

## CHAPTER XVIII. MINERAL INDUSTRY.

### § 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, the pastoral or the dairying 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.)

During the years 1934 to 1940 a survey of certain areas in Australia north of the 22nd parallel of south latitude was undertaken by the Governments of the Commonwealth, Queensland and Western Australia. This survey is referred to in § 16 below.

3. *Quantity and Value of Production in 1945.*—The quantities (where available) and the values of certain of the principal minerals produced in each State, and in Australia as a whole, during 1945, are shown 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 below. 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 quantities of cadmium and cobalt recovered in Tasmania from zinc ores mined in New South Wales during 1945 are shown in § 8, par. 2 (page 831.)

#### MINERAL PRODUCTION : QUANTITIES, 1945.

Mineral.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W.Aust.	Tas.	N.T.	Australia.
Antimony and Ore ..	ton	152	24	25	..	..	..	..	201
Arsenic and Ore ..	..	..	..	..	..	1,989	..	..	1,989
Asbestos ..	cwt.	52,640	..	..	140	21,840	5,520	..	80,140
Barytes ..	ton	977	..	..	2,470	..	..	..	3,447
Bismuth and Ore ..	cwt.	64	..	19	..	5	11	..	99
Cadmium ..	..	(a)	..	..	..	..	(b) 580	..	(c) 580
Chalk, Talc, Soap-stone, etc.	ton	495	..	..	2,989	..	153	..	3,637
Coal—	..	..	..	..	..	..	..	..	..
Black ..	..	10,237,886	247,297	1,634,746	41,452	543,363	149,077	..	12,853,821
Brown ..	..	..	5,445,108	..	..	..	..	..	5,445,108
Copper (Ingot and Matte) ..	..	3,050	..	15,007	134	40	7,473	146	25,850
Copper Ore ..	..	..	..	..	..	..	..	..	..
Diatomaceous earth ..	..	2,230	829	29	..	..	..	..	3,088
Felspar ..	..	3,725	214	..	940	1,235	..	..	6,114
Fireclay ..	..	..	..	..	4,786	2,413	..	..	7,199
Graphite ..	cwt.	1,000	..	1,140	100	..	..	..	2,240
Gold ..	fine oz.	43,129	61,790	63,223	277	468,551	13,050	7,193	657,213
Gypsum ..	ton	22,772	11,569	..	65,600	7,233	..	..	107,174
Iron-stone and Ore ..	..	94,247	..	1,715	1,519,594	..	..	..	1,615,556
Kaolin ..	..	..	3,662	..	1,939	..	5,718	..	11,319
Lead ..	..	(a)	..	..	4	..	6,298	..	(c) 6,302
Limestone Flux ..	..	139,348	5,276	..	225,754	..	53,359	..	423,737
Magnesite ..	..	22,342	..	..	740	..	..	..	23,082
Manganese Ore ..	ton	984	..	..	..	..	..	..	984
Mica ..	cwt.	120	..	..	(d) 1,880	..	..	1,107	3,107
Molybdenite ..	..	28	..	..	..	..	..	..	28

(a) See letterpress preceding this table. (b) Excludes 3,820 cwt. of cadmium valued at £85,510 and 280 cwt. of cobalt oxide valued at £6,201, from ores of N.S.W. origin. (c) Incomplete. (d) Damourite.

MINERAL PRODUCTION: QUANTITIES, 1945—continued.

Mineral.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
Ochre and Other Pigment Clays	ton	1,012	..	..	..	650	66	554	2,282
Osmiridium	oz.	..	..	..	..	..	109	..	109
Phosphate	ton	..	..	..	714	8,483	..	..	9,197
Salt	..	..	(b)	..	171,067	(b)	..	..	(c) 171,067
Scheelite	cwt.	340	..	101	..	16	10,560	..	11,017
Shale (Oil)	ton	123,170	..	..	..	..	..	..	123,170
Silica	..	68,907	..	..	13,276	175	7,939	..	90,297
Silver	oz.	(a) 131,309	14,861	112,710	3,241	146,025	816,157	..	1,224,393
Silver-lead Ore, Concentrates, etc.	ton	205,805	..	..	..	..	..	..	205,805
Tantalite and Concentrates	cwt.	..	..	2	..	..	..	8	10
Tin and Tin Ore	ton	776	42	930	..	22	801	23	2,594
Wolfram	cwt.	620	..	2,599	..	..	4,220	2,540	9,979
Zinc and Concentrates	ton	265,284	..	..	..	..	15,609	..	280,893
Zircon - Rutile - Ilmanite-Monazite Concentrates	ton	(b)	..	13,414	..	..	..	..	(c) 13,414

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

The values of the minerals raised in each State in 1945 are shown in the following table:—

MINERAL PRODUCTION: VALUES, 1945.

Mineral.	N.S.W. (a)	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas. (a)	N.T.	Australia.
	£	£	£	£	£	£	£	£
Antimony and Ore	5,808	118	1,048	..	..	..	..	6,974
Arsenic and Ore	..	..	..	..	41,771	..	..	41,771
Asbestos	8,478	..	..	112	44,661	7,193	..	60,444
Barytes	1,651	..	..	7,970	..	..	..	9,621
Bismuth and Ore	2,362	..	383	..	152	373	..	3,270
Cadmium	(b)	..	..	..	..	13,161	..	(c) 13,161
Chalk, Talc, Soapstone, etc.	3,605	..	..	10,917	..	532	..	15,054
Coal—								
Black..	8,694,168	494,690	1,759,311	14,508	572,896	125,719	..	11,661,292
Brown	..	641,069	..	..	..	..	..	641,069
Copper (Ingot and Matte)	305,000	..	1,500,662	11,674	364	463,294	3,811	2,284,805
Copper Ore	..	..	..	..	..	..	..	..
Diatomaceous earth	2,195	2,911	79	..	..	..	..	5,185
Felspar	8,080	794	..	2,350	4,321	..	..	15,545
Fireclay	..	..	..	2,991	1,544	..	..	4,535
Gems	283	..	1,382	..	..	..	..	1,665
Gold	461,303	661,430	676,712	2,970	5,012,225	139,573	76,811	7,031,024
Graphite	287	..	684	..	350	..	..	1,321
Gypsum	12,915	5,153	..	49,200	9,136	..	..	76,404
Iron-stone and Ore	104,662	..	2,561	1,747,533	..	..	..	1,854,756
Kaolin	..	5,681	..	2,909	..	11,562	..	20,152
Lead	(b)	..	..	88	..	157,459	..	(c) 157,547
Limestone Flux	57,314	3,676	..	84,657	..	28,417	..	174,064
Magnesite	26,721	..	..	1,438	..	..	..	28,159
Manganese Ore	6,977	..	..	..	..	..	..	6,977
Mica	52	..	..	(d) 256	..	..	44,955	45,263
Molybdenite	209	..	..	..	..	..	..	209
Ochre and Other Pigment Clays	1,571	..	..	..	3,086	191	2,079	6,927
Opal	3,000	..	..	12,284	..	..	..	15,284
Osmiridium	..	..	..	..	..	2,665	..	2,665
Phosphate	..	..	..	1,486	46,656	..	..	48,142
Salt	..	(e)	..	342,134	(e)	..	..	(c) 342,134
Scheelite	7,111	..	2,018	..	8,946	158,093	..	176,168
Shale (Oil)	164,648	..	..	..	..	..	..	164,648
Silica	17,932	..	..	8,083	227	6,025	..	32,267
Silver	(b) 20,703	1,622	17,788	513	22,757	102,101	..	(c) 165,484
Silver-lead Ore, Concentrates, etc.	4,604,962	..	..	..	..	..	..	4,604,962
Tantalite and Concentrates	..	..	60	..	..	..	578	638
Tin and Tin Ore	291,788	9,869	207,948	..	4,370	240,369	5,026	759,370
Wolfram	9,604	..	48,176	..	..	69,896	42,937	170,613
Zinc and Concentrates	1,073,340	..	..	..	..	407,307	..	1,480,647
Zircon - Rutile - Ilmanite-Monazite Concentrates	198,083	..	126,020	..	..	..	..	324,103
Unenumerated	17,803	3,361	10,295	5,568	31,126	136	..	68,289
Total	16,112,615	1,830,374	4,355,127	2,309,991	5,804,238	1,934,066	176,197	32,522,608

(a) For items excluded see letterpress below.

(b) See letterpress preceding this table.

(c) Incomplete.

(d) Damourite.

(e) Not available.

The figures in the foregoing table exclude 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 par. 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 1945 consisted of—lime, £58,532; building stone, £36,409; Portland cement, £967,935; coke, £1,950,032; road material, and gravel, £701,472; shell grit, £22,486; sulphur and sulphuric acid, £363,115; and brick and pottery clays, £122,240. Carbide and cement, £273,588, have been excluded from the Tasmanian figures.

4. Value of Production, 1938 to 1945.—The values of the minerals produced in each State during the years 1938 and 1942 to 1945 are given in the table hereunder:—

## MINERAL PRODUCTION: VALUES.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
1938 ..	10,731,391	1,884,015	3,966,119	2,932,473	10,844,469	1,889,804	214,724	32,462,995
1942 ..	16,690,283	1,980,972	5,023,495	3,012,973	9,187,562	2,494,119	204,366	38,893,770
1943 ..	16,477,501	1,593,994	4,214,525	3,070,716	6,383,755	2,378,533	130,795	34,249,819
1944 ..	16,496,085	1,602,105	4,477,087	2,926,666	5,667,497	2,220,136	126,025	33,515,601
1945 ..	16,112,615	1,830,374	4,355,127	2,309,991	5,804,238	1,934,066	176,197	32,522,608

The value of mineral production in Australia during 1941 was the highest ever recorded. Although fluctuations have occurred in some States, the values recorded for Australia have declined annually since that year.

Since 1941 the greatest decrease has occurred in Western Australia, £6,595,000; followed by Queensland, £946,000; South Australia, £877,000; Tasmania, £716,000; Victoria, £541,000; Northern Territory, £98,000. New South Wales increased by £1,039,000. There was a downward movement in quantity and value for many minerals. The value of gold decreased by almost £9 million, but black coal increased by £1.2 million. The decrease of all mineral production was £8,967,000.

5. Total Production to end of 1945.—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1945. The items excluded from the preceding table are also omitted here, and consequently the total for New South Wales is £69,500,000 less than that published by the State Department of Mines. The principal items excluded from the table below are coke, £32,500,000; cement, £33,000,000; lime, £2,400,000; 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 1945.

Mineral.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£'000.	£'000.	£'000.	£'000.	£'000.	£'000.	£'000.	£'000.
Gold ..	72,570	317,525	99,072	2,147	276,030	11,051	3,575	781,970
Silver and lead ..	170,548	280	15,362	385	2,570	12,617	67	201,829
Copper ..	17,520	217	34,064	33,313	1,816	28,859	255	116,044
Iron ..	9,384	16	532	38,475	37	97	..	48,541
Tin ..	19,028	1,240	13,643	..	1,679	20,798	697	57,085
Wolfram	413	19	1,436	..	2	909	749	3,528
Zinc ..	30,888	..	3,427	16	5	6,041	..	40,377
Coal ..	286,679	23,572	36,669	28	12,367	3,214	..	362,529
Other ..	12,293	1,156	3,495	9,884	1,864	3,651	333	32,676
Total ..	619,323	344,025	207,700	84,248	296,370	87,237	5,676	1,644,579

The "other" minerals in New South Wales include alunite, £226,000; antimony, £435,000; arsenic, £212,000; bismuth, £257,000; chrome, £143,000; diamonds, £151,000; magnesite, £764,000; molybdenite, £232,000; opal, £1,639,000; scheelite, £243,000; and shale oil, £3,481,000. In the Victorian returns antimony ore was responsible for £636,000. The value for coal in this State includes £7,116,000 for brown coal. Included in "other" in the Queensland production were opal, £188,000; gems, £655,000; bismuth, £146,000; cobalt, £158,000; molybdenite, £628,000; limestone flux, £903,000; and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £6,134,000; limestone flux, £658,000; gypsum, £1,718,000; phosphate, £188,000; and opal, £236,000. In Western Australia arsenic, £679,000; gypsum, £149,000; and asbestos, £191,000 were the principal items included with "other" minerals. In the Tasmanian returns osmiridium was responsible for £657,000, scheelite for £553,000 and limestone flux for £1,349,000.

6. Quarries.—Statistics giving details of the output of quarries were first published in Official Year Book No. 33, 1940. The details were collected following a resolution of the Conference of Australian Statisticians held in 1935.

The Conference defined a quarry, for the purpose of these statistics, as one 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 authorities responsible for the collection of these statistics are the Government Statistician in 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. Complete details for all States for recent years are not available.

## OUTPUT OF QUARRIES, 1945.

Description.	N.S.W.	Victoria. (a)	Q'land. (a) (b)	S. Aust.	W. Aust. (a)	Tas. (d)	Australia.
QUANTITY.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Building Stone ..	13,456	5,909	2,757	19,181	3,386	..	44,689
Macadam, Ballast etc. ..	3,286,549	886,663	420,294	906,287	159,195	..	5,658,988
Limestone (c) ..	(d)	297,168	42,760	6,572	26,244	..	(e) 372,744
Clays ..	528,526	28,554	..	112,985	(d)	..	(e) 670,065
Other ..	..	..	..	..	6,379	..	6,379
Total ..	£3,828,531	1,218,294	465,811	1,045,025	(e) 195,204	..	£6,752,865
VALUE.							
	£	£	£	£	£	£	£
Building Stone ..	36,409	15,625	1,626	13,961	4,081	..	71,702
Macadam, Ballast, etc. ..	701,472	409,742	127,710	221,969	77,783	..	1,538,676
Limestone (c) ..	(d)	85,803	24,449	821	6,428	..	(e) 117,501
Clays ..	122,240	6,184	..	14,123	27,568	..	170,115
Other ..	..	..	..	..	1,362	..	1,362
Total ..	(e) 860,121	517,354	153,785	250,874	(e) 117,222	..	£1,899,356

(a) Year ended June, 1946. (b) Estimated. (c) Limestone used as a flux and for the manufacture of lime and cement, omitting quantities used as building stone and as macadam, ballast, etc., which are already included under those headings. (d) Not available. (e) Incomplete.

In the following table corresponding details are given for each State for the years 1939 and 1942 to 1945:—

### OUTPUT OF QUARRIES.

State.	1939.		1942.		1943.		1944.		1945.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	'000 tons.	£	'000 tons.	£	'000 tons.	£	'000 tons.	£	'000 tons.	£
N.S.W. . .	3,461	1,446,927	4,302	929,854	3,450	1,152,814	3,412	767,511	3,829	860,121
Victoria(a) . .	1,812	552,888	1,180	432,235	1,083	405,237	1,090	421,050	1,218	517,354
Q'land(a)(b)	647	186,951	268	93,573	406	112,814	310	116,626	466	153,785
S. Aust. . .	2,063	469,506	1,216	311,973	908	230,422	862	216,796	1,045	250,874
W. Aust.(a)	(c) 466	214,075	(d)	(d)	(c) 195	106,873	(c) 175	105,075	(c) 195	117,222
Tasmania . .	331	98,063	(d)	(d)	(d)	(d)	(d)	(d)	(d)	(d)
Total . .	13,780	2,968,510	6,975	2,176,635	5,042	1,800,816	5,849	1,627,058	6,753	2,189,350

(a) Year ended June following.

(b) Estimated.

(c) Incomplete.

(d) Not available.

### § 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.**—(i) *Quantities.* The following table shows the quantity of gold produced in the several States and in Australia as a whole during each of the nine decennial periods from 1851 to 1940, and in single years from 1941 to 1946. 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 miners who preferred to keep the amount of their wealth secret.

#### GOLD : QUANTITY PRODUCED.

('000 fine ounces.)

Period.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia
1851-60 . .	2,715	21,973	3	..	..	186	..	24,877
1861-70 . .	3,220	15,327	489	..	..	3	..	19,039
1871-80 . .	2,019	9,564	2,527	136	..	165	19	14,430
1881-90 . .	1,014	6,689	3,259	58	42	357	168	11,487
1891-1900 . .	2,432	7,040	5,648	52	5,252	550	214	21,188
1901-10 . .	2,253	7,095	5,512	73	17,734	604	111	33,432
1911-20 . .	1,145	3,067	2,263	55	10,671	202	23	17,426
1921-30 . .	204	593	434	10	4,557	43	2	5,843
1931-40 . .	569	1,052	1,021	53	8,474	130	84	11,383
1941 . . . .	88	150	109	2	1,109	20	19	1,497
1942 . . . .	77	101	95	2	818	19	12	1,154
1943 . . . .	64	56	63	1	546	17	4	751
1944 . . . .	63	54	51	1	466	17	5	637
1945 . . . .	43	62	63	..	469	13	7	637
1946 . . . .	32	87	63	1	617	15	10	825
Total 1851-1946	15,938	72,910	21,600	444	50,835	2,341	678	164,746

The amount of gold raised in Australia in any one year attained its maximum in 1903, when 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, 1904; and Tasmania, 1899.

\* The values quoted in this section 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 1914-18 War, the production of gold in Australia declined from 3,837,979 fine oz. in 1903 to 427,160 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 abandoned propositions into profit. The output of gold rose annually from 467,742 fine oz. in 1930 to 1,645,697 fine oz. in 1939. Following the outbreak of war in 1939, production fell very slightly in 1940, and rapidly thereafter, due to the diversion of manpower, until in 1944 it was only 656,867 fine oz. In 1945, the year in which hostilities in the 1939-45 War ceased, production showed practically no change but in 1946 a marked increase of 167,267 fine oz. or 25 per cent. was recorded, the total production for the year being 824,480 fine oz.

(ii) *Values.* In the next table the gold produced since 1851 is valued in Australian currency. For the years 1851 to 1918 and 1925 to 1930 the price used was £4 4s. 11<sup>5</sup>/<sub>16</sub>d. per fine oz. For the years 1919 to 1924 the price ranged between £5 12s. 6d. in 1920 and £4 8s. 6d. in 1923. The value applied for 1931 and to June, 1932 was the export parity calculated directly from London prices. Since then the average price paid by the mines in Australia has been used.

## GOLD : VALUE OF PRODUCTION.

Period.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
1851-60..	11,530,583	93,337,052	14,565	..	..	788,564	..	105,670,764
1861-70..	13,676,103	65,106,264	2,076,494	..	..	12,174	..	80,871,035
1871-80..	8,576,654	40,625,188	10,733,048	579,068	..	700,048	79,022	61,293,028
1881-90..	4,306,541	28,413,792	13,843,081	246,668	178,473	1,514,921	713,345	49,216,821
1891-1900	10,332,120	29,904,152	23,989,359	219,931	22,308,524	2,338,336	906,988	89,999,410
1901-10..	9,569,492	30,136,686	23,412,395	310,080	75,540,415	2,566,170	473,871	142,009,109
1911-20..	4,988,377	13,354,217	9,876,677	238,808	46,808,351	873,302	100,652	76,240,384
1921-30..	940,946	2,721,309	1,976,715	47,564	20,462,957	193,833	(b) 11,545	26,354,866
1931-40..	5,115,397	9,444,570	9,118,903	459,330	74,391,204	1,164,492	786,790	100,480,689
1941 ..	941,244	1,600,016	1,164,621	17,908	11,852,452	212,710	201,599	15,990,550
1942 ..	807,436	1,060,910	994,214	13,930	8,865,806	191,835	126,035	12,060,166
1943 ..	666,491	590,541	656,657	5,423	5,710,663	180,209	40,880	7,850,864
1944 ..	657,163	568,305	538,176	5,662	4,899,384	174,888	57,803	6,901,381
1945 ..	461,303	661,430	676,712	2,970	5,012,225	139,573	76,811	7,031,024
1946 ..	344,497	936,262	675,164	6,760	6,640,075	165,334	105,376	8,873,466
Total 1851-1946	72,914,347	318,460,694	99,746,781	2,154,102	282,670,529	11,216,389	3,680,717	790,843,559

(a) Period July, 1911 to June, 1920.

(b) Period July, 1920 to December, 1930.

Values per fine oz. in Australian currency assigned to the production of gold during recent years are: £9 14s. 5<sup>3</sup>/<sub>16</sub>d. in 1939, £10 13s. 1<sup>3</sup>/<sub>16</sub>d. in 1940, £10 13s. 8d. in 1941, £10 9s. 0<sup>3</sup>/<sub>16</sub>d. in 1942, £10 9s. 0d. in 1943, £10 10s. 1<sup>3</sup>/<sub>16</sub>d. in 1944, £10 13s. 11<sup>1</sup>/<sub>16</sub>d. in 1945 and £10 15s. 3d. in 1946. Further information regarding the price of gold is given in Chapter XIV. "Private Finance".

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 State each year. With the exception of 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 the proportion contributed by Western Australia has increased and in 1946 represented 75 per cent. of the entire yield of Australia. The proportion contributed by this State for the period 1851 to 1946 was 31 per cent. and by Victoria for the same period 44 per cent.

4. **Place of Australia in the World's Gold Production.**—The table below shows, in decennial periods from 1851 to 1940, the world's gold production (as ascertained from authoritative sources) and the share of Australia therein. The details of world production shown for the years 1941 to 1945 are possibly less complete than those shown for previous years because of censorship during the war. The figures recorded for these years represent recorded production only and therefore omit any production for those countries not reporting. Included in this latter group are the Soviet Union, Japan and some other producing countries of lesser importance.

#### GOLD : WORLD PRODUCTION.

Period.	World Production of Gold.	Gold Produced in Australia.	Percentage of Australia on Total.
	Fine oz.	Fine oz.	%
1851-60 .. .. .	64,482,933	24,877,012	38.58
1861-70 .. .. .	61,098,343	19,038,661	31.16
1871-80 .. .. .	55,670,618	14,429,601	25.92
1881-90 .. .. .	51,280,184	11,586,625	22.59
1891-1900 .. .. .	101,647,521	21,187,662	20.84
1901-10 .. .. .	182,891,525	33,432,069	18.28
1911-20 .. .. .	206,511,263	17,426,466	8.44
1921-30 .. .. .	183,805,900	5,843,052	3.18
1931-40 .. .. .	315,508,597	11,383,487	3.61
1941 .. .. .	(a) 33,685,199	1,496,698	4.44
1942 .. .. .	(a) 29,858,342	1,153,787	3.86
1943 .. .. .	(a) 23,531,415	751,279	3.19
1944 .. .. .	(a) 20,903,289	656,867	3.14
1945 .. .. .	(a) 20,205,964	657,213	3.25

(a) Recorded production only. (See letterpress above.)

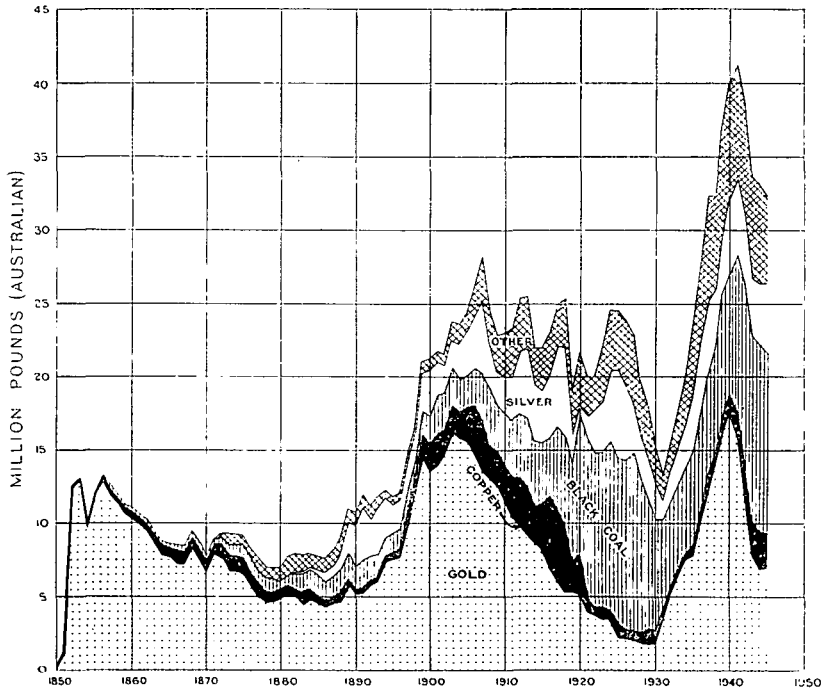
The quantities of gold produced in the principal producing countries in each of the years 1938 and 1942 to 1945 are shown in the table hereunder. Particulars of the quantities and values of gold produced in all countries for the ten years 1930-39 will be found in *Production Bulletin* No. 34, Part II., issued by this Bureau.

#### GOLD : PRODUCTION IN PRINCIPAL COUNTRIES.

Country.	1938.	1942.	1943.	1944.	1945.
	Fine oz.	Fine oz.	Fine oz.	Fine oz.	Fine oz.
Union of South Africa	12,161,392	14,126,852	12,804,379	12,279,629	12,224,629
Canada .. .. .	4,715,480	4,841,306	3,649,671	2,922,911	2,696,727
U.S.S.R. (Russia) ..	5,235,909	(a)	(a)	(a)	(a)
United States of America	4,245,377	3,583,080	1,380,758	1,022,238	915,403
Australia .. .. .	1,592,034	1,153,787	751,279	656,867	657,213
Philippine Islands ..	903,265	158,726	13,764	(a)	13,490
Korea .. .. .	948,447	868,069	411,529	118,057	96,452
Mexico .. .. .	923,819	801,325	631,537	508,882	524,017
Japan, including					
Formosa .. .. .	852,000	(a)	(a)	(a)	(a)
Rhodesia .. .. .	815,191	761,164	657,387	593,038	568,241

(a) Not available.

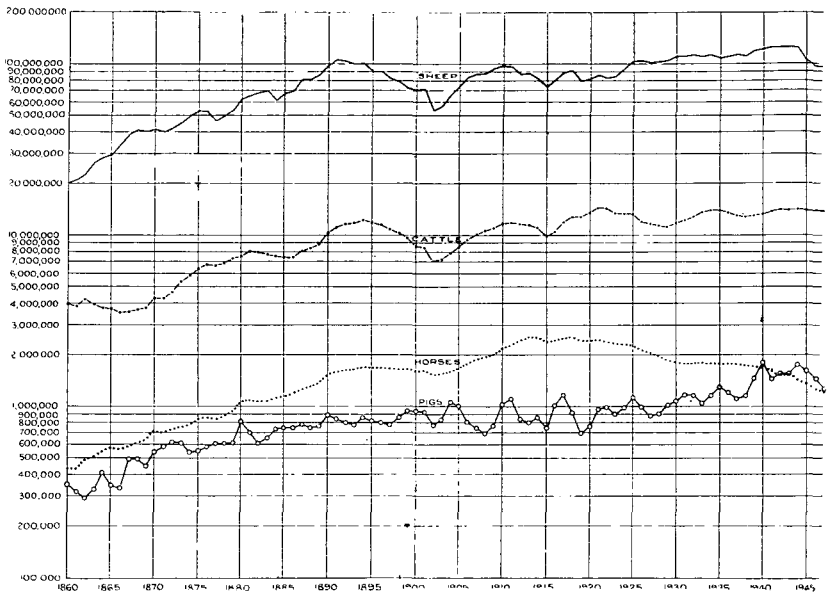
VALUE OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1850 TO 1945.



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 1917.



(See page 853.)

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.

The next table shows the average yearly production in the principal gold-producing countries for the decennium 1936 to 1945:—

**GOLD : AVERAGE ANNUAL PRODUCTION IN PRINCIPAL COUNTRIES,  
1936 TO 1945.**

Country.	Quantity.	Country.	Quantity.
	Fine oz.		Fine oz.
Union of South Africa ..	12,794,333	Mexico .. ..	751,468
U.S.S.R. (Russia) ..	(a) 4,500,750	Rhodesia .. ..	743,117
Canada .. ..	4,242,180	Japan, including Formosa (a)	752,868
United States of America ..	3,333,433	Korea .. ..	634,777
Australia .. ..	1,216,271	Philippine Islands ..	569,201

(a) Average eight years 1933 to 1940.

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 include prospectors, etc., so far as they are ascertainable, and include those who may not have worked during the whole of the year.

**GOLD-MINING : PERSONS EMPLOYED.**

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. 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
1933 ..	6,913	6,126	4,161	231	9,900	229	95	27,655
1938 ..	3,764	6,315	3,378	158	15,374	141	267	29,397
1942 ..	1,571	1,661	1,075	34	8,123	33	50	12,547
1943 ..	771	719	1,297	29	5,079	19	40	7,954
1944 ..	512	550	1,243	28	4,614	23	45	7,015
1945 ..	509	643	1,256	16	4,818	15	46	7,303

(a) Estimated.

(b) Year of maximum production for Australia.

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, employment in the industry rose more than five-fold to 33,113 in 1935, but thereafter the numbers employed declined each year to 7,015 in 1944. In 1945, following the cessation of hostilities and a relaxation of man-power control, an increase of nearly 300 was recorded.

6. **Tax on Gold.**—(i) *General.* The Commonwealth Government imposed a tax on gold produced in Australia or in any Territory under its jurisdiction and delivered to the Commonwealth Bank on or after 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.

The tax on gold yielded £1,214,621 during 1939-40; £1,452,260 during 1940-41; £1,030,425 in 1941-42; £524,694 in 1942-43; £317,720 in 1943-44; £342,457 in 1944-45; £383,552 in 1945-46 and £556,435 in 1946-47. This tax was suspended as from 20th September, 1947 by the Gold Tax Suspension Act 1947.

(ii) *Development of Gold Mining Industry.* Assistance amounting to £150,000 was given to the gold-mining industry, through the medium of the States, during 1940-41. In addition, an amount approximating £150,000 was paid during 1942 and subsequent years for the maintenance of those mines where, under man-power control, miners were transferred to other activities more directly associated with the war effort.

The suspension of the tax on gold referred to above was designed to assist the gold mining industry in meeting higher costs and to encourage a greater output.

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

### § 3. Silver, Lead and Zinc.

1. **Production.**—(i) *General.* The values of the production of silver, silver-lead ore and lead from the various States during each of the years 1938 and 1942 to 1945 are shown in the following table:—

SILVER AND LEAD : VALUE OF PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Terr.	Australia.
	£	£	£	£	£	£	£	£
1938 ..	3,520,465	647	926,614	70	29,477	267,773	..	4,745,046
1942 ..	4,168,421	2,227	1,034,550	477	23,916	358,966	..	5,588,557
1943 ..	3,752,672	2,278	230,837	62	16,475	333,058	..	4,335,382
1944 ..	4,058,935	1,280	14,733	309	15,807	313,618	..	4,414,682
1945 ..	4,625,665	1,622	17,788	601	22,757	259,560	..	4,927,993

(ii) *New South Wales.* (a) *General.* The figures for New South Wales for 1945 include silver to the value of £20,703 and silver-lead ore and concentrates valued at £4,604,962. Since the Sulphide Corporation Ltd. ceased smelting operations in 1922 the silver (metal) has been obtained chiefly in the refining of gold and copper ores, and there has been no production of lead (pig). 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 in 1945 decreased by 34,758 tons compared with the previous year, but owing to increased prices the value rose by more than £558,000.

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 understated.

(b) *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).

The value of output of the principal mines in the Broken Hill field totalled £207.3 million to the end of 1946.

(c) *Other Areas.* Silver is found in various other localities in New South Wales, the most important being at Captain's Flat where Lake George Mines produced concentrates estimated to contain 173,895 oz. of silver, 7,944 tons of lead and 13,399 tons of zinc in 1945. Production on a small scale recommenced during 1946 at Yerranderie.

(iii) *Victoria.* The silver produced in 1945 amounted to 14,861 oz., valued at £1,622, and was obtained in the refining of gold at the Melbourne Mint.

(iv) *Queensland.* The production of silver decreased from 3,055,435 oz. in 1942 to 112,710 oz. in 1945, whilst lead production dropped from 33,512 tons in 1942 to nil in 1945. This decrease was due to suspension of silver-lead and zinc operations by Mount Isa Mines Ltd. during the time it was engaged in producing copper.

(v) *South Australia.* In 1945 production amounted to 3,241 oz. valued at £513.

(vi) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1945 was 146,025 fine oz., valued at £22,757.

(vii) *Tasmania*. The silver produced in 1945 amounted to 816,157 fine oz., valued at £102,101, and the lead to 6,298 tons, valued at £157,459, produced in the Western Division of the State. Compared with previous years this represents a considerable decrease as regards both quantity and value. About 136,390 oz. of the total silver output were contained in silver-lead, 24,232 oz. in the blister copper produced by the Mount Lyell Co., and 655,535 oz. in zinc lead ore.

(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 very great in the years when any output was recorded.

2. **Production, Sales and Stocks of Refined Silver, 1939 and 1942-1946.**—The following table sets out as fully as possible the total production and distribution of refined silver in Australia. It is based on the data published by the Australian Mines and Metals Association and shows the stocks of refined silver in Australia, production and sales (locally and overseas) during the years 1939 and 1942 to 1946. Comparable figures for the year 1938 are not available.

**REFINED SILVER : PRODUCTION, SALES AND STOCKS, AUSTRALIA.**

Particulars.	1939.	1942.	1943.	1944.	1945.	1946.
	'000 fine oz.	'000 fine oz.	'000 fine oz.	'000 fine oz.	'000 fine oz.	'000 fine oz.
Stock from previous year ..	122	419	402	437	414	465
Production for year ..	9,552	9,508	8,263	7,176	7,464	6,183
<b>Total Supply</b> ..	<b>9,674</b>	<b>9,927</b>	<b>8,665</b>	<b>7,613</b>	<b>7,878</b>	<b>6,648</b>
Sold to Australian consumers	1,794	9,495	8,228	7,199	7,413	6,407
Exported or sold for export	7,518	30	..	..	..	..
Stock on hand at end of year	362	402	437	414	465	241
<b>Total Disposals and Stocks</b>	<b>9,674</b>	<b>9,927</b>	<b>8,665</b>	<b>7,613</b>	<b>7,878</b>	<b>6,648</b>
Silver Contents of Ores and Concentrates Produced ..	15,320	14,242	10,330	9,366	8,077	9,073

3. **World Production.**—The world's production of silver during the years 1938 and 1941 to 1945 is estimated to have been as follows :—

**SILVER : WORLD PRODUCTION.**

1938.	1941.	1942.(a)	1943.(a)	1944.(a)	1945.(a)
'000 fine oz.	'000 fine oz.	'000 fine oz.	'000 fine oz.	'000 fine oz.	'000 fine oz.
267,765	262,854	218,721	193,231	169,466	142,731

(a) Output of reporting countries.

The world's production of silver during 1938 amounted to about 268 million fine oz., of which Australia contributed 13.9 million fine oz., or 5.2 per cent. The production for Australia includes an estimate of the silver contents of the ores, bullion and concentrates exported.

The estimated yields of the principal silver-producing countries in 1945 (or the latest year available) were as follows :—

**SILVER : PRODUCTION IN PRINCIPAL COUNTRIES, 1945.**

Country.	Production.	Country.	Production.
	Fine oz. ( <sup>000</sup> omitted.)		Fine oz. ( <sup>000</sup> omitted.)
Mexico .. .. .	61,098	British India (including Burma) .. .. .	(a) 6,175
United States of America .. .. .	29,046	Belgian Congo .. .. .	4,138
Canada .. .. .	12,943	Yugoslavia .. .. .	(b) 2,570
Peru .. .. .	12,887	Union of South Africa .. .. .	1,243
Japan .. .. .	(a) 11,000	Argentina .. .. .	(c) 1,134
<b>Australia</b> .. .. .	<b>8,077</b>	Chile .. .. .	1,000
U.S.S.R. (Russia) .. .. .	(a) 7,000	Newfoundland .. .. .	665
Germany .. .. .	(b) 7,000		
Bolivia .. .. .	6,684		

(a) Year 1940.

(b) Year 1939.

(c) Year 1942.

4. **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. The chief sources of production are New South Wales, Queensland and Tasmania.

In the following table details of production, sales, and stocks are given for the years indicated and have been compiled from data supplied by the Australian Mines and Metals Association. Comparable figures for the year 1938 are not available.

**REFINED LEAD : PRODUCTION, SALES AND STOCKS, AUSTRALIA.**

Particulars.	1939.	1942.	1943.	1944.	1945.	1946.
	Ton.	Ton.	Ton.	Ton.	Ton.	Ton.
Stocks from previous year .. .. .	10,290	79,487	30,040	73,720	18,959	17,418
Production for year .. .. .	199,437	206,929	180,629	154,547	155,852	137,459
<b>Total Supply</b> .. .. .	<b>209,727</b>	<b>286,416</b>	<b>210,669</b>	<b>228,267</b>	<b>174,811</b>	<b>154,877</b>
Sold to Australian consumers .. .. .	32,217	48,122	40,583	29,853	30,198	42,040
Exported or sold for export .. .. .	164,684	208,254	96,366	179,455	127,195	88,111
Stock on hand at end of year .. .. .	12,826	30,040	73,720	18,959	17,418	24,726
<b>Total Disposals and Stocks</b> .. .. .	<b>209,727</b>	<b>286,416</b>	<b>210,669</b>	<b>228,267</b>	<b>174,811</b>	<b>154,877</b>
Lead Contents of Ores and Concentrates Produced .. .. .	280,003	263,183	206,376	180,485	164,741	184,314

5. Prices of Silver, Lead and Zinc.—In view of the close association in Australia, particularly in New South Wales, of ores containing these metals, the average prices in sterling of each metal on the London Metal Exchange during the years shown have been incorporated in the table hereunder. During 1942, 1943 and 1944, prices remained unchanged at the 1941 levels.

## PRICES OF SILVER, LEAD AND SPELTER.

(In Sterling).

Metal.		1938.	1940.	1941.	1945.	1946.	1947.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Silver	(Fine) per oz.	0 1 9.06	0 2 0.04	0 2 1.31	0 2 6.51	0 4 0.7	0 3 8.4
Lead	per ton	15 6 6	25 0 0	25 0 0	27 15 11	48 1 7	85 1 7
Spelter	„ „	14 1 7	25 15 0	25 15 0	28 16 7	43 1 11	70 0 0

(a) Maximum price as fixed by the British Ministry of Supply.

The prices of lead and zinc in Australia were fixed by Prices Regulation at £A22 per ton in February, 1940, and have continued at that level up to December, 1948. In January, 1949, the local price of lead was increased to £A35 per ton and zinc to £A40 per ton. The price of silver, however, was not so fixed and the following prices per fine oz. in Australia represent the export parity calculated directly from London prices:—2s. 3.8d. in 1939; 2s. 6.1d. in 1940; 2s. 7.5d. in the years 1941 to 1944; 3s. 2.2d. in 1945; 5s. 0.8d. in 1946 and 4s. 7.6d. in 1947.

6. Employment in Silver, Lead and Zinc-mining.—The average number of persons employed in mining for these metals during each of the years 1938 and 1942 to 1945 is given below:—

## SILVER, LEAD AND ZINC-MINING : PERSONS EMPLOYED.

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Terr.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1938	5,612	530	..	4	421	3	6,570
1942	4,104	471	..	..	509	..	5,084
1943	3,982	239	..	2	491	..	4,714
1944	3,896	..	..	..	470	..	4,366
1945	3,929	34	..	..	445	..	4,408

## § 4. Copper.

1. Production.—Copper is widely distributed throughout Australia. South Australia and New South Wales were once large producers but the output of these States is much less than it was in earlier years. The chief sources of production are now centred in Queensland and Tasmania.

The values of the local production as reported and credited to the mineral industry for the years 1938 and 1942 to 1945 are shown hereunder. Quantities for Australia as a whole, as returned by the several State Mines Departments, are appended at the foot of the table :—

## COPPER : PRODUCTION.

State.	1938.	1942.	1943.	1944.	1945.
	£	£	£	£	£
New South Wales ..	87,905	277,376	379,800	309,900	305,000
Queensland ..	203,967	625,375	1,111,049	1,644,747	1,500,662
South Australia ..	15,333	31,715	10,100	12,115	11,674
Western Australia ..	1,275	738	33	(a) 367	364
Tasmania ..	580,238	730,675	691,199	633,188	463,294
Northern Territory ..	4,362	..	2,393	1,878	3,811
Australia ..	893,080	1,665,879	2,194,574	(a) 2,602,195	2,284,805
	Tons.	Tons.	Tons.	Tons.	Tons.
Ingot, Matte, etc. ..	18,751	} 21,699	} 25,894	} (a) 20,365	} 25,850
Ore and Concentrates	935				

(a) Incomplete.

In the following table, details of the production, sales and stocks of refined copper, as compiled by the Australian Mines and Metals Association, are given for the years indicated. Comparable figures for the year 1938 are not available :—

## REFINED COPPER : PRODUCTION, SALES AND STOCKS, AUSTRALIA.

Particulars.	1939.	1942.	1943.	1944.	1945.	1946.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Stocks from previous year ..	1,342	988	972	587	800	2,611
Production for year ..	17,867	24,609	20,457	19,898	20,498	22,659
Total ..	19,209	25,597	21,429	20,485	21,298	25,270
Sold to Australian consumers	18,808	24,625	20,842	19,685	18,687	22,957
Exported or sold for export	100	..	..	..	..	1,000
Stocks on hand at end of year	301	972	587	800	2,611	1,313
Total ..	19,209	25,597	21,429	20,485	21,298	25,270

2. Sources of Production.—(i) *New South Wales.* Copper ores and concentrates produced in New South Wales in 1945 amounted to 3,050 tons with an estimated metallic content of 1,830 tons of copper.

(ii) *Queensland.* In 1945 the yield of metallic copper in this State amounted to 15,007 tons compared with 15,804 tons in 1944 and 10,758 tons in 1943.

The increased production was due principally to operations at Mount Isa where, in 1943, mining for copper was undertaken to meet the war-time demand whilst mining in this field for silver-lead and zinc was suspended. The returns from the chief producing areas in 1945 were as follows :—Mount Isa, 11,763 tons, and Mount Morgan, 3,005 tons.

(iii) *South Australia.* Deposits of copper are found over a large portion of South Australia and its total production to date exceeds that of any other State. Since the exhaustion of the ore reserves on the principal copper fields, output has diminished to negligible dimensions and in 1945, at 134 tons, was less than production in Queensland, Tasmania and New South Wales. Drilling operations were continued during 1945 on the Wallaroo lode.

(iv) *Western Australia.* During 1945, the quantity of copper reported was 40 tons valued at £364 compared with 46 tons for £367 in 1944.

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1945 was 7,473 tons, valued at £463,294, the Mount Lyell Mining and Railway Co. Ltd. accounting for the greater part of the production. This company treated 32,396 tons of ore and concentrates and produced blister copper, containing copper (7,197 tons), silver (24,232 oz.) and gold (4,853 oz.), the whole being valued at £771,102.

(vi) *Northern Territory.* Copper has been found at various places in the Territory. In 1945, 146 tons of concentrates were produced compared with 68 tons in 1944, and 96 tons in 1939.

3. *World Production of Copper.*—The world's production of copper during the years 1938 and 1942 to 1945 was estimated as follows. The figures have been obtained from authoritative sources but some countries did not report their production during the war years and in these cases estimates have been substituted.

#### COPPER : WORLD PRODUCTION.

(Tons of 2,240 lb.)

1938.	1942.	1943.	1944.	1945.
2,020,000	2,422,000	2,449,000	2,088,000	1,768,000

The yields from the principal copper-producing countries reporting in 1945 were as follows :—

#### COPPER : PRODUCTION IN PRINCIPAL COUNTRIES, 1945.

(Tons of 2,240 lb.)

Country.	Production.	Country.	Production.
United States of America ..	751,000	Yugoslavia .. ..	(a)
Chile .. .. .	455,000	<b>Australia</b> .. ..	<b>25,850</b>
Canada .. .. .	202,000	Peru .. .. .	24,000
Northern Rhodesia .. ..	194,000	Germany .. .. .	(a)
Belgian Congo .. .. .	(a)	Turkey .. .. .	9,000
U.S.S.R. (Russia) .. .. .	(a)	Belgium .. .. .	8,000
Mexico .. .. .	61,000	Spain .. .. .	6,000
Japan .. .. .	28,000	Bolivia .. .. .	6,000

(a) Not available.

During 1945 the share of the United States of America in the world's copper production amounted to 42 per cent. while the Australian proportion was about 1.5 per cent.



4. Prices.—At the outbreak of war in 1939, the price of copper in Australia and the United Kingdom was fixed by Regulation. Details of the average price for the years shown are given in terms of Australian currency and sterling in the following table :—

**AVERAGE PRICE PER TON OF COPPER IN AUSTRALIA AND UNITED KINGDOM.**

Country.	December, 1939.	1944.	1945.	1946.	1947.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Australia—in Australian currency .. ..	63 17 6	105 0 0	100 0 0	95 0 0	118 10 0
United Kingdom—in Sterling .. ..	62 0 0	62 0 0	62 0 0	77 4 0	130 12 4

5. Employment in Copper-mining.—The number of persons employed in copper-mining during each of the years 1938 and 1942 to 1945 was as follows :—

**COPPER-MINING : PERSONS EMPLOYED.**

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Terr.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1938 .. ..	13	213	67	4	1,015	5	1,317
1942 .. ..	79	419	52	5	1,595	7	2,157
1943 .. ..	260	864	36	1	1,577	1	2,739
1944 .. ..	210	919	37	..	1,549	4	2,719
1945 .. ..	145	814	3	2	1,473	5	2,442

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

**§ 5. Tin.**

1. Production.—The values of the production of tin as reported to the Mines Departments in each of the States during the years 1938 and 1942 to 1945 are given in the following table. A separate line is appended showing the production of refined tin as recorded by the Australian Mines and Metals Association for the years indicated.

**TIN : PRODUCTION.**

State.	1938.	1942.	1943.	1944.	1945.
	£	£	£	£	£
New South Wales .. ..	286,768	417,210	403,320	309,860	291,788
Victoria .. ..	28,650	19,173	14,162	12,835	9,869
Queensland .. ..	141,547	150,454	167,176	275,185	207,948
South Australia .. ..	..	..	10	..	..
Western Australia .. ..	7,421	4,634	2,315	(b) 2,351	4,370
Tasmania .. ..	244,037	297,919	246,218	235,612	240,369
Northern Territory .. ..	3,205	6,627	5,594	2,086	5,026
Total .. ..	711,628	896,017	838,795	(b)837,929	759,370
Refined Tin .. ..	Tons. (a)	Tons. 3,024	Tons. 2,565	Tons. 2,442	Tons. 2,359

(a) Not available.

(b) Incomplete.

2. Sources of Production.—(i) *New South Wales*. Production of tin in 1945 was stated at 776 tons of ingots, valued at £291,788, compared with 824 tons, valued at £309,860, in 1944. A large proportion of the output in this State is obtained in normal years by dredging, principally in the New England district.

(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 1945 amounted to 42 tons of concentrates, valued at £9,869, compared with 55 tons, valued at £12,835, in 1944.

(iii) *Queensland*. The chief producing districts in Queensland during 1945 were Herberton, 821 tons, valued at £182,432; Cooktown, 27 tons, £6,060; Stanthorpe, 38 tons, £9,527; Chillagoe, 25 tons, £5,404 and Kangaroo Hills, 16 tons, £3,883. The total production in 1945 amounted to 930 tons, valued at £207,948, compared with 1,232 tons, valued at £275,185 in 1944. It is interesting to compare these production figures with those recorded in the early years of this century when the output ranged between 2,000 and 5,000 tons per annum.

(iv) *Western Australia*. The quantity of tin reported in this State in 1945 amounted to 22 tons, valued at £4,370, and was obtained mainly in the Pilbara and Greenbushes fields.

(v) *Tasmania*. For 1945 the output amounted to 801 tons of tin, valued at £240,369 a decrease of 9 tons on the output of the previous year but, due to the rise in prices, the value was nearly £4,000 higher.

(vi) *Northern Territory*. The production for 1945 amounted to 23 tons of concentrates valued at £5,026, compared with 11 tons of concentrates valued at £2,086 produced during 1944.

3. World Production.—The world's production of tin during each of the years 1938 and 1940 to 1944 was as follows:—

**TIN : WORLD PRODUCTION.**  
(Tons of 2,240 lb.)

1938.	1940.	1941.	1942.	1943.	1944.
148,600	235,500	241,700	107,900	130,200	97,400

The production of tin reached its maximum in 1941 when 241,700 tons were recorded. The following are the chief producing countries of the world:—Malaya, Netherlands East Indies, Bolivia, Belgian Congo, Nigeria and Siam. Normally these countries produce about three-quarters of the total production.

The yields from the principal producing countries in 1944 were as follows:—

**TIN : PRODUCTION IN PRINCIPAL COUNTRIES, 1944.**  
(Tons of 2,240 lb.)

Country.	Production.	Country.	Production.
Bolivia .. .. .	38,809	China .. .. .	2,160
Belgian Congo .. .. .	16,858	United Kingdom .. .. .	1,289
Nigeria .. .. .	12,512	Argentina .. .. .	986
Malaya .. .. .	8,000	Burma .. .. .	775
Netherlands East Indies .. .. .	6,400	Portugal .. .. .	610
Siam .. .. .	3,296	Japan .. .. .	374
<b>Australia .. .. .</b>	<b>2,547</b>	Indo-China .. .. .	357

Australia's share of the world's tin production, estimated at 97,400 tons in 1944, was about 2.6 per cent.

4. Prices.—At the outbreak of war in September, 1939, the price of tin in Australia and London was fixed by Regulation. Details of the movement in average prices for the years shown are given in terms of Australian currency and sterling in the following table:—

**AVERAGE PRICE PER TON OF TIN IN AUSTRALIA AND UNITED KINGDOM..**

Country.	December, 1939.	1944.	1945.	1946.	1947.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Australia—In Australian currency .. .. .	299 0 0	376 0 0	376 0 0	376 0 0	438 15 0
United Kingdom—in Ster- ling .. .. .	271 0 0	300 0 0	300 0 0	336 2 10	425 18 7

5. Employment in Tin-mining.—The number of persons employed in tin-mining during the years 1938 and 1942 to 1945 was as follows:—

**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.
1938 .. .. .	1,440	5	1,263	73	1,123	15	3,919
1942 .. .. .	1,243	3	589	15	801	(b) 49	(c) 2,702
1943 .. .. .	1,175	4	599	7	847	(b) 45	(c) 2,679
1944 .. .. .	927	26	532	5	834	(b) 46	2,370
1945 .. .. .	814	4	465	13	736	(b) 48	2,080

(a) The tin produced in Victoria was raised by a dredging company operating primarily for gold  
(b) Including some engaged in mining for tantalite. (c) Includes two miners in South Australia.

**§ 6. Zinc.**

1. Production : States.—(i) *New South Wales.* The production of zinciferous concentrates is confined chiefly to the Broken Hill district of New South Wales, where zincblende forms one of the chief constituents in the enormous deposits of sulphide ores. The re-opening in 1937 of the mine at Captain's Flat by the Lake George Mines, Ltd. was an important development. Production commenced in 1939. Details of the zinc contents of ores and concentrates produced at this mine are given in the table below.

As the metallic contents of the bulk of the concentrates, etc., produced from these fields 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 1945 the zinc concentrates produced amounted to 265,284 tons, valued at £1,073,340. Portion of the zinc concentrates produced is treated at Risdon in Tasmania and the balance is exported, mainly to the United Kingdom and the United States of America. The production from these concentrates treated by the Electrolytic Zinc Company of Australia Ltd. at Risdon amounted to 65,263 tons of zinc, 190.87 tons of cadmium and 13.7 tons of cobalt oxide in 1945. This is referred to in the Tasmanian production below.

(ii) *Queensland.* The production of zinc in the Cloncurry district of Queensland during 1943 was 5,077 tons, valued at £76,158, compared with 21,035 tons, valued at £394,412 in 1942 and 4,411 tons, valued at £68,863, obtained in 1935. The metal was produced by the Mount Isa Mines Ltd. and was exported overseas as concentrates. There was no production in 1944 and 1945 but operations were resumed in 1946, the output reaching 11,361 tons.

(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 1945, 15,609 tons of zinc, valued at £407,307, were obtained from Tasmanian ores, as well as 29 tons of cadmium valued at £13,161 and 5 cwt. of cobalt oxide valued at £136.

In addition to the foregoing the Electrolytic Zinc Company of Australia Ltd. at Risdon operated on raw materials obtained from Broken Hill in New South Wales. Production from this source during 1945 amounted to 65,263 tons of slab zinc, valued at £1,501,049, 190.87 tons of cadmium, valued at £85,510 and 13.7 tons of cobalt oxide, valued at £6,291.

2. **Production : Australia.**—The details furnished above do not adequately convey the potentialities of Australia as a producer of zinc. A better indication is given in the following table which shows the estimated zinc contents of ores and concentrates produced in Australia according to data compiled by the Australian Mines and Metals Association. Comparable figures for 1938 are not available.

#### ZINC CONTENTS OF ORES AND CONCENTRATES PRODUCED.

Year.	New South Wales.			Queensland.	Tasmania.	Australia.
	Broken Hill.	Lake George.	Total.	Mt. Isa.	Rosebery.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1939..	145,207	11,850	157,057	29,092	31,107	217,256
1940..	161,449	19,358	180,807	29,584	32,338	242,729
1941..	171,872	18,930	190,802	27,447	30,595	248,844
1942..	151,128	21,309	172,437	21,035	28,362	221,834
1943..	128,092	23,242	151,334	5,077	26,430	182,841
1944..	128,384	19,657	148,041	..	26,317	174,358
1945..	118,566	11,893	130,459	..	19,854	150,313
1946..	142,983	15,187	158,170	11,269	22,678	192,117

In the next table details are given of the quantity of refined zinc produced in Australia, the quantity sold and stocks held for the years 1939 and 1942 to 1946, according to data compiled by the Australian Mines and Metals Association. Comparable figures for 1938 are not available.

#### REFINED ZINC : PRODUCTION, SALES AND STOCKS, AUSTRALIA.

Particulars.	1939.	1942.	1943.	1944.	1945.	1946.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Stocks from previous year ..	3,225	2,115	4,420	3,314	11,295	4,786
Production for year ..	71,220	74,282	75,756	78,716	83,773	76,316
Total ..	74,445	76,397	80,176	82,030	95,068	81,102
Sold to Australian consumers	31,088	54,526	32,958	19,828	26,639	35,984
Exported or sold for export ..	43,137	17,451	43,904	50,907	63,643	44,587
Stocks on hand at end of year	220	4,420	3,314	11,295	4,786	531
Total ..	74,445	76,397	80,176	82,030	95,068	81,102

3. **World Production.**—The world's production of zinc ore in terms of metal during the seven years 1938 to 1944, was as follows :—

**ZINC : WORLD PRODUCTION.**  
(Tons of 2,240 lb.)

1938.	1939.	1940.	1941.	1942.	1943.	1944.
1,840,000	1,920,000	1,970,000	2,110,000	2,160,000	2,110,000	2,030,000

Particulars of the production of zinc ore, expressed in terms of metal, are given in the following table for the principal producing countries for 1944.

**ZINC : PRODUCTION IN PRINCIPAL COUNTRIES, 1944.**  
(Tons of 2,240 lb.)

Country.	Production.	Country.	Production.
United States of America ..	641,645	Newfoundland .. ..	53,125
Canada .. ..	286,815	Sweden .. ..	32,389
Germany .. ..	250,000	Spain .. ..	30,000
Mexico .. ..	215,507	Italy .. ..	19,224
<b>Australia .. ..</b>	<b>174,358</b>	Rhodesia .. ..	18,872
U.S.S.R. (Russia) .. ..	(a)	Bolivia .. ..	16,061
Japan .. ..	74,672	Belgian Congo .. ..	15,300
Peru .. ..	56,207		

(a) Not available.

The production of Australia quoted above represents the metallic contents of zinc ores produced during 1944 and is equal to 8·6 per cent. of world output. The quantity of zinc metal extracted in Australia in that year was 78,716 tons.

4. **Prices and Employment.**—Information regarding prices of zinc and employment in zinc-mining will be found on page 821.

## § 7. Iron.

1. **General.**—Although iron ore is widely distributed throughout Australia, the only known ore bodies of large extent and high grade which are easy of 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. Bearing in mind the expansion of the iron industry in Australia, and the limitations of these reserves, the Commonwealth Government prohibited the export of iron ore from 1st July, 1938. A survey of the iron ore resources of Australia undertaken by the Commonwealth Geologist was completed at the end of 1940.

2. **Production.**—(i) *New South Wales.* The production in 1935 of pig-iron from ores mined in New South Wales amounted to 4,580 tons, valued at £18,320. No iron ores were produced from 1935 until 1941 when 202,180 tons of ore were mined. In 1942, 375,297 tons were mined but only 86,185 tons in 1945. 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 gas-works 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 1945 the iron oxide raised amounted to 8,062 tons, valued at £5,549. 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, in comparison with the more favourable deposits of South Australia, preclude their exploitation. In 1945, 1,715 tons of ore were obtained 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 1939, when 2,571,759 tons of ore valued at £2,957,523 were raised. The production of 1,519,594 tons, valued at £1,747,533, for 1945, represents a decrease of 1,052,165 tons and £1,209,990 on the 1939 figures.

(iv) *Western Australia.* The development of the deposits at Yampi Sound was discontinued in 1938 as a result of the embargo on exports. However, in 1942, production of iron ore was reported for the first time since 1938; it amounted to 150 tons, valued at £225. Production in 1943 amounted to 84 tons valued at £128, but up to 1945 no further production had been recorded.

At the end of 1944 Australian Iron & Steel Co. Ltd., on behalf of Broken Hill Proprietary Co. Ltd., started preliminary work connected with the development and mining of the iron ore on Cockatoo Island, and it was estimated that substantial output would not be attained for two years. The ore would be mixed with the iron ore from the Iron Monarch mine in South Australia to reduce the manganese content of the furnace charge to an acceptable figure. The Iron Monarch ore has a high manganese content.

The production of pyrites from which sulphuric acid is obtained for the manufacture of superphosphate has shown a marked expansion in Western Australia. Since 1942, when production amounted to 368 tons, it has risen to 66,504 tons in 1945.

(v) *Tasmania.* There has been no production of ironstone in Tasmania since 1943 when 7 tons, valued at £14 were produced. The production of iron pyrites, which in 1945 amounted to 40,168 tons, valued at £50,208, 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.

Reference to the iron ore deposits in the various States appears in preceding issues of the Official Year Book (see No. 22, pp. 777-9).

3. **Iron and Steel Bounties.**—During 1945-46 the bounties paid under the Bounties Acts on articles manufactured from locally produced materials were as follows:—Wire-netting, £349; traction engines, £10,095. Corresponding amounts paid during 1944-45 were £496 and £13,317 respectively.

4. **Production of Iron and Steel—Principal Countries.**—(i) *General.* Particulars of the production in the principal countries during the years 1938, 1944 and 1945 according to figures published by the Imperial Institute and the Statistical Office of the United Nations are shown in the next table.

## PIG-IRON AND STEEL : PRODUCTION IN PRINCIPAL COUNTRIES.

Country.	Pig-iron and Ferro-alloys.			Steel Ingots and Castings.		
	1938.	1944.	1945.	1938.	1944.	1945.
	Thousands of Tons (2240lb.).			Thousands of Tons (2240lb.).		
United States America	19,161	56,131	48,339	28,350	80,037	71,138
Germany ..	17,760	13,158	(a)	22,268	18,005	(a)
U.S.S.R. (Russia) ..	14,756	(a)	(a)	17,500	(a)	(a)
United Kingdom ..	6,761	6,737	7,096	10,398	12,142	11,819
Canada ..	761	1,807	1,759	1,155	2,693	2,574
France ..	5,977	2,847	1,169	6,040	3,043	1,629
<b>Australia (b) ..</b>	<b>930</b>	<b>1,305</b>	<b>1,118</b>	<b>1,230</b>	<b>1,641</b>	<b>1,447</b>
India ..	1,571	1,443	1,334	936	1,369	1,275
Sweden ..	701	872	764	957	1,179	1,181
Japan ..	2,535	2,637	496	6,367	6,725	1,051
Czechoslovakia ..	1,215	1,535	567	1,710	2,457	933
Belgium ..	2,388	701	720	2,243	621	720
Spain ..	433	552	463	567	604	551
Union of South Africa	290	464	547	341	476	531
Poland ..	948	(a)	248	1,527	1,380	531
Luxemburg ..	1,526	1,327	307	1,514	1,249	260
Brazil ..	..	287	256	..	217	203
Mexico ..	110	133	..	72	178	189
Austria ..	542	942	(a)	663	979	(a)
Hungary ..	330	390	12	638	638	126
Italy ..	914	227	(a)	2,271	1,063	(a)
<b>Total—All Countries</b>	<b>81,000</b>	<b>112,000</b>	<b>(a)</b>	<b>107,600</b>	<b>158,000</b>	<b>(a)</b>

(a) Not available.

(b) Year ended 30th June.

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. In South Australia, the Broken Hill Pty. Co. Ltd. established a blast furnace at Whyalla which was blown in during May, 1941, and continued to operate until May, 1944. Production was resumed during April, 1946.

(ii) *Australia.* The production of steel and pig-iron in Australia, of which New South Wales is the main producing State, is shown for each of the years 1936-37 to 1945-46.

## PIG-IRON AND STEEL : AUSTRALIAN PRODUCTION.

Year ended 30th June—	Pig-iron.	Steel Ingots.	Blooms and Billets.	Year ended 30th June—	Pig-iron.	Steel Ingots.	Blooms and Billets.
	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.
1937 ..	913,406	1,079,854	963,993	1942 ..	1,557,641	1,699,793	1,699,447
1938 ..	929,676	1,167,340	1,021,243	1943 ..	1,399,306	1,632,825	1,583,417
1939 ..	1,104,605	1,171,787	1,120,142	1944 ..	1,305,357	1,527,564	1,393,919
1940 ..	1,212,006	1,292,115	1,266,156	1945 ..	1,117,709	1,356,913	1,236,528
1941 ..	1,475,707	1,647,108	1,631,679	1946 ..	906,283	1,061,918	1,036,501

## § 8. Other Metallic Minerals.

1. **Wolfram and Scheelite.**—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. Production during 1938 and the four years 1942 to 1945 is shown in the following table :—

## WOLFRAM AND SCHEELITE : PRODUCTION.

Particulars.		1938.	1942.	1943.	1944.	1945.
WOLFRAM.						
New South Wales	cwt.	1,877	760	840	605	620
	£	25,740	11,655	14,033	10,982	9,604
Victoria ..	cwt.	..	42	282	60	..
	£	..	1,059	5,041	1,005	..
Queensland ..	cwt.	3,015	3,803	3,027	3,931	2,599
	£	30,779	63,296	56,778	73,445	48,176
South Australia ..	cwt.	..	..	3	1	..
	£	..	6	10	10	..
Western Australia	cwt.	..	4	..	..	..
	£	..	115	80	..	..
Tasmania ..	cwt.	5,982	3,660	4,600	4,838	4,220
	£	63,348	58,397	82,965	86,749	69,896
Northern Territory	cwt.	8,694	3,016	3,769	1,841	2,540
	£	78,277	43,734	58,166	31,583	42,937
Total ..	cwt.	19,568	11,285	12,521	11,276	9,979
	£	198,144	178,262	217,073	203,774	170,613

## SCHEELITE.

New South Wales	cwt.	184	260	460	360	340
	£	2,472	5,807	9,185	7,247	7,111
Queensland ..	cwt.	13	28	48	52	101
	£	93	546	889	988	2,018
Western Australia	cwt.	..	1	5	39	16
	£	..	357	2,664	21,420	8,946
Tasmania ..	cwt.	611	4,300	3,984	644	10,560
	£	6,193	71,353	68,908	10,848	158,093
Total ..	cwt.	808	4,589	4,497	1,095	11,017
	£	8,758	78,063	81,646	40,503	176,168

2. **Cadmium and Cobalt.**—Cadmium is extracted at Risdon in Tasmania as a by-product from ores mined at Broken Hill in New South Wales, and on the west coast of Tasmania.



Cobalt as an oxide is recovered from the treatment of silver, lead and zinc ores of Broken Hill and Tasmanian origin in the same way as is cadmium. The production of cobalt and cadmium is shown for the years 1938 and 1942 to 1945 in the following table :—

**CADIUM AND COBALT : PRODUCTION.**

Year.	Cadmium.				Cobalt Oxide.			
	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.	£
1938 .. ..	2,943	980	3,923	79,406	377	12	389	8,084
1942 .. ..	2,436	828	3,264	72,218	325	45	370	8,981
1943 .. ..	2,344	807	3,151	70,609	274	13	287	6,604
1944 .. ..	4,206	794	5,000	112,046	258	8	266	6,092
1945 .. ..	3,818	588	4,406	98,671	274	5	279	6,427

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

3. **Platinum and Platinoid Metals.**—(i) *Platinum.* (a) *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 1945 from all divisions amounted to 2 oz. valued at £22. The total production recorded to the end of 1943 amounted to 20,243 oz., valued at £128,996.

(b) *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.

(c) *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.

(ii) *Osmium, Iridium, etc.* (a) *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. There was no production of these metals during 1945.

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

(c) *Tasmania.* The yield of osmiridium was returned as 109 oz. in 1945, valued at £2,665, compared with the record production in 1925 of 3,365 oz., 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 (although the price rose to £24 19s. 1d. per oz. in 1940 and reached £24 10s. 6d. in 1945), but the depletion of the known alluvial deposits was also a factor.

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

§ 9. Coal.

1. Production in each State.—An account of the discovery of coal in each State appears 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 1915, 1925, 1935, 1938 and for each of the years 1942 to 1945 are shown in the following table :—

BLACK COAL : PRODUCTION.

Year.	N.S.W.	Victoria.(a)	Q'land.	S. Aust.	W. Aust.	Tasmania.	Australia.
QUANTITY.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1915 ..	9,449,008	588,104	1,024,273	..	286,666	64,536	11,412,587
1925 ..	11,396,199	534,246	1,177,173	..	437,461	81,698	13,626,777
1935 ..	8,698,579	476,495	1,051,978	..	537,188	123,714	10,887,954
1938 ..	9,570,930	307,258	1,113,426	..	604,792	83,753	11,680,159
1942 ..	12,236,219	312,854	1,637,148	1,650	581,176	134,442	14,903,489
1943 ..	11,528,893	287,100	1,699,521	..	531,546	145,882	14,192,942
1944 ..	11,102,138	257,092	1,659,675	34,620	558,322	143,641	13,756,088
1945 ..	10,237,886	247,297	1,634,746	41,452	543,393	149,077	12,853,821
VALUE.(b)							
	£	£	£	£	£	£	£
1915 ..	3,424,630	274,770	409,342	..	137,859	30,418	4,277,019
1925 ..	9,302,515	596,117	1,037,956	..	363,203	70,424	11,370,215
1935 ..	4,887,341	282,253	843,034	..	318,013	86,204	6,416,845
1938 ..	5,603,842	188,101	958,884	..	375,083	61,991	7,187,901
1942 ..	9,472,363	411,107	1,698,231	1,650	461,495	108,241	12,153,087
1943 ..	9,290,095	429,358	1,824,591	..	489,721	117,361	12,151,126
1944 ..	9,206,063	407,793	1,785,621	12,117	583,076	122,673	12,117,343
1945 ..	8,694,168	494,690	1,759,311	14,508	572,896	125,719	11,661,292

(a) Excludes brown coal, shown in next table.

(b) At the pit's mouth.

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

BROWN COAL : PRODUCTION IN VICTORIA.

Year.	Quantity.	Value.(a)	Year.	Quantity.	Value.(a)
	Tons.	£		Tons.	£
1915 ..	2,864	573	1942 ..	4,933,861	469,699
1925 ..	876,468	166,404	1943 ..	5,091,729	528,666
1935 ..	2,221,515	317,444	1944 ..	5,016,437	566,444
1938 ..	3,675,450	351,721	1945 ..	5,445,108	641,069

(a) Cost of production.

2. Distribution and Production of Coal in each State.—(i) *New South Wales.*—The coal deposits of New South Wales are 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 districts is essentially a steaming

coal. The Grota 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 the most important coal-mining district in Australia.

The following table shows the yields in each of the three districts during the four years 1942 to 1945 compared with 1938 :—

**COAL : PRODUCTION IN DISTRICTS OF NEW SOUTH WALES.**

District.	1938.	1942.	1943.	1944.	1945.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern .. ..	6,294,213	8,300,356	7,854,173	7,363,484	6,821,646
Southern .. ..	1,831,408	2,303,071	2,175,935	2,040,453	1,791,891
Western .. ..	1,445,309	1,632,792	1,498,785	1,698,201	1,624,349
Total .. ..	9,570,930	12,236,219	11,528,893	11,102,138	10,237,886
Total Value (a) £ ..	5,603,842	9,472,363	9,290,095	9,206,063	8,694,168
Average value per ton (a) .. ..	11s. 8½d.	15s. 6d.	16s. 1d.	16s. 7d.	17s. 0d.

(a) At the pit's mouth.

The production of coal in New South Wales exceeded 10 million tons in each year from 1920 to 1927, the maximum annual production in this period being in 1924, when 11,618,000 tons were produced. Consequent upon the economic depression, production fell to 6,400,000 tons in 1931, but steadily increased each year to 10,051,519 tons in 1937. Production declined by 480,000 tons in 1938 but rose to 11,195,832 tons in 1939. A decrease of 1,646,000 tons in 1940 was followed in the next two years by increased production, the highest output yet recorded, namely 12,236,219 tons being registered in 1942. Production decreased during the next three years by 707,000, 427,000 and 864,000 tons respectively and stood at 10,237,886 tons in 1945. Of the total quantity of coal won in New South Wales since the commencement of operations to the end of 1945, namely, 500 million tons, about 339 million tons or 68 per cent. was obtained in the Northern District, 101 million tons or 20 per cent. in the Southern District, and 60 million tons or 12 per cent. in the Western District.

(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 1945 amounted to 20,016,228 tons, valued at £16,356,482.

The output of black coal in Victoria during each of the four years ended 1945 compared with 1938 was as follows :—

**BLACK COAL : PRODUCTION IN VICTORIA.**

Year.	State Coal-mine.	Other Coal-mines.	Total Production.	Total Value. (a)
	Tons.	Tons.	Tons.	£
1938 .. ..	253,065	54,193	307,258	188,101
1942 .. ..	270,754	42,100	312,854	411,107
1943 .. ..	253,359	33,741	287,100	429,358
1944 .. ..	224,313	33,379	257,692	407,793
1945 .. ..	213,710	33,587	247,297	494,690

(a) At the pit's mouth.

(b) *Brown Coal. General.* Victoria is richly endowed, both in quantity and quality, with 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 1945 amounted to 5,445,108 tons, all but 30,639 tons being procured at the State open cut at Yallourn. During 1945-46 5,534,000 tons of brown coal were produced by the State Electricity Commission, of which 3,525,000 tons went to the power station, 1,923,000 tons to the briquette factory and 86,000 tons to other factories for use as fuel.

*Production of Briquettes.* The briquetting plant started operations in November, 1924, and the output, which in 1926 was 95,477 tons, had increased to 180,905 tons in 1930 and to 493,000 in 1945-46. Two and a half tons of brown coal are required to make one ton of briquettes.

The table following shows the production and distribution of brown coal, and the production of briquettes in Victoria for the years 1942-43 to 1945-46, compared with 1938-39.

**BROWN COAL : PRODUCTION AND UTILIZATION, VICTORIA.**  
(‘000 tons.)

Year.	Total Production.	Brown Coal used as fuel.		Brown Coal used as Material in Production of Briquettes.	Production of Briquettes.
		Generating Station.	Briquette Works.		
1938-39 .. .. .	3,643	2,096	516	1,031	400
1942-43 .. .. .	4,978	3,344	545	1,089	415
1943-44 .. .. .	4,829	3,215	538	1,076	417
1944-45 .. .. .	5,249	3,527	574	1,148	431
1945-46 .. .. .	(a) 5,534	3,525	641	1,282	493

(a) Includes 86,000 tons used by other factories.

(iii) *Queensland.* The distribution of production during 1938 and the years 1942 to 1946 was as follows:—

**COAL : PRODUCTION IN QUEENSLAND.**

District.	1938.	1942.	1943.	1944.	1945.	1946.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Ipswich .. .. .	547,901	751,177	755,660	802,269	812,641	823,737
Bowen .. .. .	224,778	347,381	400,931	316,016	292,043	234,512
Clermont .. .. .	88,407	142,607	147,179	145,237	177,331	161,777
Maryborough .. .. .	77,162	127,975	136,541	128,606	113,578	103,929
Darling Downs .. .. .	76,571	112,230	115,004	126,950	112,666	107,555
Rockhampton .. .. .	64,174	119,673	107,332	108,043	95,799	82,099
(Mount Mulligan)	19,192	17,544	17,533	18,961	19,960	22,193
Mount Morgan .. .. .	13,608	18,561	19,341	13,593	10,728	31,118
Mackay .. .. .	1,543	..	..	..	..	..
Total .. .. .	1,113,426	1,637,148	1,699,521	1,659,675	1,634,746	1,567,520

The production of 1,699,521 tons in 1943 represents the highest annual production to date.

(iv) *South Australia.* A new field of sub-bituminous coal was opened up at Leigh Creek, South Australia, in 1942 when 1,650 tons, valued at £1,650 were produced. There was no production in 1943, but in 1944, 34,620 tons, valued at £12,117, were produced and 41,452 tons, valued at £14,508, in 1945.

Details of production (which is by open-cut methods) and employment are given in the following table for the years 1942 to 1945.

**COAL : PRODUCTION AND EMPLOYMENT IN SOUTH AUSTRALIA.**

Year.				Production.	Value.	Numbers Employed.
				Tons.	£	No.
1942	..	..	..	1,650	1,650	12
1943	..	..	..	..	..	..
1944	..	..	..	34,620	12,117	91
1945	..	..	..	41,452	14,508	100
Total to 1945				77,722	28,275	..

(v) *Western Australia.* Details of the quantity of coal raised on the Collie coal-fields in Western Australia and the men employed are given in the table below for the years 1942 to 1945, compared with 1938.

**COAL : PRODUCTION AND EMPLOYMENT IN WESTERN AUSTRALIA.**

Year.	Production.	Value.	Men employed.		
			Above ground.	Below ground.	Total.
			No.	No.	No.
1938	604,792	375,083	158	607	765
1942	581,176	461,495	175	647	822
1943	531,546	489,721	188	650	838
1944	558,323	583,076	207	673	880
1945	543,363	572,896	224	636	860

(vi) *Tasmania.* Details of the production of coal in Tasmania and the numbers employed are given in the following table for the years 1942 to 1944, compared with 1938. The chief source of coal supplies in this State is the Cornwall Coal Mine situated on the east coast which produced 83,253 tons in 1945 or 56 per cent. of the State's output.

**COAL : PRODUCTION AND EMPLOYMENT IN TASMANIA.**

Year.				Production.	Value.	Men employed.
				Tons.	£	No.
1938	..	..	..	83,753	61,991	269
1942	..	..	..	134,442	108,241	243
1943	..	..	..	145,882	117,361	278
1944	..	..	..	143,641	122,673	277
1945	..	..	..	149,077	125,719	279

(vii) *Australia's Coal Reserves.* The latest available estimate of the actual and probable coal reserves of Australia is based upon that prepared by the Coal and Lignites Panel of the Power Survey Sectional Committee of the Standards Association of Australia and issued in a report prepared in 1947. 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.	Anthracitic and Bituminous Coals.	Sub-bituminous and Lignite Coals.
New South Wales .. .. .	11,668	50
Victoria .. .. .	33	37,000
Queensland .. .. .	1,704	67
South Australia .. .. .	..	650
Western Australia .. .. .	..	800
Tasmania .. .. .	244	..
<b>Total .. .. .</b>	<b>13,649</b>	<b>38,567</b>

3. **Production in Various Countries.**—The total known coal production of the world in 1944 amounted to about 1,710 million tons, towards which Australia contributed about 18.8 million tons, or about 1 per cent. The following tables show the production of the chief British and foreign countries during each of the three years 1943 to 1945 compared with 1938:—

**COAL : PRODUCTION IN BRITISH EMPIRE.**  
(Thousands of Tons, 2,240 lb.)

Country.	Black Coal.				Brown Coal, Lignite.			
	1938.	1943.	1944.	1945.	1938.	1943.	1944.	1945.
United Kingdom .. .. .	227,015	198,844	191,725	182,255	..	..	..	..
British India .. .. .	29,052	22,776	23,780	25,999	..	..	..	..
Canada .. .. .	9,223	14,452	13,968	13,318	3,540	1,488	1,228	1,370
Australia .. .. .	11,680	14,103	13,756	12,854	3,675	5,092	5,016	5,445
New Zealand .. .. .	978	1,133	1,063	1,063	1,244	1,653	1,736	1,747
Union of South Africa .. .. .	16,027	19,895	22,268	22,729	..	..	..	..
Southern Rhodesia .. .. .	1,027	1,747	1,783	1,841	..	..	..	..

(a) Coal sold.

**COAL : PRODUCTION IN FOREIGN COUNTRIES.**  
(Thousands of Tons, 2,240 lb.)

Country.	Black Coal.				Brown Coal, Lignite.			
	1938.	1943.	1944.	1945.	1938.	1943.	1944.	1945.
United States of America .. .. .	349,684	578,635	607,789	563,001	2,677	2,455	2,281	(a)
Germany .. .. .	183,238	156,067	133,101	40,546	191,899	250,513	227,099	106,040
France .. .. .	45,770	39,908	24,854	32,836	1,041	1,866	1,311	1,665
Japan .. .. .	47,915	54,644	48,539	22,009	..	..	..	..
Poland .. .. .	37,502	89,646	86,009	24,795	9	..	..	..
Belgium .. .. .	29,118	23,366	13,283	15,467	..	..	..	..
Czechoslovakia .. .. .	15,900	24,216	22,859	11,240	15,779	27,145	26,424	15,172
Netherlands .. .. .	13,275	12,291	8,182	5,006	168	378	236	130
Spain .. .. .	5,559	9,439	10,319	10,461	163	1,094	1,183	(c)
Turkey .. .. .	2,548	3,117	3,507	3,660	143	414	523	504
Chile .. .. .	2,011	2,232	2,243	2,019	..	..	..	..
Brazil .. .. .	871	2,043	1,877	2,043	..	..	..	..
Hungary .. .. .	1,026	1,346	1,240	685	8,186	10,615	9,918	4,050
Mexico .. .. .	879	1,037	889	900	..	..	..	..
China .. .. .	4,600	744	744	614	..	..	..	..
Portugal .. .. .	303	401	425	425	18	105	125	161
Austria .. .. .	222	211	191	(c)	3,477	3,588	3,616	2,031
Bulgaria .. .. .	140	(c)	(c)	(c)	1,826	3,755	2,846	3,377
Greece .. .. .	..	..	..	..	106	366	177	71

(a) Included with black coal!

(b) Includes Silesia, which is not included with Germany.

(c) Not available.

World production of coal amounted to 1,440 million tons in 1938 rising to 1,750 million tons in 1943 but declining to 1,710 million tons in 1944. Of these quantities those produced in the British Commonwealth totalled 304 million or 21 per cent. in 1938, 286 million or 16 per cent. in 1943 and 281 million tons or 16 per cent. in 1944.

4. Exports.—(i) *General.* The quantity of coal of Australian production (excluding bunker coal) exported to other countries in 1946-47 was 44,375 tons, valued at £54,754, from New South Wales. The quantities and values of the oversea exports of Australian coal for the years specified are shown in the following table :—

**COAL : OVERSEA EXPORTS, AUSTRALIA.**

Year.	Quantity.		Value.		Year.	Quantity.		Value.	
	Tons.		£			Tons.		£	
1913 ..	2,098,505	1,121,505	1943-44 ..	157,741	182,354				
1921-22 ..	1,028,767	1,099,899	1944-45 ..	189,198	223,677				
1931-32 ..	344,015	341,800	1945-46 ..	75,883	92,764				
1938-39 ..	382,085	347,054	1946-47 ..	44,375	54,754				

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	1943-44 ..	211,188	371,584				
1921-22 ..	1,498,035	2,178,101	1944-45 ..	207,462	382,505				
1931-32 ..	506,140	534,897	1945-46 ..	228,977	415,167				
1938-39 ..	549,453	561,063	1946-47 ..	355,428	655,207				

(ii) *New South Wales.* The distribution of the total output from New South Wales collieries during the years 1942-43 to 1946-47 compared with 1938-39, according to data compiled by the Government Statistician for that State, was as follows.

**COAL : DISTRIBUTION OF OUTPUT, NEW SOUTH WALES.**

('000 tons.)

Year.	Exports.				Local Consumption.	Total.
	Interstate as—		Overseas as—			
	Cargo.	Bunker.	Cargo.	Bunker.		
1938-39 ..	1,860	411	382	517	5,744	8,914
1942-43 ..	2,793	358	254	256	8,276	11,937
1943-44 ..	2,722	378	158	162	8,139	11,559
1944-45 ..	2,866	340	189	159	7,601	11,155
1945-46 ..	2,499	287	75	173	6,997	10,031
1946-47 ..	2,378	290	44	289	8,185	11,186

5. *Consumption in Australia.*—Details of the average annual production of coal and its distribution in Australia are given in the following table for the five years ended 1938-39 and 1944-45, together with similar details of production and distribution for the year 1945-46.

Under normal circumstances the production and consumption of coal move in the same direction, but in times of short supplies or abnormal consumption consumers may be compelled to rely upon accumulated stocks, and, consequently annual figures may move out of alignment. For this reason the following table has been prepared on a five-yearly basis in order to smooth out any variations from the normal.

COAL : PRODUCTION AND UTILIZATION IN AUSTRALIA.

Particulars.	Average for Five Years Ended—		Total for Year. 1945-46.			
	1938-39.	1944-45.				
<b>BLACK COAL.</b>						
Source—	'000 Tons.	%	'000 Tons.	%	'000 Tons.	%
Production of Saleable Coal <i>a</i>	11,169	99.72	13,798	99.97	12,625	99.99
Imports	31	0.28	4	0.03	1	0.01
Total Supplies	11,200	100.00	13,802	100.00	12,626	100.00
Disposal—						
Exported overseas—						
Bunker	592	5.29	278	2.01	229	1.81
Other	346	3.09	234	1.70	76	0.60
Total	938	8.38	512	3.71	305	2.41
Consumed as fuel in—						
Electric Light and Power Works	1,796	16.03	2,443	17.70	2,770	21.94
Factories (b)	2,067	18.46	2,550	18.48	2,157	17.08
Railway Locomotives (c)	2,328	20.78	3,107	22.51	3,053	24.18
Total	6,191	55.27	8,100	58.69	7,980	63.20
Consumed as raw material in—						
Gas works	1,111	9.92	1,557	11.28	1,759	13.93
Coke Works	1,467	13.10	2,233	16.18	1,483	11.75
Total	2,578	23.02	3,790	27.46	3,242	25.68
Balance available for consumption including accumulation of stocks (d)	1,493	13.33	1,400	10.14	1,099	8.71
Grand Total	11,200	100.00	13,802	100.00	12,626	100.00

BROWN COAL.

Production of Brown Coal ..	'000 Tons.		'000 Tons.		'000 Tons.	
	3,064		4,849		5,534	
Utilization—						
As fuel in Electric Light and Power Works	1,673	54.60	3,200	65.99	3,525	63.70
As fuel and as a raw material by Briquette Works	1,391	45.40	1,649	34.01	(e) 2,009	36.30
Total	3,064	100.00	4,849	100.00	5,534	100.00

(a) Estimated. (b) Estimated where details were not available. (c) Government Railways only. (d) Includes bunker coal for interstate and intra-state shipping. (e) Includes 86,000 tons used by other factories.



The production of coal is ascertained only in calendar years and to relate it to the other data in the table above it has been necessary to estimate the output of black coal in annual periods ended June. Checks applied from other official sources confirm the reliability of these estimates.

6. Prices.—(i) *New South Wales*. The price of New South Wales coal depends on the district from which it is mined. Up to 1933 the Northern district coal generally realized a somewhat higher price than the Southern, but thereafter the average price in the Southern district was in excess of that prevailing in the Northern. According to the figures compiled by the State Statistician the average prices of saleable coal at the pit's mouth for the various districts and for the State as a whole during 1938 and for the years 1942 to 1946 are given in the following table:—

**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.
1938	.. ..	11 11	14 0	9 6	12 0
1942	.. ..	15 11	17 9	14 3	16 0
1943	.. ..	15 11	17 11	14 5	16 1
1944	.. ..	16 4	18 9	15 1	16 7
1945	.. ..	16 11	19 2	14 11	17 0
1946	.. ..	17 1	19 2	15 2	17 1

(ii) *Victoria*. In Victoria the average price of black coal per ton, which is largely determined on the landed cost of New South Wales coal seaborne to Melbourne was : in 1938, 12s. 3d. ; in 1942, 24s. 7d. ; in 1943, 27s. 5d. ; in 1944, 29s. 3d. and in 1945, 37s. 11d. These averages exclude brown coal, which in 1945 cost 2s. 4d. per ton to produce.

(iii) *Queensland*. Prices in the principal coal-producing districts during 1938 and the five years ended 1946 were as follows:—

**COAL PRICES : QUEENSLAND.**

District.	Value at Pit's Mouth.					
	1938.	1942.	1943.	1944.	1945.	1946.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich .. ..	17 0	20 5	21 0	21 2	21 3	21 3
Darling Downs .. ..	19 11	23 2	24 7	24 6	24 9	24 6
Wide Bay and Maryborough .. ..	24 0	27 11	28 8	28 9	28 8	29 0
Rockhampton .. ..	17 0	20 4	20 2	19 9	21 8	19 11
Clermont .. ..	13 8	16 4	16 8	16 6	16 5	16 4
Bowen .. ..	14 10	19 8	20 7	20 5	20 5	21 2
Chillagoe (Mount Mulligan) .. ..	31 6	33 10	34 1	34 1	34 8	35 2
Average for State ..	17 2	20 9	21 6	21 6	21 6	21 7

(iv) *South Australia*. The value of the 1945 production was 7s. per ton, which represents the cost of production.

(v) *Western Australia*. The average prices per ton of the Collie (Western Australia) coal during the four years ended 1946 were : 1943, 18s. 5d. ; 1944, 20s. 6d. ; 1945, 21s. 1d. ; 1946, 22s. 9d. as compared with 12s. 5d. recorded for 1938.

(vi) *Tasmania*. The average prices per ton of coal at the pit's mouth in Tasmania for the four years ended 1946 were : 1943, 16s. 1d. ; 1944, 17s. 0d. ; 1945, 16s. 10d and 1946, 17s. 5d. compared with 14s. 10d. in 1938.

7. Prices in New South Wales, Great Britain, Canada and the United States of America.—In the following table the prices of coal in Great Britain, Canada and the United States are compared with that recorded in New South Wales.

**AVERAGE PRICES OF COAL PER TON : NEW SOUTH WALES, GREAT BRITAIN, CANADA AND UNITED STATES OF AMERICA.**

Country.	1938.	1941.	1942.	1943.	1944.	1945.	1946.	1947.
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
New South Wales (a) ..	12 0	14 4	16 0	16 1	16 7	17 0	17 1	18 7
Great Britain (b) ..	16 8	22 11	24 1	27 3	31 3	35 0	36 10	40 3
Canada (c) — Bituminous (run of mine) ..	\$ 5.477	\$ 5.650	\$ 5.700	\$ 5.700	\$ 6.650	\$ 6.788	\$ 6.980	\$ 6.980
United States (d)—Bituminous (chestnut) ..	4.327	4.560	4.782	5.045	5.239	5.356	5.775	6.873

(a) Average value at the mine per ton of 2,240 lb. ; in Australian currency. (b) Average value at the mine per ton of 2,240 lb. ; in sterling. (c) In Canadian currency per ton of 2,000 lb. (d) In United States currency per ton of 2,000 lb.

8. Employment in Coal-mines.—The number of persons employed both above and below ground in coal-mines, in each of the producing States is given for selected years from 1915 and for each of the four years ended 1945 :—

**COAL-MINES : PERSONS EMPLOYED.**

Year.	New South Wales.	Victoria.		Queensland.	South Australia.	Western Australia.	Tasmania.	Total.
		Black.	Brown.					
1915 .. ..	No. 17,959	No. 1,312	No. (a) 646	No. 2,518	..	No. 498	No. 161	No. 22,448
1925 .. ..	24,049	1,947	646	2,826	..	677	312	30,457
1935 .. ..	13,337	1,397	615	2,455	..	689	340	18,833
1938 .. ..	15,815	1,322	444	2,495	..	765	269	21,110
1942 .. ..	17,101	1,234	620	2,838	12	822	243	22,870
1943 .. ..	17,497	1,203	630	2,898	..	838	278	23,344
1944 .. ..	17,468	1,196	613	2,978	91	880	277	23,503
1945 .. ..	17,427	1,016	584	2,966	100	860	279	23,232

(a) Included with black coal: production prior to 1925 was of little significance.

The maximum number employed was 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 1933 there has been a gradual increase, but the numbers employed in 1945 were only about three-quarters of the maximum figure already quoted. In New South Wales 3,594,000 tons of coal, or 32.1 per cent. of the total output in 1939, was cut by machinery compared with 5,005,011 tons or 40.9 per cent. in 1942, 4,417,912 tons or 38.3 per cent. in 1943, 4,099,230 tons or 36.9 per cent. in 1944, 3,560,778 tons or 36.7 per cent. in 1945, and 3,818,714 tons or 34.5 per cent. in 1946. Similar details for other States are not available.

9. Accidents in Coal-mining.—(i) *Australia.* The following table gives the number of persons killed or injured in 1945, with the proportion per 1,000 employed, and in relation to the quantity of coal raised, 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 days or more appears to have been uniformly adopted by the State Departments of Mines.

## COAL-MINING : EMPLOYMENT AND ACCIDENTS, 1945.

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 ..	17,427	14	82	0.80	4.71	731,278	124,852
Victoria (a) ..	1,600	4	3	2.50	1.88	1,423,101	1,897,468
Queensland ..	2,966	6	221	2.02	74.51	272,458	7,397
South Australia ..	100	..	6	..	60.00	..	6,909
Western Australia ..	860	1	275	1.16	319.77	543,363	1,976
Tasmania ..	279	..	7	..	25.09	..	21,297
Total ..	23,232	25	594	1.08	25.57	514,153	21,639

(a) Includes brown coal.

The next table shows for the five-yearly period 1941 to 1945 annual averages respecting the number employed in mining and the number of fatalities, and the rate of fatalities per 1,000 employed.

## COAL-MINING : FATALITIES, 1941 TO 1945.

State.	Average No. of Coal-miners Employed.	Average Annual No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales ..	17,369	21.6	1.24
Victoria ..	1,802	2.4	1.33
Queensland ..	2,913	3.0	1.03
South Australia ..	41	..	..
Western Australia ..	836	1.4	1.67
Tasmania ..	262	0.4	1.53
Total ..	23,223	28.8	1.24

(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 five-yearly period 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. Details are not available for a later comparison.

10. **Commonwealth Board of Inquiry into the Coal-mining Industry.**—In January, 1945 a Commonwealth Board of Inquiry consisting of three members was constituted under National Security (Inquiries) Regulations to inquire into and report upon the coal-mining industry of Australia. The terms of reference included, amongst other things, such matters as production of coal, absenteeism, causes of stoppages, health and safety of employees, housing, pension schemes, etc. The Chairman of the Board was the Hon. Mr. Justice Davidson, of the Supreme Court of New South Wales.

On the 4th March, 1946, the instrument appointing the Board of Inquiry was revoked and the Chairman was appointed a sole Commissioner to present a report upon the information, evidence and material already before the former Board. A report in two volumes was presented in March, 1946.

11. **Joint Coal Board.**—In August and September, 1946, a joint Commonwealth and State authority to re-organize and rehabilitate the coal industry of New South Wales was established by law.

### § 10. Coke.

1. **General.**—The production of coke in Australia was limited to about 250,000 tons per annum prior to the 1914-18 War. This was below local requirements and necessitated an annual import of about 27,000 tons from abroad. By 1920, production had risen to more than 500,000 tons and by 1938-39 it exceeded 1,000,000 tons. This increased production permitted an export of 30,000 tons in 1938-39. Imports in the same year were 9,700 tons. In 1945-46 the quantity exported was 5,613 tons, valued £14,572, of which 2,346 tons, valued at £5,286, went to New Caledonia and 1,892 tons, valued at £7,090, to New Zealand.

2. **Production at Coke Works.**—(i) *New South Wales.* The following table shows the production in New South Wales during 1938 and each of the four years 1943 to 1946, as recorded by the Department of Mines:—

#### COKE : PRODUCTION IN COKE WORKS, NEW SOUTH WALES.

Items.		1938.	1943.	1944.	1945.	1946.
Quantity	.. tons	1,135,446	1,567,172	1,380,158	1,045,049	1,052,303
Value, total	.. £	1,100,266	2,400,993	2,235,700	1,950,032	1,898,094
Value, per ton	..	19s. 5d.	£1 10s. 8d.	£1 12s. 5d.	£1 17s. 4d.	£1 16s. 1d.

(ii) *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. The following table shows the amount manufactured at the State Coke Works during the four years ended 1945-46, compared with 1938-39.

#### COKE : PRODUCTION IN STATE COKE WORKS, QUEENSLAND.

Year.		1938-39.	1942-43.	1943-44.	1944-45.	1945-46.
Quantity	.. tons	26,032	18,701	9,347	13,181	11,591

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.

3. **Total Production, Australia.**—The production of coke in New South Wales and Queensland referred to above relates to the product of coke ovens only and excludes coke produced at gas works. In the following table, however, particulars of the total production of coke in Australia are shown together with the quantities produced at coke works and gas works respectively.

#### TOTAL COKE PRODUCTION : AUSTRALIA.

Industry.		1938-39.	1942-43.	1943-44.	1944-45.	1945-46.
COKE.						
		Tons.	Tons.	Tons.	Tons.	Tons.
Coke Works	.. ..	1,164,873	1,606,713	1,485,342	1,223,892	986,005
Gas Works	.. ..	757,046	956,896	992,898	1,032,950	1,027,157
Total	.. ..	1,921,919	2,563,609	2,478,240	2,256,842	2,013,162
COKE BREEZE.						
Coke Works	.. ..	78,584	92,658	126,221	102,402	78,466
Gas Works	.. ..	35,996	40,798	48,873	50,480	53,845
Total	.. ..	114,580	133,456	175,094	152,882	132,311

### § 11. Other By-Products from Coal.

In addition to coke, other products are obtained from the treatment of coal by coke and gas works. Details of some of these are given in the following table.

#### OTHER BY-PRODUCTS FROM COAL : AUSTRALIA.

Commodity.	1938-39.	1942-43.	1943-44.	1944-45.	1945-46.
	Gals.	Gals.	Gals.	Gals.	Gals.
Tar—Crude ..	34,614,313	36,926,518	39,618,296	36,001,178	34,754,021
Refined ..	3,752,201	10,966,112	10,332,404	11,913,537	13,185,119
Tar Oils (crude) ..	1,254,396	2,646,314	2,962,100	2,982,844	3,176,381
Ammoniacal Liquor ..	5,387,638	17,802,926	36,894,460	20,908,430	17,153,833
	Tons.	Tons.	Tons.	Tons.	Tons.
Ammonium Sulphate ..	24,251	25,392	24,147	22,095	21,823

### § 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., by 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 plant will probably lead to an expansion of the industry in Australia and should provide a valuable training ground for technicians. Production of crude oil commenced in 1940 but details are not available for publication. The following table shows the production of oil shale during 1940 to 1946 :—

#### OIL SHALE : PRODUCTION IN NEW SOUTH WALES.

Year.	Northern District.		Southern District.		Western District.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Tons.	£	Tons.	£	Tons.	£	Tons.	£
1940 ..	..	..	..	..	43,805	43,805	43,805	43,805
1941 ..	..	..	820	540	122,758	96,131	123,578	96,671
1942 ..	828	1,881	1,559	1,898	114,937	138,564	117,324	142,343
1943 ..	4,033	6,377	..	..	112,842	153,838	116,875	160,215
1944 ..	3,047	8,827	..	..	134,411	156,458	137,458	165,285
1945 ..	..	..	..	..	123,170	164,648	123,170	164,648
1946 ..	..	..	..	..	121,654	139,902	121,654	139,902

(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.

Interest in the commercial utilization of oil shales of the Mersey Valley for the extraction of fuel oils has been retarded due to structural and physical conditions for underground mining and the low-grade nature of the shale.

2. *Coal Oil*.—Attention has been directed to the production of oil from coal by a number of processes. A committee appointed by the Commonwealth Government which consisted 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 Commonwealth Minister for Supply and Development 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 has been proved to exist in Queensland, Victoria and Western Australia, the best indications being found in Victoria and Queensland. Many of the conditions favourable to the accumulation of oil in commercial quantities have been shown to be present in Queensland, Western Australia and New South Wales. In the latter State, however, no strong positive evidence of its existence has been recorded. Oil has been proved to occur in noteworthy quantities at Lakes Entrance, Victoria, but it still remains to be demonstrated whether the area can be developed on a commercial basis.

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

(ii) *Victoria.* There has been no production of crude petroleum oil since 1940. The total production to the end of that year was 115,283 gallons, valued at £2,769. Two experts who were engaged by the Commonwealth Government to investigate the oil-producing area of Gippsland expressed the opinion that production on a commercial scale could be established and drilling has been continued in this area since 1941 in accordance with their recommendations. Boring for oil in the Nelson area was carried out during the years 1942 to 1945.

(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 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. No production has been recorded up to the end of 1945.

(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, Queensland, South Australia and 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.

Further details of action taken by the Commonwealth Government in connexion with the search for oil will be found in § 16. "Government Aid to Mining".

### § 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 show the production of the principal items in this class for each State during 1945.

### § 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 1945 in New South Wales was estimated at 73 carats, valued at £167. These were won by fossickers in the Inverell district. The total production to the end of 1945 is given at 206,829 carats, valued at £150,469.

2. **Sapphires.**—The production of sapphires in New South Wales during 1929 was returned as 65 oz., valued at £450, obtained wholly at Sapphire in the Inverell district, and the only output recorded since that year was 1,200 oz., valued at £600, in 1941. 248 oz., valued at £124, in 1943, and 125 oz., valued at £283 in 1945.

In Queensland, gems to the value of £1,382 were purchased on the Anakie sapphire fields in 1945. 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 only 25 at the end of 1945. Production has declined very considerably since 1920, when the yield was valued at £66,000.

3. **Precious Opal.**—The estimated value of the opal won in New South Wales during 1945 was £3,000. This is not regarded as the total output of the State, however, because 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 Wallungulla field, weighing 6½ carats, being sold in 1910 for £102, while in the early part of 1920 a specimen realized £600. It is stated that this locality is the only place in the world where the "black" variety of the gem has been found. The total value of opal won in New South Wales since 1890 is estimated at £1,638,976, but, as pointed out above, the figures are to some extent understated.

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

The opaliferous district in Queensland stretches over a considerable area of the western interior of the State, from Kynuna and Opalton as far south as Cunnamulla. The yield in 1944 was estimated at £200, and up to the end of that year at about £188,000. No production was recorded in 1945. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. 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 production rose in 1937 to £11,887, but declined to £6,020 in 1939, and rose again to £11,568 in 1941. After a further drop in 1942, to less than £6,000, production has risen to £12,284 in 1945. The field is extremely prolific, a large quantity of precious white opal having been raised therefrom, and 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, chialtolite, 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.

During the three years 1939, 1940 and 1941, 10 tons of beryl ore, valued at £83 were produced in Western Australia. There was no production in 1942, but since that year 515 tons, valued at £14,564 were produced in 1943, 387 tons, valued at £12,602, in 1944 and 34 tons, valued at £952, in 1945. Beryl is required chiefly for special alloys with copper which are used in the manufacture of castings, non-sparking tools and special diamond-drill bits.

### § 15. Number 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 market, and according to the permanence of new finds and the development of the established mines. During 1945 the number so engaged was as follows :—

NUMBER OF PERSONS ENGAGED IN MINING, 1945.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	509	3,929	145	814	17,427	1,481	24,305
Victoria ..	643	..	..	4	1,600	194	2,441
Queensland ..	1,256	34	814	465	2,966	313	5,848
South Australia ..	16	..	3	..	100	621	740
Western Australia ..	4,818	..	2	13	860	324	6,017
Tasmania ..	15	445	1,473	736	279	241	3,189
Northern Territory ..	46	..	5	(a) 48	..	159	258
<b>Australia ..</b>	<b>7,303</b>	<b>4,408</b>	<b>2,442</b>	<b>2,080</b>	<b>23,232</b>	<b>3,333</b>	<b>42,798</b>

(a) Includes some engaged in mining of tantalite.

Included in the figures for "other" in South Australia were 210 engaged in mining iron ore, 30 gypsum miners, 189 salt gatherers, and 34 opal miners. The Tasmanian figures include 140 scheelite miners and 12 osmiridium miners. Northern Territory figures include 80 wolfram and 75 mica miners.

The following table shows, at intervals since 1911, the number of persons engaged in mining in each State and the proportion so engaged of the total population :—

NUMBER ENGAGED IN MINING PER 100,000 OF POPULATION.

State.	1911.		1921.		1931.	
	Miners engaged.	No. per 100,000 of Population.	Miners engaged.	No. per 100,000 of Population.	Miners engaged.	No. per 100,000 of Population.
New South Wales ..	37,017	2,225	29,701	1,410	30,682	1,200
Victoria ..	15,986	1,210	5,211	339	6,463	359
Queensland ..	13,201	2,147	5,847	766	6,753	730
South Australia ..	6,000	1,457	2,020	406	518	90
Western Australia ..	16,596	5,787	7,084	2,122	7,147	1,653
Tasmania ..	5,247	2,760	3,170	1,486	3,397	1,512
Northern Territory ..	715	21,505	131	3,356	145	2,918
<b>Australia ..</b>	<b>94,762</b>	<b>2,109</b>	<b>53,164</b>	<b>974</b>	<b>55,105</b>	<b>844</b>



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

State.	1941.		1944.		1945.	
	Miners engaged.	No. per 100,000 of Population.	Miners engaged.	No. per 100,000 of Population.	Miners engaged.	No. per 100,000 of Population.
New South Wales .. .. .	27,554	987	24,632	859	24,305	839
Victoria .. .. .	4,839	250	2,690	135	2,441	121
Queensland .. .. .	6,541	631	5,981	562	5,848	542
South Australia .. .. .	928	154	906	146	740	118
Western Australia .. .. .	14,021	2,959	5,930	1,224	6,017	1,228
Tasmania .. .. .	2,974	1,248	3,439	1,404	3,189	1,287
Northern Territory .. .. .	424	6,756	259	5,020	258	4,945
<b>Australia .. .. .</b>	<b>57,281</b>	<b>807</b>	<b>43,837</b>	<b>601</b>	<b>42,798</b>	<b>580</b>

The upward movement in the number of miners engaged which commenced in 1930 reached a peak of 998 per 100,000 of population in 1937 but since that year the ratio has declined as follows:—1938, 957; 1939, 945; 1940, 880; 1941, 807; 1942, 696; 1943, 636; 1944, 601; 1945, 580.

2. **Wages Paid in Mining.**—Information regarding rates of wages paid in the mining industry is shown in the Labour Report issued by this Bureau.

3. **Accidents in Mining, 1945.**—The following table gives particulars of the number of men killed or injured in mining accidents during 1945:—

## MINING ACCIDENTS, 1945.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
<b>KILLED.</b>								
Coal .. .. .	14	4	6	..	1	..	..	25
Copper .. .. .	..	..	1	..	..	2	..	3
Gold .. .. .	..	..	..	..	11	..	..	11
Iron .. .. .	..	..	..	..	..	..	..	..
Silver, lead and zinc .. .. .	2	..	..	..	..	..	..	2
Tin .. .. .	..	..	..	..	..	..	..	..
Other minerals (a)	5	..	..	1	..	..	..	6
<b>Total .. .. .</b>	<b>21</b>	<b>4</b>	<b>7</b>	<b>1</b>	<b>12</b>	<b>2</b>	<b>..</b>	<b>47</b>

(a) Includes quarries.

<b>INJURED.</b>								
Coal .. .. .	(a) 82	3	221	6	275	7	..	594
Copper .. .. .	..	..	21	..	..	3	..	24
Gold .. .. .	7	2	6	..	590	..	..	605
Iron .. .. .	..	..	..	27	..	..	..	27
Silver, lead and zinc .. .. .	95	..	..	..	..	9	..	104
Tin .. .. .	..	..	1	..	..	3	..	..
Other minerals (b)	10	(b) 1	43	13	..	..	..	67
<b>Total .. .. .</b>	<b>194</b>	<b>6</b>	<b>292</b>	<b>46</b>	<b>865</b>	<b>22</b>	<b>..</b>	<b>1,425</b>

(a) Includes shale.

(b) Includes quarries.

## § 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 Act 1926, the Gold Bounty Act 1930, the Petroleum Oil Search Acts 1936 (which superseded the Petroleum Prospecting Acts 1926, 1927 and 1928), the Loan Appropriation (Unemployment Relief) Act 1934, the Northern Australia Survey Act 1934 and the Gold Mining Encouragement Act 1940.

Expenditure under the Acts mentioned has been reviewed in previous issues of the Official Year Book. Further expenditure under the Gold Mining Encouragement Act is not contemplated because an entirely new scheme of financial assistance to the mining industry has been arranged. This scheme is described below. Similarly, further expenditure is not contemplated under the Petroleum Oil Search Act 1936, except for two projects not already completed. Apart from these, the Government policy is to conduct geological and geophysical surveys of possible oil-fields (*see* (iii) below).

The Commonwealth Government has recently decided to provide substantial funds both for the immediate rehabilitation of the mining industry and for development of mining projects generally which offer promise of contributing materially to the national development, employment and the economic welfare of the Commonwealth. Applications for financial assistance under the new arrangements are presented to the Mines Department of the State concerned and projects recommended for assistance by the States or Territories are considered by the newly created Bureau of Mineral Resources, Geology and Geophysics. The report and recommendation of the Bureau are considered by the Commonwealth Mining Industry Committee which consists of representatives of the Departments of Supply and Development, the Treasury and Post-war Reconstruction, under the chairmanship of the permanent head of the Department of Supply and Development. The Committee's recommendations are presented for the consideration of the Minister for Supply and Development and the Treasurer.

Recently also an Australian Mining Council has been created, consisting of the Commonwealth and State Ministers whose Departments are concerned with the mining industry. This body deals with problems of national importance and functions in relation to mining in the same way as the Agricultural Council functions in regard to agriculture.

The Bureau has sections dealing with geology and geophysics, mining, engineering, petroleum, technology and mineral economics. The geological section conducts routine surveys in Commonwealth Territories, surveys of possible oil-fields in Australia and New Guinea, surveys of Commonwealth-owned mines and mines for which financial assistance is sought, and investigations of deposits of radio-active minerals. The geophysical section conducts investigations connected with the search for metalliferous radio-active and other mineral deposits; problems connected with exploration of coal, oil and water; regional magnetic and gravity surveys; and engineering and military geophysics.

*Diamond Drills.* Arrangements are being made by the Department of Supply and Development to import two Sullivan and two Longyear diamond drills for use in connexion with the exploration for, and exploitation of, mineral deposits. These will be capable of drilling to depths of 1,400 and 3,000 feet respectively. The plants will be hired to mining companies and should do much to relieve the shortage of diamond drilling plant in Australia, and under Commonwealth ownership to raise the standard of drilling technique.

*Atomic Energy (Control of Materials) Act (34 of 1946).* This Act provides for control of substances which could be used for production or use of atomic energy. It gives the Commonwealth power to acquire such substances in their natural state (in waste materials from mining operations), and to carry on mining and other operations necessary for the recovery of such substances, and to pay compensation for such acquisition. It also gives the Commonwealth power to obtain possession of such substances held by any person.

The Act provides for the notification of discovery of any such substance or mineral containing such substance.

*Rewards for Discovery of Uranium Ore.* To encourage the search for, and discovery of deposits of uranium ore, the Commonwealth Government has approved the granting of monetary rewards.

Rewards will be paid as follows :—

- (1) £1,000 for the discovery of a deposit containing sufficient ore to be of economic importance.
- (2) £1,000 for the discovery of a deposit capable of producing 25 tons or more of uranium oxide and £2,000 for each 25 tons and pro rata for any excess over 25 tons.
- (3) A maximum of £25,000 for any one deposit.

To be eligible for a reward for discovery, the deposit must be more than 15 miles from any other deposit whose existence is known to the Department of Supply and Development.

*The Gold Tax Suspension Act (No. 58 of 1947)* suspended the imposition of the tax on gold under the Gold Tax Act of 1939—the latter provided for a tax of 50 per cent. of the amount received when the price of gold was in excess of £9 per oz.

*Mica Production.* The Commonwealth Government extended to the 31st December, 1948, its authority to acquire the mica produced in Australia at a price fixed by the Prices Commissioner.

*Control of Exports of Metals and Minerals.*—In order to conserve supplies and to direct surpluses to destinations where most needed, export controls were initiated in 1946. Metals, etc., controlled include copper and copper alloys; iron, steel and scrap; all non-ferrous scrap; zinc dross and dust; antimony metal and concentrates; metallic tin, tin concentrates and ores; and pig lead and scrap and manufactured lead.

(ii) *Survey of North Australia.* Reference to this aerial geological and geophysical survey in which the Commonwealth, Queensland and Western Australian Governments co-operated, and which was completed at the end of 1940 appears in Official Year Book No. 35, page 744. Reports on individual areas are being issued as printing is completed.

(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 recent years in geological surveys and in drilling operations. Details of efforts made during that period are shown in previous issues of the Official Year Book.

In 1936 the Petroleum Oil Search Act was passed and replaced all previous enactments. A considerable amount of geological work and test drilling was conducted under this scheme, and at the outbreak of the 1939–45 War two tests were partially completed, one at Oiapu in the Gulf district of Papua and one at Nerrima in the Kimberley district of Western Australia. It is proposed to complete these tests.

During the war, in co-operation with the Government of Victoria, an attempt was made to develop the oil sands of the Lakes Entrance district by sinking a vertical shaft and drilling horizontal holes therefrom. This project was continued till 1945 and in 1946 a private company took over the shaft.

A radical change in policy with regard to the search for petroleum throughout Australia and its Territories has also been made. It has been decided that the policy of granting financial assistance to relatively small companies has proved ineffective and that the Commonwealth contribution to the search for oil should take the form of a considerably intensified effort in carrying out geological and geophysical surveys. This work also will be a function of the Bureau of Mineral Resources, Geology and Geophysics working in close co-operation with the Mines Departments of the States. In this connexion co-operative agreements have already been concluded for extensive surveys to be made in the Kimberley and North-West Divisions of Western Australia.

The Bureau has also assumed full responsibility for geological and geophysical surveys in Commonwealth Territories, but suitable arrangements have been made to ensure that the local Administrations have the necessary technical advice directly available to them.

(iv) *Mineragraphic Investigations, etc.* 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 1940-41, the balance was 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 has undertaken 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 and other substitutes for fuel oil. Seven reports have been issued by this Committee to date.

(vi) *Minerals Committee and Controller of Minerals Production.* During 1941 a Minerals Committee was formed, comprising representatives of the Commonwealth and State Governments and of the mining industry, to advise the Commonwealth on plans necessary to obtain minerals and metals required for war purposes. As a result of recommendations made by the Committee, the National Security (Minerals) Regulations were brought down providing for the appointment of a Controller of Minerals Production whose powers were, broadly, to operate, control and direct the production and supply of minerals. Legislation is now being enacted to provide for the continuation of powers prescribed by the National Security (Minerals) Regulations to enable various projects which were initiated by the Controller of Minerals Production to be continued.

(vii) *Mining Industry Advisory Panel.* The Mining Industry Advisory Panel was set up under the Secondary Industries Commission in 1944 to assist the Commonwealth Government in determining its post-war mining policy. The Panel consists of representatives of the Commonwealth and the States and of the mining industry. The new policy adopted by the Commonwealth with regard to financial assistance to mining has been adopted following recommendations submitted by the Panel through the Secondary Industries Commission. The taxation concessions which have been made to the industry have also resulted from the Panel's recommendations. Investigations are being made into the possibility of arranging uniform legislation in the States and Territories in connexion with health and safety in mines.

2. *States.*—(i) *General.* In addition to free assays and determinations of rocks and minerals carried out for prospectors by the Mines Departments of the States and Territories, technical officers of these departments provide advice to the mining industry where required, carry out field examinations of mining prospects, advise on exploration and development, select sites for water supply, and in general give a free technical service to the mining industry.

(ii) *New South Wales.* State aid to metalliferous mining during 1945 amounted to £1,791, which was expended mainly in gold and tin mining. During 1946 aid totalled £4,720 of which £2,485 was for tin and £1,593 for gold.

(iii) *Victoria.* In 1946 £7,440 was granted to aid the gold mining industry by the State of Victoria.

(iv) *Queensland.* Mining operations conducted by the State include three coal-mines situated at Bowen, Styx and Mount Mulligan, batteries at Kidston and Bamford, an assay office at Cloncurry, coke-works at Bowen and the State treatment works at Irvinebank. The Chillagoe State Smelters closed down in July, 1943, and arrangements were made for copper ores to be treated at Mount Isa by Mount Isa Mines Limited.

Aid granted to prospectors during 1946 amounted to £14,651 whilst other aid granted by the State Government amounted to £88,158.

(v) *South Australia.* During 1940 the Premier announced that assistance would be given to copper mining in the form of financial help towards such development work as was absolutely necessary for the mine to enter upon reasonably continuous production.

The Commonwealth Government in 1940 made available £1,000 for distribution among gold producers in South Australia. Under the Gold Mining Encouragement Act 1940 provision was made for the refund of the gold tax to bona fide prospectors.

On 5th November, 1942, the Leigh Creek Coal Act was passed to develop the Leigh Creek Coalfield. As a result of extensive drilling operations, development of open-cut mining was commenced in January, 1943. Production from the open-cut to December, 1945 amounted to 77,722 tons.

State aid during 1946 totalled £20,885 of which £9,621 was for coal, £3,005 for copper, £2,614 for gold and the balance of £5,645 for other minerals.

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.

(vi) *Western Australia.* Under the Mining Development Act of 1902, the following sums were advanced during 1946: £2,561 for gold, £12 for copper and £9,916 for other assistance granted by the State Government.

(vii) *Tasmania.* Assistance to mining under the Aid to Mining Act of 1927 for the development of mines and for prospecting amounted to £409 in 1946. Government drilling operations involved an expenditure in 1946 of £2,027, of which £607 was repaid.

(viii) *Northern Territory.* The Commonwealth Government was responsible for the advancing of considerable sums of money for the development of wolfram and mica fields in Central Australia during the war. Commonwealth activities, with the provision of roads and water supply and the introduction of mechanical mining equipment, have resulted in a great improvement in conditions on the mica fields.

## § 17. Metallic Contents of Ores and Concentrates Produced.

According to returns compiled by the Australian Mines and Metals Association from records supplied by companies associated with mineral production and by State Departments of Mines, the metallic contents (excluding gold) of ores and concentrates produced in Australia during the years 1939 and 1942 to 1946 were as follows:—

### METALLIC CONTENTS OF ORES AND CONCENTRATES PRODUCED IN AUSTRALIA.

Metal.		1939.	1942.	1943.	1944.	1945.	1946.
Silver	oz.	15,320,116	14,241,811	10,329,830	9,365,726	8,076,740	9,073,481
Lead, Pig	tons	280,003	263,183	206,376	189,485	164,741	184,314
Zinc	..	217,256	221,834	182,841	174,358	150,313	192,117
Copper	..	20,560	20,402	24,326	28,056	24,520	17,755
Tin	..	3,067	2,931	2,635	2,547	2,282	2,127

The production of pig iron in New South Wales and South Australia, the only producing States, reached its peak in 1941-42 when 1,557,641 tons were produced compared with 1,104,605 tons in 1938-39. Production had declined by 1945-46 to 906,283 tons but rose again in 1946-47 to 1,143,132 tons.