CHAPTER XIX.
MINERAL INDUSTRY.

(NOTE.—A table showing particulars of mineral production for the year 1934 will be found in the Appendix. This information was not available at the time of compilation of this chapter.)

§ 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 allusion to this matter will be found in preceding Official Year Books. (See No. 22, p. 755.)

3. **Quantity and Value of Production in 1933.**—The quantities (where available) and the values of the principal minerals produced in each State, and in Australia as a whole, during the year 1933 are given in the tables immediately following. It must be clearly understood that the figures quoted in these tables refer to the quantities and values of the various minerals in the form in which they were reported to the State Mines Departments, and represent amounts which the Mines Departments consider may fairly be taken as accruing to the mineral industry as such. They are not to be regarded as representative of Australia's potentiality as a producer of *metals*, this matter being dealt with separately in § 17 hereinafter. New South Wales is, of course, in normal times, a large producer of iron and steel from ironstone mined in South Australia. As the table shows, the latter State receives credit for this ironstone in its mineral returns. The iron and steel produced therefrom cannot be assigned to the mineral industry of New South Wales, but the value of the transformation from ore to metal is credited to the manufacturing industry of that State. Similarly lead, silver-lead, and zinc are credited in the form reported to the State of origin—chiefly New South Wales—although the actual metal extraction is carried out to a large extent elsewhere.

MINERAL PRODUCTION.—QUANTITIES, 1933.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Antimony ..	ton	58	..	1	..	..	..	..	59
Arsenic	,,	445	..	..	..	1,331	..	..	1,776
Asbestos ..	cwt.	..	..	..	260	5,320	..	..	5,580
Barytes ..	ton	318	..	..	1,772	..	5	..	2,095
Bismuth ..	cwt.	20	..	..	7	..	26	..	53
Brown Coal ..	ton	..	2,580,060	..	..	..	..	..	2,580,060
Coal	,,	7,118,437	523,000	875,567	..	458,399	116,573	..	9,091,976
Copper (ingot, matte, etc.) ..	,,	706	..	2,941	72	35	10,739	..	14,493
Diatomaceous earth	,,	1,941	884	..	..	..	..	..	2,825
Gold	fine oz.	29,252	58,183	91,997	6,361	637,207	6,673	594	830,267
Gypsum ..	ton	2,271	5,132	..	50,561	2,608	..	..	60,572
Ironstone ..	,,	5,368	..	8,553	721,185	..	1,498	..	736,604
Kaolin	,,	4,793	3,177	..	507	..	..	..	8,477
Lead	,,	(b)	..	45,150	..	..	2,644	..	(b) 47,794
Lead and silver-lead ore, concentrates, etc. ..	,,	225,445	..	..	..	7	..	24	225,476
Limestone flux ..	,,	63,183	..	21,484	20,215	..	110,347	..	215,229
Magnesite ..	,,	9,362	6	150	202	..	..	..	9,720
Manganese ore ..	,,	129	..	..	20	..	..	..	149
Molybdenite ..	cwt.	110	..	98	..	..	..	..	208
Osmiridium ..	oz.	..	..	..	..	..	548	..	548
Phosphate ..	ton	70	..	..	26	..	..	..	96
Pigments ..	,,	685	..	..	..	..	..	..	685
Platinum ..	oz.	113	..	..	..	..	..	..	113
Salt	ton	..	(a)	..	58,587	..	..	..	(e) 58,587
Sapphires ..	oz.	..	..	(d)	..	..	..	..	(d)
Shale (oil) ..	ton	..	..	..	..	..	3,401	..	3,401
Silver	fine oz.	55,882	2,435	2,248,804	..	67,036	489,330	..	b2,863,487
Tin and tin ore ..	ton	1,135	10	856	..	37	957	25	3,020
Wolfram ..	cwt.	5	..	260	..	..	2,080	..	2,345
Zinc and concentrates.. ..	ton	230,952	..	..	..	..	..	..	(b) 230,952

(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 1933 are given in the following table :—

MINERAL PRODUCTION.—VALUE, 1933.

Minerals.	N.S.W. (a)	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas. (a)	N.T. (d)	Australia.
	£	£	£	£	£	£	£	£
Antimony ..	2,227	..	25	..	..	..	..	2,252
Arsenic	16,171	..	..	..	36,753	..	..	52,924
Asbestos ..	..	..	..	113	4,917	..	..	5,030
Barytes ..	636	..	..	4,746	..	15	..	5,397
Bismuth ..	100	..	..	150	..	705	..	955
Brown Coal ..	..	271,360	..	..	..	..	..	271,360
Coal	4,306,799	328,704	693,383	..	289,806	85,848	..	5,704,540
Copper (ingot and matte) ..	26,775	..	105,031	2,928	1,132	395,286	..	531,152
Diamonds ..	123	..	..	..	..	..	..	123
Diatomaceous earth	4,852	4,420	..	..	..	..	..	9,272
Gold	226,068	448,228	710,168	49,619	4,915,950	51,579	4,449	6,406,061
Gypsum ..	1,135	1,388	..	37,921	3,686	..	..	44,130
Ironstone ..	2,591	..	8,691	829,363	..	1,498	..	842,143
Kaolin	2,518	3,577	..	1,454	..	..	..	7,549
Lead	(b)	..	527,696	..	..	30,987	..	(b) 558,683
Lead and silver lead ore, concentrates, etc. ..	1,778,648	..	..	..	68	..	410	1,779,126
Limestone flux ..	22,114	..	15,528	7,581	..	33,048	..	78,271
Magnesite ..	23,405	22	375	280	..	..	..	24,082
Manganese ore ..	448	..	..	53	..	..	..	501
Molybdenite ..	1,215	..	898	..	..	..	..	2,113
Opal	4,231	..	400	3,256	..	..	..	7,887
Osmiridium ..	..	..	..	..	..	4,843	..	4,843
Phosphate ..	44	..	..	26	..	..	..	70
Pigments ..	1,027	..	..	..	..	..	..	1,027
Platinum ..	805	..	..	..	..	..	..	805
Salt	..	(f)	..	131,821	..	..	..	(g)131,821
Sapphires ..	..	..	2,826	..	..	..	..	2,826
Shale (oil) ..	..	..	..	..	..	1,483	..	1,483
Silver	(b) 4,559	198	181,108	..	6,792	39,808	..	(b) 232,465
Tin and tin ore ..	218,244	1,350	123,620	..	4,557	190,041	2,519	540,331
Wolfram ..	16	..	760	..	..	7,301	..	8,077
Zinc & concentrates	283,845	..	..	..	..	..	..	(b)283,845
Unenumerated ..	(c) 36,238	1,190	2,742	7,123	5,533	3,226	e10,772	66,824
Total ..	6,964,834	1,060,437	2,373,251	1,076,434	5,269,194	845,668	18,150	17,607,968

(a) For items excluded see letterpress below. (b) See letterpress above preceding table (c) Includes dolomite £9,820, silica £8,321, fireclay, £6,940, and felspar, £6,003. (d) Year ended 30th June. (e) Mica, £10,772. (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 1933 consisted of—lime, £24,665; building stone, £122,927; Portland cement, £602,082; coke, £512,963; road materials, £567,339; shell grit, £10,918; sulphur and sulphuric acid, £77,673; and brick and pottery clays, £99,166. Carbide, £91,077, and cement, £126,424, have been excluded from the Tasmanian figures.

4. **Value of Production, 1929 to 1933.**—The value of the mineral production in each State in the five years 1929 to 1933 is given in the table hereunder :—

MINERAL PRODUCTION.—VALUE.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
1929 ..	10,155,164	1,116,083	1,683,050	1,295,053	2,087,852	1,556,276	18,345	17,911,823
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

Increases in the value of mineral production were recorded in all States during 1933, mainly through the agency of gold, tin, silver-lead ores and concentrates, zinc concentrates and ironstone. Gold was the most important contributing factor with a rise in production of 116,132 fine ozs., valued at £ A 1,195,000. All the States returned higher yields, but the principal gains were made in Queensland and Western Australia, where the improvement shown in the total value of mineral production was largely due to this metal. Tin followed next in importance with an advance of £238,000. Although the output increased by 624 tons, mainly in the three principal producing States of New South Wales, Queensland and Tasmania, the enhanced price of approximately £52 per ton ruling during 1933 was more largely responsible for the gain reported.

The production of silver-lead ores and concentrates and zinc concentrates increased by 16,343 tons and 42,914 tons valued at £215,785 and £127,917 respectively ; these increases were almost wholly in New South Wales.

Ironstone in South Australia increased by 183,000 tons valued at £210,746. Other States also showed increased outputs, but these were relatively small.

The only decreases worthy of mention were lead 2,700 tons, copper 290 tons and brown coal 32,000 tons. Decreased production of lead occurred in Queensland and Tasmania which are the two States where lead is produced from local ores mined. The decreases amounted to 2,566 tons valued at £46,117 in Queensland, and 50 tons valued at £1,650 in Tasmania, making a total decrease of 2,616 tons valued at £47,767. In addition to a smaller output of lead the average price fell in 1933 compared with that in 1932. Copper also showed a reduction of 290 tons, but the improvement in price more than balanced the deficiency and actually showed an increase of £610 on that of the previous year. Brown coal in Victoria declined by 32,000 tons representing a loss of £5,000 on the previous year.

5. **Total Production to end of 1933.**—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1933. The items mentioned as excluded from the preceding table are also excluded in the following table. Thus the total for New South Wales falls short by over £49,000,000 of that published by the State Department of Mines, the principal items excluded being coke, £15,559,000 ; cement, £19,885,000 ; lime, £1,732,000 ; 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 1933.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	Million. £
Gold ..	64,469,129	304,660,962	86,885,298	1,731,084	177,683,222	9,110,214	2,294,952	647
Silver and lead ..	124,433,446	265,575	5,961,331	383,547	2,294,476	9,226,579	66,313	143
Copper ..	15,651,489	216,686	26,971,494	33,151,464	1,809,960	21,605,077	233,603	100
Iron ..	7,743,457	15,641	498,566	10,769,871	36,722	53,608	..	19
Tin ..	14,914,998	978,856	11,345,014	..	1,612,071	17,609,730	631,697	47
Wolfram	277,887	11,885	1,066,488	301	1,441	243,688	222,479	2
Zinc ..	24,831,507	..	13,460	15,993	5,437	996,077	..	26
Coal ..	202,872,506	14,934,995	21,530,588	..	7,498,926	2,127,987	..	249
Other ..	8,302,976	891,148	2,821,613	4,983,713	327,811	2,162,478	84,389	19
Total ..	463,497,395	321,975,748	157,093,852	51,035,973	191,270,066	63,135,438	3,533,433	1,252

(a) To 30th June, 1933.

The "*other*" *minerals in New South Wales include alunite*, £209,000; antimony £367,000; arsenic, £160,000; bismuth, £244,000; chrome, £125,000; diamonds, £147,000; magnesite, £210,000; molybdenite, £215,000; opal, £1,605,000; 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 £2,226,000 for brown coal. Included in "other" in the Queensland production were opal, £187,000; gems, £635,000; bismuth, £119,000; cobalt, £157,000; molybdenite, £601,000; limestone flux, £769,000; and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £3,196,000; limestone flux, £297,000; gypsum, £842,000; phosphate, £135,000; and opal, £134,000. In the Tasmanian returns osmiridium was responsible for £603,000, scheelite for £112,000, and iron pyrites for £94,000.

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 1923 to 1934. 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	20,458,080	193,833	9,894	26,348,341
1923 ..	83,325	422,105	392,563	4,199	2,232,179	16,300	743	3,151,414
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
Total .. 1851–1934	64,776,791	305,258,002	87,867,934	1,789,666	183,212,836	9,158,353	2,303,076	654,366,658

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

The value of the gold yield in 1929 was the lowest recorded since the discovery of the precious metal in 1851, while the slight increase in 1930 was to some extent due to the increased activity in prospecting and the working over of old auriferous areas resultant on prevailing economic conditions. Consequent on the enhanced price realized for gold in 1931 the figures for the year show a considerable increase, the total for Australia being the highest recorded since 1921. The average price in Australian currency applied to the production for the year 1931 was £5 19s. 9d.; for the year 1932 the price was taken as £7 5s. 11¾d.; for 1933 as £7 14s. 3¾d.; and for 1934, £8 10s. 0¾d. 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 follow:—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 1934. A separate line is added showing the total production in thousands of fine ounces from 1851 to 1934.

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.
1930 ..	12,493	24,119	7,821	1,311	416,369	4,467	13	466,593
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
Total (b) 1851–1934	15,114	71,569	20,378	404	40,710	2,133	540	150,848

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

3. **Changes in Relative Positions of States as Gold Producers.**—The figures in the table showing the value of gold raised explain the enormous increase in the population of Victoria during the period 1851 to 1861, when an average of over 40,000 persons reached the Colony each year. With the exception of the year 1889, when its output was exceeded by that of Queensland, Victoria maintained its position as the chief gold-producer for a period of forty-seven years, or up to 1898, when its production was surpassed by that of Western Australia, the latter State from this year onward contributing practically half, and so far as the last ten years are concerned nearly four-fifths of the entire yield of Australia. 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 chiefly from returns obtained directly by the Commonwealth Bureau of Census and Statistics from the gold-producing countries of the world or from other 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	5,841,992	3.14
1928	19,745,749	457,674	2.32
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	25,169,639	830,267	3.30

For the year 1933 the world's production of gold in fine ounces was 25,170,000, as compared with a return of 24,205,000 oz. fine in 1932. It is estimated that the world's production in 1934 approximated 27,300,000 fine ounces, of which Australia's share amounted to 887,490 fine ounces or 3.25 per cent.

The quantity of gold produced in the ten chief producing countries in each of the five years 1929 to 1933 is given in the table hereunder. Particulars of the quantity and value of the gold production for all countries for the ten years 1924–33 will be found in the Australian Production Bulletin No. 28 issued by this Bureau.

GOLD.—PRODUCTION, CHIEF COUNTRIES.

Country.	1929.	1930.	1931.	1932.	1933.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
Union of South Africa	10,412,326	10,716,351	10,877,777	11,558,532	11,013,712
Canada	1,928,308	2,102,068	2,693,892	3,044,387	2,949,309
Soviet Union ..	1,000,000	1,433,664	1,700,960	1,990,000	2,814,000
United States ..	2,056,629	2,100,395	2,213,741	2,219,198	2,152,726
Australia	**427,159**	**466,593**	**595,123**	**714,135**	**830,267**
Rhodesia	560,813	547,631	532,111	580,484	645,087
Mexico	651,873	670,488	623,003	584,198	637,727
Japan	334,061	388,740	425,000	462,251	498,800
India	363,869	329,231	330,484	329,600	336,100
Gold Coast ..	207,851	240,899	261,651	278,782	305,908

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 1924–1933.

GOLD.—AVERAGE ANNUAL PRODUCTION, CHIEF COUNTRIES, 1924 TO 1933.

Country.	Quantity.	Country.	Quantity.
	Fine ozs.		Fine ozs.
Union of South Africa ..	10,418,285	Rhodesia	584,321
United States	2,200,944	**Australia .. ..**	**575,527**
Canada	2,147,669	India	362,373
Soviet Union	1,421,075	Japan	357,658
Mexico	694,573	Gold Coast	223,785

5. **Employment in Gold Mining.**—The number of persons engaged in gold mining in each State in 1901, 1903, 1913, 1923, and in each of the last five years 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

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

The heavy decline noticeable since 1901 is, of course, due to the exhaustion of accessible payable deposits and the failure to locate any considerable fresh sources of supply. As pointed out previously, the increase in number since 1929 was due to the higher price of the metal coupled with lack of other employment bringing about considerable accessions to the ranks of prospectors and fossickers. In every State an expansion in the numbers engaged has been recorded in each successive year since 1929 with the exception of New South Wales. In New South Wales a drop of 3,000 between 1931 and 1933 is shown. This decrease was general throughout the mining districts of the State. In Western Australia a substantial increase in the numbers employed

in 1933 over that of 1932 is recorded and the development has been distributed over all the goldfields of that State.

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 1933 amounted to 113 ozs., valued at £805 as compared with 336 ozs., valued at £2,906 in the preceding year, while the total production recorded to the end of 1933 amounted to 19,815 ozs., valued at £125,707.

(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 plantinoid 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 1933 the yield of osmiridium was returned as 548 ozs., valued at £4,843, the quantity raised being about 237 ozs. less than in 1932. 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 less than £9 per oz. in 1933, coupled with a reduced demand. It is stated that one of the reasons for the decreased demand for the metal and the consequent fall in price is that the process of treatment is a particularly dangerous one, owing to the fact that osmium oxide, which is a deadly poison, is given off in a gaseous state. Some of the American firms are using African ore containing platinum and iridium, the treatment of which is simpler and less hazardous.

§ 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 Year Books, Nos. 1 to 5, but considerations of space preclude the repetition of this matter.

2. **Production.**—(i) *General.* The value of the production of silver, silver-lead ore, and lead from each State during the five years ending 1933 is given hereunder :—

SILVER AND LEAD.—PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	£
1929 ..	3,032,741	100	14,807	258	12,525	233,353	79	3,293,863
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

(a) Year ended 30th June.

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

(ii) *New South Wales.* The figures quoted above for New South Wales for the year 1933 include silver to the value of £4,559 and silver-lead ore and concentrates valued at £1,778,648. Since the closing down of the Sulphide Corporation's works 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 the refinery of the Broken Hill Associated Smelters Proprietary Limited at Port Pirie in South Australia, while the remainder of the ore is concentrated on the field and dispatched to Port Pirie for refining. Low prices were responsible for the decrease in the quantity raised during the period dealt with and this is reflected in the lower total values shown. In 1933 there was an increased output of silver-lead ores together with a slight improvement in the price of silver. Lead, however, showed a slight fall in price.

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 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
1929 ..	7,619,884	165,364	46,163	5,918,014	835,697	7,009	76,619	734,261
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	3,579,886	790,792	18,344	63,849	475,161

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 1933 the amount won from ores of New South Wales origin was given as 160 tons, valued at £22,330. 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 1933.

Mine.	Value of Output to end of 1933.	Dividends and Bonuses Paid to end of 1933.
	£	£
Broken Hill Proprietary Co. Ltd.	53,324,074	14,103,403
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)	27,223,362	3,466,875
Broken Hill South Ltd.	23,358,634	5,315,000
North Broken Hill Ltd.	18,880,503	5,570,190
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.	10,419,511	3,619,280
Barrier South Ltd.	151,517	50,000
Total	153,611,094	35,307,619

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 1933, 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 160.9 millions and 38 millions respectively. The authorized capital of the various companies amounted to £6,448,000. In 1933 the dividends and bonuses paid amounted to £655,000 shared in by the Companies controlling the principal mines as follows : Zinc Corporation, £72,000 ; North Broken Hill, £122,500 ; Broken Hill South, £160,000, 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 1933 was unimportant, operations being restricted by the low price of the metal.

(iii) *Victoria.* The silver produced in 1933 amounted to 2,435 ozs., valued at £198, 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 1933, but despite this, production was well maintained and amounted to 45,150 tons of lead and 2,249,000 ounces of silver. The Mount Isa Mines Ltd. which produced the greater proportion of these metals was only in operation for ten months of 1933. Activities were suspended owing to the continued low prices. For the same reason operations in the northern fields were at a standstill.

(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 1933 was 67,036 ozs., valued at £6,792. In addition 1 ton of lead in concentrates valued at £13 and 5 tons of lead and silver-lead ore valued at £55 were exported.

(vii) *Tasmania.* The silver produced in 1933 amounted to 489,330 ozs., valued at £39,808, and the lead to 2,644 tons, valued at £30,987. About 362,000 ozs. of the total silver output were contained in silver-lead, while 128,000 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.

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.	1932.	1933.	1934.
	fine ozs.	fine ozs.	fine ozs.	fine ozs.	fine ozs.
Metal recovered by—					
Smelters	4,020,904	7,529,845	6,413,999	7,856,448	8,583,133
Mints	226,019	101,368	85,406	100,700	91,416
Metallic contents in ores and concentrates exported ..	8,901,212	2,242,170	2,494,173	2,945,446	2,579,082
Total Production ..	13,148,135	9,873,383	8,993,578	10,902,594	11,253,631

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.	1929.	1930.	1931.	1932.	1933.
					(*a*)
World's production in 1,000 fine ozs. ..	260,970	248,708	195,920	164,749	162,752

(*a*) Estimated.

The world's production of silver in millions of fine ounces during the years 1913, 1923 and 1933 amounted respectively to 210.0, 246.0, and 162.8, of which Australia contributed 16.7 million, 11.4 million, and 10.9 million fine ounces, or 8 per cent., 4.6 per cent., and 6.7 per cent. respectively. The production for Australia includes an estimate of the silver contents of the ores, bullion and concentrates exported.

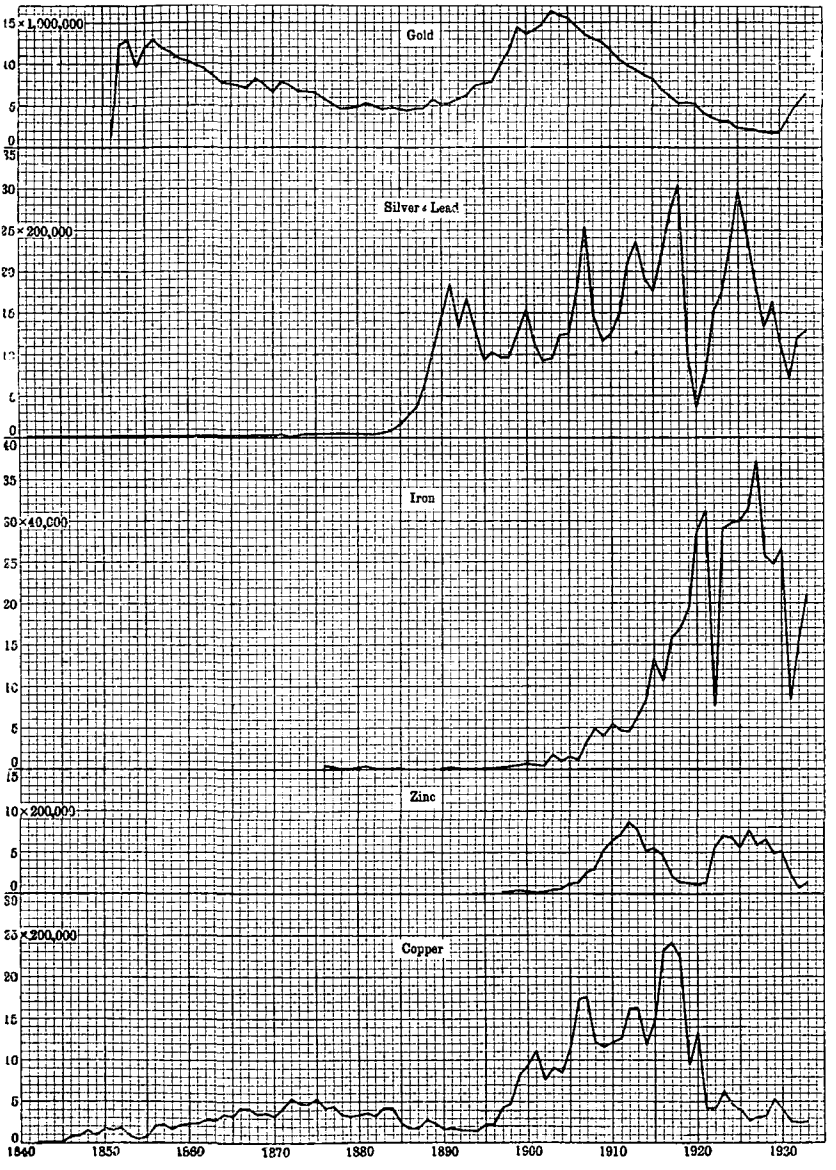
The figures for the world's production are given on the authority of *The Mineral Industry.*

Arranged in order of importance the estimated yields in 1933 from the chief silver producing countries were as follow :—

SILVER.—PRODUCTION, CHIEF COUNTRIES, 1933.

Country.	Production.	Country.	Production.
	Fine ozs. ('000 omitted.)		Fine ozs. ('000 omitted.)
Mexico	68,710	British India	6,054
United States	22,141	Central America ..	4,800
Canada	15,201	Transvaal	1,065
Europe	14,000	East Indies	900
South America	11,400	Congo	415
Australia	**10,903**	China	366
Japan	6,580	Rhodesia	120

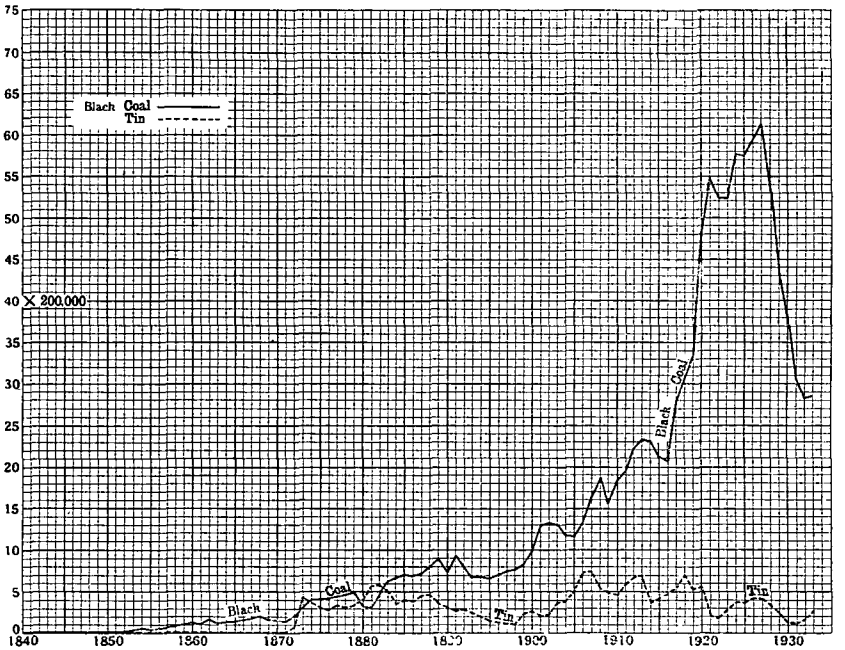
VALUES OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1933.



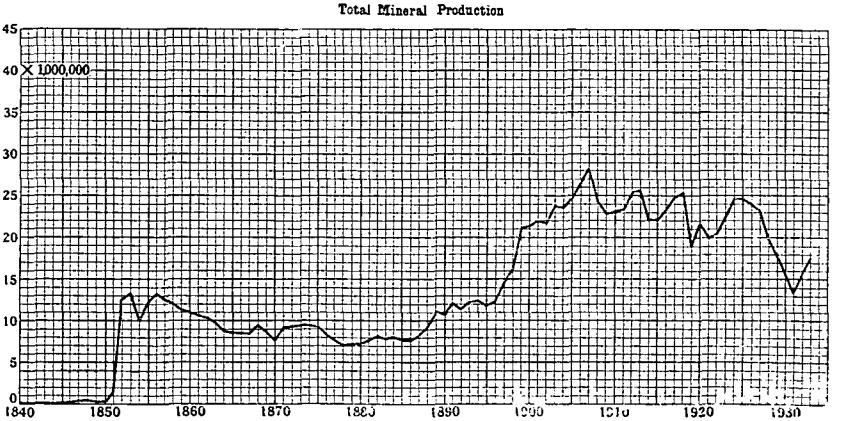
EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 onwards.

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 1933—*continued.*



Total Mineral Production



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

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

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

PRICES OF SILVER, LEAD, AND SPELTER.

Metal.	1930.	1931.	1932.	1933.	1934.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Silver (Standard) per oz.	0 1 5.66	0 1 2.60	0 1 5.84	0 1 6.14	0 1 9.22
Lead .. per ton	18 1 5	13 0 9	12 0 6	11 16 4	11 1 0
Spelter per ton	16 16 9	12 8 11	13 13 10	15 14 10	13 15 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 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.
1929 ..	5,001	447	7	31	540	2	6,028
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

(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, it is expected that the employment returns for that State will in future assume considerable importance.

§ 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 £34 per ton and the production has dropped to an average of 14,237 tons of copper. Apart from this output of ore has been small. 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 1929 to 1933 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.	1929.	1930.	1931.	1932.	1933.
	£	£	£	£	£
New South Wales	14,183	8,347	23,948	21,785	26,775
Queensland	294,188	174,075	126,342	108,858	105,031
South Australia	22,982	6,966	934	..	2,928
Western Australia	2,778	102	..	..	1,132
Tasmania	740,985	620,578	416,309	399,762	395,286
Northern Territory (a) ..	..	589	25	137	..
Australia	b1,075,146	810,657	567,558	530,542	531,152
Ingot, Matte, etc. .. tons	12,613	13,063	13,453	14,763	14,493
Ore .. .. tons	416	251	79	20	..

(a) Year ended 30th June. (b) Includes £30, value of production in Victoria.

2. **Sources of Production.**—(i) *New South Wales.* The production during 1933 amounted to 706 tons, practically all of which was electrolytic copper obtained at Port Kembla from the treatment of 2,985 tons of copper matte forwarded by the Broken Hill Smelters and derived from Broken Hill silver-lead ores. No copper mines operated in the State during the year on account of the low price ruling. 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 1933 to 2,941 tons valued at £105,031, 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 partly to the low prices realized for copper and partly to old-fashioned plant and methods of treatment. Improvement in this regard is now being contemplated. Returns from the chief producing areas in 1933 were as follow :—Cloncurry, 2,088 tons, £74,094 ; Herberton, 360 tons, £12,768 ; and Mount Morgan 423 tons, £15,656.

(iii) *South Australia.* The total production of copper in South Australia easily exceeds that of any other State. In recent years, however, Tasmania and Queensland have been the leading producers, as shown in the table above. Deposits of copper ore are found over a large portion of South Australia. 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. 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.

(iv) *Western Australia.* Thirty-five tons of copper valued at £1,132 were recovered in this State during 1933.

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1933 was 10,739 tons, valued at £395,286, the whole of the production being by the Mount Lyell Mining and Railway Co. Ltd. This Company treated 61,136 tons of ore and concentrates and produced 10,839 tons of blister copper, containing copper, 10,736 tons ; silver, 127,562 ozs. ; and gold, 5,424 ozs., the whole being valued at £440,000.

(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. The production in 1933 was negligible.

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 1931, 1932, and 1933 the price reached the low levels of £38.4, £31.7 and £32.6 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 1929–1933 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.	1929.	1930.	1931.	1932.	1933.
World's production—tons ..	1,902,311	1,548,900	1,328,600	887,700	1,022,100

The yields from the chief copper-producing countries in 1933 were as follow :—

COPPER.—PRODUCTION, CHIEF COUNTRIES, 1933.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	208,600	Soviet Union	36,900
Africa	176,800	Spain and Portugal ..	36,200
Chile	160,700	Germany	26,600
Canada	132,600	Peru	24,400
Japan	68,000	Norway	18,000
Mexico	39,900	**Australia**	**14,500**
Yugoslavia	39,400	Cuba	7,236

During the five years ending in 1933 the share of the United States in the world's copper production amounted to over 27 per cent.

The Australian production in 1933 amounted to a little over 1.4 per cent. of the total.

The most notable feature of the copper mining industry in 1933 was the general expansion of output throughout almost all of the important copper producing countries of the world with the exception of the United States, which showed a decrease of about 20,000 tons.

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.
1929	32	366	74	9	1,307	..	(*a*)1,789
1930	33	376	58	3	1,333	6	1,809
1931	35	287	61	..	1,442	3	1,828
1932	(*b*) 3	278	51	..	1,518	3	1,853
1933	(*b*) 13	175	54	..	1,483	1	1,726

(*a*) Including 1 in Victoria. (*b*) No production from copper mines.

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

§ 6. Tin.

1. **Production.**—The activity of tin mining is, of course, largely dependent on the price realized for the metal, and, as in the case of copper, the production has been subject to somewhat violent fluctuations. The next table shows the value of the production as reported to the Mines Departments in each of the States during the five years 1929 to 1933. A separate line is appended showing the recorded tonnages for Australia during each of the specified years.

TIN.—PRODUCTION.

State.	1929.	1930.	1931.	1932.	1933.
	£	£	£	£	£
New South Wales	191,199	84,800	103,111	120,124	218,244
Victoria	3,545	..	440	404	1,350
Queensland	114,518	49,708	35,744	66,174	123,620
Western Australia	13,432	10,608	3,945	3,295	4,557
Tasmania	130,014	69,592	70,634	109,767	190,041
Northern Territory (*a*) ..	6,958	3,345	2,331	2,322	2,519
Total	459,666	218,053	216,205	302,086	540,331
Tonnage	2,723	1,798	1,938	2,396	3,020

(*a*) Year ended 30th June.

2. **Sources of Production.**—(i) *New South Wales.* The production in 1933 was estimated at 1,135 tons of ingots valued at £218,244. The increase over the previous year's total was due to the rise in price of tin from £136 in 1932 to £195 in 1933. This so stimulated the industry that the production of 1,135 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 1933 being 398 tons, valued at £61,922. The Tingha area was the principal contributor to the output in 1933, the yield from this district comprising 530 tons of concentrates. Amongst other areas, Emmaville produced 261 tons, Ardlethan 195 tons, while the lode mines at Torrington returned a yield of 191 tons.

(ii) *Victoria.* The production in 1929 was obtained by dredging, the Cock's Pioneer Gold and Tin Co. in the Beechworth district contributing 14 tons valued at £2,000, the balance mainly coming from Toora in Gippsland. No production was recorded in 1930, and since that year the output has been trifling.

(iii) *Queensland.* The chief producing districts in Queensland during 1933 were Herberton, 505 tons, valued at £71,285; Cooktown, 46 tons, £6,953; Stanthorpe, 136 tons, £22,009; Chillagoe, 99 tons, £13,097; and Kangaroo Hills, 57 tons, £8,426. The total production, 856 tons, £123,620, showed a considerable advance on that for 1932 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 1933 amounted to 37 tons, valued at £4,557. The small quantity won during the year was obtained in the Pilbara and Greenbushes fields.

(v) *Tasmania.* For 1933 the output amounted to 957 tons of tin, valued at £190,041, an increase of 160 tons in quantity and £80,000 in value over the return for the previous year. Operations at Mount Bischoff, the principal producer, were mainly carried on by the tributers. An increased output in 1934 is anticipated, due to operations on a number of deposits reaching the productive stage.

(vi) *Northern Territory.* The Maranboy field was the chief contributor to the small output of tin in 1933; the balance (about 9 tons of concentrates) was obtained at Hayes Creek by Chinese tributers. No work was done at Mount Wells nor at any other tin mine during the year.

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.

1929.	1930.	1931.	1932.	1933.
Tons.	Tons.	Tons.	Tons.	Tons.
190,600	173,100	147,900	96,100	88,000

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 three-quarters of the world's total production in 1933. 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. The International Tin Committee has induced Indo-China, Burma, and Belgian Congo to subscribe to this agreement. There has been no concerted restriction of production in Australia.

The yields from the chief producing countries in 1933 were as follow :—

TIN.—PRODUCTION, CHIEF COUNTRIES, 1933.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Malaya	23,760	Burma..	3,200
Bolivia	14,725	**Australia**	**3,020**
Netherlands East Indies ..	14,130	Indo-China	1,800
Siam	10,324	Belgian Congo	1,720
China	8,000	Great Britain	1,543
Nigeria	3,651	Union of South Africa ..	734

Australia's share of the world's tin production, estimated at 88,000 tons, would appear therefore to be a little less than 3½ per cent.

4. **Prices.**—The average price of the metal in the London market for the years 1929 to 1934 was as follows :—

TIN.—PRICES, LONDON.

Year.	Average Price Per Ton.	Year.	Average Price Per Ton.
	£ s. d.		£ s. d.
1929	203 18 10	1932	135 18 10
1930	141 19 1	1933	194 11 11
1931	118 9 1	1934	230 7 5

For January, 1932, the average London price was £140 5s. 7d., but as the year proceeded, tin dealing tended to become increasingly concentrated in London and Singapore, and the sterling price rather than the gold price ruled quotations. The price ell till April, then fluctuated more or less rapidly till August, when the average rose to

£142 2s. 5d., and reached its highest for the year in November, when the figure stood at £153 13s. 4d. On September 7th and for some little time thereafter as much as £160 per ton was paid, but as pointed out in the preceding sentence the average monthly quotation reached its peak in November. For the year 1932, the average London price was returned at £135 18s. 10d.; in 1933 it increased to £194 11s. 11d. and rose to £230 7s. 5d. in 1934.

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.
1929	1,008	49	750	49	810	66	2,732
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

(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 1933 the zinc concentrates produced amounted to 230,952 tons, valued at £283,845. 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 1929 to 1933 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 1933.

The Electrolytic Zinc Co. at Risdon operated on raw materials obtained wholly from Broken Hill in New South Wales. Production in 1933 amounted to 53,956 tons of slab zinc valued at £1,100,950, and 160 tons of cadmium, valued at £22,330. 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 1929–33 was as follows :—

ZINC.—WORLD'S PRODUCTION.

1929.	1930.	1931.	1932.	1933.
Tons.	Tons.	Tons.	Tons.	Tons.
1,447,000	1,388,000	989,000	780,000	985,000

The yields from the chief producing countries in 1933 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. In 1933 the average price rose by £2 per ton while the world's production increased by 26 per cent. Practically all producing countries contributed towards this increased output, the exceptions being Mexico, Poland and Spain. The International Zinc Cartel which was organized in 1931 continued to operate in 1933.

ZINC.—PRODUCTION, CHIEF COUNTRIES, 1933.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	289,800	Great Britain	41,000
Belgium	135,200	Japan	29,000
Australia	**114,700**	Mexico	27,400
Canada	81,400	Italy	21,900
Poland (a)	77,000	Soviet Union	21,600
France	54,600	Rhodesia	18,500
Germany	49,800	Netherlands	18,400
Norway	44,200	Spain	8,400

(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 985,000 tons Australia's output of 114,700 tons represents 11.6 per cent.

3. **Prices.**—Information regarding prices of zinc will be found in the table in §4.5, *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 1933 the iron oxide raised amounted to 2,936 tons, valued at £1,641. In addition ironstone flux amounting to 2.432 tons valued at £950 was raised in the Goulburn Division. This is the first production recorded since 1932.

(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 1930, when the ore raised amounted to over 928,000 tons, valued at £1,068,000. In 1931, however, the output fell to 289,179 tons, valued at £332,556, rising to 537,928 tons valued at £618,617 in 1932 and recovering still further in 1933 to 721,185 tons valued at £829,363.

(iii) *Tasmania.* In 1931 about 500 tons of iron pyrites valued at £250 were produced, the last recorded previous production being for the year 1923, when nearly 12,000 tons valued at £27,000 were raised. For 1933 the output was returned at 1,498 tons, valued at £1,498. 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 1933-34 the bounties paid under the Iron and Steel Products Bounty Act on articles manufactured from locally produced materials were as follow :—wire-netting, £9,838 ; traction engines, £5,152.

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.		
	1931.	1932.	1933.	1931.	1932.	1933.
	Thousands of Tons.			Thousands of Tons.		
United States ..	18,426	8,781	13,346	25,429	13,681	23,232
Germany	6,063	3,933	5,267	8,291	5,751	7,586
France	8,217	5,549	6,327	7,809	5,604	6,526
Saar Territory ..	1,515	1,349	1,592	1,538	1,463	1,676
Belgium	3,231	2,783	2,744	3,056	2,758	2,689
Luxemburg ..	2,053	1,959	1,888	2,027	1,956	1,845
Austria	145	94	88	322	205	226
Italy	509	461	517	1,453	1,391	1,784
Spain	476	288	347	604	455	468
Czechoslovakia ..	1,165	450	499	1,526	685	747
Poland	347	199	306	1,037	551	817
Sweden	389	262	319	551	537	628
Soviet Union ..	4,900	6,370	7,250	5,400	5,800	6,920
China	252	200	200	30	25	40
Japan	1,408	1,542	2,032	1,864	2,360	3,047
United Kingdom ..	3,773	3,573	4,124	5,203	5,257	7,003
India	820	699	913	626	602	694
Canada	420	144	229	672	343	408
Australia	**129**	**228**	**350**	**143**	**255**	**375**
Total—All Countries	54,795	39,275	48,781	68,031	50,029	67,121

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.
1925 ..	460,154	388,156	320,693	1930 ..	308,369	314,917	256,696
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

§ 9. Other Metallic Minerals.

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. About 46 lb. of mercury sulphide valued at £6 was produced in 1933 in the Kilkivan district in Queensland.

§ 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
1929 ..	7,617,736	703,828	1,368,745	..	544,719	130,291	10,365,319
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
			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
1929 ..	5,952,720	813,370	1,199,599	..	426,706	105,877	8,498,272
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

(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 follow :—

BROWN COAL.—PRODUCTION, VICTORIA.

Year.	Quantity.	Value. (a)	Year.	Quantity.	Value. (a)
	Tons.	£		Tons.	£
1913	2,984	569	1930	1,831,507	173,713
1921	79,224	31,074	1931	2,194,453	251,511
1926	957,935	188,899	1932	2,612,512	274,903
1929	1,741,176	178,052	1933	2,580,060	271,360

(a) Cost of Production.

2. **Distribution and Production of Coal in each State.**—(i) *New South Wales.* Estimates of the quantity of merchantable coal available in the deposits in each State were given in preceding issues of the Official Year Book (see No. 20, pp. 752 *et seq.*).

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 (Illawarra) and Western (Lithgow) 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 1929 to 1933 :—

COAL.—PRODUCTION IN DISTRICTS, NEW SOUTH WALES.

District.	1929.	1930.	1931.	1932.	1933.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	3,019,693	3,715,805	4,161,798	4,398,253	4,651,483
Southern	2,339,837	1,529,674	981,964	1,112,686	1,218,014
Western	2,258,206	1,847,576	1,288,620	1,273,283	1,248,940
Total	7,617,736	7,093,055	6,432,382	6,784,222	7,118,437
Total Value (a) £ ..	5,952,720	5,193,032	4,607,343	4,376,453	4,306,799
Average value per ton (a) ..	15s. 8d.	14s. 8d.	14s. 4d.	12s. 11d.	12s. 1d.

(a) At the pit's mouth.

The depression in industry is reflected in the decreased coal production. The output for 1931 was the lowest since 1904, and the value the least since 1917. Although there was a small increase in tonnage in 1932 and in 1933, the values shown for both of those years were below that of 1931. Of the total quantity of coal won in New South Wales since the inception of operations to the end of the year 1933, viz., 378 million tons, about 257 millions or 68 per cent. was obtained in the Northern District, 79 million tons or 21 per cent. came from the Southern District, and 42 million 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.
1929	634,805	69,023	703,828	813,370	23 1
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

(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), but it is not proposed to repeat this information in the present issue. The brown coal produced in Victoria in 1933 amounted to 2,580,000 tons, the greater proportion being procured at the State open cut at Yallourn. During the year 1933–34 the State Electricity Commission report that 2,692,874 tons of brown coal were won of which 1,438,929 tons went to the power station and 1,253,945 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 1933 it was more than trebled, sales alone reaching 329,000 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 1933 was as follows :—

COAL PRODUCTION.—QUEENSLAND, 1933.

District.	1933.	District.	1933.
	Tons.		Tons.
Ipswich	439,496	Clermont	35,779
Darling Downs	70,586	Bowen	167,600
Wide Bay and Maryborough	66,697	Mount Mulligan (Chillagoe)	18,368
Rockhampton (Central) ..	65,628	Other	11,413
		Total	875,567

The production in 1933 shows an improvement on that of 1932, amounting to about 34,000 tons or 4 per cent. This output is still considerably below the maximum of 1929 when 1,369,000 tons were raised. The distribution of the 875,567 tons raised in 1933 was as follows: Railway Department 345,961 tons, Other Industries within the State 464,197 tons, Exported 65,409 tons. There were 56 collieries operating in the Ipswich district, 9 in the Darling Downs, 8 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). Prospecting for lignite in 1933 was continued in the Inkerman and Balaclava areas, one drill being employed.

(v) *Western Australia.* The production from the six collieries operating on the Collie field amounted in 1933 to 458,000 tons, an increase of about 43,000 tons on the return for 1932. The deposits at Wilga again remained unworked during the year.

(vi) *Tasmania.* The production in 1933 amounted to 116,573 tons, about 5,000 tons more than the total for 1932. 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 1933 were contributed by the Cornwall Coal Company, 31,000 tons by the Mt. Nicholas Proprietary and 16,000 tons by the Jubilee Company. The three mines combined raised 99,000 tons or 85 per cent. of the total output.

(vii) *Australia's Coal Reserves.* A summary of the information available in regard to estimated actual and possible reserves of coal for Australia as a whole was given in tabular form on page 755 of Official Year Book No. 20.

3. **Production in Various Countries.**—The total known coal production of the world in 1933 amounted to about 1,140 million tons, towards which Australia contributed about 11.6 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.
1930	243,881,800	23,803,000	10,202,700	9,531,400	1,382,900	12,029,500
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	7,609,000	9,092,000	843,800	10,545,200
BROWN COAL, LIGNITE.						
1930	..	..	3,083,100	1,831,500	1,159,200	..
1931	..	..	2,598,700	2,194,500	1,178,100	..
1932	..	..	3,093,000	2,612,500	913,700	..
1933	..	..	3,002,000	2,580,000	977,400	..

COAL PRODUCTION.—FOREIGN COUNTRIES.

Year.	Germany.	Austria.	Hungary.	Belgium.	France. (*b*)	Czecho-slovakia.	Yugoslavia.
BLACK COAL.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1930 ..	140,444,000	212,500	798,700	26,972,700	53,033,000	14,207,000	360,400
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 ..	108,184,600	235,200	787,000	24,878,400	46,113,200	10,471,800	377,400

Year.	Poland.	Nether-lands.	Soviet Union.	Japan.	China. (*c*)	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1930	36,914,000	12,018,200	47,635,600	30,880,700	26,037,000	479,384,900
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	19,990,000	321,040,000
1933	26,924,000	12,375,000	70,000,000	31,750,000	(*d*)	336,908,000

BROWN COAL, LIGNITE.

Year.	Germany.	Austria.	Hungary.	Belgium.	France.	Czecho-slovakia.	Yugoslavia.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1930 ..	143,704,000	3,014,600	6,078,900	..	1,124,700	18,890,500	4,826,700
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 ..	124,793,400	2,966,900	5,815,000	..	1,071,100	14,886,000	3,711,500

Year.	Poland.	Nether-lands.	Soviet Union.	Japan.	China.	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1930	54,000	141,900	(a)	126,600	..	(a)
1931	38,800	120,300	(a)	115,900	..	(a)
1932	32,900	122,000	(a)	106,800	..	(a)
1933	32,900	95,500	(a)	107,000	..	(a)

(a) Included with black coal. (b) Exclusive of Saar District, which produced 13,026,700 tons in 1930, 11,187,500 tons in 1931, 10,273,200 tons in 1932, and 10,394,400 tons in 1933. (c) Includes about 300,000 tons of lignite yearly. (d) Not available.

The figures generally show a slight improvement over the year 1932, except in certain instances where the production either remained stationary or declined slightly.

4. **Exports.**—(i) *General.* The quantity of coal of Australian production (exclusive of bunker coal) exported to other countries in 1933–34 was 292,416 tons, valued at £269,000. New South Wales exported 291,835 tons, followed by Tasmania with 320 tons, Queensland with 253 tons, and Victoria 8 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	1930–31 ..	387,851	411,612
1921–22 ..	1,028,767	1,099,899	1931–32 ..	344,015	341,800
1928–29 ..	346,658	428,754	1932–33 ..	282,977	281,512
1929–30 ..	294,503	346,916	1933–34 ..	292,416	269,296

(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	1930–31 ..	509,303	607,537
1921–22 ..	1,498,035	2,178,101	1931–32 ..	506,140	534,897
1928–29 ..	739,713	1,009,163	1932–33 ..	562,442	550,277
1929–30 ..	507,349	742,383	1933–34 ..	523,014	495,032

(a) Calendar Year.

(ii) *New South Wales.* The total export of coal from New South Wales in 1933 amounted to 2,455,178 tons, valued at £2,125,700, of which 2,104,558 tons, valued at £1,776,701, were shipped from Newcastle. Interstate exports amounted to 1,623,840 tons, valued at £1,358,612, and were divided as follows :—Cargo, 1,387,608 tons, £1,179,987, bunker, 236,232 tons, £178,625. Oversea exports totalled 831,338 tons, valued at £767,088, representing 540,594 tons of bunker coal, valued at £488,741, and 290,744 tons of cargo coal, valued at £278,347.

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.
1929	1,237,272	694,913	5,685,551	7,617,736
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

(a) Including Bunker.

For the period of five years shown in the table above, 20 per cent. of the total output was exported to other States, 11 per cent. was sent overseas, and 69 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.**—An estimate of the consumption of coal in Australia may be arrived at by adding the imports to the home production, and deducting the exports (including bunker coal taken by oversea vessels). The following table shows the consumption computed in the manner specified for the last five years :—

COAL.—CONSUMPTION, AUSTRALIA.

Year.	Quantity of Coal Consumed.		
	Home Produce.	Produce of Other Countries.	Total.
	Tons.	Tons.	Tons.
1929	11,140,576	493,461	11,634,037
1930	10,446,019	392,675	10,838,694
1931	9,696,738	1,962	9,698,700
1932	10,366,300	4,674	10,370,974
1933	10,836,613	4,368	10,840,981

The bunker coal taken away in 1933 was estimated at 543,000 tons. Figures for brown coal produced in Victoria are included in the total for home produce, the amounts so included being 2,194,000 tons in 1931, 2,613,000 tons in 1932, and 2,580,000 tons in 1933. With the exception of a few tons the whole of the oversea imports in 1933, which amounted to 4,368 tons, came from the United Kingdom.

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. 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.
1929	16 8	16 11	12 11	15 8
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

(ii) *Victoria.* In Victoria the average price of coal per ton at the pit's mouth in 1929 was 23s. 1d.; in 1930, 23s.; in 1931, 12s. 8d.; in 1932, 12s. 9d.; and in 1933, 12s. 7d. These averages are exclusive of brown coal, which in 1933 cost 2s. 1d. 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.				
	1929.	1930.	1931.	1932.	1933.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich	16 10	16 7	15 8	15 2	14 9
Darling Downs	19 5	19 5	18 6	18 4	18 2
Wide Bay and Maryborough	23 2	23 0	22 10	22 10	22 7
Rockhampton	22 11	20 5	16 8	17 6	16 6
Clermont	12 2	14 3	14 7	14 0	13 11
Bowen	15 4	15 5	15 1	14 9	13 9
Mount Mulligan (Chillagoe)	31 9	29 9	28 10	27 1	28 5
Average for State ..	17 6	17 5	16 8	16 3	15 10

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 1929, 15s. 8d.; in 1930, 15s. 9d.; in 1931, 15s. 7d.; in 1932, 13s. 0d.; and in 1933, 12s. 8d. 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 1929, 16s. 3d.; in 1930, 15s. 11d.; in 1931, 15s. 10d.; in 1932, 15s. 6d.; and in 1933, 14s. 9d. 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 1929, 13s. 5d.; in 1930, 13s. 7d.; in 1931, 13s. 6d.; in 1932, 13s. 3d.; and in 1933, 13s. 0d.

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 1929 to 1933.

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
1929 ..	14,577	1,926	325	2,773	858	311	20,770
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

(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. In 1927 the number dropped to slightly under 31,000, declining further in 1928 to 27,500, then falling rapidly to 20,800 in 1929. New South Wales, the chief producing State, was the heaviest loser as will be seen from the above table. During the period under review the export trade has diminished seriously and the position has recently been aggravated by the industrial depression. At the same time coal has had to meet increasing competition from oil fuel and from electricity generated by water power.

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, 1933.

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 ..	13,349	10	61	0.75	4.57	711,800	116,700
Victoria	1,789	1	18	0.56	1.01	3,103,000	172,400
Queensland ..	2,448	2	113	0.82	46.16	438,000	7,700
Western Australia ..	626	1	190	1.60	303.51	458,400	2,400
Tasmania	313	1	5	3.19	15.97	116,600	23,300
Total ..	18,525	15	387	0.81	20.89	778,100	30,200

The next table shows the average number of miners employed, number of fatalities, and rate per 1,000 during the quinquennium 1929–33 :—

COAL MINING.—FATALITIES, 1929 TO 1933.

State.	Average No. of Coal Miners Employed.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	14,898	12	0.81
Victoria	2,082	1	0.48
Queensland	2,549	2	0.78
Western Australia	747	1	1.34
Tasmania	362	1	2.76
Total	20,638	17	0.82

(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 1929–33 was 1.05, the rates varying between 1.11 in 1929 and 0.98 in 1931, while the rate for Australia for the same period was 0.82. 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, 1.8; Poland, 1.7; 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, there was prior to the war a fairly considerable amount of coke imported 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 1933-34 the coke imported amounted to 850 tons, of which 174 tons were obtained from the United Kingdom and 676 tons from Germany, while the quantity exported was 5,249 tons, valued at £8,598, of which 4,166 tons, valued £5,482, 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.		1929.	1930.	1931.	1932.	1933.
Quantity ..	tons	464,360	367,772	217,509	356,495	473,427
Value, total ..	£	757,580	589,343	297,318	403,177	512,693
Value, per ton ..	..	32s. 8d.	32s. 1d.	27s. 4d.	22s. 7d.	21s. 8d.

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. The prevailing slackness of trade is reflected in the dwindling returns since that year, but an improvement is noted.

A small quantity of coke is made in Queensland, the quantity returned in 1933 being 12,450 tons, valued at £20,614. The following table shows the amount manufactured locally during the last five years :—

COKE.—PRODUCTION, QUEENSLAND.

Year.		1929.	1930.	1931.	1932.	1933.
Quantity ..	tons	4,079	3,444	2,280	1,933	12,450

The increased output in 1933 was due to the operations of the coke ovens recently erected at Bowen. Hitherto the coke used at the ore treatment works at Mount Isa and Chillagoe was imported from the southern States but with the erection of a battery of 45 ovens it is anticipated that the output will be sufficient to meet the whole requirements of these works.

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.

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.

Negotiations are in progress between the governments of the Commonwealth and of New South Wales with the object of evolving a plan for the development of the oil shale deposits at Newnes. In 1933 a technical Committee recommended the formation of a company but it is the opinion of both Governments that success can only be achieved by the application of technical and engineering knowledge and general business ability of a very high order. Without these qualifications the formation of a company would be futile and the matter is being further investigated. No production was recorded in New South Wales in 1933.

About 57,000 gallons of crude oil were produced in 1933 from shale treated in Tasmania, while the total quantity of oil distilled from shale up to the end of 1933 was set down at 319,000 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.

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 1933 by five companies in localities situated in the south-eastern portion of the State.

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.

Boring was continued in 1933 by the Freney Kimberley Oil Company, but results were indeterminate. Surface explorations were also carried out in the Wooramel, North Western, and South Coastal areas.

The Commonwealth Government encourages the search for oil by placing at the disposal of companies and individuals the advice and experience of its technical staff appointed for this purpose. In co-operation with the Air Board useful aerial reconnaissances have already been made in Queensland by the Commonwealth Geological Adviser, the photographs and mosaics produced proving of great value in conjunction with the ground geological surveys. A further aerial reconnaissance was undertaken to cover most of the possible oil producing regions in Australia. Further reference is made in § 16 hereinafter to the search for oil.

Attention is being directed also 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.

§ 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 1933.

§ 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 1933 in New South Wales was estimated at 123 carats, valued at £123, while the total production to the end of 1933 is given at 204,000 carats, valued at £147,000. The yield in 1933 was obtained wholly at Howell and 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 £2,826 were purchased on the Anakie sapphire fields in 1933. 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 1933 was £4,231, 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 £1,605,000, 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 1933 was estimated at £400, 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 last three years. 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 three 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 1933 the number so employed was as follows :—

NUMBER OF PERSONS ENGAGED IN MINING, 1933.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead, and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	6,913	3,197	13	1,448	13,349	1,006	25,926
Victoria	6,126	..	..	..	1,789	49	7,964
Queensland	4,161	553	175	818	2,448	357	8,512
South Australia	231	..	54	..	..	273	558
Western Australia ..	9,900	10	..	63	626	91	10,690
Tasmania	229	962	1,483	1,007	313	239	4,233
Northern Territory ..	95	..	1	33	..	80	209
Australia	27,655	4,722	1,726	3,369	18,525	2,095	58,092

Included in the figures for " other " in South Australia were 54 engaged in mining iron ore, 24 gypsum miners, 81 salt gatherers, and 62 opal miners. The Tasmanian figures include 126 osmiridium miners and 113 miscellaneous miners in the metallic and non-metallic groups, and those for the Northern Territory, 80 mica miners.

The following table shows the number of persons engaged in mining in each State during each of the years 1901, 1911, 1921, 1930 to 1933, 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

NUMBER ENGAGED IN MINING PER 100,000 OF POPULATION—*continued.*

State.	1930.		1931.		1932.		1933.	
	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 ..	27,512	1,086	30,682	1,200	27,708	1,074	25,926	996
Victoria	3,255	182	6,463	359	8,105	448	7,964	437
Queensland ..	5,534	608	6,753	730	8,013	856	8,512	900
South Australia ..	565	99	518	90	531	92	558	96
Western Australia..	5,442	1,268	7,147	1,653	8,695	1,998	10,690	2,436
Tasmania ..	3,280	1,485	3,397	1,512	4,605	2,028	4,233	1,853
Northern Territory	173	3,468	145	2,918	187	3,795	209	4,256
Australia ..	45,761	708	55,105	844	57,844	879	58,092	876

The general falling-off since 1901 is largely due to the causes mentioned in § 1.7 *ante*. As compared with the preceding year, the proportion to population for Australia as a whole shows increases for 1931 and 1932, attributable mainly to the larger numbers engaged in the search for gold, particularly in New South Wales, Victoria, Queensland, and Western Australia. 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 1933.

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, 1933.**—The following table gives particulars of the number of men killed or injured in mining accidents during the year 1933 :—

MINING ACCIDENTS, 1933.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED.								
Coal ..	10	1	2	..	1	1	..	15
Copper ..	..	..	1	..	..	5	..	6
Gold ..	3	9	1	1	21	..	..	35
Silver, lead, and zinc ..	6	..	3	..	..	..	..	9
Tin	3	..	..	..	..	1	..	4
Other minerals	..	..	..	..	..	..	..	..
Total ..	22	10	7	1	22	7	..	69
INJURED.								
Coal ..	61	18	113	..	190	5	..	387
Copper ..	..	..	26	..	..	49	..	75
Gold ..	4	5	24	9	356	..	..	398
Silver, lead, and zinc ..	11	..	19	..	..	7	..	37
Tin	1	..	3	..	..	9	..	13
Other minerals	4	..	..	1	..	1	..	6
Total ..	81	23	185	10	546	71	..	916

§ 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 Government of the Commonwealth and the States of Queensland and Western Australia agreed to co-operate in the conduct of a geological and geophysical survey of certain areas in the northern parts of Australia 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 is now in full progress. Geological parties are in the field in Western Australia, Northern Territory and Queensland. Geophysical parties have just taken up work in the Cloncurry district in Queensland, and aircraft, having photographed a large portion of the area in Queensland, are now moving across to Western Australia, taking in portion of the Northern Territory en route. A staff, including Air Force personnel, totalling about sixty persons is now employed. This staff will probably be augmented as time goes on.

(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 7th March, 1935, were £115,000.

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. It is expected, that as a result of this assistance, employment will be provided for more than 5,500 men.

(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 have now arrived in Australia, and, in company with the Commonwealth Geological Adviser, are at present (May, 1935) carrying out an aerial reconnaissance of likely areas. This reconnaissance is 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.

(iv) *Appointment of Geological Staff.* In 1927 a small geological staff, including a palaeontologist, was appointed. The Geological Adviser visited the United States and Argentina 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 1933-34, 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 1933 loans totalling £5,292 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 £18,965. No claims for rewards in connexion with the discovery of new mineral fields were paid during the year.

3. **Victoria.**—During the year 1933 expenditure in connexion with mining amounted to £33,109, of which £8,849 consisted of advances to prospectors, while advances to miners amounted to £11,350, aid to boring, £221, and assistance to batteries and testing plants, £10,330. The total includes also expenses amounting to £2,359 on account of geological surveys, etc.

4. **Queensland.**—State assistance to the mining industry in 1933 amounted to £32,666, of which £29,999 was advanced to prospectors, the balance consisting of grants under the *Mining Machinery Advances Act* and for the provision of transport facilities, etc., to mineral fields.

State coal mines were in operation at Bowen, Styx and at Mount Mulligan. There is also a State Assay Office at Cloncurry at which assays and sampling are carried out for the public, and State batteries were maintained at Kidston, Charters Towers, and Bamford. The battery at Charters Towers was leased privately, but the State Works for the treatment of tin at Irvinebank which had been leased to a co-operative party were, after a period of idleness, put into commission by the Mines Department.

5. **South Australia.**—Aid is given to the industry mining under the terms of the *Mining Act* of 1893, and previous measures. Up to the end of 1933 the total amount of subsidy paid was £70,815 of which £13,698 has been repaid, and £4,549 written off, leaving a debit of £52,568. 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 1933 amounted to £1,025.

6. **Western Australia.**—Under the *Mining Development Act* of 1902 assistance was granted in 1933 in accordance with the subjoined statement:—Advances in aid of mining work and equipment of mines with machinery, £152; aid to prospectors, £30,709; subsidies on stone crushed for the public, £475; total, £31,336. Other assistance granted from the vote on various matters during the year amounted to £5,906, principally in connexion with prospecting for gold.

In 1932 there were 25 State batteries in operation. The amount expended thereon up to the end of 1933 was £91,981 from revenue and £337,325 from loan fund giving a total of £429,306. The working expenditure up to the end of 1933 exceeded the revenue by £142,391. The total value of gold and tin produced to the end of 1933 at the State plants was £7,119,413. 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 1933 amounted to £2,259, of which £132 was expended under Part III. of the *Aid to Mining Act* 1927 on drilling and boring, and £2,127 represented assistance and sustenance to prospectors under Part II. In addition a sum of £490 was paid from The Unemployment Relief Act for drilling and boring at Legunia. The amount received from ore sales was £1,645, the bulk of which was paid to tributers. Receipts amounted to £181.

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 1932–33 assistance was granted to approved prospectors at the rate of £1 per week per man for rations with loan of prospecting tools not exceeding £2 in value to each prospector. The total assistance granted during the year amounted to £219.

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 1929 to 1933 were as follow :—

REFINED METALS PRODUCED IN AUSTRALIA.

Metal.		1929.	1930.	1931.	1932.	1933.
Silver	ozs.	9,229,514	9,002,705	7,349,794	6,499,405	7,957,148
Lead, pig ..	tons	176,820	168,291	133,306	134,499	159,393
Zinc	„	51,872	54,901	53,832	53,200	53,956
Copper ..	„	10,874	14,900	12,936	13,307	11,238
Tin	„	2,260	1,544	1,690	1,958	2,360

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 1929–30 to 308,369 tons, in 1930–31 to 232,783 tons, in 1931–32 to 190,132 tons, and in 1932–33, 336,246 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 1929 to 1933, 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—	1929.	1930.	1931.	1932.	1933.
Silver	ozs.	Lead-Silver-Gold Bullion	44,677	44,777	1,018,359	2,470,807	2,177,633
		Lead Concentrates and Ores	31,121	179,185	303,307	..	447,943
		Zinc Concentrates and Ores	604,014	558,577	183,111	23,366	319,870
		Copper and Gold Ores ..	..	..	..	..	..
		Total	679,812	782,539	1,504,777	2,494,173	2,945,446
Lead	tons	Lead-Silver-Gold Bullion	689	252	17,130	51,857	45,871
		Lead Concentrates and Ores	878	12,986	10,982	..	16,019
		Zinc Concentrates and Ores	5,704	9,482	1,878	1,159	2,196
		Total	7,271	22,720	29,990	53,016	64,086
Zinc	tons	Lead Concentrates and Ores	21	396	557	..	586
		Zinc Concentrates and Ores	69,958	86,761	41,917	31,542	60,142
		Total	69,979	87,157	42,474	31,542	60,728
Copper	tons	Ores, Matte, etc. ..	2,737	3,277	2,765	1,099	1,109
Tin	tons	Concentrates and Ores ..	4	..	17	101	139

§ 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 1933-34 :—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1933-34.

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	3,362	..	..	..	..	..	..	3,362
Silver and Silver-lead	3,737	..	..	3,737	..	..	..	..
Iron	142,180	..	..	..	..	142,080	..	100
Wolfram	4,445	191	504	546	2,587	..	..	617
Concentrates—								
Silver and Silver-lead	716,197	..	..	415,665	..	..	..	(a) 300,532
Zinc	1,925,390	1,680,981	..	96,805	..	100,000	..	(b) 47,604
Cadmium—Blocks, Ingots, etc.	6,017	2,871	..	200	1,760	286	..	(c) 900
Copper—								
Matte	..	..	..	..	..	..	..	..
Ingot	105,310	67,240	..	5,000	32,960	..	110	..
Tin—Ingot	24,794	15,322	3,000	800	300	100	2,652	2,620
Lead—								
Pig	3,687,298	3,210,297	..	207,382	195,054	33,442	22,399	18,724
Zinc—Bars, Blocks, etc.	646,883	384,141	..	..	8,003	118,877	..	(d) 135,862
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.
Platinum, Osmium, etc.	(e) 671	658	..	..	..	..	..	13
Gold—								
Bar, Dust, etc.	978,742	976,243	2,482	..	..	..	17	..
Silver—								
Bar, Ingot, etc.	8,657,960	7,686,797	254	..	..	..	1,502	(f) 969,407
VALUE.								
Ores—	£	£	£	£	£	£	£	£
Copper	1,310	..	..	..	..	..	..	1,310
Silver and Silver-lead	2,114	..	..	2,114	..	..	..	..
Iron	4,087	..	..	..	..	4,072	..	15
Wolfram	21,747	564	2,020	2,470	13,696	..	..	2,997
Concentrates—								
Silver and Silver-lead	313,156	..	..	184,204	..	..	..	(a) 128,952
Zinc	201,308	170,540	..	8,952	..	18,097	..	(b) 3,719
Cadmium—Blocks, Ingots, etc.	45,592	18,900	..	1,120	15,454	1,690	..	(c) 8,338
Copper—								
Matte	..	..	..	..	..	..	..	..
Ingot	230,458	126,170	..	9,500	94,515	..	273	..
Tin—Ingot	329,410	207,754	34,011	11,001	4,275	1,375	35,053	35,941
Lead—								
Pig	2,418,072	2,126,367	..	120,172	116,173	24,995	17,097	13,268
Zinc—Bars, Blocks, etc.	617,520	363,795	..	..	7,200	112,920	..	(d) 133,605
Platinum, Osmium, etc.	(e) 6,753	6,629	..	..	..	..	..	124
Gold—								
Bar, Dust, etc.	7,960,877	7,939,917	20,830	..	..	..	130	..
Silver—								
Bar, Ingot, etc.	952,407	850,223	22	..	..	..	166	(f) 101,996

(a) Italy. (b) France. (c) France, 600 cwt., £5,228; Sweden, 300 cwt., £3,110. (d) India, 135,483 cwt., £133,148. (e) Mainly osmiridium exported from Tasmania and platinum from New South Wales. (f) Ceylon, 908,466 oz., £95,323; India, 58,721 oz., £6,385; Fiji, 2,170 oz., £282; Samoa, 50 oz., £6.