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 1947.**—The quantities (where available) and the values of certain of the principal minerals produced in each State, and in Australia as a whole, during 1947, 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 1947 are shown in § 8, par. 2 (page 870).

MINERAL PRODUCTION: QUANTITIES, 1947.

Mineral.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W.Aust.	Tas.	N.T.	Australia.
Antimony and Ore	ton	85	5	16	..	120	..	..	226
Arsenic and Ore ..	,,	..	..	..	..	1,191	..	..	1,191
Asbestos ..	,,	4,021	..	..	39	1,052	..	..	5,112
Barytes ..	,,	1,684	..	..	3,729	..	..	..	5,413
Bismuth and Ore ..	cwt.	60	..	26	..	..	8	..	94
Cadmium ..	,,	(*a*) ..	..	..	..	..	(*b*) 691	..	(*c*) 691
Chalk, Talc, Soapstone, etc.	ton	1,162	..	..	4,460	213	..	..	5,835
Coal—									
Black	,,	11,683,123	173,683	1,883,414	193,351	730,506	167,140	..	14,831,217
Brown ..	,,	..	6,140,140	..	33	..	..	..	6,140,173
Copper (Ingot and Matte) ..	,,	2,391	..	2,778	..	917	7,954	..	14,040
Copper Ore ..	,,								
Diatomaceous Earth	,,	(*d*) 4,366	1,113	59	..	5	..	..	5,543
Felspar	,,	5,278	..	..	(*e*) 1,927	1,226	..	..	8,431
Fireclay	,,	..	..	..	6,447	6,278	..	..	12,725
Gold	fine oz.	50,082	84,709	72,281	629	703,886	15,051	11,016	937,654
Graphite ..	cwt.	1,960	..	3,686	420	..	..	..	6,066
Gypsum ..	ton	64,070	22,895	..	106,955	20,282	..	..	214,202
Ironstone and Ore	,,	9,238	..	1,342	2,145,529	..	..	..	2,156,109
Kaolin	,,	..	6,245	..	(*f*) 2,669	581	3,076	..	12,571
Lead	,,	(*a*)	..	29,590	21	..	7,710	..	(*c*) 37,330
Limestone Flux ..	,,	112,771	3,118	..	341,339	..	29,147	..	486,375
Magnesite ..	,,	57,751	..	..	987	73	..	..	58,811
Manganese Ore ..	,,	1,587	..	..	189	..	..	..	1,776
Mica	cwt.	60	..	..	(*g*) 6,280	..	..	(*h*) 968	7,308
Molybdenite ..	,,	60	..	20	..	..	..	..	80

(*a*) *See* letterpress preceding this table. (*b*) Excludes 3,076 cwt. of cadmium valued at £68,910 and 239 cwt. of cobalt oxide valued at £5,500, from ores of N.S.W. origin. (*c*) Incomplete.
(*d*) Diatomite. (*e*) Includes chinastone. (*f*) Includes ball-clay. (*g*) Damourite.
(*h*) Cut and crude.

MINERAL PRODUCTION: QUANTITIES, 1947—*continued.*

Mineral.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W.Aust.	Tas.	N.T.	Australia.
Ochre and Other Pigment Clays	ton	1,130	..	..	..	(d) 1,037	395	570	3,132
Osmiridium ..	oz.	..	..	..	..	..	99	..	99
Phosphate ..	ton	228	..	..	5,089	..	..	..	5,317
Salt	,,	..	(b)	..	155,074	..	..	..	(c)155,074
Scheelite ..	cwt.	300	..	156	..	(e) 120	12,620	..	13,196
Shale (Oil) ..	ton	138,427	..	..	..	..	..	..	138,427
Silica	,,	33,762	..	..	5,594	464	5,047	..	44,867
Silver	oz.	(a)112,471	10,133	2,100,966	752	199,302	918,791	..	c3,342,415
Silver-lead Ore, Concentrates, etc.	ton	212,410	..	..	..	22	..	..	212,432
Tantalite and Concentrates ..	cwt.	..	..	..	..	..	..	1	1
Tin and Tin Ore ..	ton	552	87	1,396	..	24	830	20	2,909
Wolfram ..	cwt.	460	..	1,261	..	..	4,020	2,020	7,761
Zinc and Concentrates	ton	249,420	..	25,216	..	..	18,513	..	293,149
Zircon - Rutile - Ilmanite-Monazite Concentrates ..	ton	27,519	..	10,254	..	..	..	..	37,773

(a) *See* letterpress preceding this table. (b) Not available. (c) Incomplete. (d) Includes 10 tons of jarasite. (e) Concentrates.

The values of the minerals raised in each State in 1947 are shown in the following table:—

MINERAL PRODUCTION: VALUES, 1947.

(£.)

Mineral.	N.S.W. (a)	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas. (a)	N.T.	Australia.
Antimony and Ore	4,442	350	1,115	..	9,731	..	..	15,638
Arsenic and Ore ..	..	..	..	..	28,738	..	..	28,738
Asbestos ..	11,203	..	..	843	37,393	..	..	49,439
Barytes ..	3,468	..	..	18,406	..	..	..	21,874
Bismuth and Ore ..	3,456	..	400	..	..	305	..	4,161
Cadmium ..	(b)	..	..	..	..	15,470	..	(c) 15,470
Chalk, Talc, Soapstone, etc. ..	2,755	..	..	23,779	813	..	...	27,347
Coal—								
Black	12,101,178	299,784	2,237,738	67,777	840,249	154,725	..	15,701,451
Brown ..	..	937,429	..	33	..	..	..	937,462
Copper (Ingot and Matte) ..	290,905	..	338,508	..	6,071	1,057,825	..	1,693,309
Copper Ore ..								
Diatomaceous Earth	(d) 4,618	4,577	148	..	50	..	..	9,393
Felspar	10,449	..	..	(e) 5,751	4,291	..	..	20,491
Fireclay	..	..	..	4,030	6,064	..	..	10,094
Gems	630	..	..	..	..	..	..	630
Gold	539,008	911,681	777,924	6,770	7,575,574	161,986	118,563	10,091,506
Graphite ..	980	..	1,062	545	..	..	..	2,587
Gypsum ..	50,253	10,259	..	80,216	28,774	..	..	169,502
Ironstone and Ore	7,633	..	2,104	2,467,396	..	..	..	2,477,133
Kaolin	..	8,199	..	(f) 4,004	310	8,800	..	21,313
Lead	(b)	..	2,486,942	1,504	..	660,861	..	c3,149,307
Limestone Flux ..	40,645	1,715	..	136,430	..	19,020	..	197,810
Magnesite ..	51,432	..	..	2,518	73	..	..	54,023
Manganese Ore ..	12,642	..	..	1,861	..	..	..	14,503
Mica	29	..	..	(g) 884	..	..	h 62,547	63,460
Molybdenite ..	470	..	200	..	..	..	..	670
Ochre and Other Pigment Clays	1,683	..	..	..	(i) 10,893	405	2,564	15,545
Opal	1,000	..	307	61,569	..	..	..	62,876
Osmiridium ..	..	..	..	..	..	2,700	..	2,700
Phosphate ..	114	..	..	6,361	..	..	..	6,475
Salt	..	(j)	..	310,148	..	..	..	(c) 310,148
Scheelite ..	6,847	..	3,166	..	(k) 3,840	240,006	..	253,859
Shale (Oil) ..	193,798	..	..	..	..	..	..	193,798
Silica	19,294	..	..	3,084	469	1,646	..	25,393
Silver	(b) 26,242	1,910	380,038	172	47,814	169,068	..	625,244
Silver-lead Ore, Concentrates, etc.	10,554,416	..	..	..	937	..	..	10,555,353
Tantalite and Concentrates ..	..	..	..	..	..	..	45	45
Tin and Tin Ore ..	246,423	25,307	390,833	..	5,565	353,045	4,698	1,025,961
Wolfram ..	9,184	..	28,283	..	..	82,928	41,020	161,415
Zinc and Concentrates	1,774,959	..	1,738,600	..	..	1,295,883	..	4,809,442
Zircon - Rutile - Ilmanite-Monazite Concentrates ..	276,101	..	152,889	..	..	..	..	428,990
Unenumerated ..	18,431	5,327	5,042	4,401	(l) 254,628	83	..	287,912
Total ..	26,264,688	2,206,628	8,545,299	3,209,382	8,862,277	4,224,756	229,437	53,542,467

(a) For items excluded *see* letterpress below. (b) *See* letterpress preceding this table.
(c) Incomplete. (d) Diatomite. (e) Includes chinastone. (f) Includes ball-clay.
(g) Damourite. (h) Cut and crude. (i) Includes jarasite. (j) Not available.
(k) Concentrates. (l) Includes pyritic ore, £18,767 and alunite, £41,212.

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 1947 consisted of—lime, £90,867; building stone, £167,032; Portland cement, £1,588,693; coke, £2,675,423; road material, and gravel, £854,962; shell grit, £9,577; sulphur and sulphuric acid, £206,135; and brick and pottery clays, £285,815. Carbide, cement and limestone, £360,845 have been excluded from the Tasmanian figures.

4. **Value of Production, 1938, 1943 to 1947.**—The values of the minerals produced in each State during the years 1938 and 1943 to 1947 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 ..	10,786,157	1,884,015	3,966,119	2,932,473	10,844,469	1,889,804	214,724	32,517,761
1943 ..	16,984,110	1,593,994	4,214,525	3,079,716	6,383,755	2,378,533	130,795	34,756,428
1944 ..	17,057,691	1,602,105	4,477,087	2,926,666	5,667,497	2,220,136	126,025	34,077,207
1945 ..	16,879,131	1,830,374	4,355,127	2,309,991	5,804,238	1,934,066	176,197	33,289,124
1946 ..	20,327,962	2,079,353	4,761,403	2,776,145	7,586,707	2,855,674	166,543	40,553,787
1947 ..	26,264,688	2,206,628	8,545,299	3,209,382	8,862,277	4,224,756	229,437	53,542,467

The value of mineral production in Australia reached its highest level in 1947 at £53,542,467 compared with £40,553,787 in 1946 and £32,517,761 in 1938. Although this marked increase was due to some extent to increased quantity output the main contributing factors were the increased prices paid in 1947 for coal, silver, lead and zinc.

Since 1938 the greatest increase has occurred in New South Wales, £15,478,531; followed by Queensland, £4,579,180; Tasmania, £2,334,952; Victoria, £322,613; and South Australia, £276,909. Because of the reduced output of gold in Western Australia, the value of minerals produced in that State was £1,982,192 lower in 1947 than in 1938.

5. **Total Production to end of 1947.**—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1947. The items excluded from the preceding table are also omitted here, and consequently the total for New South Wales is £77,780,000 less than that published by the State Department of Mines. The principal items excluded from the table below are coke, £37,500,000; cement, £35,750,000; lime, £2,575,000; 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 1947.
(£'000.)

Mineral.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
Gold ..	73,454	319,373	100,525	2,161	290,245	11,378	3,799	800,935
Silver and lead ..	188,127	285	19,066	386	2,663	13,975	67	224,569
Copper ..	18,156	217	35,050	33,313	1,822	30,633	261	119,452
Iron ..	9,500	16	537	42,313	37	97	..	52,500
Tin ..	19,577	1,265	14,072	..	1,689	21,279	705	58,587
Wolfram	426	19	1,485	..	7	1,037	812	3,786
Zinc ..	34,042	..	5,685	16	5	8,137	..	47,885
Coal ..	311,119	25,909	40,599	143	13,937	3,506	..	395,213
Other ..	13,187	1,226	4,188	11,901	2,414	4,277	428	37,621
Total ..	667,588	348,310	221,207	90,233	312,819	94,319	6,072	1,740,548

The "other" minerals in New South Wales include alunite, £229,000; antimony, £442,000; arsenic, £212,000; bismuth, £261,000; chrome, £143,000; diamonds, £151,000; magnesite, £842,000; molybdenite, £232,000; opal, £1,644,000; scheelite, £259,000; and shale oil, £3,815,000. In the Victorian returns antimony ore was responsible for £637,000. The value for coal in this State includes £8,760,000 for brown coal. Included in "other" in the Queensland production were opal, £189,000; gems, £657,000; bismuth, £147,000; cobalt, £158,000; molybdenite, £630,000; limestone flux, £903,000; and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £6,760,000; limestone flux, £904,000; gypsum, £1,866,000; phosphate, £194,000; and opal, £370,000. In Western Australia arsenic, £742,000; gypsum, £199,000; and asbestos, £242,000 were the principal items included with "other" minerals. In the Tasmanian returns osmiridium was responsible for £662,000, scheelite for £958,000 and limestone flux for £1,393,000.

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.

OUTPUT OF QUARRIES, 1947.

Description.	N.S.W.	Victoria. (a)	Q'land. (a)	S. Aust.	W. Aust. (a)	Tas. (b)	Australia.
QUANTITY (TONS).							
Building Stone	364,475	8,245	2,902	32,358	15,978	..	423,958
Macadam, Ballast etc.	4,125,490	967,669	480,897	1,725,222	229,010	..	7,528,288
Limestone (c)	(b)	305,130	33,838	10,862	107,637	..	(d)547,467
Clays	1,462,659	53,318	..	212,130	543,990	..	2,272,097
Other	..	243,241	..	..	51,499	..	294,740
VALUE (£.).							
Building Stone	167,032	25,197	1,414	27,317	16,277	..	237,237
Macadam, Ballast, etc.	854,962	456,666	157,215	449,412	143,951	..	2,062,206
Limestone (c)	(b)	121,620	24,215	1,688	18,404	..	(d)165,927
Clays	285,815	12,803	..	26,516	70,310	..	395,444
Other	..	72,167	..	..	17,109	..	89,276
Total	d1,307,809	688,453	182,844	504,933	266,051	..	d2,950,090

(a) Year ended June, 1948. (b) Not available. (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) Incomplete.

In the following table details of the total value of the output of quarries are given for each State for the years 1939 and 1943 to 1947 :—

OUTPUT OF QUARRIES.
(£.)

State.	1939.	1943.	1944.	1945.	1946.	1947.
New South Wales ..	1,446,927	b1,152,814	(b)767,511	(b)860,121	b1,056,325	b1,307,809
Victoria(a)	552,888	405,237	421,050	517,354	680,619	688,453
Queensland (a) ..	186,951	112,814	116,626	153,785	151,785	182,844
South Australia ..	469,606	230,422	216,796	250,874	364,469	504,933
Western Australia(a)	214,075	106,873	(b)105,075	(b)117,222	183,902	266,651
Tasmania	98,063	(c)	(c)	(c)	(c)	(c)
Total ..	2,968,510	b2,008,160	b1,627,058	b1,899,356	b2,437,100	b2,950,690

(a) Year ended June following. (b) Incomplete. (c) 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 1948. 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 oz.)

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	11,587
1891–1900 ..	2,432	7,040	5,648	52	5,252	550	214	21,188
1901–10 ..	2,253	7,095	5,512	73	17,784	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	848	19	12	1,154
1943	64	56	63	1	516	17	4	751
1944	63	54	51	1	466	17	5	657
1945	43	62	63	..	469	13	7	657
1946	32	87	63	1	617	15	10	825
1947	50	85	72	1	704	15	11	938
1948	57	69	70	2	665	13	15	891
Total, 1851–1948	16,045	73,064	21,742	447	52,204	2,369	704	166,575

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 increased costs due to deep mining 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 between that year and 1939 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 man-power, 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. In 1947, there was a further increase of 113,174 fine oz. or 13.7 per cent. to 937,654 fine oz., but in 1948 production declined by 46,849 fine oz. or 5.0 per cent. to 890,805 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. $11^{5}/_{11}$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 mints 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	28,473,792	13,843,081	246,668	178,473	1,514,921	713,345	49,216,821
1891–1900	10,332,120	29,904,152	23,989,359	219,931	22,308,524	2,338,336	906,988	89,999,410
1901–10..	9,569,492	30,136,686	23,412,395	310,080	75,540,415	2,566,170	473,871	142,009,109
1911–20..	4,988,377	13,354,217	9,876,677	238,808	46,808,351	873,302	(a)100,652	76,240,384
1921–30..	940,946	2,721,309	1,976,715	47,564	20,462,957	193,833	(b) 11,545	26,354,869
1931–40..	5,115,397	9,444,570	9,118,903	459,330	74,391,204	1,164,492	786,790	100,480,686
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	5,123	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	8,873,468
1947 ..	530,008	911,681	777,924	6,770	7,575,574	161,986	118,563	10,091,506
1948 ..	618,444	738,092	749,565	21,912	7,156,909	138,889	163,482	9,587,293
Total, 1851–1948	74,071,799	320,110,467	101,274,270	2,182,784	297,403,012	11,517,264	3,962,762	810,522,358

(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. 5¾d. in 1939, £10 13s. 1⅞d. in 1940, £10 13s. 8d. in 1941, £10 9s. $0^{3}/_{4}$d. in 1942, £10 9s. od. in 1943, £10 10s. 1½d. in 1944, £10 13s. 11½d. in 1945 and £10 15s. 3d. in 1946, at which level it remained until 19th September, 1949. On that date, following the alteration in the rate of exchange, the value of gold rose to £15 9s. 10d. per fine oz. in terms of Australian currency. Further information regarding the price of gold is given in Chapter XVI., " 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 very large 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 1948 represented 75 per cent. of the entire yield of Australia. The proportion contributed by this State for the period 1851 to 1948 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, and other producing countries of lesser importance.

GOLD : WORLD PRODUCTION.

Period.	World Production of Gold.	Gold Produced in Australia.	Percentage of Australian Production 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) 34,000,000	1,496,698	4.40
1942	(a) 31,900,000	1,153,787	3.62
1943	(a) 24,800,000	751,279	3.03
1944	(a) 22,100,000	656,867	2.97
1945	(a) 21,300,000	657,213	3.09
1946	21,600,000	824,480	3.82
1947	21,800,000	937,654	4.30

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

The quantities of gold produced in the principal producing countries in each of the years 1938 and 1943 to 1947 are shown in the table hereunder.

GOLD: PRODUCTION IN PRINCIPAL COUNTRIES.
('000 fine oz.)

Country.	1938.	1943.	1944.	1945.	1946.	1947.
Union of South Africa	12,161	12,804	12,280	12,225	11,927	11,198
Canada	4,725	3,651	2,923	2,697	2,832	3,070
U.S.S.R. (Russia) ..	5,236	(a)	(a)	(a)	(a)	(a)
United States of America	(b) 4,245	(b) 1,318	(b) 1,022	(b) 915	(b) 1,462	2,321
Australia	**1,592**	**751**	**657**	**657**	**824**	**938**
Philippine Islands ..	903	14	(a)	13	(a)	64
Korea	948	412	119	96	(a)	(a)
Mexico	924	632	509	524	430	465
Japan, including Formosa ..	852	487	357	65	43	69
Rhodesia	815	657	593	568	551	523

(a) Not available. (b) Refinery production.

The next table shows for the decennium 1938 to 1947 the average yearly production in ten of the principal gold-producing countries, of which five are within the British Commonwealth.

GOLD : AVERAGE ANNUAL PRODUCTION IN PRINCIPAL COUNTRIES. 1938 TO 1947.

(Fine oz.)

Country.	Quantity.	Country.	Quantity.
British Countries—		Foreign Countries—	
Union of South Africa ..	12,799,999	U.S.S.R. (Russia) ..	(a) 5,433,333
Canada	4,045,578	United States of America	2,901,891
Australia	**1,135,970**	Mexico	677,485
Gold Coast	678,502	Belgian Congo ..	438,400
Rhodesia, North and South	689,658	Colombia	542,120

(a) Average three years 1938 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.
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
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
1946 ..	772	1,282	1,651	38	6,961	13	106	10,823
1947 ..	795	1,135	1,834	50	7,649	14	176	11,653

(a) Estimated. (b) Year of maximum production for Australia.

Owing to the exhaustion of the more easily worked deposits and increased costs due to deep mining, 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. Following the cessation of hostilities and a relaxation of manpower control, the numbers rose to 7,303 in 1945, to 10,823 in 1946 and to 11,653 in 1947.

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 manpower 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 1943 to 1947 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
1943 ..	3,752,672	2,278	230,837	62	16,475	333,058	..	4,335,382
1944 ..	4,068,935	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
1946 ..	6,999,543	2,687	836,879	224	43,860	527,937	..	8,411,130
1947 ..	10,580,658	1,910	2,866,980	1,676	48,751	829,929	..	14,329,904

(ii) *New South Wales.* (*a*) *General.* The figures for New South Wales for 1947 include silver to the value of £26,242 and silver-lead ore and concentrates valued at £10,554,416. 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 1947 decreased by 3,518 tons compared with the previous year, but owing to increased prices the value rose by more than £3,500,000.

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. The value of the output of the principal mines in the Broken Hill field totalled £207.3 million to the end of 1946. In 1947 the value of output was £12,389,400 and in 1948, £17,927,995. 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.)

(*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 ; 253,870 oz. of silver, 10,355 tons of lead, and 17,891 tons of zinc in 1946 ; 202,102 oz. of silver, 8,453 tons of lead, and 14,497 tons of zinc in 1947 ; and 135,813 oz. of silver, 5,973 tons of lead, and 10,540 tons of zinc in 1948. Production on a small scale recommenced during 1946 at Yerranderie, and amounted in that year to 111 tons of ore, containing 11,100 oz. of silver and 27 tons of lead ; in 1947, 150 tons of ore, containing 1,506 oz. of silver and 35 tons of lead ; and in 1948, 173 tons of ore, containing 16,075 oz. of silver and 43 tons of lead. In addition, 6,902 oz. of silver were obtained in 1948 in conjunction with the gold-copper ores at Cobar.

(iii) *Victoria.* The silver produced in 1947 amounted to 10,133 oz., valued at £1,910 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. Mining for copper

ceased at Mount Isa in 1946 and the production of silver, lead and zinc was resumed. The production of silver rose from 980,538 fine oz. in 1946 to 2,100,966 fine oz. in 1947 whilst the output of lead rose from 12,754 tons to 29,590 tons and zinc from 11,361 tons to 25,216 tons.

(v) *South Australia.* In 1947, production of silver amounted to 752 oz. valued at £172 compared with 607 fine oz. valued at £151 in 1946.

(vi) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1947 was 199,302 fine oz. valued at £47,814 compared with 171,452 fine oz. valued at £42,792 in 1946.

(vii) *Tasmania.* The silver produced in 1947 amounted to 918,791 fine oz., valued at £169,068, and the lead to 7,719 tons, valued at £660,861, produced in the Western Division of the State. About 146,776 oz. of the total silver output were contained in silver-lead, 27,892 oz. in the blister copper produced by the Mount Lyell Co., and 744,123 oz. in zinc lead ore.

(viii) *Northern Territory.* A rich deposit of silver-lead and copper ore was located in 1930 at the Jervois Range about 200 miles east of Alice Springs. Development is hindered, however, by transport difficulties and lack of permanent water. Rich sulphides have been found at Barrow Creek. 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 1944 to 1948.**—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 1944 to 1948. Comparable figures for the year 1938 are not available.

REFINED SILVER : PRODUCTION, SALES AND STOCKS, AUSTRALIA.
('000 fine oz.)

Particulars.	1939.	1944.	1945.	1946.	1947.	1948.
Stock from previous year ..	122	437	414	465	241	445
Production for year ..	9,552	7,176	7,464	6,183	6,658	6,212
Total Supply ..	9,074	7,613	7,878	6,648	6,899	6,657
Sold to Australian consumers	1,794	7,199	7,413	6,407	3,560	1,375
Exported or sold for export	7,518	..	..	..	2,894	4,998
Stock on hand at end of year	362	414	465	241	445	284
Total Disposals and Stocks	9,674	7,613	7,878	6,648	6,899	6,657
Silver Contents of Ores and Concentrates Produced ..	15,320	9,366	8,077	9,073	9,527	10,058

3. **World Production.**—The world's production of silver during the years 1938 and 1943 to 1947 is estimated to have been as follows :—

SILVER : WORLD PRODUCTION.
('000 fine oz.)

1938.	1943.(a)	1944.(a)	1945.(a)	1946.(a)	1947.(a)
267,765	195,010	173,060	151,173	131,119	159,000

(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 1947 (or the latest year available) were as follows :—

SILVER: PRODUCTION IN PRINCIPAL COUNTRIES, 1947.

('000 fine oz.)

Country.	Production.	Country.	Production.
Mexico	49,198	British India (including Burma)	(a) 6,175
United States of America ..	36,053	Belgian Congo	4,057
Canada	12,504	Yugoslavia	(b) 2,570
Peru	10,783	Argentina	2,435
Australia	**9,527**	Japan	2,272
U.S.S.R. (Russia) ..	(a) 7,000	Union of South Africa ..	1,147
Germany	(b) 7,000	Newfoundland	956
Bolivia	6,237	Chile	747

(a) Year 1940. (b) Year 1939.

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.

The details of production, sales, and stocks given in the table following 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.

(Tons.)

Particulars.	1939.	1944.	1945.	1946.	1947.	1948.
Stocks from previous year (a)	10,290	73,720	18,959	17,418	24,726	(b)5,028
Production for year ..	199,437	154,547	155,852	137,459	158,548	159,497
Total Supply ..	209,727	228,267	174,811	154,877	183,274	164,525
Sold to Australian consumers	32,217	29,853	30,198	42,040	33,242	34,774
Exported or sold for export	164,684	179,455	127,195	88,111	138,378	123,890
Stock on hand at end of year a	12,826	18,959	17,418	24,726	11,654	(b)5,861
Total Disposals and Stocks	209,727	228,267	174,811	154,877	183,274	164,525
Lead Contents of Ores and Concentrates Produced ..	280,003	189,485	164,741	184,314	196,623	216,955

(a) Physical stocks. (b) Unsold stocks.

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, LONDON METAL EXCHANGE.

(£ s. d. Stg.).

Metal.	1938.	1941.	1945.	1946.	1947.	1948.
Silver per fine oz.	0 1 9.06	0 2 1.31	0 2 6.51	0 4 0.7	0 3 8.4	0 3 9.0
Lead .. per ton	15 6 6	a25 0 0	a27 15 11	48 1 7	85 1 7	95 10 0
Spelter ,, ,,	14 1 7	a25 15 0	a28 16 7	43 1 11	70 0 0	80 0 9

(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 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 ; 4s. 7.6d. in 1947, and 4s. 8.4d. in 1948.

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 1943 to 1947 is given below :—

SILVER, LEAD AND ZINC-MINING : PERSONS EMPLOYED.

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Terr.	Australia.
1938 ..	5,612	530	..	4	421	3	6,570
1943 ..	3,982	239	..	2	466	..	4,689
1944 ..	3,896	..	..	..	445	..	4,341
1945 ..	3,929	34	..	..	417	..	4,380
1946 ..	4,713	1,003	2	5	453	..	6,176
1947 ..	5,331	994	12	..	523	2	6,862

§ 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 1943 to 1947 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.	1943.	1944.	1945.	1946.	1947.
	£	£	£	£	£	£
New South Wales ..	87,905	379,800	309,900	305,000	344.682	290,905
Queensland.. ..	203,967	1,111,049	1,644,747	1,500,662	648,122	338,508
South Australia ..	15,333	10,100	12,115	11,674	..	..
Western Australia ..	1,275	33	(a) 367	364	105	6,071
Tasmania	580,238	691,199	633,188	463,294	716,212	1,057,825
Northern Territory ..	4,362	2,393	1,878	3.811	6,282	..
Australia	893,080	2,194,574	(a) 2,602,195	2,284,805	1,715,403	1,693,309
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Ingot, Matte, etc. ..	18,751	25,894	(a) 29.365	25,850	19,160	14,040
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.

(Tons.)

Particulars.	1939.	1943.	1944.	1945.	1946.	1947.	1948.
Stocks from previous year..	1,342	972	587	800	2,611	1,313	409
Production for year ..	17,867	20,457	19,898	20,498	22,659	19,303	11,389
Total	19,209	21,429	20,485	21,298	25,270	20,616	11,798
Sold to Australian consumers	18,808	20,842	19,685	18,687	22,957	20,207	11,407
Exported or sold for export	100	..	..	..	1,000	..	..
Stocks on hand at end of year	301	587	800	2,611	1,313	409	391
Total	19,209	21,429	20,485	21,298	25,270	20,616	11,798

2. **Sources of Production.**—(i) *New South Wales.* The copper content of ores and concentrates produced in New South Wales in 1947 amounted to 2,391 tons.

(ii) *Queensland.* In 1947 the yield of metallic copper in this State amounted to 2,778 tons compared with 6,481 tons in 1946 and 15,007 tons in 1945.

The decrease in recent years is due to the suspension at Mount Isa of copper production and the resumption thereat of silver-lead and zinc operations. Copper production was begun at Mount Isa as a war-time expedient. The chief producing area in 1947 was Mount Morgan, which produced 2,570 tons during the year.

(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 notwithstanding that output has diminished to negligible dimensions since the exhaustion of the ore reserves on the principal copper fields. No production was recorded in 1946 or 1947.

(iv) *Western Australia.* During 1947, the quantity of copper reported was 917 tons, valued at £6,071, compared with 74 tons for £105 in 1946.

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1947 was 7,954 tons, valued at £1,057,825, the Mount Lyell Mining and Railway Co. Ltd. accounting for the greater part of the production. This company treated 34,418 tons of ore and concentrates and produced blister copper, containing copper (7,668 tons), silver (28,291 oz.) and gold (5,401 oz.), the whole being valued at £1,001,054.

(vi) *Northern Territory.* Copper has been found at various places in the Territory. In 1947 there was no production, but during 1946 there were 279 tons produced compared with 96 tons in 1939.

3. **World Production of Copper.**—The world's estimated production of copper during the years 1938 and 1943 to 1947 is shown below. 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 used.

COPPER : WORLD PRODUCTION.

(Tons of 2,240 lb.)

1938.	1943.	1944.	1945.	1946.	1947.
2,020,000	2,700,000	2,500,000	2,120,000	1,790,000	2,170,000

The yields from the principal copper-producing countries reporting in 1947 were as follows :—

COPPER : PRODUCTION IN PRINCIPAL COUNTRIES, 1947.

(Tons of 2,240 lb.)

Country.	Production.	Country.	Production.
United States of America ..	756,000	Germany	(a) 30,000
Chile	420,000	Peru	22,000
Canada	202,000	Japan	21,500
Northern Rhodesia ..	192,500	**Australia**	**14,040**
Belgian Congo	148,000	Turkey	10,000
U.S.S.R. (Russia) ..	140,000	Belgium	8,000
Mexico	62,500	Spain	6,000
Yugoslavia	30,000	Bolivia	6,000

(a) Year 1939.

During 1947 the share of the United States of America in the world's copper production amounted to nearly 35 per cent. while the Australian proportion was less than 1 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.

(£ s. d.)

Country.	December, 1939.	1944.	1945.	1946.	1947.	1948.
Australia — in Aust. currency	63 17 6	105 0 0	100 0 0	95 0 0	123 5 9	140 0 0
United Kingdom in Sterling ..	62 0 0	62 0 0	62 0 0	77 4 0	130 12 4	134 0 0

5. **Employment in Copper-mining.**—The number of persons employed in copper-mining during each of the years 1938 and 1943 to 1947 was as follows :—

COPPER-MINING : PERSONS EMPLOYED.

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Terr.	Australia.
1938	13	213	67	4	1,015	5	1,317
1943	260	864	36	1	821	1	1,983
1944	210	919	37	..	799	4	1,969
1945	145	814	3	2	738	5	1,707
1946	134	59	11	1	709	9	923
1947	184	48	..	2	733	15	982

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

§ 5. Tin.

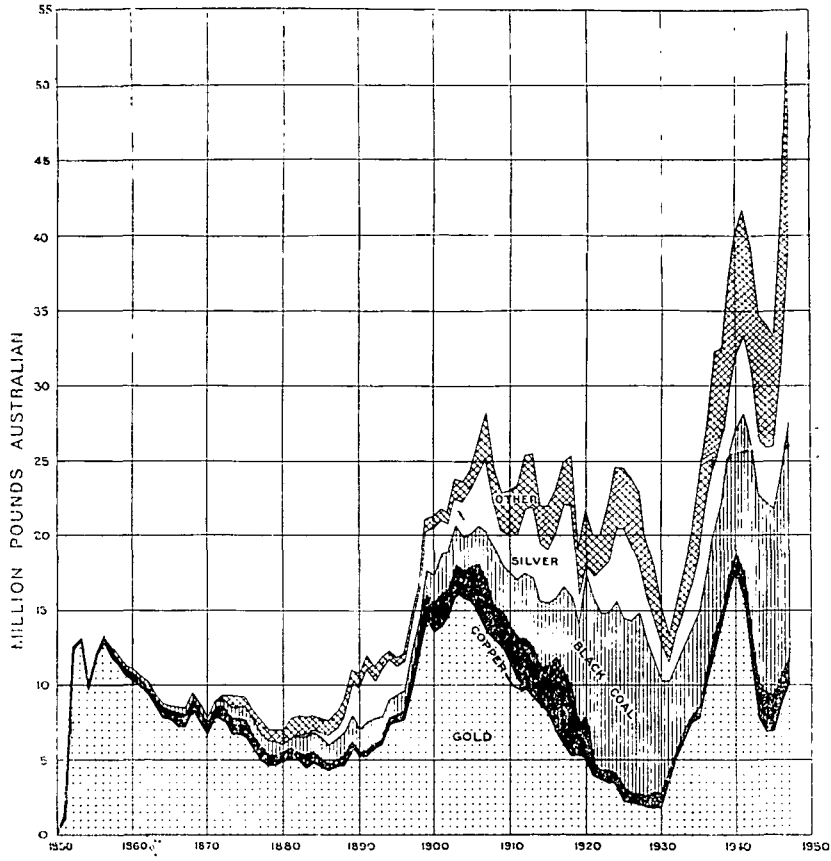
1. ***Production.***—The values of the production of tin as reported to the Mines Departments in each of the States during the years 1938 and 1943 to 1947 are given in the following table. A separate line is appended showing the production of refined tin as recorded by the Australian Mines and Metals Association for the years indicated.

TIN : PRODUCTION.

State.	1938.	1943.	1944.	1945.	1946.	1947.
	£	£	£	£	£	£
New South Wales ..	286,768	403,320	309,860	291,788	257,153	246,423
Victoria	28,650	14,162	12,835	9,869	14,917	25,397
Queensland.. ..	141,547	167,176	275,185	207,948	220,901	390,833
South Australia ..	..	10	..	..	..	..
Western Australia ..	7,421	2,315	(b) 2,351	4,370	5,838	5,565
Tasmania	244,037	246,218	235,612	240,369	240,584	353,045
Northern Territory ..	3,205	5,594	2,086	5,026	3,228	4,698
Total ..	711,628	838,795	b 837,929	759,370	742,621	1,025,961
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Refined Tin ..	(a)	2,565	2,442	2,359	2,225	2,371

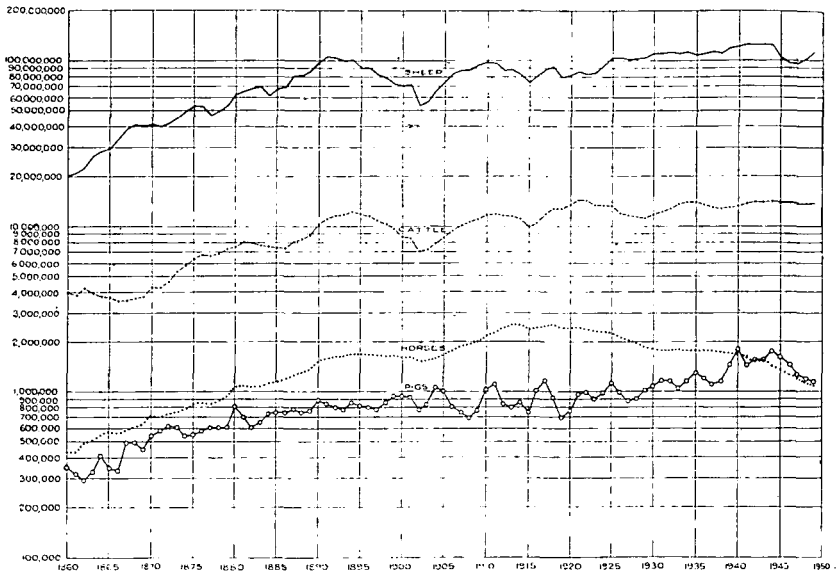
(a) Not available. (b) Incomplete.

VALUE OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1850 TO 1947.



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 1949.



(*See* page 893.)

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.

2. **Sources of Production.**—(i) *New South Wales.* Production of tin in 1947 was stated at 552 tons of ore, valued at £246,423, compared with 674 tons, valued at £257,153, in 1946. 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 1947 amounted to 87 tons of concentrates, valued at £25,397, compared with 64 tons, valued at £14,917, in 1946.

(iii) *Queensland.* The chief producing districts in Queensland during 1947 were Herberton, 1,283 tons, valued at £359,325; Cooktown, 28 tons, £8,588; Stanthorpe, 27 tons, £8,058; Chillagoe, 11 tons, £2,940; Kangaroo Hills, 31 tons, £7,794; and Ingham, 15 tons, £4,410. The total production in 1947 amounted to 1,396 tons, valued at £390,833 compared with 977 tons, valued at £220,901 in 1946. 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 1947 amounted to 24 tons, valued at £5,565, and was obtained mainly in the Pilbara and Greenbushes fields.

(v) *Tasmania.* For 1947 the output amounted to 830 tons of tin, valued at £353,045, an increase of 129 tons on the output of the previous year.

(vi) *Northern Territory.* The production for 1947 amounted to 20 tons of concentrates valued at £4,698, compared with 15 tons of concentrates valued at £3,228 produced during 1946.

3. **World Production.**—The world's production of tin during each of the years 1938 and 1942 to 1947 was as follows:—

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

1938.	1942.	1943.	1944.	1945.	1946.	1947.
148,600	119,700	138,400	101,100	90,000	88,600	114,500

The production of tin reached its maximum in 1941 when 241,400 tons were recorded. The following are the chief producing countries of the world:—Bolivia, Malaya, Indonesia, Belgian Congo and Nigeria. Normally these countries produce about three-quarters of the total production.

The yields from the principal producing countries in 1947 were as follows:—

TIN: PRODUCTION IN PRINCIPAL COUNTRIES, 1947.
(Tons of 2,240 lb.)

Country.	Production.	Country.	Production.
Bolivia	33,259	Burma	1,818
Federation of Malaya ..	27,026	Siam	1,401
Indonesia	15,915	United Kingdom ..	898
Belgian Congo	14,897	Japan	600
Nigeria	9,139	Spain and Portugal ..	503
China	(a) 4,000	Union of South Africa ..	483
Australia	**2,445**	Argentina	468

(a) Estimated.

The world's tin production in 1947 was estimated at 114,500 tons of which Australia's share was about 2.1 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.

(£ s. d.)

Country.	December, 1939.	1944.	1945.	1946.	1947.	1948.
Australia—in Aust. currency	299 0 0	376 0 0	376 0 0	376 0 0	438 15 0	620 0 0
United Kingdom —in sterling..	271 0 0	300 0 0	300 0 0	336 2 10	425 18 7	548 1 11

5. **Employment in Tin-mining.**—The number of persons employed in tin-mining during the years 1938 and 1943 to 1947 was as follows :—

TIN-MINING : PERSONS EMPLOYED.

Year.	N.S.W.	Victoria. (a)	Q'land.	W. Aust.	Tas.	Nor. Terr.	Australia.
1938	1,440	5	1,263	73	1,123	15	3,919
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
1946	778	..	462	10	695	49	1,994
1947	523	..	528	9	627	52	1,739

(a) The tin produced in Victoria was raised by a dredging company operating primarily for gold. (b) Includes 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 1947 the zinc concentrates produced amounted to 249,420 tons, valued at £1,774,959. 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 52,241 tons of zinc, 153.82 tons of cadmium and 11.9 tons of cobalt oxide in 1947. 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 in that year and increasing in 1947 to 25,216 tons valued at £1,738,600.

(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 1947, 18,513 tons of zinc, valued at £1,295,883, were obtained from Tasmanian ores, as well as 35 tons of cadmium valued at £15,470 and 4 cwt. of cobalt oxide valued at £83.

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 1947 amounted to 52,241 tons of slab zinc, valued at £1,201,543, 153.82 tons of cadmium, valued at £68,910 and 11.93 tons of cobalt oxide, valued at £5,500.

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.
(Tons.)

Year.	New South Wales.			Queensland.	Tasmania.	Australia.
	Broken Hill.	Lake George.	Total.	Mt. Isa.	Rosebery.	Total.
1939.. ..	145,207	11,850	157,057	29,092	31,107	217,256
1944.. ..	128,384	19,657	148,041	..	26,317	174,358
1945.. ..	118,566	11,893	130,459	..	19,854	150,313
1946.. ..	122,776	15,187	137,963	11,269	22,678	171,910
1947.. ..	120,993	12,667	133,660	24,994	23,604	182,258
1948.. ..	136,144	9,445	145,589	21,578	23,151	(a) 190,469

(a) Including 151 tons from other sources.

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 1944 to 1948, 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.
(Tons.)

Particulars.	1939.	1944.	1945.	1946.	1947.	1948.
Stocks from previous year ..	3,225	3,314	11,295	4,786	531	3,685
Production for year ..	71,220	78,716	83,773	76,316	69,421	81,312
Total	74,445	82,030	95,068	81,102	69,952	84,997
Sold to Australian consumers	31,088	19,828	26,639	35,984	47,442	42,018
Exported or sold for export..	43,137	50,907	63,643	44,587	18,825	37,100
Stocks on hand at end of year	220	11,295	4,786	531	3,685	5,879
Total	74,445	82,030	95,068	81,102	69,952	84,997

3. **World Production.**—The world's production of zinc ore in terms of metal during the years 1939 and 1942 to 1947 was as follows :—

ZINC : WORLD PRODUCTION.

(Tons of 2,240 lb.)

1939.	1942.	1943.	1944.	1945.	1946.	1947.
1,920,000	2,160,000	2,110,000	1,964,000	1,751,000	1,733,000	1,848,000

Particulars of the production of zinc ore, expressed in terms of metal, are given in the following table for the principal producing countries for 1947.

ZINC : PRODUCTION IN PRINCIPAL COUNTRIES, 1947.

(Tons of 2,240 lb.)

Country.	Production.	Country.	Production.
United States of America ..	569,293	Belgian Congo	44,475
Mexico	192,721	Newfoundland	39,481
Canada	185,592	Sweden	35,358
Australia	**182,258**	Spain	(*b*) 35,000
U.S.S.R. (Russia) ..	(*b*) 105,000	Japan	29,068
Germany	(*a*)	Rhodesia	21,600
Peru	57,262	Bolivia	14,381
Italy	53,700		

(*a*) Not available. (*b*) Estimated.

The production of Australia quoted above represents the metallic contents of zinc ores produced during 1947 and is equal to 9·9 per cent. of world output. The quantity of zinc metal extracted in Australia in that year was 69,421 tons.

4. **Prices and Employment.**—Information regarding prices of zinc and employment in zinc-mining will be found on page 857.

§ 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. Since that year there has been no iron-ore mined in this State for conversion into pig-iron. 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 1947 the iron oxide raised amounted to 9,238 tons, valued at £7,633. 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 1947, 1,342 tons of ore were obtained by the Queensland Cement & Lime Co. from their workings at Biggenden.

(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 2,145,529 tons, valued at £2,467,396, for 1947, represents a decrease of 426,230 tons and £490,127 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 1947 no further production had been recorded.

Australian Iron & Steel Co. Ltd., on behalf of Broken Hill Proprietary Co. Ltd. continued the development of the iron deposits on Cockatoo Island in Yampi Sound.

The production of pig-iron was commenced at Wundowie in Western Australia in January, 1948 under the direction of the State Department of Industrial Development. The ore used is obtained from the local deposits and converted to pig-iron by the use of charcoal burnt from timber obtained in the same locality. The production, which amounted to 771 tons for the six months ended June, 1948, is sufficient for local requirements and to provide a small quantity for export to the eastern States.

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 86,952 tons in 1947.

(v) *Tasmania.* There has been no production of ironstone in Tasmania since 1943 when 7 tons, valued at £14 were produced. The production of pyrites, which in 1947 amounted to 42,329 tons, valued at £59,260, 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 1947–48 the bounties paid under the Bounties Acts on articles manufactured from locally produced materials were as follows:—Wire-netting, £321; traction engines, £19,978. Corresponding amounts paid during 1946–47 were £633 and £22,955 respectively.

4. **Production of Iron and Steel—Principal Countries.**—(i) *General.* Particulars of the production in the principal countries during the years 1938, 1946 and 1947 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.

('000 Tons of 2,240 lb.)

Country.	Pig-iron and Ferro-alloys.			Steel Ingots and Castings.		
	1938.	1946.	1947.	1938.	1946.	1947.
United States America	19,161	41,531	53,676	28,350	59,467	75,798
Germany	17,760	(a)	(a)	22,268	(a)	(a)
U.S.S.R. (Russia) ..	14,756	11,200	12,800	17,500	14,200	15,500
United Kingdom ..	6,761	7,761	7,785	10,398	12,695	12,725
France	5,977	3,389	4,809	6,040	4,338	5,642
Belgium	2,388	2,127	2,776	2,243	2,260	2,851
Canada	761	1,385	1,892	1,155	2,078	2,630
Czechoslovakia ..	1,215	945	1,400	1,710	1,642	2,250
Luxemburg	1,526	1,343	1,789	1,514	1,274	1,686
Italy	914	201	378	2,271	1,135	1,677
Poland	948	714	853	1,527	1,200	1,554
Australia (b) ..	**930**	**903**	**1,143**	**1,230**	**1,096**	**1,346**
India	1,571	1,415	1,410	936	1,301	1,261
Sweden	701	708	713	957	1,184	1,172
Japan	2,535	208	361	6,367	556	926
Spain	433	500	510	567	623	589
Union of South Africa	290	551	632	341	499	588
Hungary	330	158	299	638	347	587
Brazil	..	365	473	..	337	382
Austria	542	57	274	663	184	351
Mexico	119	278	(a)	72	247	316
Total—All Countries	81,000	79,000	98,000	107,600	109,800	134,000

(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 has since continued to operate except for the periods May, 1944 to April, 1946 and April, 1949 to September, 1949.

In Western Australia, the production of pig-iron, under the direction of the State Department of Industrial Development, commenced in January, 1948 and, as previously mentioned, the output for the six months ended June, 1948 amounted to 771 tons.

(ii) *Australia.* The production of steel and pig-iron in Australia, of which New South Wales is the main producing State, is shown in the following table for each of the years 1938–39 to 1947–48.

PIG-IRON AND STEEL : AUSTRALIAN PRODUCTION.

(Tons.)

Year ended 30th June—	Pig-iron. (a)	Steel Ingots.	Blooms and Billets.	Year ended 30th June—	Pig-iron. (a)	Steel Ingots.	Blooms and Billets.
1939 ..	1,104,605	1,169,989	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	1,656,742	1,631,679	1946 ..	906,283	1,061,918	1,036,501
1942 ..	1,557,641	1,699,793	1,699,447	1947 ..	1,143,132	1,312,439	1,255,703
1943 ..	1,399,306	1,632,825	1,583,417	1948 ..	1,235,574	1,343,153	1,221,538

(a) Includes pig-iron for castings.

§ 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 five years 1943 to 1947 is shown in the following table :—

WOLFRAM AND SCHEELITE : PRODUCTION.

Particulars.		1938.	1943.	1944.	1945.	1946.	1947.
WOLFRAM.							
New South Wales	cwt.	1,877	840	605	620	240	460
	£	25,740	14,033	10,982	9,604	3,859	9,184
Victoria.. ..	cwt.	..	282	60	..	..	..
	£	..	5,041	1,005	..	..	..
Queensland ..	cwt.	3,015	3,027	3,931	2,599	1,295	1,261
	£	30,779	56,778	73,445	48,176	20,773	28,283
South Australia ..	cwt.	..	3	1	..	..	..
	£	..	10	10	..	..	..
Western Australia	cwt.	..	..	..	..	..	..
	£	..	80	..	..	..	..
Tasmania ..	cwt.	5,982	4,600	4,838	4,220	3,140	4,020
	£	63,348	82,965	86,740	69,896	44,553	82,928
Northern Territory	cwt.	8,694	3,769	1,841	2,540	1,455	2,020
	£	78,277	58,166	31,583	42,937	21,696	41,020
Total ..	cwt.	19,568	12,521	11,276	9,979	6,130	7,761
	£	198,144	217,073	203,774	170,613	90,881	161,415
SCHEELITE.							
New South Wales	cwt.	184	460	360	340	440	300
	£	2,472	9,185	7,247	7,111	8,680	6,847
Queensland ..	cwt.	13	48	52	101	9	156
	£	93	889	988	2,018	98	3,166
Western Australia	cwt.	..	5	39	16	100	(a) 120
	£	..	2,664	21,420	8,946	1,552	(a) 3,840
Tasmania ..	cwt.	611	3,984	644	10,560	12,560	12,620
	£	6,193	68,908	10,848	158,093	165,264	240,006
Total ..	cwt.	808	4,497	1,095	11,017	13,109	13,196
	£	8,758	81,646	40,503	176,168	175,594	253,859

(a) Concentrates.

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 1943 to 1947 in the following table :—

CADMIUM 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
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
1946	3,737	675	4,412	98,823	305	4	309	7,106
1947	3,076	691	3,767	84,335	239	4	243	5,102

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 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 1945 amounted to 20,555 oz., valued at £130,667. There has been no production in New South Wales since that year.

(*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 1947.

(*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 99 oz. in 1947, valued at £2,700, 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 per oz. in 1925 to £15 0s. 4d. per oz. in 1938 (although the price rose to £24 19s. 1d. per oz. in 1940 and reached £27 5s. 5d. in 1947), 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 1944 to 1948 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).				
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
1944 ..	11,042,939	257,692	1,659,675	34,620	558,322	143,641	13,696,889
1945 ..	10,176,254	247,297	1,634,746	41,452	543,363	149,077	12,792,189
1946 ..	11,186,383	191,290	1,567,520	135,460	642,287	158,751	13,881,691
1947 ..	11,683,123	173,683	1,883,414	193,351	730,506	167,140	14,831,217
1948 ..	11,721,446	167,540	1,742,396	239,464	732,938	179,393	14,783,177
			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 ..	5,652,964	188,101	958,884	..	375,083	61,991	7,237,023
1944 ..	9,761,304	407,793	1,785,621	12,117	583,076	122,673	12,672,584
1945 ..	9,451,930	494,690	1,759,311	14,508	572,896	125,719	12,419,054
1946 ..	10,534,914	392,812	1,692,272	47,411	730,104	137,736	13,535,249
1947 ..	12,101,178	299,784	2,237,738	67,777	840,249	154,725	15,701,451
1948 ..	14,938,182	347,687	2,347,065	119,732	880,236	177,652	18,810,554

(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	1944	5,016,437	566,444
1925	876,468	166,404	1945	5,445,108	641,069
1935	2,221,515	317,444	1946	5,707,039	706,504
1938	3,675,450	351,721	1947	6,140,140	937,429
			1948	6,692,291	1,187,715

(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 Greta coal seams in the Northern division are being worked extensively between West Maitland and Cessnock, and this stretch of country, covering a distance of 15 miles, is the most important coal-mining district in Australia.

The following table shows the yields in each of the three districts during the five years 1944 to 1948 compared with 1938. Separate details are given respecting coal won underground and from open cuts—

COAL : PRODUCTION IN DISTRICTS OF NEW SOUTH WALES.

District.	1938.	1944.	1945.	1946.	1947.	1948.(*b*)
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Northern—Underground ..	6,294,213	7,324,270	6,440,531	7,176.652	7,325,874	7,146,500
Open Cut ..	..	11,176	334,539	513,449	553,597	635,100
Southern—Underground ..	1,831,408	2,005,642	1,775.165	1,738,058	1,915,899	1,922,400
Open Cut ..	..	..	..	..	..	..
Western—Underground ..	1,445,309	1,533,366	1,437,486	1,515,297	1,482,696	1,397,800
Open Cut ..	..	168,485	188,833	242,927	405,057	619,500
Total—Underground ..	9,570,930	10,863,278	9,653,182	10,430,007	10,724,469	10,466,700
Open Cut	..	179,661	523,072	756,376	958,654	1.254,600
Grand Total	9,570,930	11,042,939	10,176,254	11,186,383	11,683,123	11,721,300
Total Value (*a*) .. £	5,652,964	9,761,304	9,451,930	10,534,914	12,101,178	14,938,182
Average value per ton(*a*) ..	11s. 10d.	17s. 8d.	18s. 7d.	18s. 9d.	20s. 8¼d.	25s. 6d.

(*a*) At the pit's mouth. (*b*) Subject to revision.

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, 12,205,935 tons, being registered in 1942. Production decreased during the next three years by 732,436, 430,560 and 866,685 tons respectively and stood at 10,176,254 tons in 1945. Since that year there has been an annual increase in production, the increases in 1946, 1947 and 1948 being 1,010,129, 496,740 and 38,000 tons respectively. Production of coal from open cuts, by which coal is won after the overburden has been removed, has expanded rapidly in recent years and in 1948 represented 10.7 per cent. of the total coal won. Of the total quantity of coal won in New South Wales since the commencement of operations to the end of 1948, namely, 535 million tons, about 363 million tons or 68 per cent. was obtained in the Northern District, 107 million tons or 20 per cent. in the Southern District, and 65 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

1948 amounted to 20,548,741 tons, valued at £17,396,765. The record output, namely 703,828 tons, occurred in 1929 but production since that year has dropped considerably and in 1948 was only 167,540 tons.

The output of black coal in Victoria during each of the five years ended 1948 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
1944	224,313	33,379	257,692	407,793
1945	213,710	33,587	247,297	494,690
1946	169,650	21,640	191,290	392,812
1947	153,236	20,447	173,683	299,784
1948	145,880	21,660	167,540	347,687

(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 1947 amounted to 6,140,140 tons, all but 196,047 tons being procured at the State open cut at Yallourn. During 1947–48 6,192,336 tons of brown coal were produced by the State Electricity Commission, of which 3,763,828 tons went to the power station, 2,230,879 tons to the briquette factory and 197,629 tons to other factories for use as fuel.

Production of Briquettes. The briquetting plant of the State Electricity Commission 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 545,236 in 1947–48. 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 1943–44 to 1947–48, compared with 1938–39.

BROWN COAL : PRODUCTION AND UTILIZATION, VICTORIA.

('000 Tons.)

Year.	Total Production.	State Electricity Commission.				Brown Coal for other Industries.
		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	..
1943–44 ..	4,829	3,215	538	1,076	417	..
1944–45 ..	5,249	3,527	574	1,148	431	..
1945–46 ..	5,534	3,525	641	1,282	493	86
1946–47 ..	5,882	3,667	651	1,303	490	261
1947–48 ..	6,415	3,767	743	1,487	545	418

(iii) *Queensland.* The distribution of production during the years 1938 and 1944 to 1948 was as follows:—

COAL: PRODUCTION IN QUEENSLAND.

(Tons.)

District.	1938.	1944.	1945.	1946.	1947.	1948.
Ipswich	547,901	802,269	812,641	823,737	967,007	902,411
Bowen	224,778	316,016	292,043	234,512	267,417	238,487
Clermont	88,407	145,237	177,331	161,777	240,564	216,610
Maryborough ..	77,162	128,606	113,578	103,929	139,635	132,085
Darling Downs ..	76,571	126,950	112,666	107,555	123,758	117,277
Rockhampton ..	64,174	108,043	95,799	82,699	85,540	73,611
Chillagoe (Mount Mulligan) ..	19,192	18,961	19,960	22,193	23,907	18,670
Mount Morgan ..	13,698	13,593	10,728	31,118	35,586	43,245
Mackay	1,543	..	..	..	..	..
Total ..	1,113,426	1,659,675	1,634,746	1,567,520	1,883,414	1,742,396

The production of 1,883,414 tons in 1947 represents the highest annual production to date.

(iv) *South Australia.* The increasing demand for coal to meet the industrial expansion of South Australia has caused intensified efforts to develop the coal resources of the State so as to reduce, as far as possible, its dependence upon supplies from New South Wales. A new field of sub-bituminous coal was opened up at Leigh Creek, South Australia, in 1942 when 1,650 tons were produced. There was no production in 1943, but in 1944, 34,620 tons, valued at £12,117, were produced. Production has increased rapidly since that year and stood at 239,464 tons, valued at £119,732, in 1948.

Statistics published by the Department of Mines show that the quantities of Leigh Creek coal consumed in South Australia rose from 18,820 tons in 1944 to 34,208 tons in 1945, 68,925 tons in 1946, 128,963 tons in 1946–47 and 177,135 tons in 1947–48.

Details of production (which is by open-cut methods) and employment are given in the following table for the years 1944 to 1948.

COAL: PRODUCTION AND EMPLOYMENT IN SOUTH AUSTRALIA.

Year.	Production.	Value.	Numbers Employed.
	Tons.	£	
1944	34,620	12,117	91
1945	41,452	14,508	100
1946	135,460	47,411	121
1947	193,351	67,777	124
1948	239,464	119,732	237
Total to 1948 ..	645,997	263,195	..

(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 1944 to 1948 compared with 1938. Production at 732,938 tons in 1948 exceeded the previous record of 730,506 tons in 1947.

COAL : PRODUCTION AND EMPLOYMENT IN WESTERN AUSTRALIA.

Year.	Production.	Value.	Men employed.		
			Above ground.	Below ground.	Total.
	Tons.	£			
1938	604,792	375,083	158	607	765
1944	558,323	583,076	207	673	880
1945	543,363	572,896	224	636	860
1946	642,287	730,104	262	693	955
1947	730,506	840,249	287	745	1,032
1948	732,938	880,236	296	768	1,064

(vi) *Tasmania.* Details of the production of coal in Tasmania and the numbers employed are given in the following table for the years 1944 to 1948 compared with 1938. The chief source of coal supplies in this State is the Cornwall Coal Mine, situated on the east coast, which produced 94,219 tons in 1948 or 53 per cent. of the State's output.

Production in 1948, at 179,393 tons, exceeded the previous record of 167,140 tons in 1947.

COAL : PRODUCTION AND EMPLOYMENT IN TASMANIA.

Year.	Production.	Value.	Men employed.
	Tons.	£	
1938	83,753	61,991	269
1944	143,641	122,673	277
1945	149,077	125,719	279
1946	158,751	137,736	276
1947	167,140	154,725	288
1948	179,393	177,652	274

(vii) *Australia's Coal Reserves.* The latest available estimate of the actual and probable coal reserves of Australia is that prepared by the Coal and Lignites Panel of the Power Survey Sectional Committee of the Standards Association of Australia in May, 1950. The following table shows the actual and probable coal reserves as determined by that Committee :—

ACTUAL AND PROBABLE COAL RESERVES OF AUSTRALIA.
('000,000 Tons.)

State.	Anthracitic and Bituminous Coals.	Sub-bituminous and Lignitic Coals.
New South Wales	11,770	100
Victoria	33	37,000
Queensland	2,000	67
South Australia	..	650
Western Australia	..	1,000
Tasmania	244	..
Total	(a) 14,000	(a) 39,000

(a) Rounded to nearest '000,000,000 tons.

3. **Production in Various Countries.**—The total known coal production of the world in 1947 amounted to about 1,628 million tons, towards which Australia contributed about 21 million tons, or about 1·3 per cent. The following tables show the production of the chief British and foreign countries during each of the three years 1945 to 1947 compared with 1938 :—

COAL : PRODUCTION IN BRITISH COUNTRIES.

('000 Tons of 2,240 lb.)

Country.	Black Coal.				Brown Coal, Lignite.			
	1938.	1945.	1946.	1947.	1938.	1945.	1946.	1947.
United Kingdom ..	227,015	182,255	190,277	197,813	..	..	..	..
India	29,052	29,167	29,709	26,918	..	..	..	..
Union of South Africa ..	16,027	23,182	23,229	23,442	..	..	..	..
Australia	**11,680**	**12,792**	**13,882**	**14,831**	**3,675**	**5,445**	**5,707**	**6,140**
Canada	9,223	13,318	14,542	12,760	3,540	1,370	1,360	1,402
New Zealand	2,090	1,063	2,527	2,441	132	246	267	311
Southern Rhodesia ..	1,027	1,641	1,587	1,484	..	..	..	..

COAL : PRODUCTION IN FOREIGN COUNTRIES.

('000 Tons of 2,240 lb.)

Country.	Black Coal.				Brown Coal, Lignite.			
	1938.	1945.	1946.	1947.	1938.	1945.	1946.	1947.
United States of America	349,684	562,395	528,358	611,554	2,677	2,382	2,382	2,566
Germany	183,238	40,557	64,651	84,334	191,899	106,040	157,351	158,060
Poland	37,502	24,795	46,541	58,196	9	..	1,432	4,691
France	45,770	32,787	46,462	44,513	1,041	1,665	2,055	2,067
Czechoslovakia ..	15,900	11,240	13,913	16,047	15,779	15,172	19,204	22,031
Japan	47,915	22,009	20,054	26,805	..	..	2,315	2,776
Belgium	29,118	15,467	22,419	24,005	..	..	..	..
Spain	5,559	10,461	10,589	10,394	163	1,329	1,315	1,251
Netherlands	13,275	5,006	8,183	9,941	168	130	493	466
Hungary	1,026	685	709	1,043	8,186	4,050	5,539	7,627
Bulgaria	140	(*b*) 227	(*b*) 227	(*b*) 227	1,826	3,377	3,466	3,979
Turkey	2,548	3,660	3,770	3,883	143	504	594	810
Austria	222	70	103	175	3,477	2,033	2,364	2,791
Chile	2,011	2,019	1,923	2,046	..	..	..	..
Brazil	871	2,043	1,867	1,957	..	..	..	..
Mexico	879	900	967	1,023	..	..	..	..
Portugal	303	425	374	364	18	161	139	106
China	4,600	614	(*a*)	(*a*)	..	..	..	..
Greece	..	..	..	..	106	70	(*a*)	(*a*)

(*a*) Not available. (*b*) Estimated.

World production of coal amounted to 1,440 million tons in 1938 ; it rose to 1,770 million tons in 1943 but declined to 1,628 million tons in 1947. Of those 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 288 million tons or 17.7 per cent. in 1947.

4. **Exports.**—(i) *General.* The quantity of coal of Australian production exported to other countries in 1947–48 was 67,228 tons, valued at £108,733, shipped mainly from New South Wales. These figures of oversea exports exclude bunker coal supplied to oversea vessels, which in 1947–48 amounted to 283,354 tons, valued at £597,559. The quantities and values of the oversea exports of Australian coal for the years specified are shown in the following table. Similar details for the coal taken for bunker purposes on oversea vessels are shown below in a separate table.

COAL : OVERSEA EXPORTS, AUSTRALIA.

(EXCLUDING BUNKER COAL).

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913 ..	2,098,505	1,121,505	1944–45 ..	189,198	223,677
1921–22 ..	1,028,767	1,099,899	1945–46 ..	75,883	92,764
1931–32 ..	344,015	341,800	1946–47 ..	44,375	54,754
1938–39 ..	382,085	347,054	1947–48 ..	67,228	108,733
1943–44 ..	157,741	182,354			

Australian coal taken for bunker purposes on oversea vessels during the same years was as follows :—

BUNKER COAL SUPPLIED TO OVERSEA VESSELS, AUSTRALIA.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913 ..	1,647,870	1,018,375	1944–45 ..	207,462	382,505
1921–22 ..	1,498,035	2,178,101	1945–46 ..	228,977	415,167
1931–32 ..	506,140	534,897	1946–47 ..	355,428	655,207
1938–39 ..	549,453	561,063	1947–48 ..	283,354	597,559
1943–44 ..	211,188	371,584			

(ii) *New South Wales.* The distribution of the total output from New South Wales collieries during the years 1943–44 to 1947–48 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
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	8,211	11,212
1947–48 ..	2,537	307	59	234	8,643	11,780

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 1946–47, together with similar details of production and distribution for the year 1947–48.

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— 1938–39.		Average for Five Years Ended— 1946–47.		Total for Year. 1947–48.	
BLACK COAL.						
Source—	'000 Tons.	%	'000 Tons.	%	'000 Tons.	%
Production of Saleable Coal *a*	11,169	99.72	13,762	99.98	14,734	99.97
Imports	31	0.28	3	0.02	4	0.03
Total Supplies ..	11,200	100.00	13,765	100.00	14,738	100.00
Disposal—						
Exported overseas—						
Bunker	592	5.29	259	1.86	283	1.92
Other	346	3.09	144	1.06	67	0.45
Total	938	8.38	403	2.92	350	2.37
Consumed as fuel in—						
Electric Light and Power Works	1,796	16.03	2,732	19.86	3,441	23.34
Factories (*b*)	2,067	18.46	2,428	17.64	2,517	17.08
Railway Locomotives (*c*)	2,328	20.78	3,209	23.34	3,043	20.65
Total	6,191	55.27	8,369	60.84	9,001	61.07
Consumed as raw material in—						
Gas works	1,111	9.92	1,717	12.52	1,982	13.45
Coke Works	1,467	13.10	1,916	13.86	2,103	14.27
Total	2,578	23.02	3,633	26.38	4,085	27.72
Balance available for other consumption and accumulation of stocks (*d*) ..	1,493	13.33	1,360	9.86	1,302	8.84
Grand Total ..	11,200	100.00	13,765	100.00	14,738	100.00
BROWN COAL.						
Production of Brown Coal ..	'000 Tons. 3,064		'000 Tons. 5,294		'000 Tons. 6,415	
Utilization—		%		%		%
As fuel in Electric Light and Power Works ..	1,673	54.60	3,456	65.40	3,767	58.72
As fuel and as a raw material by Briquette Works ..	1,391	45.40	1,769	33.42	2,230	34.76
Recorded consumption as fuel in factories ..	(*e*)	(*e*)	62	1.08	384	5.99
Balance—Unrecorded consumption other purposes	(*e*)	(*e*)	7	0.10	34	0.53
Total	3,064	100.00	5,294	100.00	6,415	100.00

(*a*) Estimated. (*b*) Estimated where details were not available. (*c*) Government Railways only. (*d*) Includes bunker coal for interstate and intrastate shipping. (*e*) Not available.

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. **Coal Value at Pit's Mouth.**—(i) *New South Wales.* Particulars of the average value at the pit's mouth of the saleable output of coal for each district and for New South Wales as a whole are shown in the following table for the years 1938 and 1943 to 1947, according to figures compiled by the State Statistician. The figures relate to the pit head value (including subsidy).

AVERAGE VALUE(*a*) AT THE PIT'S MOUTH PER TON OF SALEABLE COAL(*b*): NEW SOUTH WALES.

(s. d.)

Year.	Northern District.	Southern District.	Western District.	Average for State.
1938	12 0	14 0	9 6	12 0
1943	16 10	20 1	14 9	17 2
1944	17 7	21 2	15 0	17 10
1945	18 7	21 11	15 4	18 7
1946	18 8	23 1	15 7	18 10
1947	20 11	23 11	16 10	20 9

(*a*) Including subsidy from 1943. (*b*) "Saleable" output represents "gross" output less coal used in operating the mines and miner's coal.

(ii) *Victoria.* The average value per ton at the pit's mouth of black coal produced in Victoria was as follows:—1938, 12s. 3d.; 1943, 27s. 5d.; 1944, 29s. 3d.; 1945, 37s. 11d; 1946, 40s. 5d.; and 1947, 33s. 2d.

The figures shown above exclude Victorian brown coal which in 1947 cost 3s. 1d. per ton to produce.

(iii) *Queensland.* Average values in the principal coal-producing districts during the years 1938 and 1943 to 1947 were as follows:—

AVERAGE VALUE PER TON OF COAL AT PIT'S MOUTH: QUEENSLAND.

(s. d.)

District.	1938.	1943.	1944.	1945.	1946.	1947.
Ipswich	17 0	21 0	21 2	21 3	21 3	23 4
Darling Downs	19 11	24 7	24 6	24 9	24 6	26 5
Wide Bay and Maryborough	24 0	28 8	28 9	28 8	29 0	33 0
Rockhampton	17 0	20 2	19 9	21 8	19 11	21 10
Clermont	13 8	16 8	16 6	16 5	16 4	17 4
Bowen	14 10	20 7	20 5	20 5	21 2	24 6
Chillagoe (Mount Mulligan) ..	31 6	34 1	34 1	34 8	35 2	38 2
Average for State ..	17 2	21 6	21 6	21 6	21 7	23 10

(iv) *South Australia.* The cost of production of black coal (sub-bituminous) was 7s. per ton in 1947.

(v) *Western Australia.* The average value per ton of Collie coal at pit's mouth was as follows:—1938, 12s. 5d.; 1943, 18s. 5d.; 1944, 20s. 6d.; 1945, 21s. 1d.; 1946, 22s. 9d.; and 1947, 25d. 10d.

(vi) *Tasmania.* The average value per ton of coal at the pit's mouth in Tasmania for the five years ended 1947 was:—1943, 16s. 1d.; 1944, 17s. 0d.; 1945, 16s. 10d.; 1946, 17s. 5d.; and 1947, 18s. 6d.; 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 Canada and the United States of are compared with the average value per ton of coal in New South Wales and Great ritain.

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

Country.	1938.	1942.	1943.	1944.	1945.	1946.	1947.	1948.
	s. d.	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*	*s. d.*
New South Wales (*a*) ..	12 0	16 1	17 2	17 10	18 7	18 10	20 9	25 8
Great Britain (*b*) ..	16 8	24 1	27 3	31 3	35 0	36 10	40 3	47 2½
	$	$	$	$	$	$	$	$
Canada—Bituminous(*c*) ..	5.417	5.700	5.700	6.650	6.788	6.980	6.980	6.980
United States of America—								
Bituminous (*d*) ..	4.327	4.782	5.045	5.239	6.356	5.776	6.873	(*e*)8.118

(*a*) Average pit head value per ton of 2,240 lb.; the figures relate to saleable coal and include subsidy from 1943. (*b*) Average value at the mine per ton of 2,240 lb., in sterling. (*c*) Wholesale price in Canadian currency per ton of 2,000 lb. (*d*) Wholesale price in United States of America currency per ton of 2,000 lb. (*e*) Average for nine months, March to November.

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 five years ended 1947:—

COAL-MINES: PERSONS EMPLOYED.

Year.	New South Wales.	Victoria.		Queensland.	South Australia.	Western Australia.	Tasmania.	Total.
		Black.	Brown.					
1915	17,959	1,312	(*a*)	2,518	..	498	161	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
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
1946	17,448	924	655	2,641	121	955	276	23,020
1947	17,614	860	594	3,337	124	1,032	288	23,849

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

The year of maximum employment was 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 1947 were only about three-quarters of the maximum figure already quoted. In New South Wales in 1939, 3,594,000 tons of coal, or 32.1 per cent. of the total output of underground coal, was cut by machinery, compared with 4,418,000 tons or 38.7 per cent. in 1943, 4,099,000 tons or 37.7 per cent. in 1944, 3,561,000 tons or 36.9 per cent. in 1945, 3,819,000 tons or 36.6 per cent. in 1946 and 4,150,000 tons or 38.7 per cent. in 1947. Similar details for other States are not available.

9. **Accidents in Coal-mining.**—The following table gives the number of persons killed or injured in the coal-mining industry in Australia during 1947, 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, 1947.

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 ..	17,614	(a) 16	(a) 82	0.91	4.66	730,195	142,477
Victoria (b) ..	1,454	1	13	0.69	8.94	6,313,823	485,679
Queensland ..	3,337	3	197	0.90	59.04	627,805	9,560
South Australia ..	124	..	7	..	56.45	..	27,622
Western Australia ..	1,032	..	281	..	272.29	..	2,600
Tasmania ..	288	..	4	..	13.89	..	41,785
Total ..	23,849	20	584	0.86	20.29	1,048,570	35,910

(a) Includes shale. (b) Includes brown coal.

The next table shows for the five-yearly period 1943 to 1947 annual averages respecting the number employed in mining and the number of fatalities, and the rate of fatalities per 1,000 employed.

COAL-MINING: AVERAGE ANNUAL FATALITIES, 1943 TO 1947.

State.	Average No. of Coal-miners Employed.	Average Annual No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	17,491	18	1.03
Victoria	1,655	2	1.21
Queensland	2,964	4	1.35
South Australia	87	..	..
Western Australia	913	1	1.10
Tasmania	280	..	..
Total	23,390	25	1.07

10. **Commonwealth Board of Inquiry into the Coal-mining Industry.**—Reference to the appointment in 1945 of the Commonwealth Board of Inquiry, its terms of reference and the report issued in 1946 is given in Official Year Book No. 37, page 842.

11. **Joint Coal Board.**—(i) *General.* Under war-time emergency legislation, the Commonwealth had wide powers to control the production, distribution and price of coal in Australia. Under peace-time conditions, however, the constitutional powers of the Commonwealth were less effective and in order to ensure the maintenance of supplies of coal to meet the peace-time needs of industry it was necessary to seek wider powers.

With this objective in view, the Governments of the Commonwealth and New South Wales, the chief coal-producing State, mutually agreed to create jointly an authority with powers similar to and in some respects wider than those possessed under Commonwealth war-time legislation. Following this agreement, the Joint Coal Board was created and has functioned as from 1st March, 1947.

(ii) *Constitution.* The legislative authority of the Joint Coal Board is contained in the Coal Industry Act No. 40 of 1946 passed by the Commonwealth Parliament and in the Coal Industry Act No. 44 of 1946 passed by the Parliament of New South Wales. Both Acts are identical for all practical purposes except that the New South Wales Act granted to the Board powers to control collieries and compulsorily to requisition and resume land, buildings, plant, machinery and equipment.

(iii) *Powers.* Under Section 14 of the Commonwealth Act and Section 11 of the New South Wales Act, the powers and functions of the Board are stated to include the taking of such action as is necessary or desirable—(*a*) to ensure that coal is produced in the State in such quantities and with such regularity as will meet requirements throughout Australia and in trade with other countries; (*b*) to ensure that the coal resources of the State are conserved, developed, worked and used to the best advantage in the public interest; (*c*) to ensure that coal produced in the State is distributed and used in such manner, quantities, classes and grades and at such prices as are calculated best to serve the public interest and secure the economical use of coal and the maintenance of essential services and industrial activities; and (*d*) to promote the welfare of workers engaged in the coal industry in the State. In addition the Board has full power with regard to health matters but does not exercise any basic responsibilities as regards safety measures or inspection of mines; these duties remain the responsibility of the New South Wales Department of Mines.

§ 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 1947–48 the quantity exported was 9,434 tons, valued at £39,041, of which 5,394 tons, valued at £16,847, went to New Caledonia and 3,269 tons, valued at £17,118, to New Zealand. In 1947–48, South Australia imported 862 tons of coke valued at £6,414 from the Union of South Africa.

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 five years 1943 to 1947, as recorded by the Department of Mines:—

COKE: PRODUCTION IN COKE WORKS, NEW SOUTH WALES.

Items.	1938.	1943.	1944.	1945.	1946.	1947.
Quantity tons	1,135,446	1,567,172	1,380,158	1,045,049	1,052,303	1,302,145
Value, total £	1,100,266	2,400,993	2,235,700	1,950,032	1,898,094	2,675,423
Value, per ton ..	19s. 5d.	£1 10s. 8d.	£1 12s. 5d.	£1 17s. 4d.	£1 16s. 1d.	£2 1s. 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 five years ended 1947–48, compared with 1938–39.

COKE: PRODUCTION IN STATE COKE WORKS, QUEENSLAND.

Year.	1938–39.	1943–44.	1944–45.	1945–46.	1946–47.	1947–48.
Quantity tons	26,032	9,347	13,181	11,591	12,574	14,880

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.

(Tons.)

Industry.	1938–39.	1943–44.	1944–45.	1945–46.	1946–47.	1947–48.
COKE.						
Coke Works ..	1,164,873	1,485,342	1,223,892	986,005	1,197,636	1,384,238
Gas Works ..	757,046	992,898	1,032,950	1,027,157	1,072,906	1,170,545
Total ..	1,921,919	2,478,240	2,256,842	2,013,162	2,270,542	2,554,783
COKE BREEZE.						
Coke Works ..	78,584	126,221	102,402	(a) 80,466	93,403	(a)111,062
Gas Works ..	35,996	48,873	50,480	51,845	55,546	60,556
Total ..	114,580	175,094	152,882	132,311	148,949	171,618

(a) Includes a small quantity produced in other works.

§ 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.	1943–44.	1944–45.	1945–46.	1946–47.	1947–48.
	Gals.	Gals.	Gals.	Gals.	Gals.	Gals.
Tar—Crude ..	34,614,313	39,618,296	36,001,178	34,754,021	39,143,025	41,166,231
Refined ..	3,752,201	10,332,404	11,913,537	13,185,119	14,631,470	14,996,193
Tar Oils (crude) ..	1,254,396	2,962,100	2,982,844	3,176,381	3,868,652	4,021,552
Ammoniacal Liquor ..	5,387,638	36,894,460	20,908,430	17,153,833	16,336,785	18,102,385
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Ammonium Sulphate	24,251	24,147	22,095	21,823	29,266	39,489

§ 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 would lead to an expansion of the industry in Australia and should provide a valuable training ground for technicians. Production of crude oil commenced at Glen Davis near Newnes in 1940 and the installation of a new processing plant enabled 3,696,981 gallons of petrol to be produced in 1946 and 4,063,628 gallons in 1947 compared with 1,043,821 gallons in 1944 and 1,979,511 gallons in 1945. In 1947 the yield of crude oil per ton of shale processed was 51 gallons. The following table shows the production of oil shale during the years 1943 to 1947 compared with 1940 :—

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
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
1947 ..	..	..	..	..	138,427	193,798	138,427	193,798

(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.**—Reference to investigations made into the possibility of establishing plants for the production of oil from coal is made in previous issues of the Official Year Book.

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 in Victoria 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.

During 1947 geological, geophysical and aerial surveys were undertaken in the south-western areas, in central Queensland and in the Roma area by various companies, but no drilling was done.

(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.

Geophysical surveys were undertaken by private interests during 1947 and continued into 1948, in the north-east corner of the State and extending over the border into New South Wales and Queensland. Assistance given by the Commonwealth included equipment and a geophysical survey party.

(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. During 1947 the Geological Survey of Western Australia authorized participation in the oil survey of the Fitzroy Basin, West Kimberley District, in conjunction with the Mineral Resources Bureau. No production had been recorded up to the end of 1947.

(vi) *General.* During 1939 efforts were made to secure greater uniformity in State egislation 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 1947.

§ 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 1947 in New South Wales was estimated at 73 carats, valued at £215. These were won by fossickers in the Inverell district. The total production to the end of 1947 is given at 206,952 carats, valued at £150,799.

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; 125 oz., valued at £283, in 1945; 1,838 oz., valued at £908, in 1946; and 510 oz., valued at £570, in 1947.

In Queensland, gems to the value of £3,540 were won in 1947. It is probable that many gems were sold privately or held for better prices and for these reasons the returns are considered to be very incomplete. There were about 120 miners operating on the fields during 1934 but only 28 at the end of 1947. 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 1947 was £1,000. 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 £1,643,476, 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 1947 was estimated at £307, and up to the end of that year, at about £188,000. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. 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, the value of production rose in 1947 to £61,569, the greatest annual production ever recorded. 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.

4. **Other Gems.**—Various other gems and precious stones have from time to time been discovered in the different States, the list including agates, amethysts, beryls, chiastolite, emeralds, garnets, 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; 34 tons, valued at £952, in 1945; 15 tons, valued at £581, in 1946; and 45 tons, valued at £1,525, in 1947. 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 1947 the number so engaged was as follows :—

NUMBER OF PERSONS ENGAGED IN MINING, 1947.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	795	5,331	184	523	17,614	1,555	26,002
Victoria	1,135	..	..	..	(a) 1,454	61	2,650
Queensland	1,834	994	48	528	3,337	283	7,024
South Australia	50	12	..	..	124	1,057	1,243
Western Australia ..	7,649	..	2	9	1,032	563	9,255
Tasmania	14	523	733	627	288	214	2,399
Northern Territory ..	176	2	15	52	..	174	419
Australia	11,653	6,862	982	1,739	23,849	3,907	48,992

(a) Includes 594 engaged in mining for brown coal.

Included in the figures for "other" in South Australia were 188 engaged in mining iron ore, 86 gypsum miners, 207 salt gatherers, and 240 opal miners. The Tasmanian figures include 154 scheelite miners and 14 osmiridium miners. The Northern Territory figures include 92 wolfram and 72 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	21,595	131	3,356	145	2,918
Australia	94,762	2,109	53,164	974	55,105	844

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

State.	1941.		1946.		1947.	
	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	984	25,082	852	26,002	871
Victoria	4,839	250	2,919	144	2,650	129
Queensland	6,541	631	6,056	555	7,024	635
South Australia	928	154	1,031	162	1,243	192
Western Australia	14,021	2,958	8,567	1,739	9,255	1,840
Tasmania	2,974	1,237	2,385	946	2,309	931
Northern Territory .	424	4,125	322	3,047	419	3,847
Australia	57,281	806	46,362	621	48,992	646

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 from that year until 1945 the ratio declined as follows:—1938, 957; 1939, 944; 1940, 880; 1941, 806; 1942, 696; 1943, 636; 1944, 601; 1945, 569. Since the end of the 1939-45 War the ratio has increased to 621 in 1946 and 646 in 1947.

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, 1947.**—The following table gives particulars of the number of men killed or injured in mining accidents during 1947:—

MINING ACCIDENTS, 1947.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED.								
Coal ..	(a) 16	(b) 1	3	..	..	..	..	20
Copper ..	..	..	..	..	..	..	..	..
Gold ..	1	1	..	..	18	..	..	20
Iron ..	..	..	..	1	..	..	..	1
Silver, lead and zinc ..	6	..	..	..	..	..	..	6
Tin	..	..	..	..	..	..	..	..
Other minerals	1	3	..	..	..	..	..	4
Total ..	24	5	3	1	18	..	..	51
INJURED.								
Coal ..	(a) 82	(b) 13	197	7	281	4	..	584
Copper ..	..	..	(c) 57	..	..	4	..	61
Gold	24	6	32	..	763	..	2	827
Iron ..	..	..	..	4	..	..	..	4
Silver, lead and zinc ..	45	..	67	..	..	11	..	123
Tin	..	..	..	..	..	3	1	4
Other minerals	9	14	1	7	(d) 12	..	..	43
Total ..	160	33	354	18	1,056	22	3	1,646

(a) Includes shale. (b) Brown coal. (b) Includes 2 in brown coal. (c) Copper and gold. (d) Gold and pyrites.

§ 16. Government Aid to Mining, and Mineral Control.

1. **Aid to Mining.**—(i) *Commonwealth.* (*a*) *General.* The Precious Metals Act 1926, the Gold Bounty Act 1930, the Loan Appropriation (Unemployment Relief) Act 1934, the Northern Australian Survey Act 1934 and the Gold Mining Encouragement Act 1940, mentioned in the previous issue of the Official Year Book, either have become inoperative or have been superseded. The Petroleum Oil Search Act 1936 is still in force. Further expenditure under the Gold Mining Encouragement Act is not contemplated, as an entirely new method of providing financial assistance to the mining industry is in operation, and is described below. Similarly no further expenditure is contemplated under the Petroleum Oil Search Act 1936, except for two projects not yet completed, and the Government policy now is to conduct geological and geophysical surveys of possible oil fields (*see* below).

Applications for financial assistance for the development of mining projects which offer promise of contributing materially to the economic welfare of the Commonwealth may be considered by the Bureau of Mineral Resources and the Treasury after consultation with the State concerned. This policy supersedes that set out in Official Year Book No. 37, page 849—the Australian Mining Council which was to have been set up under the previous policy has not met or fulfilled any of its functions and its creation was not finalized.

The Commonwealth Government in 1948 decided to provide financial assistance to certain gold mines in remote and isolated parts of Western Australia. These mines were experiencing difficulty because income from the fixed price for gold was insufficient to cover higher operating costs due to a number of factors, including the general rise in the level of wages and prices. Before granting assistance, the mine, its financial position and its relation to the economic and social welfare of the district were investigated by officers of the Bureau of Mineral Resources and the Treasury in collaboration with the State Mines Department, and conditions which should be observed in order to obtain financial assistance were laid down. Assistance as decided in 1948 was in the form of periodical payments sufficient to cover the difference between revenue and expenditure and to provide a return of 4 per cent. on the paid-up capital of the Company, but in 1949 this was increased to 6 per cent. At the same time the assistance scheme was extended to enable gold mines in remote areas of other States to participate. The scheme was terminated on the devaluation in September, 1949 of the Australian pound in terms of the United States of America dollar, which had resulted in a rise of £4 14s. 7d. per fine ounce in the Australian price of gold.

(*b*) *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. These 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 any excess over 25 tons ; and (3) a maximum of £25,000 for any one deposit.

(*c*) *Bureau of Mineral Resources.* The Bureau of Mineral Resources, Geology and Geophysics has sections dealing with geology and geophysics, mining engineering, petroleum technology and mineral economics. The geological section conducts all surveys required in Commonwealth Territories, detailed and regional surveys in conjunction with or by arrangement with the State Mines Departments, surveys of possible oil-fields in Australia and New Guinea, surveys of 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. The Bureau works in close co-operation with the Mines Departments of the States. The Bureau has 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.

(*d*) *Diamond Drills.* The four diamond drills mentioned in the previous Official Year Book have arrived in Australia and are available for hire by mining companies.

(*e*) *Search for Oil.* No variation has been made in the policy described in Official Year Book No. 37, page 850, regarding the search for petroleum throughout Australia and its Territories. In addition to the activities of the Bureau of Mineral Resources, Geology and Geophysics set out in that Year Book, it furnishes field laboratories and trained personnel to assist small companies in recording scientific information obtained while drilling for oil.

The Commonwealth Government has encouraged the search for oil in Australia, Papua and New Guinea; details of the efforts made are outlined in previous issues of the Official Year Book. A considerable amount of geological work and test drilling was conducted under the provision of the Petroleum Oil Search Act 1936 and, at the outbreak of the 1939–45 War, two tests were partially completed, one at Oiapu in the Gulf district of Papua and the other at Nerrima in the Kimberley district of Western Australia. At Nerrima, the Freney Kimberley Oil Co. (1932) N.L. rejected a Commonwealth offer of financial assistance. The company is now drilling with financial assistance from the Government of Western Australia, using a drilling plant hired from the Commonwealth; technical advice and assistance is also provided by the Commonwealth.

(*f*) *Survey of North Australia.* Reference to this survey which was completed at the end of 1940 appears in Official Year Book No. 35, page 744. A few reports on individual areas remain to be printed.

(*g*) *Mining Industry Advisory Panel.* This panel has not functioned since 1946. During the year, the Bureau of Mineral Resources continued the investigation, recommended by the Panel, into the possibility of arranging uniform legislation in the States and Territories in connexion with health and safety in mines.

(*h*) *Standing Committee on Liquid Fuels.* This Committee has become inoperative.

(*i*) *Ore-dressing and mineragraphic investigations.* These investigations are conducted by the Commonwealth Scientific and Industrial Research Organization as required by the industry. Ore-dressing investigations are 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 grant of £22,000 mentioned in Official Year Book No. 37, page 851, was expended by 1947; since that year funds to continue the investigations are included in an investigational vote approved annually for the Commonwealth Scientific and Industrial Research Organization. In 1948 the Government expended approximately £5,000 on ore-dressing and £6,100 on mineragraphic investigations.

(ii) *States.* (*a*) *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.

(*b*) *New South Wales.* State aid to assist metalliferous mining consisted of grants to assist the prospecting and/or mining for gold and minerals and for the purchase, removal and installation of mining plant or equipment. In 1948, this assistance totalled £4,705, the greater part of which was granted to prospect or mine for either tin or gold.

(*c*) *Victoria.* In 1948, £5,368 was granted by the State to assist the gold-mining industry. Grants may be made to assist prospecting and development or the purchase of machinery. The Mines Department has 24 stamp batteries in different parts of the State to crush ore for prospectors at nominal rates. Small mining companies may avail themselves of these facilities.

(*d*) *Queensland.* The Mines Department maintains a treatment works for tin ores, etc. at Irvinebank, an assay office at Cloncurry and diamond-drilling plants in several parts of the State. The Venus State Mill at Charters Towers is available for

the treatment of gold-bearing ores and another State battery is located at Kidston. In addition, many departmental compressor plants, pumping plants and other mining equipment are provided and made available on hire on the principal mining fields. Financial aid granted to prospectors for 1948 amounted to £11,695, whilst other forms of aid for mining granted by the State amounted to £7,505 for the same period.

(*e*) *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. 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-cuts to December, 1948 amounted to 645,997 tons. State aid to mining during 1948 totalled £58,567, of which £11,350 was for coal, £4,304 for copper, £6,285 for gold, and the balance, £36,628, 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.

(*f*) *Western Australia.* Financial aid granted to prospectors and others in 1948 amounted to £40,799; this sum was allotted as follows:—oil, £15,000; lead, £10,000; gold, £4,049; coal, £1,199; vermiculite, £656; tin, £139; other forms of assistance, £9,756. The Mines Department has about twenty batteries throughout the mining fields where prospectors and others can have their ore treated.

(*g*) *Tasmania.* During 1948 the Department of Mines reported that the policy of assistance to mining was maintained to the extent provided for under the provisions of the Aid to Mining Act but no material advantage was taken thereof. In that year £75 was expended and £493 was repaid against advances previously made.

Other assistance rendered to the industry is provided by a well-equipped metallurgical laboratory at Launceston where ore-dressing and other metallurgical problems can be investigated for the mine-owner and advice given regarding the most suitable type of plant to instal.

(*h*) *Northern Territory.* The Commonwealth Government has maintained a 10-head battery at Tennant Creek for the treatment of ore by miners. Another battery has been leased. A 10-head battery is situated on the Maranboy tin-field and crushes ore for all parties on the field. Assistance has been given to miners on the mica fields to purchase air-compressors and other mining plant on liberal terms. The Commonwealth Government has purchased all mica produced on the fields. Roads and water supply services are provided and maintained for all mines and mineral-producing areas throughout the Territory.

2. **Control of Minerals.**—(i) *Minerals Committee, and Controller of Minerals Production.* With the termination of the war the activities of the Controller of Minerals Production, appointed under the provision of the National Security (Minerals) Regulations, were reduced. In 1948, operations conducted by the Controller were the Dorset Tin Dredge in Tasmania and the acquisition and sale of mica produced in Australia.

(ii) *Mica Production.* The Commonwealth Government extended to 31st December, 1949, its authority to acquire the mica produced in Australia at a price fixed by the Prices Commissioner.

(iii) *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.

(iv) *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 and in waste materials from mining operations, 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 substances or mineral containing such substance.

§ 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 1944 to 1948 were as follows :—

METALLIC CONTENTS OF ORES AND CONCENTRATES PRODUCED IN AUSTRALIA.

Metal.		1939.	1944.	1945.	1946.	1947.	1948.
Silver	oz.	15,320,116	9,365,726	8,076,740	9,045,280	9,527,140	10,057,519
Lead, Pig	tons	280,003	189,485	164,741	183,835	196,623	216,955
Zinc	,,	217,256	174,358	150,313	171,910	182,258	190,469
Copper	,,	20,560	28,056	24,520	17,755	13,123	12,368
Tin	,,	3,067	2,547	2,282	2,127	2,445	1,874

The production of pig-iron in New South Wales and South Australia—the only producing States until 1947–48 when production was commenced in Western Australia—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, and to 1,235,574 in 1947–48, including 771 tons, the output of Western Australia.