

CHAPTER XVII.
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 in large numbers and thus accelerated its national development.

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

3. Quantity and Value of Production in 1932.—(NOTE.—A table showing particulars of mineral production for the year 1933 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 1932, 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. 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, but the value of the transformation from ore to metal is credited to the manufacturing industry of that State. Similarly lead, silver-lead, and zinc are credited in the form reported to the State of origin—chiefly New South Wales—although the actual metal extraction is carried out to a large extent elsewhere.

MINERAL PRODUCTION.—QUANTITIES, 1932.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (c)	Australia.
Antimony ..	ton	87	..	..	..	..	..	..	87
Arsenic ..	..	487	..	..	..	1,477	..	..	1,964
Asbestos ..	..	..	..	..	..	20	110	..	130
Barytes ..	..	304	..	..	1,701	..	..	..	2,005
Bismuth ..	cwt.	380	..	1	4	..	..	20	405
Brown Coal ..	ton	..	2,612,512	..	..	..	..	..	2,612,512
Coal ..	..	6,784,222	432,353	841,711	..	415,719	111,853	..	8,585,858
Copper (Ingot, matte, etc.) ..	..	632	..	3,136	..	..	10,995	..	14,763
Copper ore ..	..	..	..	..	..	..	3	17	20
Diatomaceous earth ..	..	1,334	..	..	..	..	..	..	1,334
Gold ..	fine oz.	27,941	47,745	23,263	3,014	605,561	5,937	674	714,335
Gypsum ..	ton	2,442	2,920	..	44,962	3,647	..	..	53,971
Ironstone ..	..	3,065	..	8,232	537,928	..	..	..	549,225
Kaolin ..	..	2,731	2,004	375	..	..	..	..	5,110
Lead (b) ..	..	..	..	47,716	..	..	2,694	..	50,410
Lead and silver-lead ore, concentrates etc. ..	..	209,125	..	..	..	8	..	..	209,133
Limestone flux ..	..	44,205	..	15,930	10,619	..	90,335	..	161,089
Magnesite ..	..	5,117	29	130	115	..	..	..	5,391
Manganese ore ..	..	106	..	..	..	..	..	..	106
Molybdenite ..	cwt.	70	..	32	..	..	..	..	102
Osmiridium ..	oz.	..	..	..	..	..	785	..	785
Phosphate ..	ton	225	..	..	(d)	..	..	..	225
Pigments ..	..	698	..	..	50	..	..	..	748
Platinum ..	oz.	336	..	..	..	..	..	..	336
Salt ..	ton	..	(a)	..	60,063	..	..	..	60,063
Sapphires ..	oz.	..	..	..	..	..	..	..	..
Shale (oil) ..	ton	2,691	..	..	..	..	1,097	..	3,788
Silver ..	fine oz.	49,309	2,083	2,301,782	..	58,285	463,488	..	2,874,947
Tin and tin ore ..	ton	793	38	708	..	37	794	26	2,396
Wolfram ..	..	24	..	7	..	..	..	34	65
Zinc and concentrates ..	..	188,038	..	..	..	..	..	..	188,038

(a) Not available for publication. (b) See letterpress preceding this table. (c) Year ended 30th June. (d) Quantity not stated.

The values of the minerals raised in each State in 1932 are given in the following table:—

MINERAL PRODUCTION.—VALUE, 1932.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (d)	Australia.
	£	£	£	£	£	£	£	£
Antimony ..	2,743	..	..	..	..	..	..	2,743
Arsenic ..	11,316	..	..	..	26,161	..	..	37,477
Asbestos ..	..	..	..	130	1,762	..	..	1,892
Barytes ..	608	..	..	5,104	..	..	..	5,712
Bismuth ..	2,125	..	12	109	..	541	..	2,787
Brown Coal ..	..	276,799	..	..	..	..	..	276,799
Coal ..	4,376,453	274,903	684,555	..	270,630	86,733	..	5,693,274
Copper (ingot and matte) ..	21,785	..	108,858	..	..	399,646	..	530,289
Copper ore ..	..	..	..	..	..	116	137	253
Diamonds ..	252	..	..	..	..	..	..	252
Diatomaceous earth	4,002	..	..	..	..	..	..	4,002
Gold ..	203,622	351,586	173,144	22,018	4,413,800	43,137	4,196	5,211,512
Gypsum ..	1,221	1,135	..	39,342	5,354	..	..	47,052
Iron (pig) (b)	..	..	..	..	..	..	..	..
Ironstone ..	1,668	..	8,783	618,617	..	..	..	629,068
Kaolin ..	2,589	2,593	..	750	..	..	..	5,932
Lead (b) ..	..	..	573,813	..	..	32,637	..	606,450
Lead and silver- lead ore, con- centrates, etc. ..	1,563,229	..	..	..	112	..	..	1,563,341
Limestone flux ..	16,577	..	13,541	3,982	..	18,725	..	52,825
Magnesite ..	12,792	110	260	173	..	..	..	13,335
Manganese ore ..	340	..	..	..	..	..	..	340
Molybdenite ..	704	..	296	..	..	..	..	1,000
Opal ..	1,233	..	500	3,060	..	..	..	4,793
Osmiridium ..	..	..	..	..	..	9,075	..	9,075
Phosphate ..	169	..	..	1,912	..	..	..	2,081
Pigments ..	1,396	..	..	325	..	..	..	1,721
Platinum ..	2,906	..	..	..	..	..	..	2,906
Salt ..	..	(a)	..	135,142	..	..	..	135,142
Sapphires ..	..	..	1,982	..	..	..	..	1,982
Shale (oil) ..	2,372	..	..	..	..	1,074	..	3,446
Silver (b) ..	3,683	208	182,733	..	5,664	37,304	..	229,532
Tin and tin ore ..	120,124	404	66,174	..	3,295	109,767	2,322	302,086
Wolfram ..	1,012	..	137	..	..	..	1,369	2,518
Zinc & concentrates	155,928	..	..	..	..	..	..	155,928
Unenumerated ..	(c)22,342	1,256	3,913	7,232	5,013	303	(e)2,787	45,846
Total ..	6,533,191	908,994	1,818,701	837,896	4,731,740	739,058	13,811	15,583,391

(a) Not available for publication. (b) See letterpress above preceding table. (c) Includes dolomite £7,296, silica £5,559, fireclay £6,280, and felspar £1,731. (d) Year ended 30th June. (e) Mica, £5,547; tantalite, £240.

It may be pointed out in connexion with the figures given in the above table that the totals are exclusive of certain commodities, such as stone for building and industrial uses, sand, gravel, brick and pottery clays, lime, cement, and slates, which might be included under the generic term "mineral." Valuations of the production of some of these may be obtained from the reports of the various Mines Departments, but in regard to others it is impossible to obtain adequate information. In certain instances, moreover, the published information is of little value. Some of the items excluded, such as cement, carbide and sulphuric acid are included in manufacturing production, and, in any case, only the raw material could properly be included in mineral production. The items excluded from the total for New South Wales in 1932 consist of—lime, £30,745; building stone, £110,640; Portland cement, £390,715; coke, £403,177; road materials, £506,727; shell grit, £5,609; mineral water, £9; sulphur and sulphuric acid, £44,356; and brick and pottery clays, £47,434. Carbide, £59,495, and cement, £106,809, have been excluded from the Tasmanian figures.

4. Value of Production, 1928 to 1932.—The value of the mineral production in each State in the five years 1928 to 1932 is given in the table hereunder :—

MINERAL PRODUCTION.—VALUE.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
	£	£	£	£	£	£	£	£
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	16,956	15,355,872
1931 ..	6,517,703	882,334	1,274,953	548,204	3,410,472	707,234	11,416	13,352,316
1932 ..	6,533,191	908,994	1,818,701	837,896	4,731,740	739,058	13,811	15,583,391

For New South Wales the small increase in value of production in 1932 on that for the previous year was due to gold, silver, lead, and tin, but the gain in this respect was offset by heavy falls in the returns for zinc and coal.

The small increase in the Victorian returns for 1932 was chiefly due to the rise in the price of gold and the increased output of brown coal. There was a fall in the value of output of black coal, but this was more than offset by the increases above-mentioned.

In Queensland the rise in value recorded in 1932 was largely due to increases in the returns from lead, silver, and gold, amounting respectively to £570,000, £177,000, and £140,000, although these increases were partly counterbalanced by a fall of £268,000 in the return from coal, and of £65,000 from copper. The returns for South Australia in 1932 showed an increase of about £290,000 on the figures for 1931, the advance being mainly due to a rise in the production of ironstone from £333,000 in 1931 to £619,000 in 1932. The value of the yield from salt, however, showed a decline of over £19,000, i.e., from £154,000 in 1931 to £135,000 in 1932. In Western Australia the total for 1932 shows an increase of about £1,321,000 on that for the preceding year. All minerals, however, with the exception of gold, gypsum, arsenic, and silver showed decreases. The yield from gold, which showed an increase of £1,359,000, accounted for over 93 per cent. of the value of the State's output in 1932. 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. The small increase in 1932 was mainly due to tin, the production of which showed a rise in value of £39,000 over that for 1931, but there were further decreases in copper and coal, while consequent on low price and difficulty in securing a market the yield from osmiridium declined by 50 per cent. 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 £5,787 was the chief item of production in 1932, the mineral being obtained in the Arltunga district.

5. Total Production to end of 1932.—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1932. 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 £47,000,000 of that published by the State Department of Mines, the principal items excluded being coke, £15,046,000; cement, £19,282,000; lime, £1,707,000; 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 1932.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Australia.
	£	£	£	£	£	£	(a)	Million. £
Gold ..	64,243,061	304,212,734	86,175,130	1,681,465	172,762,395	9,058,635	2,290,503	640
Silver and lead ..	122,650,239	265,377	5,252,527	383,547	2,287,616	9,155,784	65,903	140
Copper ..	15,624,714	216,686	26,866,463	33,148,536	1,808,828	21,209,791	233,603	99
Iron ..	7,740,886	15,641	489,875	9,940,508	36,722	52,110	..	18
Tin ..	14,696,754	977,506	11,221,394	..	1,607,514	17,419,689	629,178	47
Wolfram	277,871	11,885	1,065,728	301	1,441	236,387	222,479	2
Zinc ..	24,547,662	..	13,460	15,993	5,437	996,977	..	26
Coal ..	198,565,707	14,334,931	20,837,205	..	7,209,120	2,042,130	..	243
Other ..	8,185,667	880,531	2,798,819	4,789,189	276,922	2,119,158	73,617	19
Total	456,532,561	320,915,311	154,720,601	49,959,539	185,995,995	62,289,770	3,515,283	1,234

(a) To 30th June, 1932.

The "other" minerals in New South Wales include alunite, £209,000; antimony, £365,000; arsenic, £144,000; bismuth, £244,000; chrome, £123,000; diamonds, £147,000; magnesite, £186,000; molybdenite, £213,000; opal, £1,601,000; scheelite, £194,000; and oil shale, £2,695,000. In the Victorian returns antimony ore was responsible for £612,000. The value for coal in this State includes £1,955,000 for brown coal. Included in "other" in the Queensland production were opal, £187,000; gems, £632,000; bismuth, £119,000; cobalt, £155,000; molybdenite, £600,000; limestone flux, £753,000, and arsenic, £124,000. The chief items in South Australian "other" minerals were salt, £3,064,000; limestone flux, £289,000; gypsum, £804,000; phosphate, £135,000; and opal, £131,000. In the Tasmanian returns osmiridium was responsible for £598,000, 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; and (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 1922 to 1933, 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
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
1933 ..	226,068	448,228	710,168	49,619	4,915,958	51,579	4,449	6,406,069
Total								
1851-1933	64,469,129	304,660,962	86,885,298	1,731,084	177,678,353	9,110,214	2,295,242	646,830,282

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

The value of the gold yield in 1929 was the lowest recorded since the discovery of the precious metal in 1851, while the slight increase in 1930 was to some extent due to the increased activity in prospecting and the working over of old auriferous areas resultant on prevailing economic conditions. Consequent on the enhanced price realized for gold in 1931 the figures for the year show a considerable increase, the total for Australia being the highest recorded since 1921. The average price in Australian currency applied to the production for the year 1931 was £5 19s. 9d.; for the year 1932 the price was taken as £7 5s. 11½d.; and for 1933 as £7 14s. 3½d. Reference to the bounty paid by the Commonwealth Government on local production will be found in § 16. i. 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.
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	674	714,135
1933 ..	29,252	58,183	91,997	6,361	637,208	6,673	594	830,268
Total (b)								
1851-1933	15,078	71,498	20,263	397	40,058	2,127	539	149,960

(a) Year ended 30th June.

(b) '000 omitted in each case.

3. **Changes in Relative Positions of States as Gold Producers.**—The figures in the table showing the value of gold raised explain the enormous increase in the population of Victoria during the period 1851 to 1861, when an average of over 40,000 persons reached the 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. The position of the States from 1898 to 1932 according to the quantities produced was in the following order, viz. :—Western Australia, Victoria, Queensland, New South Wales, Tasmania and South Australia, with the exception of the years 1921, 1926 and 1930 to 1932, when the positions of Queensland and New South Wales were reversed. In 1933 Queensland improved its position and occupied second place, which had been held by Victoria for so long a period, the latter State dropping to third position.

4. **Place of Australia in the World's Gold Production.**—In the table given below will be found particulars 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.

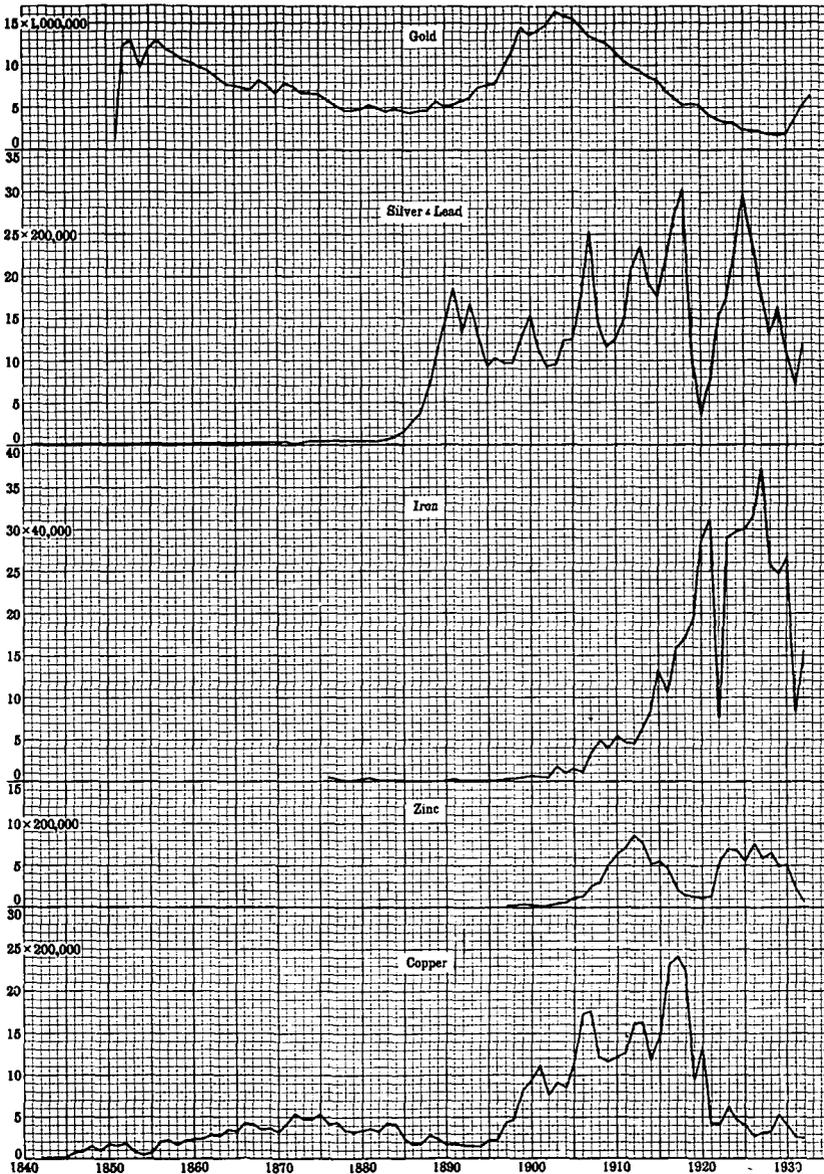
GOLD.—WORLD'S PRODUCTION.

Period.	World's Production of Gold.	Gold Produced in Australia.	Percentage of Australia on Total.
	Fine ozs.	Fine ozs.	%
1851-60	61,352,295	24,877,013	40.55
1861-70	53,675,679	19,038,661	35.47
1871-80	50,473,314	14,429,599	28.59
1881-90	51,998,060	11,586,626	22.28
1891-1900	102,695,748	21,187,661	20.63
1901-10	182,891,525	33,434,069	18.28
1911-20	206,114,773	17,426,466	8.45
1921-30	186,091,278	5,841,902	3.14
1927	19,425,458	508,355	2.62
1928	19,745,749	457,674	2.32
1929	19,615,412	427,159	2.18
1930	20,839,955	466,593	2.24
1931	22,801,162	595,123	2.61
1932	24,226,915	714,135	2.95

For the year 1932 the world's production of gold in fine ounces was 24,227,000, as compared with a return of 22,801,000 oz. fine in 1931. It is estimated that the world's production in 1933 approximated 25,370,000 fine ounces, of which Australia's share amounted to 830,268 fine ounces or 3.27 per cent.

The quantity of gold produced in the ten chief producing countries in each of the five years 1928 to 1932 is given in the table hereunder. Particulars of the quantity and value of the gold production for all countries for the ten years 1923-32 will be found in the Australian Production Bulletin No. 27 issued by this Bureau.

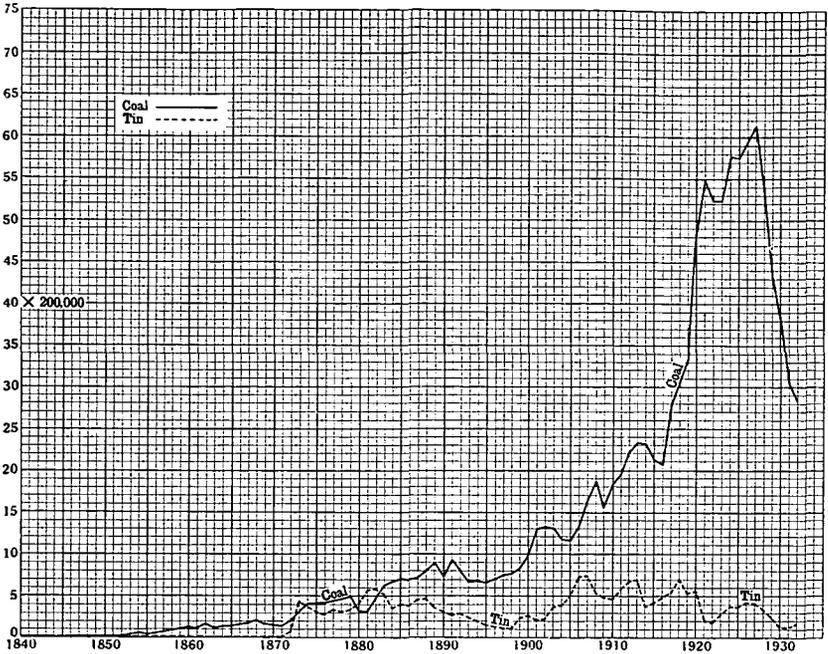
VALUES OF THE PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1932.



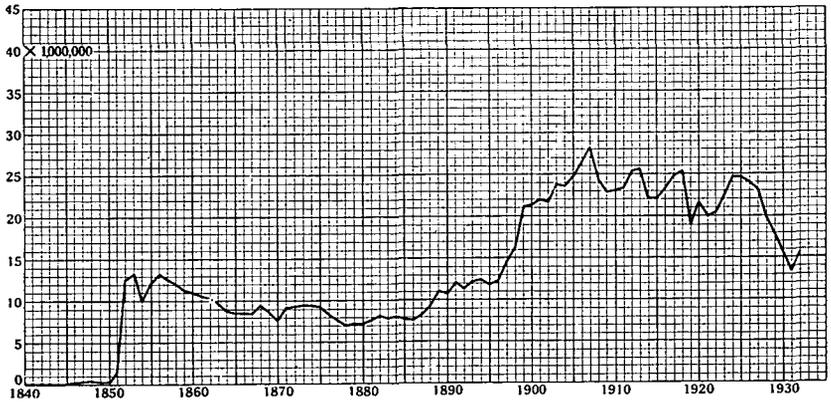
EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 onwards.

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 1932—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.

GOLD.—PRODUCTION, CHIEF COUNTRIES.

Country.	1928.	1929.	1930.	1931.	1932.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
Union of South Africa	10,354,264	10,412,326	10,716,351	10,877,777	11,558,532
United States ..	2,144,720	2,056,629	2,100,395	2,213,741	2,219,198
Canada ..	1,890,592	1,928,308	2,102,068	2,693,892	3,044,387
Soviet Union ..	1,200,000	1,000,000	1,433,664	1,700,960	1,990,000
Mexico ..	699,102	651,873	670,488	623,003	584,198
Rhodesia ..	576,112	560,813	547,631	532,111	580,484
Australia ..	457,674	427,159	466,593	595,123	714,135
India ..	375,992	363,869	329,231	330,484	329,600
Japan ..	308,823	334,061	388,740	425,000	462,251
Gold Coast ..	167,042	207,851	240,899	261,651	280,000

The next table shows the average yearly production in order of importance of the yield in the chief gold-producing countries for the decennium of 1923-1932.

GOLD.—AVERAGE ANNUAL PRODUCTION, CHIEF COUNTRIES, 1923 TO 1932.

Country.	Quantity.	Country.	Quantity.
	Fine ozs.		Fine ozs.
Union of South Africa ..	10,231,821	Rhodesia	584,562
United States	2,228,320	Australia	563,767
Canada	1,976,801	India	367,126
Soviet Union	1,170,895	Japan	333,856
Mexico	708,481		

The comparison has been restricted to countries where the average for the period is in excess of 300,000 fine ounces.

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
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
1932 ..	8,154	6,089	3,893	142	7,983	250	89	26,600

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 three 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, Victoria 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 1932 amounted to 336 ozs., valued at £2,906 as compared with 283 ozs., valued at £2,201, in the preceding year, while the total production recorded to the end of 1932 amounted to 19,702 ozs., valued at £124,902. About 70 men were engaged in prospecting and fossicking in the Fifield area in 1932.

(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 1932 the yield of osmiridium was returned as 785 ozs., valued at £9,075, the quantity raised being about 495 ozs. less than in 1931. 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 the process of treatment is a particularly dangerous one, owing to the fact that osmium oxide, which is a deadly poison, is given off in a gaseous state. Some of the American firms are using African ore containing platinum and iridium, the treatment of which is simpler and less hazardous.

§ 4. Silver, Lead, and *Zinc.

1. **Occurrence in Each State.**—Particulars regarding the occurrence of silver and associated metals in each State were given in Year Books, Nos. 1 to 5, but considerations of space 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 1932 is given hereunder :—

SILVER AND LEAD.—PRODUCTION.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter. (a)	Australia.
	£	£	£	£	£	£	£	£
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
1932 ..	1,566,912	208	756,546	..	5,716	69,941	..	2,399,323

(a) Year ended 30th June.

(ii) *New South Wales.* The figures quoted above for New South Wales for the year 1932 include silver to the value of £3,683 and silver-lead ore and concentrates valued at £1,563,229. 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,

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

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

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

Year.	Metal Produced within Australia.				Contents of Concentrates Exported.			
	Silver.	Lead.	Zinc.	Value.	Silver.	Lead.	Zinc.	Value.
	oz. fine.	tons.	tons.	£	oz. fine.	tons.	tons.	£
1928 ..	7,068,964	151,475	44,004	5,256,649	1,259,931	11,372	94,087	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
1932 ..	5,896,193	131,422	53,200	3,001,005	178,034	1,222	30,164	124,719

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 1932 the amount won from ores of New South Wales origin was given as 158 tons, valued at £22,164. As pointed out previously, credit for the value is not taken in the New South Wales returns, the value accruing to the State being taken as that of the declared value of the concentrates at the time of their dispatch.

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

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

SILVER.—BROKEN HILL RETURNS TO END OF 1932.

Mine.	Value of Output to end of 1932.	Dividends and Bonuses Paid to end of 1932.
	£	£
Broken Hill Proprietary Co. Ltd.	53,324,074	13,804,632
Broken Hill Proprietary Block 14 Co. Ltd.	4,750,508	670,160
British-Australian Broken Hill Co. Ltd.	5,858,998	821,280
Broken Hill Proprietary Block 10 Co. Ltd.	4,946,989	1,432,500
Sulphide Corporation Ltd. (Central and Junction Mines)	26,982,303	3,466,875
Broken Hill South Ltd.	22,796,350	5,155,000
North Broken Hill Ltd.	18,214,692	5,447,690
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.	9,873,353	3,547,534
Barrier South Ltd.	151,517	50,000
Total	151,595,782	34,654,602

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 1932, 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 159 millions and 39 millions respectively. The authorized capital of the various companies amounted to £6,448,000. In 1932 the dividends and bonuses paid amounted to £476,000 shared in by the Companies controlling the principal mines as follows: Zinc Corporation, £71,000; North Broken Hill, £175,000; Broken Hill South, £80,000, and Broken Hill Proprietary, £149,000.

(b) *Other Areas.* Silver is found in various other localities in New South Wales, but the production therefrom in 1932 was unimportant, developmental operations being retarded by the low price of the metal.

(iii) *Victoria.* The silver produced in 1932 amounted to 2,083 ozs., valued at £208, and was obtained in the refining of gold at the Melbourne Mint.

(iv) *Queensland.* Although the prices of lead and silver fell to record low levels in 1932, the production of lead in Queensland rose from £231,000 in 1931 to £574,000 in 1932, while silver increased from £76,000 to £183,000. The Mount Isa Mines Ltd. which entered the production stage in 1931 increased output by effecting additions and improvements to plant. Operating costs were reduced to a minimum by extensive use of electric power and by adoption of up to date methods of mining. Owing to the low price of lead, mining for silver-lead ores on the northern fields was practically stagnant.

(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, and none was recorded in 1932.

(vi) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1932 was 58,285 oz., valued at £5,604. In addition, 8 tons of lead and silver-lead ore and concentrates valued at £112 were exported. There was no production of lead reported, and mining for this mineral was at a standstill.

(vii) *Tasmania.* The silver produced in 1932 amounted to 463,488 oz., valued at £37,304, and the lead to 2,694 tons, valued at £32,637. About 302,000 oz. of the total silver output were contained in silver-lead, while 161,000 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 the 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 and 1932.

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.	1928.	1929.	1930.	1931.	1932.
World's production in 1,000 fine ozs. . .	257,273	260,970	248,708	192,710	161,003

(a) Estimated.

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 1932 local extraction was set down as 6,499,000 oz., and exports as 2,494,000 oz., the total being equivalent to about 5½ 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 1932 from the chief silver producing countries were as follow :—

SILVER.—PRODUCTION, CHIEF COUNTRIES, 1932.

Country.	Production.	Country.	Production.
	Fine ozs. (‘000 omitted.)		Fine ozs. (‘000 omitted.)
Mexico	71,700	Japan	4,500
United States	24,425	Central America	3,800
Canada	18,356	Transvaal	1,121
South America	12,400	East Indies	1,000
Europe	11,000	Congo	421
Australia	8,993	China	200
British India	5,000	Rhodesia	80

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.	1929.	1930.	1931.	1932.	1933.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Silver (Standard) per oz.	0 2 0.46	0 1 5.66	0 1 2.60	0 1 5.84	0 1 6.54
Lead .. per ton	23 4 11	18 1 5	13 0 9	12 0 6	11 16 4
Spelter per ton	24 17 8	16 16 9	12 8 11	13 13 10	15 14 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, ETC., MINING.—PERSONS EMPLOYED.

Year.	N.S.W. (a)	Q'land.	S. Aust.	W. Aust. (b)	Tasmania. (a)	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1928 ..	4,666	282	..	12	627	..	(c) 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
1932 ..	3,145	443	1	16	932	1	4,538

(a) Silver, lead, and zinc.

(b) Principally lead and silver-lead ore.

(c) 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 1928 to 1932 is shown hereunder. Quantities for Australia as a whole as returned by the several State Mines Departments are appended on separate lines at the foot of the table.

COPPER.—PRODUCTION.

State.	1928.	1929.	1930.	1931.	1932.
	£	£	£	£	£
New South Wales	3,497	14,183	8,347	23,948	21,785
Queensland	177,043	294,188	174,075	126,342	108,858
South Australia	13,321	22,982	6,966	934	..
Western Australia	765	2,778	102	..	..
Tasmania	444,802	740,985	620,578	416,309	399,762
Northern Territory (a) ..	..	..	589	25	137
Australia	639,428	1,075,146	810,657	567,558	530,542
Ingot, Matte, etc. tons	9,455	12,613	13,063	13,453	14,763
Ore tons	100	416	251	79	20

(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.

2. *Sources of Production.*—(i) *New South Wales.* 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 1932 was obtained from the treatment of other than copper ores, the output for the year comprising 632 tons of electrolytic copper valued at £21,785. With the exception of a small quantity obtained from the treatment of gold and other ores, the entire production was obtained at Port Kembla from copper matte forwarded from the Broken Hill smelters and derived from silver-lead ores. None of the copper mines in the State operated productively during the year.

(ii) *Queensland.* The yield in this State amounted in 1932 to 3,136 tons valued at £108,858, 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 1932 were as follow :—Cloncurry, 2,597 tons, £90,162; Herberton, 430 tons, £14,925; and Gladstone, 52 tons, £1,814.

(iii) *South Australia.* The total production of copper in South Australia easily exceeds 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 for the State 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.

The year 1932 was remarkable for the fact that for the first time since 1842 there was no recorded sale of copper. Mining, however, was not at a standstill during the year, and considerable quantities of ore were raised at the Moonta mines and smaller quantities at Wallaroo also were awaiting treatment. The copper obtained from Moonita ores is free from deleterious impurities and is specially suitable for manufacturing purposes. A new plant has been installed and a small amount of copper was produced in 1933.

(iv) *Western Australia.* No production was reported in this State for the year 1932.

(v) *Tasmania.* The quantity of copper produced in Tasmania during 1932 was 10,998 tons, valued at £399,762, the whole of the production being due to the Mount Lyell Mining and Railway Co. Ltd. This Company treated 59,168 tons of ore and concentrates and produced 11,101 tons of blister copper, containing copper, 10,995 tons; silver, 161,633 ozs.; and gold, 4,865 ozs., the whole being valued at £441,000.

(vi) *Northern Territory.* Copper has been found at various places, but lack of capital, low prices and difficulty of transport prevent the development of the deposits. The production in 1932 was obtained from ore raised in former years at Wollgorang.

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

COPPER.—PRICES, LONDON AND NEW YORK.

Year.				Average London Price per Ton Standard Copper.	Average New York Price in Cents per lb. Electrolytic Copper.
				£	Cents.
1928	..	..	..	63.70	14.57
1929	..	..	..	75.42	18.11
1930	..	..	..	54.62	12.98
1931	..	..	..	38.34	8.12
1932	..	..	..	31.68	5.56

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 a very low figure of £31.68, the price dropping from £39.46 in January to as low as £26.07 in July. For the remaining months of the year the price varied between £34.98 in September and £29.09 in December. For the year 1933 the average was returned at £32.56.

4. World's Production of Copper.—The world's production of copper during the five years 1928–1932 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.	1928.	1929.	1930.	1931.	1932.
World's production—tons ..	1,689,600	1,899,900	1,547,900	1,323,200	868,500

The yields from the chief copper-producing countries in 1932 were as follow :—

COPPER.—PRODUCTION, CHIEF COUNTRIES, 1932.

Country.		Production.	Country.		Production.
		Tons.			Tons.
United States	.. ..	228,000	Yugoslavia	.. ..	29,700
Africa	.. ..	126,800	Spain and Portugal	.. ..	29,100
Canada	.. ..	111,900	Germany	.. ..	27,600
Chile	.. ..	101,900	Peru	.. ..	21,100
Japan	.. ..	69,500	Australia	.. ..	14,000
Mexico	.. ..	33,600	Norway	.. ..	12,200
Soviet Union	.. ..	31,500	Cuba	.. ..	5,300

During the five years ending in 1932 the share of the United States in the world's copper production amounted to over 42 per cent.

The Australian production in 1932 amounted to a little over 1.6 per cent. of the total.

As pointed out in *The Mineral Industry*, the unprecedentedly low price of copper in 1932 was of minor importance as regards production, inasmuch as it was the inevitable result of conditions beginning with the pegging of copper at 18c. in 1929-30. Even on the basis of the world curtailment agreement, production was in excess of consumption, and under the existent conditions, selling below cost of production was ineffective in creating demand.

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.
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
1932	.. ..	(b) 3	278	51	..	1,518	3	1,853

(a) Including 1 in Victoria.

(b) No production from copper mines.

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

§ 6. Tin.

1. **Production.**—The 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 next table shows the value of the production as reported to the Mines Departments in each of the States during the five years 1928 to 1932. A separate line is appended showing the recorded tonnages for Australia during each of the specified years.

TIN.—PRODUCTION.

State.	1928.	1929.	1930.	1931.	1932.
	£	£	£	£	£
New South Wales	231,843	191,199	84,800	103,111	120,124
Victoria	12,954	3,545	..	440	4 ⁰⁴
Queensland	134,727	114,518	49,708	35,744	66,174
Western Australia	15,002	13,432	10,608	3,945	3,295
Tasmania	258,676	130,014	69,592	70,634	109,767
Northern Territory (a) ..	10,828	6,958	3,345	2,331	2,322
Total	664,030	459,666	218,053	216,205	302,086
Tonnage	3,425	2,723	1,798	1,938	2,396

(a) Year ended 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 18s. 10d., in 1929, and the tremendous drop to £141 19s. 1d. 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., and for 1933, £194 11s. 11d. per ton.

2. Sources of Production.—(i) *New South Wales.* The production in 1932 was estimated at 793 tons of ingots valued at £120,124. The increase over the previous year's total was due to the rise in price of tin from £118 in 1931 to £136 in 1932. 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 1932 being 272 tons, valued at £27,842. The Tingha area was the principal contributor to the output in 1932, the yield from this district comprising 346 tons of concentrates, of which 150 tons were obtained by dredging. Amongst other areas, Emmaville produced 209 tons, Ardlathan 135 tons, while the lode mines at Torrington returned a yield of 80 tons.

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

(iii) *Queensland.* The chief producing districts in Queensland during 1932 were Herberton, 426 tons, valued at £39,354; Cooktown, 40 tons, £3,847; Stanthorpe, 122 tons, £12,681; Chillagoe, 65 tons, £5,332; and Kangaroo Hills, 48 tons, £4,443. The total production, 708 tons, £66,174, showed a considerable advance on that for 1931 which was the lowest recorded, but it is far below that of 1929 and most of the earlier years.

(iv) *Western Australia.* The export of tin from the State in 1932 amounted to 37 tons, valued at £3,295. The small quantity won during the year was obtained in the Pilbara and Greenbushes fields.

(v) *Tasmania.* For 1932 the output amounted to 794 tons of metallic tin, valued at £109,767, an increase of 200 tons in quantity and £39,000 in value over the return for the previous year. Operations at Mount Bischoff, the principal producer, were mainly carried on by the tributers.

(vi) *Northern Territory.* The Maranboy field was the chief contributor to the small output of tin in 1932. Owing to the low price of the metal, however, the battery on the field operated for one month only, as many of the claim holders preferred to retain ore raised until the market improved. Small quantities were raised also at Hayes Creek 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.

1928.	1929.	1930.	1931.	1932.
Tons. 178,000	Tons. 190,600	Tons. 173,100	Tons. 147,900	Tons. 94,000

The comparatively small total for the year 1932 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 1932 were as follow :—

TIN.—PRODUCTION, CHIEF COUNTRIES, 1932.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Malaya	28,400	Burma	2,900
Bolivia	20,600	Australia	2,000
Netherlands East Indies	14,900	Great Britain	1,300
Siam	9,300	Indo-China	1,000
China	6,800	Spain and Portugal	700
Nigeria	4,100	Union of South Africa	600

Australia's share of the world's tin production, estimated at 94,000 tons, would appear therefore to be a little over 2 per cent.

The world's production of tin in 1932 was the lowest recorded since 1907, and reflects the increased severity of restriction in countries where the output was under the control of the International Tin Committee.

4. **Prices.**—The average price of the metal in the London market for the years 1928 to 1933 was as follows :—

TIN.—PRICES, LONDON.

Year.	Average Price Per Ton.	Year.	Average Price per Ton.
	£ s. d.		£ s. d.
1928	227 4 8	1931	118 9 1
1929	203 18 10	1932	135 18 10
1930	141 19 1	1933	194 11 11

For January, 1932, the average London price was £140 5s. 7d., but as the year proceeded, tin dealing tended to become increasingly concentrated in London and Singapore, and the sterling price rather than the gold price ruled quotations. Prices fell till April, then fluctuated more or less rapidly till August, when the average rose to £142 2s. 5d., and reached their highest for the year in November, when the figure stood at £153 13s. 4d. On September 7th and for some little time thereafter as much as £160 per ton was paid, but as pointed out in the preceding sentence the average monthly quotation reached its peak in November. For the year 1932, the average London price was returned at £135 18s. 10d., while that for 1933 showed an increase to £194 11s. 11d.

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.
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
1932	1,201	27	597	41	870	27	2,763

(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 1932 the zinc concentrates produced amounted to 188,038 tons, valued at £155,928. 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 1928 to 1932 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 1932 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 1932 amounted to 53,200 tons of slab zinc valued at £948,396, and 158 tons of cadmium, valued at £22,164. There was no production from local ores. Provision has been made for the treatment of the zinc-lead deposits in the Mount Read-Rosebery districts, but operations have been delayed pending an improvement in price of the metals concerned.

2. **World's Production.**—According to *The Mineral Industry* the world's production of zinc during the five years 1928–32 was as follows :—

ZINC.—WORLD'S PRODUCTION.

1928.	1929.	1930.	1931.	1932.
Tons. 1,399,000	Tons. 1,447,000	Tons. 1,391,000	Tons. 994,000	Tons. 781,000

The yields from the chief producing countries in 1932 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 1932 from a combination of low prices and reduced demand. Production was also curtailed through the operation of the zinc cartel.

ZINC.—PRODUCTION, CHIEF COUNTRIES, 1932.

Country.		Production.	Country.		Production.
		Tons.			Tons.
United States	.. ..	190,700	Mexico	.. ..	29,900
Belgium	.. ..	97,400	Great Britain	.. ..	26,900
Australia	.. ..	84,700	Japan	.. ..	24,400
Poland (a)	.. ..	83,600	Italy	.. ..	17,300
Canada	.. ..	69,100	Netherlands	.. ..	15,400
France	.. ..	48,600	Soviet Union	.. ..	13,800
Norway	.. ..	41,900	Spain	.. ..	9,400
Germany	.. ..	41,300	Czechoslovakia	.. ..	6,600

(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 § 4.4. *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, therefore, represent the total production of pig iron in New South Wales, since a considerable quantity of ore raised in South Australia, and credited to the mineral returns of that State, is treated in New South Wales. 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 1932 the iron oxide raised amounted to 3,065 tons, valued at £1,668.

(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, but there was a rise to 537,928 tons valued at £618,617 in 1932.

(iii) *Tasmania*. In 1931 about 500 tons of iron pyrites valued at £250 were produced, the last recorded previous production being for the year 1923, when nearly 12,000 tons valued at £27,000 were raised. For 1932, the output was returned at 274 tons, valued at £150. Apart from this pyritic ore there has been no production of iron ore since the year 1908.

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

3. Iron and Steel Bounties.—During the year 1932–33 the bounties paid under the Iron and Steel Products Bounty Act on articles manufactured from locally produced materials were as follow :—wire-netting, £8,947; traction engines, £894.

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.		
	1930.	1931.	1932.	1930.	1931.	1932.
	Thousands of Tons.			Thousands of Tons.		
United States	31,752	18,426	8,781	40,699	25,429	13,681
Germany	9,694	6,063	3,933	11,539	8,291	5,751
France	10,100	8,217	5,549	9,402	7,809	5,604
Saar Territory	1,884	1,515	1,349	1,935	1,538	1,463
Belgium	3,403	3,231	2,783	3,370	3,056	2,758
Luxemburg	2,473	2,053	1,959	2,269	2,027	1,956
Austria	287	145	94	468	322	205
Italy	534	509	461	1,774	1,453	1,391
Spain	650	476	288	850	604	455
Czechoslovakia	1,572	1,165	450	1,984	1,526	685
Poland	478	347	199	1,237	1,037	551
Sweden	457	389	262	629	551	537
Soviet Union	4,969	4,900	6,370	5,552	5,400	5,800
China	400	252	200	200	30	25
Japan	1,630	1,408	1,542	1,750	1,864	2,360
United Kingdom	6,197	3,773	3,573	7,298	5,203	5,257
India	891	820	699	581	626	602
Canada	814	420	144	1,012	672	343
Australia	440	129	228	420	143	255
Total—All Countries	79,360	54,795	39,333	93,430	68,031	50,029

In regard to both iron and steel the figures for world production reached a distressingly low ebb in 1932. According to the annual review published by "The Iron Age" on the 5th January, 1933, in the four years 1929 to 1932 the industry fell from prosperity to impoverishment, from virtually full employment to widespread unemployment, and from more or less generous profits to staggering losses. The output of pig iron fell from 96 million tons in 1929 to 39 million tons in 1932, while during the same period steel declined from 118 million to 50 million tons.

(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.	
1923 ..	330	200	1928 ..	420	439
1924 ..	416	306	1929 ..	333	348
1925 ..	439	351	1930 ..	440	429
1926 ..	450	360	1931 ..	129	143
1927 ..	410	420	1932 ..	228	255

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. About 2,000 lb. of mercury sulphide valued at £754 was produced in 1932 in the Kilkivan district in Queensland. It is stated that with the cessation of production of this metal in New Zealand in 1931, the Kilkivan area is the sole producer of mercury in the British Empire.

§ 10. Coal.

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

COAL.—PRODUCTION.

Year.	N.S.W.	Victoria. (a)	Q'land.	S. Aust.	W. Aust.	Tasmania.	Australia.
QUANTITY.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1913 ..	10,414,165	593,912	1,037,944	..	313,818	55,043	12,414,882
1921 ..	10,793,387	514,859	954,763	..	468,817	66,476	12,798,302
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	793,487	1,094,676	..	501,425	138,716	9,531,359
1931 ..	6,432,382	571,342	841,308	..	432,400	123,828	8,401,260
1932 ..	6,784,222	432,253	841,711	..	415,719	111,853	8,585,758
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
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
1932 ..	4,376,453	274,903	684,555	..	270,630	86,733	5,693,274

(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	1929 ..	1,741,176	178,052
1921 ..	79,224	31,074	1930 ..	1,831,507	173,713
1926 ..	957,935	188,899	1931 ..	2,194,453	251,511
1928 ..	1,591,858	202,393	1932 ..	2,612,512	274,903

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

The coal from the various districts differs considerably in quality—that from the Northern district being especially suitable for gas-making and household purposes, while the product of the Southern (Illawarra) and Western (Lithgow) is an excellent steaming coal. At the present time the Greta coal seams 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 1928 to 1932 :—

COAL.—PRODUCTION IN DISTRICTS, NEW SOUTH WALES.

District.	1928.	1929.	1930.	1931.	1932.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	5,978,480	3,019,693	3,715,805	4,161,798	4,398,253
Southern	1,817,225	2,339,837	1,529,674	981,964	1,112,686
Western	1,652,492	2,258,206	1,847,576	1,288,620	1,273,283
Total	9,448,197	7,617,736	7,093,055	6,432,382	6,784,222

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. Although there was a small increase in tonnage in 1932, the value showed a decrease of nearly £231,000 on the figures for 1931. Of the total quantity of coal won in New South Wales since the inception of operations to the end of the year 1932, viz., 370 million tons, about 252 millions or 68 per cent. was obtained in the Northern District, 77 million tons or 21 per cent. came from the Southern District, and 41 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.	£
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
1932	359,011	73,342	432,353	274,903

Amongst "other coal mines" in 1932, the principal producers were the Sunbeam Colliery at Korumburra with 24,000 tons, and the Kilcunda Coal Mining Co. at Kilcunda with 18,000 tons.

(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 1932 amounted to 2,568,000 tons.

(2) *Production of Briquettes.* The briquetting plant started operations in November, 1924, and the output for the year 1932-33 was 308,000 tons, a decrease of about 14,000 tons on the total for the preceding year. Greater expansion in 1933 was restricted by decreased spending power of consumers, the free distribution of 86,000 tons of firewood by the Sustenance Department, and the competition of imported black coal. 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 1932 was as follows :—

COAL PRODUCTION.—QUEENSLAND, 1932.

District.	1932.	District.	1932.
	Tons.		Tons.
Ipswich	436,684	Clermont	48,929
Darling Downs	71,801	Bowen	152,937
Wide Bay and Maryborough	64,765	Mount Mulligan (Chillagoe)	18,640
Rockhampton (Central) ..	47,955		
		Total	841,711

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 48 collieries operating in the Ipswich district, 6 in the Darling Downs, 8 in the Maryborough area, 4 in Clermont district, 4 in Rockhampton district, 1 in Chillagoe district, 1 at Mount Morgan, 1 at Mackay, and 2 in the Bowen district. State coal mines are in operation at Collinsville in the Bowen field, at Styx in the Central area, and at Mount Mulligan.

(iv) *South Australia.* So far no coal has been worked in South Australia (*see* Official Year Book No. 22, page 786). Prospecting for lignite in 1932 was restricted to further exploration of the seams in the Inkerman and Balaclava areas.

(v) *Western Australia.* The production from the six collieries operating on the Collie field amounted in 1932 to 416,000 tons, a decrease of about 17,000 tons on the return for 1931. The deposits at Wilga again remained unworked during the year.

(vi) *Tasmania.* The production in 1932 amounted to 111,900 tons, about 12,000 tons less than the total for 1931. About 56,000 tons of the total output in 1932 were contributed by the Cornwall Coal Company, 28,000 tons by the Mt. Nicholas Proprietary and 16,000 tons by the Jubilee Company. About 1,700 tons were raised by the Excelsior Colliery at Avoca, and an output of 1,050 tons was returned at the Fingal Colliery.

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

3. Production in Various Countries.—The total known coal production of the world in 1932 amounted to about 1,110 million tons, towards which Australia contributed about 11 million tons, or 1 per cent. The following tables show the production of the chief British and foreign countries during each of the last four years where the returns are available:—

COAL PRODUCTION.—BRITISH EMPIRE.

Year.	Great Britain.	British India.	Canada.	Australia.	New Zealand.	Union of S. Africa.
BLACK COAL.						
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
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
1932	208,733,000	20,153,000	7,386,000	8,586,000	928,200	9,764,400
BROWN COAL, LIGNITE.						
1929	320	..	3,542,900	1,741,200	1,168,700	..
1930 .. ..	..	..	3,083,100	1,831,500	1,159,200	..
1931 .. ..	..	..	2,598,700	2,194,500	1,178,100	..
1932 .. ..	..	..	3,080,700	2,612,500	913,700	..

COAL PRODUCTION.—FOREIGN COUNTRIES.

Year.	Germany.	Austria.	Hungary.	Belgium.	France. (b)	Czechoslovakia.	Yugoslavia.
BLACK COAL.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
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
1932	103,086,300	217,800	880,700	21,075,000	45,536,000	13,034,000	(e) 3,480,500
	Poland.	Netherlands.	Soviet Union.	Japan.	China. (c)	United States.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
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	479,381,900	
1931	37,661,000	12,697,600	56,804,500	27,545,300	27,245,000	394,406,300	
1932	28,379,200	12,555,000	64,770,000	25,669,800	(d)	317,417,000	
BROWN COAL, LIGNITE.							
Year.	Germany.	Austria.	Hungary.	Belgium.	France.	Czechoslovakia.	Yugoslavia.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
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
1932	120,709,600	3,055,000	5,837,800	..	975,700	16,792,000	(f) 1,097,500
	Poland.	Netherlands.	Soviet Union.	Japan.	China.	United States.	
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	
1929	73,100	154,100	(a)	137,000	..	(a)	
1930	54,000	141,900	(a)	126,600	..	(a)	
1931	38,800	120,300	(a)	115,900	..	(a)	
1932	32,900	122,000	..	(d)	..	(a)	

(a) Included with black coal. (b) Exclusive of Saar District, which produced 13,364,900 tons in 1929; 13,026,700 tons in 1930; 11,187,500 tons in 1931; and 10,273,200 in 1932. (c) Includes about 300,000 tons of lignite yearly. (d) Not available. (e) Includes brown coal. (f) Lignite.

The figures, generally speaking, show a considerable decline in production, particularly as regards the more important countries. Several factors are responsible for the falling off, i.e., the practically world wide depression in industry, the increasing use of oil fuel instead of coal, and the wider application of electricity for power, fuel, and lighting.

4. 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 1932-33 was 283,000 tons, valued at £282,000. With the exception of 8 tons from Victoria the whole export was shipped by New South Wales. The quantity and value of the overseas 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	1929-30 ..	294,503	346,916
1921-22 ..	1,028,767	1,099,899	1930-31 ..	387,851	411,612
1927-28 ..	555,617	690,995	1931-32 ..	344,015	341,800
1928-29 ..	346,658	428,754	1932-33 ..	282,977	281,512

(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	1929-30 ..	507,349	742,383
1921-22 ..	1,498,035	2,178,101	1930-31 ..	509,303	607,537
1927-28 ..	950,708	1,300,832	1931-32 ..	506,140	534,897
1928-29 ..	739,713	1,009,163	1932-33 ..	562,442	550,277

(a) Calendar Year.

(ii) *New South Wales*. The overseas and interstate coal exports from New South Wales in 1932 amounted to 2,294,000 tons, valued at £2,184,000, of which 1,502,000 tons, valued at £1,414,000, went to Australasian ports.

About 87 per cent. of the total, or 1,991,000 tons, were shipped from the port of Newcastle. Victoria took 832,000 tons, South Australia 416,000 tons, other Australian States 187,000 tons, New Zealand 147,000 tons, while 112,000 tons went to the United Kingdom, 31,000 tons to India, 35,000 tons to Java, 54,000 tons to Philippine Islands, about 36,000 tons to Straits Settlements, 13,000 tons to Canada, 20,000 tons to Fiji, 17,000 tons to Nauru, and 13,000 tons to China. The figures quoted include bunker coal.

During the year 1932 the exports from Port Kembla, Bulli and Bellambi to other States amounted to 60,000 tons, while 3,900 tons were sent to Malaya (British) and about 38,000 tons to New Caledonia. The coal shipped from Sydney, amounting to 8,700 tons, went principally to New Guinea, Papua, the New Hebrides, and other Pacific Islands. For the twelve months ended 30th June, 1932, about 33,000 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.	
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	1,460,939		802,760		4,169,583		6,432,382	
1932	1,501,598		792,750		4,489,874		6,784,222	

For the period of five years shown in the table above, 20 per cent. of the total output was exported to other States, 11 per cent. was sent overseas, and 69 per cent. was consumed locally.

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

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

COAL.—CONSUMPTION, AUSTRALIA.

Year.	Quantity of Coal Consumed.		
	Home Produce.	Produce of Other Countries.	Total.
	Tons.	Tons.	Tons.
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
1932	10,366,300	4,674	10,370,974

The bunker coal taken away in 1932 was estimated at 534,000 tons. Figures for brown coal produced in Victoria are included in the total for home produce, the amounts so included being 2,194,000 tons in 1931, and 2,613,000 tons in 1932. With the exception of a few tons the whole of the oversea imports in 1932, which amounted to 4,674 tons, came from the United Kingdom.

6. **Prices.**—(i) *New South Wales.* The price of New South Wales coal depends on the district from which it is obtained, the northern district coal generally realizing a 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.
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
1932	13 8	12 5	10 8	12 11

(ii) *Victoria*. In Victoria the average price of coal at the pit's mouth in 1928 was 22s. 2d.; in 1929, 23s. 1d.; in 1930, 23s.; in 1931, 12s. 8d., and in 1932, 12s. 9d. per ton. These averages are exclusive of brown coal, the production of which in 1932, when valued at the cost of production, amounted to 2s. 4d. 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.				
	1928.	1929.	1930.	1931.	1932.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich	16 11	16 10	16 7	15 8	15 2
Darling Downs	19 5	19 5	19 5	18 6	18 4
Wide Bay and Maryborough	23 8	23 2	23 0	22 10	22 10
Rockhampton	23 3	22 11	20 5	16 8	17 6
Clermont	14 1	12 2	14 3	14 7	14 0
Bowen	15 2	15 4	15 5	15 1	14 9
Mount Mulligan (Chillagoe)	31 11	31 9	29 9	28 10	27 1
Average for State ..	18 0	17 6	17 5	16 8	16 3

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 1928, 15s. 11d.; in 1929, 15s. 8d.; in 1930, 15s. 9d.; in 1931, 15s. 7d.; and in 1932, 13s. 0d. per ton.

(v) *Tasmania*. The average price per ton of coal at the pit's mouth in Tasmania for the five years 1928 to 1932 was :—In 1928, 16s. 7d.; in 1929, 16s. 3d.; in 1930, 15s. 11d.; in 1931, 15s. 10d.; and in 1932, 15s. 6d. per ton.

7. Prices in the United Kingdom.—During the five years 1928 to 1932 the average selling value of coal at the pit's mouth in the United Kingdom was :—In 1928, 12s. 10d.; in 1929, 13s. 5d.; in 1930, 13s. 7d.; in 1931, 13s. 6d.; and in 1932, 13s. 3d. per ton.

8. Employment and Accidents in Coal Mining.—(i) *Australia*. The number of persons employed in coal mining, both above and below ground, in each of the States during the year 1932 is shown below. The table also gives the number of persons killed and injured, with the proportion per 1,000 employed, and in relation to the quantity of coal raised, this being a factor which must be reckoned with in any consideration of the degree of risk attending mining operations. A further table gives the rate of fatalities during the last five years.

COAL MINING.—EMPLOYMENT AND ACCIDENTS, 1932.

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 ..	14,275	13	68	0.91	4.76	521,900	99,600
Victoria	1,944	..	5	..	2.57	..	609,000
Queensland	2,392	1	129	4.18	53.89	841,700	6,500
Western Australia ..	604	..	124	..	205.13	..	3,400
Tasmania	381	..	2	..	5.25	..	55,900
Total	19,596	14	328	0.71	16.74	728,400	34,100

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 1928-32 :—

COAL MINING.—FATALITIES, 1928 TO 1932.

State.	Average No. of Coal Miners.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales	16,522	12	0.73
Victoria	2,168	2	0.92
Queensland	2,594	3	1.16
Western Australia	782	1	1.28
Tasmania	371	1	2.70
Total	22,437	19	0.85

(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 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; Union of South Africa, 3.4; Germany, 2.3; Spain, 1.8; Poland, 1.7; Belgium, 1.1; and France, 1.0. In comparing these rates, allowance must be made for the circumstance that the methods of calculation are not identical in all countries.

§ 11. Coke.

Notwithstanding the large deposits of excellent coal in Australia, there was, prior to the war, a fairly considerable amount of coke imported from abroad. During recent years, however, a high standard of excellence has been attained in the local product, and the necessity for import has to a large extent disappeared. For the year 1932-33 the coke imported amounted to 437 tons, of which 185 tons were obtained from the United Kingdom and 252 tons from Germany.

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

COKE.—PRODUCTION, NEW SOUTH WALES.

Items.	1928.	1929.	1930.	1931.	1932.
Quantity .. tons	520,201	464,360	367,772	217,509	356,495
Value, total .. £	852,739	757,580	589,343	297,318	403,177
Value, per ton	32s. 9d.	32s. 8d.	32s. 1d.	27s. 4d.	22s. 7d.

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, amounting to 709,000 tons valued at £1,131,000, was the highest recorded. The prevailing slackness of trade is reflected in the dwindling returns for the last few years.

A small quantity of coke is made in Queensland, the quantity returned in 1932 being 1,933 tons, valued at £3,414. The following table shows the amount manufactured locally during the last five years :—

COKE.—PRODUCTION, QUEENSLAND.

Year.	1928.	1929.	1930.	1931.	1932.
Quantity .. tons	4,058	4,079	3,444	2,280	1,933

About 29,000 tons of coke were purchased from the southern States during the year 1932 for consumption at the ore treatment works at Mount Isa and Chillagoe. It is hoped, however, that in the near future the whole of the local market will be supplied from coke ovens which are being erected 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.

Negotiations are in progress between the governments of the Commonwealth and of New South Wales with the object of evolving a plan for the development of the oil shale deposits at Newnes. In the event of successful operation it is proposed to supply the needs of the naval and military authorities for crude oil and petrol, and to distribute any surplus products through the Commonwealth Oil Refineries.

The total recorded production of shale in 1932 was 2,691 tons, valued at £2,372.

About 79,000 gallons of crude oil were produced in 1932 from shale treated in Tasmania, while the total quantity of oil distilled from shale up to the end of 1932 was set down at 262,000 gallons. An amalgamation of interests was effected in 1931, the individuals and companies concerned now operating under the name of the Tasmanite Shale Oil Company.

Great hopes were at one time entertained in regard to the petroliferous area in Queensland, but while gas and light to medium gravity oils have been found at Roma, and gas and oily wax at Longreach, structural conditions for accumulations on a commercial scale have not yet been located in the drilled areas.

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 1932 by the Freney Kimberley Oil Company, but results were indeterminate. Surface explorations were also carried out in the Wooramel, North Western, and South Coastal areas.

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

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 1932.

§ 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 1932 in New South Wales was estimated at 251 carats, valued at £252, while the total production to the end of 1932 is given at 204,000 carats, valued at £147,000. The yield in 1932 was obtained mainly at Howell and Copeton in the Tingha division. Ninety carats were won from a site in the Bingara division.

2. **Sapphires.**—The production of sapphires in New South Wales during 1929 was returned as 65 ozs., valued at £450, obtained wholly at Sapphire in the Inverell division, but no output was recorded in the period 1930–32. Production during recent years was restricted owing to the unfavourable market.

In Queensland, gems to the value of £1,981 were purchased on the Anakie sapphire fields in 1932, but the prices obtainable were not sufficiently high to encourage intensive prospecting. Production has declined very considerably since 1920, when the yield was valued at £66,000.

3. **Precious Opals.**—The estimated value of the opal won in New South Wales during the year 1932 was £1,233, obtained on the Lightning Ridge, White Cliffs and Grawin fields. The figures quoted, however, do not represent the total output, as in many instances miners, buyers, and collectors leave the fields before a record of their production or purchases can be secured. Some very fine stones are at times obtained, one weighing 5 ozs. and valued at £300 being 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 £1,601,000, 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 1932 was estimated at £500, and up to the end of that year at about £187,000. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. Production during recent years has been limited by the paucity of demand. The greatest recorded output was for the year 1895 when the yield was valued at £32,750.

Owing to the poor market for gems, production from the Coober Pedy opal field situated in the Stuart Range in South Australia, fell from £11,056 in 1929 to £3,127 in 1931, and £3,060 in 1932. 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 quantity of the gem was obtained during the year on the new field near Mount Johns, about 130 miles west of Oodnadatta. The greatest yield for the State in any one year was obtained in 1920 when the value of production was returned at £24,000.

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

4. **Other Gems.**—Various other gems and precious stones have from time to time been discovered in the different States, the list including agates, amethysts, beryls, chialtolite, 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 and 1932.

§ 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 1932 the number so employed was as follows:—

NUMBER OF PERSONS ENGAGED IN MINING, 1932.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead, and Zinc.	Copper.	Tin.	Coal.	Other.	
New South Wales	8,154	3,145	3	1,201	14,275	930	27,708
Victoria	6,089	..	..	27	1,944	45	8,105
Queensland	3,893	443	278	597	2,392	410	8,013
South Australia	142	1	51	..	..	337	531
Western Australia	7,983	16	..	41	604	51	8,695
Tasmania	250	932	1,518	870	381	654	4,605
Northern Territory	89	1	3	27	..	67	187
Australia	26,600	4,538	1,853	2,763	19,596	2,494	57,844

Included in the figures for "other" in South Australia were 81 engaged in mining iron ore, 34 gypsum miners, 77 salt gatherers, and 80 opal miners. The Tasmanian figures include 242 osmiridium miners and 306 miscellaneous miners in the non-metallic group, and those for the Northern Territory, 55 mica miners and 10 wolfram miners.

The following table shows the number of persons engaged in mining in each State during each of the years 1901, 1911, 1921, 1929 to 1932, 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 Popu- lation.	Miners employed.	No. per 100,000 of Popu- lation.	Miners employed.	No. per 100,000 of Popu- lation.
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.	1929.		1930.		1931.		1932.	
	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 ..	22,893	915	27,512	1,086	30,682	1,200	27,708	1,074
Victoria ..	3,231	183	3,255	182	6,463	359	8,105	448
Queensland ..	5,069	565	5,531	608	6,753	730	8,013	856
South Australia ..	610	108	565	99	518	90	531	92
Western Australia ..	5,159	1,226	5,442	1,268	7,147	1,653	8,695	1,998
Tasmania ..	3,603	1,655	3,280	1,485	3,397	1,512	4,605	2,028
Northern Territory ..	153	3,478	173	3,468	145	2,918	187	3,795
Australia ..	40,727	637	45,761	708	55,105	844	57,844	879

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 for the last three years, attributable mainly to the larger numbers engaged in the search for gold, particularly in New South Wales, Victoria, Queensland, and Western Australia. These increases, however, were offset by decreases in respect of other minerals, especially coal for which the employment figures fell from 23,000 in 1930 to about 20,000 in 1932.

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

3. **Accidents in Mining, 1932.**—The following table gives particulars of the number of men killed and injured in mining accidents during the year 1932 :—

MINING ACCIDENTS, 1932.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED.								
Coal ..	13	..	1	..	..	..	..	14
Copper ..	..	..	..	..	..	1	..	1
Gold ..	2	2	3	..	16	1	..	24
Silver, lead, and zinc ..	8	..	2	..	..	1	..	11
Tin ..	2	..	..	..	..	1	..	3
Other minerals	2	..	..	..	..	..	..	2
Total ..	27	2	6	..	16	4	..	55
INJURED.								
Coal ..	68	5	129	..	124	2	..	328
Copper ..	..	..	9	1	..	43	..	53
Gold ..	5	4	26	..	254	..	..	289
Silver, lead, and zinc ..	18	..	24	..	..	12	..	54
Tin ..	..	..	3	..	..	7	..	10
Other minerals	2	..	..	1	..	3	..	6
Total ..	93	9	191	2	378	67	..	740

§ 16. Government Aid to Mining.

1. *Commonwealth.*—Assistance to mining may be 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 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.

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.

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 1926–1927* 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* provided 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 Argentina in 1930 to study oil-field conditions on the spot, and submitted a comprehensive report, which was published as a Parliamentary Paper in 1931.

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

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 under normal conditions is in the direction of assistance to prospectors, but there were no appropriations from the Prospecting Vote for the year 1932–33, all claims being met from Unemployment Relief Funds. Advances are also made for the purpose of assisting in the erection of crushing batteries or reduction plants, the expenditure in 1932 under this heading amounting to £2,915. Aid is granted on a footage basis to sink, drive, etc., on approved sites to which a valid mining title is held, the actual expenditure in respect of work completed during the year aggregating £5,852. Loans to the amount of £2,915 were also approved for the purpose of assisting in the erection of mining plant and machinery. Claims for rewards to an amount of £250 were paid in connexion with the discovery of new mineral fields.

3. **Victoria.**—During the year 1932 expenditure in connexion with mining amounted to £43,123, of which £17,353 consisted of advances to prospectors, while advances to miners amounted to £13,956, aid to boring, £1,220, and assistance to batteries, £7,980. The total includes also expenses amounting to £1,907 on account of geological surveys.

4. **Queensland.**—State assistance to the mining industry in 1932 amounted to £10,575, of which £9,070 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. In addition a sum of £25,000 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, but the State Works for the treatment of tin at Irvinebank which had been leased to a co-operative party were, after a period of idleness, put into commission by the Mines Department.

5. **South Australia.**—Aid is given to the mining industry under the terms of the *Mining Act* of 1893, and previous measures. Up to the end of 1932 the total amount of subsidy paid was £70,815, of which £13,681 has been repaid, and £4,549 written off, leaving a debit of £52,585. Portion of this amount is represented by machinery that has fallen into the hands of the Government. Repayments must be provided from profits, but in only two instances have the profits enabled a full return to be made. The State maintains batteries and cyanide works at Mount Torrens, Peterborough, Mongolata, and Tarcoola, and assays for public purposes are made at the School of Mines. Advances to prospectors in 1932 amounted to £1,450.

6. **Western Australia.**—Under the *Mining Development Act* of 1902 assistance was granted in 1932 in accordance with the subjoined statement:—Advances in aid of mining work and equipment of mines with machinery, £70; aid to prospectors, £8,772; subsidies on stone crushed for the public, £851; Total, £9,693. Other assistance granted from the vote on various matters during the year amounted to £14,396, principally in connexion with prospecting for gold.

In 1932 there were 25 State batteries in operation. The amount expended thereon up to the end of 1932 was £91,981 from revenue and £331,534 from loan, giving a total of £423,515. The working expenditure up to the end of 1932 exceeded the revenue by £171,776. The total value of gold and tin recovered to the end of 1932 at the State plants was £6,815,313. 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 1932 amounted to £4,691, of which £906 was expended under Part III. of the *Aid to Mining Act* 1927, on drilling and boring, and £3,112 represented assistance and sustenance to prospectors under Part II., the balance being expended on miscellaneous assistance under Parts III. and IV. of the Act, exclusive of a sum of £673 expended in connexion with Unemployment Relief Acts. The amount received from ore sales was £1,557, the bulk of which was paid to tributers. Receipts amounted to £146.

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

8. **Northern Territory.**—During the year 1932-33 assistance was granted to approved prospectors at the rate of £1 per week per man for rations with loan of prospecting tools not exceeding £2 in value to each prospector. The total assistance granted during the year amounted to £2,874.

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 1928 to 1932 were as follow :—

REFINED METALS PRODUCED IN AUSTRALIA.

Metal.		1928.	1929.	1930.	1931.	1932.
Silver	ozs.	8,053,251	9,229,514	9,002,705	7,349,794	6,499,405
Lead, pig	tons	155,076	176,820	168,291	133,306	134,499
Zinc	"	50,223	51,872	54,901	53,832	53,200
Copper	"	11,858	10,874	14,900	12,936	13,307
Tin	"	3,133	2,260	1,544	1,690	1,958

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 1928 to 1932 are given in the following table :—

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

Metal.	Contained in—	1928.	1929.	1930.	1931.	1932.	
Silver	ozs. {	Lead-Silver-Gold Bullion	..	44,677	44,777	1,018,359	2,470,807
		Lead Concentrates and Ores	117,846	31,121	179,185	303,307	..
		Zinc Concentrates and Ores	1,453,396	604,014	558,577	183,111	23,366
		Copper and Gold Ores ..	..	..	..	..	..
	Total	1,571,242	679,812	782,539	1,504,777	2,494,173	
Lead	tons {	Lead-Silver-Gold Bullion	..	689	252	17,130	51,857
		Lead Concentrates and Ores	2,221	878	12,986	10,982	..
		Zinc Concentrates and Ores	12,726	5,704	9,482	1,878	1,159
		Total	14,947	7,271	22,720	29,990	53,016
Zinc	tons {	Lead Concentrates and Ores	77	21	396	557	..
		Zinc Concentrates and Ores	117,858	69,958	86,761	41,917	31,542
		Total	117,935	69,979	87,157	42,474	31,542
Copper	tons	Ores, Matte, etc. ..	1,989	2,737	3,277	2,765	1,099
Tin	tons	Concentrates and Ores ..	..	4	..	17	101

§ 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 1932-33:—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1932-33.

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 ..	17,637	..	..	17,637	..	..	..	..
Silver and Silver-lead ..	9,094	..	..	8,714	380	..	..	..
Iron ..	275,140	..	..	..	..	275,140	..	..
Wolfram ..	650	26	620	..	4	..	..	..
Concentrates—								
Silver and Silver-lead ..	194,766	..	..	180,606	14,160	..	..	..
Zinc ..	1,356,198	554,410	..	..	..	751,726	(a)	50,062
Cadmium—Blocks, Ingots, etc. ..	4,402	2,560	..	..	1,217	185	(d)	440
Copper—								
Matte ..	37,512	..	..	37,512	..	..	..	..
Ingot ..	130,638	122,773	..	7,500	..	..	185	180
Tin—Ingot ..	19,571	16,200	1,600	..	..	..	1,715	56
Lead—								
Pig ..	3,634,202	3,211,663	..	70,625	286,712	26,580	15,382	(b) 21,240
Zinc—Bars, Blocks, etc. ..	699,378	372,069	..	10,000	15,005	178,979	(c)	123,325
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.
Platinum, Osmium, etc. ..	(f) 664	621	..	..	..	..	43	..
Gold—								
Bar, Dust, etc. ..	956,282	950,800	5,476	..	..	..	6	..
Silver—								
Bar, Ingot, etc. ..	6,253,331	5,773,101	..	..	..	..	1,313	(e) 478,917
VALUE.								
Ores—	£	£	£	£	£	£	£	£
Copper ..	5,750	..	..	5,750	..	..	..	..
Silver and Silver-lead ..	4,424	..	..	4,329	95	..	..	..
Iron ..	7,908	..	..	..	..	7,908	..	..
Wolfram ..	1,976	50	1,921	..	5	..	..	..
Concentrates—								
Silver and Silver-lead ..	94,028	..	..	86,312	7,716	..	..	..
Zinc ..	179,200	44,403	..	..	..	125,211	..	9,586
Cadmium—Blocks, Ingots, etc. ..	37,083	20,639	..	..	10,685	1,325	..	4,434
Copper—								
Matte ..	18,892	..	..	18,892	..	..	..	..
Ingot ..	229,713	215,819	..	13,135	..	..	450	309
Tin—Ingot ..	189,723	156,063	15,324	..	..	..	17,933	403
Lead—								
Pig ..	2,384,056	2,139,714	..	40,202	155,736	20,850	11,871	15,683
Zinc—Bars, Blocks, etc. ..	578,448	304,276	..	10,000	10,688	148,012	..	105,472
Platinum, Osmium, etc. ..	5,257	4,963	..	..	..	..	294	..
Gold—								
Bar, Dust, etc. ..	7,179,081	7,138,329	40,705	..	..	..	47	..
Silver—								
Bar, Ingot, etc. ..	633,477	584,168	..	..	..	..	147	49,162

(a) France. (b) Hong Kong, 15,904 cwt.; Norway, 4,000 cwt. (c) India, 122,924 cwt. (d) Sweden. (e) Ceylon, 375,358 oz.; India, 102,471 oz.; Fiji, 1,088 oz. (f) Mainly osmium exported from Tasmania, and platinum from New South Wales.