,199,316	385,082	2,213,623	92,380	20
Total ..	471,263,899	323,067,777	159,806,987	52,749,510	197,154,496	63,885,827	3,562,239	1,271

(a) To 30th June, 1934.

The "other" minerals in New South Wales include alunite, £209,000; antimony £367,000; arsenic, £175,000; bismuth, £244,000; chrome, £130,000; diamonds, £147,000; magnesite, £249,000; molybdenite, £215,000; opal, £1,608,000; scheelite, £194,000; and oil shale, £2,695,000. In the Victorian returns antimony ore was responsible for £612,000. The value for coal in this State includes £2,391,000 for brown coal. Included in "other" in the Queensland production were opal, £187,000; gems, £638,000; bismuth, £123,000; cobalt, £158,000; molybdenite, £601,000; limestone flux, £781,000; and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £3,333,000; limestone flux, £302,000; gypsum, £898,000; phosphate, £135,000; and opal, £136,000. In the Tasmanian returns osmiridium was responsible for £608,000, scheelite for £112,000, and iron pyrites for £108,000.

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. **Decline in the Metalliferous Industry.**—On the 1st December, 1921, a Select Committee was appointed by the Legislative Assembly of New South Wales to inquire into and report upon the serious decline in the metalliferous industry. The result of the Committee's investigations was published in a Report issued in 1922 wherein the chief contributing causes of the decline in New South Wales and in Australia generally were summarized as follows:—(1) High cost of production; (2) Deterioration in ore values in existing mines; (3) Inadequate machinery; (4) High freights; (5) High treatment charges; (6) Imperfect labour conditions in mines; (7) Lack of new payable discoveries; and (8) Lack of efficiently-supported prospecting.

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

§ 2. Gold.

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

2. **Production at Various Periods.**—In the following table will be found the value of the gold raised in the several States and in Australia as a whole during each of the eight decennial periods from 1851 to 1930, and in single years from 1924 to 1935. 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..	9,569,492	30,136,686	23,412,395	310,080	75,540,415	2,566,170	473,871	142,009,109
1911–20..	4,988,377	13,354,217	9,876,677	238,808	46,808,351	873,302	100,652	76,240,384
1921–30..	940,946	2,721,309	1,976,715	47,564	20,462,957	193,833	9,894	26,353,218
1924 ..	86,905	312,398	459,716	4,093	2,255,932	21,516	3,270	3,143,830
1925 ..	82,498	200,901	197,118	3,535	1,874,320	14,969	1,939	2,375,280
1926 ..	82,551	208,471	43,914	3,219	1,857,716	17,936	594	2,214,401
1927 ..	76,595	163,699	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	4,413,809	43,137	4,196	5,211,512
1933 ..	226,068	448,228	710,168	49,619	4,915,950	51,579	4,449	6,406,061
1934 ..	307,662	597,040	982,636	58,582	5,534,491	48,139	8,124	7,536,674
1935(a) ..	439,123	768,401	929,553	64,109	5,677,328	73,143	44,127	7,995,784
Total 1851–1935	65,215,914	306,026,403	88,797,487	1,853,775	188,895,041	9,231,496	2,347,203	662,367,319

(a) Subject to revision.

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 have 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 913,279 ozs. in 1935, 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. 11¾d. in 1932, £7 14s. 3¾d. in 1933, £8 10s. 0¼d. in 1934 and £8 15s. 1¼d. in 1935. 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. 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 quantity in fine ounces of gold raised in each State and in Australia during each of the five years ending 1935. A separate line is added showing the total production in thousands of fine ounces from 1851 to 1935:—

GOLD.—QUANTITY PRODUCED.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Ter. (a)	Australia.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
1931 ..	19,673	43,637	13,147	2,782	510,572	4,760	552	595,123
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 (c)	50,100	87,609	105,817	7,333	649,049	8,343	5,028	913,279
Total (b) 1851–1935	15,164	71,656	20,484	411	41,359	2,141	545	151,760

(a) Year ended 30th June. (b) '000 omitted in each case. (c) Subject to revision.

3. **Changes in Relative Positions of States as Gold Producers.**—The figures in the table showing the value of gold raised explain the enormous increase in the population of Victoria during the period 1851 to 1861, when an average of over 40,000 persons reached the Colony each year. With the exception of the year 1889, when its output was exceeded by that of Queensland, Victoria maintained its position as the chief gold-producer for a period of forty-seven years, or up to 1898, when its production was surpassed by that of Western Australia, the latter State from this year onward contributing practically half, and so far as the last ten years are concerned nearly four-fifths of the entire yield of Australia. The position of the States from 1898 to 1932 according to the quantities produced was in the following order, viz. :—Western Australia, Victoria, Queensland, New South Wales, Tasmania and South Australia, with the exception of the years 1921, 1926 and 1930 to 1932, when the positions of Queensland and New South Wales were reversed. In 1933 Queensland improved its position and occupied second place, which had been held by Victoria for so long.

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

GOLD.—WORLD'S PRODUCTION.

Period.	World's Production of Gold.	Gold Produced in Australia.	Percentage of Australia on Total.
	Fine ozs.	Fine ozs.	%
1851–60	61,352,295	24,877,013	40.55
1861–70	53,675,679	19,038,661	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
1929	19,615,412	427,159	2.18
1930	20,831,245	467,742	2.25
1931	22,786,683	595,123	2.61
1932	24,204,528	714,135	2.95
1933	25,574,772	830,267	3.25
1934	27,594,072	886,609	3.22

For the year 1934 the world's production of gold in fine ounces was 27,594,000, as compared with a return of 25,575,000 fine ounces in 1933. It is estimated that the world's production in 1935 approximated 29,201,000 fine ounces, of which Australia's share amounted to 913,279 fine ounces or 3.12 per cent.

The quantity of gold produced in the ten chief producing countries in each of the five years 1930 to 1934 is given in the table hereunder. Particulars of the quantity and value of the gold production for all countries for the ten years 1925–34 will be found in the Australian Production Bulletin No. 29 issued by this Bureau.

GOLD.—PRODUCTION, CHIEF COUNTRIES.

Country.	1930.	1931.	1932.	1933.	1934.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
Union of South Africa	10,716,351	10,877,777	11,558,532	11,013,712	10,479,857
Canada	2,102,068	2,693,892	3,044,387	2,949,309	2,972,074
Soviet Union ..	1,433,664	1,700,960	1,990,000	2,814,000	4,200,000
United States ..	2,100,395	2,213,741	2,219,198	2,276,682	2,742,161
Australia	**466,593**	**595,123**	**714,135**	**830,267**	**886,609**
Rhodesia	547,631	532,111	580,484	645,087	693,265
Mexico	670,488	623,003	584,198	637,727	662,000
Japan	388,740	425,000	462,251	502,875	531,371
India	329,231	330,484	329,600	336,100	322,100
Gold Coast ..	240,899	261,651	278,782	305,908	326,040

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 1925–1934 :—

GOLD.—AVERAGE ANNUAL PRODUCTION, CHIEF COUNTRIES, 1925 TO 1934.

Country.	Quantity.	Country.	Quantity.
	Fine ozs.		Fine ozs.
Union of South Africa ..	10,508,766	**Australia .. ..**	**596,757**
Canada	2,292,338	Rhodesia	590,875
United States	2,242,923	Japan	385,902
Soviet Union	1,745,268	India	354,948
Mexico	681,532	Gold Coast	235,799

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 includes 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
1929 ..	684	864	326	58	4,108	63	5	6,108
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

(a) Estimated. (b) Year of Maximum Production.

Owing to causes referred to earlier in this section, the number employed in gold-mining had dwindled to the comparatively small figure of 6,108 in 1929. Stimulated by the enhanced price of gold in Australian currency of recent years a revival has occurred in the industry and employment therein has increased five-fold since 1929. Western Australia participated most largely in the increased employment followed by New South Wales and Victoria, but all States have benefited, and indications point to still higher figures as more units are gradually coming into commission.

6. **Bounty on Production.**—A reference to the bounty provided by the Commonwealth on gold production in Australia will be found in § 16. 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 1934 amounted to 180 ozs., valued at £1,271 as compared with 113 ozs., valued at £805 in the preceding year, while the total production recorded to the end of 1934 amounted to 19,995 ozs., valued at £126,978. The production for 1934 included a nugget weighing 1 oz. 10 dwts. 16 grs. At the close of the year about 56 men were engaged in prospecting and fossicking.

(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.* For 1934 the yield of osmiridium was returned as 488 ozs., valued at £4,622, the quantity raised being about 60 ozs. less than in 1933. The greatest production recorded was for the year 1925, when over 3,365 ozs. valued at £103,570 were raised. The decrease in later years was due in large measure to the lower price, which fell from nearly £31 per oz. in 1925 to £9 11s. 2d. per oz. in 1934. Other factors were the depletion of the known alluvial deposits and the reduction in the demand for the metal.

§ 4. Silver, Lead and Zinc.*

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

2. **Production.**—(i) *General.* The value of the production of silver, silver-lead ore and lead from each State during the five years ending 1934 is given hereunder :—

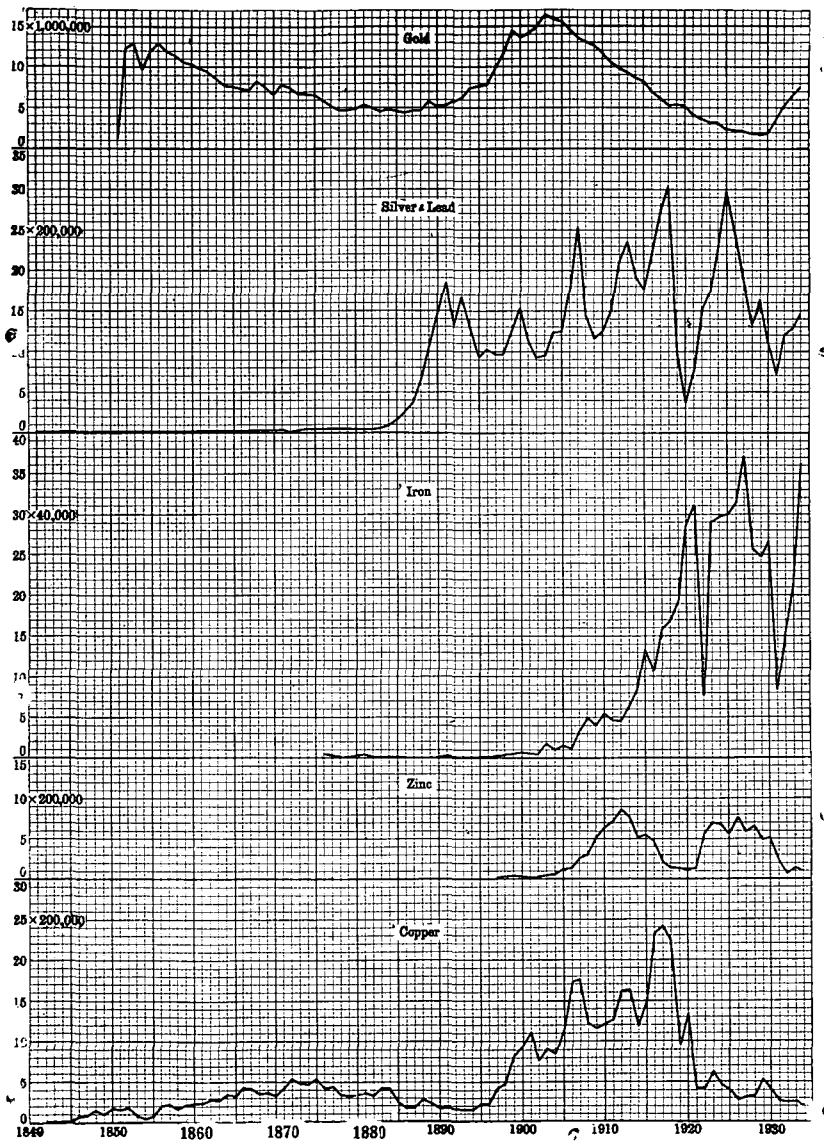
SILVER AND LEAD.—PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	£
1930 ..	2,088,790	65	9,696	90	9,330	133,658	1,684	2,243,313
1931 ..	1,079,359	99	306,393	5	3,103	54,778	160	1,443,897
1932 ..	1,566,912	208	756,546	..	5,716	69,941	..	2,399,323
1933 ..	1,783,207	198	708,804	..	6,860	70,795	410	2,570,274
1934 ..	2,199,823	370	671,255	..	7,199	43,850	11	2,922,508

(a) Year ended 30th June.

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

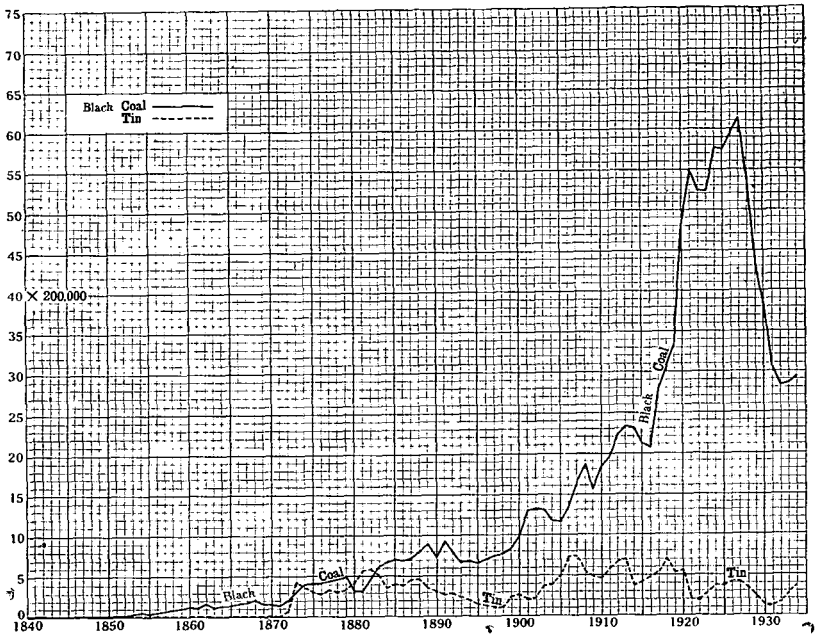
VALUES OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1934.



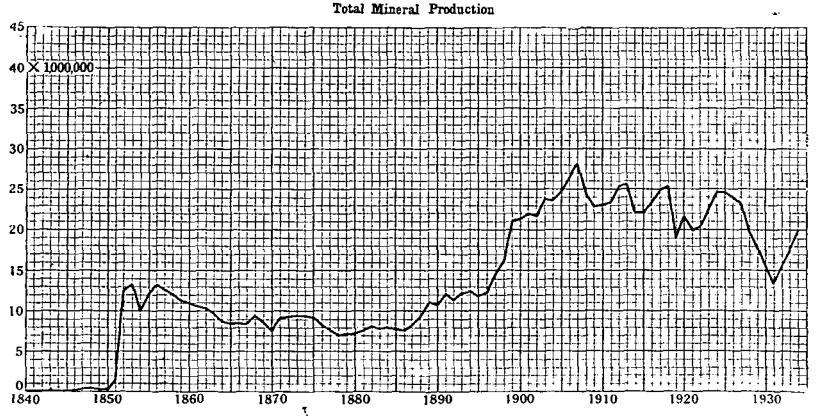
EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 onwards.

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

VALUES OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1934—*continued.*



Total Mineral Production



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

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

(ii) *New South Wales.* The figures quoted above for New South Wales for the year 1934 include silver to the value of £5,285 and silver-lead ore and concentrates valued at £2,194,538. 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 1934 showed an increase both in quantity and value over that of the previous year and was due to the improvement in the price of silver. Lead, however, showed a slight fall in price to £11 1s. per ton.

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

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

Year.	Metal Produced within Australia.				Contents of Concentrates Exported.			
	Silver.	Lead.	Zinc.	Value.	Silver.	Lead.	Zinc.	Value.
	oz. fine.	tons.	tons.	£	oz. fine.	tons.	tons.	£
1903 ..	6,489,689	92,293	286	1,790,929	1,736,512	29,706	14,625	308,714
1913 ..	5,908,638	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
1930 ..	7,876,894	162,703	53,958	4,579,412	844,188	14,044	87,913	911,724
1931 ..	6,177,863	129,819	53,832	2,995,029	460,958	13,405	43,629	257,705
1932 ..	5,896,193	131,422	53,200	3,001,005	178,034	1,222	30,164	124,719
1933 ..	7,430,479	158,475	53,956	3,570,886	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

The figures given above are quoted on the authority of the Mines Department of New South Wales. Accurate details in regard to gold, copper and antimony contained in the silver-lead ores are not available. Cadmium was first extracted in 1922 at Risdon, in Tasmania, and in 1934 the amount won from ores of New South Wales origin was given as 173 tons, valued at £24,163. 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 1934.

Mine.	Value of Output to end of 1934.	Dividends and Bonuses Paid to end of 1934.
	£	£
Broken Hill Proprietary Co. Ltd.	53,324,074	14,402,174
Broken Hill Proprietary Block 14 Co. Ltd.	4,750,508	670,160
British-Australian Broken Hill Co. Ltd.	5,858,998	821,280
Broken Hill Proprietary Block 10 Co. Ltd.	4,946,989	1,432,500
Sulphide Corporation Ltd. (Central and Junction Mines)	27,499,105	3,466,875
Broken Hill South Ltd.	24,068,486	5,555,000
North Broken Hill Ltd.	19,748,462	5,815,190
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.	10,965,495	3,724,938
Barrier South Ltd.	151,517	50,000
Total	156,010,632	36,197,048

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 1934, 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 163·3 millions and 39 millions respectively. The authorized capital of the various companies amounted to £6,318,000. In 1934 the dividends and bonuses paid amounted to £890,000 shared in by the Companies controlling the principal mines as follows: Zinc Corporation, £106,000; North Broken Hill, £245,000; Broken Hill South, £240,000, and Broken Hill Proprietary, £299,000.

(*b*) *Other Areas.* Silver is found in various other localities in New South Wales, but the production therefrom in 1934 was unimportant; operations were either suspended or restricted on account of the low price of the metal.

(iii) *Victoria.* The silver produced in 1934 amounted to 3,106 ozs., valued at £370, and was obtained in the refining of gold at the Melbourne Mint.

(iv) *Queensland.* The prices of lead and silver remained at a low level in 1934, but despite this, production of silver was well maintained at about 2·2 million fine ozs. Lead, however, declined by 2,700 tons to 42,462 tons. The production of the mine and works at Mount Isa, which operated throughout the year, amounted to 2,192,495 ozs. of silver and 42,437 tons of lead. The production for the rest of the State was very small.

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

(vi) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1934 was 61,394 ozs., valued at £7,113. In addition 10 tons of lead and silver-lead ore valued at £86 were exported.

(vii) *Tasmania.* The silver produced in 1934 amounted to 284,687 ozs., valued at £27,127, and the lead to 1,507 tons, valued at £16,723. This represents a considerable reduction in output compared with 1933 due principally to the continued low price for lead. About 195,000 ozs. of the total silver output were contained in silver-lead, while 90,000 ozs. were contained in the blister copper produced by the Mount Lyell Co.

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

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

SILVER.—PRODUCTION IN AUSTRALIA.

Particulars.	1914.	1924.	1933.	1934.	1935.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
Metal recovered by—					
Smelters	4,020,904	7,529,845	7,856,448	8,583,133	8,880,823
Mints	226,019	101,368	100,700	91,416	103,127
Metallic contents in ores and concentrates exported ..	8,901,212	2,242,170	2,945,446	2,579,082	2,998,435
Total Production ..	13,148,135	9,873,383	10,902,594	11,253,631	11,982,385

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.	1930.	1931.	1932.	1933.	1934.
					(a)
World's production in 1,000 fine ozs. ..	252,661	201,042	171,600	169,413	185,588

(a) Estimated.

The world's production of silver in millions of fine ounces during the years 1914, 1924 and 1934 amounted respectively to 160.6, 238.8 and 185.6, of which Australia contributed 13.1 million, 9.9 million and 11.3 million fine ounces, or 8 per cent., 4.1 per cent. and 6.1 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 1934 from the chief silver producing countries were as follows:—

SILVER.—PRODUCTION, CHIEF COUNTRIES, 1934.

Country.	Production.	Country.	Production.
	Fine ozs. ('000 omitted.)		Fine ozs. ('000 omitted.)
Mexico	74,142	Germany	5,626
United States	26,441	Bolivia	5,600
Canada	16,441	Belgian Congo	3,858
Australia	**11,254**	Spain and Portugal ..	1,850
Peru	9,000	Yugoslavia	1,748
Japan	6,900	Soviet Union	1,322
India	6,850	Union of South Africa ..	1,002

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.	1931.	1932.	1933.	1934.	1935.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Silver (Standard) per oz.	0 1 2.60	0 1 5.84	0 1 6.14	0 1 9.22	0 2 4.95
Lead .. per ton	13 0 9	12 0 6	11 16 4	11 1 0	14 5 7
Spelter per ton	12 8 11	13 13 10	15 14 10	13 15 6	14 3 6

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

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)	Q'land.	S. Aust.	W. Aust. (b)	Tasmania. (a)	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1930 ..	4,489	474	2	..	231	35	5,231
1931 ..	2,812	351	2	15	299	4	3,483
1932 ..	3,145	443	1	16	932	1	4,538
1933 ..	3,197	553	..	10	962	..	4,722
1934 ..	3,237	523	..	4	958	1	4,723

(a) Silver, lead and zinc. (b) Principally lead and silver-lead ore.

With the development of the great silver-lead field at Mount Isa in Queensland and a recovery in the price of metal, it is expected that the employment returns for that State will in future assume considerable importance. The actual number of men employed at the end of 1934 on this field totalled 1,316, including 662 engaged in mining operations, 109 in milling and 232 in smelting.

§ 5. Copper.

1. **Production.**—The production of copper in the various States has been influenced considerably by the ruling prices, which have undergone extraordinary fluctuations. In 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 past three years the price has averaged little more than £31 per ton and the production has dropped to an average of 13,793 tons of copper. The low price has prevented the profitable working of many copper mines in Australia. The value of the local production as reported and credited to the mineral industry for the years 1930 to 1934 is shown hereunder. Quantities for Australia as a whole as returned by the several State Mines Departments are appended on separate lines at the foot of the table :—

COPPER.—PRODUCTION.

State.	1930.	1931.	1932.	1933.	1934.
	£	£	£	£	£
New South Wales	8,347	23,948	21,785	26,775	25,398
Queensland	174,075	126,342	108,858	105,031	95,903
South Australia	6,966	934	..	2,928	8,475
Western Australia	102	..	..	1,132	..
Tasmania	620,578	416,309	399,762	395,286	267,342
Northern Territory (a) ..	589	25	137	..	..
Australia	810,657	567,558	530,542	531,152	397,118
Ingot, Matte, etc. .. tons	13,063	13,453	14,763	14,493	12,003
Ore .. .. tons	251	79	20	..	96

(a) Year ended 30th June.

2. **Sources of Production.**—(i) *New South Wales.* The production during 1934 amounted to 681 tons of electrolytic copper and 96 tons of ore, the latter being exported overseas. Practically all of the copper was obtained at Port Kembla from the treatment of 2,369 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 on account of the low price ruling the outputs were very small. Since 1919 the production of 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 1934 to 2,906 tons valued at £95,903, and shows 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 1934 were as follows : Cloncurry, 1,878 tons, £61,974 ; Herberton, 212 tons, £7,021 ; and Mount Morgan, 756 tons, £24,948.

(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. Tasmania and Queensland, however, are now the leading producers, as shown in the table above. 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. Increased attention is being given to the possibility of making fresh discoveries in the Moonta and Wallaroo copper fields. Grants have been made by the Commonwealth and State Governments to that end, and further assistance was provided under an unemployment relief measure. In addition, the State Government has negotiated with the miners and leaseholders on a basis of co-operation known as the Moonta Mining Scheme. Milling operations commenced in September, 1933, and 261 tons of copper and 110 fine ounces of gold were produced during the twelve months following. On 1st September, 1934, work was suspended until 1st January, 1936, when productive operations were resumed. This field was opened in 1860 and worked continuously until 1923, and up to the close of 1931 had produced copper to the value of £20,500,000. The year 1932 was remarkable for the fact that for the first time since 1842 there was no recorded sale of copper. Mining, however, was not at a standstill during the year, and considerable quantities of ore were raised at various mines. In 1933 the production of the State amounted to 72 tons valued at £2,928, increasing in 1934 to 207 tons valued at £8,475.

(iv) *Western Australia.* Thirty-five tons of copper valued at £1,132 were recovered in this State during 1933, but no production was recorded in 1934.

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1934 was 8,209 tons, valued at £267,332, the whole of the production being by the Mount Lyell Mining and Railway Co. Ltd. This Company treated 49,808 tons of ore and concentrates and produced 8,280 tons of blister copper, containing copper, 8,209 tons ; silver, 89,941 oz. ; and gold, 4,651 oz., the whole being valued at £308,300.

(vi) *Northern Territory.* Copper has been found at various places, but lack of capital, low prices and difficulty of transport prevent the development of the deposits. There was no production in 1934.

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

COPPER.—PRICES, LONDON AND NEW YORK.

Year.	Average London Price per Ton Standard Copper.	Average New York Price in Cents per lb. Electrolytic Copper.
	£	Cents.
1930	54.62	12.98
1931	38.34	8.12
1932	31.68	5.56
1933	32.52	7.02
1934	30.32	8.43

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. In 1932, 1933 and 1934 the price reached the low levels of £31.7, £32.5 and £30.3 respectively. As previously mentioned this factor has considerably hampered the development of copper mining in Australia.

4. **World's Production of Copper.**—The world's production of copper during the five years 1930–1934 is estimated to have been as follows. The figures have been taken from the latest issue of *The Mineral Industry*:—

COPPER.—WORLD'S PRODUCTION.

Year.	1930.	1931.	1932.	1933.	1934.
World's production—tons ..	1,548,900	1,328,600	881,000	1,015,100	1,233,500

The yields from the chief copper-producing countries in 1934 were as follows:—

COPPER.—PRODUCTION, CHIEF COUNTRIES, 1934.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Chile	251,990	Yugoslavia	43,650
United States	207,400	Soviet Union	43,370
Canada	163,720	Spain and Portugal ..	34,230
Rhodesia	143,267	Peru	27,100
Belgian Congo	110,200	Germany	23,600
Japan	59,000	Norway	19,250
Mexico	46,520	**Australia**	**12,100**

During the five years ending in 1934 the share of the United States in the world's copper production amounted to over 29 per cent., while the Australian proportion was only about 1 per cent.

With the exception of the United States which again showed a decreased output, the improvement in production recorded in 1934 was general throughout the important producing countries, the increase in Chile being most notable.

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.
1930	33	376	58	3	1,333	6	1,809
1931	35	287	61	..	1,442	3	1,828
1932	(a) 3	278	51	..	1,518	3	1,853
1933	(a) 13	175	54	..	1,483	1	1,726
1934	4	151	45	..	1,471	..	1,671

(a) No production from copper mines.

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

§ 6. Tin.

1. **Production.**—A further advance in the price of tin gave an added stimulus to the industry during 1934 and an increase of 303 tons in the output was recorded. The next table shows the value of the production as reported to the Mines Departments in each of the States during the five years 1930 to 1934. A separate line is appended showing the recorded tonnages for Australia during each of the specified years :—

TIN.—PRODUCTION.

State.	1930.	1931.	1932.	1933.	1934.
	£	£	£	£	£
New South Wales	84,800	103,111	120,124	218,244	328,130
Victoria	..	440	404	1,350	3,886
Queensland	49,708	35,744	66,174	123,620	179,404
Western Australia	10,608	3,945	3,295	4,557	6,765
Tasmania	69,592	70,634	109,767	190,041	219,246
Northern Territory (*a*) ..	3,345	2,331	2,322	2,519	9,566
Total	218,053	216,205	302,086	540,331	746,997
Tonnage	1,798	1,938	2,396	3,020	3,323

(*a*) Year ended 30th June.

2. **Sources of Production.**—(i) *New South Wales.* The production in 1934 was estimated at 1,161 tons of ingots valued at £325,187 and 18 tons of concentrates valued at £2,943 were exported overseas. The increase over the previous year's total was due to the rise in price of tin from £195 in 1933 to £230 in 1934. This so stimulated the industry that the production of 1,179 tons is the greatest for any year during the last decade. A large proportion of the output in this State is obtained in normal years by dredging, principally in the New England district, the quantity so won in 1934 being 464 tons, valued at £87,005. The Tinga area was the principal contributor to the output in 1934, the yield from this district comprising 550 tons of concentrates. Amongst other areas, Emmaville produced 242 tons, Ardlethan 285 tons, while the lode mines at Torrington returned a yield of 133 tons.

(ii) *Victoria.* The production of tin in Victoria is small, being chiefly obtained by dredging in the Beechworth district and by mining in the Toora district in Gippsland. The production in 1934 amounted to 23 tons, valued at £3,886.

(iii) *Queensland.* The chief producing districts in Queensland during 1934 were Herberton, 683 tons, valued at £114,384 ; Cooktown, 55 tons, £9,576 ; Stanthorpe, 154 tons, £27,916 ; Chillagoe, 60 tons, £10,249 ; and Kangaroo Hills, 100 tons, £16,560. The total production, 1,056 tons, £179,404, showed a considerable advance on that for 1933, but it is far below that of the early years of this century, when the production ranged between 2,000 and 5,000 tons per annum.

(iv) *Western Australia.* The export of tin from the State in 1934 amounted to 47 tons, valued at £6,765. This quantity won during the year was obtained in the Pilbara and Greenbushes fields. The Mines Department proposes to test certain areas by boring for deep leads, which it is hoped will result in increased production.

(v) *Tasmania.* For 1934 the output amounted to 952 tons of tin, valued at £219,246, a decrease of 5 tons in quantity but an increase of £29,205 in value over the return for the previous year. Operations at Mount Bischoff, the principal producer, were mainly carried on by the tributers. On account of increased activities by mining companies engaged in working newly acquired properties, it is anticipated that there will be an enlarged output when these reach the production stage.

(vi) *Northern Territory.* The production for the year amounted to 66 tons of concentrates valued at £9,566, the whole of which was shipped out of the Territory and sold in Sydney. Forty-six tons were produced on the Maranboy field and the balance was made up of small parcels from various other localities. Included in the balance was a parcel of 9 tons which had been mined fourteen years previously and had been lying unsold during that period.

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

TIN.—WORLD'S PRODUCTION.

1930.	1931.	1932.	1933.	1934.
Tons.	Tons.	Tons.	Tons.	Tons.
173,100	147,900	96,100	89,000	117,000

The comparatively small total for the year 1933, the lowest since 1907, was due principally to the restriction in output agreed upon between the chief producing countries, viz., Malaya, Bolivia, Netherlands East Indies, Siam and Nigeria. These countries produced more than three-quarters of the world's total production in 1934. An extension of this agreement to control production and export of tin has been effected by these countries for a further period of three years commencing in January, 1934. There has been no concerted restriction of production in Australia.

The yields from the chief producing countries in 1934 were as follows :—

TIN.—PRODUCTION, CHIEF COUNTRIES, 1934.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Malaya	36,385	Belgian Congo	4,570
Bolivia	20,634	Burma	3,850
Netherlands East Indies ..	18,418	Australia	3,323
Siam	10,157	Great Britain	1,984
China	8,046	Indo-China	1,700
Nigeria	4,935	Union of South Africa ..	591

Australia's share of the world's tin production, estimated at 117,000 tons in 1934, would appear to be a little less than 3 per cent.

4. **Prices.**—The average price of the metal in the London market for the years 1930 to 1935 was as follows :—

TIN.—PRICES, LONDON.

Year.	Average Price Per Ton.	Year.	Average Price Per Ton.
	£ s. d.		£ s. d.
1930	141 19 1	1933	194 11 11
1931	118 9 1	1934	230 7 5
1932	135 18 10	1935	225 14 5

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

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

TIN MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Victoria. (a)	Q'land.	W. Aust.	Tas.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1930	870	..	579	30	443	60	1,982
1931	994	3	548	17	625	29	2,216
1932	1,201	27	597	41	870	27	2,763
1933	1,448	..	818	63	1,007	33	3,369
1934	1,903	10	1,214	73	1,247	120	4,567

(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 1934 the zinc concentrates produced amounted to 231,780 tons, valued at £208,511. Portion of the zinc concentrates produced is treated at Risdon in Tasmania, and the balance is exported overseas.

(*b*) *Local and Foreign Extraction.* A statement of the quantity of zinc extracted in Australia and the estimated zinc contents of concentrates exported overseas during the five years 1930 to 1934 will be found in § 17 hereinafter.

(ii) *Queensland.* The total production of zinc in 1926 was returned at 200 tons, valued at £6,827, produced from ores raised in the Chillagoe area, but there was no record of production in later years.

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

(iv) *Tasmania.* The production of zinc ores remained suspended during 1934, although developmental work on the Mount Read and Roseberry districts was in progress during that period.

The Electrolytic Zinc Co. at Risdon operated on raw materials obtained wholly from Broken Hill in New South Wales. Production in 1934 amounted to 54,629 tons of slab zinc valued at £982,285, and 173 tons of cadmium, valued at £24,163. There was no production from local ores. Provision has been made for the treatment of the zinc-lead deposits in the Mount Read-Rosebery districts, but operations have been delayed pending an improvement in price of the metals concerned.

2. World's Production.—According to *The Mineral Industry* the world's production of zinc during the five years 1930–34 was as follows :—

ZINC.—WORLD'S PRODUCTION.

1930.	1931.	1932.	1933.	1934.
Tons.	Tons.	Tons.	Tons.	Tons.
1,388,000	989,000	780,000	986,000	1,162,000

The yields from the chief producing countries in 1934 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 both in 1933 and in 1934, despite the fact that the 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, 1934.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	327,500	Norway	44,300
Belgium	172,200	Mexico	36,000
Canada	120,400	Japan	29,000
Poland (*a*)	91,500	Soviet Union	26,600
Australia	**81,600**	Italy	24,000
Germany	71,700	Netherlands	19,600
Great Britain	51,200	Rhodesia	19,500
France	50,400	Spain	8,000

(*a*) Including Upper Silesia.

The figures for Australia have been taken from returns supplied by the Australian Mines and Metals Association. On a world's production of 1,162,000 tons Australia's output of 81,600 tons represents 7 per cent.

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

§ 8. Iron.

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

2. Production.—(i) *New South Wales.* The production from ores mined in New South Wales in 1929 amounted to 3,911 tons, valued at £17,600, but there was no production from this source recorded subsequently, as the smelters now obtain their ore from places outside the State.

The figures quoted do not, therefore, represent the total production of pig iron in New South Wales, since a considerable quantity of ore raised in South Australia, and credited to the mineral returns of that State, is treated in New South Wales. 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 1934 the iron oxide raised amounted to 4,213 tons, valued at £2,304. 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 1934, when 1,244,235 tons of ore were raised valued at £1,430,877. 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) *Tasmania.* The production of iron pyrites during 1934 amounted to 12,030 tons valued at £1 per ton. This is being produced as a by-product from the Mount Lyell flotation plant and exported to the mainland. A marked increase in the production for 1934 is noted compared with that of 1933, 1,498 tons and 1932, 274 tons. Apart from this pyritic ore there has been no production of iron ore since the year 1908.

(iv) *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 1934-35 the bounties paid under the Iron and Steel Products Bounty Act on articles manufactured from locally produced materials were as follows: wire-netting, £10,644; traction engines, £6,192.

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

PIG IRON AND STEEL.—WORLD'S PRODUCTION.

Country.	Pig Iron.			Steel Ingots and Castings.		
	1932.	1933.	1934.	1932.	1933.	1934.
	Thousands of Tons.			Thousands of Tons.		
United States ..	8,781	13,346	16,139	13,681	23,232	26,468
Germany	3,933	5,267	8,742	5,751	7,586	11,886
France	5,549	6,327	6,155	5,604	6,526	6,148
Saar Territory ..	1,349	1,592	1,826	1,463	1,676	1,950
Belgium	2,783	2,744	2,907	2,758	2,689	2,900
Luxemburg ..	1,959	1,888	1,955	1,956	1,845	1,932
Austria	94	88	134	205	226	309
Italy	461	517	521	1,391	1,784	1,696
Spain	288	347	348	455	468	407
Czechoslovakia ..	450	499	590	685	747	936
Poland	199	306	382	551	817	844
Sweden	262	319	523	537	628	858
Soviet Union ..	6,370	7,250	10,329	5,800	6,920	9,394
China	200	200	225	25	40	50
Japan	1,542	2,032	2,404	2,360	3,047	3,742
United Kingdom ..	3,573	4,124	8,742	5,257	7,003	8,859
India	699	913	1,297	602	694	798
Canada	144	229	407	343	408	759
Australia	**228**	**350**	**420**	**255**	**375**	**461**
Total—All Countries	39,275	48,781	64,056	50,029	67,121	80,397

In regard to both iron and steel the figures for world production reached an exceptionally low ebb in 1932. The turning point in the long period of depression appears to have been reached in 1933, when practically all steel producing nations recorded increased production. 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.

(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.
1926 ..	430,597	385,231	339,463	1931 ..	232,783	228,363	188,708
1927 ..	468,899	410,728	360,212	1932 ..	190,132	221,488	178,740
1928 ..	428,404	405,590	350,941	1933 ..	336,246	392,666	295,523
1929 ..	461,110	432,773	353,921	1934 ..	487,259	518,326	431,765
1930 ..	308,369	314,917	256,696	1935 ..	698,493	696,861	585,838

§ 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 1934, 6,374 cwts. of wolfram valued at £42,044 were raised in Australia, of which New South Wales produced 950 cwts. valued at £6,506; Queensland, 740 cwts. £5,049; Tasmania, 3,884 cwts., £27,375; and Northern Territory, 800 cwts., £3,114. New South Wales was the only State in which the production of scheelite was recorded in 1934; the quantity raised amounted to 130 cwts., valued at £818. With a recovery in prices, Australia will probably be an important contributor to the world's output of tungsten ore.

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

§ 10. Coal.

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
1930 ..	7,093,055	703,487	1,094,676	..	501,425	138,716	9,531,359
1931 ..	6,432,382	571,342	841,308	..	432,400	123,828	8,401,260
1932 ..	6,784,222	432,353	841,711	..	415,719	111,853	8,585,858
1933 ..	7,118,437	523,000	875,567	..	458,399	116,573	9,091,976
1934 ..	7,873,180	356,958	956,558	..	278,704	113,633	9,579,033
			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
1930 ..	5,193,032	807,699	952,856	..	394,758	110,253	7,458,598
1931 ..	4,607,343	362,284	699,926	..	336,178	98,004	6,103,735
1932 ..	4,376,453	274,903	684,555	..	270,630	86,733	5,693,274
1933 ..	4,306,799	328,704	693,383	..	289,806	85,848	5,704,540
1934 ..	4,541,923	215,413	752,303	..	278,704	81,262	5,869,605

(*a*) Exclusive of brown coal, shown in next table. (*b*) At the pit's mouth.

The figures for Victoria quoted before are exclusive of brown coal, the quantity and value of which for the years specified were as follows :—

BROWN COAL.—PRODUCTION, VICTORIA.

Year.	Quantity.	Value. (a)	Year.	Quantity.	Value. (a)
	Tons.	£		Tons.	£
1913	2,984	569	1931	2,194,453	251,511
1921	79,224	31,074	1932	2,612,512	274,903
1926	957,935	188,899	1933	2,580,060	271,360
1930	1,831,507	173,713	1934	2,617,534	264,192

(a) Cost of Production.

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

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

The table hereunder gives the yields in each of the three districts during the five years 1930 to 1934 :—

COAL.—PRODUCTION IN DISTRICTS, NEW SOUTH WALES.

District.	1930.	1931.	1932.	1933.	1934.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	3,715,805	4,161,798	4,398,253	4,651,483	5,227,647
Southern	1,529,674	981,964	1,112,686	1,218,014	1,344,669
Western	1,847,576	1,288,620	1,273,283	1,248,940	1,300,864
Total	7,093,055	6,432,382	6,784,222	7,118,437	7,873,180
Total Value (a) £ ..	5,193,032	4,607,343	4,376,453	4,306,799	4,541,923
Average value per ton (a) ..	14s. 8d.	14s. 4d.	12s. 11d.	12s. 1d.	11s. 6½d.

(a) At the pit's mouth.

During the five years ended 1927, the average annual production of coal in New South Wales exceeded 11,000,000 tons, but in 1928 the output declined to 9,448,000 tons owing to a reduction of oversea and interstate orders. A prolonged stoppage of work in the Northern mines during the next two years seriously affected the yield, and the influence of the depression can be seen in the returns for recent years. Of the total quantity of coal won in New South Wales since the inception of operations to the end of the year 1934, viz., 386,000,000 tons, about 262,250,000 or 68 per cent. was obtained in the Northern District, 80,000,000 tons or 21 per cent. came from the Southern District, and 43,500,000 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.
1930	637,261	66,226	703,487	807,699	23 0
1931	532,003	39,339	571,342	362,284	12 8
1932	359,011	73,342	432,353	274,903	12 9
1933	444,868	78,132	523,000	328,704	12 7
1934	268,861	88,097	356,958	215,413	12 1

(a) At the pit's mouth.

(b) *Brown Coal.*—(1) *General.* Some account of the brown coal deposits and of the operations of the State Electricity Commission in connexion therewith will be found in preceding Official Year Books (see No. 22, page 785). The brown coal produced in Victoria in 1934 amounted to 2,617,534 tons, all but 500 tons being procured at the State open cut at Yallourn. During the year 1934–35 the State Electricity Commission report that 1,990,642 tons of brown coal were won, of which 1,006,675 tons went to the power station and 983,967 tons to the briquette factory.

(2) *Production of Briquettes.* The briquetting plant started operations in November, 1924, and the output for fourteen months ending December, 1925, was 77,945 tons. In 1926 the output was 95,477 tons. By 1930 this production was almost doubled, amounting to 180,905 tons whilst in 1934 it was more than trebled, sales alone reaching 312,000 tons. 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 1934 was as follows :—

COAL PRODUCTION.—QUEENSLAND, 1934.

District.	1934.	District.	1934.
	Tons.		Tons.
Ipswich	469,843	Clermont	54,860
Darling Downs	72,900	Bowen	198,237
Wide Bay and Maryborough	73,201	Mount Mulligan (Chillagoe)	19,785
Rockhampton (Central) ..	50,283	Other	17,449
		Total	956,558

The production in 1934 shows an improvement on that of 1933, amounting to about 81,000 tons or 9 per cent. This output is still considerably below the maximum of 1929 when 1,369,000 tons were raised. The distribution of the 956,558 tons raised in 1934 was as follows: Railway Department 375,506 tons, Other Industries within the State 510,211 tons, Exported 70,841 tons. There were 56 collieries operating in the Ipswich district, 8 in the Darling Downs, 7 in the Maryborough area, 4 in Clermont district, 5 in Rockhampton district, 1 in Chillagoe district, 1 at Mount Morgan, 1 at Mackay, and 2 in the Bowen district. State coal mines are in operation at Collinsville in the Bowen field, at Styx in the Central area, and at Mount Mulligan.

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

(v) *Western Australia.* The production from the six collieries operating on the Collie field amounted in 1934 to 500,000 tons, an increase of about 42,000 tons on the return for 1933. The deposits at Wilga again remained unworked during the year.

(vi) *Tasmania.* The production in 1934 amounted to 113,633 tons, about 3,000 tons less than the total for 1933. The industry is being carried on under difficulties owing to restricted markets and consequently operations are not continuous. About 52,000 tons of the total output in 1934 were contributed by the Cornwall Coal Company, 26,000 tons by the Mt. Nicholas Proprietary and 13,000 tons by the Jubilee Company. The three mines combined raised 91,000 tons or 80 per cent. of the total output.

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

ACTUAL AND PROBABLE COAL RESERVES OF AUSTRALIA.

(Millions of Tons.)

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

3. **Production in Various Countries.**—The total known coal production of the world in 1934 amounted to about 1,250 million tons, towards which Australia contributed about 12.2 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.
1931	219,459,000	21,716,000	8,329,000	8,401,260	979,600	10,709,100
1932	208,733,000	20,153,000	7,386,000	8,586,000	928,200	9,764,400
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	9,458,000	9,579,000	832,000	12,002,000
			BROWN COAL, LIGNITE.			
1931	..	..	2,598,700	2,194,500	1,178,100	..
1932	..	..	3,093,000	2,612,500	913,700	..
1933	..	..	3,009,000	2,580,000	977,400	..
1934	..	..	2,859,000	2,618,000	1,228,600	..

COAL PRODUCTION.—FOREIGN COUNTRIES.

BLACK COAL.

Year.	Germany.	Austria.	Hungary.	Belgium.	France. (b)	Czecho-slovakia.	Yugoslavia
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1931 ..	116,766,300	224,500	764,100	26,608,300	50,256,300	12,895,800	426,700
1932 ..	103,086,300	217,800	880,700	21,075,000	45,536,000	10,788,000	362,200
1933 ..	107,960,000	235,200	787,000	24,878,400	46,113,200	10,471,800	377,400
1934 ..	122,937,000	246,900	744,000	25,949,000	47,870,000	10,585,000	381,000

Year.	Poland.	Nether-lands.	Soviet Union.	Japan.	China. (c)	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1931	37,661,000	12,697,600	55,737,000	27,545,300	19,857,000	394,406,300
1932	28,379,200	12,555,000	63,299,000	27,610,300	18,370,000	321,040,000
1933	26,924,000	12,375,000	71,097,000	32,010,000	19,143,000	342,118,000
1934	28,771,390	12,146,000	92,023,000	32,540,000	(d)	371,233,000

BROWN COAL, LIGNITE.

Year.	Germany.	Austria.	Hungary.	Belgium.	France.	Czecho-slovakia.	Yugoslavia
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1931 ..	131,205,200	2,935,000	6,014,800	..	1,023,600	17,648,400	4,487,500
1932 ..	120,709,600	3,055,000	5,837,800	..	975,700	15,608,000	4,042,000
1933 ..	124,792,000	2,966,900	5,815,000	..	1,071,100	14,825,000	3,711,500
1934 ..	135,098,000	2,806,000	6,101,000	..	1,014,000	15,017,000	3,864,000

Year.	Poland.	Nether-lands.	Soviet Union.	Japan.	China.	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1931	38,800	120,300	(a)	115,900	..	(a)
1932	32,900	122,000	(a)	106,800	..	(a)
1933	32,900	95,500	(a)	114,000	..	(a)
1934	26,000	91,032	(a)	125,000	..	(a)

(a) Included with black coal. (b) Exclusive of Saar District, which produced 11,187,500 tons in 1931, 10,273,200 tons in 1932, 10,394,400 tons in 1933, and 11,139,000 tons in 1934. (c) Includes about 300,000 tons of lignite yearly. (d) Not available.

Compared with the previous year the production for 1934 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 283,000,000 tons in 1934 or an increase of 20,000,000 tons or 7.6 per cent. on that of 1933. The production of foreign countries increased by 80,000,000 tons to 970,000,000 tons, or by 9.0 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 1934–35 was 305,139 tons, valued at £273,305. New South Wales exported 304,087 tons and Queensland, 1,052 tons. The

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

COAL.—OVERSEA EXPORTS, AUSTRALIA.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913 (a) ..	2,098,505	1,121,505	1931–32 ..	344,015	341,800
1921–22 ..	1,028,767	1,099,899	1932–33 ..	282,977	281,512
1929–30 ..	294,503	346,916	1933–34 ..	292,416	269,296
1930–31 ..	387,851	411,612	1934–35 ..	305,139	273,305

(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	1931–32 ..	506,140	534,897
1921–22 ..	1,498,035	2,178,101	1932–33 ..	562,442	550,277
1929–30 ..	507,349	742,383	1933–34 ..	523,014	495,032
1930–31 ..	509,303	607,537	1934–35 ..	575,418	544,875

(a) Calendar Year.

(ii) *New South Wales.* The total export of coal from New South Wales in 1934 amounted to 2,690,027 tons, valued at £2,299,396, of which 2,372,457 tons, valued at £1,972,784, were shipped from Newcastle. Interstate exports amounted to 1,882,873 tons, valued at £1,574,798, and were divided as follows :—Cargo, 1,882,873 tons, £1,355,308, bunker, 290,411 tons, £219,490. Oversea exports totalled 807,154 tons, valued at £724,598, representing 502,041 tons of bunker coal, valued at £450,661, and 305,113 tons of cargo coal, valued at £273,937.

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

COAL.—DISTRIBUTION OF OUTPUT, NEW SOUTH WALES.

Year.	Exports to Australian Ports. (a)	Exports to Foreign Ports. (a)	Local Consumption.	Total.
	Tons.	Tons.	Tons.	Tons.
1930	1,279,288	624,106	5,189,661	7,093,055
1931	1,460,039	802,760	4,169,583	6,432,382
1932	1,501,598	792,750	4,489,874	6,784,222
1933	1,623,840	831,338	4,663,259	7,118,437
1934	1,882,873	807,154	5,183,153	7,873,180

(a) Including Bunker.

For the period of five years shown in the table above, 22 per cent. of the total output was exported to other States, 11 per cent. was sent overseas, and 67 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.**—On account of the lack of the necessary data, no detailed statistics of the consumption of coal in Australia have hitherto been given. It is possible from the information now available to show, with reasonable precision, the manner of the disposal of the coal produced and the quantities involved.

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 triennial basis in order to smooth out any departures from the normal:—

PRODUCTION AND UTILIZATION OF COAL, AUSTRALIA.

Particulars.	Average for Three Years ending. 1928–29.		1933–34.	
BLACK COAL.				
	Tons.		Tons.	
Production of Black Coal (*a*)— Gross	12,394,301		8,926,267	
Saleable (*b*)	11,774,585		8,479,954	
Imports	40,110		5,121	
Total Supplies	11,814,695		8,485,075	
Utilization—		%		%
As fuel in Electric Light and Power Works	1,563,144	13.23	1,438,074	16.95
Factories (*c*)	1,440,333	12.19	1,327,333	15.64
Railways	3,429,780	29.03	2,621,100	30.89
Overseas Steamships	907,109	7.68	530,535	6.25
Total	7,340,366	62.13	5,917,042	69.73
As raw material in Gas Works	1,317,868	11.15	996,612	11.74
Coke Works	947,261	8.02	664,393	7.84
Total	2,265,129	19.17	1,661,005	19.58
Exported overseas	569,808	4.82	306,469	3.61
Domestic consumption and all other purposes (*d*)	1,639,392	13.88	600,559	7.08
Grand Total	11,814,695	100.00	8,485,075	100.00
BROWN COAL.				
	Tons.		Tons.	
Production of Brown Coal	1,449,828		2,607,997	
Utilization—		%		%
As fuel in Electric Light and Power Works	927,315	63.96	1,286,543	49.33
As raw material in Briquette Works (*e*)	522,513	36.04	1,321,454	50.67
Total	1,449,828	100.00	2,607,997	100.00

(*a*) Estimated. (*b*) Estimated on basis of New South Wales experience. (*c*) Approximate not including Brown Coal, *see* NOTE (*e*). (*d*) Including bunker coal for Interstate and Intrastate Shipping. (*e*) A portion of the briquette output, probably 50 per cent., is consumed in factories.

It should be noted that the production of coal is ascertained only in calendar years, and to relate it to the other factors in the table, recourse has been had 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 in 1930 and 1934 the average price in the southern fields was slightly in excess of that prevailing in the northern area. The average price on the mine in each district and for the State as a whole during the last five years was as follows :—

COAL.—PRICES, NEW SOUTH WALES.

Year.	Northern District.	Southern District.	Western District.	Average for State.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
1930	15 4	15 8	12 4	14 8
1931	15 2	13 11	12 0	14 4
1932	13 8	12 5	10 8	12 11
1933	12 9	12 6	9 5	12 1
1934	12 0	12 2	8 10	11 6

(ii) *Victoria.* In Victoria the average price of coal per ton at the pit's mouth in 1930, was 23s.; in 1931, 12s. 8d.; in 1932, 12s. 9d.; in 1933, 12s. 7d.; and in 1934, 12s. 1d. These averages are exclusive of brown coal, which in 1934 cost 2s. 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.				
	1930.	1931.	1932.	1933.	1934.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich	16 7	15 8	15 2	14 9	14 11
Darling Downs	19 5	18 6	18 4	18 2	18 4
Wide Bay and Maryborough	23 0	22 10	22 10	22 7	22 11
Rockhampton	20 5	16 8	17 6	16 6	16 7
Clermont	14 3	14 7	14 0	13 11	12 11
Bowen	15 5	15 1	14 9	13 9	13 6
Mount Mulligan (Chillagoe)	29 9	28 10	27 1	28 5	26 0
Average for State ..	17 5	16 8	16 3	15 10	15 11

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

(iv) *Western Australia.* The average prices of the Collie (Western Australia) coal during the last five years were: in 1930, 15s. 9d.; in 1931, 15s. 7d.; in 1932, 13s.; in 1933, 12s. 8d.; and in 1934, 11s. 2d. per ton.

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

7. Prices in the United Kingdom.—During the five years 1929 to 1933 the average selling value of coal per ton at the pit's mouth in the United Kingdom was: in 1930, 13s. 7d.; in 1931, 13s. 6d.; in 1932, 13s. 3d.; in 1933, 13s.; and in 1934, 12s. 10½d. 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 1930 to 1934:—

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
1930 ..	16,624	2,080	187	2,768	896	441	22,996
1931 ..	15,667	1,897	259	2,362	752	363	21,300
1932 ..	14,275	1,663	281	2,392	604	381	19,596
1933 ..	13,349	1,517	272	2,448	626	313	18,525
1934 ..	13,465	1,502	319	2,385	624	342	18,637

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

The maximum number employed was attained in 1926 when 31,774 persons were engaged in the coal mines of Australia. Shortly after that year a slackening in the demand for coal and a prolonged cessation of activities on one of the principal fields of New South Wales during 1929 and 1930, seriously affected the figures of employment, while the reduction to their present level of about 18,600 was the result of the reaction of the industry to the industrial depression of recent years. It would also appear that the growth of mechanization has depressed employment in the industry for, notwithstanding an additional output of 1,000,000 tons since 1932, the number employed declined by approximately 1,000. In 1934 the output of coal per employee averaged 515 tons, compared with 418 tons in 1926.

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

COAL MINING.—EMPLOYMENT AND ACCIDENTS, 1934.

State.	Persons Employed in Coal Mining.	No. of Persons.		Proportion per 1,000 Employed.		Tons of Coal raised for each Person.	
		Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
New South Wales ..	13,465	15	56	1.11	4.16	511,200	140,600
Victoria	1,821	..	9	..	4.94	..	330,500
Queensland ..	2,385	1	153	0.42	64.15	956,600	6,300
Western Australia ..	624	..	236	..	378.21	..	1,200
Tasmania	342	..	5	..	14.62	..	22,727
Total ..	18,637	16	459	0.86	24.63	598,690	20,869

The next table shows the average number of miners employed, number of fatalities, and rate per 1,000 during the quinquennium 1930–34 :—

COAL MINING.—FATALITIES, 1930 TO 1934.

State.	Average No. of Coal Miners Employed.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	14,676	12.20	0.83
Victoria	1,995	1.00	0.50
Queensland	2,471	1.40	0.57
Western Australia	700	0.40	0.57
Tasmania	368	1.00	2.72
Total	20,210	16.00	0.79

(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 1930–34 was 1.10, the rates varying between 1.35 in 1934 and 0.98 in 1931, while the rate for Australia for the same period was 0.79. In the United States during the ten years 1923–32 the death rate per 1,000 employees averaged 4.8 for bituminous coal miners, and 3.9 for anthracite miners. Rates for other coal-producing countries for the same period were—Canada, 2.4 ; Union of South Africa, 3.2 ; Germany, 2.2 ; Spain, 1.7 ; Poland, 1.6 ; Belgium, 1.1 ; and France, 1.0. In comparing these rates, allowance must be made for the circumstance that the methods of calculation are not identical in all countries.

§ 11. Coke.

Notwithstanding the large deposits of excellent coal in Australia, the production of coke was limited to about 250,000 tons prior to the war. This was below local requirements and necessitated a fairly considerable import from abroad. During recent years, however, a high standard of excellence has been attained in the local product and imports have almost ceased, while Australian coke is being shipped to New Zealand and other islands in the Pacific. For the year 1934–35 the coke imported amounted to 1,524 tons, of which 251 tons were obtained from the United Kingdom and 1,273 tons from Germany, Western Australia being the chief importing State. The quantity exported was 17,083 tons, valued at £24,595, of which 14,846 tons, valued at £19,757, 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.		1930.	1931.	1932.	1933.	1934.
Quantity ..	tons	367,772	217,509	356,495	473,427	688,621
Value, total ..	£	589,343	297,318	403,177	512,693	636,346
Value, per ton ..	..	32s. 1d.	27s. 4d.	22s. 7d.	21s. 8d	18s. 6d.

The figures quoted refer to the product of coke ovens, and are exclusive of coke produced in the ordinary way at gas works. As regards both tonnage and value, the production in 1927, amounting to 709,000 tons valued at £1,131,000, was the highest recorded. After that year the slackness of trade was responsible for the dwindling returns to 1931, but during the next three years the industry made a rapid recovery, the output for the latest year under review being only 3 per cent. under the record figure of 1927.

A small quantity of coke is made in Queensland, the quantity returned in 1934 being 25,655 tons, valued at about £42,478 of which 22,006 tons, valued at £36,436 was produced at Bowen State Coke Works. The greater proportion of the output of these works was consigned to the Mount Isa Mines Ltd. and the remainder 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, recently erected, is in operation, it is anticipated that the output will be sufficient to meet the requirements of the State. The following table shows the amount manufactured locally during the last five years :—

COKE.—PRODUCTION. QUEENSLAND.

Year.		1930.	1931.	1932.	1933.	1934.
Quantity ..	tons	3,444	2,280	1,933	15,096	25,655

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 as well as to the efforts put forward in connexion with 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 the Commonwealth Government in conjunction with that of the State of New South Wales. Investigations were made by a special committee and by a committee of two experts appointed from overseas, each of which presented independent reports. As a result of these reports the Commonwealth Government has accepted the recommendation of the special committee, known as the Newnes Investigation Committee, that the establishment of the shale oil industry is not warranted and could only be justified, if at all, on the plea that its development was essential for national considerations. In 1934, 200 tons of shale were mined for experimental purposes at an estimated value of £100.

(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. An amalgamation of interests was effected in 1931, the individuals and companies concerned now operating under the name of the Tasmanite Shale Oil Company.

2. **Coal Oil.**—Attention is being directed to the production of oil from coal by the hydrogenation process. To this end negotiations were entered into by the Commonwealth Government with Imperial Chemical Industries Ltd., England. The company agreed to co-operate, but suggested that before any proposals be formulated it was desirable to await the results of the experience gained in the running of its own plant at Billingham in England which commenced operations early in 1935. A Committee consisting of nominees of the Commonwealth and State Governments, excepting Western Australia, and of Imperial Chemical Industries Ltd. has been appointed to advise on specific questions submitted to it. The Committee was unable to complete its investigations through lack of detailed information. This will be done when the data become available.

3. **Well Oil.**—(i) *Australia.* The Commonwealth Government encourages the search for oil by placing at the disposal of companies and individuals the advice and experience of its technical staff appointed for this purpose. In co-operation with the Air Board

useful aerial reconnaissances have already been made in Queensland by the Commonwealth Geological Adviser, the photographs and mosaics produced proving of great value in conjunction with the ground geological surveys. A further aerial reconnaissance was undertaken to cover most of the possible oil producing regions in Australia.

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

(ii) *Victoria.* The production of crude petroleum oil in the year 1934 amounted to 5,588 gallons valued at £140. The total production to the end of that year amounted to 82,828 gallons worth £2,070.

(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 1934 by three companies in localities situated in the south-eastern portion 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 1934 an oil geologist examined the territory of the Freney Kimberley Oil Company. Other than this, little was done.

§ 13. Other Non-metallic Minerals.

A more or less detailed statement regarding the occurrence and production of other non-metallic minerals is given in preceding Official Year Books (*see* No. 22, pages 793 to 796). The tables of quantity and value in § 1 of this Chapter will, however, show the production of the principal items in this class for each State during the year 1934.

§ 14. Gems and Gemstones.

1. **Diamonds.**—It is difficult to secure accurate returns in connexion with the production of precious stones, but the yield of diamonds in 1934 in New South Wales was estimated at 49 carats, valued at £52, while the total production to the end of 1934 is given at 204,000 carats, valued at £147,000. The yield in 1934 was obtained wholly at Copeton in the Tingha division.

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

In Queensland, gems to the value of £3,055 were purchased on the Anakie sapphire fields in 1934. About 120 miners carried on operations during the year but no finds of importance were made. 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 1934 was £3,283, 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 £1,608,000, 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 1934 was estimated at £300, and up to the end of that year at about £187,000. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. Production during recent years has been limited by the paucity of demand. 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 about £3,000 during each of the three years ending 1933 and to £1,517 in 1934. 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, chiastolite, 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 was no recorded production in the last four years.

§ 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 1934 the number so employed was as follows:—

NUMBER OF PERSONS ENGAGED IN MINING, 1934.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	7,080	3,237	4	1,903	13,465	1,099	26,788
Victoria	6,943	..	..	10	1,821	51	8,825
Queensland	3,867	523	151	1,214	2,385	457	8,597
South Australia	804	..	45	..	..	326	1,175
Western Australia ..	12,523	4	..	73	624	83	13,307
Tasmania	275	958	1,471	1,247	342	246	4,539
Northern Territory ..	115	1	..	120	..	142	378
Australia	31,607	4,723	1,671	4,567	18,637	2,404	63,609

Included in the figures for "other" in South Australia were 124 engaged in mining iron ore, 30 gypsum miners, 85 salt gatherers, and 40 opal miners. The Tasmanian figures include 87 osmiridium miners, and those for the Northern Territory, 100 mica miners.

The following table shows the number of persons engaged in mining in each State during each of the years 1901, 1911, 1921 and 1931 to 1934, together with the proportion of the total population so engaged :—

NUMBER ENGAGED IN MINING PER 100,000 OF POPULATION.

State.	1901.		1911.		1921.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales ..	36,615	2,685	37,017	2,225	29,701	1,410
Victoria	28,670	2,381	15,986	1,210	5,211	339
Queensland ..	13,352	2,664	13,201	2,147	5,847	766
South Australia ..	7,007	1,931	6,000	1,457	2,020	406
Western Australia ..	20,895	11,087	16,596	5,787	7,084	2,122
Tasmania	6,923	4,017	5,247	2,760	3,170	1,486
Northern Territory ..	..	..	715	21,595	131	3,356
Australia	113,462	2,992	94,762	2,109	53,164	974

State.	1931.		1932.		1933.		1934.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales ..	30,682	1,200	27,708	1,074	25,926	996	26,788	1,021
Victoria	6,463	359	8,105	448	7,964	437	8,825	482
Queensland ..	6,753	730	8,013	856	8,512	900	8,597	900
South Australia ..	518	90	531	92	558	96	1,175	201
Western Australia ..	7,147	1,653	8,695	1,998	10,690	2,436	13,307	3,013
Tasmania ..	3,397	1,512	4,605	2,028	4,233	1,853	4,539	1,981
Northern Territory	145	2,918	187	3,795	209	4,256	378	7,663
Australia ..	55,105	844	57,844	879	58,092	876	63,609	952

The general falling-off since 1901 is largely due to the causes mentioned in § 1, par. 7 *ante* and in each section relating to employment hereinbefore. The proportion to population for Australia as a whole shows increases since 1930 and is attributable mainly to the larger numbers engaged in the search for gold in all of the States. Since that year the increase in the number so employed was approximately 20,000 persons. The number engaged in mining for tin also increased by 2,600. These increases, however, were offset by decreases in respect of other minerals, especially coal for which the employment figures fell from 23,000 in 1930 to about 18,600 in 1934.

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, 1934.**—The following table gives particulars of the number of men killed or injured in mining accidents during the year 1934 :—

MINING ACCIDENTS, 1934.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
			KILLED.					
Coal ..	15	..	1	..	..	..	..	16
Copper ..	..	..	1	..	..	4	..	5
Gold ..	3	7	4	..	30	..	..	44
Silver, lead and zinc ..	6	..	3	..	..	..	..	9
Tin	2	..	1	..	..	..	..	3
Other minerals	2	..	..	..	..	..	..	2
Total ..	28	7	10	..	30	4	..	79
			INJURED.					
Coal ..	56	9	153	..	236	5	..	459
Copper ..	..	..	72	..	..	75	..	147
Gold ..	7	7	22	1	692	..	..	729
Silver, lead and zinc ..	25	..	52	..	..	6	..	83
Tin	2	..	6	..	..	15	..	23
Other minerals	2	..	2	10	..	1	..	15
Total ..	92	16	307	11	928	102	..	1,456

§ 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 Prospecting Acts of 1926, 1927 and 1928, and under the Loan Appropriation (Unemployment Relief) Act 1934.

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

In 1934 the Northern Australia Survey Act was passed. Under this Act the Governments of the Commonwealth and the States of Queensland and Western Australia agreed to co-operate in the conduct of an aerial, geological and geophysical survey of certain areas in Australia north of the 22nd parallel of south latitude at a cost of £150,000. Half of the cost is being borne by the Commonwealth and the other half equally between the two States. The survey, which is expected to extend over a period of three years, is now in full progress. Geological and geophysical parties are in the field, and the aerial photographic survey has covered an area of approximately 3,000 square miles. A report for the period ending 30th June, 1935, has been issued.

(ii) *Metalliferous Mining.* (*a*) The Precious Metals Prospecting Act 1926 provided a sum of £40,000 of which £15,000 was to be expended in the Northern Territory, and the balance allocated to the States in such proportions as the Minister determined. At the 30th June, 1934, the expenditure amounted to £18,657 and no further assistance is being granted to the States or to the Northern Territory from this fund.

(*b*) The Gold Bounty Act 1930 provided that for a period of ten years from 1st January, 1931, a bounty of £1 per ounce would be payable under prescribed conditions by the Commonwealth on each ounce of fine gold produced in excess of the average production for the three years 1928–30. Under the Financial Emergency Act 1931 the Bounty was reduced to 10s. per ounce, subject to increases of 1s. for each decrease of 3s. per cent. in the average rate of exchange. The rate of exchange on which the

reduction to 10s. per ounce was based was taken as 30 per cent. Under the Financial Emergency Act of 1932 the bounty was temporarily suspended.

(c) Grants to States for Assistance to Metalliferous Mining. Under the Loan Appropriation (Unemployment Relief) Act 1934 a sum of £283,750 was made available to the States as grants for assistance to metalliferous mining. The amount granted to each State and the purpose to which it shall be applied is 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. Amounts advanced up to 31st March, 1936, were £187,250.

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 is contingent upon the States providing a similar amount.

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

(d) In addition to the amounts shown in (c) above, the Commonwealth Government has decided, subject to approval by Parliament, to grant additional financial assistance to the States to aid the metalliferous mining industry during the years ending June, 1937 and 1938. The amount approved by Cabinet is £210,000 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.

(iii) *Search for Oil.—(a) Papua and New Guinea.* Prior to the passage of the Petroleum Prospecting Act 1926 the Commonwealth Government had expended a sum of £368,790 in connexion with the search for oil principally in Papua and New Guinea.

(b) Australia. Under the Petroleum Prospecting Act 1926–1927 a trust account of £160,000 was established to encourage the search for oil. The Minister was authorized to make advances out of the money standing to the credit of this account to persons or companies engaged in the search for oil, and to assist persons, companies, or State Governments to make geological surveys. The Petroleum Prospecting Act of 1928 provided a further sum of £50,000. Up to the 30th June, 1934, the total expenditure under these Acts amounted to £196,297. The Government decided to discontinue subsidies for deep drilling and to confine its assistance to geological surveys and scout boring. Owing to financial stringency, however, the payment of all subsidies for oil prospecting has been substantially restricted.

The Commonwealth Oil Refineries Ltd. of which the Government of the Commonwealth of Australia is the principal shareholder has undertaken an extensive programme of prospecting for oil. The investigation is under the control of an Australian Advisory Committee of Geologists appointed by the Company, the personnel of which comprises the Commonwealth Geological Adviser, the Government Geologist of South Australia and two other members. Two oil geologists, in company with the Commonwealth Geological Adviser, carried out an aerial reconnaissance of likely areas during 1935. This reconnaissance was a preliminary to a more detailed examination of areas

and a study of all the data which has been collected over a period of years. This detailed investigation is now being carried out by one of the geologists.

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

2. **New South Wales.**—The chief aid given by the Government of New South Wales has been in the assistance to prospectors, but there were no appropriations from the Prospecting Vote for the year 1934-35, all claims being met from Unemployment Relief Funds. Loans are also made to assist in the erection of crushing batteries or reduction plants. Interest is charged at the rate of 4 per cent. During the year 1934 loans totalling £3,887 were approved. Aid is granted on a footage basis to sink, drive, etc., on approved sites to which a valid mining title is held, the actual expenditure in respect of work completed during the year aggregating £16,789. Rewards in connexion with the discovery of new mineral fields were paid during the year and amounted to £500.

3. **Victoria.**—During the year 1934 expenditure in connexion with mining amounted to £35,999, of which £13,528 consisted of advances to prospectors, while advances to miners amounted to £10,753, aid to boring, £500, and assistance to batteries and testing plants, £9,419. The total includes also expenses amounting to £1,364 on account of geological surveys, and laboratory expenses, £435.

4. **Queensland.**—State assistance to the mining industry in 1934 amounted to £33,573, of which £30,000 was advanced to prospectors the balance consisting of grants under the Mining Machinery Advances Act £2,500, and £1,073 for the provision of transport facilities, etc., to mineral fields. In addition to the above amounts, a sum of £5,915 was spent on the State coal mines at Bowen and Styx, £4,895 was spent at the three State batteries and £3,233 as Queensland's quota to the aerial survey of North Australia, totalling in all, £47,616.

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

5. **South Australia.**—Aid is given to the mining industry under the terms of the Mining Act of 1893, and previous measures. Up to the end of 1934 the total amount of subsidy paid was £70,815, of which £13,723 has been repaid, and £4,549 written off, leaving a debit of £52,543. Portion of this amount is represented by machinery that has fallen into the hands of the Government. Repayments must be provided from profits, but in only two instances have the profits enabled a full return to be made. The State maintains batteries and cyanide works at Mount Torrens, Peterborough, Mongolata and Tarcoola, and assays for public purposes are made at the School of Mines. Advances to prospectors in 1934 amounted to £583.

6. **Western Australia.**—Under the Mining Development Act of 1902 assistance was granted in 1934 in accordance with the subjoined statement:—Aid to prospectors, £36,162; subsidies on stone crushed for the public, £369; total, £36,531. Other assistance granted from the vote on various matters during the year amounted to £16,776, principally in connexion with prospecting for gold.

In 1934 there were 25 State batteries in operation of which four were leased. The amount expended thereon up to the end of 1934 was £91,181 from revenue and £348,824 from loan fund giving a total of £440,805. The working expenditure up to the end of 1934 exceeded the revenue by £127,194. The total value of gold and tin produced to the end of 1934 at the State plants was £7,437,048. 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 1934 amounted to £2,394, of which £1,949 was expended under the Aid to Mining Act 1927 on drilling and assistance and sustenance to prospectors, and the balance of £445 was paid from The Unemployment Relief Act. The amount received from ore sales was £1,069, the bulk of which was paid to tributers. Receipts amounted to £127.

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 1933–34 no assistance was granted to prospectors. The greater opportunity of obtaining work due to the opening of the Tennant Creek field and the improvement in metal prices was reflected in the fact that very few applications for assistance were received.

The Government maintains a battery at Marranboy, and the Government Assayer makes free assays for prospectors, and arranges 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 1930 to 1934 were as follows :—

REFINED METALS PRODUCED IN AUSTRALIA.

Metal.		1930.	1931.	1932.	1933.	1934.
Silver ..	ozs.	9,002,705	7,349,794	6,499,405	7,957,148	8,674,549
Lead, pig ..	tons	168,291	133,306	134,499	159,393	160,201
Zinc	,,	54,901	53,832	53,200	53,956	54,629
Copper ..	,,	14,900	12,936	13,307	11,238	7,970
Tin	,,	1,544	1,690	1,958	2,360	2,330

The local production of pig iron during the quinquennium 1923–27 ranged between 330,000 tons in 1923 and 517,000 tons in 1927. Complete information for later years is not available from the returns published by the Association, but according to the metal extraction returns published in the Statistical Register of New South Wales, the production of pig iron in that State amounted in 1930–31 to 232,783 tons, in 1931–32 to 190,132 tons, in 1932–33, 336,246 tons, and in 1933–34 to 487,259 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 1930 to 1934, 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—	1930.	1931.	1932.	1933.	1934.
Silver	ozs.	Lead-Silver-Gold Bullion	44,777	1,018,359	2,470,807	2,177,633	1,819,546
		Lead Concentrates and Ores	179,185	303,307	..	447,943	612,014
		Zinc Concentrates and Ores	558,577	183,111	23,366	319,870	147,522
		Copper and Gold Ores ..	..	..	..	..	..
		Total	782,539	1,504,777	2,494,173	2,945,446	2,579,082
Lead	tons	Lead-Silver-Gold Bullion	252	17,130	51,857	45,871	35,804
		Lead Concentrates and Ores	12,986	10,982	..	16,019	21,075
		Zinc Concentrates and Ores	9,482	1,878	1,159	2,196	803
		Total	22,720	29,990	53,016	64,086	57,682
Zinc	tons	Lead Concentrates and Ores	396	557	..	586	..
		Zinc Concentrates and Ores	86,761	41,917	31,542	60,142	26,963
		Total	87,157	42,474	31,542	60,728	26,963
Copper	tons	Ores, Matte, etc. ..	3,277	2,765	1,099	1,109	1,122
Tin	tons	Concentrates and Ores ..	..	17	101	139	198

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

The following table shows the quantity and value of the principal oversea exports of ores, concentrates and metals, the produce of Australia, together with the countries to which the respective products were forwarded, for the year 1934-35 :—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1934-35.

Article.	Total Exports.	Exports to— United Kingdom.	United States.	Belgium.	Germany.	Japan.	New Zealand.	Other Countries.
QUANTITY.								
Ores—	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.
Copper	..	..	..	..	..	..	..	..
Silver and Silver-lead	27,570	..	206	27,071	293	..	..	..
Iron	7,918,044	..	2,637,144	180,280	..	5,009,960	..	90,660
Wolfram	6,591	275	..	1,883	2,022	233	..	2,178
Tin	2,450	806	..	..	..	..	..	(f) 1,644
Zinc	580	..	..	..	..	..	..	580
Other	10,969	3,205	4,561	743	488	20	..	1,952
Concentrates								
Silver and Silver-lead	349,369	..	..	269,136	..	..	..	(a) 80,233
Zinc	1,708,221	1,473,186	..	235,035	..	..	..	..
Copper	125,479	..	125,097	382	..	..	..	..
Tin	7,369	7,369	..	..	..	..	..	..
Lead Slime Residue	19,962	19,962	..	..	..	..	..	..
Gold Ore, Quartz and Concentrates	823	41	782	..	..	..	..	..
Other	1,924	1,804	..	..	120	..	..	..
Cadmium—Blocks, Ingots, &c.	3,771	1,766	..	300	..	405	..	(b) 1,300
Copper—								
Matte	10,014	..	..	10,014	..	..	..	..
Ingot	1,004	..	734	..	..	..	270	..
Tin—Ingot	22,097	15,700	1,900	..	500	200	2,632	1,165
Lead—								
Pig	3,668,124	3,557,423	2,546	..	..	52,378	28,990	26,787
Matte	5,223	5,223	..	..	..	..	..	..
Zinc—Bars, Blocks, etc.	548,572	212,245	..	..	..	182,961	861	(c) 152,505
Platinum, Osmium, etc.	oz. (d) 423	oz. 423	oz. ..	oz. ..	oz. ..	oz. ..	oz. ..	oz. ..
Gold—								
Bar, Dust, etc.	919,381	918,945	436	..	..	..	..	..
Silver—								
Bar, Ingot, etc.	3,981,166	439,069	..	..	..	..	1,168	(e) 3,540,929
VALUE.								
Ores—	£	£	£	£	£	£	£	£
Copper	..	..	..	..	..	..	..	..
Silver and Silver-lead	20,601	..	126	20,265	210	..	..	..
Iron	213,854	..	66,022	4,732	..	140,535	..	2,565
Wolfram	42,294	1,280	..	11,243	14,233	1,650	..	13,888
Tin	21,393	5,856	..	..	..	..	..	(f) 15,537
Zinc	25	..	..	..	..	..	..	25
Other	13,296	4,088	2,598	870	3,437	412	..	1,891
Concentrates—								
Silver and Silver-lead	168,779	..	..	129,589	..	..	..	(a) 39,190
Zinc	171,587	148,036	..	23,551	..	..	..	..
Copper	331,983	..	330,893	1,090	..	..	..	..
Tin	64,404	64,404	..	..	..	..	..	..
Lead Slime Residue	7,439	7,439	..	..	..	..	..	..
Gold Ore, Quartz and Concentrates	3,360	975	2,385	..	..	..	..	..
Other	15,104	14,254	..	..	850	..	..	..
Cadmium—Blocks, Ingots, etc.	29,274	13,906	..	2,250	..	3,158	..	(b) 9,960
Copper—								
Matte	7,863	..	..	7,863	..	..	..	..
Ingot	1,777	..	1,098	..	..	..	679	..
Tin—Ingot	302,271	215,246	20,922	..	6,979	2,820	39,951	16,353
Lead								
Pig	2,406,673	2,328,198	1,391	..	..	36,524	21,532	19,028
Matte	3,350	3,350	..	..	..	..	..	..
Zinc—Bars, Blocks, etc.	494,065	189,862	..	..	..	163,542	913	(c) 139,748
Platinum, Osmium, etc.	(d) 3,815	3,815	..	..	..	..	..	..
Gold—								
Bar, Dust, etc.	8,015,675	8,011,968	3,707	..	..	..	..	..
Silver—								
Bar, Ingot, etc.	523,811	51,382	..	..	..	..	177	(e) 472,252
Total	12,862,693	11,064,059	429,142	201,453	25,709	348,641	63,252	730,437

(a) Italy. (b) France, 700 cwt., £5,520; Sweden, 300 cwt., £2,190; Netherlands, 300 cwt., £2,250; (c) India, 128,461 cwt., £115,768. (d) Mainly osmiridium exported from Tasmania and platinum from New South Wales. (e) Ceylon, 2,211,740 oz., £300,093; India, 1,328,589 oz., £172 077; Fiji, 600 oz., £82. (f) Malaya (British).