CHAPTER XVI.
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 or the pastoral industry, nevertheless it was the discovery of gold in payable quantities that first attracted population to Australia, and thus laid the foundation of its nationhood.

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

3. **Quantity and Value of Production in 1931.**—(NOTE.—A table showing particulars of mineral production for the year 1932 will be found in the Appendix. This information was not available at the time of compilation of the present Chapter.) The quantities (where available) and the values of the principal minerals produced in each State, and in Australia as a whole, during the year 1931, are given in the tables immediately following. It must be clearly understood that the figures quoted in these tables refer to the quantities and values of the various minerals in the form in which they were reported to the States Mines Departments, and represent amounts which the Mines Departments consider may fairly be taken as accruing to the mineral industry as such. They are not to be regarded as representative of Australia's potentiality as a producer of *metals*, this matter being dealt with separately in § 17 hereinafter. It may be explained, therefore, that the item pig-iron included in the returns for New South Wales up to the year 1929 refers only to metal produced from the locally-raised ore and so reported to the Mines Department. 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, but the iron and steel produced therefrom cannot be assigned to the mineral industry of New South Wales. Similarly lead, silver-lead, and zinc are credited in the form reported to the State of origin—chiefly New South Wales—although the actual metal extraction is carried out to a large extent elsewhere.

MINERAL PRODUCTION.—QUANTITIES, 1931.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Antimony ..	ton	65	..	..	..	..	..	..	65
Arsenic	,,	661	..	..	..	409	..	..	1,070
Asbestos ..	,,	8	..	..	6	108	..	..	122
Barytes ..	,,	122	..	..	1,445	..	..	..	1,567
Bismuth ..	cwt.	750	..	3	4	..	35	..	792
Brown Coal ..	ton	..	2,194,453	..	..	..	..	..	2,194,453
Coal	,,	6,432,382	571,342	841,308	..	432,400	123,828	..	8,401,260
Copper (ingot, matte, etc.) ..	,,	485	..	3,135	..	..	9,833	..	13,453
Copper ore ..	,,	56	..	..	22	..	..	1	79
Diatomaceous earth	,,	1,067	..	..	..	..	..	..	1,067
Gold	fine oz.	19,673	43,637	13,147	2,782	510,572	4,760	552	595,123
Gypsum ..	ton	1,738	1,565	..	24,207	222	..	..	27,732
Iron (pig) (b) ..	,,	..	..	..	..	..	..	..	..
Iron oxide ..	,,	3,665	..	..	..	..	..	..	3,665
Ironstone ..	,,	..	..	4,556	289,179	..	..	..	293,735
Kaolin	,,	2,576	2,973	..	639	..	..	..	6,188
Lead (b) ..	,,	..	..	17,184	..	..	2,189	..	19,373
Lead and silver-lead ore, concentrates etc. ..	,,	172,380	..	..	..	24	..	9	172,413
Limestone flux ..	,,	30,304	..	15,054	14,940	..	55,268	..	115,566
Magnesite ..	,,	3,425	50	..	..	..	..	..	3,475
Manganese ore ..	,,	..	..	..	13	..	..	..	13
Molybdenite ..	cwt.	5	..	6	..	..	..	..	11
Osmiridium ..	oz.	..	..	..	..	..	1,280	..	1,280
Phosphate ..	ton	94	..	..	515	..	..	..	609
Pigments ..	,,	571	..	..	21	..	..	..	592
Platinum ..	oz.	283	..	..	..	..	..	..	283
Salt	ton	..	(a)	..	68,666	..	..	..	68,666
Sapphires ..	oz.	..	..	..	..	..	..	..	..
Shale (oil) ..	ton	2,131	..	..	..	..	1,402	..	3,533
Silver	fine oz.	50,353	1,512	1,088,478	68	43,739	391,732	..	1,575,882
Tin and tin ore ..	ton	794	5	478	..	39	589	33	1,938
Wolfram ..	,,	54	..	1	..	..	..	14	69
Zinc and concentrates	,,	220,982	..	..	..	..	..	..	220,982

(a) Not available for publication. (b) See letterpress preceding this table; no production of pig-iron recorded for the last three years. (c) Year ended 30th June.

The values of the minerals raised in each State in 1931 are given in the following table:—

MINERAL PRODUCTION.—VALUE, 1931.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (d)	Australia.
	£	£	£	£	£	£	£	£
Antimony ..	1,990	..	..	..	..	..	..	1,990
Arsenic	10,550	..	..	..	7,291	..	..	17,841
Asbestos ..	64	..	..	100	1,446	..	..	1,610
Barytes ..	305	..	..	4,335	..	..	..	4,640
Bismuth ..	5,387	..	37	103	..	1,015	..	6,542
Brown Coal ..	..	251,511	..	..	..	..	..	251,511
Coal	4,607,343	362,284	699,926	..	336,178	98,004	..	6,103,735
Copper (ingot and matte) ..	23,298	..	126,342	..	..	416,309	..	565,949
Copper ore ..	650	..	..	934	..	..	25	1,609
Diamonds ..	694	..	..	..	..	..	..	694
Diatomaceous earth	3,201	..	..	..	..	..	..	3,201
Gold	118,623	262,488	79,652	17,328	3,054,743	28,150	2,535	3,563,519
Gypsum ..	869	428	..	21,181	304	..	..	22,782
Iron (pig) (b) ..	..	..	..	..	..	..	..	..
Iron Oxide ..	2,135	..	..	..	..	..	..	2,135
Ironstone ..	..	..	5,100	332,556	..	..	..	337,656
Kaolin	2,892	2,730	..	1,800	..	..	..	7,422
Lead (b) ..	..	..	230,740	..	..	29,024	..	259,764
Lead and silver-lead ore, concentrates, etc. ..	1,076,208	..	..	..	270	..	160	1,076,638
Limestone flux ..	11,364	..	16,626	5,603	..	19,344	..	52,937
Magnesite ..	6,850	190	..	..	..	..	..	7,040
Manganese ore ..	..	..	..	78	..	..	..	78
Molybdenite ..	54	..	48	..	..	..	..	102
Opal	2,178	..	600	3,127	..	..	..	5,905
Osmiridium ..	..	..	..	..	..	18,028	..	18,028
Phosphate ..	70	..	..	2,060	..	..	..	2,130
Pigments ..	1,142	..	..	115	..	..	..	1,257
Platinum ..	2,201	..	..	..	..	..	..	2,201
Salt	..	(a)	..	154,499	..	..	..	154,499
Sapphires ..	..	..	2,903	..	..	..	..	2,903
Shale (oil) ..	1,814	..	..	..	..	600	..	2,414
Silver (b) ..	3,151	99	75,653	5	2,833	25,754	..	107,495
Tin and tin ore ..	103,111	440	35,744	..	3,945	70,634	2,331	216,205
Wolfram ..	2,633	..	28	..	..	16	384	3,061
Zinc & concentrates	512,795	..	..	..	..	..	..	512,795
Unenumerated ..	(c) 16,131	2,164	1,554	4,380	3,462	356	(e)5,981	34,028
Total ..	6,517,703	882,334	1,274,953	548,204	3,410,472	707,234	11,416	13,352,316

(a) Not available for publication. (b) See letterpress above preceding table. (c) Includes dolomite £2,733, silica £5,484, and fireclay £5,867. (d) Year ended 30th June. (e) Mica, £5,531; tantalite, £450.

It may be pointed out in connexion with the figures given in the above table that the totals are exclusive of returns relating to certain commodities, such as stone for building and industrial uses, sand, gravel, brick and pottery clays, lime, cement, and slates, which might be included under the generic term "mineral." Valuations of the production of some of these may be obtained from the reports of the various Mines Departments, but in regard to others it is impossible to obtain adequate information. In certain instances, moreover, the published information is of little value. Some of the items excluded, such as cement, carbide and sulphuric acid are included in manufacturing production, and, in any case, only the raw material could properly be included in mineral production. The items excluded from the total for New South Wales in 1931 consist of—lime, £28,125; building stone, £147,436; Portland cement, £617,432; coke, £297,318; road materials, £558,112; shell grit, £4,733; mineral water, £55; sulphur and sulphuric acid, £10,877; and brick and pottery clays, £43,015. Carbide, £67,298, and cement, £96,310, have been excluded from the Tasmanian figures.

4. **Value of Production, 1927 to 1931.**—The value of the mineral production in each State in the five years 1927 to 1931 is given in the table hereunder :—

MINERAL PRODUCTION.—VALUE.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
1927 ..	15,449,702	1,176,378	1,614,535	1,150,847	2,202,437	1,400,994	19,609	23,014,502
1928 ..	12,600,668	1,098,691	1,359,616	1,008,514	2,128,109	1,329,057	14,627	19,539,282
1929 ..	10,155,164	1,116,083	1,683,050	1,295,053	2,087,852	1,556,276	18,345	17,911,823
1930 ..	8,504,034	1,088,343	1,241,125	1,263,398	2,191,393	1,050,923	16,656	15,355,872
1931 ..	6,517,703	882,334	1,274,953	548,204	3,410,472	707,234	11,416	13,352,316

For New South Wales the value of production in 1931 was about £2,000,000 less than that for 1930. The decline was due to the low prices realized for silver, lead, zinc and tin, and to the diminished output of coal.

The decrease in the Victorian returns for 1931 was chiefly due to a fall in the production of black coal although increases were shown for brown coal and gold.

In Queensland the rise in value recorded in 1931 was largely due to increases in the returns from lead, silver, and gold, amounting respectively to £227,000, £70,000, and £46,000, although these increases were partly counterbalanced by a fall of £253,000 in the return from coal, of £48,000 from copper, while the yield from tin showed a decline of £14,000. The returns for South Australia in 1931 showed a decline of over £735,000 on the figures for 1930, the loss being mainly due to a decrease in the production of ironstone from £1,068,000 in 1930 to less than £333,000 in 1931. The value of the gold yield, however, advanced from under £6,000 in 1930 to over £17,000 in 1931. In Western Australia the total for 1931 shows an increase of about £1,219,000 on that for the preceding year. All minerals, however, with the exception of gold, arsenic, and tantalite showed decreases. The yield from gold, which showed an increase of £1,286,000, accounted for nearly 90 per cent. of the total value of the State's output in 1931. The decline in Tasmania during 1931 was mainly due to the fall in price of the chief industrial metals. This was reflected in the returns from copper and lead, which showed decreases of £204,000 and £49,000 respectively. There were also considerable decreases in the returns from silver and wolfram and from coal. It is stated that the decline in the Northern Territory returns for recent years is due in some measure to the fact that some of those engaged in mining forsook it to take up more profitable work in other pursuits. The number of Chinese miners in the Territory has steadily decreased and those remaining are old men. Mica to the value of £5,531 was the chief item of production in 1931, the mineral being obtained in the Arltunga district.

5. **Total Production to end of 1931.**—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1931. The figures given in the table are also exclusive of the same items referred to in connexion with the preceding table. Thus the total for New South Wales falls short by over £46,000,000 of that published by the State Department of Mines, the principal items excluded being coke, £14,643,000 ; cement, £18,892,000 ; lime, £1,676,000 ; and considerable values for marble, slate, granite, chert, gravels, etc., which the Department now includes in the returns for quarries.

MINERAL PRODUCTION.—VALUE TO END OF 1931.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	Million. £
Gold ..	64,039,439	303,861,148	86,001,986	1,659,447	168,348,586	9,015,498	2,286,307	635
Silver and lead ..	121,083,327	265,169	4,495,981	383,547	2,281,900	9,085,843	65,903	138
Copper	15,602,929	216,686	26,757,605	33,148,536	1,808,828	20,810,029	233,466	99
Iron ..	7,739,218	15,641	481,092	9,321,891	36,722	52,110	..	17
Tin ..	14,576,630	977,102	11,155,220	..	1,604,219	17,309,922	626,856	46
Wolfram	276,859	11,885	1,065,591	301	1,441	236,387	221,110	2
Zinc ..	24,391,734	..	13,460	15,993	5,437	996,077	..	25
Coal ..	194,189,254	13,783,229	20,152,650	..	6,938,490	1,955,406	..	237
Other ..	8,099,980	875,457	2,778,315	4,591,928	238,632	2,089,440	67,830	19
Total	449,999,370	320,006,317	152,901 900	49,121,643	181,264,255	61,550,712	3,501,472	1,218

(a) To 30th June. 1931.

The " other " minerals in New South Wales include alunite, £209,000 ; antimony, £362,000 ; arsenic, £133,000 ; bismuth, £242,000 ; chrome, £123,000 ; diamonds, £146,000 ; magnesite, £173,000 ; molybdenite, £213,000 ; opal, £1,600,000 ; scheelite, £194,000 ; and oil shale, £2,692,000. In the Victorian returns antimony ore was responsible for £612,000. The value for coal in this State includes £1,678,000 for brown coal. Included in " other " in the Queensland production were opal, £186,000 ; gems, £630,000 ; bismuth, £118,000 ; cobalt, £155,000 ; molybdenite, £600,000 ; limestone flux, £739,000, and arsenic, £124,000. The chief items in South Australian " other " minerals were salt, £2,929,000 ; limestone flux, £285,000 ; gypsum, £764,000 ; phosphate, £133,000 ; and opal, £128,000. In the Tasmanian returns osmiridium was responsible for £589,000, scheelite for £112,000, and iron pyrites for £94,000.

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

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

§ 2. Gold.

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

2. **Production at Various Periods.**—In the following table will be found the value of the gold raised in the several States and in Australia as a whole during each of the eight decennial periods from 1851 to 1930, and in single years from 1921 to 1931, from the dates when payable discoveries were first reported. Owing to the defective information in the earlier years the figures fall considerably short of the actual totals, for during the first stages of mining development, large quantities of gold were taken out of Australia by successful diggers, who preferred to keep the amount of their wealth secret.

GOLD.—VALUE OF PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Australia.
	£	£	£	£	£	£	£	£
1851–60..	11,530,583	93,337,052	14,565	..	..	788,564	..	105,670,764
1861–70..	13,676,103	65,106,264	2,076,494	..	..	12,174	..	80,871,035
1871–80..	8,576,654	40,625,188	10,733,048	579,068	..	700,048	79,022	61,293,028
1881–90..	4,306,541	28,413,792	13,843,081	246,668	178,473	1,514,921	713,345	49,216,821
1891–1900	10,332,120	29,904,152	23,989,359	219,931	22,308,524	2,338,336	906,988	89,999,410
1901–10..	9,569,492	30,136,686	23,412,395	310,080	75,540,415	2,566,170	473,871	142,009,109
1911–20..	4,988,377	13,354,217	9,876,677	238,808	46,808,351	873,302	100,652	76,240,384
1921–30..	940,946	2,721,309	1,976,715	47,564	20,458,080	193,833	9,894	26,348,341
1921 ..	271,302	554,087	214,060	13,933	2,935,693	28,311	1,299	4,018,685
1922 ..	118,359	501,515	378,154	4,693	2,525,811	16,101	540	3,545,173
1923 ..	83,325	422,105	392,563	4,199	2,232,179	16,300	743	3,151,414
1924 ..	86,905	312,398	459,716	4,093	2,255,932	21,516	3,270	3,143,830
1925 ..	82,498	200,901	197,118	3,535	1,874,320	14,969	1,939	2,375,280
1926 ..	82,551	208,471	43,914	3,219	1,857,716	17,936	594	2,214,401
1927 ..	76,595	163,699	161,321	1,776	1,734,571	20,646	468	2,159,076
1928 ..	54,503	144,068	56,395	2,258	1,671,093	15,306	431	1,944,054
1929 ..	31,842	111,609	40,250	4,289	1,602,142	23,772	553	1,814,457
1930 ..	53,066	102,456	33,224	5,569	1,768,623	18,976	57	1,981,971
1931 ..	118,623	262,488	79,652	17,328	3,054,743	28,150	2,535	3,563,519
1932 ..	203,622	351,586	173,144	22,018	4,413,809	43,137	4,486	5,211,802
Total 1851–1932	64,243,061	304,212,734	86,175,130	1,681,465	172,762,395	9,058,635	2,290,793	640,424,213

In the figures quoted on previous page, allowance has been made in the values for the years in which gold was at a premium in Australian currency.

The value of the gold yield in 1929 was the lowest recorded since the discovery of the precious metal in 1851, while the slight increase in 1930 was to some extent due to the increased activity in prospecting and the working over of old auriferous areas resultant on prevailing economic conditions. Consequent on the enhanced price realized for gold in 1931 the figures for the year show a considerable increase, the total for Australia being the highest recorded since 1921. The average price in Australian currency applied to the production for this year was £5 19s. 9d. Reference to the bounty paid by the Commonwealth Government on local production will be found in § 16. 1. hereinafter.

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

The following table shows the quantity in fine ounces of gold raised in each State and in Australia during each of the last five years. A separate line is added showing the total production in thousands of fine ounces since 1851:—

GOLD.—QUANTITY PRODUCED.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Ter. (a)	Australia.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
1928 ..	12,831	33,917	13,277	532	393,408	3,603	101	457,669
1929 ..	7,496	26,275	9,476	1,009	377,176	5,597	130	427,159
1930 ..	12,493	24,119	7,821	1,311	416,369	4,467	13	466,593
1931 ..	19,673	43,637	13,147	2,782	510,572	4,760	552	595,123
1932 ..	27,941	47,745	23,263	3,014	605,561	5,937	761	714,222
Total (b) 1851–1932	15,050	71,440	20,170	391	39,419	2,121	538	149,129

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

3. **Changes in Relative Positions of States as Gold Producers.**—The figures in the table showing the value of gold raised will sufficiently explain the enormous increase in the population of Victoria during the period 1851 to 1861, when an average of over 40,000 persons reached the State each year. With the exception of the year 1889, when its output was surpassed by that of Queensland, Victoria maintained its position as the chief gold-producer for a period of forty-seven years, or up to 1898, when its production was outstripped by that of Western Australia, the latter State from this year onward contributing practically half, and so far as the last ten years are concerned nearly four-fifths of the entire yield of Australia. New South Wales occupied the second place on the list until 1874, when Queensland returns exceeded those of the parent State, and, with the exception of the years 1921, 1926 and 1930 to 1932, maintained this pre-eminence.

4. **Place of Australia in the World's Gold Production.**—In the table given below will be found the estimated value of the world's gold production, and the share of Australia therein in decennial periods since 1851 and during each of the last six years for which returns are available. The figures given in the table have been compiled chiefly from returns obtained directly by the Commonwealth Bureau of Census and Statistics from the gold-producing countries of the world.

GOLD.—WORLD'S PRODUCTION.

Period.	World's Production of Gold.	Gold Produced in Australia.	Percentage of Australia on Total.
	£	£	%
1851–60	260,645,000	105,671,000	40.5
1861–70	228,031,000	80,871,000	35.5
1871–80	214,427,000	61,293,000	28.5
1881–90	220,903,000	49,217,000	22.3
1891–1900	436,421,000	89,999,000	20.6
1901–10	777,696,000	142,009,000	18.3
1911–20	908,537,000	76,240,000	8.4
1921–30	823,212,000	26,348,000	3.2
1926	82,684,000	2,214,000	2.7
1927	82,567,000	2,159,000	2.6
1928	83,829,000	1,944,000	2.3
1929	83,312,000	1,814,000	2.2
1930	88,490,000	1,982,000	2.2
1931	136,538,000	3,564,000	2.6

For the year 1931 the world's production of gold in fine ounces was 22,802,000, as compared with a return of 20,832,000 oz. fine in 1930, but the value per oz. fine in Australian currency for 1931 was taken as £5·988 as against an average of £4·248 for each of the preceding five years.

The value of the gold yield in the ten chief producing countries in each of the five years 1927 to 1931 is given in the table hereunder. Particulars of the quantity and value of the gold production for all countries for the ten years 1922–31 will be found in the Australian Production Bulletin issued by this Bureau.

GOLD.—PRODUCTION, CHIEF COUNTRIES.

Country.	1927.	1928.	1929.	1930.	1931.
	£	£	£	£	£
Union of South Africa	42,998,000	43,982,000	44,229,000	45,520,000	65,135,000
United States ..	8,993,000	9,110,000	8,736,000	8,922,000	13,256,000
Canada	7,870,000	8,031,000	8,191,000	8,929,000	16,131,000
Russia	4,507,000	5,097,000	4,248,000	6,090,000	10,185,000
Mexico	3,081,000	2,970,000	2,769,000	2,848,000	3,730,000
Rhodesia	2,470,000	2,447,000	2,382,000	2,358,000	3,242,000
Australia	2,159,000	1,944,000	1,814,000	1,982,000	3,564,000
India	1,632,000	1,597,000	1,546,000	1,398,000	1,979,000
Japan	1,374,000	1,312,000	1,419,000	1,651,000	2,545,000
Gold Coast ..	728,800	670,400	883,000	1,045,000	1,551,000

The next table shows the average yearly value in order of importance of the yield in the chief gold-producing countries for the decennium 1922–1931.

GOLD.—AVERAGE ANNUAL PRODUCTION, CHIEF COUNTRIES, 1922 TO 1931.

Country.	Value.	Country.	Value.
	£		£
Union of South Africa ..	44,282,500	Rhodesia	2,673,800
United States	10,123,700	Australia	2,589,300
Canada	8,245,600	India	1,682,900
Russia	4,562,700	Japan	1,434,400
Mexico	3,266,600		

The comparison has been restricted to countries where the average for the period is in excess of a million sterling.

5. **Employment in Gold Mining.**—The number of persons engaged in gold mining in each State in 1901 and in each of the last five years is shown in the following table :—

GOLD MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Total.
	No.	No.	No.	No.	No.	No.	No.	No.
1901 ..	12,064	27,387	9,438	1,000	19,771	1,112	200	70,972
1927 ..	670	1,126	304	17	4,056	65	12	6,250
1928 ..	736	655	343	30	3,863	47	12	5,686
1929 ..	684	864	326	58	4,108	63	5	6,108
1930 ..	4,229	942	903	114	4,452	43	4	10,687
1931 ..	9,944	4,258	2,751	180	6,344	166	70	23,713

The heavy decline noticeable since 1901 is of course due to the exhaustion of accessible payable deposits and the failure to locate any considerable fresh sources of supply. As pointed out previously, the increase in number during the last two years was due to the higher price of the metal coupled with lack of other employment bringing about considerable accessions to the ranks of prospectors, particularly in New South Wales and Queensland where much attention was devoted to turning over old gold-fields. In Western Australia renewed activity took place at existing mines and in some cases abandoned mines were reopened. The treatment plant at the Wiluna Gold Mines Ltd. was put into commission early in the year, and the Company was dealing with about 26,000 tons of ore monthly.

6. **Bounty on Production.**—A reference to the bounty provided by the Commonwealth on gold production in Australia will be found in § 16. 1. hereinafter.

§ 3. Platinum and Platinoid Metals.

1. **Platinum.**—(i) *New South Wales.* The deposits at present worked in the State are situated in the Fifield division, near Parkes, and the production in 1931 amounted to 283 ozs., valued at £2,201 as compared with 155 ozs., valued at £1,073, in the preceding year, while the total production recorded to the end of 1931 amounted to 19,366 ozs., valued at £121,996. About 80 men were engaged in prospecting and fossicking in the Fifield area in 1931.

(ii) *Victoria.* In Gippsland the metal has been found in association with copper and 127 ozs. were produced in 1913, but there was no production in recent years.

(iii) *Queensland.* Platinum, associated with osmiridium, has been found in the beach sands between Southport and Currumbin, in creeks on the Russell gold-field near Innisfail, and in alluvial deposits on the Gympie gold-field, but no production has been recorded.

2. **Osmium, Iridium, etc.**—(i) *New South Wales.* Small quantities of osmium, iridium, and rhodium are found in various localities. Platinum, associated with iridium and osmium, has been found in the washings from the Aberfoil River, about 15 miles from Oban; on the beach sands of the northern coast; in the gem sand at Bingara, Mudgee, Bathurst, and other places. In some cases, as for example in the beach sands of Ballina, the osmiridium and other platinoid metals amount to as much as 40 per cent. of the platinum, or about 28 per cent. of the whole metallic content.

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

(iii) *Tasmania.* For 1931 the yield of osmiridium was returned as 1,280 ozs., valued at £18,028, the quantity raised being about 327 ozs. more than in 1930. The greatest production recorded was for the year 1925, when over 3,365 ozs. valued at £103,570 were raised. The decrease in later years was due in large measure to the lower price coupled with a reduced demand. It is stated that one of the reasons for the decreased demand for the metal and the consequent fall in price, is that osmiridium itself is of no commercial value, the value being in the osmium and iridium extracted therefrom. The process of extraction is a particularly dangerous one, owing to the fact that osmium oxide, which is a deadly poison, is given off in a gaseous state. Some of the American firms have ceased producing on this account, and are using African ore containing platinum and iridium, the extraction of which is simpler and less hazardous.

§ 4. Silver, Lead, and *Zinc.

1. **Occurrence in Each State.**—Particulars regarding the occurrence of silver and associated metals in each State were given in Year Books, Nos. 1 to 5, but considerations of space precluded the repetition of this matter.

2. **Production.**—(i) *General.* The value of the production of silver, silver-lead and ore, and lead from each State during the five years ending 1931 is given hereunder :—

SILVER AND LEAD.—PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	£
1927 ..	3,487,980	304	32,102	143	30,421	222,427	379	3,773,756
1928 ..	2,492,089	275	3,387	..	10,836	180,517	22	2,687,126
1929 ..	3,032,741	100	14,807	258	12,525	233,353	79	3,293,863
1930 ..	2,088,790	65	9,696	90	9,330	133,658	1,684	2,243,313
1931 ..	1,079,359	99	306,393	5	3,103	54,778	160	1,443,897

(a) Year ended 30th June.

(ii) *New South Wales.* The figures quoted above for New South Wales for the year 1931 include silver to the value of £3,151 and silver-lead ore and concentrates valued at £1,076,208. Since the closing down of the Sulphide Corporation's works in 1922 the silver (metal) is obtained chiefly in the refining of gold and copper ores, and there has been no production of lead (pig) in the State. It may be noted here that the bulk of the carbonate and siliceous ore from the Broken Hill field is sent for treatment by the Broken Hill Associated Smelters Proprietary Limited at Port Pirie in South Australia, while the remainder of the ore is concentrated on the field and the product is dispatched to Port Pirie for refining. Low prices coupled with increased costs of production were responsible for the decrease in values during the period dealt with. The improvement in 1929 as compared with 1928 was mainly due to an advance in the price of lead.

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

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

regards New South Wales, the estimated total production and the value of the metal contents of all ore mined :—

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

Year.	Metal Produced within Australia.				Contents of Concentrates Exported.			
	Silver.	Lead.	Zinc.	Value.	Silver.	Lead.	Zinc.	Value.
	ozs. fine.	tons.	tons.	£	ozs. fine.	tons.	tons.	£
1927 ..	7,901,861	156,306	42,757	5,955,009	2,339,382	26,709	115,123	1,467,235
1928 ..	7,068,964	151,475	44,004	5,256,649	1,259,931	11,372	94,987	835,620
1929 ..	7,619,884	165,364	46,163	5,918,014	835,697	7,009	76,619	734,261
1930 ..	7,876,894	162,703	53,958	4,579,412	844,188	14,044	87,913	911,724
1931 ..	6,177,863	129,819	53,832	2,995,029	460,958	13,405	43,629	257,705

The figures given above are quoted on the authority of the Mines Department of New South Wales. Accurate details in regard to gold, copper, and antimony contained in the silver-lead ores are not available. Cadmium was first extracted in 1922 at Risdon, in Tasmania, and in 1931 the amount won from ores of New South Wales origin was given as 199 tons, valued at £45,514. As pointed out previously, credit for the value is not taken in the New South Wales returns, the value accruing to the State being taken as that of the declared value of the concentrates at the time of their dispatch

(*a*) *Broken Hill.* Broken Hill, in New South Wales, is at present the chief centre of silver production in Australia. A description of the silver-bearing area in this district is given in earlier issues of the Year Book. (See No. 4, page 506.)

Although the returns are not complete in all cases, the following table relating to the companies controlling the principal mines at Broken Hill will give some idea of the richness of the field :—

SILVER.—BROKEN HILL RETURNS TO END OF 1931.

Mine.	Value of Output to end of 1931.	Dividends and Bonuses Paid to end of 1931.
	£	£
Broken Hill Proprietary Co. Ltd.	53,324,074	13,655,247
Broken Hill Proprietary Block 14 Co. Ltd.	4,749,915	670,160
British-Australian Broken Hill Co. Ltd.	5,858,998	821,280
Broken Hill Proprietary Block 10 Co. Ltd.	4,946,989	1,432,500
Sulphide Corporation Ltd. (Central and Junction Mines)	26,811,642	3,466,875
Broken Hill South Ltd.	22,209,320	5,075,000
North Broken Hill Ltd.	17,718,641	5,272,690
Broken Hill Junction Lead Mining Co.	1,185,058	87,500
Junction North Broken Hill Mine	3,511,940	171,431
The Zinc Corporation Ltd.	9,387,239	3,475,788
Barrier South Ltd.	151,517	50,000
Totals	149,855,333	34,178,471

The returns relating to dividends and bonuses paid are exclusive of £1,744,000 representing the nominal value of shares in Block 14, British, and Block 10 companies, allotted to shareholders of Broken Hill Proprietary Company. If the output of the companies which were, prior to 1931, engaged in treating the tailings, etc., be taken into consideration, the totals for output and dividends shown in the table would be increased to about 157 millions and 37 millions respectively. The authorized capital

of the various companies amounted to £6,448,000. In 1931 the increase in dividends and bonuses paid amounted to £203,000 shared in by four only of the Companies included above, i.e., Zinc Corporation, £83,000 ; North Broken Hill, £70,000 ; Sulphide Corporation, £30,000 ; and Broken Hill South, £20,000.

(*b*) *Other Areas.* Silver is found in various other localities in New South Wales, but the production therefrom in 1931 was unimportant.

(iii) *Victoria.* The silver produced in 1931 amounted to 1,512 ozs., valued at £99, and was obtained in the refining of gold at the Melbourne Mint.

(iv) *Queensland.* Owing to the initiation of smelting operations at Mt. Isa, the yields from both silver and lead in Queensland showed a large increase in 1931 as compared with 1930. In the case of silver, the value rose from £5,527 in 1930 to nearly £76,000 in 1931, while lead increased from £4,000 in 1930 to about £231,000 in 1931. The low prices current for the metals in 1931 were, however, responsible for a decreased production from the Herberton and Etheridge fields.

(v) *South Australia.* Silver ore has been discovered at Miltalie and Poonana, in the Franklin Harbour district, also at Mount Malvern and Olivaster, near Rapid Bay, and in the vicinity of Blinman and Farina, at Baratta, and elsewhere. Production in 1931 was, however, trifling.

(vi) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1931 was 43,739 oz., valued at £2,833. In addition, 24 tons of lead and silver-lead ore and concentrates valued at £270 were exported.

(vii) *Tasmania.* The silver produced in 1931 amounted to 391,732 oz., valued at £25,754, and the lead to 2,189 tons, valued at £29,024. About 243,000 oz. of the total silver output were contained in silver-lead, while 148,000 oz. were contained in the blister copper produced by the Mount Lyell Co.

(viii) *Northern Territory.* A rich deposit of silver-lead and copper ore was located in 1930 at the Jervois Range about 200 miles east of Alice Springs. Development is, however, hindered by tne low price of metals coupled with transport difficulties and lack of permanent water. Rich sulphides have been found at Barrow Creek. During the year a small quantity of silver-lead ore was raised in the Mt. Gardner district. There was no record of production in 1931.

3. **World's Production.**—The world's production of silver during the last five years for which particulars are available is estimated to have been as follows :—

SILVER.—WORLD'S PRODUCTION.

Total.	1927.	1928.	1929.	1930.	1931.
World's production in 1,000 fine ozs. ..	251,232	257,273	261,715	248,157	195,204

The share of Australia in the world's silver production in 1919 was estimated at 7,800,000 oz., or about 4½ per cent. of the total production, but in 1921, owing to the cessation of operations at the Broken Hill field, the total local extraction fell to 4,573,000 oz., and the estimated silver contents of the ores, bullion, and concentrates exported to 732,000 oz., the total being a little over 3 per cent. of the world's production. For 1931 local extraction was set down as 7,350,000 oz., and exports as 1,505,000 oz., the total being equivalent to about 4½ per cent. on the production for the world. The figures for the world's production are given on the authority of *The Mineral Industry.*

Arranged in order of importance the estimated yields in 1931 from the chief silver producing countries were as follow :—

SILVER.—PRODUCTION, CHIEF COUNTRIES, 1931.

Country.	Production.	Country.	Production.
	Fine ozs. ('000 omitted.)		Fine ozs. ('000 omitted.)
Mexico	86,064	Japan	5,500
United States	30,968	Central America ..	3,200
Canada	20,558	East Indies	2,000
South America	18,000	Transvaal	1,063
Europe	11,000	China	200
Australia	8,855	Congo	181
British India	7,000	Rhodesia	70

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

PRICES OF SILVER, LEAD, AND SPELTER.

Metal.	1928.	1929.	1930.	1931.	1932.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Silver (Standard) per oz.	0 2 2.75	0 2 0.46	0 1 5.66	0 1 2.60	0 1 5.84
Lead .. per ton	21 3 4	23 4 11	18 1 5	13 0 9	12 0 6
Spelter per ton	25 5 5	24 17 8	16 16 9	12 8 11	13 13 10

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

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

SILVER MINING.—PERSONS EMPLOYED.

Year.	N.S.W. (a)	Q'land.	S. Aust.	W. Aust. (b)	Tasmania. (a)	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1927 ..	5,833	277	1	51	718	..	(c) 6,882
1928 ..	4,666	282	..	12	627	..	(d) 5,589
1929 ..	5,001	447	7	31	540	2	6,028
1930 ..	4,489	474	2	..	231	35	5,231
1931 ..	2,812	351	2	15	299	4	3,483

(a) Silver, lead, and zinc. (b) Principally lead and silver-lead ore. (c) Including 2 in Victoria. (d) Including 2 in Victoria.

With the development of the great silver-lead field at Mount Isa, in Queensland, it is expected that the employment returns for that State will in future assume considerable importance.

§ 5. Copper.

1. **Production.**—The production of copper in the various States has been influenced considerably by the ruling prices, which have undergone extraordinary fluctuations. The value of the local production as reported and credited to the mineral industry for the years 1927 to 1931 is shown hereunder. Quantities for Australia as a whole as returned by the several State Mines Departments are appended on separate lines at the foot of the table.

COPPER.—PRODUCTION AUSTRALIA.

State.		1927.	1928.	1929.	1930.	1931.
		£	£	£	£	£
New South Wales ..	..	12,655	3,497	14,183	8,347	23,948
Queensland ..	..	218,842	177,043	294,188	174,075	126,342
South Australia ..	..	12,452	13,321	22,982	6,966	934
Western Australia ..	..	101	765	2,778	102	..
Tasmania	..	362,988	444,802	740,985	620,578	416,309
Northern Territory (a)	..	..	..	..	589	25
Australia	..	607,038	639,428	b1,075,146	810,657	567,558
Ingot, Matte, etc. ..	tons	9,940	9,455	12,613	13,063	13,453
Ore	tons	192	100	416	251	79

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

The total value of the production in 1920 was £2,658,000, and the heavy fall during recent years was due to the low price of the metal preventing the profitable working of many of the copper mines throughout Australia. Production in 1931 was again depressed by the fall in price.

2. **Sources of Production.**—(i) *New South Wales.* The depression in this branch of the mining industry during the last few years is likely to continue, unless copper appreciates in value, and less costly methods of production are evolved. For the year 1917 the yield was valued at upwards of £814,000, in 1918 it was returned at £697,000, but in 1928 it had declined to under £4,000. The rise in price during 1929 led to a moderate increase in activity. The small production in 1931 was obtained principally from the treatment of other than copper ores, the output for the year including 485 tons of electrolytic copper valued at £23,298, and 56 tons of ore valued at £650 exported overseas.

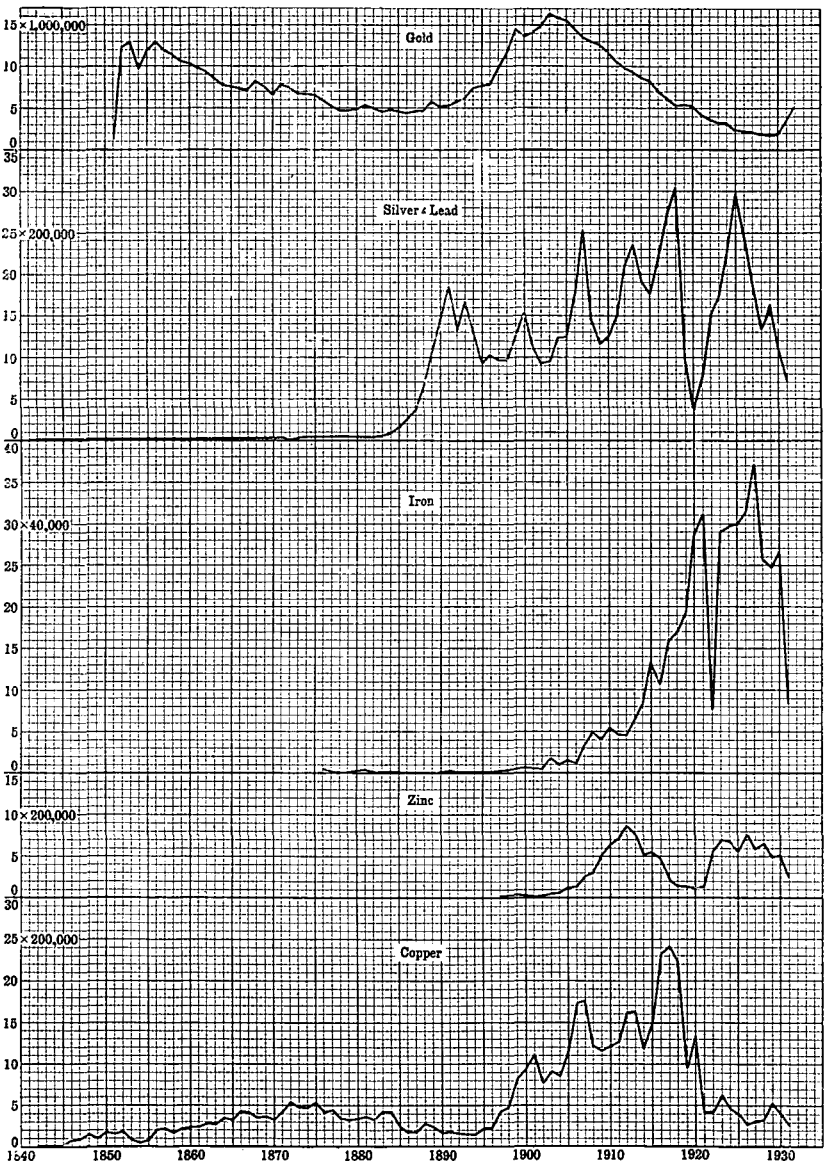
(ii) *Queensland.* The yield in this State amounted in 1931 to 3,135 tons valued at £126,342, and shows a serious decline as compared with 1920 when nearly 16,000 tons valued at £1,552,000 were raised. The falling-off in the yield in recent years was due partly to the low prices realized for copper and partly to old-fashioned plant and methods of treatment. Returns from the chief producing areas in 1931 were as follow :— Cloncurry, 2,316 tons, £93,357; Herberton, 595 tons, £23,944; and Mount Morgan, 114 tons, £4,594.

(iii) *South Australia.* Taking the entire period over which production extended, the yield of copper in South Australia easily outstrips that of any other State. In recent years, however, Tasmania, Queensland, and New South Wales have come to the front as copper producers, as shown in the table above. Deposits of copper ore are found over a large portion of South Australia. A short account of the discovery, etc., of some of the principal mining areas, such as Kapunda, Burra Burra, Wallaroo, and Moonta, was given in earlier issues of the Official Year Book. Increased attention is being given to the possibility of making fresh discoveries in the Moonta and Wallaroo copper field. Opened in 1860, this field worked continuously until 1923, and up to the close of 1931 had produced copper to the value of £20,500,000. In 1930 the production fell to 94 tons, valued at £6,966, the lowest return since the year 1845, and in 1931 the value dwindled to under £1,000. Owing to the low price of the metal a considerable tonnage of ore is held in reserve at Moonta.

(iv) *Western Australia.* No production was reported in this State for the year 1931.

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1931 was 9,833 tons, valued at £416,309, the whole of the production being due to the Mount Lyell Mining and Railway Co. Ltd. This Company treated 52,245 tons of ore and concentrates and produced 9,913 tons of blister copper, containing copper, 9,833 tons; silver, 148,782 ozs.; and gold, 3,796 ozs., the whole being valued at £443,000.

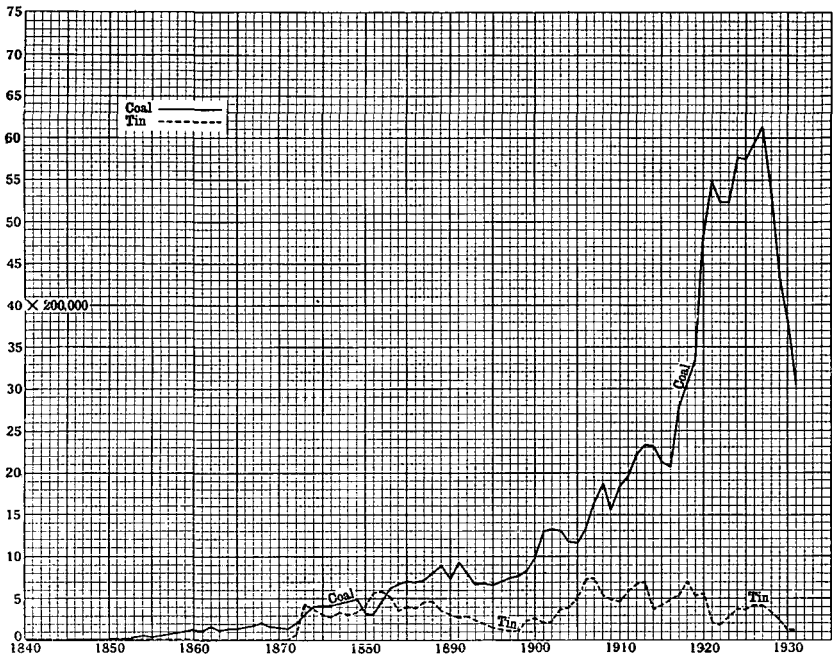
VALUES OF THE PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1931.



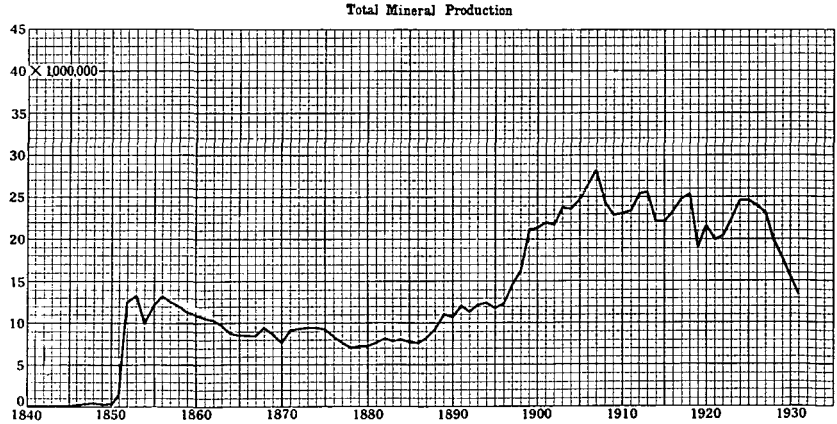
EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 onwards.

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

VALUES OF PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1931—*continued.*



Total Mineral Production



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

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

(vi) *Northern Territory.* Copper has been found at various places, but lack of capital and difficulty of transport prevent the development of the deposits. The production in 1931 was obtained from an old mine dump near Settlement Creek.

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

COPPER.—PRICES.

Year.	Average London Price per Ton Standard Copper.	Average New York Price in Cents per lb. Electrolytic Copper.
	£	Cents.
1927	55.65	12.92
1928	63.70	14.57
1929	75.42	18.11
1930	54.62	12.98
1931	38.34	8.12

As evidence of the tremendous variation in the price of copper it may be noted that in December, 1916, the average London price of standard copper was £145.32 per ton, while in June, 1927, it was quoted at £54.03. In 1930 the highest average was £71.47, recorded in January, but in October the price had fallen as low as £43.03. The highest average in 1931 was £45.37 for February, but thenceforward the price dropped to the very low figure of £31.50 in September, rising thereafter in the closing months of the year to £38.27 in December. In 1932 the average fell to the very low figure of £31.73.

4. **World's Production of Copper.**—The world's production of copper during the five years 1927–1931 is estimated to have been as follows. The figures for foreign countries have been taken from the latest issue of *The Mineral Industry* :—

COPPER.—WORLD'S PRODUCTION.

Year.	1927.	1928.	1929.	1930.	1931.
World's production—tons ..	1,502,000	1,689,000	1,899,000	1,562,000	1,341,000

The yields from the chief copper-producing countries in 1931 were as follow :—

COPPER.—PRODUCTION, CHIEF COUNTRIES, 1931.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	468,400	Peru	43,600
Chile	221,400	Spain and Portugal ..	32,900
Africa	151,200	Germany	27,600
Canada	130,000	Yugoslavia	24,000
Japan	75,200	Australia	15,700
Mexico	51,900	Cuba	13,200
Russia	47,200	Norway	9,600

During the five years ending in 1931 the share of the United States in the world's copper production amounted to over 45 per cent.

The Australian production in 1931 amounted to a little over 1 per cent. of the total.

5. **Employment in Copper Mining.**—The number of persons employed in copper mining during each of the last five years was as follows :—

COPPER MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1927	29	271	20	9	760	..	1,089
1928	3	517	14	10	1,181	..	1,725
1929	32	366	74	9	1,307	..	(a)1,789
1930	33	376	58	3	1,333	6	1,809
1931	35	287	61	..	1,442	3	1,828

(a) Including 1 in Victoria.

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

§ 6. Tin.

1. **Production.**—The development of tin mining is, of course, largely dependent on the price realized for the metal, and, as in the case of copper, the production has been subject to somewhat violent fluctuations. The table below shows the value of the production as reported to the Mines Departments in each of the States during the five years 1927 to 1931. A separate line is appended showing the recorded tonnages for Australia during each of the specified years.

TIN.—PRODUCTION, AUSTRALIA.

State.	1927.	1928.	1929.	1930.	1931.
	£	£	£	£	£
New South Wales	287,539	231,843	191,199	84,800	103,111
Victoria	11,454	12,954	3,545	..	440
Queensland	193,774	134,727	114,518	49,708	35,744
Western Australia	13,316	15,002	13,432	10,608	3,945
Tasmania	317,593	258,676	130,014	69,592	70,634
Northern Territory (a)	18,754	10,828	6,958	3,345	2,331
Total	842,430	664,030	459,666	218,053	216,205
Tonnage	3,507	3,425	2,723	1,798	1,938

(a) Year ending 30th June.

In 1923, the average London price of tin was £202 3s. per ton, while in 1926 it had advanced to £291 2s. per ton. There was a decline in the average for 1927 to £289 1s. 5d. per ton, although in March of that year the price was £313 9s. 5d. The sharp decline in values to £227 4s. 8d. in 1928, to £203 19s. 4d., in 1929, and the tremendous drop to £141 19s. in 1930, are reflected in the decreased production for those years. In December, 1930, the price had fallen to £111 13s. per ton. Early in May, 1931, the price fell as low as £99 15s. The average for the year 1932 was £135 18s. 10d.

2. **Sources of Production.**—(i) *New South Wales.* The production in 1931 was estimated at 777 tons of ingots valued at £101,761, and 17 tons of ore and concentrates valued at £1,350. A large proportion of the output in this State is obtained in normal years by dredging, principally in the New England district, the quantity so won in 1931 being 200 tons, valued at £17,230. Owing to the low price of the metal, however, very

few of the dredges operated continuously. The increase in production in 1931 was chiefly due to improved returns from two of the larger mines at Ardlethan, and greater output by fossickers at Tingha, Emmaville, and elsewhere.

(ii) *Victoria.* The production in 1929 was obtained by dredging, the Cock's Pioneer Gold and Tin Co. in the Beechworth district contributing 14 tons valued at £2,000, the balance mainly coming from Toora in Gippsland. No production was recorded in 1930, and the output for 1931 was trifling.

(iii) *Queensland.* The chief producing districts in Queensland during 1931 were Herberton, 329 tons, valued at £24,406; Cooktown, 63 tons, £4,216; Stanthorpe, 43 tons, £6,396; Chillagoe, 25 tons, £1,914; and Kangaroo Hills, 11 tons, £848. The total production was the lowest recorded.

(iv) *Western Australia.* The export of tin from the State in 1931 amounted to 39 tons, valued at £3,945. The small quantity won during the year was obtained in the Pilbara field.

(v) *Tasmania.* During 1931 the output amounted to 589 tons of metallic tin, valued at £70,634, the second lowest return over a long series of years. Operations at Mount Bischoff, the principal producer, were mainly carried on by tributers.

(vi) *Northern Territory.* The Maranboy field was the chief contributor to the output of tin in 1931. Small quantities were raised also at Hayes Creek, Hidden Valley, and Mt. Tomler.

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

TIN.—WORLD'S PRODUCTION.

1927.	1928.	1929.	1930.	1931.
Tons.	Tons.	Tons.	Tons.	Tons.
157,000	178,000	190,600	173,100	147,200

The comparatively small total for the year 1931 was partly due to the low price of the metal and partly to the restriction in output agreed upon between the chief producing countries.

The yields from the chief producing countries in 1931 were as follow :—

TIN.—PRODUCTION, CHIEF COUNTRIES, 1931.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Federated Malay States ..	51,300	**Australia**	**1,800**
Bolivia	30,900	Unfederated Malay States	1,400
Netherlands East Indies ..	30,100	Indo-China	800
Siam	12,100	Spain and Portugal ..	700
Nigeria	7,300	Great Britain	600
China	6,500	South Africa	400
Burma	2,400		

Australia's share of the world's tin production, estimated at 147,000 tons, would appear therefore to be a little over 1.2 per cent.

4. **Prices.**—The average price of the metal in the London market for the years 1927 to 1932 was as follows :—

TIN.—PRICES.

Year.	Average Price Per Ton.	Year.	Average Price per Ton.
	£ s. d.		£ s. d.
1927	289 1 5	1930	141 19 1
1928	227 4 8	1931	118 9 1
1929	203 18 10	1932	135 18 10

Early in May, 1931, the price for a time was as low as £99 15s., but with the creation of the International Tin Pool there was a recovery to £119 per ton. In August the average was £114 19s. 1d., and the price rose thereafter to £138 19s. 7d. in December.

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

TIN MINING.—PERSONS EMPLOYED.

Year.	N.S.W.	Victoria. (a)	Q'land.	W. Aust.	Tas.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1927	1,430	42	906	106	1,230	95	3,809
1928	1,275	118	954	119	1,113	95	3,674
1929	1,008	49	750	49	810	66	2,732
1930	870	..	579	30	443	60	1,982
1931	994	3	548	17	625	29	2,216

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

§ 7. Zinc.

1. **Production.**—(i) *New South Wales.* (a) *Values Assigned.* The production of zinciferous concentrates is chiefly confined to the Broken Hill district of New South Wales, where zincblende forms one of the chief constituents in the enormous deposits of sulphide ores. During the earlier years of mining activity on this field a considerable amount of zinc was left unrecovered in tailings, but from 1909 onwards improved methods of treatment resulted in the profitable extraction of the zinc contents of the accumulations at the various mines.

As the metallic contents of the bulk of the concentrates, etc., produced in the Broken Hill district are extracted outside New South Wales, the mineral industry of that State is not credited by the Mines Department with the value of the finished product. During 1931 the zinc concentrates actually exported amounted to 220,982 tons, valued at £512,795. Portion of the zinc concentrates produced is treated at Risdon in Tasmania, and the balance is exported overseas.

(b) *Local and Foreign Extraction.* A statement of the quantity of zinc extracted in Australia and the estimated zinc contents of concentrates exported overseas during the five years 1926 to 1930 will be found in § 17 hereinafter.

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

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

(iv) *Tasmania.* During the year 1931 there was no production of zinc or cadmium from local ores.

The Electrolytic Zinc Co. at Risdon operated on raw materials obtained wholly from Broken Hill in New South Wales. Production in 1931 amounted to 53,832 tons of slab zinc, a decrease of 1,000 tons on the output for the preceding year. Production from the Mount Read-Rosebery group of mines was in abeyance owing to the low prices of zinc and lead.

2. **World's Production.**—According to *The Mineral Industry* the world's production of zinc during the five years 1927–31 was as follows :—

ZINC.—WORLD'S PRODUCTION.

1927.	1928.	1929.	1930.	1931.
Tons.	Tons.	Tons.	Tons.	Tons.
1,307,200	1,399,000	1,447,000	1,390,000	997,000

The yields from the chief producing countries in 1931 were as given hereunder, the figures referring to slab zinc produced in the various countries, unallocated according to the source of the ore. In common with the other industrial metals zinc suffered in 1931 from a combination of low prices and reduced demand. Production was also to a certain extent curtailed through the operation of the zinc cartel. It is stated that one of the aims of the cartel is to make future production accord more reasonably with consumption.

ZINC.—PRODUCTION, CHIEF COUNTRIES, 1931.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	268,500	Mexico	34,700
Poland (*a*)	137,400	Japan	21,900
Belgium	136,300	Great Britain	21,200
Canada	105,700	Netherlands	19,000
Australia	**96,300**	Italy	16,000
France	61,900	Soviet Union	11,200
Germany	44,600	Spain	9,900
Norway	41,300	Czechoslovakia ..	9,000

(*a*) Including Upper Silesia.

The figures for Australia have been taken from returns supplied by the Australian Mines and Metals Association.

3. **Prices.**—Information regarding prices of zinc will be found in the table in § 4.5, *ante*.

§ 8. Iron.

1. **General.**—The fact that iron ore is widely distributed in Australia had long been known, and extensive deposits have been discovered from time to time at various places throughout the States, but the utilization of these deposits for the production of iron and steel is, at present, confined to New South Wales.

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

The figures quoted do not, of course, represent the total production of pig iron in New South Wales, since a considerable quantity of ore raised in South Australia, and credited therefore to the mineral returns of that State, is treated in New South Wales. A quantity of iron oxide is purchased by the various gasworks for use in purifying gas, and is also to some extent employed as a pigment, and in paper manufacture, the output in New South Wales being drawn chiefly from the deposits in the Port Macquarie Division. During 1931 the iron oxide raised amounted to 3,665 tons, valued at £2,125.

(ii) *South Australia.* The production from the deposits worked by the Broken Hill Pty. Co. Ltd., at Iron Knob, and at Middlebank reached its maximum in 1930, the ore raised amounting to over 928,000 tons, valued at £1,068,000. In 1931, however, the output fell to 289,179 tons, valued at £332,556.

(iii) *Tasmania.* In 1931 about 500 tons of iron pyrites valued at £250 were produced the last recorded previous production being for the year 1923, when nearly 12,000 tons valued at £27,000 were raised. There has been no production of iron ore since the year 1908.

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

3. **Iron and Steel Bounties.**—During the year 1931–32 the bounties paid under the Iron and Steel Products Bounty Act on articles manufactured from locally produced materials were as follow :—wire-netting, £6,334 ; traction engines, £1,058.

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

PIG IRON AND STEEL.—WORLD'S PRODUCTION.

Country.	Pig Iron.			Steel Ingots and Castings.		
	1929.	1930.	1931.	1929.	1930.	1931.
	Thousands of Tons.			Thousands of Tons.		
United States ..	42,614	31,752	18,426	56,433	40,699	25,429
Germany	13,401	9,694	6,063	16,246	11,539	8,291
France	10,439	10,100	8,217	9,666	9,402	7,809
Saar Territory ..	2,088	1,884	1,515	2,209	1,935	1,538
Belgium	3,970	3,403	3,145	4,039	3,370	3,074
Luxemburg ..	2,906	2,473	2,021	2,702	2,269	2,004
Austria	450	287	145	630	468	322
Italy	678	534	509	2,115	1,774	1,453
Spain	709	650	500	929	850	750
Czechoslovakia ..	1,643	1,572	1,165	2,145	1,984	1,526
Poland	704	478	347	1,377	1,237	1,037
Sweden	490	457	388	694	603	546
Russia	4,018	4,969	4,900	4,723	5,552	5,400
China	250	400	350	50	200	150
Japan	1,750	1,400	1,450	2,100	1,750	1,600
United Kingdom ..	7,580	6,197	3,758	9,655	7,298	5,179
India	1,348	703	950	580	619	625
Canada	1,080	814	420	1,380	1,012	638
Australia	**333**	**440**	**380**	**348**	**420**	**150**
Total—All Countries	96,263	78,942	55,209	118,208	93,430	67,871

The figures for Japan include Manchuria and Korea. Production of both iron and steel improved somewhat in 1930 in Australia, the decline in the previous year being due principally to shortage in fuel owing to industrial disturbances on the coal-fields.

(ii) *Australia.* The table below, which is also given on the authority of *The Mineral Industry*, shows the estimated production of pig iron and steel ingots and castings in Australia during each of the last ten years for which particulars are available.

PIG IRON AND STEEL.—AUSTRALIAN PRODUCTION.

Year.	Pig Iron.	Steel.	Year.	Pig Iron.	Steel.
	Thousands of Tons.			Thousands of Tons.	
1922 ..	84	220	1927 ..	410	420
1923 ..	330	200	1928 ..	420	439
1924 ..	416	306	1929 ..	333	348
1925 ..	439	351	1930 ..	440	420
1926 ..	450	360	1931 ..	380	150

The principal producers in Australia are the Broken Hill Proprietary and the Australian Iron and Steel Co., the former situated at Newcastle and the latter at Port Kembla in New South Wales.

§ 9. Other Metallic Minerals.

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

§ 10. Coal.

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

COAL.—PRODUCTION, AUSTRALIA.

Year.	N.S.W.	Victoria. (a)	Q'land.	S. Aust.	W. Aust.	Tasmania.	Australia.
			QUANTITY.				
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1913 ..	10,414,165	593,912	1,037,944	..	313,818	55,043	12,414,882
1921 ..	10,793,387	514,859	954,763	..	468,817	66,476	12,798,302
1927 ..	11,126,114	684,245	1,099,040	..	501,505	112,056	13,522,960
1928 ..	9,448,197	658,323	1,076,340	..	528,420	128,500	11,839,780
1929 ..	7,617,736	703,828	1,368,745	..	544,719	130,291	10,365,319
1930 ..	7,093,055	703,487	1,094,676	..	501,425	138,716	9,531,359
1931 ..	6,432,382	571,342	841,308	..	432,400	123,828	8,401,260
			VALUE.				
	£	£	£	£	£	£	£
1913 ..	3,770,375	274,371	403,767	..	153,614	25,367	4,627,494
1921 ..	9,078,388	603,323	831,483	..	407,117	63,446	10,983,757
1927 ..	9,782,002	762,530	987,465	..	407,967	99,802	12,039,766
1928 ..	8,263,729	731,015	971,690	..	420,145	106,558	10,493,137
1929 ..	5,952,720	813,370	1,199,599	..	426,706	105,877	8,498,272
1930 ..	5,193,032	807,699	952,856	..	394,758	110,253	7,458,598
1931 ..	4,607,343	362,284	699,926	..	336,178	98,004	6,103,735

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

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

BROWN COAL.—PRODUCTION, VICTORIA.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913	2,984	569	1928	1,591,858	202,393
1921	79,224	31,074	1929	1,741,176	178,052
1926	957,935	188,899	1930	1,831,507	173,713
1927	1,455,482	220,003	1931	2,194,453	251,511

2. **Production Per Employee.**—The production per employee for New South Wales and for Australia as a whole is shown in the appended table.

COAL.—PRODUCTION PER EMPLOYEE.

Year.	Coal Production per Employee.		Year.	Coal Production per Employee.	
	New South Wales.	Australia.		New South Wales.	Australia.
	Tons.	Tons.		Tons.	Tons.
1913	550	530	1928	440	490
1921	500	480	1929	520	580
1926	440	440	1930	430	500
1927	450	480	1931	410	497

The averages for Australia include employment and production in connexion with brown coal.

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

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

The table hereunder gives the yields in each of the three districts during the five years 1927 to 1931 :—

COAL.—PRODUCTION IN DISTRICTS, NEW SOUTH WALES.

District.	1927.	1928.	1929.	1930.	1931.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	7,145,116	5,978,480	3,019,693	3,715,805	4,161,798
Southern	2,155,461	1,817,225	2,339,837	1,529,674	981,964
Western	1,825,537	1,652,492	2,258,206	1,847,576	1,288,620
Total ..	11,126,114	9,448,197	7,617,736	7,093,055	6,432,382

The depression in industry is reflected in the decreased production, and the output for 1931 was the lowest since 1904, and the value the least since 1917. Of the total quantity of coal won in New South Wales since the inception of operations to the end

of the year 1931, viz., 364 million tons, about 248 millions or 68 per cent. was obtained in the Northern District, 76 million tons or 21 per cent. came from the Southern District, and 40 million tons or 11 per cent. was contributed by the mines in the Western District.

(ii) *Victoria.* (*a*) *Black Coal.* The deposits of black coal in Victoria occur in the Jurassic system, the workable seams, of a thickness ranging from two feet three inches to six feet, being all in the Southern Gippsland district.

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

BLACK COAL.—PRODUCTION, VICTORIA.

Year.	State Coal Mine.	Other Coal Mines.	Total Production.	Value.
	Tons.	Tons.	Tons.	£
1927	610,618	73,627	684,245	762,530
1928	600,931	57,392	658,323	731,015
1929	634,805	69,023	703,828	813,370
1930	637,261	66,226	703,487	807,699
1931	532,003	39,339	571,342	362,284

(*b*) *Brown Coal.*—(1) *General.* Some account of the brown coal deposits and of the operations of the State Electricity Commission in connexion therewith will be found in preceding Official Year Books (see No. 22, page 785), but it is not proposed to repeat this information in the present issue. The brown coal produced in Victoria was raised chiefly at the State Open Cut at Yallourn, where the output in 1931 amounted to 2,186,789 tons. There was no production during the year from the old open cut at Morwell.

(2) *Production of Briquettes.* The briquetting plant started operations in November, 1924, and the output for the year 1931–32 was 321,741 tons, an increase of nearly 96,000 tons on the total for the preceding year. This increase was due to the coming into operation of extensions on which construction had been in progress for some years. The Yallourn briquettes are considered to be equal in quality to those produced in the best German factories.

(3) *Distillation Products.* A new industry is in contemplation for the distillation of oil, motor spirit, and other valuable substances from brown coal, experiments in this direction on a small scale having yielded very satisfactory results.

(iii) *Queensland.* The distribution of production during the year 1931 was as follows :—

COAL PRODUCTION.—QUEENSLAND, 1931.

District.	1931.	District.	1931.
	Tons.		Tons.
Ipswich	438,962	Clermont	35,850
Darling Downs	75,366	Bowen	159,444
Wide Bay and Maryborough	64,379	Mount Mulligan (Chillagoe)	16,052
Rockhampton (Central) ..	51,255	Total	841,308

The output in 1929, amounting to 1,369,000 tons, was the highest recorded, but with the resumption of operations after the close of the dispute in New South Wales the trade slackened off. Amongst the chief contributing factors were the effect of the competition of southern coal as a result of reductions in award rates, increase in the use of internal combustion engines, further extension of the use of electric power, and general trade depression. There were 46 collieries operating in the Ipswich district,

6 in the Darling Downs, 7 in the Maryborough area, 4 in Clermont district, 2 in Rockhampton district, 1 in Chillagoe district, and 2 in the Bowen district. State coal mines are in operation at Collinsville in the Bowen field, at Styx in the Central area, and at Mount Mulligan.

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

(v) *Western Australia.* The production from the six collieries operating on the Collie field amounted in 1931 to 432,400 tons, a decrease of about 69,000 tons on the return for 1930. The deposits at Wilga again remained unworked during the year.

(vi) *Tasmania.* The production in 1931 amounted to 123,800 tons, about 10,000 tons less than the total for 1930. About 70,000 tons of the total output in 1931 were contributed by the Cornwall Coal Company, and 29,000 tons by the Mt. Nicholas Proprietary. Small quantities were raised at the Jubilee colliery and at various mines in the Latrobe district.

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

4. **Production in Various Countries.**—The total known coal production of the world in 1931 amounted to about 1,230 million tons, towards which Australia contributed about 10⅝ million tons, or 0.86 per cent. The following tables show the production of the chief British and foreign countries during each of the last four years where the returns are available:—

COAL PRODUCTION.—BRITISH EMPIRE.

Year.	Great Britain.	British India.	Canada.	Australia.	New Zealand.	Union of S. Africa.
BLACK COAL.						
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1928	237,471,900	22,542,900	12,241,400	11,839,800	1,348,700	12,407,500
1929	257,906,800	23,418,700	12,079,000	10,365,300	1,367,200	12,812,800
1930	243,881,800	23,803,000	10,202,700	9,531,400	1,382,900	12,029,500
1931	219,459,000	21,716,000	8,329,000	8,401,260	979,600	10,709,100
BROWN COAL, LIGNITE.						
1928	640	..	3,439,300	1,591,900	1,088,000	..
1929	320	..	3,542,900	1,741,200	1,168,700	..
1930	..	..	3,074,400	1,831,500	1,159,200	..
1931	..	..	2,591,200	2,194,500	1,178,100	..

COAL PRODUCTION.—FOREIGN COUNTRIES.

Year.	Germany.	Austria.	Hungary.	Belgium.	France. (*b*)	Czecho-slovakia.	Yugoslavia.
BLACK COAL.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1928 ..	148,478,000	198,900	770,900	27,142,700	50,554,000	14,330,300	351,900
1929 ..	160,859,300	204,700	813,200	26,514,400	52,930,400	16,260,500	435,100
1930 ..	140,444,000	212,500	798,700	26,972,700	53,033,000	14,207,000	360,400
1931 ..	116,766,300	224,500	764,100	26,608,300	50,256,300	12,895,800	426,700

Year.	Poland.	Nether-lands.	Russia.	Japan.	China. (*c*)	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1928	39,974,900	10,525,300	32,351,400	33,325,400	25,000,000	514,368,800
1929	45,505,800	11,398,300	40,711,700	33,716,800	25,437,000	543,586,400
1930	36,914,000	12,018,200	47,635,600	30,880,700	26,037,000	479,384,900
1931	37,661,000	12,697,600	56,804,500	25,388,000	27,245,000	390,753,000

COAL PRODUCTION.—FOREIGN COUNTRIES—*continued.*

BROWN COAL, LIGNITE.

Year.	Germany.	Austria.	Hungary.	Belgium.	France.	Czecho-slovakia.	Yugoslavia.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1928 ..	162,972,900	3,211,000	6,405,800	..	1,057,700	20,128,400	4,620,300
1929 ..	171,700,700	3,469,100	6,932,700	..	1,178,300	22,204,500	5,363,500
1930 ..	143,704,000	3,014,600	6,078,900	..	1,124,700	18,890,500	4,826,700
1931 ..	131,205,200	2,935,000	6,014,800	..	1,023,600	17,648,400	4,487,500

Year.	Poland.	Nether-lands.	Russia.	Japan.	China.	United States.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1928	72,400	193,600	2,836,800	120,000	..	(*a*)
1929	73,100	154,100	(*a*)	137,000	..	(*a*)
1930	(*a*)	141,900	(*a*)	126,600	..	(*a*)
1931	(*a*)	120,300	(*a*)	(*d*)	..	(*a*)

(*a*) Included with black coal. (*b*) Exclusive of Saar District, which produced 12,899,700 tons in 1928; 13,364,900 tons in 1929; 13,026,700 tons in 1930; and 11,187,500 tons in 1931. (*c*) Includes about 300,000 tons of lignite yearly. (*d*) Not available.

5. **Exports.**—(i) *General.* The exports of coal from Australia are chiefly confined to New South Wales.

The quantity of coal of Australian production (exclusive of bunker coal) exported to other countries in 1931–32 was 344,000 tons, valued at £341,800, of which 342,000 tons were exported from New South Wales, and 2,000 tons from Queensland. The quantity and value of the oversea exports of Australian coal for the years specified are shown in the appended table.

COAL.—OVERSEA EXPORTS, AUSTRALIA.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913 (*a*) ..	2,098,505	1,121,505	1928–29 ..	346,658	428,754
1921–22 ..	1,028,767	1,099,899	1929–30 ..	294,503	346,916
1926–27 ..	807,148	965,899	1930–31 ..	387,851	411,612
1927–28 ..	555,617	690,995	1931–32 ..	344,015	341,800

(*a*) Calendar Year.

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

COAL.—BUNKER, AUSTRALIA.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1913 (*a*) ..	1,647,870	1,018,375	1928–29 ..	739,713	1,009,163
1921–22 ..	1,498,035	2,178,101	1929–30 ..	507,349	742,383
1926–27 ..	1,028,810	1,421,927	1930–31 ..	509,303	607,537
1927–28 ..	950,708	1,300,832	1931–32 ..	506,140	534,897

(*a*) Calendar Year.

(ii) *New South Wales.* The oversea and interstate coal exports from New South Wales in 1931 amounted to 2,263,000 tons, valued at £2,278,000, of which 1,460,000 tons, valued at £1,458,000 went to Australasian ports.

About 87 per cent. of the total, or 1,968,000 tons, were shipped from the port of Newcastle. Victoria took 770,000 tons, South Australia 432,000 tons, other Australian States 184,000 tons, New Zealand 200,000 tons, while 86,000 tons went to the United

Kingdom, 25,000 tons to India, 51,000 tons to Java, 59,000 to Philippine Islands, about 18,000 tons to Straits Settlements, 14,000 tons to Canada, 16,000 tons to Peru, and 27,000 tons to Hong Kong. The figures quoted include bunker coal.

During the year 1931 the exports from Port Kembla, Bulli and Bellambi to other States amounted to 67,700 tons, while 1,400 tons were sent to New Zealand, and about 25,000 tons to New Caledonia. The coal shipped from Sydney, amounting to 7,600 tons, went principally to New Guinea, Papua, the New Hebrides, and other Pacific Islands. For the twelve months ended 30th June, 1931, about 32,000 tons of coal were dispatched to interstate ports from the jetty at Catherine Hill Bay, near Newcastle.

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

COAL.—DISTRIBUTION OF OUTPUT, NEW SOUTH WALES.

Year.	Exports to Australian Ports.	Exports to Foreign Ports.	Local Consumption.	Total.
	Tons.	Tons.	Tons.	Tons.
1927	2,651,492	1,687,716	6,786,906	11,126,114
1928	2,209,981	1,135,572	6,102,644	9,448,197
1929	1,237,272	694,913	5,685,551	7,617,736
1930	1,279,288	624,106	5,189,661	7,093,055
1931	1,460,039	802,760	4,169,583	6,432,382

For the period of five years shown in the table above, 21 per cent. of the total output was exported to other States, 12 per cent. was sent overseas, and 67 per cent. was consumed locally.

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

6. **Consumption in Australia.**—An estimate of the consumption of coal in Australia may be arrived at by adding the imports to the home production, and deducting the exports (including bunker coal taken by oversea vessels). The following table shows the consumption computed in the manner specified for the last five years :—

COAL.—CONSUMPTION, AUSTRALIA.

Year.	Quantity of Coal Consumed.		
	Home Produce.	Produce of Other Countries.	Total.
	Tons.	Tons.	Tons.
1927	13,378,301	23,563	13,401,864
1928	12,273,727	17,870	12,291,597
1929	11,140,576	493,461	11,634,037
1930	10,446,019	392,675	10,838,694
1931	9,696,738	1,962	9,698,700

The bunker coal taken away in 1931 was estimated at 508,000 tons. Figures for brown coal produced in Victoria are included in the total for home produce. The whole of the oversea imports in 1931, which amounted to 2,446 tons, came from the United Kingdom.

7. **Prices.**—(i) *New South Wales.* The price of New South Wales coal depends on the district from which it is obtained, the northern district coal generally realizing a much higher rate than the southern or western product. The average price on the mine in each district and for the State as a whole during the last five years was as follows :—

COAL.—PRICES, NEW SOUTH WALES.

Year.	Northern District.	Southern District.	Western District.	Average for State.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
1927	19 2	16 8	12 6	17 7
1928	19 0	16 6	13 1	17 6
1929	16 8	16 11	12 11	15 8
1930	15 4	15 8	12 4	14 8
1931	15 2	13 11	12 0	14 4

(ii) *Victoria.* In Victoria the average price of coal in 1926 was 22s. 3d. ; in 1927, 22s. 3d. ; in 1928, 22s. 2d. ; in 1929, 23s. 1d. ; and in 1930, 23s. per ton. These averages are exclusive of brown coal, the production of which in 1930 was valued at 1s. 11d. per ton.

(iii) *Queensland.* Prices in the principal coal-producing districts during the last five years were as follow :—

COAL.—PRICES, QUEENSLAND.

District.	Value at Pit's Mouth.				
	1927.	1928.	1929.	1930.	1931.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich	17 0	16 11	16 10	16 7	15 8
Darling Downs	19 6	19 5	19 5	19 5	18 6
Wide Bay and Maryborough	23 9	23 8	23 2	23 0	22 10
Rockhampton	22 10	23 3	22 11	20 5	16 8
Clermont	13 11	14 1	12 2	14 3	14 7
Bowen	16 3	15 2	15 4	15 5	15 1
Mount Mulligan (Chillagoe)	32 0	31 11	31 9	29 9	28 10
Average for State ..	18 0	18 0	17 6	17 5	16 8

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

(iv) *Western Australia.* The average price of the Collie (Western Australia) coal during the last five years was as follows :—In 1927, 16s. 3d. ; in 1928, 15s. 11d. ; in 1929, 15s. 8d. ; in 1930, 15s. 9d ; and in 1931, 15s. 7d. per ton.

(v) *Tasmania.* The average price per ton of coal at the pit's mouth in Tasmania for the five years 1927 to 1931 was :—In 1927, 17s. 10d. ; in 1928, 16s. 7d. ; in 1929, 16s. 3d. ; in 1930, 15s. 11d ; and in 1931, 15s. 10d. per ton.

8. **Prices in the United Kingdom.**—During the five years 1927 to 1931 the average selling value of coal at the pit's mouth in the United Kingdom was :—In 1927, 14s. 7d. ; in 1928, 12s. 10d. ; in 1929, 13s. 5d. ; in 1930, 13s. 7d. ; and in 1931, 13s. 6d. per ton.

9. **Employment and Accidents in Coal Mining.**—(i) *Australia.* The number of persons employed in coal mining in each of the States during the year 1931 is shown below. The table also gives the number of persons killed and injured, with the proportion per 1,000 employed, while further columns are added showing the quantity of coal raised for each person killed and injured, this being a factor which must be reckoned with in any consideration of the degree of risk attending mining operations. A further table gives the rate of fatalities during the last five years.

COAL MINING.—EMPLOYMENT AND ACCIDENTS, 1931.

State.	Persons Employed in Coal Mining.	No. of Persons.		Proportion per 1,000 Employed.		Tons of Coal raised for each Person.	
		Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
New South Wales ..	15,667	7	66	0.45	4.21	918,900	97,500
Victoria	2,156	2	14	0.93	6.49	1,382,900	..
Queensland ..	2,362	..	117	..	49.53	..	7,200
Western Australia ..	752	1	118	1.33	156.91	432,400	3,700
Tasmania	363	4	2	1.10	0.55	31,000	61,900
Total ..	21,300	14	317	0.66	14.88	756,800	33,400

Owing to lack of uniformity in the definition of "injury," the figures relating to persons injured possess little comparative value.

The next table shows the average number of miners employed, number of fatalities, and rate per 1,000 during the quinquennium 1927–31 :—

COAL MINING.—FATALITIES, 1927 TO 1931.

State.	Average No. of Coal Miners.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	18,566	15	0.81
Victoria	2,278	2	0.88
Queensland	2,684	3	1.12
Western Australia	811	1	1.23
Tasmania	366	1	2.73
Total	24,705	22	0.89

(ii) *Other Countries.* According to the report of the Chief Inspector of Mines, the average death-rate per 1,000 miners from accidents in coal mines in Great Britain during the quinquennium 1927–31 was 1.06, the rates varying between 1.11 in 1929, and 0.98 in 1931, while, as shown in the table preceding, the rate for Australia for the same period was 0.89. In the United States during the eight years 1923–30 the death rate per 1,000 employees averaged 4.9 for bituminous coal miners, and 3.8 for anthracite miners. Rates for other coal-producing countries for the same period were—Canada, 2.6; South Africa, 3.4; Germany 2.3; Spain, 1.8; Poland, 1.7; Belgium, 1.1; France, 1.0. In comparing these rates, allowance must be made for the circumstance that the methods of calculation are not identical in all countries.

§ 11. Coke.

Notwithstanding the large deposits of excellent coal in Australia, there was, prior to the war, a fairly considerable amount of coke imported from abroad. During recent years, however, a high standard of excellence has been attained in the local product, and the necessity for import has to a large extent disappeared. For the year 1931–32 the coke imported amounted to 777 tons, of which 228 tons were obtained from the United Kingdom and 549 tons from Germany.

The table hereunder gives the production in New South Wales during the last five years :—

COKE.—PRODUCTION, NEW SOUTH WALES.

Items.		1927.	1928.	1929.	1930.	1931.
Quantity ..	tons	709,342	520,201	464,360	367,772	217,509
Value, total ..	£	1,131,335	852,739	757,580	589,343	297,318
Value, per ton ..	..	31s. 10d.	32s. 9d.	32s. 8d.	32s. 1d.	27s. 4d.

The figures quoted refer to metallurgical coke, the product of coke ovens, and are exclusive of coke produced in the ordinary way at gas works. As regards both tonnage and value the production in 1927 was the highest recorded. The prevailing slackness of trade is reflected in the dwindling returns for the last few years.

A small quantity of coke is made in Queensland, the quantity returned in 1931 being 2,280 tons, valued at £4,081. The following table shows the amount manufactured locally during the last five years :—

COKE.—PRODUCTION, QUEENSLAND.

Year.		1927.	1928.	1929.	1930.	1931.
Quantity ..	tons	4,196	4,058	4,079	3,444	2,280

About 15,000 tons of coke were purchased from the southern States during the year 1931 for consumption at the ore treatment works at Mount Isa and Chillagoe. Local production in 1932 declined to 1,933 tons, valued at £3,414. An agreement, however, has been reached for the supply of 20,000 tons of coke per annum to the Mount Isa Mines Ltd. from the State Government's coke ovens at Bowen.

In order to avoid duplication with coal values the returns for coke have not been included in the general tables of mineral production in the early part of this chapter.

§ 12. Oil Shale and Mineral Oil.

Reference to the deposits of oil shale as well as to the efforts put forward in connexion with the search for mineral oil in Australia will be found in Official Year Book No. 22, pages 791 to 793.

A Committee for the Development of the Shale Oil Industry was established in 1931 by the Commonwealth Government, and a sum of £93,000 was made available to help the industry and with the further object of providing work for unemployed coal

miners. A subsidy was granted to Companies at Baerami to carry out a prospecting campaign and some 1,500 tons of shale were raised. At Newnes, the Committee commenced operations in August, and up to the end of the year about 2,000 tons of shale were mined, and over 100,000 gallons of crude oil were produced. A small quantity of shale was also mined at Joadja. Bores at Farley and Bargo were extended to a depth of 3,897 feet and 2,020 feet respectively. The total recorded production of shale in 1931 was 2,000 tons, valued at £1,800.

About 32,000 gallons of crude oil were produced in 1931 from shale treated in Tasmania, while the total quantity of oil distilled from shale up to the end of 1931 was set down at 183,000 gallons. An amalgamation of interests was effected in 1931, the individuals and companies concerned now operating under the name of the Tasmanite Shale Oil Company.

Great hopes were at one time entertained in regard to the petroliferous area in Queensland, but at time of writing it appears that all that can legitimately be said is that while gas and light to medium gravity oils have been found at Roma, and gas and oily wax at Longreach, structural conditions for accumulations on a commercial scale have not yet been located in the drilled areas. Attention, however, is being given to the scientific testing of structures in other areas.

During the year 1931 further attempts were made to treat the Roma petroliferous gas commercially, and about 5,000 gallons of petrol were produced.

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

Boring was continued in 1931 on a fresh site in the area held by the Freney Kimberley Oil Company in the West Kimberley Gold-field and prospecting was carried out in other parts of the State, but no outstanding results were reported.

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

Attention is at present being devoted to the problem of economically obtaining fuel oil and other products from black and brown coals, to a review of the wasteful practice of burning lump coal to generate power, and to the more effective utilization of the known deposits of oil shale, particularly in New South Wales and Tasmania.

§ 13. Other Non-metallic Minerals.

A more or less detailed statement regarding the occurrence and production of other non-metallic minerals is given in preceding Official Year Books (see No. 22, pages 793 to 796). The tables of quantity and value in § 1 of this Chapter will, however, show the production of the principal items in this class for each State during the year 1931.

§ 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 1931 in New South Wales was estimated at 725 carats, valued at £694, while the total production to the end of 1931 is given at 203,970 carats, valued at £146,372. The yield in 1931 was obtained mainly at Howell and Copeton in the Tingha division. Eighty carats were won near Bingara, and a small output was derived, but not sold, at Gulgong.

2. **Sapphires.**—The production of sapphires in New South Wales during 1929 was returned as 65 ozs., valued at £450, obtained wholly at Sapphire in the Inverell division, but no output was recorded in 1930 and 1931. Production during recent years was restricted owing to the unfavourable market.

In Queensland, gems to the value of £2,903 were purchased on the Anakie sapphire fields in 1931, but the prices obtainable were not sufficiently high to encourage intensive prospecting.

3. **Precious Opals.**—The estimated value of the opal won in New South Wales during the year 1931 was £2,178, obtained on the Lightning Ridge and Grawin fields. The figures quoted, however, do not represent the total output, as in many instances miners, buyers, and collectors leave the fields before a record of their production or purchases can be secured. Some very fine stones are at times obtained, one weighing 5 ozs. and valued at £300 being recovered in 1911. Three finds of large stone were made in 1928, the gems weighing 790, 590, and 232 carats respectively, and showing fine fire and lustre. Occasionally, black opals of very fine quality are found, one specimen from the Wallangulla field, weighing 6½ carats, being sold in 1910 for £102, while in the early part of 1920 a specimen realized £600. It is stated that this locality is the only place in the world where the "black" variety of the gem has been found. The total value of opal won in New South Wales since the year 1890 is estimated at £1,599,000, but as pointed out above the figures are to some extent understated.

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

The opaliferous district in Queensland stretches over a considerable area of the western interior of the State, from Kynuna and Opalton as far down as Cunnamulla. The yield in 1931 was estimated at £600, and up to the end of that year at about £186,000. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. Production during the last few years has been limited by the paucity of demand.

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 £3,127 in 1931. The field is extremely prolific, a large quantity of precious white opal having been raised therefrom, while only a small portion of the known opal-bearing area has been thoroughly tested. A small amount of work was carried out during the year on the new field near Mount Johns.

According to a report a few years ago by the Australian Trade Commissioner in the East there is a good sale for the gems in China. It is stated that there is no difficulty in cutting and polishing, as the Chinese method of dealing with jade, dating back many centuries, can also be applied to opal.

4. **Other Gems.**—Various other gems and precious stones have from time to time been discovered in the different States, the list including agates, amethysts, beryls, chiastolite, emeralds, garnets, olivines, moonstones, rubies, topazes, tourmalines, turquoises, and zircons. In Western Australia, 609 carats (rough) of emeralds, valued at £278, were produced during 1929 in the Cue district on the Murchison gold-field. The value of the 3,750 carats reported from the same area in 1930 was not ascertainable, as there were no sales during the year. There was no recorded production in 1931.

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

1. **Total Employment in Mining.**—The number of persons engaged in the mining industry in Australia fluctuates according to the season, the price of industrial metals, the state of the labour markets, and according to the permanence of new finds, and the development of the established mines. During the year 1931 the number so employed was as follows :—

NUMBER OF PERSONS ENGAGED IN MINING, 1931.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead, and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales ..	9,944	2,812	35	994	15,667	1,230	30,682
Victoria	4,258	..	..	3	2,156	46	6,463
Queensland	2,751	351	287	548	2,362	454	6,753
South Australia	180	2	61	..	..	275	518
Western Australia ..	6,344	15	..	17	752	19	7,147
Tasmania	166	299	1,442	625	363	502	3,397
Northern Territory ..	70	4	3	29	..	39	145
Australia	23,713	3,483	1,828	2,216	21,300	2,565	55,105

Included in the figures for "other" in South Australia were 42 engaged in mining iron ore, 17 gypsum miners, 85 salt gatherers, and 85 opal miners. The Tasmanian figures include 280 osmiridium miners and 146 prospectors, and those for the Northern Territory, 30 mica miners and 5 tantalite miners.

The following table shows the number of persons engaged in mining in Australia during each of the years 1901, 1911, 1921, 1928 to 1931, together with the proportion of the total population so engaged :—

NUMBER ENGAGED IN MINING PER 100,000 OF POPULATION.

State.	1901.		1911.		1921.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales ..	36,615	2,685	37,017	2,177	29,701	1,408
Victoria	28,670	2,381	15,986	1,193	5,211	339
Queensland	13,352	2,664	13,201	2,122	5,847	765
South Australia	7,007	1,931	6,000	1,435	2,020	406
Western Australia ..	20,895	11,087	16,596	5,644	7,084	2,126
Tasmania	6,923	4,017	5,247	2,713	3,170	1,486
Northern Territory ..	..	..	715	..	131	3,351
Australia	113,462	2,992	94,762	2,074	53,164	974

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

State.	1928.		1929.		1930.		1931.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales ..	29,859	1,227	22,893	926	27,512	1,106	30,682	1,223
Victoria	3,045	174	3,231	183	3,255	183	6,463	360
Queensland	5,283	580	5,069	548	5,534	588	6,753	705
South Australia ..	593	103	619	107	565	97	518	89
Western Australia ..	4,853	1,215	5,159	1,254	5,442	1,300	7,147	1,698
Tasmania	3,778	1,783	3,603	1,685	3,280	1,515	3,397	1,544
Northern Territory ..	160	3,803	153	3,662	173	3,720	145	3,158
Australia ..	47,571	757	40,727	639	45,761	710	55,105	848

The general falling-off since 1901 is largely due to the causes mentioned in § 1. 6 *ante.* As compared with the preceding year, the proportion to population for Australia as a whole shows increases in 1930 and 1931, attributable mainly to the larger numbers engaged in the search for gold, particularly in New South Wales and Queensland.

2. **Wages Paid in Mining.**—Information regarding rates of wages paid in the mining industry, which in earlier issues of the Year Book was given in this chapter, is now contained in the Labour Report issued by this Bureau.

3. **Accidents in Mining, 1931.**—The following table gives particulars of the number of men killed and injured in mining accidents during the year 1931 :—

MINING ACCIDENTS, 1931.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED.								
Coal ..	7	2	..	..	1	4	..	14
Copper ..	..	..	2	..	..	1	..	3
Gold ..	4	1	..	..	16	3	..	24
Silver, lead, and zinc ..	5	..	2	..	..	..	..	7
Tin	..	..	..	..	..	..	..	..
Other minerals	3	..	..	..	..	..	..	3
Total ..	19	3	4	..	17	8	..	51
INJURED.								
Coal ..	66	14	117	..	118	2	..	317
Copper ..	..	..	6	..	..	15	..	21
Gold ..	5	1	30	..	290	..	..	326
Silver, lead, and zinc ..	19	..	35	..	..	6	..	60
Tin	1	..	2	..	..	4	..	7
Other minerals	4	..	..	..	..	2	..	6
Total ..	95	15	190	..	408	29	..	737

The number killed in mining accidents in 1931 was considerably less than that for 1921 when 132 deaths were recorded, the figures for the earlier year being swollen by the 75 fatalities in the colliery disaster at Mount Mulligan in Queensland.

§ 16. Government Aid to Mining.

1. **Commonwealth.**—Assistance to mining is given by the Commonwealth under the provisions of the *Precious Metals Prospecting Act* 1926, the *Gold Bounty Act of* 1930, and the Petroleum Prospecting Acts of 1926, 1927, and of 1928.

The first-mentioned Act provides for a sum of £40,000, of which £15,000 is to be expended in the Northern Territory, and the balance is to be allocated to the States in such proportions as the Minister determines. At the 30th June, 1932, the expenditure amounted to £18,490. No further assistance is being granted to the States from this fund.

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

Under the *Petroleum Prospecting Act* 1926–27 a trust account of £160,000 was established to assist in the search for oil. The Minister was authorized to make advances out of the money standing to the credit of this account to persons or companies engaged in the search for oil, and to assist persons, companies, or State Governments to make geological surveys. The Petroleum Prospecting Act of 1928 provides a further sum of £50,000. Up to the 30th June, 1932, the total expenditure under these Acts amounted to £187,827. The Government has decided to discontinue the granting of subsidies for deep drilling and to confine its attention to assistance in the carrying out of geological surveys and scout boring. Owing to financial stringency, however, the payment of all subsidies for oil prospecting has been temporarily suspended.

A small geological staff, including palaeontologists, has been appointed. The Geological Adviser was instructed to proceed to the United States and the Argentine in 1930 to study oil-field conditions on the spot, and submitted a comprehensive report, which was published as a Parliamentary Paper in 1931.

Experimental aerial photographic surveys have been carried out in conjunction with the Royal Australian Air Force to determine to what extent this technique is applicable under Australian conditions, and a report on the investigations is being issued.

The *Gold Bounty Act* 1930 provided that for a period of ten years from 1st January, 1931, a bounty of £1 per ounce was payable under prescribed conditions by the Commonwealth on each ounce of fine gold produced in excess of the average production for the three years 1928–30. Under the *Financial Emergency Act* 1931 the bounty was reduced to 10s. per ounce, subject to increases of 1s. according to each decrease of 3s. per cent. in the average rate of exchange. The rate of exchange on which the reduction to 10s. per ounce was based was taken as 30 per cent. Under the Financial Emergency Act of 1932 the bounty was temporarily suspended.

To provide for geophysical prospecting in Australia, a sum of £32,000 was made available by the Commonwealth Government in conjunction with the Empire Marketing Board. This survey was completed and the covering report in connexion therewith has been issued.

2. **New South Wales.**—The chief aid given in this State is in the direction of assistance to prospectors. Advances are also made for the purpose of assisting in the erection of crushing batteries or reduction plants, but the expenditure in 1931 under this heading was only £60. Payments from the Prospecting Vote during 1931 amounted to £11,095. In addition, grants amounting to £5,573 were made to unemployed prospectors, and payments for work done absorbed £5,309. The Unemployment Relief Council made available also a sum of £9,000 to provide for the purchase of rations and free issue of miners' rights.

3. **Victoria.**—During the year 1931 expenditure in connexion with mining amounted to £53,300, of which £31,300 consisted of advances to prospectors, while advances to miners amounted to £9,152, aid to boring, £4,607, and assistance to batteries, £3,164. A sum of £2,174 was expended from the Commonwealth Unemployed Relief Fund on boring. The total includes also expenses amounting to £1,658 on account of geological surveys.

4. **Queensland.**—State assistance to the mining industry in 1931 amounted to £11,639, of which £8,076 was advanced to prospectors, the balance consisting of grants under the Mining Machinery Advances Act and for the provision of transport facilities, etc., to mineral fields, while £1,451 was expended on the erection of coke ovens at the Bowen State coal mine.

State coal mines were in operation at Bowen, Styx and at Mount Mulligan. The last mentioned mine, however, was continued on the co-operative system during the year. There is also a State Assay Office at Cloncurry at which assays and sampling are carried out for the public, and State batteries were maintained at Kidston, Charters Towers, and Bamford. The battery at Charters Towers was leased privately, also the State Works for the treatment of tin at Irvinebank.

5. **South Australia.**—Aid is given to the mining industry under the terms of the Mining Act of 1893, and previous measures. Up to the end of 1931 the total amount of subsidy paid was £69,145, of which £13,681 has been repaid, and £4,549 written off, leaving a debit of £50,915. Portion of this amount is represented by machinery that has fallen into the hands of the Government. Repayments must be provided from profits, but in only two instances have the profits enabled a full return to be made. The State maintains batteries and cyanide works at Mount Torrens, Peterborough, Tarcoola, and Glenloth, and assays for public purposes are made at the School of Mines. Advances to prospectors in 1931 amounted to £3,396.

6. **Western Australia.**—Under the Mining Development Act of 1902 assistance was granted in 1931 in accordance with the subjoined statement:—Advances in aid of mining work and equipment of mines with machinery, £910; aid to prospectors, £2,242; subsidies on stone crushed for the public, £703; total £3,855. Other assistance granted from the vote on various matters during the year amounted to £26,690, principally in connexion with prospecting for gold.

In 1931 there were 23 State batteries in operation. The amount expended thereon up to the end of 1931 was £91,981 from revenue and £322,918 from loan, giving a total of £414,899. The working expenditure up to the end of 1931 exceeded the revenue by £185,931. The total value of gold and tin recovered to the end of 1930 at the State plants was £6,556,000. Free assays and determinations of mineral values for prospectors are made at the Kalgoorlie School of Mines, and at the Government laboratory at Perth.

7. **Tasmania.**—Aid to Mining in 1931 amounted to £7,711, of which £2,219 was expended under Part III. of the *Aid to Mining Act* 1927, on drilling and boring, and £4,178 represented assistance and sustenance to prospectors under Part II., the balance being expended on miscellaneous assistance under Parts III. and IV. of the Act. The amount received from ore sales was £699, the bulk of which was paid to tributers. Receipts amounted to £153.

Tributers' assays are made at a nominal charge, and all tribute surveys are carried out free of charge by the Assay and Survey Office at Zeehan.

8. **Northern Territory.**—During the year 1931-32 assistance was granted to approved prospectors at the rate of £1 per week per man for rations with loan of prospecting tools not exceeding £2 in value to each prospector. The total assistance granted during the year amounted to £2,113.

The Government maintains a battery at Marranboy, and the Government Assayer makes free assays for prospectors, and arranges for the sampling, storage, and sale of ores.

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

1. **Local Production.**—According to returns compiled from various sources by the Australian Mines and Metals Association, the quantities of the principal metals (exclusive of gold) extracted in Australia during the five years 1927 to 1931 were as follow :—

REFINED METALS PRODUCED IN AUSTRALIA.

Metal.		1927.	1928.	1929.	1930.	1931.
Silver	ozs.	9,390,070	8,053,251	9,229,514	9,002,705	7,349,794
Lead, pig ..	tons	164,480	155,076	176,820	168,291	133,306
Zinc	tons	49,155	50,223	51,872	54,901	53,832
Copper	tons	9,564	11,858	10,874	14,900	12,936
Tin	tons	2,989	3,133	2,260	1,544	1,690

The local production of pig iron during the quinquennium 1923–27 ranged between 330,000 tons in 1923, and 517,000 tons in 1927. Complete information for later years is not available from the returns published by the Association, but according to the metal extraction returns published in the Statistical Register of New South Wales. the production of pig iron in that State amounted in 1927–28 to 428,000 tons, in 1928–29 to 461,000 tons, in 1929–30 to 308,369 tons, and in 1930–31 to 232,783 tons. As pointed out previously, the iron ore used is now obtained from South Australia.

2. **Metallic Contents of Ores, Concentrates, etc., Exported.**—The estimated metallic contents of ores, concentrates, etc., exported during the five years 1927 to 1931 are given in the following table :—

METALLIC CONTENTS OF ORES, CONCENTRATES, ETC., EXPORTED.

Metal.		Contained in—	1927.	1928.	1929.	1930.	1931.
Silver	ozs.	Lead–Silver–Gold Bullion	..	..	44,677	44,777	1,018,359
		Lead Concentrates and Ores	615,484	117,846	31,121	179,185	303,307
		Zinc Concentrates and Ores	1,640,891	1,453,396	604,014	558,577	183,111
		Copper and Gold Ores ..	..	..	..	..	..
		Total	2,256,375	1,571,242	679,812	782,539	1,504,777
Lead	tons	Lead–Silver–Gold Bullion	488	..	689	252	17,130
		Lead Concentrates and Ores	12,115	2,221	878	12,986	10,982
		Zinc Concentrates and Ores	14,198	12,726	5,704	9,482	1,878
		Total	26,801	14,947	7,271	22,720	29,990
Zinc	tons	Lead Concentrates and Ores	579	77	21	396	557
		Zinc Concentrates and Ores	111,755	117,858	69,958	86,761	41,917
		Total	112,334	117,935	69,979	87,157	42,474
Copper	tons	Ores, Matte, etc. ..	1,597	1,989	2,737	3,277	2,765
Tin	tons	Concentrates and Ores ..	12	..	4	..	17

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

The following table shows the quantity and value of the principal oversea exports of ores, concentrates, and metals, the produce of Australia, together with the countries to which the respective products were forwarded, for the year 1931–32 :—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1931–32.

Article.	Total Exports.	Exports to— United Kingdom.	United States.	Belgium.	Germany.	Japan.	New Zealand.	Other Countries.
QUANTITY.								
Ores—	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.	cwt.
Copper	3,031	497	2,534	..	..	..	..	..
Silver and Silver-lead	33,041	..	1,247	15,642	16,152	..	..	..
Iron	684,820	..	417,800	..	..	267,020	..	..
Wolfram	1,427	..	714	..	713	..	..	..
Concentrates—								
Silver and Silver-lead	75,091	..	..	68,431	6,660	..	..	..
Zinc	1,169,939	1,013,531	..	..	..	156,408	..	..
Cadmium—Blocks, Ingots, etc.	744	534	..	..	..	10	..	(a) 200
Copper—								
Matte	..	..	..	..	..	..	..	..
Ingot	240,444	197,163	42,970	..	97	..	85	(b) 129
Tin—Ingot	15,577	4,840	8,700	..	..	..	1,858	(c) 179
Lead—								
Pig	2,997,015	2,401,491	..	199,868	311,513	37,928	16,432	(d) 29,783
Zinc—Bars, Blocks, etc.	910,669	393,919	..	280,084	4,007	181,255	..	(e) 51,404
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.
(f) Platinum, Osmium, etc.	1,772	1,772	..	..	..	..	..	..
Gold—								
Bar, Dust, etc.	978,488	978,203	266	..	..	..	19	..
Silver—								
Bar, Ingot, etc.	5,821,889	2,458,534	..	..	..	..	851	(g) 3,362,504
VALUE—£.								
Ores—								
Copper	1,867	151	1,716	..	..	..	..	..
Silver and Silver-lead	10,817	..	245	5,949	4,623	..	..	..
Iron	22,443	..	14,096	..	..	8,347	..	..
Wolfram	3,738	..	2,388	..	1,350	..	..	..
Concentrates—								
Silver and Silver-lead	27,256	..	..	24,266	2,990	..	..	..
Zinc	106,078	81,084	..	..	..	24,994	..	..
Cadmium—Blocks, Ingots, etc.	4,746	2,860	..	..	..	112	..	1,774
Copper—								
Matte	..	..	..	..	..	..	..	..
Ingot	469,003	389,528	78,841	..	190	..	250	194
Tin—Ingot	124,963	37,891	70,239	..	..	..	15,389	1,444
Lead—								
Pig	2,267,924	1,861,386	..	126,027	210,392	31,213	13,982	24,924
Zinc—Bars, Blocks, etc.	697,120	304,811	..	208,690	3,281	139,336	..	41,002
Platinum, Osmium, etc.	22,600	22,600	..	..	..	..	..	..
Gold—								
Bar, Dust, etc.	6,784,745	6,782,749	1,864	..	..	..	132	..
Silver—								
Bar, Ingot, etc.	581,310	255,163	..	..	..	..	99	326,048

(a) Sweden. (b) Netherlands. (c) South Africa, 100 cwt. (d) Hong Kong, 24,411 cwt.; Norway, 3,000 cwt.; South Africa, 2,338 cwt. (e) Hong Kong, 500 cwt.; India, 50,697 cwt. (f) Mainly platinum and osmiridium exported from New South Wales and Tasmania. (g) India, 2,978,000 oz.; China, 384,011 oz.; Fiji, 493 oz.