

CHAPTER XII. MINERAL INDUSTRY.

(NOTE.—A table showing particulars of mineral production for the year 1939 will be found in the Appendix. With the exception of gold this information was not available at the time this chapter was compiled. Details of gold production are included in § 2 hereinafter.)

§ 1. The Mineral Wealth of Australia.

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

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

3. **Quantity and Value of Production in 1938.**—The quantities (where available) and the values of the principal minerals produced in each State, and in Australia as a whole, during the year 1938 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, cadmium, cobalt and zinc are credited in the form reported to the State of origin—chiefly New South Wales—although the actual metal extraction is carried out principally in South Australia and Tasmania.

The quantity of cadmium and cobalt recovered in Tasmania from zinc ores mined in New South Wales during 1938 is given in § 9 pars. 2 and 3 hereafter.

MINERAL PRODUCTION : QUANTITIES, 1938.

Mineral.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
Antimony ..	ton	144	398	16	..	339	..	..	897
Arsenic ..	..	..	..	..	..	3,999	..	..	3,999
Asbestos ..	cwt.	..	..	..	960	6,680	83	..	7,723
Barytes ..	ton	317	..	..	2,863	..	..	..	3,180
Bismuth ..	cwt.	1	..	115	..	..	17	..	133
Brown coal ..	ton	..	3,675,450	..	..	..	..	..	3,675,450
Coal ..	..	9,570,930	307,258	1,113,426	..	604,702	83,753	..	11,680,159
Cadmium ..	..	(a)	..	..	..	..	980	..	(b) 980
Copper (ingot, matte, etc.) ..	ton	1,963	..	4,459	254	29	12,729	252	19,686
Diatomaceous earth ..	..	3,451	190	51	..	..	..	..	3,692
Gold ..	fine oz.	88,698	144,243	151,432	5,293	1,167,791	22,200	12,378	1,592,034
Gypsum ..	ton	12,511	13,381	..	146,590	13,429	..	..	185,911
Ironstone ..	..	108	..	5,125	2,245,366	..	..	..	2,250,599
Kaolin ..	..	16,101	5,656	80	..	..	..	..	21,897
Lead ..	..	(a)	..	41,196	..	1	10,652	..	(b) 51,849
Lead and silver-lead ore, concentrates, etc. ..	..	317,230	..	..	..	352	..	..	317,582

MINERAL PRODUCTION: QUANTITIES, 1938—continued.

Mineral.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
Limestone flux ..	ton	158,381	..	16,529	26,170	..	281,859	..	482,939
Magnesite ..	"	19,158	121	..	227	..	..	..	19,506
Manganese ore ..	"	218	..	376	..	..	..	..	594
Molybdenite ..	cwt.	173	710	278	..	..	..	..	1,161
Osmiridium ..	oz.	..	..	..	..	..	191	..	191
Phosphate ..	ton	240	..	..	..	..	..	..	240
Pigments ..	oz.	553	..	..	..	..	..	..	553
Platinum ..	"	8	..	..	..	..	..	..	8
Salt ..	ton	..	(c)	..	74,812	..	..	..	(b) 74,812
Shale (oil) ..	ton	..	..	..	..	..	..	..	536
Silver ..	oz.	(a) 83,822	5,898	3,533,490	503	271,346	1,219,550	..	5,511,469
Tin and tin ore ..	ton	1,190	169	1,005	..	68	1,279	21	3,732
Wolfram ..	cwt.	1,877	..	3,015	..	..	5,982	8,694	19,568
Zinc and concentrates ..	ton	265,296	..	23,735	..	..	25,366	..	314,397

(a) See letterpress preceding this table. (b) Incomplete. (c) Not available.

The values of the minerals raised in each State in 1938 are given in the following table:—

MINERAL PRODUCTION: VALUES, 1938.

Mineral.	N.S.W. (a)	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas. (a)	N.T.	Australia.
	£	£	£	£	£	£	£	£
Antimony ..	3,444	10,619	194	..	3,859	..	..	18,116
Arsenic ..	..	..	..	..	71,982	..	..	71,982
Asbestos ..	..	..	..	599	17,711	68	..	18,378
Barytes ..	538	..	..	6,334	..	..	..	6,872
Bismuth ..	4	..	1,968	..	..	396	..	2,368
Brown coal ..	..	351,721	..	..	..	..	..	351,721
Coal ..	5,603,842	188,101	958,884	..	375,083	61,991	..	7,187,901
Cadmium ..	(b)	..	..	..	..	18,636	..	(c) 18,636
Copper (ingot and matte) ..	87,905	..	203,967	15,333	1,275	580,238	4,362	893,080
Diamonds ..	300	..	..	..	..	..	..	300
Platinoaceous earth ..	3,184	786	89	..	..	..	..	4,059
Gems ..	..	..	2,166	..	..	..	..	2,166
Gold ..	780,958	1,273,351	1,334,788	46,922	10,286,349	195,079	109,168	14,026,615
Gypsum ..	10,671	14,826	..	109,942	12,409	..	..	147,848
Ironstone ..	43	..	3,365	2,582,171	..	..	..	2,585,579
Kaolin ..	10,458	5,020	160	..	..	..	..	15,638
Lead ..	(b)	..	628,025	19	..	163,102	..	(c) 791,146
Lead and silver-lead ore, concentrates, etc. ..	3,513,108	..	..	..	625	..	..	3,513,733
Limestone flux ..	35,113	..	12,268	9,814	..	85,624	..	142,819
Magnesite ..	41,744	458	..	191	..	..	..	42,393
Manganese ore ..	740	..	1,811	..	..	..	..	2,551
Molybdenite ..	1,759	7,306	2,900	..	..	..	..	11,965
Opal ..	4,226	..	80	4,570	..	..	..	8,876
Osmiridium ..	..	..	..	..	..	2,976	..	2,976
Phosphate ..	1,150	..	..	..	..	..	..	1,150
Pigments ..	848	..	..	..	..	..	..	848
Platinum ..	52	..	..	..	..	..	..	52
Salt ..	..	(d)	..	149,624	..	..	..	(c) 149,624
Shale (oil) ..	337	..	..	..	..	..	..	337
Silver ..	(b) 7,357	647	298,589	51	28,852	104,671	..	(c) 440,167
Tin and tin ore ..	286,768	28,650	141,547	..	7,421	244,037	3,205	711,628
Wolfram ..	25,740	..	30,779	..	..	63,348	78,277	198,144
Zinc and concentrates ..	230,989	..	329,464	..	..	356,452	..	916,905
Other ..	(e) 80,113	2,530	15,075	6,903	38,903	13,186	19,712	176,422
Total ..	10,731,391	1,884,015	3,966,119	2,932,473	10,844,469	1,889,804	214,724	32,462,995

(a) For items excluded see letterpress below. (b) See letterpress above preceding table. (c) Incomplete. (d) Not included with mineral production. (e) Includes dolomite £32,715, silica £19,634, fireclay £16,532, and zircon-rutile-ilmenite £4,005. (f) Mica.

It should be pointed out in connexion with the figures given in the foregoing 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." Particulars of the production of some of these items are given in paragraph 6, Quarries, below. 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 1938 consisted of—lime, £54,349; building stone, £124,088; Portland cement, £1,515,744; coke, £1,100,266; road material and gravel, £1,083,286; shell grit, £22,842; sulphur and sulphuric acid, £44,206; and brick and pottery clays, £302,319. Carbide and cement, £378,258, have been excluded from the Tasmanian figures.

4. Value of Production, 1934 to 1938.—The values of the minerals produced in each State during the past five years are given in the table hereunder:—

MINERAL PRODUCTION: VALUES.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
1934 ..	7,766,504	1,092,029	2,713,135	1,713,537	5,884,430	750,389	28,806	19,948,830
1935 ..	9,210,820	1,394,253	2,387,440	2,498,617	6,107,990	1,071,807	76,090	23,247,527
1936 ..	10,136,789	1,623,003	3,613,511	2,513,359	7,771,154	1,624,036	98,601	27,330,753
1937 ..	11,081,891	1,832,195	4,392,492	2,509,449	9,230,182	2,282,365	205,851	32,434,425
1938 ..	10,731,391	1,884,015	3,966,119	2,032,473	10,844,469	1,889,804	214,724	32,462,995

The value of mineral production in Australia during 1938 exceeded that of 1937 by £29,000. Increases were recorded in Victoria, South Australia, Western Australia and the Northern Territory, and decreases in the remaining States. In the latter, lower values for zinc, lead, copper and tin were mainly responsible for the reductions. The effects of these lower values on the total value of production would have been much more pronounced but for the larger output of gold and its enhanced value in Australian currency.

Of all the minerals gold and ironstone were the only ones to show any appreciable increase in value during 1938. The production of the former increased by 211,000 fine oz. and its value by £2,934,000, while ironstone increased by 370,000 tons for an added value of £436,000.

As already mentioned lower prices contributed to the reduced values shown for some metals. Zinc declined in value by £873,000 although the quantity produced rose by more than 43,000 tons. Similarly lead and silver-lead ores and concentrates decreased by £317,000 and £794,000 respectively, despite an increase of 4,000 tons in the output of lead and 30,000 tons in that of ores and concentrates. Copper and tin decreased both in quantity and value but more markedly in value: copper declined by 1,900 tons and in value by £270,000, while the output of tin was only 11 tons less than last year, but the value was lower by £152,000. There was a small reduction in the quantity and value of coal produced, but the average price was slightly higher than in 1937.

More detailed particulars of the production in the various States are given in later sections.

5. Total Production to end of 1938.—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1938. The items excluded from the preceding table are also omitted here, and consequently the total for

New South Wales is £66,000,000 less than that published by the State Department of Mines. The principal items excluded from the table below are coke, £19,809,000; cement, £25,484,000; lime, £2,014,000; and considerable values for marble, slate, granite, chert, gravels, etc., which the State Department now includes in the returns for quarries.

MINERAL PRODUCTION: VALUES TO END OF 1938.

Mineral.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Terr.	Australia.
	£	£	£	£	£	£	£	Million £
Gold ..	67,118,536	309,584,931	92,260,985	2,027,662	215,196,620	9,754,996	2,669,950	699
Silver and lead ..	141,474,520	268,250	10,386,731	384,345	2,385,684	10,125,626	66,652	165
Copper ..	15,920,956	216,686	27,843,509	33,230,566	1,812,318	24,232,730	239,992	103
Iron ..	7,754,107	15,641	509,813	21,248,714	36,722	91,229	..	30
Tin ..	16,422,868	1,084,744	12,213,702	..	1,654,389	18,799,261	664,965	51
Wolfram	329,438	11,835	1,133,232	301	1,441	463,722	414,532	2
Zinc ..	26,358,324	..	1,471,293	15,993	5,437	2,161,458	..	30
Coal ..	228,855,931	17,629,187	25,877,648	..	9,142,735	2,516,596	..	284
Other ..	9,090,110	989,919	2,969,636	6,295,827	873,245	2,607,921	152,808	23
Total ..	513,324,790	329,801,243	174,666,549	63,203,408	231,108,591	70,753,539	4,208,900	1,387

The "other" minerals in New South Wales include alunite, £213,000; antimony, £377,000; arsenic, £194,000; bismuth, £245,000; chrome, £136,000; diamonds, £148,000; magnesite, £384,000; molybdenite, £218,000; opal, £1,627,000; scheelite, £202,000; and oil shale, £2,695,000. In the Victorian returns antimony ore was responsible for £629,000. The value for coal in this State includes £3,710,000 for brown coal. Included in "other" in the Queensland production were opal, £188,000; gems, £645,000; bismuth, £143,000; cobalt, £158,000; molybdenite, £613,000; limestone flux, £828,000; and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £3,955,000; limestone flux, £331,000; gypsum, £1,252,000; phosphate, £135,000; and opal, £165,000. In Western Australia arsenic, £327,000; gypsum, £94,000; and asbestos, £88,000 were the principal items included with "other" minerals. In the Tasmanian returns osmiridium was responsible for £626,000, scheelite for £119,000, and limestone for £942,600.

6. Quarries.—As mentioned in previous issues of the Official Year Book, the data published in regard to the mineral industry contained no details of the output of quarries. In 1935 a Conference of Australian Statisticians resolved to include statistics of quarrying with those of mining, and it is now possible to present some details of the output of quarries in each State.

For the purpose of these statistics the Conference defined a quarry as an establishment in which four hands or more are employed, or in which power other than hand-power is used. The details given in the following table represent the output of quarries conforming to this definition, although in a few relatively unimportant cases details of other establishments have been included.

The authority responsible for the collection of these statistics is the Government Statistician in the States of New South Wales, Victoria, Queensland and Western Australia, and the Department of Mines in South Australia and Tasmania.

It should be noted that the inclusion of returns from certain small establishments tends to inflate the figures in the following tables, but there is possibly a compensating factor in that some quantities used by shires and Municipalities in the repair of roads have not been returned to the collecting authority.

OUTPUT OF QUARRIES: AUSTRALIA, 1938.

Description.	New South Wales.		Victoria. (a)		Queensland. (a)		South Australia.	
	Quantity.	Value.	Quantity.	Value.	Quantity. (b)	Value. (b)	Quantity.	Value.
	Tons.	£	Tons.	£	Tons.	£	Tons.	£
Building Stone	367,772	146,666	18,373	23,255	3,684	1,759	27,226	17,785
Macadam Ballast, etc. ..	6,371,232	1,088,353	1,297,618	394,255	701,836	195,859	1,533,134	295,625
Limestone (c)	849,546	178,191	305,147	76,066	23,852	15,700	7,580	1,023
Clays	1,734,127	228,349	(d)	(d)	..	..	197,047	24,631
Other	78,853	13,328	..	..	..	..	..	..
Total	9,401,530	1,654,887	1,621,138	493,576	729,372	213,318	1,764,987	339,064

Description.	Western Australia.(a)		Tasmania.		Australia.		
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
	Tons.	£	Tons.	£	Tons.	£	
Building Stone	33,293	12,825	173	885	450,521	203,175
Macadam Ballast, etc.	420,084	164,304	..	..	10,323,904	2,138,396
Limestone (c)	46,435	8,108	281,859	85,624	1,514,419	364,712
Clays	1,931,174	252,980
Other	6,126	3,146	84,979	16,474
Total	499,812	185,237	288,158	89,655	14,304,997	2,975,737

(a) Year ended June, 1939. (b) Estimated. (c) Limestone used for the manufacture of lime and cement and as a flux. It omits quantities used as building stone and as macadam, ballast, etc., which are already included under those headings. (d) Not collected.

In the following table corresponding details are given for each State for a series of years.

OUTPUT OF QUARRIES: AUSTRALIA.

State.	1934.		1935.		1936.		1937.		1938.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	'000 tons.	£	'000 tons.	£	'000 tons.	£	'000 tons.	£	'000 tons.	£
New South Wales	4,630	875,413	6,142	1,052,989	7,260	1,261,301	8,616	1,662,135	9,402	1,654,887
Victoria (a)	61,340	6374,454	61,609	6476,293	61,673	6514,984	61,573	6474,303	61,621	6493,576
Queensland (a)	(c)899	188,316	(c)902	168,030	(c)934	255,040	(c)776	242,093	(c)729	213,318
South Aust. (a)	735	122,645	1,005	170,273	1,154	196,957	1,244	226,696	1,765	339,064
Western Aust.(a)	171	60,006	164	68,201	272	94,975	367	137,672	500	185,237
Tasmania	174	44,877	254	68,357	262	71,243	309	86,986	288	89,655
Total	7,949	1,665,711	10,076	2,004,143	11,555	2,394,500	12,885	2,830,485	14,305	2,975,737

(a) Year ended June following. (b) Omits clays. (c) Estimated.

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

§ 2. Gold.

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

2. **Production at Various Periods.**—In the following table will be found the values of the gold raised in the several States and in Australia as a whole during each of the eight decennial periods from 1851 to 1930, and in single years from 1927 to 1938. 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. Terr.	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	a 100,652	76,240,384
1921-30..	940,946	2,721,309	1,976,715	47,564	20,462,937	193,833	(a) 9,894	26,353,218
1927 ..	76,595	163,699	161,321	1,776	1,734,571	20,646	(a) 468	2,159,076
1928 ..	54,503	144,068	56,395	2,258	1,671,093	15,306	(a) 431	1,944,054
1929 ..	31,842	111,609	40,250	4,289	1,602,142	23,772	(a) 553	1,814,457
1930 ..	53,066	102,456	33,224	5,560	1,773,500	18,976	(a) 57	1,986,849
1931 ..	118,623	262,488	79,652	17,328	3,054,743	12,150	(b) 2,535	3,865,518
1932 ..	203,622	351,586	173,144	22,018	4,413,809	43,137	(a) 4,196	5,211,512
1933 ..	226,068	448,228	710,168	49,619	4,915,950	51,579	(a) 4,449	6,406,061
1934 ..	307,662	597,040	982,636	58,582	5,534,491	48,139	(a) 8,124	7,536,674
1935 ..	439,140	768,401	904,755	64,109	5,677,328	73,143	(a) 44,458	7,971,334
1936 ..	525,792	1,018,702	1,048,748	66,593	7,326,309	152,291	b 112,786	10,251,189
1937 ..	595,855	1,266,507	1,104,760	60,372	8,688,921	176,130	100,462	11,993,007
1938 ..	780,958	1,273,351	1,334,788	46,922	10,286,349	195,079	109,168	14,026,615
Total—								
1851-1938	67,118,536	309,584,931	92,260,985	2,027,662	215,196,620	9,754,996	2,669,950	698,613,680

(a) Period ended June of year stated.

(b) Eighteen months ended December of year stated.

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

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

Increased activity in prospecting due to prevailing economic conditions resulted in some improvement in 1930, but the marked development since that year received its impetus from the heavy depreciation of Australian currency in terms of gold. Oversea and local capital were attracted to the industry, and the employment of advanced geological methods and technical improvements brought many difficult or extinct propositions into profit. The output of gold rose from 466,593 fine oz. in 1930 to 1,592,034 fine oz. in 1938, and further increases are forecast. Values per fine oz. in Australian currency assigned to the production of gold during recent years in the table above are £5 19s. 9d. in 1931, £7 5s. 11½d. in 1932, £7 14s. 3½d. in 1933, £8 10s. 0½d. in 1934, £8 15s. 1½d. in 1935, £8 13s. 2d. in 1936, £8 13s. 8d. in 1937 and £8 16s. 2½d. in 1938. Monthly fluctuations in the price of gold in London and in Australia are shown in Chapter XXVI. "Public Finance."

The amount of gold raised in Australia in any one year attained its maximum in 1903, in which year Western Australia also reached its highest point. For the other States the years in which the greatest yields were obtained were as follows:—New South Wales, 1852; Victoria, 1856; Queensland, 1900; South Australia, 1894; and Tasmania, 1899.

The following table shows the quantities of gold raised in the various States and in Australia during each of the five years ending 1938. A separate line is added showing the total production in thousands of fine ounces from 1851 to 1938:—

GOLD : QUANTITY PRODUCED.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Terr.	Australia.
	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.
1934 ..	36,123	70,190	115,471	6,870	651,338	5,622	(a) 989	886,609
1935 ..	50,102	87,609	102,990	7,333	649,049	8,343	(a) 5,066	910,492
1936 ..	60,739	117,596	121,174	7,681	840,208	17,600	b 12,998	1,183,996
1937 ..	68,607	145,799	127,281	6,962	1,000,647	20,276	11,563	1,381,135
1938 ..	88,698	144,243	151,432	5,292	1,107,791	22,200	12,378	1,592,034
Total (c)								
1851-1938	15,382	72,064	20,881	431	44,373	2,201	582	155,914

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

(b) Eighteen months ended December 1936.

(c) '000

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

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

GOLD : WORLD'S PRODUCTION.

Period.	World's Production of Gold.	Gold Produced in Australia.	Percentage of Australia on Total.
	Fine oz.	Fine oz.	%
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	33,434,009	18.28
1911-20	206,114,773	17,426,466	8.45
1921-30	186,091,278	5,841,902	3.14
1931	22,786,773	595,123	2.61
1932	24,204,275	713,882	2.95
1933	25,568,920	830,332	3.25
1934	27,032,084	887,490	3.28
1935	29,434,127	914,736	3.11
1936	33,167,494	1,178,581	3.55
1937	34,543,360	1,381,135	4.00
1938	37,110,594	1,592,034	4.20

For the year 1938 the world's production of gold in fine oz. was 37,100,000, as compared with a return of 34,500,000 fine oz. in 1937. It is estimated that the world's production in 1939 approximated 39,150,000 fine oz. of which Australia's share amounted to 1,645,697 fine oz. or 4.2 per cent.

The quantities of gold produced in the ten principal producing countries in each of the five years 1934 to 1938 are given in the table hereunder. Particulars of the quantities and values of gold produced in all countries for the ten years 1929-38 will be found in *Production Bulletin* No. 33, Part II., issued by this Bureau.

GOLD PRODUCTION IN PRINCIPAL COUNTRIES.

Country.	1934.	1935.	1936.	1937.	1938.
	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.
Union of South Africa	10,479,857	10,773,991	11,336,214	11,734,575	12,161,392
U.S.S.R. (Russia) ..	3,700,000	4,500,000	5,500,000	5,000,000	5,000,000
Canada ..	2,972,074	3,284,890	3,748,028	4,096,213	4,725,117
U.S.A. ..	2,742,161	3,163,166	3,759,645	4,117,078	4,245,368
Australia ..	887,490	914,736	1,178,581	1,381,135	1,592,034
Korea ..	420,000	540,000	650,000	850,000	1,050,000
Mexico ..	662,000	682,319	753,950	846,381	923,798
Philippine Islands ..	340,314	451,818	599,657	716,967	903,265
Rhodesia ..	693,265	727,928	801,513	808,447	815,191
Japan, including Formosa ..	531,371	674,030	820,666	832,000	852,000

The next table shows the average yearly production in order of importance of the yield in the principal gold-producing countries for the decennium 1929 to 1938 :—

GOLD : AVERAGE ANNUAL PRODUCTION IN PRINCIPAL COUNTRIES, 1929 TO 1938.

Country.	Quantity.	Country.	Quantity.
	Fine oz.		Fine oz.
Union of South Africa ..	11,106,473	Mexico	703,513
U.S.S.R. (Russia) ..	3,263,862	Rhodesia	672,934
Canada ..	3,154,429	Japan, including Formosa	582,299
U.S.A. ..	2,889,356	Korea	444,112
Australia ..	898,860	Philippine Islands ..	405,984

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

GOLD-MINING : PERSONS EMPLOYED.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Taa.	Nor. Terr.	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
1932 ..	8,154	6,089	3,893	142	7,983	250	89	26,660
1933 ..	6,913	6,126	4,161	231	9,900	229	95	27,655
1934 ..	7,080	6,943	3,867	804	12,523	275	115	31,607
1935 ..	6,652	6,960	3,931	243	14,708	216	403	33,113
1936 ..	5,204	6,959	3,983	283	15,696	230	372	32,727
1937 ..	3,885	6,180	3,436	192	16,174	179	388	30,434
1938 ..	3,764	6,315	3,378	158	15,374	141	267	29,397

(a) Estimated.

(b) Year of maximum production.

Owing to causes referred to earlier in this section, the number employed in gold-mining had dwindled to the comparatively small figure of 6,108 in 1929. Stimulated by the enhanced price of gold in recent years employment in the industry rose more than five-fold to 33,113 in 1935, but the numbers employed have declined since that year.

6. Tax on Gold.—The Commonwealth Government imposed a tax on gold delivered in Australia or in any territory under its jurisdiction to the Commonwealth Bank on and after the 15th September, 1939. The rate of tax was fixed at 50 per cent. of the price payable by the Bank in excess of £A9 per fine oz. Gold imported from places other than Australian Territories is not subject to the tax, nor is gold coin or wrought gold unless and until the Treasurer otherwise directs by notice in the *Commonwealth Gazette*.

A rebate of tax is allowed to bona fide prospectors in respect of the first 25 ounces delivered by them each year. In 1940 the Gold Mining Encouragement Act provided for the refund of the whole or part of the tax to producers, other than bona fide prospectors, working at a loss or at a profit not exceeding 30s. per fine oz. A sum of £150,000 was also appropriated for the purpose of making grants to the States to provide advances to companies needing capital to develop their properties.

It was anticipated that the tax on gold would yield about £1,400,000 per annum, while the assistance provided was estimated as follows:—

	£
Bona fide prospectors	90,000
Marginal producers and low-grade mines	100,000
Assistance to industry through the States	150,000

7. Bounty on Production.—A reference to the bounty provided by the Commonwealth on gold production in Australia will be found in Official Year Book No. 32. p. 579.

§ 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 in the Ballina division. The production in 1938 from these divisions amounted to 4 oz. and 3½ oz. respectively making a total of 7½ oz. valued at £52, as compared with 46 oz. valued at £455 in the preceding year. The total production recorded to the end of 1938 amounted to 20,193 oz., valued at £128,544.

(ii) *Victoria.* In Gippsland the metal has been found in association with copper and 127 oz. were produced in 1913, but there has been 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 sands at Bingara, Mudgee, Bathurst and other places. In some cases, as for example in the beach sands of Ballina, the osmiridium and other platinoid metals amount to as much as 40 per cent. of the platinum, or about 28 per cent. of the whole metallic content.

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

(iii) *Tasmania.* The yield of osmiridium was returned as 191 oz. in 1938 valued at £2,976 compared with the record production of 3,365 oz. in 1925 valued at £103,570. The decrease in later years was largely due to the decline in price from £31 in 1925 to £15 os. 4d. per oz. in 1938, but the depletion of the known alluvial deposits was also a factor.

§ 4. Silver, Lead and Zinc.*

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

2. **Production.**—(i) *General.* The values of the production of silver, silver-lead ore and lead from the various States during the five years ending 1938 are given hereunder :—

SILVER AND LEAD : VALUE OF PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Terr.	Australia.
	£	£	£	£	£	£	£	£
1934 ..	2,199,823	370	671,255	..	7,199	43,850	(a) 11	2,922,508
1935 ..	3,189,388	642	755,899	..	12,687	63,713	..	4,022,329
1936 ..	3,820,785	525	899,101	357	14,001	215,449	..	4,950,218
1937 ..	4,310,613	491	1,172,531	371	27,844	308,262	328	5,820,440
1938 ..	3,520,465	647	926,614	70	29,477	267,773	..	4,745,046

(a) Year ended 30th June.

(ii) *New South Wales.* The figures quoted above for New South Wales for the year 1938 include silver to the value of £7,357 and silver-lead ore and concentrates valued at £3,513,108. Since the Sulphide Corporation Ltd. ceased smelting operations in 1922 the silver (metal) is obtained chiefly in the refining of gold and copper ores, and there has been no production of lead (pig) in the State. It may be noted here that the bulk of the carbonate and siliceous ore from the Broken Hill field is sent for treatment to Port Pirie in South Australia, while the remainder of the ore is concentrated on the field and then dispatched to Port Pirie for refining. The output of silver-lead ores and concentrates for 1938 showed an increase in quantity over that of the previous year. Owing to the fall in the price of lead, however, the value of these ores and concentrates declined by almost £800,000.

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

SILVER AND LEAD : PRODUCTION IN NEW SOUTH WALES.

Year.	Metal Extracted within Australia.				Contents of Concentrates Exported.			
	Silver.	Lead.	Zinc.	Value.	Silver.	Lead.	Zinc.	Value.
	Fine oz.	Tons.	Tons.	£	Fine oz.	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	124,576	41,153	5,707,739	4,834,718	49,906	149,319	1,813,287
1933 ..	7,430,479	158,475	53,956	3,579,886	790,792	18,344	63,849	475,161
1935 ..	8,422,316	180,958	67,666	4,933,492	660,630	11,947	72,285	424,929
1936 ..	7,778,514	157,755	57,744	4,608,888	779,289	18,569	68,011	549,319
1937 ..	8,731,750	184,822	43,254	6,353,963	1,048,749	13,832	64,785	889,991
1938 ..	8,497,637	181,187	47,370	4,438,188	1,060,913	15,213	66,359	479,795

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

The figures given above are quoted on the authority of the Mines Department of New South Wales. Accurate details in regard to gold, copper, antimony, cadmium and cobalt contained in the silver-lead ores are not available. Cadmium was first extracted in 1922 at Risdon, in Tasmania, and in 1938 the amount won from ores of New South Wales origin was given as 147.17 tons, valued at £60,770. 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, p. 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 1938.

Mine.	Value of Output to end of 1938.	Dividends and Bonuses Paid to end of 1938.
	£	£
Broken Hill Proprietary Co. Ltd.	54,059,804	16,580,109
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)	29,037,544	3,770,625
Broken Hill South Ltd.	28,224,159	7,535,000
North Broken Hill Ltd.	25,049,305	7,950,190
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.	15,229,099	4,842,178
Barrier South Ltd.	151,517	50,000
Total	172,004,981	43,910,973

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 1938, 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 £179.3 millions and £47.0 millions respectively. The authorized capital of the various companies amounted to £18,918,000 in 1938, an increase of £7.5 million on that of 1936 due to the authorized capital of the Broken Hill Proprietary Co. being raised from £7.5 million to £15 million in 1937. In 1938 the dividends and bonuses paid amounted to £1,882,760 shared in by the Companies controlling the principal mines as follows:—Zinc Corporation, £431,142; North Broken Hill, £315,000; Broken Hill South, £400,000; Broken Hill Proprietary, £706,618, and Sulphide Corporation, £30,000. The dividend of the latter company is quoted in sterling.

(b) *Other Areas.* Silver is found in various other localities in New South Wales, but the production therefrom in 1938 was relatively unimportant. Development of the Captain's Flat silver-lead-zinc mine was continued during 1938 and, as expected, production commenced during 1939. This mine employs about 400 men. The rate of production is to be 500 tons per day, increasing to 1,000 tons per day as soon as additional equipment has been installed. In addition to the production of silver-lead-zinc ores, it is expected that 80,000 tons of iron pyrites will be railed to Port Kembla annually where the sulphur contents will be used for the large-scale manufacture of sulphuric acid and superphosphates.

(iii) *Victoria*. The silver produced in 1938 amounted to 5,898 oz., valued at £647, and was obtained in the refining of gold at the Melbourne Mint.

(iv) *Queensland*. The production of silver increased by 268,496 oz. to about 3.5 million oz., and lead increased by 2,722 tons to 41,196 tons, practically all of which was won from the mine and works at Mount Isa in the Cloncurry mineral field.

(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 was no production between 1932 and 1935 but subsequently there has been a small output of silver. In 1938 production amounted to 503 oz. valued at £51. In addition 1 ton of lead was mined for a value of £20.

(vi) *Western Australia*. The quantity of silver obtained as a by-product and exported in 1938 was 271,346 oz., valued at £28,852.

(vii) *Tasmania*. The silver produced in 1938 amounted to 1,219,550 oz., valued at £104,671, and the lead to 10,652 tons, valued at £163,162. This represents a considerable increase on that of the previous year as regards quantities. The drop in the price of lead, however, was responsible for the lower value. About 1,153,000 oz. of the total silver output were contained in silver-lead, while 67,000 oz. were contained in the blister copper produced by the Mount Lyell Co.

(viii) *Northern Territory*. A rich deposit of silver-lead and copper ore was located in 1930 at the Jervis Range about 200 miles east of Alice Springs. Development is hindered, however, by transport difficulties and lack of permanent water. Rich sulphides have been found at Barrow Creek. Production during the past ten years has been very intermittent and not of great consequence in those years when any output was recorded.

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

SILVER : PRODUCTION IN AUSTRALIA.

Particulars.	1914.	1924.	1934.	1937.	1938.
	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.
Metal recovered by—					
Smelters	4,020,904	7,529,845	8,583,133	9,279,983	9,102,178
Mints	226,019	101,368	91,416	230,526	254,961
Metallic contents in ores and concentrates exported ..	8,901,212	2,242,170	2,579,082	4,267,571	4,538,402
Total Production ..	13,148,135	9,873,383	11,253,631	13,778,080	13,895,541

Particulars for 1939 are not available for publication.

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.

1934.	1935.	1936.	1937.	1938.
Fine oz.				
193,000	223,000	249,000	276,000	267,000

The world's production of silver in millions of fine oz. during the years 1918, 1928 and 1938 amounted respectively to 203, 258 and 267, of which Australia contributed 10.4 million, 9.6 million and 13.9 million fine ounces, or 5.1 per cent., 3.7 per cent. and 5.2 per cent. respectively. The production for Australia includes an estimate of the silver contents of the ores, bullion and concentrates exported.

Arranged in order of importance the estimated yields in 1938 from the principal silver-producing countries were as follows:—

SILVER PRODUCTION IN PRINCIPAL COUNTRIES, 1938.

Country.	Production.	Country.	Production.
	Fine oz. (^{'000 omitted.})		Fine oz. (^{'000 omitted.})
Mexico	81,017	Bolivia	6,366
United States of America	61,706	Burma	5,920
Canada	22,219	Honduras	3,346
Peru	20,424	Belgian Congo	3,120
Australia	13,806	Yugoslavia	2,450
Japan	10,000	Newfoundland	1,414
U.S.S.R. (Russia)	7,000	Chile	1,646
Germany	6,773	Union of South Africa	1,135

5. **Production of Lead in Australia.**—For reasons already mentioned, difficulties arise when an attempt is made to show the production of lead by States. This is due to the fact that production is largely recorded in terms other than metal. As the chief sources of production are confined to the States of New South Wales, Queensland, and Tasmania, the aggregation of their outputs can be accepted as being representative of the production for Australia. This is shown in the following table:—

LEAD : PRODUCTION IN AUSTRALIA.

Year.	New South Wales. (a)	Queensland. (a)	Tasmania.	Total.
	Tons.	Tons.	Tons.	Tons.
1934	175,783	42,462	1,507	219,752
1935	192,905	32,952	1,488	227,345
1936	176,324	35,762	7,563	219,649
1937	198,654	38,474	9,117	246,245
1938	196,400	41,196	10,652	248,248

(a) Estimated lead contents of silver-lead ores.

The following table, compiled from details supplied by the Australian Mines and Metals Association, adds confirmation to the total figures given in the previous table.

LEAD : PRODUCTION IN AUSTRALIA.

Particulars.	1935.	1936.	1937.	1938.
	Tons.	Tons.	Tons.	Tons.
Metal recovered in Australia	181,211	159,504	186,757	182,214
Metallic contents in ores and concentrates exported	48,000	52,534	53,279	57,376
Total Production	229,211	212,038	240,036	239,590

Particulars for 1939 are not available for publication.

6. **Lead : War-time Contract.**—On the outbreak of war in September, 1939, the British Ministry of Supply contracted with the Broken Hill Associated Smelters Pty. Ltd. for the purchase of Australia's surplus lead. The contract, which was made with the approval of the Commonwealth Government, is for a period of twelve months, the buyer having the option of renewal by giving three months notice. The quantity involved amounts to 13,330 tons per month up to a total of 160,000 tons for the year and the price is quoted at £Stg15 1s. 3d. per ton or £A18 16s. 7d. on a basis of f.o.b. Port Pirie.

7. **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.	1935.			1936.			1937.			1938.			1939.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Silver (Standard) per oz.	0	2	4.95	0	1	8.06	0	1	8.07	0	1	7.52	0	1	8.57
Lead .. per ton	14	5	7	17	13	4	23	4	3	15	5	4	15	13	10
Spelter per ton	14	3	6	15	0	9	22	5	9	13	19	10	14	13	6

A marked recovery in the prices of lead and spelter occurred on the London Metal Market between November, 1936, and March, 1937, when the price of lead rose from £22 to £33 per ton and that of spelter from £16 to more than £33 per ton. Prices receded after that month and by June, 1939, were quoted at £15 and £14 per ton respectively. Silver at the latter date was about 1s. 7½d. per oz.

At the outbreak of war in September, 1939, the prices of lead and zinc were fixed in London by the Ministry of Supply at £Stg16 12s. 6d. and £Stg15 respectively. On the 18th December, 1939, increases to £Stg25 and £Stg25 15s. respectively, were permitted. In Australia prices were fixed on 19th December, 1939, at £A20 17s. 8d. per ton for lead and £A20 2s. 6d. per ton for zinc, and increases to £A25 per ton for each metal were made in February, 1940. No further changes were recorded in either country up to May, 1940.

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

SILVER, ETC., MINING : PERSONS EMPLOYED.

Year.	N.S.W. (a)	Q'land.	S. Aust.	W. Aust. (b)	Tasmania (a)	Nor. Terr.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1934 ..	3,237	523	..	4	192	1	3,957
1935 ..	3,536	544	..	..	162	..	4,242
1936 ..	4,163	601	3	32	271	..	5,070
1937 ..	5,225	578	2	29	369	..	6,203
1938 ..	5,612	530	..	4	421	3	6,570

(a) Silver, lead and zinc.

(b) Principally lead and silver-lead ore.

§ 5. Copper.

1. **Production.**—Copper is widely distributed throughout Australia, but the chief sources of production are now centred in Tasmania and Queensland. South Australia and New South Wales were once large producers of copper but the output has dwindled considerably during recent years. The quantity of copper raised in Australia is dependent largely upon prices, as prices improve so production expands and vice versa.

The values of the local production as reported and credited to the mineral industry for the years 1934 to 1938 are shown hereunder. Quantities for Australia as a whole as returned by the several State Mines Departments are appended on separate lines at the foot of the table :—

COPPER : PRODUCTION.

State.	1934.	1935.	1936.	1937.	1938.
	£	£	£	£	£
New South Wales	25,398	30,071	53,687	72,406	87,905
Queensland	95,993	101,489	161,688	308,968	203,967
South Australia	8,475	11,065	22,609	21,620	15,333
Western Australia .. ..	..	..	97	986	1,275
Tasmania	267,342	464,007	556,734	759,332	580,238
Northern Territory .. ..	..	..	(a) 1,972	55	4,362
Australia	397,118	606,632	796,787	1,163,367	893,080
Ingot, Matte, etc. .. tons	12,003	16,992	18,069	18,694	18,751
Ore and Concentrates tons	96	56	819	2,884	935

(a) Eighteen months ended 31st December, 1936.

2. Sources of Production.—(i) *New South Wales.* The production during 1938 amounted to 1,280 tons of electrolytic copper and 683 tons of concentrates, the latter being exported overseas. Practically all of the copper was obtained at Port Kembla from the treatment of copper matte forwarded by the Broken Hill Smelters and derived from Broken Hill silver-lead ores. The concentrates were obtained from the treatment of ore from the Cobar district. Other copper mines operated in the State during the year but the outputs were very small. Since 1919 the production in New South Wales has rarely exceeded 1,000 tons, whilst previously it had ranged from 2,500 tons in 1915 to 10,600 tons in 1911.

(ii) *Queensland.* The yield in this State amounted in 1938 to 4,459 tons valued at £203,967. Although an improvement on the yields of recent years the output for 1938 was very much less than that of 1920 when nearly 16,000 tons valued at £1,552,000 were raised. The falling-off was due primarily to the low prices realized for copper. The returns from the chief producing areas in 1938 were as follows: Cloncurry, 1,562 tons, £71,462; Herberton, 169 tons, £7,743; and Mount Morgan, 2,488 tons, £113,829.

(iii) *South Australia.* Deposits of copper are found over a large portion of South Australia and its total production easily exceeds that of any other State. Compared with the output of previous years the production of South Australia has dwindled during recent times to very small dimensions, and is now exceeded by that of Tasmania, Queensland and New South Wales. A short account of the discovery, etc., of some of the principal mining areas, such as Kapunda, Burra Burra, Wallaroo and Moonta, is given in earlier issues of the Official Year Book. The Moonta and Wallaroo copper field, which was opened in 1860, was worked continuously and up to the close of 1931, £20,500,000 of copper was produced. Between 1933 and 1938, the field was worked on a co-operative basis known as the Moonta Mining Scheme to which reference is made in previous issues of the Official Year Book. Owing to the exhaustion of the ore reserves the operations of the Scheme ceased in August, 1938. The production of copper in the State in 1938 amounted to 254 tons, valued at £15,323.

(iv) *Western Australia.* Twenty-nine tons of copper valued at £1,275 were exported from this State during 1938, compared with 35 tons valued at £986 exported in 1937.

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1938 was 12,729 tons, valued at £580,238, the whole of the production being by the Mount Lyell Mining and Railway Co. Ltd. This Company treated 58,822 tons of ore and concentrates and produced 12,791 tons of blister copper, containing copper 12,700 tons, silver 67,176 oz., and gold 7,919 oz., the whole being valued at £A803,065.

(vi) *Northern Territory.* Copper has been found at various places, but the development of these deposits is hindered by low prices and the difficulties of transport. For the eighteen months ended December, 1936, 204 tons of ore were raised. This was the first production recorded since 1932-33. In 1937, 7 tons valued at £55 were also produced, whilst in 1938 the production amounted to 252 tons valued at £4,362.

3. **World's Production of Copper.**—The world's production of copper during the five years 1934-1938 was estimated as follows. The figures have been taken from the statistical summary prepared by the Imperial Institute.

COPPER : WORLD'S PRODUCTION.

1934.	1935.	1936.	1937.	1938.
Tons. 1,300,000	Tons. 1,470,000	Tons. 1,700,000	Tons. 2,300,000	Tons. 2,020,000

The yields from the principal copper-producing countries in 1938 were as follows :—

COPPER : PRODUCTION IN PRINCIPAL COUNTRIES, 1938.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States of America ..	498,003	Yugoslavia	48,700
Chile	345,821	Mexico	41,190
Canada	255,022	Peru	37,154
Rhodesia	250,882	Cyprus	34,000
Belgian Congo	121,985	Germany	30,000
U.S.S.R. (Russia)	100,000	Spain	30,000
Japan	80,000	Australia	19,446

During the year 1938 the share of the United States of America in the world's copper production amounted to nearly one-fourth, while the Australian proportion was less than 1 per cent. The total production of copper in 1938 was somewhat lower than that of the previous year despite the increase in armaments.

4. **War-time Contract.**—Soon after the outbreak of war in September, 1939, the British Ministry of Supply expressed its willingness to purchase, under contract, any surplus electrolytic copper up to a total quantity of 7,000 tons for the first year. Owing to the expansion of the armament industry in Australia, however, it is probable that no surplus will be available for export.

5. **Prices.**—The average prices of copper in London and New York during each of the last five years are given in the following table. 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.
1934	30.28	8.43
1935	31.37	8.65
1936	38.44	9.47
1937	54.47	13.17
1938	40.71	10.00

Copper is subject to considerable variation in price. 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 £54, and during each of the next five years just over £30 per ton. It rose to £60 in June, 1937, but declined thereafter to £35 in June, 1938, only to rise again to more than £42 in June, 1939.

At the outbreak of war in September, 1939, the price of copper in London was fixed at £Stg51 per ton. This was subsequently increased to £Stg62 per ton on 13th December, 1939. On the following day, the price in Australia was fixed at £A63 17s. 6d. per ton, and on 16th February, 1940, was further increased to £A76 per ton. This latter increase was made, partly, to stimulate production in Australia. Owing to the expansion of defence measures, local production was insufficient for local needs and, to avoid the necessity of imports, the price was raised to include a sum of £4 per ton which was to be devoted to exploration and new development by the major copper-mining companies. No further changes were recorded in either country up to May, 1940.

6. **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. (a)	Nor. Terr.	Australia. (a)
	No.	No.	No.	No.	No.	No.	No.
1934	4	151	45	..	905	..	1,105
1935	7	170	54	..	1,113	..	1,344
1936	9	196	54	..	914	4	1,177
1937	27	306	75	..	952	8	1,368
1938	13	213	67	4	1,015	5	1,317

(a) Revised.

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

§ 6. Tin.

1. **Production.**—The values of the production of tin as reported to the Mines Departments in each of the States during the five years 1934 to 1938 are given in the next table. A separate line is appended showing the recorded tonnage for Australia during each of the specified years.

TIN : PRODUCTION.

State.	1934.	1935.	1936.	1937.	1938.
	£	£	£	£	£
New South Wales	328,130	287,890	268,454	336,628	286,768
Victoria	3,886	14,475	14,750	44,127	28,650
Queensland	179,404	187,234	157,889	202,614	141,547
Western Australia	6,765	8,829	6,882	12,421	7,421
Tasmania	219,246	258,919	206,656	260,673	244,037
Northern Territory	(a) 9,566	(a) 6,036	(b) 4,176	7,205	3,205
Total	746,997	763,383	658,807	863,668	711,628
Ingot, Matte etc. tons	3,169	3,395	3,187	3,377	3,446
Concentrates tons	154	207	225	366	286

(a) Year ended 30th June.

(b) Eighteen months ended December, 1936.

2. Sources of Production.—(i) *New South Wales*. The production in 1938 was stated at 1,162 tons of ingots valued at £282,024, and 28 tons of concentrates valued at £4,744 were exported overseas. A large proportion of the output in this State is obtained in normal years by dredging, principally in the New England district, the quantity of stream tin won in 1938 being 527 tons. The Tingha area was the principal contributor to the output in 1938, the yield from this district comprising 615 tons of concentrates. Amongst other areas, Emmaville produced 243 tons of concentrates and Ardlethan 205 tons of concentrates, while the lode mines at Torrington returned a yield of 25 tons of tin oxide.

(ii) *Victoria*. The production of tin in this State is obtained chiefly by dredging in the Beechworth district and by mining in the Toora district in Gippsland. The production in 1938 amounted to 169 tons of concentrates valued at £28,650 compared with 218 tons valued at £44,127 in 1937.

(iii) *Queensland*. The chief producing districts in Queensland during 1938 were Herberton, 601 tons, valued at £83,953; Cooktown, 71 tons, £10,898; Stanthorpe, 119 tons, £17,854; Chillagoe, 78 tons, £10,815 and Kangaroo Hills, 122 tons, £16,080. The total production, 1,005 tons, £141,547, was a decrease of 166 tons and £61,067 on that for 1937. These figures may be compared with those recorded in the early years of this century when the production ranged between 2,000 and 5,000 tons per annum.

(iv) *Western Australia*. The quantity of tin reported in this State in 1938 amounted to 68 tons, valued at £7,421, and was obtained in the Pilbara and Greenbushes fields.

(v) *Tasmania*. For 1938, the output amounted to 1,279 tons of tin, valued at £244,037, an increase of 189 tons in quantity but a decrease of £16,636 in value over the return for the previous year. The production of tin in this State has substantially increased since 1929 when the metal produced amounted to only 640 tons. The mines associated with the production of tin are well equipped and the prospects of greater activity in the future are very favourable.

(vi) *Northern Territory*. The production for the year ended December, 1938, amounted to 21 tons of concentrates valued at £3,205. This may be compared with 41 tons of concentrates valued at £7,205 produced during 1937.

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

TIN : WORLD'S PRODUCTION.

1934.	1935.	1936.	1937.	1938.
Tons.	Tons.	Tons.	Tons.	Tons.
117,000	136,000	179,000	206,000	157,000

The world's production of tin increased to a record high level in 1937 but fell to 157,000 tons in 1938 a decline of 24 per cent. The chief producing countries of the world are:—Malaya, Netherlands East Indies, Bolivia and Thailand. These countries produced about three-quarters of the total production in 1938. The agreement controlling the production and export of tin has been extended to 1941. The parties to this agreement are those countries already mentioned together with Nigeria, Congo and Indo-China. Production in Australia is not affected.

The yields from the principal producing countries in 1938 were as follows :—

TIN : PRODUCTION IN PRINCIPAL COUNTRIES, 1938.

Country.			Production.	Country.			Production.
			Tons.				Tons.
Malaya			43,247	Burma.. .. .			4,412
Netherlands East Indies			27,299	Australia			3,732
Bolivia			25,484	Japan			2,300
Thailand			14,704	United Kingdom			1,999
China			11,600	Indo-China			1,599
Belgian Congo			9,025	Portugal			1,036
Nigeria			7,305	Argentina			(a)

(a) Not yet available.

Australia's share of the world's tin production, estimated at 157,000 tons in 1938, would appear to be a little more than 2 per cent.

4. Prices.—The average prices of the metal in the London market for the years 1934 to 1939 were as follows :—

TIN PRICES : LONDON.

Year.			Average Price Per Ton.	Year.			Average Price Per Ton.
			£ s. d.				£ s. d.
1934			230 7 5	1937			242 6 7
1935			225 14 5	1938			189 12 1
1936			204 12 8	1939			226 5 8

The average price of tin rose to £242 per ton in 1937 compared with £118 in 1931, the peak depression year. In 1938 the price receded to £189 per ton.

Subsequent to the outbreak of war in September, 1939, the price of tin in London was controlled and fixed at £Stg230 per ton. In December, 1939, the price was unpegged and it immediately rose to £Stg271. In Australia the domestic price was raised to £A306 per ton in February, 1940.

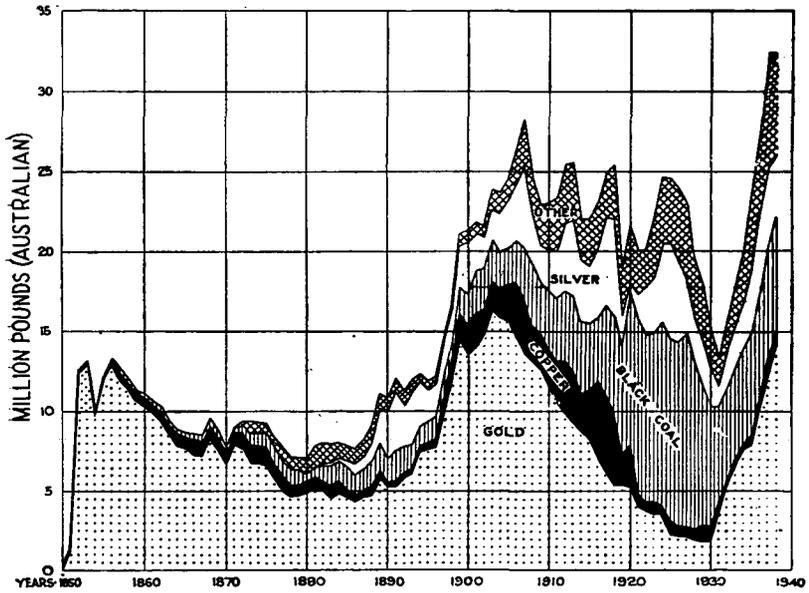
5. Employment in Tin-mining.—The number of persons employed in tin-mining during the last five years is shown below :—

TIN-MINING : PERSONS EMPLOYED.

Year.	N.S.W.	Victoria. (a)	Q'land.	W. Aust.	Tas.	Nor. Terr.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1934	1,903	10	1,214	73	1,207	120	4,527
1935	1,807	5	1,122	58	1,415	30	4,437
1936	1,762	6	1,270	48	1,253	37	4,376
1937	1,781	8	1,389	60	1,330	27	4,595
1938	1,440	5	1,263	73	1,123	15	3,919

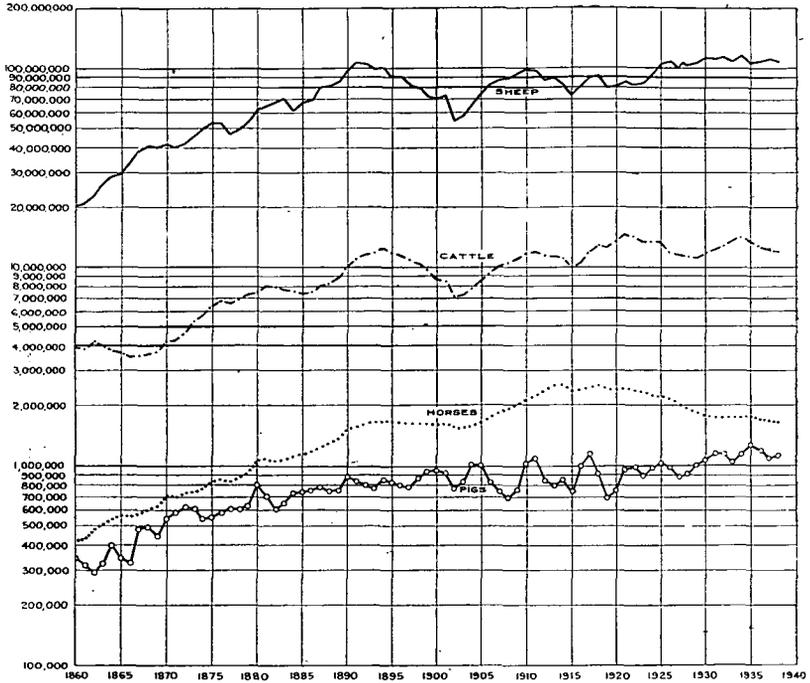
(a) The tin produced in Victoria was raised by a dredging company operating primarily for gold.

VALUE OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1850 TO 1938.



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

LIVE STOCK—AUSTRALIA, 1860 to 1938.



(See page 326.)

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

§ 7. Zinc.

1. Production : States.—(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 zinblendes 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 1938 the zinc concentrates produced amounted to 265,296 tons, valued at £230,989. Portion of the zinc concentrates produced is treated at Risdon in Tasmania. The production from these concentrates in 1938 as recorded by the Electrolytic Zinc Company of Australia Ltd. at Risdon amounted to 47,370 tons of zinc, 147.17 tons of cadmium and 18.97 tons of cobalt oxide. This is referred to in the Tasmanian production below. The balance, which in 1938 amounted to 124,071 tons, valued at £240,677, was exported overseas.

The reopening of the mine at Captain's Flat by the Lake George Mines Ltd. was an important development in 1937. Production commenced in 1939. Approximately 400 men are employed at the mine.

(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 1934 to 1938 will be found in § 17 hereinafter.

(ii) *Queensland.* The production of zinc in the Cloncurry district of Queensland during 1938 was 23,735 tons, valued at £329,464, compared with 4,411 tons, valued at £68,863, obtained in 1935. The metal was produced by the Mount Isa Mines Ltd. and is exported overseas as concentrates.

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

(iv) *Tasmania.* The production of zinc from Tasmanian ores was suspended from 1931 to 1935. Developmental work on the Mount Read-Rosebery district was continued during that period and production commenced in 1936. In 1937—the first full year's operations since the inception of milling at Rosebery—23,481 tons, valued at £525,824, were obtained. In 1938, 25,366 tons of zinc, valued at £356,452, were obtained from Tasmanian ores, as well as 49 tons of cadmium, valued at £18,636, and 12 cwt. of cobalt oxide, valued at £243.

In addition to the above, the Electrolytic Zinc Company at Risdon operated on raw materials obtained from Broken Hill in New South Wales. Production from this source during 1938 amounted to 47,370 tons of slab zinc, valued at £915,617, 147.18 tons of cadmium, valued at £60,760, and 18.97 tons of sheet cobalt oxide, valued at £7,841.

2. Production : Australia.—The details furnished above do not adequately convey the potentialities of Australia as a producer of zinc. This is due to the omission of the metallic contents of ores and concentrates exported overseas, which, in recent years, have been in excess of the amount of metal actually recovered in Australia. In the following table the estimated metallic contents of these exports have been combined with the quantities of metal extracted in Australia to show the total production of zinc from ores mined in Australia. The figures do not include the contents of other zinc-bearing concentrates, e.g., lead concentrates, unless payment has been made for the zinc actually contained in them.

PRODUCTION OF ZINC : AUSTRALIA, 1938.

State of Extraction or Export.	Estimated Metallic Contents and Metal extracted from Ores and Concentrates the produce of—			
	New South Wales.	Queensland.	Tasmania.	Total.
	Tons.	Tons.	Tons.	Tons.
New South Wales	(a) 66,359	.. .. .	.. .. .	(a) 66,359
Queensland .. .. .	.. .. .	(b) 23,735	.. .. .	(b) 23,735
Tasmania	47,370	.. .. .	25,366	72,736
Total	113,729	23,735	25,366	162,830

(a) Metallic contents of 124,071 tons of concentrated exported overseas. (b) Metallic contents of 44,799 tons of zinc concentrates produced.

3. **World's Production.**—The world's production of zinc ore in terms of metal during the five years 1934–38 was as follows :—

ZINC : WORLD'S PRODUCTION.

1934.	1935.	1936.	1937.	1938.
Tons. 1,162,000	Tons. 1,540,000	Tons. 1,700,000	Tons. 1,860,000	Tons. 1,840,000

The yields from the principal producing countries in 1938 were as given hereunder, the figures referring to slab zinc produced in the various countries, irrespective of the source of the ore.

ZINC : PRODUCTION IN PRINCIPAL COUNTRIES, 1938.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States of America ..	398,500	United Kingdom	55,000
Belgium	207,000	Japan	50,000
Germany	191,300	Norway	45,000
Canada	153,500	Mexico	33,100
Poland	106,400	Italy	36,900
Australia	72,468	Netherlands	24,900
U.S.S.R. (Russia)	70,000	Rhodesia	10,200
France	60,000	Czechoslovakia	8,700

The production of Australia quoted above represents the actual quantity of metal extracted in Australia and omits, therefore, the zinc contents of ores and concentrates exported. If this quantity was included, the total production would amount to 162,562 tons, or about 9 per cent. of the world's output.

4. **War-time Contract.**—At the outbreak of war in September, 1939, the British Ministry of Supply contracted with the Electrolytic Zinc Company for the purchase of Australia's surplus zinc. The contract, which was made with the approval of the Commonwealth Government, is for a period of twelve months; the buyers have the option of renewal by giving three months' notice. The quantity involved amounts to 3,000 tons per month up to a total of 36,000 tons for the year and the price quoted being £Stg18 per ton, or £A22 10s. on a basis of f.o.b. Risdon.

5. **Prices and Employment**.—Information regarding prices of zinc and employment in zinc-mining will be found in § 4, pars. 7 and 8, respectively.

§ 8. Iron.

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

2. **Production**.—(i) *New South Wales*. The production from ores mined in New South Wales amounted to 4,580 tons in 1935, valued at £18,320. This is the only occasion since 1929 that ore of New South Wales origin has been used in the production of pig-iron in that State. For many years the chief source of supply has been South Australia.

Small quantities of iron oxide produced in New South Wales are used by the various gasworks for purifying gas, and also in the manufacture of paper, and for pigments. These supplies are drawn chiefly from the deposits in the Port Macquarie Division. During 1938 the iron oxide raised amounted to 108 tons, valued at £43. Ironstone flux amounting to 2,432 tons valued at £950 was raised in the Goulburn Division during 1933. This is the only production recorded since 1922.

(ii) *Queensland*.—Extensive deposits of iron ore are known to exist in Queensland. Their location and size, however, preclude their exploitation in comparison with the more favorable deposits of South Australia. In 1938, 5,326 tons of ore were obtained from Mount Lucy and used as a flux at the Chillagoe State Smelters.

(iii) *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 1938, when 2,245,366 tons of ore valued at £2,582,171 was raised. This may be contrasted with an output of 289,000 tons obtained during the industrial depression of 1931. The marked recovery in the iron and steel industry of Australia and the prospects of further expansion indicate an output in the neighbourhood 3,000,000 tons of iron ore in 1940.

(iv) *Western Australia*. The development of the deposits at Yampi Sound was discontinued in 1938 as a result of the embargo on exports. Exploratory operations are to continue until the survey of the quantity and grade of ore is completed. The expenditure thus incurred is to be the responsibility of the Commonwealth Government.

(v) *Tasmania*. There was no production of ironstone in Tasmania during 1938. The production of iron pyrites which amounted to 50,277 tons, valued at £62,845 in 1938, is not included in the mineral returns, but is credited to the manufacturing industry, as it is a by-product from the flotation of copper ore at Mount Lyell. This product is exported to the mainland, where the sulphur contents have displaced imported sulphur in the manufacture of chemical fertilizers. The recovery has grown considerably since 1932, when the output amounted to 274 tons.

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

3. **Iron and Steel Bounties**.—During the year 1938–39 the bounties paid under the Iron and Steel Products Bounty Act on articles manufactured from locally produced materials were as follows: Wire-netting, £5,736; traction engines, £17,313. Corresponding amounts paid during 1939–40 were £4,534 and £12,452 respectively.

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

PIG-IRON AND STEEL : WORLD'S PRODUCTION.

Country.	Pig-iron.			Steel Ingots and Castings.		
	1936.	1937.	1938.	1936.	1937.	1938.
	Thousands of Tons.			Thousands of Tons.		
U.S.A.	31,029	37,127	19,161	48,478	51,792	28,739
Germany	15,303	15,957	18,226	19,158	19,816	22,875
U.S.S.R. (Russia) ..	14,400	14,520	14,479	16,300	17,824	17,802
Great Britain	7,686	8,497	6,763	11,698	12,963	10,394
France	6,237	7,917	5,956	6,562	7,761	6,080
Japan	2,869	3,561	3,040	5,368	6,423	5,930
Belgium	3,207	3,843	2,426	3,105	3,777	2,249
Luxemburg	1,987	2,513	1,527	1,981	2,510	1,413
Czechoslovakia ..	1,140	1,675	1,215	1,559	2,315	1,733
Italy	816	790	850	2,328	2,087	2,285
Poland	582	724	952	1,143	1,450	1,522
Canada	679	898	758	1,115	1,401	1,156
Sweden	585	646	647	1,022	1,104	964
India	1,541	1,453	1,628	880	971	950
Australia	(b) 662	905	1,059	(b) 716	1,146	1,206
Hungary	306	362	345	460	706	650
Austria	248	389	(a)	418	650	(a)
Union of South Africa	199	272	271	298	332	341
Total—All Countries	89,802	102,848	80,452	124,794	135,317	107,157

(a) Included with Germany.

(b) Incomplete.

The figures for the world's production of iron and steel reached an exceptionally low level in 1932, namely, pig-iron, 39,275,000 tons; steel, 50,029,000 tons. From that year onwards all steel-producing nations recorded continuous increases in production, but in 1938 a marked decline was recorded. The principal producers in Australia are the Broken Hill Pty. Co. Ltd. and the Australian Iron and Steel Ltd., the former situated at Newcastle and the latter at Port Kembla in New South Wales. Additional plant has been authorized at both of these works in order to meet the increasing demand for steel in Australia whilst an extension of the industry to South Australia is in hand. Work connected with the erection of a blast furnace at Whyalla is proceeding.

(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.
1930 ..	308,369	314,917	256,696	1935 ..	698,493	696,861	585,838
1931 ..	232,783	228,363	188,708	1936 ..	783,233	820,395	671,244
1932 ..	190,132	221,488	178,740	1937 ..	913,406	1,073,479	837,445
1933 ..	336,246	392,666	295,523	1938 ..	929,676	1,159,075	906,426
1934 ..	487,259	518,326	431,765	1939 ..	1,104,605	1,170,103	987,847

§ 9. Other Metallic Minerals.

1. **Wolfram and Scheelite.**—(i) *General.* Tungsten ores occur in several of the States, in the Northern Territory and on King Island in Bass Strait, the last-named being included with Tasmania. It is a minor metal of growing importance in both peace and war. On account of the low prices during recent years, mining activities were restricted and production intermittent. In 1937, however, prices soared to the record level of £16 6s. per cwt., compared with only £3 2s. 9d. per cwt. in 1932. As a result, production of wolfram and scheelite responded accordingly. Although prices receded slightly in 1938 production, both in quantity and value, increased considerably. The production during the past five years is shown in the following table :—

WOLFRAM AND SCHEELITE : PRODUCTION, AUSTRALIA.

Particulars.		1934.	1935.	1936.	1937.	1938.
WOLFRAM.						
New South Wales	cwt.	950	1,095	105	915	1,877
	£	6,506	5,694	560	13,051	25,740
Queensland	.. cwt.	740	480	404	1,963	3,015
	£	5,049	2,888	1,889	26,139	30,779
Tasmania	.. cwt.	3,884	4,640	4,143	5,820	5,982
	£	27,375	29,345	28,323	71,643	63,348
Northern Territory	cwt. (a)	800	(a) 1,846	(b) 3,155	5,831	8,694
	£ (a)	3,114	(a) 10,380	(b) 15,451	84,832	78,277
Total	.. cwt.	6,374	8,061	7,807	14,529	19,568
	£	42,044	48,307	46,223	195,665	198,144

SCHEELITE.

New South Wales	cwt.	130	50	245	202	184
	£	818	381	1,631	3,401	2,472
Queensland	.. cwt.	..	22	..	38	13
	£	..	120	..	533	93
Tasmania	.. cwt.	..	..	..	..	611
	£	..	..	..	..	6,193
Total	.. cwt.	130	72	245	240	808
	£	818	501	1,631	3,934	8,758

(a) Year ended June.

(b) Eighteen months ended December, 1936.

(ii) *War-time Contract.* Arrangements have been made for the sale of the Australian output of wolfram and scheelite to the Government of the United Kingdom. Subject to certain conditions, yet to be finalized, the production of tungsten will be sold at a price of £Stg.2 10s. per unit f.o.b.

2. **Cadmium.**—Cadmium is extracted as a by-product at Risdon in Tasmania from ores mined at Broken Hill in New South Wales, and on the west coast of Tasmania. The particulars given in the following table refer to the production of metal and do not include the cadmium contents of zinc ores or concentrates exported overseas.

3. **Cobalt.** The recovery of this metal as an oxide is obtained in the same way as cadmium. It is recovered from the treatment of silver, lead and zinc ores of Broken Hill and Tasmanian origin. The production together with that of cadmium is given in the following table.

PRODUCTION OF CADMIUM AND COBALT : AUSTRALIA.

Year.	Cadmium.				Cobalt.			
	Extracted in Tasmania from Ores mined in				Extracted in Tasmania from Ores mined in			
	New South Wales.	Tasmania.	Total.		New South Wales.	Tasmania.	Total.	
	Cwt.	Cwt.	Cwt.	£	Cwt.	Cwt.	Cwt.	£
1934	3,450	..	3,450	24,163	..	..	..	..
1935	4,372	..	4,372	46,980	..	..	..	..
1936	4,284	673	4,957	64,977	..	..	..	..
1937	3,245	900	4,145	77,203	..	..	..	..
1938	2,943	980	3,923	79,406	377	12	389	8,084

The figures given above do not include the metallic contents of cadmium and cobalt contained in the ores and concentrates exported overseas.

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

§ 10. Coal.

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

COAL : PRODUCTION.

Year.	N.S.W.	Victoria. (a)	Q'land.	S. Aust.	W. Aust.	Tasmania.	Australia.
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QUANTITY.

	Tons	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1913 ..	10,414,165	593,912	1,037,944	..	313,818	55,043	12,414,882
1921 ..	10,793,387	514,859	954,763	..	468,817	66,476	12,798,302
1931 ..	6,432,382	571,342	841,308	..	432,400	123,828	8,401,260
1935 ..	8,698,579	476,495	1,051,978	..	537,188	123,714	10,887,954
1936 ..	9,199,466	426,725	1,046,879	..	565,075	132,204	11,370,409
1937 ..	10,051,519	257,945	1,120,179	..	553,510	91,121	12,074,274
1938 ..	9,570,930	307,258	1,113,426	..	604,792	83,753	11,680,159

VALUE.(b)

	£	£	£	£	£	£	£
1913 ..	3,770,375	274,371	493,767	..	153,614	25,367	4,627,494
1921 ..	9,078,388	603,323	831,483	..	407,117	63,446	10,983,757
1931 ..	4,607,343	362,284	699,926	..	336,178	98,004	6,103,735
1935 ..	4,887,341	282,253	843,034	..	318,013	86,204	6,416,845
1936 ..	5,126,850	253,835	858,732	..	331,565	92,269	6,663,251
1937 ..	5,823,469	171,369	934,107	..	340,444	66,883	7,336,272
1938 ..	5,603,842	188,101	958,884	..	375,083	61,991	7,187,910

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

(b) At the pit's mouth.

The figures for Victoria already quoted are exclusive of brown coal, the quantities and values of which were as follows :—

BROWN COAL : PRODUCTION IN VICTORIA.

Year.		Quantity	Value. (a)	Year.		Quantity.	Value. (a)
		Tons.	£			Tons.	£
1913	.. ..	2,984	569	1935	.. ..	2,221,515	317,444
1921	.. ..	79,224	31,074	1936	.. ..	3,044,897	323,914
1926	.. ..	957,935	188,899	1937	.. ..	3,393,919	325,950
1931	.. ..	2,194,453	251,511	1938	.. ..	3,675,450	351,721

(a) Cost of Production.

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

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

The table hereunder gives the yields in each of the three districts during the five years 1934 to 1938 :—

COAL : PRODUCTION IN DISTRICTS OF NEW SOUTH WALES.

District.	1934.	1935.	1936.	1937.	1938.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	5,227,647	5,679,802	6,197,554	6,674,362	6,294,213
Southern	1,344,669	1,558,282	1,626,143	1,880,440	1,831,408
Western	1,300,864	1,460,495	1,375,769	1,496,717	1,445,309
Total	7,873,180	8,698,579	9,199,466	10,051,519	9,570,930
Total Value (a) £ ..	4,541,923	4,887,341	5,126,850	5,823,469	5,603,842
Average value per ton (a) ..	11s. 6d.	11s. 3d.	11s. 2d.	11s. 7d.	11s. 8½d.

(a) At the pit's mouth.

For a number of years before the industrial depression the production of coal in New South Wales exceeded 10 million tons, reaching its maximum in 1924 when 11,618,000 tons were produced. The output fell to 6,400,000 tons in 1931, but it has steadily increased each year to 9,570,930 tons in 1938. Of the total quantity of coal won in New South Wales since the commencement of operations to the end of the year, 1938, namely, 423 million tons, about 287 million tons or 68 per cent. was obtained in the Northern District, 87,000,000 tons or 21 per cent. came from the Southern District, and 49 million tons or 11 per cent. was contributed by the mines in the Western District.

The quantity of coal cut by machinery in New South Wales amounted to 2,722,049 tons in 1938 or 28.4 per cent. of the total output for the State, compared with 23.4 per cent. so cut in 1928.

(ii) *Victoria.* (a) *Black Coal.* The deposits of black coal in Victoria occur in three main areas in the southern portion of the State, namely, the Wannon, the Otway and South Gippsland, which total approximately 3,500 square miles. The workable seams are restricted to the South Gippsland area, where the thickness ranges from 2 feet 3 inches to 6 feet. The total quantity of black coal mined in Victoria to the end of 1938 amounted to 17,952,000 tons valued at £13,819,507.

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

BLACK COAL : PRODUCTION IN VICTORIA.

Year.	State Coal-mine.	Other Coal-mines.	Total Production.	Total Value. (a)	Average Value per ton. (a)	
					Tons.	£	s.	d.
1934	268,861	88,097	356,958	215,413	12	1
1935	393,532	82,963	476,495	282,253	11	10
1936	355,605	71,120	426,725	253,835	11	11
1937	187,934	70,011	257,945	171,369	13	3
1938	253,065	54,193	307,258	188,101	12	3

(a) At the pit's mouth.

(b) *Brown Coal.*—(i) *General.* Victoria is richly endowed, both in quantity and quality, in its brown coal deposits. Some account of these deposits and of the operations of the State Electricity Commission in connexion therewith will be found in preceding Official Year Books (see No. 22, p. 785). The brown coal produced in Victoria in 1938 amounted to 3,675,450 tons, all but 1,000 tons being procured at the State open cut at Yallourn. During the year 1938-39, 3,643,490 tons of brown coal were produced by the State Electricity Commission, of which 2,096,169 tons went to the power station and 1,547,321 tons to the briquette factory.

(ii) *Production of Briquettes.* The briquetting plant started operations in November, 1924, and the output for fourteen months ending December, 1925, was 77,945 tons. In 1926 the output was 95,477 tons which had increased to 180,905 tons in 1930 and to 399,924 in 1938-39. Two and a half tons of brown coal are required to make one ton of briquettes.

(iii) *Queensland.* The distribution of production during the year 1938 was as follows :—

COAL : PRODUCTION IN QUEENSLAND, 1938.

District.			Production.	District.			Production.
			Tons.				Tons.
Ipswich .. ..	..	..	547,901	Clermont .. ..	..	..	88,407
Bowen .. ..	..	..	224,778	Chillagoe (Mount Mulligan)	..	..	19,192
Darling Downs .. ..	..	..	76,571	Mount Morgan .. ..	..	..	13,698
Maryborough .. ..	..	..	77,162	Other .. ..	..	..	1,543
Rockhampton .. ..	..	..	64,174				
				Total			1,113,426

The production in 1938 was somewhat lower than that of the previous year and was about 19 per cent. below the peak production of 1,369,000 tons in 1929. The distribution of the output in 1938 was as follows : Railway Department, 423,569 tons ; other industries within the State 620,960 tons : exported, 68,897 tons. There were 58 collieries operating in the Ipswich district, 7 in the Darling Downs, 6 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 ; a total of 85 collieries for the State. 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, p. 786).

(v) *Western Australia.* The production from the five collieries operating on the Collie field amounted in 1938 to 604,792 tons, an increase of 51,283 tons on the return for 1937. The value of the production increased by £34,639 to £375,083. The number of men employed was 765 and the output per man was 791 tons, which was 25 tons greater than in 1937. The total production of coal from the Collie coalfield to the end of 1938 amounted to 13,877,292 tons.

(vi) *Tasmania.* The production in 1938 amounted to 83,753 tons, being 7,368 tons less than the total for 1937. Industrial troubles, resulting in the cessation of operations for considerable periods, were responsible for this reduction in output. About 43,400 tons of the total output in 1938 were contributed by the Cornwall Coal Company and 13,600 tons by the Jubilee Company. The two mines combined raised 57,000 tons, or about 68 per cent. of the total output of the State. The Cornwall Coal Company absorbed the Mount Nicholas Colliery in 1937 and operations at the latter mine ceased.

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

ACTUAL AND PROBABLE COAL RESERVES OF AUSTRALIA.

(Millions of Tons.)

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

3. *Production in Various Countries.*—The total known coal production of the world in 1938 amounted to about 1,420 million tons, towards which Australia contributed about 15.4 million tons, or 1 per cent. The following tables show the production of the chief British and foreign countries during each of the four years ended 1938 :—

COAL : PRODUCTION IN BRITISH EMPIRE.

Year.	Great Britain.	British India.	Canada.	Australia.	New Zealand.	Union of S. Africa.
BLACK COAL.						
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1935 ..	222,249,000	23,017,000	9,193,000	10,888,000	825,000	13,360,000
1936 ..	228,448,000	22,611,000	10,146,000	11,370,000	859,000	14,607,000
1937 ..	240,409,000	25,036,000	10,840,000	12,074,000	970,000	15,246,000
1938 ..	227,015,000	28,343,000	9,623,000	11,680,000	978,000	16,027,000

BROWN COAL, LIGNITE.

1935 ..	..	..	3,186,000	2,222,000	1,290,000	..
1936 ..	..	..	3,452,000	3,045,000	1,231,000	..
1937 ..	..	..	3,299	3,394,000	1,308,000	..
1938 ..	..	..	3,098,000	3,675,000	1,244,000	..

COAL : PRODUCTION IN FOREIGN COUNTRIES.

Year.	Germany.	Austria.	Hungary.	Belgium.	France. (a)	Czecho- slovakia.	Yugoslavia.
BLACK COAL.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1935 ..	149,744,000	246,500	810,000	26,087,000	46,363,000	10,791,000	394,000
1936 ..	155,783,000	240,500	814,000	27,427,000	44,512,000	12,040,000	434,000
1937 ..	181,599,000	226,600	903,000	29,213,000	43,618,000	16,513,000	432,000
1938 ..	183,238,000	222,000	(b)	29,106,000	45,763,000	13,300,000	(b)
Year.	Spain.	Poland.	Nether- lands.	U.S.S.R.	Japan.	China. (c)	U.S.A.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1935 ..	6,905,000	28,091,945	11,690,000	93,736,000	34,354,000	12,000,000	379,046,000
1936 ..	(d)	29,278,000	12,600,000	106,677,000	37,466,000	12,000,000	440,774,000
1937 ..	(d)	35,646,000	14,095,000	120,643,000	(d)	(d)	444,096,000
1938 ..	(d)	37,502,000	13,275,000	130,300,000	(d)	(d)	348,865,000
BROWN COAL, LIGNITE.							
Year.	Germany.	Austria.	Hungary.	Belgium.	France.	Czecho- slovakia.	Yugoslavia.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1935 ..	145,028,000	2,924,000	6,612,000	..	885,000	14,977,000	3,971,000
1936 ..	158,848,000	2,851,000	6,993,000	..	905,000	15,697,000	3,971,000
1937 ..	182,106,000	3,191,000	7,928,000	..	1,000,000	17,613,000	4,523,000
1938 ..	191,399,000	3,477,000	9,212,000	..	1,040,000	12,900,000	5,651,000
Year.	Spain.	Poland.	Nether- lands.	U.S.S.R.	Japan.	China.	U.S.A.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1935 ..	299,000	18,000	85,000	13,602,000	(d)	..	(e)
1936 ..	(d)	13,000	87,000	17,333,000	(d)	..	(e)
1937 ..	(d)	19,000	141,000	(e)	(d)	..	(e)
1938 ..	(d)	9,000	168,000	(e)	(d)	..	(e)

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

World production dropped from 1,510 million tons in 1937 to 1,420 million tons in 1938. The United States of America with a reduced output of nearly 100 million tons was chiefly responsible for the decline. The production of the British Empire amounted to 304 million tons in 1938, a decrease of 11 million tons or 3.5 per cent. on that of 1937. The production of foreign countries also decreased by 80 million tons to 1,120 million tons, or by 6.6 per cent. in the same period.

4. Exports.—(i) General. The quantity of coal of Australian production (exclusive of bunker coal) exported to other countries in 1938-39 was 382,085 tons, valued at £347,054. New South Wales exported 381,778 tons. Queensland 305 tons, and Victoria

2 tons. The quantities and values 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 ..	2,098,505	1,121,505	1935-36 ..	307,540	276,553
1921-22 ..	1,028,767	1,099,899	1936-37 ..	340,388	300,457
1931-32 ..	344,015	341,800	1937-38 ..	392,873	354,754
1934-35 ..	305,139	273,305	1938-39 ..	382,085	347,054

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 ..	1,647,870	1,018,375	1935-36 ..	614,333	576,549
1921-22 ..	1,498,035	2,178,101	1936-37 ..	605,425	564,071
1931-32 ..	506,140	534,897	1937-38 ..	614,762	575,319
1934-35 ..	575,418	544,875	1938-39 ..	549,453	561,063

(ii) *New South Wales.* The total export of coal from New South Wales in 1938 amounted to 3,024,265 tons, valued at £2,622,292 of which 2,695,217 tons, valued at £2,348,181 were shipped from Newcastle. Interstate exports amounted to 2,113,393 tons, valued at £1,773,530 and were divided as follows:—Cargo, 1,763,628 tons, £1,505,388; bunker, 349,765 tons, £268,142. Oversea exports totalled 910,872 tons, valued at £848,762, representing 531,272 tons of bunker coal, valued at £506,641 and 379,600 tons of cargo coal, valued at £342,121.

The distribution of the total output from New South Wales collieries during the last five years was as follows, the quantities shown for exports including bunker coal.

COAL : DISTRIBUTION OF OUTPUT, NEW SOUTH WALES.

Year.	Exports to Australian Ports.		Exports to Foreign Ports.		Local Consumption.	Total.
	(a)		(a)			
	Tons.		Tons.		Tons.	Tons.
1934	1,882,873		807,154		5,183,153	7,873,180
1935	1,889,274		876,591		5,932,714	8,698,579
1936	2,166,241		911,176		6,122,049	9,199,466
1937	2,407,978		922,515		6,721,026	10,051,519
1938	2,113,393		910,872		6,546,665	9,570,930

(a) Including Bunker.

For the period of five years shown in the table above, 23 per cent. of the total output was exported to other States, 10 per cent. was sent overseas, and 67 per cent. was consumed locally. The quantity shown for local consumption in 1938 includes an amount of 48,711 tons of interstate bunker coal shipped from Sydney. It is understood that this amount is not included in the export returns.

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

5. *Consumption in Australia.*—From the information now available it is possible to show in greater detail, particulars of the production of coal and the manner of its disposal in Australia.

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

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

COAL : PRODUCTION AND UTILIZATION IN AUSTRALIA.

Particulars.	Average for Five Years ending.			
	1933-34.		1938-39.	
BLACK COAL.				
Production of Saleable Coal (a)	Tons. 8,770,730		Tons. 11,168,996	
Imports	169,940		30,860	
Total Supplies	8,940,670		11,199,856	
Exported overseas	320,449	% 3.58	345,606	% 3.09
Exported as bunker, overseas	521,651	5.84	592,469	5.29
Total	842,100	9.42	938,075	8.38
Consumed as fuel in—				
Electric Light and Power Works	1,491,633	16.68	1,795,568	16.03
Factories (b)	1,434,635	16.05	2,067,462	18.46
Railway Locomotives (c)	2,161,552	24.18	2,327,791	20.78
Total	5,087,820	56.91	6,190,821	55.27
Consumed as raw material in—				
Gas Works	1,077,372	12.05	1,110,801	9.92
Coke Works	609,020	6.81	1,467,459	13.10
Total	1,686,392	18.86	2,578,260	23.02
Balance available for consumption including accumulation of stocks (d)	1,324,358	14.81	1,492,700	13.33
Grand Total	8,940,670	100.00	11,199,856	100.00
BROWN COAL				
Production of Brown Coal	Tons. 2,294,321		Tons. 3,063,879	
Utilization—				
As fuel in Electric Light and Power Works	1,173,743	% 51.16	1,673,018	% 54.60
Used in Briquette Works (e)	1,120,578	48.84	1,390,861	45.40
Total	2,294,321	100.00	3,063,879	100.00

(a) Estimated. (b) Estimated where details were not available. Not including Brown coal, see Note (e). (c) Government Railways only. (d) Including bunker coal for Interstate and Intra-state Shipping. (e) A portion of the briquette output is consumed in factories.

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

6. Prices.—(i) *New South Wales.* The price of New South Wales coal depends on the district from which it is obtained. Previously the northern district coal generally realized a somewhat higher rate than the southern or western product, but latterly the average price in the southern fields has been somewhat in excess of that prevailing in the northern area. The average price at the mine in each district and for the State as a whole during the last five years is given in the following table. The increase in 1937 was the first recorded since 1927.

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.
1934	12 0	12 2	8 10	11 0.4
1935	11 9	11 10	8 8	11 2.8
1936	11 6	11 8	8 9	11 1.8
1937	11 11	12 7	9 0	11 7.1
1938	11 9	13 4	9 8	11 8.5

(ii) *Victoria.* In Victoria the average price of coal per ton at the pit's mouth in 1934 was 12s 1d.; in 1935, 11s. 10d.; in 1936, 11s. 11d.; in 1937, 13s. 3d. and in 1938, 12s. 3d. These averages are exclusive of brown coal, which in 1938 cost 1s. 11d. 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.				
	1934.	1935.	1936.	1937.	1938.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich	14 11	15 5	16 0	16 4	17 0
Darling Downs	18 4	18 3	18 10	19 3	19 11
Wide Bay and Maryborough	22 11	23 1	23 9	23 7	24 0
Rockhampton	16 7	16 7	17 4	17 4	17 0
Clermont	12 11	12 5	12 8	13 0	13 8
Bowen	13 6	13 10	14 0	14 2	14 10
Mount Mulligan (Chillagoe)	26 0	29 0	28 9	30 5	31 6
Average for State ..	15 11	16 0	16 5	16 8	17 2

(iv) *Western Australia.* The average prices of the Collie (Western Australia) coal during the last five years were: 1934, 11s. 2d.; 1935, 11s. 10d.; 1936, 11s. 9d.; 1937, 12s 4d.; and 1938, 12s. 5d.

(v) *Tasmania.* The average prices per ton of coal at the pit's mouth in Tasmania for the last five years were: 1934, 14s. 4d.; 1935, 13s. 11d.; 1936, 13s. 11d.; 1937, 14s. 8d.; and 1938, 14s. 10d. per ton.

7. Prices in the United Kingdom.—During the five years 1933 to 1937 the average selling prices of coal per ton at the pit's mouth in the United Kingdom were: 1933, 13s.; 1934, 12s. 11d.; 1935, 13s.; 1936, 14s. 0½d.; and 1937, 15s. 2½d.

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 1933 to 1938 :—

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
1933 ..	13,349	1,517	272	2,448	626	313	18,525
1934 ..	13,465	1,502	319	2,385	624	342	18,637
1935 ..	13,337	1,397	615	2,455	689	340	18,833
1936 ..	14,221	1,367	419	2,432	768	334	19,541
1937 ..	14,981	1,359	390	2,442	723	322	20,217
1938 ..	15,815	1,322	444	2,495	765	269	21,110

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

The maximum number was employed in 1926 when 31,774 persons were engaged in the coal-mines of Australia. Shortly after that year the industrial depression and a prolonged stoppage of work on one of the principal fields of New South Wales during 1929 and 1930 seriously affected the figures of employment. Since 1934 there has been a gradual improvement, but the numbers employed in 1938 were only about two-thirds of the maximum figure already quoted. As the production in 1938 was not so far below the record output of 13.7 million tons in 1924, it would appear that the growth of mechanization in the industry has been a factor in raising production during recent years. In 1928, 23.4 per cent. of the total output of coal in New South Wales was cut by machinery, while in 1938 the percentage had increased to 28.4.

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

COAL-MINING : EMPLOYMENT AND ACCIDENTS, 1938.

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 ..	15,815	11	65	0.70	4.11	870,085	147,245
Victoria ..	1,766	2	5	1.13	2.83	1,991,354	796,542
Queensland ..	2,495	2	184	0.80	73.75	556,713	6,051
Western Australia ..	765	1	364	1.31	475.82	604,792	1,662
Tasmania ..	269	..	4	..	14.87	..	20,938
Total ..	21,110	16	622	0.76	29.46	730,010	18,778

The next table shows the average number of miners employed, number of fatalities, and rate per 1,000 during the quinquennium 1934-38 :—

COAL-MINING : FATALITIES, 1934 TO 1938.

State.	Average No. of Coal-miners Employed.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	14,366	15.20	1.04
Victoria	1,827	3.40	1.86
Queensland	2,442	3.00	1.23
Western Australia	714	0.20	0.28
Tasmania	324	0.20	0.62
Total	19,673	22.00	1.12

(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 1933-37 was 1.11, the rates varying between 1.35 in 1934 and 1.02 in 1936 while the rate for Australia for the same period was 1.14.

§ 11. Coke.

1. *General.* Notwithstanding the large deposits of excellent coal in Australia, the production of coke was limited to about 250,000 tons prior to the war of 1914-18. This was below local requirements and necessitated a fairly considerable import from abroad. During recent years, however, a high standard of excellence has been attained in the local product and imports have almost ceased, while Australian coke is being shipped to New Zealand and other islands in the Pacific. For the year 1938-39 the coke imported amounted to 9,719 tons, of which 6,695 tons were obtained from the United Kingdom and 2,030 tons from Germany, Western Australia being the chief importing State. The quantity exported was 30,091 tons, valued at £56,027, of which 25,894 tons, valued at £42,291, were sent to New Caledonia.

2. *New South Wales.* The table hereunder gives the production in New South Wales during the last five years as recorded by the Department of Mines :—

COKE : PRODUCTION IN NEW SOUTH WALES.

Items.	1934.	1935.	1936.	1937.	1938.
Quantity .. tons	688,621	857,875	893,201	939,944	1,135,446
Value, total .. £	636,346	802,887	800,632	909,822	1,100,266
Value, per ton	18s. 6d.	18s. 9d.	17s. 11d.	19s. 4d.	19s. 5d.

The figures quoted refer to the product of coke ovens, and are exclusive of coke produced in the ordinary way at gasworks. Prior to the industrial depression the maximum production of coke was 709,000 tons in 1927 : the output fell to 217,509 tons in 1931, but with the general recovery of trade, the figure rose to a new high level of 1,135,000 tons in 1938. During the latter year the number of coke ovens at work totalled 548, whilst the number of persons engaged in its manufacture was 647.

3. *Queensland.* A small quantity of coke is made in Queensland, the quantity returned in 1938 being 30,984 tons, of which 27,328 tons were produced at the Bowen State Coke Works. The greater proportion of the output of these works was consigned

to the Mount Isa Mines Ltd. and to the Chillagoe State Smelters. Hitherto the coke used at these ore-treatment works was imported from New South Wales, but now the local output is sufficient to meet the requirements of the State and leave a small surplus available for export. During 1938 2,329 tons of coke were exported from Bowen to Noumea. The following table shows the amount manufactured during the last five years:—

COKE : PRODUCTION IN QUEENSLAND.

Year.	1934.	1935.	1936.	1937.	1938.
Quantity .. tons	25,655	24,877	23,326	30,459	30,984

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. Shale-oil and Mineral Oil.

1. *Shale-oil.*—(i) *General.* Reference to the deposits of shale and the search for mineral oil in Australia will be found in Official Year Book No. 22, pp. 791-3.

(ii) *New South Wales.* Reference to the establishment of the shale-oil industry in Australia will be found in previous issues of the Official Year Book. In 1937 negotiations were completed between the Commonwealth and New South Wales Governments and the National Oil Proprietary Ltd., in which the latter company undertook to develop the shale-oil industry in the Newnes-Capertee district. The Commonwealth Government agreed to protect the industry by exempting from excise, up to 10 million gallons annually, the Company's output of petrol for a period of 25 years. The successful establishment of this project will probably lead to an expansion of the industry in Australia and should provide a valuable training ground for technicians. Production commenced in 1940.

(iii) *Tasmania.* About 38,000 gallons of crude oil were produced in 1934 from shale treated in Tasmania, while the total quantity of oil distilled from shale up to the end of 1934 was set down at 357,000 gallons. The plant owned by the Tasmanite Shale Oil Company has not operated since the end of January, 1935.

2. *Coal Oil.*—Attention has been directed to the production of oil from coal by a number of processes. A committee consisting of nominees of the Commonwealth and State Governments, excepting Western Australia, and of Imperial Chemical Industries Ltd., was appointed to advise on specific questions submitted to it. In a report submitted in June, 1937, it was stated that the stage had not been reached when Australia could establish plants for the production of oil from coal. The committee recommended, however, that close touch be kept with developments abroad. A report dated 25th July, 1939, on the production of oil from coal was submitted to the Minister by the Standing Committee on Liquid Fuels. The recommendations of this Committee followed the lines of those of its predecessors.

3. *Natural Oil.*—(i) *Australia.* Natural oil does exist in Australia. This has been proved in Queensland, Victoria and Western Australia. Conditions favourable to accumulation in commercial quantities have been shown to exist in Queensland, Western Australia and New South Wales. In the latter State, however, no strong positive evidence of its existence has been recorded. In Victoria, while oil has been proved to exist, the problem as to whether it can be produced on a commercial basis has still to be worked out.

Reference is made in § 16 hereinafter to the assistance afforded by the Commonwealth Government in the search for petroleum oil.

(ii) *Victoria.* The production of crude petroleum oil in the year 1938 amounted to 6,173 gallons, valued at £154. The total production to the end of that year amounted to 106,476 gallons, worth £2,602. In conjunction with the State Government, the Commonwealth Government is carrying out a scout drilling campaign in the Gippsland area of Victoria.

(iii) *Queensland.* Great hopes are still entertained in regard to the petroliferous area in Queensland. Gas and light to medium gravity oils have been found at Roma, and gas and oily wax at Longreach. Structural conditions favourable to accumulation on a commercial scale have been located at several places between Injune and Springsure. The search for oil was continued during 1939 by several companies in localities situated at Mount Bassett, near Roma, at Hutton Creek and at Arcadia. Test bores have been drilled to bed rock in all the localities mentioned, the deepest being that at Arcadia which exceeded 6,000 feet. Showings of petroliferous gas, amounting at Arcadia to 3,000,000 cubic feet a day, and of petroleum have been encountered in all these bore-holes.

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

(v) *Western Australia.* Only one company was active in Western Australia during 1939. The company, financially assisted by the Commonwealth and State Governments, commenced deep-drilling operations in the Kimberley district in 1939.

(vi) *General.* During 1939 efforts were made to secure greater uniformity in State legislation governing the search for oil. A draft Bill based on modern legislation in other countries was prepared by the Commonwealth and submitted to the State Governments. As a result amending legislation was passed in Victoria and Queensland, while certain amendments are proposed in Western Australia. There was immediate response to this in Queensland, where an agreement has been reached between the State Government and one of the major oil Companies, whereby the Company has undertaken to spend up to £400,000 in the search for oil in that State.

§ 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 issues of the Official Year Book (see No. 22, pp. 793-6). The tables of quantities and values in § 1 of this Chapter will show the production of the principal items in this class for each State during the year 1938.

§ 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 1938 in New South Wales was estimated at 300 carats, valued at £300. These were won by fossickers in the Inverell district. The total production to the end of 1938 is given at 205,543 carats, valued at £148,000.

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

In Queensland, gems to the value of £2,166 were purchased on the Anakie sapphire fields in 1938. It is probable that many were sold privately or held for better prices. For these reasons the returns are considered to be very incomplete. There were about 120 miners operating on the fields during 1934 but their number decreased to 25 in 1938. 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 1938 was £4,226, obtained chiefly on the Lightning Ridge field. White Cliffs and Grawin fields also contributed but their total output was less than £100. 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 $6\frac{1}{2}$ 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 £1,627,021, 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 1938 was estimated at £80, and up to the end of that year at about £188,000. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. Production during recent years has been limited by the paucity of demand. Only six men operated during 1938 and then only for a period of two months. The little quantity of stone obtained was unsold and the men have left the field. The greatest recorded output was for the year 1895 when the yield was valued at £32,750.

Owing to the poor market for gems, production from the Coober Pedy opal field, situated in the Stuart Range in South Australia, fell from £11,056 in 1929 to £1,517 in 1934. The demand improved in 1937 and the production rose to £11,887 but it declined in 1938 to £4,570. 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.

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

§ 15. Numbers Engaged, Wages Paid and Accidents in Mining.

1. **Total Employment in Mining.**—The number of persons engaged in the mining industry in Australia fluctuates according to the season, the price of industrial metals, the state of the labour markets, and according to the permanence of new finds and the development of the established mines. During the year 1938, the number so employed was as follows:—

NUMBER OF PERSONS ENGAGED IN MINING, 1938.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	3,764	5,612	13	1,440	15,815	1,547	28,191
Victoria ..	6,315	..	..	5	1,766	107	8,193
Queensland ..	3,378	530	213	1,263	2,495	574	8,453
South Australia ..	158	..	67	..	..	607	832
Western Australia ..	15,374	4	4	73	765	207	16,427
Tasmania ..	141	421	1,015	1,123	269	305	3,274
Northern Territory ..	267	3	5	15	..	321	611
Australia ..	29,397	6,570	1,317	3,919	21,110	3,668	65,981

Included in the figures for "other" in South Australia were 253 engaged in mining iron ore, 63 gypsum miners, 143 salt gatherers, and 56 opal miners. The Tasmanian figures include 48 osmiridium miners, and those for the Northern Territory, 30 mica and 287 wolfram miners.

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

NUMBER ENGAGED IN MINING PER 100,000 OF POPULATION.

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

State.	1931.		1937.		1938.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales	30,682	1,200	27,318	1,014	28,191	1,036
Victoria	6,463	359	8,037	433	8,193	439
Queensland	6,753	730	8,924	902	8,453	845
South Australia	518	90	825	140	832	140
Western Australia	7,147	1,653	17,136	3,772	16,427	3,571
Tasmania	3,397	1,512	3,412	1,459	3,274	1,389
Northern Territory	145	2,918	557	10,294	611	10,609
Australia	55,105	844	66,209	969	65,981	957

The general falling-off since 1901 is largely due to the causes mentioned in each section hereinbefore. The proportion to population shows increases since 1931 in all States excepting New South Wales and Tasmania and is attributable mainly to the larger numbers engaged in the search for gold. Since that year the increase in the number so employed was approximately 6,000 persons. The number engaged in mining for tin increased by 1,700, while increases of 3,000 were also recorded in the mining for silver, lead and zinc.

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, 1938.**—The following table gives particulars of the number of men killed or injured in mining accidents during the year 1938:—

MINING ACCIDENTS, 1938.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED								
Coal ..	11	2	2	..	1	..	..	16
Copper ..	..	..	3	..	..	1	..	4
Gold ..	6	7	4	..	23	..	..	40
Silver, lead and zinc ..	7	..	4	..	..	..	..	11
Tin ..	..	..	..	..	..	1	..	1
Other minerals	1	..	..	..	4	..	..	5
Total ..	25	9	13	..	28	2	..	77
INJURED.								
Coal ..	65	5	184	..	364	4	..	622
Copper ..	1	..	47	1	..	64	..	113
Gold ..	17	11	71	3	1,007	..	2	1,111
Silver, lead and zinc ..	229	..	21	..	..	19	..	269
Tin ..	1	..	..	..	..	11	..	12
Other minerals	..	..	..	29	..	..	1	30
Total ..	313	16	323	33	1,371	98	3	2,157

§ 16. Government Aid to Mining.

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

Expenditure under these various Acts has been reviewed in previous issues of the Official Year Book. With the exception of the Northern Australia Survey Act and the Petroleum Oil Search Acts further expenditure under these Acts is not contemplated.

(ii) *Survey of North Australia.* In 1934 the Northern Australia Survey Act was passed. Under this Act the Governments of the Commonwealth and the States of Queensland and Western Australia agreed to co-operate in the conduct of an aerial, geological and geophysical survey of certain areas in Australia north of the 22nd parallel of south latitude. This survey was conducted during the three years ended 1937, and has now been extended to the end of 1940. The total cost of the survey will involve an expenditure of £250,000, of which the Commonwealth Government will contribute £140,000, Queensland £67,500 and Western Australia £42,500. The latest report was in respect of the period ending 30th June, 1939. About 60 reports on individual areas have been issued as appendices and a further 60 are in course of preparation.

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

In 1936 the Petroleum Oil Search Acts were passed which replaced all previous enactments. Under these Acts a sum of £250,000 was appropriated to assist in the search for oil in Australia and the Territories of Papua and New Guinea. Considerable preliminary geological surveys have already been conducted and test drilling has been and still is being done at approved sites in Australia. So far no commercial production has been obtained. In Papua preparations are being made to drill a deep test in 1940.

The moneys made available under the Acts mentioned may be applied—

- (1) to the payment of advances to persons and companies engaged in drilling operations or in the conduct of geological surveys in connexion with the search for petroleum ; and
- (2) for the purchase of drilling plants.

Under the provisions of the Acts four modern rotary-drilling plants have been purchased. These are made available on hire to companies engaged in the search. Since their purchase the four plants have been in use in Queensland, Victoria, New South Wales, Western Australia and Papua.

(iv) *Mineragraphic and Ore-dressing Investigations.* In addition to the assistance mentioned above the Commonwealth Government made a grant of £25,000 in 1934 to the Council for Scientific and Industrial Research to stimulate gold production by conducting mineragraphic and ore-dressing investigations as required by the industry. This amount was expended during the succeeding five years in conducting these investigations, which were carried out conjointly with appropriate State institutions, the three laboratory centres being the School of Mines, Kalgoorlie, the School of Mines and Industries, Adelaide, and the University of Melbourne.

The success of the scheme induced a further grant of £22,000. After providing £2,000 for the year 1940-41, the balance is to be expended at the rate of £4,000 during each of the succeeding five years. The scheme is administered by a Mining Advisory Committee.

(v) *Standing Committee on Liquid Fuels.* The Commonwealth Government has appointed a Standing Committee on Liquid Fuels to co-ordinate knowledge concerning the production of liquid fuels and the use of substitutes therefor, and to furnish information which will enable Australia to obtain greater independence in regard to fuel supplies. This Committee undertakes the investigation of such matters as the production of oil from coal, benzol, power alcohol, shale oil, the use of producer and compressed gas in road vehicles, and tar as a substitute for fuel oil. Six reports have been issued by this Committee to date.

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 four years ended 1938-39; all claims are met from State Unemployment Relief Funds and the Commonwealth Grant. Aid is granted on a footage basis to sink, drive, etc., on approved sites to which a valid mining title is held. Grants approved during 1938 amounted to £16,859 but the actual expenditure in respect of work completed amounted to £12,694. Loans are also made to assist in the erection of crushing batteries or reduction plants on which interest at the rate of 4 per cent. is charged. During the year loans totalling £10,087 were approved. A reward amounting to £250 was paid in 1937 in connexion with the discovery of a new gold deposit near Weethalle, but all offers of rewards have now been withdrawn.

3. **Victoria.**—During the year 1938 expenditure in connexion with mining amounted to £28,298. Of this amount £5,100 consisted of advances to prospectors and £9,808 was advanced to companies on a £ for £ basis under conditions of Commonwealth Grant for assistance to metalliferous mining. The balance of £13,390 was provided for operation of State batteries, boring operations, geological surveys, etc.

4. **Queensland.**—State assistance to the mining industry in 1938–39 amounted to £28,710, of which £25,844 was advanced to prospectors, the balance consisting of grants under the Mining Machinery Advances Act £1,439, and £1,427 for the provision of transport facilities, etc., to mineral fields. In addition to the amounts above, a sum of £10,000 was spent in connexion with the aerial survey of North Australia.

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

5. **South Australia.**—Aid is given to the mining industry under the terms of the Mining Acts of 1930 and 1931. Up to the end of 1938 the total amount of subsidy paid was £70,915, of which £16,807 has been repaid, and £4,700 written off, leaving a debit of £49,408. 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, Tarcoola and Glenloth, and assays for public purposes are made at the School of Mines. Advances to prospectors in 1938 amounted to £4,006.

6. **Western Australia.**—Under the Mining Development Act of 1902 assistance was granted in 1938 in accordance with the subjoined statement:—Aid to prospectors, £15,282; subsidies on stone crushed for the public, £1,140; advances in aid of mining work and equipment of mines with machinery, £5,210. Other assistance granted from the vote on various matters during the year amounted to £283. The total amount involved was £21,915.

In 1938 there were 24 State batteries in operation of which three were leased. The amount expended thereon up to the end of 1938 was £91,981 from revenue, £390,108 from loan fund and £42,408 from other sources, giving a total of £524,497. The working expenditure up to the end of 1938 exceeded the revenue by £81,415. The total value of gold and tin produced to the end of 1938 at the State plants was £10,183,770. 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 1938 amounted to £2,942, of which £490 was expended as sustenance, £203 for prospecting, £1,937 as assistance to companies and individuals, £270 on construction of roads and tracks, and £42 for assistance to batteries.

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 1937–38 the assistance granted to prospectors amounted to £451. In addition a sum of £16,861 was also granted to assist mining companies and mine owners.

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

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

1. Local Production.—According to returns compiled from various sources by the Australian Mines and Metals Association, the quantities of the principal metals (exclusive of gold) extracted in Australia during the five years 1934 to 1938 were as follows. Particulars for 1939 are not available for publication.

REFINED METALS PRODUCED IN AUSTRALIA.

Metal.		1934.	1935.	1936.	1937.	1938.
Silver	oz.	8,674,549	8,983,950	8,498,674	9,510,509	9,357,139
Lead, pig	tons	160,201	181,211	159,504	186,757	182,214
Zinc	"	54,629	67,666	70,509	69,750	69,820
Copper	"	7,970	11,768	13,313	17,400	17,098
Tin	"	2,330	2,837	2,717	2,907	3,229

The local production of pig-iron during the quinquennium 1923–27 ranged between 330,000 tons in 1923 and 517,000 tons in 1927. Complete information for the later years is not available from the returns published by the Association, but according to the metal extraction returns published in the *Statistical Register of New South Wales*, the production of pig-iron in that State amounted in 1933–34 to 487,259 tons, in 1934–35 to 698,493 tons, in 1935–36 to 783,233 tons, in 1936–37 to 913,406 tons, in 1937–38 to 929,676 tons and in 1938–39 to 1,104,605 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 1934 to 1938 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—	1934.	1935.	1936.	1937.	1938.
Silver	oz. { Lead-Silver-Gold Bullion Lead Concentrates and Ores Zinc Concentrates and Ores Copper and Gold Ores ..	1,819,546	2,506,015	2,810,828	3,505,293	3,400,581
		612,014	275,134	444,052	557,438	831,809
		147,522	217,266	222,536	204,840	306,012
	
	Total	2,579,082	2,998,435	3,477,416	4,267,571	4,538,402
Lead	tons { Lead-Silver-Gold Bullion Lead Concentrates and Ores Zinc Concentrates and Ores	35,804	36,723	33,450	41,773	40,369
		21,075	9,619	17,497	10,086	15,049
		803	1,658	1,587	1,420	1,958
Total	57,682	48,000	52,534	53,279	57,376	
Zinc	tons { Lead Concentrates and Ores Zinc Concentrates and Ores	..	..	..	..	..
		26,963	54,693	75,391	76,990	93,561
Total	26,963	54,693	75,391	76,990	93,561	
Copper	tons Ores, Matte, etc. ..	1,122	1,361	2,770	2,389	3,228
Tin	tons Concentrates and Ores ..	198	289	246	192	202

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

The following table shows the quantities and values of the principal overseas exports of ores, concentrates and metals, the produce of Australia, together with the countries to which the respective products were forwarded, for the year 1938-39:—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1938-39.

Article.	Total Exports.	Exports to—						
		U.K.	U.S.A.	Belgium.	Germany.	Japan.	N.Z.	Other Countries.
QUANTITY.								
Ores—	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Copper	376	376	..	..	..	..	..	..
Silver and Silver-lead	8,447	..	3,287	5,139	..	..	..	..
Iron	2,643,260	..	1,146,600	..	..	1,496,660	..	21
Wolfram	18,371	3,350	404	1,351	7,160	..	..	6,106
Tin	174	174	..	..	..	..	..	..
Zinc	46,121	46,121	..	..	..	..	..	..
Other	43,317	14,488	20,700	459	3,076	108	1,565	2,921
Concentrates—								
Silver and Silver-lead	688,968	..	194,550	494,418	..	..	..	..
Zinc	4,898,291	4,073,931	..	650,089	62,049	40,499	..	(a) 71,723
Copper	267,380	..	263,882	628	2,870	..	..	..
Tin	9,464	9,464	..	..	..	..	..	..
Lead Slime Residue	31,744	11,859	17,889	1,569	..	..	..	427
Gold Ore, Quartz and Concentrates	10,359	13	8,256	1,683	..	..	407	..
Other	20,838	213	1,500	19,125	..	..	..	..
Cadmium—Blocks, Ingots, etc.	3,036	2,240	..	..	..	14	22	760
Copper—								
Matte	21,231	24	..	21,207	..	..	..	..
Ingot	324	4	..	..	..	..	320	..
Tin—Ingot	29,431	14,860	6,600	1,400	..	..	4,402	2,169
Lead—								
Pig	4,089,895	4,010,625	..	..	..	6,985	43,698	28,587
Matte .. .. .	..	..	..	..	..	..	..	..
Zinc—Bars, Blocks, etc.	892,192	283,055	..	4,800	..	230,281	3,427	(b) 370,629
Platinum, Osmium, etc.	(c) 225	169	..	..	..	56	..	..
Gold—								
Bar, Dust, etc.	1,639,430	212,409	1,426,180	..	..	..	..	(d) 841
Silver—								
Bar, Ingot, etc.	9,332,624	198,059	33,054	..	74,205	..	3,940	9,023,366
VALUE.								
Ores—	£	£	£	£	£	£	£	£
Copper	1,092	1,092	..	..	..	..	..	..
Silver and Silver-lead	5,517	..	2,628	2,869	..	..	..	30
Iron	83,300	..	31,823	..	..	51,477	..	..
Wolfram	177,361	35,665	5,178	13,217	68,253	..	..	55,048
Tin	1,167	1,167	..	..	..	..	..	..
Zinc	19,509	19,509	..	..	..	..	..	..
Other	90,297	23,144	24,850	7,469	27,982	1,028	1,204	4,620
Concentrates—								
Silver and Silver-lead	484,395	..	149,229	335,166	..	..	..	..
Zinc	804,264	662,205	..	111,238	7,398	14,895	..	(a) 8,528
Copper	406,446	..	401,148	1,483	3,815	..	..	..
Tin	80,139	80,139	..	..	..	..	..	..
Lead Slime Residue	27,937	5,619	21,988	190	..	..	..	140
Gold Ore, Quartz and Concentrates	17,799	7,208	8,712	1,757	..	..	122	..
Other	24,241	316	675	23,250	..	..	..	..
Cadmium—Blocks, Ingots, etc.	56,543	41,356	..	..	..	314	314	14,559
Copper—								
Matte	14,741	56	..	14,685	..	..	..	..
Ingot	915	10	..	..	..	..	905	..
Tin—Ingot	370,137	184,142	83,070	18,240	..	..	50,307	28 378
Lead—								
Pig	4,266,566	4,188,961	..	..	..	7,050	43,423	27,132
Matte .. .. .	..	..	..	..	..	..	..	..
Zinc—Bars, Blocks, etc.	887,421	281,454	..	4,716	..	228,995	3,811	(b) 368,445
Platinum, Osmium, etc.	4,768	3,726	..	..	..	1,042	..	..
Gold—								
Bar, Dust, etc.	14,848,705	1,887,423	12,953,955	..	..	..	..	(d) 7,327
Silver—								
Bar, Ingot, etc.	958,053	21,705	3,402	..	7,745	..	459	(e) 924,742
Total	23,631,313	7,444,807	13,686,658	534,280	115,193	304,801	106,545	1,438,039

(a) Czechoslovakia, 40,000 cwt., £4,602; Netherlands, 31,723 cwt., £3,926. (b) India, 357,599 cwt., £355,479. (c) Mainly osmium exported from Tasmania. (d) France. (e) Ceylon, 8,801,107 fine oz., £901,209; India, 222,259 fine oz., £23,533.