

CHAPTER XXI.

MINERAL INDUSTRY.

§ 1. The Mineral Wealth of Australia.

1. **Place of Mining in Australian Development.**—The value of production from the mineral industry is now considerably less than that returned by the agricultural or the pastoral industry, nevertheless it was the discovery of gold in payable quantities that first attracted population to Australia, and thus laid the foundation of its nationhood. Prior to 1851, the year when Hargraves' memorable discovery was made, coal and copper had both been mined to some extent, and the existence of deposits of other minerals, including gold, had been proved. But it was the news of the sensational finds of the precious metal in 1851 and the year immediately following that brought about a constant stream of immigration, and caused an increase in population from 405,000 at the end of 1850 to upwards of 1,146,000 at the end of 1860.

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. The presence of considerable deposits of valuable minerals has long been known. Thus, coal was discovered in 1797, and a shipload was exported to Bengal in 1799, silver was discovered as early as 1839, and was worked as early as 1864; copper mining dates back to 1844; lead to about 1848; iron to about 1850; while the discovery of gold in payable quantities dates back to 1851. Cobalt, nickel, manganese, chromium, tungsten, molybdenum, mercury, antimony, bismuth, zinc, cadmium, radio-active ores, etc., have all been found, some in fairly large quantities. During recent years osmiridium has figured largely in the Tasmanian returns.

Among the more valuable non-metalliferous substances other than coal may be mentioned coke, kerosene shale, graphite, alunite, asbestos, diatomaceous earth, phosphate, clays, ochres, etc.; in building stones—sandstones, syenites, granites, basalts, augite-andesite, porphyries, serpentines, slates, limestones, and marbles; in precious stones—diamonds, emeralds, rubies, sapphires, amethysts, precious opal, turquoise, topazes, garnets, chrysolites, cairngorm, agates, etc.

3. **Quantity and Value of Production during 1925.**—The quantities (where available) and the values of the principal minerals produced in each State, and in Australia as a whole during the year 1925, 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 § 18 hereinafter. It may be explained, therefore, that the item pig-iron in New South Wales refers only to metal produced from locally-raised ore and so reported to the Mines Department. New South Wales is, of course, in normal times, a large producer of iron and steel from ironstone mined in South Australia. As the table shows, the latter State receives credit for this ironstone in its mineral returns, but the iron and steel produced therefrom cannot be assigned to the mineral industry of New South Wales. Similarly lead, silver-lead, and zinc are credited in the form reported to the State of origin—chiefly New South Wales—although the actual metal extraction is carried out to a large extent elsewhere.

MINERAL PRODUCTION.—QUANTITIES, 1925.

Minerals.	Unit.	N.S.W.	Vic.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (d)	Australia.
Alunite ..	ton	531	..	..	..	..	..	..	531
Antimony ..	"	20	120	..	..	..	..	..	149
Arsenic ..	"	3,346	..	1,115	100	(c)	..	..	4,561
Asbestos ..	"	..	..	..	..	51	..	..	51
Barytes ..	"	200	..	..	2,008	..	..	..	2,211
Bismuth ..	cwt.	220	..	10	..	..	3	..	230
Brown Coal ..	ton	..	876,468	..	..	..	..	..	876,468
Chromite ..	"	963	..	..	..	..	..	..	963
Coal ..	"	11,396,199	534,246	1,177,173	..	437,461	81,608	..	13,626,777
Cobalt ..	"	..	..	90	..	..	..	..	90
Copper (ingot, matte, etc.) ..	"	478	..	3,909	570	..	6,539	..	11,496
Copper ore ..	"	..	..	..	..	1,201	..	4	1,205
Diatomaceous earth ..	"	701	..	..	..	..	..	..	701
Gold ..	fine oz.	10,422	47,296	46,406	832	441,252	3,524	456	559,185
Gypsum ..	ton	296	14,518	..	72,278	3,060	..	..	90,150
Iron (pig) (b) ..	"	95,530	..	..	..	..	..	..	95,530
Iron oxide ..	"	4,376	..	..	..	..	..	..	4,376
Ironstone ..	"	..	..	345	586,652	..	..	..	586,997
Kaolin ..	"	3,793	1,594	..	490	..	..	..	5,877
Lead ..	"	..	..	5,235	..	..	5,528	..	10,761
Lead and silver ore, concentrates, etc. ..	"	277,566	..	..	37	4,664	..	101	282,458
Limestone flux ..	"	135,115	..	82,571	114,870	..	124,670	..	457,226
Magnesite ..	"	14,012	91	267	351	..	..	..	14,721
Manganese ore ..	"	1,164	..	..	..	..	..	..	1,164
Molybdenite ..	cwt.	120	690	60	..	..	3,366	..	870
Osmiridium ..	oz.	..	..	..	742	..	..	..	3,366
Phosphate ..	ton	200	..	..	..	..	..	..	942
Pigments ..	"	276	307	..	87	..	..	..	670
Platinum ..	oz.	573	..	..	..	..	..	..	573
Salt ..	"	..	(a)	..	78,251	..	..	..	78,251
Sapphires ..	"	1,490	..	22,237	..	..	..	..	23,727
Shale (oil) ..	ton	..	..	..	..	..	820	..	820
Silver ..	fine oz.	46,544	2,082	385,489	1,458	81,226	730,194	..	1,246,993
Tin and tin ore ..	ton	957	69	1,012	..	108	1,130	110	3,386
Wolfram ..	"	7	..	51	..	..	174	..	186
Zinc ores and con- centrates ..	"	226,525	..	171	..	..	3,113	..	229,809

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

The values of the minerals raised in each State during 1925 are given in the following table:—

MINERAL PRODUCTION.—VALUE, 1925.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T. (e)	Australia.
	£	£	£	£	£	£	£	£
Alunite ..	2,124	..	..	..	..	..	..	2,124
Antimony ..	395	5,380	..	..	..	..	..	5,775
Arsenic ..	8,333	..	11,150	600	1,045	..	..	21,128
Asbestos ..	..	..	..	..	1,641	..	..	1,641
Barytes ..	400	..	79	6,024	..	16	..	6,440
Bismuth ..	2,950	..	..	..	..	..	..	3,029
Brown Coal ..	..	166,404	..	..	..	..	..	166,404
Chromite ..	2,670	..	..	..	..	..	..	2,670
Coal ..	9,302,515	596,117	1,037,956	..	363,203	70,424	..	11,370,215
Cobalt ..	..	..	18,014	..	..	..	..	18,014
Copper (ingot and matte) ..	30,215	..	254,074	35,878	..	436,661	..	756,828
Copper ore ..	..	..	..	..	18,200	..	15	18,215
Diamonds ..	240	..	..	..	..	..	..	240
Diatomaceous earth ..	1,084	..	..	..	..	..	..	1,084
Gold ..	82,498	200,958	197,118	3,535	1,874,320	15,041	1,939	2,375,499
Gypsum ..	724	11,291	..	63,242	4,118	..	..	79,375
Iron (pig) (b) ..	525,415	..	..	..	..	..	..	525,415
Iron oxide ..	2,436	..	..	..	..	..	..	2,436
Ironstone ..	..	..	345	674,649	..	..	..	674,994
Kaolin ..	3,793	2,262	..	559	..	..	..	6,614
Lead ..	..	..	187,681	..	..	197,452	..	385,133
Lead and silver- lead ore, concen- trates, etc. ..	5,314,977	..	..	1,455	103,300	..	617	5,420,349

For notes see next page.

MINERAL PRODUCTION—VALUE, 1925—*continued.*

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N. T. (e)	Australia.
	£	£	£	£	£	£	£	£
Limestone flux ..	33,779	..	38,091	43,076	..	124,670	..	239,616
Magnesite ..	12,832	273	267	878	..	..	..	14,250
Manganese ore ..	3,635	..	..	..	..	..	..	3,635
Molybdenite ..	1,648	5,545	271	..	..	..	..	7,464
Opal ..	10,030	..	1,000	9,070	..	..	..	20,100
Osmiridium ..	..	..	..	..	..	103,570	..	103,570
Phosphate ..	337	..	..	1,142	..	..	..	1,479
Pigments ..	166	650	..	887	..	..	..	1,703
Platinum ..	11,061	..	..	..	..	..	..	11,061
Salt ..	..	(a)	..	176,065	..	..	..	176,065
Sapphires ..	7,772	..	34,573	..	..	..	..	42,345
Shale (oil) ..	..	..	..	..	..	559	..	559
Silver ..	5,999	291	53,003	200	11,661	105,509	..	176,663
Tin and tin ore ..	250,944	11,592	161,500	..	15,392	297,515	15,966	752,909
Wolfram ..	311	..	184	..	..	14,658	..	15,153
Zinc concentrates ..	1,022,016	..	2,350	..	..	110,691	..	1,135,057
Unenumerated ..	(d) 16,286	..	14,800	11,136	1,010	1,178	(c) 3,178	47,588
Total ..	16,657,585	1,000,763	2,012,456	1,028,396	2,393,890	1,477,944	21,715	24,592,749

(a) Not available for publication. (b) See letterpress, page 724. (c) Includes mica £2,835, and amblygonite £343. (d) Includes dolomite £3,600, silica £6,000, and fireclay £8,000. (e) Year ended 30th June.

It may be pointed out in connexion with the figures given in the above table that the totals are exclusive of returns relating to certain commodities, such as stone for building and industrial uses, sand, gravel, brick and pottery clays, lime, cement, and slates, which might rightly 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. By restricting the comparison to items in connexion with which properly comparable information can be obtained for each State, it is believed that a satisfactory estimate of the progress of the mineral industry can be more readily obtained. The items excluded from the total for New South Wales in 1925 consist of—lime, £96,178; building stone, £147,172; Portland cement, £1,320,698; coke, £942,448; road materials, £251,956; shell grit, £470; mineral water, £282; sulphur and sulphuric acids, £93,724; and brick and pottery clays, £300,510. From the Queensland returns, marble, £221 has been deducted, while carbide, £60,047, and cement £162,870 have been excluded from the Tasmanian figures.

4. Value of Production, 1921 to 1925.—The value of the mineral production in each State during the five years 1921 to 1925 is given in the table hereunder:—

MINERAL PRODUCTION.—VALUE, 1921 TO 1925.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N. T.	Australia.
	£	£	£	£	£	£	£	£
1921 ..	12,052,509	1,218,783	1,405,899	904,659	3,463,764	822,767	19,003	19,977,384
1922 ..	12,951,164	1,244,966	1,859,084	331,866	3,041,112	878,009	9,959	20,316,160
1923 ..	14,178,683	1,031,223	2,215,498	890,378	2,747,101	1,154,397	16,612	22,231,897
1924 ..	16,299,835	964,917	2,305,069	653,592	2,776,796	1,325,867	19,138	24,045,914
1925 ..	16,657,585	1,000,763	2,012,456	1,028,396	2,393,890	1,477,944	21,715	24,592,749

For New South Wales the value of production in 1925 was the highest ever recorded, and was over £357,000 in excess of that for 1924 which showed the highest value previously. The principal increase in 1925 was in silver-lead, the production from which was valued

at over a million sterling above that in 1924. Small increases were recorded also in gold and iron. On the other hand, the return from coal declined by £287,000, and from zinc by £275,000. The decrease in the Victorian returns for 1924 resulted chiefly from the decline in the yields from gold and tin, and the improvement in 1925 was due to the increased production of brown coal, the value of the output rising from £41,000 in 1924 to £166,000 in 1925.

In Queensland the comparatively small returns in 1921 and 1922 were occasioned by the low prices realized for the principal industrial metals. Increases in the yields from copper, lead, silver, cobalt, and tin mainly accounted for the rise in value of production for 1923. In 1924 the chief increases were in gold, tin, and coal, but in 1925, although there were increases in lead and coal, these were more than counterbalanced by the falling-off in gold, copper, and tin. The low returns in South Australia for 1921 were due to the small production of copper, and this was followed by a still smaller yield in 1922, when the value dwindled to £74,000, the least return since 1844. A further factor in the reduction of the total for 1922 was the temporary cessation of operations at the ironstone deposits at Iron Knob, the value of the ore raised being £58,000, as compared with £587,000 in 1921. The improvement in the returns for this State during the last three years was mainly due to the increased production of iron ore, the value of which rose to over £667,000 in 1925. The yield from salt advanced from £127,000 in 1921 to £176,000 in 1925. In Western Australia the returns for 1925 show a decrease of about £383,000 on the total for 1924, the fall being due almost entirely to the decline in the gold yield. The increased production for 1925 in Tasmania was largely due to the returns from osmiridium, the yield from which was valued at £104,600, as compared with £10,600 in 1924. There were increases also in the returns from lead, tin, wolfram, and zinc. The mining industry in the Northern Territory is apparently emerging from the stagnation which characterized it a few years ago, although wolfram, which formed one of the principal products in previous years, is still unprofitable to mine.

5. Total Production to end of 1925.—In the next table will be found the estimated value of the total mineral production in each State up to the end of 1925. 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 £24,394,000 of that published by the State Department of Mines, the principal items excluded being coke, £10,074,000; cement, £10,614,000; lime, £1,175,000; and marble, £51,000.

MINERAL PRODUCTION.—VALUE TO END OF 1925.

Minerals.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor.Ter.(a)	Australia.
	£	£	£	£	£	£	£	Million. £
Gold ..	63,622,259	302,868,414	85,587,230	1,625,008	156,659,698	8,890,784	2,281,669	622
Silver and lead ..	104,502,415	264,019	3,981,872	380,386	2,130,081	7,079,955	63,132	119
Copper ..	15,517,826	216,656	25,693,524	33,077,200	1,804,998	17,769,513	232,792	94
Iron ..	6,161,280	15,641	472,270	4,733,540	36,721	52,110	..	11
Tin ..	13,351,664	943,634	10,452,602	..	1,537,466	16,140,887	568,788	43
Wolfram ..	272,187	11,885	1,061,624	301	1,441	196,910	216,859	2
Zinc ..	18,615,153	..	6,633	15,993	5,437	237,496	..	19
Coal ..	150,953,908	8,433,962	14,242,187	..	4,558,336	1,344,511	..	179
Other ..	7,456,133	808,328	2,768,717	3,195,217	137,950	1,160,046	38,494	15
Total	380,452,834	313,562,539	144,266,668	43,027,645	166,872,128	53,772,212	3,401,734	1,104

(a) To 30th June, 1925.

The "other" minerals in New South Wales include alunite, £206,475; antimony, £344,983; bismuth, £232,504; chrome, £119,756; diamonds, £144,452; limestone flux, £1,074,733; molybdenite, £211,759; opal, £1,549,924; scheelite, £192,375; and oil shale,

£2,690,710. In the Victorian returns antimony ore was responsible for £612,035. The value for coal in this State includes £463,692 for brown coal. Included in "other" in the Queensland production were opal, £182,495; gems, £604,248; bismuth, £118,297; molybdenite, £598,796; and limestone flux, £778,371. The chief items in South Australian "other" minerals were salt, £1,925,878; limestone flux, £373,621; gypsum, £404,272; and phosphate, £129,118. In the Tasmanian returns limestone flux was responsible for £393,238, osmiridium for £412,467, scheelite for £112,468, and iron pyrites for £93,916.

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

§ 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, but considerations of space preclude its repetition in the present issue.

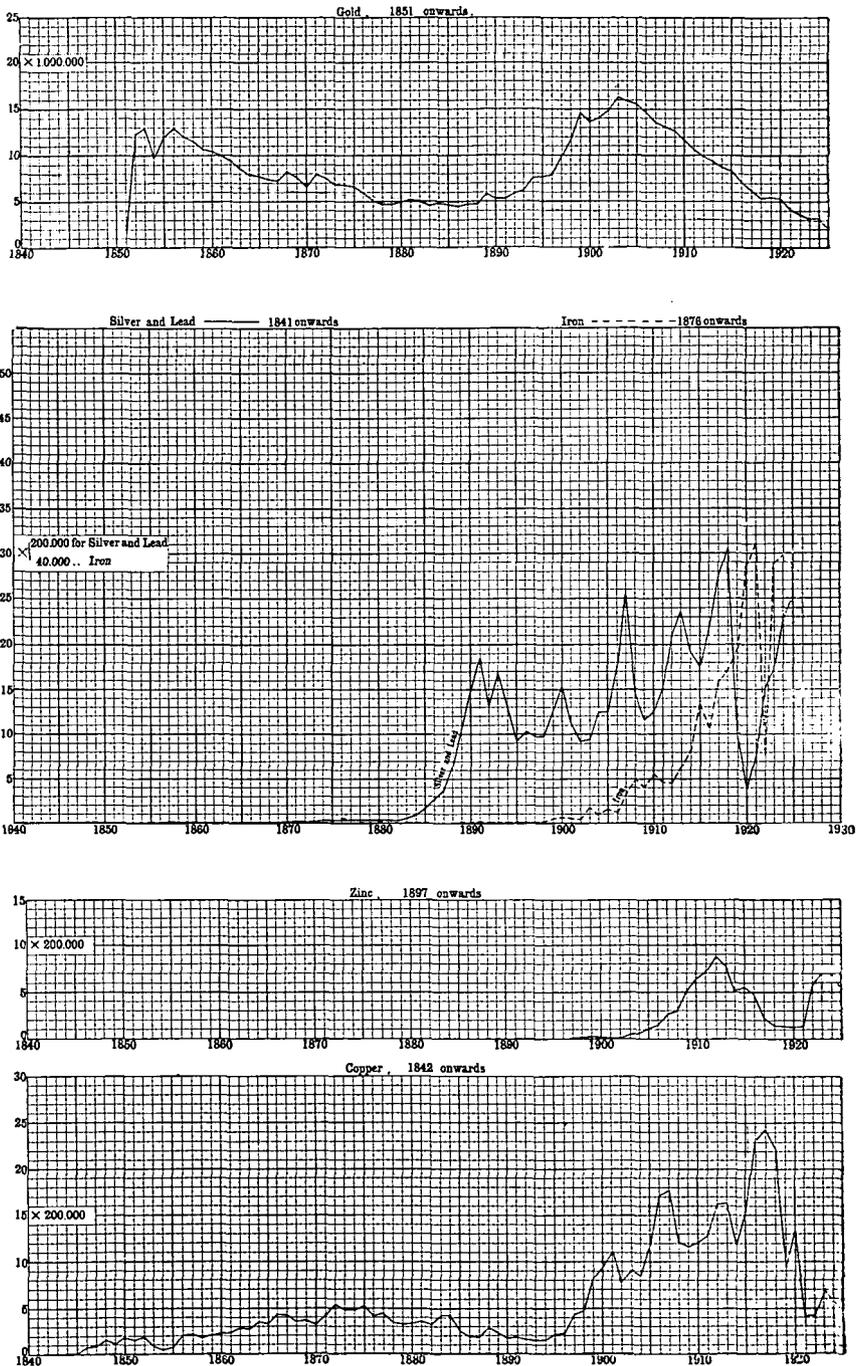
2. Production at Various Periods.—In the following table will be found the value of the gold raised in the several States and in Australia as a whole during each of the six decennial periods from 1851 to 1920, and in single years from 1921 to 1925, from the dates when payable discoveries were first reported. Owing to 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, 1851 TO 1925.

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	40,216,821
1891-1900	10,332,120	29,904,152	23,939,359	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 ..	271,302	554,087	214,060	13,933	2,935,693	28,311	1,299	4,018,685
1922 ..	118,359	501,515	378,154	4,693	2,525,811	16,101	540	3,545,173
1923 ..	83,325	422,105	392,563	4,199	2,232,179	16,300	743	3,151,414
1924 ..	86,905	312,398	459,716	4,093	2,255,932	21,516	3,270	3,143,830
1925 ..	82,498	200,958	197,118	3,535	1,874,320	15,041	1,939	2,375,409
Total ..	63,622,259	302,868,414	85,587,230	1,625,008	156,659,693	8,890,784	2,281,669	621,535,062

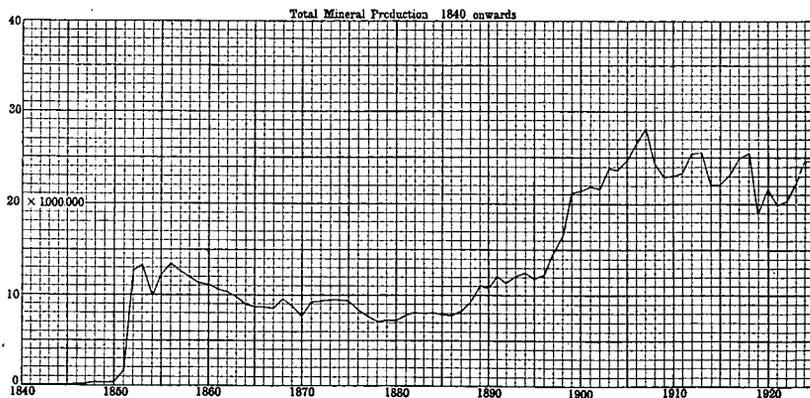
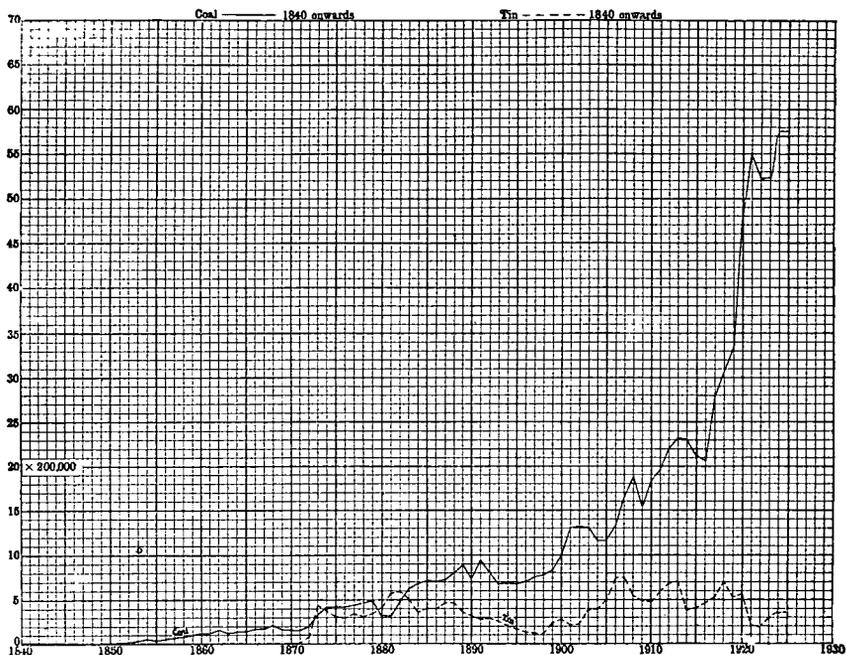
The value of the gold yield in 1925 was the lowest recorded since the discovery of the precious metal in 1851.

VALUES OF THE PRINCIPAL MINERALS PRODUCED—AUSTRALIA, 1840 TO 1925.



EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 to 1925.

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 1925—*continued.*

EXPLANATION.—The values shown are those of the total Australian production of certain of the most important minerals in successive years from 1840 to 1925.

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.

The amount of gold raised in Australia in any one year attained its maximum in 1903, in which year Western Australia also reached its highest point. For the other States the years in which the greatest yields were obtained were as follows:—New South Wales, 1852; Victoria, 1856; Queensland, 1900; South Australia, 1904; 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, the value of one ounce fine being taken at £5 6s. 0½d. in 1921, at £4 13s. 10½d. in 1922, at £4 8s. 5¼d. in 1923, at £4 13s. 0½d. in 1924, and £4 4s. 11½d. in 1925:—

GOLD.—QUANTITY PRODUCED, 1921 TO 1925.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Nor. Ter.	Australia.
	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.	Fine ozs.
1921 ..	51,173	104,512	40,376	2,628	553,731	5,340	(a) 245	758,095
1922 ..	25,222	106,872	80,584	1,000	533,246	3,431	(a) 115	755,470
1923 ..	18,833	95,403	88,726	949	504,511	3,684	(a) 168	712,274
1924 ..	18,685	67,167	98,841	880	485,035	4,626	(a) 703	675,937
1925 ..	19,422	47,296	46,406	832	441,252	3,524	(a) 456	559,188

(a) Year ended 30th June.

Unfortunately the general decline which has characterized Australia's gold output for a number of years has not been checked by new finds of importance, and unless more economic methods of exploiting existing low-grade deposits can be evolved the depression is likely to continue.

3. Changes in Relative Positions of States as Gold Producers.—A glance at the figures in the table showing the value of gold raised will sufficiently explain the enormous increase in the population of Victoria during the period 1851 to 1861, when an average of over 40,000 persons reached the State each year. With the exception of the year 1889, when its output was surpassed by that of Queensland, Victoria maintained its position as the chief gold-producer for a period of forty-seven years, or up to 1898, when its production was outstripped by that of Western Australia, the latter State from this year onward contributing practically half, and so far as recent years are concerned more than half the entire yield of Australia. New South Wales occupied the second place on the list until 1874, when Queensland returns exceeded those of the parent State, and, with the exception of the year 1921, maintained this pre-eminence to the end of 1924. South Australia has occupied the position of lowest contributor to the total gold yield since the year 1871. Taking the average of the last ten years, the relative position of each State in regard to the gold production of Australia was as follows:—

GOLD.—RELATIVE POSITION OF STATES AS PRODUCERS, 1916 TO 1925.

State.	Annual Average of Gold Production, 1916 to 1925.	Percentage on Total.	State.	Annual Average of Gold Production, 1916 to 1925.	Percentage on Total.
	Ozs.			Ozs.	
Total ..	986,741	100·0	New South Wales	52,544	5·3
Western Australia ..	678,291	68·7	Tasmania ..	7,535	0·8
Victoria ..	132,681	13·5	South Australia ..	3,230	0·3
Queensland ..	111,923	11·4	Northern Territory	537	..

4. Methods of Gold Mining adopted in Each State.—(i) *New South Wales.* Approximately half the production in 1925 was obtained by two dredges operating in the Adelong and Gundagai divisions. The yields from alluvial other than by dredging amounted to

983 ozs., of which 216 ozs. were won in the Tumut and Adelong district, 180 ozs. at Tambaroora and Turon, 173 ozs. at Peel and Uralla, 159 ozs. in the Southern area, and 138 ozs. at Bathurst. From stone treated the production was 7,969 ozs. over 5,000 ozs. of the total coming from the Lachlan district. The Bathurst district contributed 950 ozs., and smaller quantities were returned from the Southern, Turon and Tumut and Adelong areas. From the Cobar district, which for many years was the principal producer, the yield in 1925 was only 140 ozs., as compared with over 3,000 ozs. in 1922.

(ii) *Victoria.* Reef mining predominates in Victoria, although gold is also obtained from alluvial workings, both surface and deep leads. Owing to the exhaustion of much of the payable auriferous area the yield has been on the down grade for many years, and the return for 1925 was the lowest experienced since 1851. A considerable amount of attention is given to dredging and hydraulic sluicing, particularly in the Beechworth, Maryborough, Castlemaine, Ararat, Stawell, Gippsland, and Ballarat districts. The yields from alluvial and quartz respectively as returned (in crude ounces) from the chief mining districts of the State during 1925 were as follows:—Ararat and Stawell, 3,703 and 60; Ballarat, 910 and 1,068; Beechworth, 6,631 and 10,844; Bendigo, 337 and 17,347; Castlemaine, 1,529 and 7,194; Gippsland, 145 and 121; Maryborough, 193 and 14. The yield from the cyanide plants amounted to 971 ozs.

The largest output from quartz mining in the Bendigo district was furnished by the Hercules and Energetic, 7,344 ozs., £28,958, followed by the New Red, White, and Blue, 4,076 ozs., £16,304; Carlisle, 2,179 ozs., £8,676; and Bendigo Amalgamated, 338 ozs., £1,311. In the Beechworth district the Rose, Thistle, and Shamrock at Harrierville returned 4,370 ozs., £18,115; and the Morning Star, at Woods Point, 2,580 ozs., £8,733. In the Daylesford area of the Castlemaine district the Ajax returned 3,741 ozs., £15,124; Ajax North, 1,832 ozs., £7,328. In the Gippsland district the Loch Fyne Co. at Jericho produced 1,381 ozs., valued at £5,121; and the Rankin Syndicate at Omeo 562 ozs., valued at £2,092. From the once famous Ballarat area the yield in 1925 was less than £600.

From alluvial the principal yield was obtained by Cock's Pioneer Gold and Tin Mines, with 5,081 ozs., valued at £20,327. This Company, which operates in the Beechworth district, also produced about £12,000 worth of tin during the year. The New Langi Logan at Ararat returned 2,817 ozs., valued at £11,182; and the Langi Logan in the same area 683 ozs., valued at £2,718.

(iii) *Queensland.* Operations in Queensland are chiefly confined to reefing, and to the production of gold in connexion with the smelting of copper and other ores, the yield from alluvial in 1925 being only 1,085 ozs., of which 670 ozs. were obtained at Batavia River and 268 ozs. at Charters Towers, while the quantity produced from stone treated was 8,295 ozs.; from copper and other ores 34,660 ozs.; and from old tailings 2,366 ozs.; making a total production of 46,406 ozs. The yields from the principal fields were—Mount Morgan, 33,981 ozs.; Charters Towers, 539 ozs.; Gympie, 3,100 ozs.; Etheridge, 1,075 ozs.; Ravenswood, 3,200 ozs.; and Mount Coolon, 3,021 ozs. Nearly three-fourths of the entire production came from Mount Morgan, but the yield from this area showed a great reduction on the total for 1925, when 76,552 ozs. were returned. The decrease in 1925 was due to several causes, i.e., the creep in the workings, the railway strike in August, and the fire which broke out in the mine in September. The once famous Charters Towers field is apparently approaching exhaustion.

(iv) *South Australia.* Gold is found in widely-scattered localities in South Australia, but the production has at no period been large. During the last five years the yield has declined from 2,628 ozs. in 1921 to 832 ozs. in 1925. Of the total yield in the latter year, about 700 ozs. were produced at Tarcoola.

(v) *Western Australia.* A grouping of the auriferous deposits of Western Australia under various headings was given in previous issues (see Official Year Book 19, p. 725), but considerations of space preclude its retention in the present issue.

The yields from the principal fields in order of importance were as follows:—East Coolgardie, 305,769 ozs.; Mt. Margaret, 41,850 ozs.; Murchison, 29,439 ozs.; Yilgarn, 13,298 ozs.; Coolgardie, 10,308 ozs.; Broad Arrow, 8,242 ozs.; North-East Coolgardie, 5,898 ozs.; East Murchison, 5,399 oz.; North Coolgardie, 4,550 ozs.; Yalgoo, 2,828 ozs.; Dundas, 2,601 ozs.; Pilbara, 2,502 ozs.; and Peak Hill, 1,636 ozs. Of the total yield of 434,533 ozs. reported to the Mines Department, 431,874 ozs. were obtained from ore treated, 1,986 ozs. from dollied and specimens, while the return from alluvial was about 673 ozs. The total referred to differs somewhat from that quoted in the first table in this chapter, which represents gold exported and minted. It may be noted here that the total amount of dividends paid by Western Australian mining companies to the end of the year 1925 was £28,560,000.

Western Australia reached its zenith as a gold-producer in 1903, when the output was valued at £8,771,000, but since then there has been a more or less steady decline until in 1925 the total had dropped to £1,874,000. Three causes may be adduced to account for this falling-off—(1) Exhaustion of known rich deposits. (2) Unwise development, *i.e.*, “picking the eyes” of good mines. (3) Increase cost of stores, equipment, and labour, rendering it unprofitable to treat low-grade ores.

(vi) *Tasmania*. The yield in Tasmania is chiefly obtained from reefing, and the returns from the principal districts in 1925 were as follows:—North-West and West Coasts, 2,264 ozs.; Mathinna, 554 ozs.; Lisle Golconda, 111 ozs.; Mt. Claude, 142 ozs.; Beaconsfield, 309 ozs.; North-Eastern Division, 144 ozs. During 1925 the blister copper produced by the Mt. Lyell Mining and Railway Co. Ltd. contained approximately 2,249 ozs. of gold.

(vii) *Northern Territory*. The production for 1925 amounted to only 456 ozs. fine. It is stated that the potentialities of the older fields have by no means been exhausted, although a revival of the industry depends on the expenditure of large sums of money, either by the Government or by mining speculators, on developmental work. The bulk of the production came from Fletcher's Gully. During the year a find of rich gold was reported from Granite Hill, about 70 miles south-west of Tanami, but the locality is practically inaccessible in dry seasons.

5. **Remarkable Masses of Gold.**—Allusion has already been made in preceding Year Books to the discovery of “nuggets” and other remarkable masses of gold, but it is not proposed to repeat this information in the present issue. (See Year Book No. 4, page 500.)

6. **Modes of Occurrence of Gold in Australia.**—This subject has been alluded to at some length in earlier issues of the Year Book, but considerations of space will not permit of repetition in the present issue.

7. **Place of Australia in the World's Gold Production.**—In the table given below will be found the estimated value of the world's gold production, and the share of Australia therein during the five years 1921 to 1925. 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, 1921 TO 1925.

Year.	World's Production of Gold.	Gold Produced in Australia.	Percentage of Australia on Total.
	£	£	%
1921	83,772,000	4,019,000	4.8
1922	71,653,000	3,545,000	4.9
1923	78,367,000	3,153,000	4.0
1924	87,640,000	3,142,000	3.6
1925	80,739,000	2,375,000	2.9

The value of the gold yield in the ten chief producing countries during each of the five years 1921 to 1925 is given in the table hereunder. Particulars of the quantity and value of the gold production for all countries for the ten years 1916-25 will be found in the Bulletin of Australian Production issued by this Bureau.

GOLD.—PRODUCTION, CHIEF COUNTRIES, 1921 TO 1925.

Country.	1921.	1922.	1923.	1924.	1925.
	£	£	£	£	£
Union of South Africa	43,096,000	32,895,000	40,480,000	44,534,000	40,768,000
United States	12,519,000	10,743,000	10,736,000	11,378,000	9,854,000
Canada	4,911,000	5,929,000	5,457,000	7,095,000	7,373,000
Australia	4,018,000	3,545,000	3,153,000	3,142,000	2,375,000
Mexico	3,626,000	3,512,000	3,437,000	3,686,000	3,351,000
Rhodesia	3,104,000	3,063,000	2,865,000	2,920,000	2,470,000
India	2,073,000	1,832,000	1,697,000	1,843,000	1,673,000
Colombia	1,539,000	1,201,000	1,220,000	450,000	411,000
Japan	1,408,000	1,239,000	1,154,000	1,177,000	1,189,000
Gold Coast	1,078,000	998,000	883,000	958,000	844,000
Russia	357,000	942,000	1,381,000	4,456,000	4,507,000

It has been deemed advisable to apportion values in accordance with Australian currency, i.e., at £5 6s. 0½d. for 1921, £4 13s. 10½d. for 1922, £4 8s. 5½d. for 1923, £4 13s. 0½d. for 1924, and £4 4s. 11½d. for 1925.

The next table shows the average yearly value in order of importance of the yield in the chief gold-producing countries for the decennium 1916-1925.

GOLD.—AVERAGE ANNUAL PRODUCTION, CHIEF COUNTRIES, 1916 TO 1925.

Country.	Value.	Country.	Value.
	£		£
Union of South Africa	40,377,000	Russia	2,692,000
United States	13,297,000	India	2,062,000
Canada	4,904,000	Japan	1,262,000
Australia	4,566,000	Gold Coast	1,195,000
Mexico	3,392,000	Colombia	1,097,000
Rhodesia	3,074,000		

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

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

GOLD MINING.—PERSONS EMPLOYED, 1901, AND 1921 TO 1925.

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
1921	1,516	3,050	722	100	6,019	67	10	11,484
1922	1,197	3,310	767	40	5,787	106	12	11,219
1923	1,141	2,982	603	32	5,555	119	30	10,462
1924	1,014	2,651	452	30	5,296	128	18	9,589
1925	831	2,353	347	34	5,009	103	32	8,709

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.

9. The Precious Metals Prospecting Act of 1926.—Under the provisions of this Act a sum of £40,000 was allocated by the Commonwealth Government to assist persons or companies engaged in prospecting for precious metals.

§ 3. Platinum and Platinoid Metals.

1. **Platinum.**—(i) *New South Wales.* The deposits at present worked in the State are situated at Platina in the Fifield division, near Parkes, and the production in 1925 amounted to 573 ozs., valued at £11,061, as compared with 646 ozs., valued at £12,422 in the preceding year, while the total production recorded to the end of 1925 amounted to 17,823 ozs., valued at £102,716. The local price for the metal at the end of the year was £19 10s. an ounce, and if a permanent water supply were assured the industry could afford a livelihood for a much larger number than the 80 men engaged in it during 1925.

(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 goldfield 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 many years osmiridium has been known to exist in the bed of the Savage River, on the West Coast, and in rivulets and creeks in the serpentine country. The first recorded production was in 1910, when 120 ozs., valued at £530, or £4 8s 4d. per oz., were raised. In 1914 the yield had increased to 1,019 ozs., valued at £10,076, or nearly £9 18s. per oz. From 1915 to 1917 the amount raised fell off considerably, owing to difficulty in disposing of the metal, but in 1918 there was an increase to 1,607 ozs., valued at £44,833; while in 1920 the 2,009 ozs. produced returned £77,114, or over £38 7s. 8d. per oz. In October of that year as much as £42 per oz. was obtained. For 1921 the production was 1,751 ozs., valued at £42,935, or about £24 10s. per oz. The output in 1925 was 3,366 ozs., valued at £103,570, or over £30 15s. per oz. Towards the middle of that year the discovery of rich alluvial wash on the Adams River in the south-west of the State led to a "rush," and within a few months over 1,000 men were on the field. As in the case with other fields in Tasmania the osmiridium is shed from serpentine derived from bronzitite rocks, and the claims worked in 1925 were all alluvial.

§ 4. Silver and Lead.

1. **Occurrence in Each State.**—Particulars regarding the occurrence of silver in each State will be found in preceding Year Books, Nos. 1 to 5, but considerations of space preclude the repetition of this matter in the present volume.

2. **Development of Silver Mining.**—The value of the production of silver, silver-lead and ore, and lead from each State during the five years ending 1925 is given hereunder:—

SILVER AND LEAD.—PRODUCTION, 1921 TO 1925.

Year.	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Australia.
	£	£	£	£	£	£	£	£
1921 ..	1,327,364	862	54,188	240	67,521	89,817	..	1,539,992
1922 ..	2,574,108	1,080	109,350	377	87,692	241,694	..	3,014,301
1923 ..	2,956,862	963	216,645	60	60,061	218,881	..	3,453,472
1924 ..	4,310,360	645	167,469	373	96,504	252,718	..	4,828,069
1925 ..	5,320,976	291	240,684	1,655	114,961	302,961	(a) 617	5,982,145

(a) Year ended 30th June.

The resumption of normal production in 1921 by the mines on the Broken Hill field in New South Wales was largely hindered by the low price of lead, and the destruction by fire of the smelting works at Port Pirie. Production in 1924 was greatly stimulated by the favourable price of the metals, and with the exception of the Central mine, where work was restricted to fire-fighting, the chief mines on the Broken Hill lode were in full

operation. Renewed activity resulted from the high prices of lead and zinc in 1925, when the Central mine rejoined the list of producers, the fire areas having been isolated by water curtains on the various levels as required.

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 metals locally produced, and the average 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 accruing to Australia from the three metals :—

SILVER-LEAD MINES.—NEW SOUTH WALES, TOTAL PRODUCTION, 1921 TO 1925.

Year.	Metal Produced within Australia.				Contents of Concentrates Exported.			
	Silver.	Lead.	Zinc.	Value.	Silver.	Lead.	Zinc.	Value.
	ozs. fine.	tons.	tons.	£	ozs. fine.	tons.	tons.	£
1921 ..	3,624,413	47,426	1,425	1,723,864	617,477	6,539	19,272	261,238
1922 ..	6,648,825	97,867	23,724	4,113,427	3,264,102	19,328	132,186	1,272,074
1923 ..	7,233,236	124,570	41,153	5,707,739	4,834,718	40,906	149,319	1,813,284
1924 ..	6,292,978	120,380	43,579	6,472,812	2,963,693	21,513	114,374	1,292,220
1925 ..	7,437,967	139,839	39,991	7,539,130	1,782,193	30,752	75,435	1,371,183

The figures given above are quoted on the authority of the Mines Department of New South Wales. During the later years considerable quantities of cadmium were also produced.

3. Sources of Production.—Broken Hill, in New South Wales, is the chief centre of silver production in Australia.

(i) *New South Wales.* (a) *Broken Hill.* A description of the silver-bearing area in this district is given in earlier issues of the Year Book. During 1913 the output of ore raised amounted to 1,744,000 tons, the highest recorded in the history of the field. For the four years 1915 to 1918 the production averaged over 1,200,000 tons, but, owing to the cessation of operations through industrial troubles and the fall in the price of metals there was a decline in 1919 to 415,400 tons, and in 1920, when operations were carried on for a few weeks only, to 38,661 tons. Thenceforward there was a continuous increase, and in 1925 the tonnage raised amounted to 1,265,977, of which 1,246,566 tons consisted of sulphides, and 19,411 tons of carbonate and siliceous ores.

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 1925.

Mine.	Value of Output to end of 1925.	Dividends and Bonuses Paid to end of 1925.
	£	£
Broken Hill Proprietary Co. Ltd.	51,412,657	12,714,550
Broken Hill Proprietary Block 14 Co. Ltd. = ..	4,279,281	638,160
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)	23,595,464	2,979,375
Broken Hill South Ltd.	16,382,426	3,735,000
North Broken Hill Ltd.	11,277,669	3,373,940
Broken Hill Junction Lead Mining Co.	1,185,058	87,500
Junction North Broken Hill Mine	3,114,414	160,814
The Zinc Corporation Ltd.	5,317,140	1,956,301
Barrier South Ltd.	151,517	50,000
Totals	127,521,613	27,949,420

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 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 135 millions and 31 millions respectively. The authorized capital of the various companies amounted to £6,823,000.

(b) *Picton Division.* The mines in the Yerranderie area produced 1,211 tons of ore in 1925, yielding 111,532 ozs. of silver, besides 217 ozs. of gold, and 317 tons of lead, the total production being valued at £27,603. Of the yield from this area in 1925, 526 tons valued at £12,433 were raised by the Silver Peaks Mines. Small quantities of ore were also raised by the Colon Peaks, Wollondilly, and Wonga mines in this area.

(c) *Yass Division.* During 1925 the Kangiara mine produced 146 tons of ore yielding 2,575 ozs. of silver, 37 tons of lead, and 11 ozs. of gold.

(d) *Cobar Division.* In this division 285 tons of ore were raised in 1925, yielding 5,300 ozs. of silver, valued at £660, and 133 ozs. of gold, valued at £532.

(e) *Other Areas.* Small quantities of silver, lead, gold, and copper were produced during the year from the Burrowa, Condobolin, and Hillgrove divisions.

(ii) *Victoria.* The silver produced in 1925 amounted to 2,082 ozs., valued at £291, and was obtained in the refining of gold at the Melbourne Mint.

(iii) *Queensland.* The yields from the chief silver and lead producing centres in 1925 were as follows:—Chillagoe, silver £25,831, lead £112,533; Herberton, silver £11,012, lead £21,994; Brisbane, silver £6,336, lead £16,275; Etheridge, silver £3,479, lead £16,078; Cloncurry, silver £3,328, lead £11,830. Some of the mining leases in the Chillagoe area are owned by the State. The Mount Isa silver-lead field in the Cloncurry district was discovered in 1923, and the lodes so far opened are distributed over a length of 5 miles by a width of one mile along the west bank of the West Leichhardt River. Large accumulations of high grade carbonate of lead are in sight on this field, which, according to experts, is the largest find in importance since the discovery of Broken Hill. During the year 1925 good progress was made with developmental work.

(iv) *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. The production of silver in 1925 was valued at £200, and of silver-lead ore at £1,455.

(v) *Western Australia.* The quantity of silver obtained as a by-product and exported in 1925 was 81,226 ozs., valued at £11,661. In addition, 4,664 tons of lead and silver-lead ore and concentrates valued at £103,300 were exported. The production of lead ore from the Northampton mineral field amounted in 1925 to 37,866 tons.

(vi) *Tasmania.* The silver produced in 1925 amounted to 730,194 ozs., valued at £105,509, and the lead to 5,526 tons, valued at £197,452. Of the silver the chief producers in the Zeehan group mines were the Nike with 7,980 ozs.; North Zeehan, 6,236 ozs.; and Swansea, 4,701 ozs. In the Dundas group, North Mt. Farrell produced 233,390 ozs.; Hercules-Rosebery, 165,356 ozs.; Magnet, 137,434 ozs.; Mt. Lyell, 133,181 ozs.; and Round Hill, 23,980 ozs. The principal producers of lead were the North Mt. Farrell 2,117 tons, Magnet 864 tons, and Round Hill 360 tons amongst the Dundas Mines, while the Swansea with 180 tons, and the Nike with 78 tons, furnished the chief yields in the Zeehan group.

(vii) *Northern Territory.* Silver-lead ores are found near Pine Creek, and at Mount Shoebidge near Brock's Creek railway station. There are a number of fair-sized galena lodes in the Pine Creek and McArthur River districts, but, owing to costs of transport and realization little attention is devoted to them. No mining for this class of mineral took place in 1925, the production recorded having been obtained from the dumps of the Evelyn silver-lead and zinc mines which were closed down in the year 1890.

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

SILVER.—WORLD'S PRODUCTION, 1921–1925.

Total.	1921.	1922.	1923.	1924.	1925.
World's production in 1,000 fine ozs.	171,284	213,541	243,265	239,107	242,767

The share of Australia in the world's silver production in 1919 was estimated at 7,800,000 ozs., or about 4½ per cent. on 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 ozs., and the estimated silver contents of the ores, bullion, and concentrates exported to 732,000 ozs., the total being a little over 3 per cent. on the world's production. For 1925 local extraction was set down as 8,573,000, and exports as 2,310,000 ozs., the total being equivalent to about 4·5 per cent. on 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 1925 from the chief silver producing countries were as follows:—

SILVER.—PRODUCTION, CHIEF COUNTRIES, 1925.

Country.	Production.	Country.	Production.
	Fine ozs. ('000 omitted.)		Fine ozs. ('000 omitted.)
Mexico	92,448	Japan	3,500
United States	66,155	Central America	3,000
South America	30,000	East Indies	2,200
Canada	20,004	Union of South Africa	1,160
Australia	10,883	Rhodesia	400
Europe	9,500	China	200
British India	5,100		

5. **Prices.**—As the production of silver is dependent to a very large extent on the price realized, a statement of the average price per standard ounce in the London market during the last five years is given below:—

SILVER.—PRICES, 1921 TO 1925.

Price.	1921.	1922.	1923.	1924.	1925.
Pence per standard oz.	36.89	34.41	31.93	33.97	32.09

The average price in cents per fine ounce in New York rose from 66·78 in 1924 to 69·07 in 1925. In explanation of the apparent decrease in the London price, *The Mineral Industry* points out that the average price for sterling rose from 441·40 cents in 1924 to 482·43 in 1925, and an adjustment of London prices in pence to their equivalent in dollars would show that the value of silver really increased in London as it did in New York.

6. **Employment in Silver Mining.**—The number of persons employed in silver mining during each of the last five years is given below :—

SILVER MINING.—PERSONS EMPLOYED, 1921 TO 1925.

Year.	N.S.W. (a)	Q'land.	W. Aust.	Tasmania.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.
1921	3,150	229	(b) 41	352	..	3,772
1922	4,712	321	(b) 152	495	..	(c) 5,686
1923	5,155	133	(b) 96	510	..	5,894
1924	5,468	759	(b) 141	479	15	(d) 6,874
1925	5,770	590	(b) 204	579	4	(e) 7,166

(a) Silver, lead, and zinc. (b) Principally lead ore. (c) Including 6 in South Australia.
(d) Including 12 in South Australia. (e) Including 19 in South Australia.

The bulk of the employment up to 1924, when Queensland assumed importance, was in New South Wales and Tasmania, the quantity of silver raised in the other States being unimportant.

§ 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 quantity and value of the local production as reported and credited to the mineral industry for the years 1921 to 1925 are shown in the following table :—

COPPER.—PRODUCTION, 1921 TO 1925.

State.	1921.	1922.	1923.	1924.	1925.
QUANTITY.					
	Tons.	Tons.	Tons.	Tons.	Tons.
New South Wales { Ingot and Matte	499	575	1,182	1,129	478
Wales { Ore .. ..	..	50	79	..	..
Queensland { Ingot and Matte	2,428	5,104	6,243	5,630	3,909
Queensland { Ore .. ..	..	..	..	..	..
South Australia { Ingot and Matte	1,532	1,185	3,523	405	570
South Australia { Ore .. ..	..	..	..	..	..
Western Australia { Ingot and Matte	206	660	1,057	..	..
Western Australia { Ore	1,040	352	3,394	2,795	1,201
Tasmania { Ingot and Matte	6,181	5,616	6,065	6,698	6,539
Tasmania { Ore .. ..	..	..	..	..	..
Northern Territory { Ingot and Matte	..	..	..	..	..
Northern Territory { Ore .. ..	..	(a) 58	..	(a) 32	(a) 4
VALUE.					
	£	£	£	£	£
New South Wales	41,267	36,233	82,375	71,658	30,215
Queensland	168,556	321,535	430,746	380,025	254,074
South Australia	106,370	73,646	232,172	26,046	35,878
Western Australia	24,601	20,379	65,100	40,676	18,200
Tasmania	463,163	391,535	435,413	457,386	436,661
Northern Territory .. ..	..	(a) 798	(a) 30	(a) 239	(a) 15
Australia	803,957	844,126	1,245,836	976,030	775,043

(a) Year ended 30th June.

The total value of the production in 1920 was £2,658,000, and the heavy fall during 1921 was due to the low price of the metal preventing the profitable working of many of the copper mines throughout Australia, while the continuation of low prices had a depressing effect on production in the following years.

2. Sources of Production.—(i) *New South Wales*. Production in this State in 1925 was valued at £30,215, as compared with £71,658 in the preceding year. As was the case in 1924, a fair proportion of the output was due to the extraction of the small copper content in the Broken Hill silver-lead and zinc ore, about 129 tons of copper, valued at £8,154 being obtained from this source. The depression in this branch of the mining industry during the last few years is likely to continue, unless copper appreciates in value, and less costly methods of production are evolved. Practically the only mines in operation were the Mt. Royal group at Tottenham, the Budgery mine at Hermidale, and the Copper Hill mine at Molong.

(ii) *Queensland*. The yield in this State amounted in 1925 to 3,909 tons valued at £254,074, 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, of course, due to the low prices realized for copper. Returns from the chief producing areas in 1925 were as follows:—Mount Morgan, 2,634 tons, valued at £171,242; Herberton, 91 tons, £5,947; Cloncurry, 982 tons, £63,830; Chillagoe, 185 tons, £12,015. These yields naturally compare very unfavourably with those of 1920. The Cloncurry district—reckoned the richest and most extensive cupriferous area in Australia—which under normal circumstances produces more than half the copper output of the State, returned a yield of 982 tons, as against 7,640 tons in 1920.

(iii) *South Australia*. Taking the entire period over which production extended, the yield of copper in South Australia easily outstrips that of any other State. In recent years, however, Queensland, Tasmania, and New South Wales have come to the front as copper producers, as the table on the preceding page shows. 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. During 1922 the output amounted to 1,185 tons, valued at £73,646, the lowest recorded since 1844. The decline was due to the closing down during the greater part of the year of the Wallaroo and Moonta mines. In 1923 the production amounted to 3,523 tons, valued at £232,172, but there was a decline to 570 tons, valued at £35,878 in 1925. The liquidation of the Wallaroo and Moonta Co. was proceeded with during the year, and a large quantity of plant was disposed of. A reverberatory furnace was in use treating material obtained in cleaning up, and a company was engaged in dealing with old tailings and slimes at the Moonta mines. At the Yelta lode high grade dressed ore was produced and sold for treatment abroad.

(iv) *Western Australia*. The value of the copper ore exported from this State in 1925 was £18,200. The Northampton field was the sole producer, no ore being reported from the West Pilbara or Phillips River fields.

(v) *Tasmania*. The quantity of copper produced in Tasmania during 1925 was 6,539 tons, valued at £436,661, the whole of the production being due to the Mount Lyell Mining and Railway Co. Ltd. This Company treated 46,771 tons of ore and concentrates and produced 6,599 tons of blister copper, containing copper, 6,539 tons; silver, 133,191 ozs.; and gold, 2,249 ozs.; the whole being valued at £465,392. The employees in 1925 numbered 1,016, of whom 532 were in the mining branch, 396 were engaged in the reduction works, and 88 in the railway department. Current for power and lighting is obtained from the Lake Margaret hydro-electric plant which also supplies the municipal requirements of Queenstown and Gormanston. During the year 1925 power was supplied by the Company's sub-station for use at Zeehan. Recognizing the fluctuating character of the returns from copper mining, and keeping in view the possibility of future exhaustion of the deposits, the directors wisely endeavoured to give permanence to the enterprise by investing portion of the profits in industrial undertakings, such as the manufacture of superphosphates and other chemical products. Success was early achieved, and this branch of the Company's business yields highly satisfactory returns. To the end of 1925 this Company had paid upwards of £4,297,000 in dividends.

(vi) *Northern Territory*. Copper has been found at various places, but lack of capital and difficulty of transport prevent the development of the deposits. In 1925, the production was returned at 4 tons of ore, valued at £15, obtained near Kilgour gorge in the Borrooloola district. Developmental work was carried on at a deposit situated about 18 miles easterly from the Barrow Creek Telegraph Station.

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

COPPER.—PRICES, 1921 TO 1925.

Year.		Average London Price per Ton Standard Copper.	Average New York Price in Cents per lb. Electrolytic Copper.
		£	Cents.
1921	.. ..	69.36	12.50
1922	.. ..	62.12	13.38
1923	.. ..	65.84	14.42
1924	.. ..	63.15	13.02
1925	.. ..	61.92	14.04

As evidence of the tremendous monthly variation in the price of copper it may be noted that in December, 1916, the average London price of standard copper was £145 6s. 4d. per ton, while in April, 1922, it was quoted at £58 16s. In 1925 the price varied between £66 1s. 4d. in January, and £59 10s. 10d. in December.

4. World's Production of Copper.—The world's production of copper during the five years 1921 to 1925, is estimated to have been as follows. The figures for foreign countries have been taken from the latest issue of *The Mineral Industry*, and differ slightly from those quoted in the previous issue :—

COPPER.—WORLD'S PRODUCTION, 1921 TO 1925.

Year	1921.	1922.	1923.	1924.	1925.
World's production—tons	547,700	853,100	1,225,800	1,344,900	1,393,400

The yields from the chief copper-producing countries in 1925 were as follows :—

COPPER.—PRODUCTION, CHIEF COUNTRIES, 1925.

Country.	Production.	Country.	Production.
	Tons.		Tons.
United States	747,600	Australia	11,800
Chile	187,100	Cuba	11,700
Africa	105,500	Norway	10,800
Japan	64,600	Serbia	7,200
Spain and Portugal	57,100	Bolivia	6,700
Mexico	52,800	Russia	6,500
Canada	50,200	Austria	3,300
Peru	36,800	Sweden	2,600
Germany	22,600		

The Australian production in 1925 amounted to under 1 per cent. of the total.

Over half the world's copper output is produced by the United States, while the three big producers in South America under American control bring the total up to 70 per cent.

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, 1921 TO 1925.

Year.	N.S.W.	Q'land.	S. Aust.	W. Aust.	Tas.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1921	109	675	1,000	36	1,361	6	3,187
1922	66	882	70	10	948	6	1,982
1923	85	1,176	420	80	1,066	3	2,830
1924	52	1,017	34	110	532	12	1,757
1925	47	878	55	34	743	6	1,763

§ 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 tables below show the quantity and value of the production as reported to the Mines Departments in each of the States during the five years, 1921 to 1925:—

TIN.—PRODUCTION, 1921 TO 1925.

State.	1921.	1922.	1923.	1924.	1925.
QUANTITY.					
	Tons.	Tons.	Tons.	Tons.	Tons.
New South Wales ..	{ Ingots 316	{ Ingots 734	{ Ingots 896	{ Ingots 1,041	{ Ingots 957
	{ Ore .. 1,595	{ Ore .. 410	{ Ore	{ Ore	{ Ore
Victoria	{ Ingots ..	{ Ore 80	{ Ore 115	{ Ore 78	{ Ore 38
	{ Ore .. 80	{ Ore 115	{ Ore 78	{ Ore 38	{ Ore 69
Queensland	{ Ingots <i>a</i> (a)	{ Ore 1,050	{ Ore 1,098	{ Ore 903	{ Ore 1,196
	{ Ore .. (a)	{ Ore 1,098	{ Ore 903	{ Ore 1,196	{ Ore 1,012
Western Australia ..	{ Ingots ..	{ Ore 67	{ Ore 110	{ Ore 131	{ Ore 87
	{ Ore .. 67	{ Ore 110	{ Ore 131	{ Ore 87	{ Ore 108
Tasmania	{ Ingots 790	{ Ore 790	{ Ore 679	{ Ore 1,160	{ Ore 1,108
	{ Ore .. 790	{ Ore 679	{ Ore 1,160	{ Ore 1,108	{ Ore 1,130
Northern Territory ..	{ Ore .. (b)	{ Ore 83	{ Ore 79	{ Ore 136	{ Ore 97
	{ Ore .. (b)	{ Ore 79	{ Ore 136	{ Ore 97	{ Ore 110
VALUE.					
	£	£	£	£	£
New South Wales ..	163,451	154,698	180,789	259,485	250,944
Victoria	11,961	12,071	10,371	6,056	11,592
Queensland	98,471	99,758	114,945	175,509	161,500
Western Australia ..	6,485	10,930	15,095	12,008	15,392
Tasmania	130,257	112,407	236,955	275,014	297,515
Northern Territory ..	(b) 7,793	(b) 5,891	(b) 13,887	(b) 12,855	(b) 15,966
Total	418,418	395,755	572,042	740,927	752,909

(a) Included with ore. (b) Year ending 30th June.

As the table shows, there was a heavy decline in the production of tin in 1922, the values being the lowest recorded for the quinquennium. The falling-off was due to low prices and high production costs, and in some instances to exhaustion of ore supplies. Dredging operations in certain districts were hampered by insufficiency of water. As shown later on, prices rose from £159 9s. per ton in 1922 to £261 1s. 6d. in 1925, and this increase is reflected in the increased value of production during the last three years.

2. Sources of Production.—(i) *New South Wales*. Tin-mining operations were stimulated by the increased price of the metal in 1925, and this, coupled with the good water supply, brought about renewed activity in the New England and Ardlathan districts, where the principal tin fields are situated. A large proportion of the output in New South Wales is obtained by dredging, the quantity so won in 1925 being 763 tons, valued at £136,131. Forty-one pump-dredges and one bucket-dredge were in operation during the year. In the Tingha division of the Peel and Uralla district the yield amounted to 443 tons, valued at £77,542. The Emmaville division in the New England district showed a yield of 357 tons, valued at £62,590. In the Wilson's Downfall division, 64 tons, valued at £11,594, were raised. From the Torrington division, 134 tons, valued at £21,984, were returned. The Ardlathan field, in the Lachlan division, produced 340 tons of concentrates, valued at £51,611, while Torrington returned 97 tons, valued at £15,520, and Inverell 27 tons, valued at £4,232.

(ii) *Victoria*. The production in 1925 was obtained by dredging, the Cock's Pioneer Gold and Tin Co. in the Beechworth district contributing the whole of the output which amounted to 69 tons.

(iii) *Queensland*. The chief producing districts in Queensland during 1925 were Herberton, 641 tons, valued at £100,234; Kangaroo Hills, 146 tons, £24,732; Stanthorpe, 101 tons, £16,489; Cooktown, 65 tons, £11,100; Chillagoe, 54 tons, £8,012. Despite the satisfactory prices realized in 1925, the total production valued at £161,500 was lower than that of 1924, which was returned at £176,600 and much below that of 1920, when the yield was valued at £252,000.

(iv) *Western Australia*. The export of tin ore from the State during 1925 amounted to 108 tons, valued at £15,392. The production from the Greenbushes field amounted to 55 tons, valued at £8,764, and from the Pilbara field 24 tons, valued at £3,609. Deposits of tin occur in widely-separated localities in the Kimberley division, the Thomas River in the Gascoyne Valley, and at Poona on the Murchison gold-field.

(v) *Tasmania*. During 1925 the quantity of metallic tin won amounted to 1,130 tons, valued at £297,515. The yield from the North-Eastern division amounted to 497 tons, of which 233 tons were contributed by the mines in the Pioneer and Gladstone districts, while 260 tons came from the Ringarooma, Derby, and Branxholm area. The yield in the Eastern division amounted to 241 tons; the Avoca Mines furnishing 111 tons; the St. Helen's Mines 63 tons; and the Weldborough, Lottah, and Blue Tier, 62 tons. From the North-Western division the output was 359 tons, the bulk of it being raised by the Mt. Bischoff, with 275 tons, and Mt. Bischoff Extended, with 80 tons. The production in the Western division was returned at a little over 24 tons. During the year 1926 a discovery of rich alluvial and lode tin was reported from King Island in Bass Strait.

(vi) *Northern Territory*. The yield of tin ore and concentrates in 1925 amounted to 110 tons, valued at £15,966, of which 49 tons were raised at Marranboy, and 32 tons at Mt. Wells, while small quantities were also produced at Hayes Creek, Hidden Valley, Collia, Muldiva, and elsewhere. Two batteries for the treatment of tin ore have been erected by the Government, one at Marranboy, costing £20,163, and one at Hayes Creek, at an expense of £3,294.

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. The figures for 1923 and 1924 have been amended since last issue.

TIN.—WORLD'S PRODUCTION, 1921 TO 1925.

1921.	1922.	1923.	1924.	1925.
Tons. 109,709	Tons. 129,329	Tons. 124,747	Tons. 140,847	Tons. 143,157

The yields from the chief producing countries in 1925 were as follows:—

TIN.—PRODUCTION, CHIEF COUNTRIES, 1925.

Country.	Production.	Country.	Production.
	Tons.		Tons.
Federated Malay States ..	45,900	Nigeria	6,200
Bolivia	32,100	Australia	(a) 3,200
Banka	20,800	Great Britain	2,500
Billiton	9,800	Unfederated Malay States	2,100
China	8,000	Congo	2,000
Siam	6,800	South Africa	1,100

(a) As quoted by Australian Mines and Metals Association.

Based on the results for the last three years, Australia's share of the world's tin production would appear to be about 2.3 per cent.

4. Prices.—The average price of the metal in the London market for the years 1921 to 1925 was as follows:—

TIN.—PRICES, 1921 TO 1925.

Year.	Average Price per Ton.	Year.	Average Price per Ton.
	£ s. d.		£ s. d.
1921.. ..	165 5 4	1924	248 14 10
1922.. ..	159 9 0	1925	261 1 6
1923.. ..	202 5 0		

During the period covered by the table prices underwent remarkable fluctuations. Thus, in 1921 there was a fall of over £130 per ton on the price for the preceding year. A brief account of the variations during the next four years was given in Official Year Book No. 19, p. 739. At the end of January, 1925, the average had risen to £265 13s. 8d., but prices fell thereafter to £237 2s. 8d. in April. Thenceforward there was a marked upward tendency, the price for the closing month of the year reaching £285 1s. 1d. The highest price for the year 1925 was reached on 30th November with £290, and the lowest on 16th April with £229.

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, 1921 TO 1925.

Year.	N.S.W.	Victoria.	Q'land.	W. Aust.	Tas.	Nor. Ter.	Australia.
	No.	No.	No.	No.	No.	No.	No.
1921	1,321	31	864	59	699	100	3,074
1922	1,090	13	659	31	620	120	2,533
1923	1,047	7	703	35	842	170	2,804
1924	1,004	2	698	40	781	115	2,640
1925	1,012	(a)	653	55	1,035	118	(b)2,875

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

(b) Including 2 in South Australia.

§ 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., raised 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. The figures given hereunder, therefore, refer to the quantity and value of the zinc concentrates actually exported during the years specified.

ZINC.—CONCENTRATES, ETC., EXPORTED FROM NEW SOUTH WALES, 1889 TO 1925.

Year.	Quantity of Zinc Concentrates, etc., Exported.	Value.	Year.	Quantity of Zinc Concentrates, etc., Exported.	Value.
	Tons.	£		Tons.	£
1889	97	988	1922	363,681	1,157,458
1891	219	2,622	1923	426,049	1,411,652
1899	49,879	49,207	1924	353,650	1,296,571
1921	79,694	283,455	1925	226,525	1,022,016

(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 1921 to 1925 will be found in § 18 hereinafter.

(ii) *Queensland.* At the Silver Spur mine at Texas, in the Stanthorpe division of Queensland, part of the ore is high in zinc and lead, but low in silver. Profitable extraction of the zinc and lead depends, however, on cheap transport. It is proposed to convey the high grade zinc ore by motor tractor to the railway at Inglewood. Zinc sulphide is produced by the Mount Garnet Mine in the Herberton district, and during 1916 several hundred tons of good quality ore were raised, but until a suitable treatment plant has been erected, it is stated that production cannot be economically undertaken. The total production of zinc in 1925 was returned at 171 tons, valued at £2,350, produced in the Stanthorpe area.

(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.* Investigations in regard to the Read-Roseberry zinc-lead deposits in Tasmania have proved the existence of 1,680,000 tons of ore, which, added to an estimated quantity of 915,000 tons of "probable" ore, make a total supply of 2,595,000 tons. During the year 1925 the production from local ores was taken as 3,113 tons, valued at £110,691.

The Electrolytic Zinc Co. at Risdon worked on raw materials obtained partly from the West Coast district of Tasmania, but chiefly from Broken Hill in New South Wales. Production in 1925 consisted of 45,698 tons of slab zinc valued at £1,657,486, and 179 tons of cadmium, valued at £40,071. About 1,000 men were employed at these works. At Zeehan, where 178 men were employed, lead concentrate and zinc calcine were produced from Tasmanian ore. Lead concentrates amounted to 3,042 tons having a content of 1,170 tons of lead and 112,804 ozs. of silver, while 8,024 tons of zinc calcines were forwarded to Risdon for treatment.

2. *Prices.*—During the four years 1911 to 1914, the London price of zinc averaged £23 15s. per ton, ranging from £21 in 1914 to £26 3s. 4d. in 1912. Owing to the heavy demand and other circumstances arising out of the war, the prices in 1915 and 1916 reached the very high average of £67 11s. 1d. and £72 ls. 5d. per ton respectively. For 1921 the average recorded was £25 16s. 11d., for 1922, £30, for 1923, £33 1s. 2d., for 1924, £33 14s. 7d., and for 1925, £36 12s. 6d. per ton.

§ 8. Iron.

1. *General.*—The fact that iron-ore is widely distributed in Australia has 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.* (a) *Extent of Deposits.* Iron ores of various composition are found widely distributed throughout the State, but some of the deposits are at present of no commercial importance on account of their small and scattered extent, or by reason of their distance from means of transport. Excluding deposits too far from existing railways, or too small to warrant exploitation, as well as aluminous ores, the quantity of iron ore available by quarrying has been set down as 15 million tons. There is, in addition, a large tonnage available by the more costly method of mining. Altogether it appears probable that the total quantity available for smelting is about 53 million tons. The chief sources of supply during recent years were the deposits at Cadia, in the Orange division, and Tallawang, in the Gulgong division.

(b) *Lithgow Iron Works.* Reference to the events leading up to the establishment of ironworks at Lithgow will be found in earlier issues of the Year Book (see No. 3, p. 508). During 1925 the following materials were received at the blast furnaces: Iron ore, 165,689 tons; limestone, 63,015 tons; slag, 3,817 tons; manganese ore, 1,094 tons; and coke, 144,161 tons. The iron ore was raised from quarries owned by the Company at Tallawang and Cadia, and the pig iron produced therefrom amounted to 95,530 tons, valued at £525,415.

The following table shows the quantity and value of pig iron produced in New South Wales during the last five years from locally-raised ores only:—

PIG IRON.—PRODUCTION FROM LOCAL ORES, NEW SOUTH WALES, 1921 TO 1925.

Particulars.		1921.	1922.	1923.	1924.	1925.
Quantity	Tons	90,053	54,856	94,350	74,075	95,530
Value	£	639,376	248,909	707,625	518,525	525,415

The figures quoted above refer to production from *local* ores only, and as such credited to the New South Wales mineral industry. They do not, of course, represent the total production of pig iron in New South Wales, since, as shown in the succeeding paragraph, a considerable quantity of ore raised in South Australia, and credited therefore to the mineral returns of that State, is treated in New South Wales.

(c) *Newcastle Iron Works.* The Broken Hill Proprietary Company established works for the manufacture of iron and steel on a large scale at Newcastle, and operations were started early in 1915. The Company is utilizing the immense deposit of iron ore at the Iron Knob quarries in South Australia, which are connected with the seaboard at Whyalla, a distance of about 34 miles, by the Company's tramway. The ore quarried for the year ended 30th November, 1926, amounted to 566,765 tons. Extensive limestone works and loading bin at Devonport, Tasmania, as well as quarries in New South Wales for dolomite, magnesite, etc., are also owned by the Company.

The output of pig iron for the year ended 30th November, 1926, amounted to 332,587 tons, and of steel ingots to 321,809 tons. Further details in regard to the activities of these works in 1921 were given on page 347 of Official Year Book No. 15. The steel works possess three blast furnaces of a normal daily producing capacity of 1,300 tons, and a fourth furnace of 100 tons for the production of foundry iron. There are nine 65-ton basic open-hearth furnaces capable of producing 10 to 12,000 tons of ingot steel weekly. The works are supplied with a 35-inch blooming mill for the production of blooms, plates, etc., a 28-inch rolling mill for the manufacture of heavy rails, structural steel, billets, etc., an 18-inch mill for making light rails, structural shapes, fishplates, and heavy sections of merchant bar and billets, a 12-inch mill and an 8-inch mill, each for merchant bars, etc., a continuous rod mill for the production of wire rods, and a fishplate mill. A steel foundry, containing one acid open-hearth furnace, and a cupola furnace for iron castings, with a direct metal foundry which takes the hot metal from the blast furnaces, supply all necessary castings.

The company also possesses 224 by-product coke ovens, and connected with this department are the tar, sulphate of ammonia, and benzol plants.

(d) *Iron Oxide, etc.* A quantity of iron oxide is purchased by the various gasworks for use in purifying gas, and it is also to some extent employed as a pigment, the output in New South Wales being drawn chiefly from the deposits in the Port Macquarie, Moss Vale and Goulburn Divisions. During 1925 the iron oxide raised amounted to 4,376 tons, valued at £2,436. Since the closing down of the Sulphide Corporation's Works at Cockle Creek in 1922 there has been no production of ironstone for fluxing purposes.

(ii) *Victoria.* Iron ore has been located at various places in Victoria, particularly at Nowa Nowa in the Gippsland district, and at Dookie. A blast furnace was erected in 1881 near Lal Lal, on the Moorabool River, and some very fair quality iron was produced, which was used for truck wheels and stamper shoes at the Ballarat mines. The fall in the price of the metal, however, led to the closing of the works. In his report for 1905 the Secretary for Mines stated that without special assistance to the industry there does not seem to be any prospect of the deposits being profitably worked.

(iii) *Queensland.* Queensland possesses some extensive deposits of iron ore, which are mined chiefly for fluxing purposes in connexion with the reduction of gold and copper ores. During the year 1921, 4,061 tons of ironstone flux, valued at £5,976, were raised, the bulk of which came from Iron Island in the Rockhampton district. The production in subsequent years was small, only 345 tons having been raised in 1925 from deposits in the Chillagoe area. It is stated that Queensland possesses within its own border an abundance of the ore, fuel, and fluxes required for the carrying on of a large ironworks.

(iv) *South Australia.* South Australia possesses some rich deposits of iron ore capable of being mined for an indefinite period. The best known deposit is the Iron Knob, a veritable hill of iron ore of high percentage, situated about 40 miles W.S.W. from Port Augusta. A recent survey places the probable reserves of ore in the Iron Knob and Iron Monarch deposits at 133 million tons, with an average content of 63.64 per cent. iron. The Broken Hill company utilizes ore from this quarry at its ironworks at Newcastle, New South Wales, and the amount raised for the year 1926 was 566,765 tons, valued at £562,043. It is estimated that the deposits in the Middleback Range contain 32 million tons of slightly higher grade ore than that at the Iron Knob.

(v) *Western Australia.* This State has some very rich deposits of iron ore, but, owing to their geographical position, the most extensive fields at the present time are practically unexploited, the production in the State being confined chiefly to that needed for fluxing purposes. The ores are found over a stretch of country from Kimberley to Cape Leeuwin. Amongst the most important of the high-grade deposits are those at Yampi Sound in the Kimberley division, which are estimated to contain 97 million tons of very rich ore; Wilgie Mia, where the ore in sight is estimated at 27 million tons; Gabanintha, near Nannine, with over a million tons above surface level; Mount Gibson, in the south-west corner of the Yalgoo gold-field, where there are about 10 million tons of ore adapted for steel manufacture, by the acid process; Tallering Range in the westernmost angle of the Yalgoo gold-field where the deposits amount to several millions of tons; and Koolyanobbing, near Southern Cross, where there is a very large deposit of high-grade micaceous hematite. There was no record of production during the last few years.

(vi) *Tasmania.*—In Official Year Book No. 19, p. 742, some account was given of the position and magnitude of the deposits of iron ore in Tasmania, and it was pointed out that the quantity of ore available was estimated at 100 million tons. During the year 1908 about 3,600 tons of ore were raised, but there was no subsequent record of production. Exploitation of the deposits is at present dependent on the demand from the mainland.

(vii) *Northern Territory.* Large bodies of rich ironstone have been discovered in various parts of the Territory, particularly between the Adelaide River and Rum Jungle. Owing to the lack of local coal, however, the deposits possess no immediate value.

3. Iron and Steel Bounties.—The local production of iron and steel has been encouraged by various legislative enactments (see Official Year Book No. 15, p. 348). Under "The Iron and Steel Products Bounty Act 1922," bounties are payable on fencing wire, galvanized sheets, wire-netting, and traction engines made in Australia. It is essential that these articles be made from materials produced and manufactured in Australia, unless imported material is authorized after inquiry and report by the Tariff Board. The

total payments in any one financial year must not exceed £250,000. Rates of bounty are—for fencing wire and galvanized sheets, £2 12s. per ton; for wire-netting, £3 8s. per ton; and for traction engines from £40 to £90 each, according to brake horse-power. The amounts paid in each case during the year ended 30th June, 1926, were £97,387, £49,221, £95,127, and £270.

4. *World's Production of Iron and Steel.*—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, 1913, AND 1923 TO 1925.

Country.	Pig Iron.				Steel.			
	1913.	1923.	1924.	1925.	1913.	1923.	1924.	1925.
	Thousands of Tons.				Thousands of Tons.			
United States ..	30,966	40,361	31,436	36,701	31,301	44,944	37,932	45,394
Germany ..	16,499	4,859	7,690	10,047	17,348	6,206	9,681	12,176
France (a) ..	5,126	5,347	7,502	8,323	4,620	5,029	6,792	7,290
United Kingdom ..	10,260	7,439	7,319	6,236	7,663	8,482	8,221	6,137
Belgium ..	2,446	2,116	2,763	2,507	2,428	2,234	2,816	2,379
Luxemburg ..	2,508	1,385	2,124	2,308	1,308	1,180	1,852	2,053
Czecho-Slovakia ..	..	804	1,033	..	..	1,162	1,328	..
India ..	204	614	881	..	..	215	335	..
Russia ..	4,486	294	654	1,284	4,760	579	978	1,835
Canada ..	1,015	909	593	570	1,043	884	651	753
Sweden ..	732	277	508	423	582	267	495	456
Australia ..	47	330	416	444	..	53	200	354
Total—All Countries ..	77,536	65,988	64,112	72,400	74,787	73,615	73,687	83,500

(a) Lorraine is included with France in the last three years.

§ 9. Other Metallic Minerals.

1. *Antimony.*—The production of antimony ore in New South Wales amounted in 1925 to 29 tons, valued at £395, the output being obtained in the Hillgrove and Kempsey divisions. In addition 100 tons of Broken Hill concentrates exported overseas were estimated to contain 20 tons of antimony. Deposits of the mineral are also found in the Glen Innes and Drake divisions, and near Grasford in the East Maitland division. The total quantity of antimony (metal and ore) raised in New South Wales up to the end of 1925 was 19,061 tons, valued at £344,983. The production of antimony concentrates in Victoria during 1925 amounted to 120 tons, valued at £5,380. The whole of the production came from ore raised by a company operating at Costerfield. In Queensland extensive deposits are found at Neerdie in the Wide Bay district, at Wolfram Camp, on the Hodgkinson field, on the Palmer River in the Ravenswood district, and at various places in the Herberton district. Ore has also been obtained in the Dividing Range near Herberton and adjacent to some of the central tributaries of Emu Creek. Owing to the low price of the metal there has been no production during the last few years. In Western Australia lodes of stibnite carrying gold have been found in the Roeburne district. During 1917, 12 tons of antimony, valued at £258 were exported, but there was no subsequent production until 1920, when 3 tons, valued at £45, were exported. There was no record of production in later years.

2. **Arsenic.**—In New South Wales the production of arsenical ore and concentrates in 1925 amounted to 3,346 tons, valued at £8,333, of which 559 tons of ore yielding 97 tons of concentrates were raised by the Valla Gold Mines in the Bellingen division; 2,657 tons of ore yielding 296 tons of arsenic at the Ottery Mine in the Emmaville division; 430 tons of ore in the Hillgrove division; and small quantities of ore in the Armidale, Torrington, and Port Macquarie divisions. During 1917 the high price ruling for arsenic, and the urgency for the need of supplies in connexion with the destruction of prickly pear, led to the reservation by the Queensland Mines Department of an extensive area of arsenic-bearing deposits at Jibbinbar, in the Stanthorpe district. Production in 1925 from the Stanthorpe district amounted to 1,115 tons, valued at £11,150, but none was raised at the State mine during the year. The product is used not only for the destruction of prickly pear, but for the manufacture of arsenical dip solutions and other purposes. In South Australia arsenic-bearing minerals are found at some of the old mines, but, owing to slackness in the demand, only 100 tons of ore were raised in 1925. The arsenical ore (contained in gold ore) exported from Western Australia in 1925 was valued at £1,045.

3. **Bismuth.**—Ores of this metal are found in association with tungsten and molybdenum, and sometimes tin, in New South Wales, but owing to lack of a market the production of ore and concentrates in 1925 was only 11 tons valued at £2,950, the greater portion of the yield being obtained in the Glen Innes division in conjunction with mining for molybdenite. The total production to the end of 1925 was 805 tons, valued at £232,504. In Queensland wolfram and bismuth have been found in various districts, but, owing to the low prices obtainable, production in 1925 was small, amounting to 10 cwt. valued at £79, raised in the Chillagoe district. In South Australia deposits are found at Balhannah, at Mount Macdonald, and at Murninnie on the shores of Spencer's Gulf. A small quantity of bismuth was exported from Western Australia in 1919, but none was recorded subsequently. In Tasmania a small quantity, valued at £21, was raised in 1921 by the S. & M. mine at Middlesex, but there was no production in the last four years.

4. **Cadmium.**—The cadmium contained in the zinc ores mined at Broken Hill is recovered at Risdon, Tasmania, as a by-product in the electrolytic treatment of calcined zinc concentrates. During the four years, 1922 to 1925, amounts of 36 tons, valued at £13,189; 123 tons, valued at £34,776; 150 tons, valued at £33,478; and 156 tons, valued at £35,067 respectively were so obtained, but, as pointed out previously, credit is not taken for the value of the finished product in the New South Wales returns as the metal is not recovered in the State. Tasmania in 1925 credited its mineral returns with 5 tons of cadmium, valued at £1,178, obtained from zinc calcines produced from local ore.

5. **Chromium.**—The output of chromite in New South Wales during 1925 was estimated at 963 tons, valued at £2,670, of which 933 tons were raised in the Barraba division, and 30 tons at Attunga in the Tamworth division. Chrome iron ore is found in Queensland in the Rockhampton district, and about 160 tons were raised in 1920 by the Mount Morgan Company at Glen Geddes, but there was no production during the last five years. Chromite has been discovered at Coobina on the overland route between Peak Hill and Nullagine in Western Australia, but, on account of the difficulties of transport and the low price of the mineral, there is no immediate likelihood of production.

6. **Cobalt.**—This metal was found at Carcoar in New South Wales in 1889, and subsequently at Bungonia, Port Macquarie, and various other places. There was no export of cobalt since 1911, and the total produced since 1860 amounted in value to only a little over £10,000. In Queensland a rich deposit was opened up in 1920 at Mount Cobalt in the Cloncurry area, and the production in 1925 amounted to 90 tons, valued at £18,014. Although the product is a valuable one, greater development is hindered by the uncertainty of the demand.

7. **Lead.**—Lead mining *per se* is not practised to any extent in Australia, the supply of the metal being chiefly obtained in conjunction with silver and zinc. In New South Wales the Mines Department took credit in 1922 for 8,113 tons, valued at £194,712, and the production to the end of 1922 was taken as 327,000 tons, valued at £6,442,000. Owing to the closing down of the treatment works at Cockle Creek in 1922 no production was recorded, the whole of the lead concentrates being subsequently forwarded for treatment outside the State, principally at Port Pirie in South Australia. As stated previously, the metallic contents of the major portion of the silver-lead ores are extracted outside New South Wales, and the figures quoted above refer only to lead values

assigned as the produce of the State. In Victoria, oxides, sulphides, and carbonates of lead are found in the reefs on most of the gold-fields. The deposits are not, however, of sufficient extent to repay the cost of working. In Queensland the deposits are worked chiefly for the silver, copper or gold contents of the ore, the lead produced in 1925 amounting to 5,235 tons, valued at £187,681. Of this total the Chillagoe area produced 3,139 tons, valued at £112,533; the Herberton area, 613 tons, valued at £21,994; Etheridge, 448 tons, £16,078; Brisbane, 454 tons, valued at £16,275; Cloncurry 330 tons, valued at £11,830; and the Burketown area 179 tons, valued at £6,417. Lead has been found at many places in South Australia, although, with few exceptions, the lodes are not of great size. The works at Port Pirie in South Australia, controlled by the Associated Company, which includes the chief Broken Hill Mining Companies, constitute the largest and most complete lead smeltery in the British Empire. About 1,400 men are employed, and the fuel used amounts to 150,000 tons yearly. During 1925, lead and silver-lead ore exported from Western Australia amounted to 4,664 tons, valued at £103,300. The bulk of the product consists of lead ore raised on the Northampton field. Tasmanian lead production in 1925 was returned as 5,526 tons, valued at £197,452, of which the mines in the Dundas group contributed 5,079 tons, while 447 tons came from the mines in the Zeehan area.

8. **Manganese.**—During 1925 the output of manganese ore in New South Wales amounted to 1,164 tons, valued at £3,635, of which 1,029 tons were raised in the Grenfell division, and 105 tons in the Deepwater division. In Victoria the production in 1922 amounted to 150 tons, valued at £930, raised in the Heathcote division, but none was raised during the last three years. In Queensland there are extensive deposits of low-grade manganese ores in various places. High-grade ore is not available in quantity, but the deposits of medium grade at Kandanga should in future become a valuable asset in the steel industry. Production in 1923 amounted to 74 tons, valued at £332, but none was raised in the last two years. Extensive deposits of the ore were mined at Booloonda in South Australia some years ago, and it is found also at Pernatty, Hawker, and Gordon. The production in 1924 was valued at £1,128, but there was no output recorded in 1925. The Pernatty ore is of high grade, and being free from deleterious substances is specially suited for use in making high-grade steel. In Western Australia, ores of the metal are found widely scattered, the black oxide being especially plentiful in the Kimberley district. Extensive deposits exist in a locality 18 miles north-west from Peak Hill. In the northern part of the Cue district the deposits cannot at present be profitably worked owing to absence of cheap transport facilities. The export of manganese in 1924 consisted of 20 tons, valued at £160, but there was no return in 1925.

9. **Molybdenum.**—The production of molybdenite in New South Wales during the year 1925 amounted to 6 tons, valued at £1,648, chiefly obtained from mines at Kingsgate in the Glen Innes division. Small quantities of ore were also raised in the Grafton and Emmaville divisions. The total production of molybdenite since its discovery is stated at 827 tons, valued at £211,759. In Victoria 34 tons of concentrates valued at £5,545 were produced in 1925 at Everton. The production in Queensland for 1925 was 3 tons, valued at £271, partly raised on the Chillagoe field, and partly at Mount Perry. The Wombah mine near Mount Perry is regarded by geologists as one of the most promising sources of molybdenite in Australia. A small quantity was at one time produced from the mines in the Moonta district in South Australia, and the occurrence of the metal is reported from various other localities, but no production was recorded during the last five years. Molybdenite occurs in small quantities at various localities in Western Australia, the production recorded in 1922 being valued at £500, but none was recorded in later years. In the Northern Territory, molybdenite is found at Yenberrie, where it is stated that the ore increases in richness as the workings become deeper.

10. **Radium.**—Deposits of radio active ores occur in lode form in South Australia, and are believed to be richer and more extensive than any others so far located. There is an extensive deposit at Radium Hill, Olary, about 12 miles from Cutana railway siding, and another at Mount Painter in the Northern Flinders Ranges. Ores from both localities have yielded radium. Pure radium bromide was produced at a treatment plant in Sydney, and up to the end of 1914, when operations were suspended, 466 milligrammes were extracted. The Radium and Rare Earths Treatment Co. has been formed to exploit the radio-active ores at Olary, and a syndicate has taken up the workings at Mount Painter. A sample of 11 milligrammes of radium bromide was

extracted from 2½ tons of crude ore in 1925 by experts attached to the first named company. Extensive plant and buildings have been erected, and it is hoped that production on a large scale will shortly be possible. The value of ore raised in 1925 was set down at £172.

11. **Tungsten.**—Wolfram and scheelite, the principal ores of tungsten, are both mined to some extent in New South Wales, but the low prices obtainable caused a cessation of mining activity in this direction in the last four years. A large proportion of the total production from tungsten ores is obtained from the wolfram worked at Torrington, but the production in 1925 amounted to 7 tons only. The deposits at Hillgrove were the principal source of scheelite, but there was no production during the last five years. In Victoria the production of wolfram was returned in 1920 as 7½ tons, valued at £355, yields being obtained at Mount Murphy and the Tambo River, but there was no subsequent production. In Queensland, tungsten ores are found in several districts but, owing to low prices production in 1925 was insignificant, small yields being obtained in the Chillagoe and Herberton areas. (See also "Bismuth.") A deposit of wolfram was discovered near Yankalilla, in South Australia, as far back as 1893, but no production has been recorded since the year 1917. The mineral is also found at Callawonga Creek. There was no production of tungsten minerals in 1925 in Western Australia. Tungsten ores are commonly met with in the gold reefs, and both wolfram and scheelite have been recorded as occurring in several widely-separated localities. In the Northern Territory wolfram is found at Hatches Creek, Wauchope Creek, Wolfram Creek, Hidden Valley, and Yenberrie. Numerous samples of high grade ore have been obtained at the Frew River in Central Australia. The production in 1923 was, however, trifling, and none was recorded in 1924. Wolfram is mined at various points in Tasmania, the production for 1925 being 174 tons, valued at £14,658, of which 170 tons were raised at Storey's Creek. Scheelite has been discovered on King Island in Bass Strait, but there was no production in 1925.

12. **Other Metals.**—In addition to the metals enumerated above there is a large number of others occurring in greater or less degree, while fresh discoveries are being constantly reported.

§ 10. Coal.

1. **Production in each State.**—An account of the discovery of coal in each State will be found in preceding issues of the Year Book. (See No. 3, pp. 515-6.) The quantity and value of the production in each State, and in Australia, during the five years 1921 to 1925, are given in the table hereunder:—

COAL.—PRODUCTION, 1921 TO 1925.

Year.	N.S.W.	(a) Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Australia.
QUANTITY.							
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1921 ..	10,793,387	514,859	954,763	..	468,817	66,476	12,798,302
1922 ..	10,183,133	559,284	958,519	..	438,443	69,238	12,208,617
1923 ..	10,478,513	476,823	1,060,662	..	420,714	80,718	12,517,430
1924 ..	11,618,216	518,315	1,123,117	..	421,864	75,988	13,757,500
1925 ..	11,396,199	534,246	1,177,173	..	437,461	81,698	13,626,777
VALUE.							
	£	£	£	£	£	£	£
1921 ..	9,078,388	603,323	831,483	..	407,117	63,446	10,983,757
1922 ..	8,507,946	664,251	840,472	..	381,555	61,016	10,455,240
1923 ..	8,607,892	525,270	925,227	..	368,949	70,797	10,498,135
1924 ..	9,589,547	569,555	985,542	..	363,255	66,555	11,574,454
1925 ..	9,302,515	596,117	1,037,956	..	363,203	70,424	11,370,215

(a) Exclusive of brown coal.

The figures for Victoria quoted above are exclusive of brown coal, the quantity and value of which during the last six years were as follows:—

BROWN COAL.—PRODUCTION, VICTORIA, 1920 TO 1925.

Year.	Quantity.	Value.	Year.	Quantity.	Value.
	Tons.	£		Tons.	£
1920	162,682	64,180	1923	116,888	38,019
1921	79,224	31,074	1924	127,490	41,116
1922	90,402	31,179	1925	876,468	166,404

2. *Distribution and Production of Coal in each State.*—(i) *New South Wales.*—Estimates of the quantity of coal available in any large area of country are of course, more or less hazardous. Some years ago the Government Geologist estimated that within a depth of 4,000 feet from the surface the coal seams in New South Wales of a thickness exceeding 2½ feet were capable of producing over 78 million tons, allowing for a loss in working of one-fifth. In 1890, Professor David gave a total of between 130 million and 150 million tons, excluding seams under 3 feet in thickness. After a careful review of the position in 1901, the late E. F. Pittman suggested 115 million tons as an approximate figure.

In the following estimate by R. H. Cambage, of actual reserves, no account has been taken of coal below 4,000 feet, and the coal has been classified in three grades—Grade A, including coals of first quality, suitable for steam-raising, gas-making and household purposes; Grade B, including coals with lower calorific value and higher ash content than those in Grade A, but suitable for use as mined; Grade C, including coals from inferior seams generally with high ash content, but suitable for use after washing or flotation. The approximate tonnages in the various grades were—A, 6,800 millions; B, 5,100 millions; C, 8,100 millions, making a total of 20,000 million tons.

The total includes the amount already won, and, estimating a loss of one-fifth in winning, the actual commercial reserves may be considered to be about 16,000 million tons.

The coal from the various districts differs considerably in quality—that from the Newcastle 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 Permo-Carboniferous measures have in various places been disturbed by intrusions of volcanic rocks, which in some instances have completely cindered the seams in close proximity to the intrusive masses, while in other instances the coal has been turned into a natural coke, portion of which some years ago realized good prices as fuel.

The table hereunder gives the yields in each of the three districts during the five years 1921 to 1925:—

COAL.—PRODUCTION IN DISTRICTS, NEW SOUTH WALES, 1921 TO 1925.

District.	1921.	1922.	1923.	1924.	1925.
	Tons.	Tons.	Tons.	Tons.	Tons.
Northern	7,493,002	7,156,921	6,861,759	8,077,689	7,637,953
Southern	2,062,958	1,878,594	2,170,699	1,973,855	2,052,963
Western	1,237,427	1,147,618	1,446,055	1,566,672	1,705,283
Total	10,793,387	10,183,133	10,478,513	11,618,216	11,396,199

The output in 1925 was about 222,000 tons less than that for 1924, which was the highest recorded. It is stated, however, that a fresh record would have been created in 1925 but for the shipping hold-up during the latter portion of the year. The falling-off in 1922 as compared with the previous year was due to the closing down of the steel works at Newcastle, while the decline in production shown by the Northern district in 1923 was brought about mainly by stoppage of work on the Maitland coal-field from April to the beginning of August.

(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. An estimate, by R. H. Cambage, of the tonnage of extractable black coal places the total at 25 million tons, of which 20 millions are in the Wonthaggi area, 2 millions at Korumburra, Jumbunna, and Outtrim, and the balance in other small areas.

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

BLACK COAL.—PRODUCTION, VICTORIA, 1921 TO 1925.

Year.		State Coal Mine.	Other Coal Mines.	Total Production.	Value.
		Tons.	Tons.	Tons.	£
1921	.. ..	451,255	63,604	514,859	603,323
1922	.. ..	511,174	48,110	559,284	664,251
1923	.. ..	418,394	58,429	476,823	523,270
1924	.. ..	452,032	66,283	518,315	569,555
1925	.. ..	468,146	66,100	534,246	596,117

Amongst the other coal mines the chief producers in 1925 were the Sunbeam Colliery at Korumburra, with 18,232 tons; the Jumbunna Coal Pty. Ltd. at Jumbunna, with 15,609 tons; and the Austral Colliery, Dudley Syndicate, and Cardiff Colliery at Korumburra, with 10,237, 10,166, and 5,350 tons respectively.

(b) *Brown Coal.*—(1) *General.* Deposits of brown coal and lignite of immense extent occur in gravels, sands, and clays of the Cainozoic period throughout Gippsland, Mornington Peninsula, Werribee Plains, Gellibrand, and Barwon and Moorabool basins. In the Latrobe Valley, the beds reach a thickness of over 800 feet. As estimated by boring, the total tonnage of brown coal available, according to a report by the Government Geologist, amounts to 10,378 million tons, of which 5,000 million tons are situated in the Morwell district, a similar quantity in the Traralgon district, 250 million tons at Welshpool-Gelliondale, while the Altona, Lal Lal, and Wensleydale areas are capable of supplying 100 millions, 25 millions, and 3 millions respectively. When dried, the material makes good fuel, but, owing to its excessive combustibility and friability requires to be consumed in specially constructed grates. Its steaming value is equal to about half that of the Wonthaggi coal. Some large factories already have adopted brown coal for firing boilers, and there is also a fair demand for the product by householders. In 1917 an Advisory Committee appointed to report on the brown coal deposits of Victoria recommended the establishment of an open-cut mine at Morwell in connexion with a comprehensive scheme of electrical power generation and transmission, as well as for the supply of brown coal for other requirements. The recommendations of this Committee were incorporated in the "Electricity Commissioners Act" of 1918. The Commission is actively engaged in the work of opening up the Morwell deposits, and the product is being utilized for the generation of electricity, which is transferred to Melbourne and to other towns in Victoria within economic distance. The first generator at the Yallourn power station was brought into operation on the 15th June, 1924, and the works are now assisting in meeting the increasing demands for electric energy in the metropolitan and country areas of Victoria, and in certain areas in the south of New South Wales. The energy sold during the year 1925-26 amounted to about 162 million kw.-hours. A township has been established at Yallourn, with provision for an ultimate population of 3,000. On the 30th June, 1926, there were 2,473 employees engaged on the various works of the

Commission as follows:—At Yallourn, 1,158; Transmission Lines, 218; Metropolitan Works, 497; Water Power Investigation, 10; District Undertakings, 111; Brown Coal Mine (old open cut), 430; Rubicon Hydro-Electric Scheme, 49. Overhead lines erected to the 30th June, 1926, amounted to 979 route miles, and length of cable to 3,445 miles. At the same date about 133 miles of underground cable had been laid.

The brown coal produced in Victoria was raised chiefly at the State Open Cut at Yallourn, where the output in 1925 amounted to 701,761 tons, while 168,201 tons were raised at the old open cut at Morwell. During the year 2,258 tons were also raised by the Otway Coal Co., at Bambra, and 4,248 tons by the Victorian Central Coal and Iron Co. at Lal Lal.

(2) *Production of Briquettes.* The briquetting plant started operations in November, 1924, and the monthly average output in 1925-26 was 7,214 tons. It should be noted, however, that the Yallourn plant is what is known as a "half factory", and economic production will necessitate an extension thereof. The present capacity of the plant is about 100,000 tons a year, and the Commission is desirous of increasing this to 330,000 tons. According to the Report of the Geological Survey of the United States the world's production of briquettes in 1924 was 42 million tons, of which over 33 million tons were produced in Germany, 3 million tons in France, 2 million tons in Belgium, 1 million tons in the United Kingdom, while Spain, Netherlands, and the United States each produced about $\frac{1}{2}$ million tons.

(iii) *Queensland.* According to B. Dunstan, F.G.S., the coal measures of Queensland cover an estimated area of 73,000 square miles, of which 20,000 square miles are made up of recognized coal-fields, i.e., 2,000 square miles of Trias-Jura age, 2,000 Cretaceous, and 16,000 of Permian age. Estimated coal reserves include all seams not less than 1 foot thick situated at depths not greater than 1,000 feet below the surface. The actual and probable reserves are estimated at 412 million and 1,634 million tons respectively. Of the actual reserves, about 122 millions were set down as semi-anthracite, 279 millions as bituminous, 3 millions as semi-bituminous, and 8 millions as gas coal.

The distribution of production during the last three years was as follows:—

COAL PRODUCTION.—QUEENSLAND, 1923 TO 1925.

Districts.	1923.	1924.	1925.
	Tons.	Tons.	Tons.
Ipswich	607,983	596,720	614,053
Darling Downs	94,760	93,252	108,275
Wide Bay and Maryborough	74,215	105,181	119,704
Rockhampton (Central)	108,890	123,781	101,076
Clermont	50,553	55,799	62,204
Bowen	91,643	103,987	123,497
Mount Mulligan (Chillagoe)	32,618	44,397	43,364
Total	1,060,662	1,123,117	1,177,173

The output in 1925 was the highest recorded. There were 33 collieries operating in the Ipswich district, 5 in the Darling Downs, 6 in the Maryborough area, 10 in the Central district, 1 at Mount Mulligan in the Chillagoe district, and 2 in the Bowen district. State coal mines are in operation at Collinsville in the Bowen field, at Mount Mulligan in the Chillagoe field, at Baralaba in the Dawson Valley area, and at Hartley and Bowman in the Rockhampton area.

(iv) *South Australia.* Thin seams of black coal similar to the Jurassic coal of Victoria have been proved by a bore at Robe, but the depth at which the seams were located, i.e., between 2,830 feet and 3,950 feet, renders exploitation thereof unlikely. Reference to the situation and probable content of the widely distributed brown coal deposits in this State was made in Official Year Book No. 19, p. 750. In 1925, an expert commissioned by the Government to report on these deposits stated, amongst other things, that the brown coals at present known contain fairly large percentages of moisture, and have a high sulphur and ash content. Owing to their situation, deep-mining methods would be

necessary to win the coal, at an estimated cost of 10s. per ton. An extensive system of "scout" boring was recommended, with a view to discovering deposits suitable for mining by open-cut methods.

(v) *Western Australia.* The coal seams in Western Australia belong to the Carboniferous, Mesozoic, and Post-tertiary ages. Most of the coal contains a large proportion of moisture, and belongs partly to the hydrous bituminous and partly to the lignite class. The only coal-field at present worked is at Collie, in the Permo-Carboniferous beds. The area occupied by the coal measures is approximately 50 square miles, and the beds attain a thickness of over 2,000 feet, the coal seams totalling 137 feet.

Estimates place the amount of available coal on the field to a depth not exceeding 2,000 feet at 3,500 million tons.

The production from the five collieries situated at Collie amounted in 1925 to 437,461 tons, of which 266,000 tons were supplied to the railways. If the demand for coal warranted it, the output from any of the collieries could be considerably increased.

(vi) *Tasmania.* The total quantity of coal available for payable extraction has been estimated at approximately 135 million tons, or on the basis laid down by the International Geological Congress, 125 million tons actual reserve, and 123 millions probable reserve.

Of the output in 1925, amounting to 81,698 tons, the Cornwall and Mt. Nicholas Collieries in the North-Eastern division raised 38,151 and 28,965 tons respectively. About 12,600 tons were produced from the Cardiff-Jubilee Colliery, 800 tons from York Plains, 760 tons from Illamatha, 250 tons from Catamaran, and smaller quantities from Fingal, Mersey Valley, and others.

(vii) *Australia.* A summary of the information available in regard to estimated actual and possible reserves of coal for Australia as a whole is given in the appended table.

AUSTRALIA.—TONNAGES OF ACTUAL AND PROBABLE COAL RESERVES.

State.	Actual Reserves.	Probable Additional Reserves.
	Million tons.	Million tons.
New South Wales	20,000	100,000
Victoria	10,400 (Brown) 25 (Black)	Apparently not large
Queensland	412	13,000
South Australia	50	Fairly large, no estimate
Western Australia	(a) 3,500	..
Tasmania	125	123
Northern Territory	(b)	(b)
Total	34,512	..

(a) Combined reserves and probable reserves. (b) No estimate.

3. *Production in Various Countries.*—The total known coal production of the world in 1925 amounted to about 1,350 million tons, towards which Australia contributed nearly 14½ million tons, or about 1 per cent. The following tables show the production of the chief British and foreign countries during each of the last three years where the returns are available. Anthracite, bituminous, and sub-bituminous coals have been included under the heading black coal.

COAL PRODUCTION.—BRITISH EMPIRE, 1923 TO 1925.

Year.	Great Britain.	British India.	Canada.	Australia.	New Zealand.	Union of S. Africa.
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BLACK COAL.

	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1923 ..	276,000,600	19,656,900	11,971,900	12,517,400	935,700	11,074,700
1924 ..	267,118,200	21,176,600	8,994,600	13,757,500	1,085,000	11,633,400
1925 ..	243,176,200	19,969,000	8,489,800	13,626,800	1,004,700	13,582,500

BROWN COAL, LIGNITE.

1923 ..	..	..	3,198,300	116,900	1,034,100	..
1924 ..	..	..	3,182,400	127,500	998,200	..
1925 ..	..	..	3,232,900	876,500	1,070,300	..

COAL PRODUCTION.—FOREIGN COUNTRIES, 1923 TO 1925.

Year.	Germany.	Belgium.	France.	Czecho-Slovakia.	Poland.	Netherlands.	Russia.	Japan.	United States.
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BLACK COAL.

	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1923	61,314,600	22,553,900	46,118,300	11,437,900	35,517,900	5,195,700	10,437,000	23,483,600	587,406,800
1924	116,860,000	22,986,500	57,110,500	14,935,000	31,706,800	5,787,000	14,839,000	29,626,900	510,369,200
1925	130,490,700	22,761,400	59,072,600	12,549,500	28,613,100	6,738,500	15,826,000	29,000,000	522,128,900

BROWN COAL, LIGNITE.

1923	116,876,000	..	863,000	15,942,100	168,300	53,300	..	149,000	(a)
1924	122,634,100	..	928,900	20,130,900	86,600	188,100	..	173,900	(a)
1925	137,479,000	..	991,100	18,487,100	61,000	204,300	..	(a)	(a)

(a) Included with black coal.

4. Exports.—The exports of coal from Australia are chiefly confined to New South Wales.

The total quantity of coal of Australian production (exclusive of bunker coal) exported to other countries in 1925-6 was 794,340 tons, valued at £882,000, of which 792,144 tons were exported from New South Wales.

In the following table will be found the quantity and value of the exports from New South Wales, during the last five years. The figures are given on the authority of the Mines Department of that State, and include both bunker coal and coal exported from New South Wales to other States.

COAL.—EXPORTS, NEW SOUTH WALES, 1921 TO 1925.

Year	1921.	1922.	1923.	1924.	1925.
Quantity, 1,000 tons	5,525	5,239	4,900	5,414	4,771
Value, £1,000	5,794	5,929	5,481	6,037	5,243

Of the 4,771,000 tons of coal exported from New South Wales in 1925, over 87 per cent., or 4,174,000 tons, were shipped at Newcastle; 308,000 tons (including bunker coal, 150,000 tons) at Port Kembla and Bellambi; and 289,000 tons, mostly bunker coal, at Sydney.

The principal countries to which coal was forwarded from Newcastle during the last three years were as follows:—

EXPORTS OF COAL FROM NEWCASTLE, NEW SOUTH WALES, 1923 to 1925.

Country of Destination.	1923.	1924.	1925.
	Tons.	Tons.	Tons.
Victoria	1,384,000	1,691,000	1,502,000
New Zealand	689,700	715,900	616,000
South Australia	621,400	903,600	934,600
Tasmania	121,400	153,400	125,200
Western Australia	67,300	81,900	115,000
Queensland	71,900	78,100	101,300
United Kingdom	266,800	196,900	166,700
Java	117,300	81,300	98,800
Chile	110,900	109,600	4,600
United States	94,900	56,900	47,000
Philippine Islands	84,200	175,400	112,000
India	68,800	54,700	34,900
Straits Settlements	65,600	110,700	37,100
Sandwich Islands	42,300	15,900	11,700
Fiji	33,100	31,200	48,300
Noumea	32,600	17,600	33,800
Peru	29,500	28,700	36,400
Japan	23,300	25,100	13,300
Ocean Island	18,500	19,000	20,900
Nauru	17,000	24,600	21,400
Canada	12,900	9,400	21,200
Germany	11,300	18,200	15,900
Total—All Countries	4,043,000	4,688,000	4,174,000

During the year 1925 the exports from Port Kembla and Bellambi to other States amounted to 145,000 tons, while 13,000 tons were sent to New Caledonia, and 700 tons to New Guinea. The coal shipped from Sydney went principally to New Guinea and South Sea islands. For the twelve months ended 30th June, 1925, about 15,000 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, 1921 TO 1925.

Year.	Exports to Australian Ports.	Exports to Foreign Ports.	Local Consumption.	Total.
	Tons.	Tons.	Tons.	Tons.
1921	2,752,810	2,771,949	5,268,628	10,793,387
1922	2,841,253	2,398,144	4,943,736	10,183,133
1923	2,518,579	2,381,549	5,578,385	10,478,513
1924	3,096,881	2,317,063	6,204,272	11,618,216
1925	3,001,823	1,769,215	6,625,161	11,396,199

For the period of five years shown in the table above, 26·1 per cent. of the total output was exported to other States, 21·4 per cent. was sent overseas, and 52·5 per cent. was consumed locally.

The figures quoted 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, 1921 TO 1925.

Year.	Quantity of Coal Consumed.		
	Home Produce.	Produce of Other Countries.	Total.
	Tons.	Tons.	Tons.
1921	9,776,978	9,457	9,786,435
1922	9,531,274	46,620	9,577,894
1923	10,022,228	52,660	10,084,888
1924	11,395,631	9,234	11,404,865
1925	12,536,179	9,137	12,545,316

The bunker coal taken away in 1925 was estimated at 1,068,000 tons.

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 always 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, 1921 TO 1925.

Year.	Northern District.	Southern District.	Western District.	Average for State.
	Per ton.	Per ton.	Per ton.	Per ton.
	s. d.	s. d.	s. d.	s. d.
1921	17 7	16 6	12 10	16 10
1922	17 6	16 3	12 8	16 9
1923	17 7	16 1	11 5	16 5
1924	17 8	16 2	11 2	16 7
1925	17 7	15 11	11 1	16 4

(ii) *Victoria.* In Victoria the average price of coal in 1921 was 23s. 5d.; in 1922, 23s. 9d.; in 1923, 22s.; in 1924, 21s.; and in 1925, 22s. 4d. per ton. These averages are exclusive of brown coal, the production of which in 1925 was valued at 3s. 10d. per ton.

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

COAL.—PRICES, QUEENSLAND, 1921 TO 1925.

District.	Value at Pit's Mouth.				
	1921.	1922.	1923.	1924.	1925.
	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.	Per ton. s. d.
Ipswich	16 6	16 8	16 11	16 8	16 7
Darling Downs	18 10	18 11	19 1	18 10	18 8
Wide Bay and Maryborough	27 3	27 2	25 0	24 3	24 3
Rockhampton	15 6	16 5	15 5	15 0	16 1
Clermont	14 4	13 10	12 10	11 0	12 0
Bowen (State Coal Mine)	16 3	16 1	16 0	16 5	16 0
Mount Mulligan (Chillagoe)	19 10	20 0	22 6	29 6	31 3
Average for State	17 5	17 6	17 5	17 8	17 8

The readjustment of prices and wages in the industry was responsible for the increases in the averages during the last four years.

(iv) *Western Australia.* The average price of the Collie (Western Australia) coal during the last five years was as follows:—In 1921, 17s. 4d.; in 1922, 17s. 5d.; in 1923, 17s. 6d.; in 1924, 17s. 3d.; and in 1925, 16s. 7d. per ton.

(v) *Tasmania.* The average price per ton of coal at the pit's mouth in Tasmania for the five years 1921 to 1925 was:—In 1921, 19s. 1d.; in 1922, 17s. 7d.; in 1923, 17s. 6d.; in 1924, 17s. 6d.; and in 1925, 17s. 3d. per ton.

7. *Prices in the United Kingdom.*—During the five years 1921 to 1925 the average selling value of coal at the pit's mouth in the United Kingdom was:—In 1921, 26s. 2d.; in 1922, 17s. 7d.; in 1923, 18s. 10d.; in 1924, 18s. 10d.; and in 1925, 16s. 4d. per ton.

8. *Employment and Accidents in Coal Mining.*—The number of persons employed in coal mining in each of the States during the year 1925 is shown below. The table also gives the number of persons killed and injured, with the proportion per 1,000 employed, while further columns are added showing the quantity of coal raised for each person killed and injured, this being a factor which must be reckoned with in any consideration of the degree of risk attending mining operations. A further table gives the rate of fatalities during the last five years.

According to the report of the Chief Inspector of Mines for Great Britain, the average death-rate per 1,000 miners from accidents in coal mines during the quinquennium 1921–25 was 0.93, the rates varying between 1.06 in 1923, and 0.66 in 1921, while, as shown in the table following, the rate for Australia for the same period was 1.56. In the United States during the decennium 1913–22 the death rate per 1,000 employees averaged 4.3 for bituminous coal miners, and 4.4 for anthracite miners. Rates for other coal-producing countries for the same period were—Canada, 4.4; South Africa, 2.4; Germany, 2.8; Spain, 1.9; Belgium, 1.2; 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, while, as shown below in the case of Queensland, the average may be swollen by the occurrence of an extraordinary disaster in a single year.

COAL MINING.—EMPLOYMENT AND ACCIDENTS, 1925.

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 ..	24,049	27	115	1.12	4.18	422,100	99,100
Victoria ..	2,593	5	20	1.93	7.71	282,100	70,500
Queensland ..	2,826	3	62	1.06	21.94	392,400	19,000
Western Australia ..	677	..	78	..	115.21	..	5,600
Tasmania ..	250	..	2	..	8.00	..	40,800
Total ..	30,395	35	277	1.15	9.11	414,400	52,400

The figures for New South Wales include 20 shale miners. Owing to lack of uniformity in the definition of "injury," the figures relating to persons injured possess little value.

The next table shows the average number of miners employed, number of fatalities, and rate per 1,000 during the quinquennium 1921–25:—

COAL MINING.—FATALITIES, 1921 TO 1925.

State.	Average No. of Coal Miners.	Average No. of Fatal Accidents.	Rate per 1,000 Employed.
New South Wales ..	22,594	23.2	1.02
Victoria ..	2,194	2.8	1.28
Queensland ..	2,679	17.6	6.57
South Australia ..	4	..	..
Western Australia ..	735	0.6	0.82
Tasmania ..	259	0.2	0.77
Total ..	28,465	44.4	1.56

Figures for coal miners in South Australia appear for the first time in 1922, the miners being engaged chiefly on work in connexion with the brown coal deposits.

The abnormally heavy rate in Queensland is due to the inclusion of the 75 deaths in 1921 caused by the disastrous explosion of coal-dust at Mount Mulligan. For the quinquennium 1916-20 the Queensland rate was 1.79, and for the whole of Australia 1.14.

§ 11. Coke.

1. **Production.**—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. During the year 1925-6 the coke imported amounted to 52,000 tons, chiefly obtained from the United Kingdom, the bulk of the product being taken by South Australia. The table hereunder gives the production in New South Wales during the last five years :—

COKE.—PRODUCTION, NEW SOUTH WALES, 1921 TO 1925.

Year		1921.	1922.	1923.	1924.	1925.
Quantity	tons	592,097	240,229	580,374	564,372	609,418
Value, total	£	1,029,694	382,926	941,323	932,926	942,448
Value, per ton		34s. 9d.	31s. 10d.	32s. 5d.	33s. 1d.	30s. 11d.

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.

During recent years the industry has made considerable progress, and with the development of local iron and steel works, as well as metal refineries and smelting establishments, its future prospects ought to be assured. The heavy decline in quantity and value of coke made in 1922 was due to the lessened demand consequent on the closing down of the steel works at Newcastle, while the improvement manifested in 1923 was resultant on the recommencement of operations.

A small quantity of coke is made in Queensland, the quantity returned in 1925 being 5,384 tons, valued at £9,025, but the bulk of that used in ore reduction is imported, mainly from New South Wales. The following table shows the amount manufactured locally during the last five years :—

COKE.—PRODUCTION, QUEENSLAND, 1921 TO 1925.

Year		1921.	1922.	1923.	1924.	1925.
Quantity	tons	7,557	6,748	5,244	7,116	5,384

Information regarding the exact quantity of coke imported from New South Wales and elsewhere is not available.

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.

1. **Production.**—(i) *New South Wales.* The production of kerosene shale amounted during 1924 to 642 tons, valued at £962, as compared with 32,489 tons valued at £77,380 in 1921, but none was mined in 1925. It is estimated that the total quantity of shale in the State amounts to 40 million tons, but its profitable exploitation depends on economic methods of production. Up to date there has been no production of petroleum, but boring operations were carried out at Bargo, and several areas have been taken up for the purpose of boring in the Singleton division. The prospects of striking flow oil in the Belford dome and the associated structures known as the Loder and Sedgfield domes in the Hunter River district appeared encouraging, and the Federal Government offered to subsidize on a £1 for £1 basis up to £22,500 approved boring operations in this area by the State or a private company. The Government Geologist of New South Wales has, however, expressed the opinion that “there is nothing in the nature of evidence to justify a belief in the existence of commercial supplies of oil or gas in the domes under consideration.” A company with an authorized capital of £1,000,000 proposes to commence drilling on the area as soon as the special plant which is being obtained from America has been erected.

(ii) *Victoria.* Up to the present no extensive deposit of oil shale has been located in Victoria. Bores in search of oil have been put down from time to time, but so far without result, and the State geological authorities take an unfavourable view of the prospects of obtaining it.

(iii) *Queensland.* During the year 1925 the Lander Oil Co.'s No. 2 bore at Orallo was carried to a depth of 2,840 feet, when boring ceased. The obstruction in No. 1 bore was removed in July, but a second block occurred in August, and later on difficulty was met with in checking the inrush of water. The company has spent £85,000 in boring, and the machinery on the field is valued at £20,000.

The Commonwealth Government has allocated to the State a sum of £5,000 for detailed geological survey work. (See also Official Year Book No. 18, p. 801, and No. 19, p. 756).

(iv) *South Australia.* Bitumen is occasionally washed up on the southern coasts of the continent from Port Davey in Tasmania to Cape Leeuwin in Western Australia. Specimens found on Kangaroo Island at one time led to the belief that they were the product of a terrestrial petroliferous area. Similar occurrences of this mineral have been reported from the coasts of California, South Africa, and New Zealand. In 1920 the finding of accumulations of oily matter on the shores at Encounter Bay and Kangaroo Island was reported, but investigations by the Mines Department into the geological conditions of the surrounding country do not encourage the hope that the matter is of local origin. A considerable amount of money has been spent by private companies and individuals in the search for oil, but the results so far have been negative. The South Australian Government offers a bonus of £5,000 to the person or company first producing 100,000 gals. of crude petroleum from a bore or well in the State.

(v) *Western Australia.* In this State the chief interest in the search for oil centres in the Kimberley division. At Mount Wynne, in West Kimberley, the gas which bubbles freely in a hot spring has been found to contain hydrocarbons. Indications of free petroleum have been obtained in bores on Price's Creek, about 100 miles south-east of Mount Wynne, and traces of mineral oil have been detected in a seepage. In East Kimberley a black bitumen, residual from an asphaltic oil, has been found in weathered basalt in two localities 5 miles apart, thus indicating the former circulation of petroleum in the area. Boring operations were in progress during 1925 at “Freney's” in the Northern area, and indications were sufficiently encouraging to warrant continuance.

(vi) *Tasmania.* The deposits of oil shale in Tasmania in the Latrobe-Railton-Kimberley, Oonah, Beudah, Quamby Bluff, and Nook areas have an estimated capacity of upwards of 40 million tons. In addition the recently discovered deposits at Cheshunt are known to be large, but their full extent has not been determined. The Commonwealth Council for Scientific and Industrial Research is dealing with the problem of the commercial development of the mineral. During the last ten years exploitation of the vast areas available has been comparatively very small. For 1924 the output was 1,576 tons, valued at £1,526, and for 1925, 820 tons, valued at £559. Over three-fourths of the output in 1925 was raised by the Tasmanian Cement Co.

(vii) *Northern Territory.* Considerable activity has been displayed during recent years by speculators in acquiring areas under coal and oil prospecting licences along the north-western boundary of the Territory, and northerly along the western coast to the Daly River, but so far no developments have been recorded, although what are regarded locally as good indications of oil have been discovered. Many of the licences have been forfeited, and, so far, no success has attended the boring operations at Elcho Island.

(viii) *Papua.* In 1911 indications of petroleum were reported near the Vailala River, and, acting on the reports of geologists, an oil expert was despatched by the Commonwealth Government to sink trial bores on the site. Early in 1913 a small quantity of oil was obtained from a shallow bore. Later on, extensive geological surveys were made of the country between Yule Island and the Purari Delta, and oil was encountered in several trial bores. In 1919 the Anglo-Persian Oil Co., under agreement with the British and Commonwealth Governments, and latterly with the Commonwealth Government only, has been engaged in work on the field. At the end of June, 1926, three bores had been put down to depths of 890 feet, 1,800 feet, and 2,707 feet respectively. The New Guinea Oil Co. and the Vogel (New Guinea) Petroleum Co. have also been working almost continuously. A geological survey and examination has been made of the Papuan Gulf Coast north-west from Yule Island to the Kapuri River district, and a re-examination of areas in the Vailala River area.

(ix) *New Guinea.* At Matapau, about 54 miles from Aitape on the north coast of what was formerly German New Guinea, oil has been struck in a shallow bore, and hopes are entertained that the product will be encountered in large volume at a greater depth. At 30th June, 1926, there were in force 13 licences to prospect for mineral oil and coal.

2. *Expert's Report.*—A report by Dr. Wade presented to the Senate in October, 1924, by the Minister for Home and Territories was generally unfavourable to the prospects of finding commercial supplies of petroleum in the northern portions of Western Australia and the Northern Territory. The report points out that the marginal areas on the Fitzroy apparently offered the best possibilities, and special mention was made of the Price's Creek region, although the structure there was not satisfactory in regard to present geological knowledge. It was recommended that the district should be tested with boring plant capable of penetrating to a depth of between 3,000 and 4,000 feet. Allusion was also made to the possibility of locating oil in the Belford dome area in New South Wales.

3. *Exports.*—During the last five years the exports of kerosene shale have been trifling, only 11 tons being shipped from New South Wales in 1923–24, and 1 ton in 1924–25, while 1 ton was exported from Victoria in 1925–26.

4. *Mineral Oil Bounties.*—The offer by the Commonwealth Government of a reward up to £50,000 for the discovery of oil in Australia was withdrawn in 1925, and under the Petroleum Prospecting Act of 1926 a sum of £60,000 was allocated for providing aid to persons or companies engaged in the search for oil and to assist in geological survey work. Of the total amount, it was proposed to allocate £22,500 in aid of operations on the Fitzroy River and Price's Creek in Western Australia, £22,500 to the Belford dome area in New South Wales, £5,000 for geological survey work in the Longreach, Blackall, and Ruthven areas in Queensland, while the balance of £10,000 was reserved by the Commonwealth Government to assist boring operations in other localities where geological evidence justifies expenditure. The whole of the money has now been expended, and legislation is foreshadowed providing for a further sum of £100,000.

§ 13. Other Non-metallic Minerals.

1. *Alunite.*—The production of this mineral in New South Wales amounted during 1925 to 531 tons, valued at £2,124, raised in the Bullahdelah division. The mineral is sent to England for treatment, and, to the end of 1925, the exports were 58,000 tons, valued at £206,000.

In South Australia a deposit of the mineral was located in 1913 at Carrickalinga Head, on the coast north of Normanville, and within a short distance of Adelaide. Fresh discoveries were later reported on the western shores of St. Vincent's Gulf. Systematic prospecting has proved the existence of a deposit of at least 41,000 tons near Stansbury, on the eastern coast of Yorke Peninsula. The mineral returns show a production of 95 tons in 1922, but none was recorded subsequently.

The exploitation of the alunite deposits in the North-East Coolgardie field in Western Australia has been retarded pending the result of field experiments to determine the suitability or otherwise of the product as a fertilizer in its unroasted state. Deposits of the mineral are also found in the Kalgoorlie area.

2. **Asbestos.**—This substance has been found in various parts of Australia, but up to the present has not been produced in any considerable quantity. In New South Wales there was no production in 1925, the mines at Wood's Reef in the Barraba division having been abandoned towards the end of 1923. In Queensland seams of asbestos have been found over a belt of country extending from Cawarral to Canoona, as well as in other districts. Samples of the fibre proved suitable for the manufacture of fibro-cement sheeting and tiles, but so far the deposits have not been commercially exploited. Deposits of asbestos have been located at various places in South Australia. Production in 1924 amounted to 80 cwt., valued at £80, but none was raised in 1925. Chrysotile asbestos of high grade is found in various localities in Western Australia, particularly in the Serpentine rocks between Nullagine and Roeburne, over a distance of 200 miles. The production in 1925 amounted to 51 tons, valued at £1,641, obtained in the Pilbara field. In 1918, 2,854 tons of asbestos, valued at £5,008, were produced in Tasmania. A small quantity was raised in 1919, but there was no production during the last six years.

3. **Barytes.**—In New South Wales large quantities of this mineral are available at Kempfield in the Trunkey division, but the production in 1925 amounted to only 200 tons, valued at £400. The production in South Australia during 1925 was given as 2,008 tons, valued at £6,024. In this State there are extensive deposits of the mineral at Noarlunga and Pernatty Lagoon. The mineral is also worked near Williamstown, while new sources of supply have been located near Eudunda. High grade natural white barytes is obtained from some of the workings, but a large amount of lower grade ore is discarded or wasted owing to lack of facilities for cleaning and bleaching. Barytes in fair-sized veins occurs at many places in Western Australia, especially at Cranbrook in the south-west division. The export in 1921 was, however, small, being valued at under £20, and none was recorded in later years. About 1,000 tons of barytes, valued at £4,000, were produced in Tasmania in 1920, the greater portion being won from deposits near Queenstown and Mt. Jukes, and the balance from Beulah and elsewhere, but there was no further production recorded until 1925, when a little over 3 tons, valued at £16, was raised.

4. **Clays and Pigments.**—Valuable deposits of clays and pigments of various sorts are found throughout Australia. There is a considerable local production of earthenware, bricks, and tiles, but the finer clays have not as yet been extensively used. In New South Wales the production of pigments amounted in 1925 to 276 tons, valued at £166, raised chiefly at Burrabadine in the Dubbo division. About 4,000 tons of white clay, valued at £4,000, were raised from various areas during the year. The output of fireclay amounted to 18,000 tons, valued at £6,100, obtained chiefly in the Cobar, Wollongong, and Sydney divisions. In Victoria 1,594 tons of kaolin, valued at £2,262, were produced in 1925 from deposits at Stawell, Mt. Egerton, Bendigo, and Pyalong, and 307 tons of pigment clays, valued at £650, were raised from leases at Ballarat and Berringa. In Queensland, 2,886 tons of fireclay, valued at £700, were mined during 1925 in the Mount Morgan district. Deposits of fine white clay have been located near Wondai and Kingaroy. In South Australia ochre is obtained at the Copper King pigment mine near Beltana, and is also raised near Oodnadatta. Production in 1925 amounted to 87 tons, valued at £887. Red oxide of suitable quality as well as ochres of various hues have been found in different and widely-separated localities in Western Australia. A paint and distemper factory has been established in Perth, and this, coupled with the demand from the Eastern States, will further stimulate the search for the necessary materials. Investigation has proved the existence of a deposit of a fine white-ware clay

about 4 miles from the railway at Wagin. Porcelain and other clays of good quality have been found in Tasmania at Beaconsfield, Sorell, Hagley, etc. Oil and water paints have been made from coloured ochres from Sorell, and deposits of ochre have been located near Mowbray and Beaconsfield. In 1924 the output was 20 tons, valued at £50, but there was no record of production in 1925.

5. **Felspar.**—During 1925, the production of this mineral in New South Wales was 32 tons, valued at £32, raised at Brewongle. A fairly extensive deposit of felspar has been located at Black Ridge near Williamstown in South Australia, and the mineral has also been found near Myponga. Production in 1925 amounted to 9 tons, valued at £38. About 60 tons of felspar, valued at £485, were exported during 1922 from Western Australia, but none was recorded in later years. A large deposit of the mineral has been located near Jacob's Siding, and it also occurs in the Coolgardie area.

6. **Fluorspar.**—At Carboona in the Tumbarumba division in New South Wales this mineral is mined with silver and lead, the production in 1924 amounting to 470 tons, but none was raised in 1925. In Victoria 196 tons, valued at £625, were raised in 1921 by a company operating at Walwa, but none was recorded in later years. A high grade fluorspar occurs at the Perseverance mine on the Chillagoe railway in Queensland. Production in 1925 amounted to 4,227 tons, valued at £13,371.

7. **Fuller's Earth.**—About 30 tons of this material, valued at £50, were produced in 1925 from deposits in the Mudgee division, New South Wales, but there was no output from the deposits at Boggabri in the Narrabri division. A large deposit of excellent quality has been located near Jennacubbine in Western Australia.

8. **Graphite.**—This mineral is widely distributed throughout Australia, but there was no record of production in 1925. (See *Official Year Book* 19, p. 760.)

9. **Gypsum.**—The output of gypsum in New South Wales during 1925 was 296 tons, valued at £724, of which 276 tons were raised in the Bourke division, and 20 tons in the Hillston division. In Victoria during 1925 there was a production of 14,518 tons, valued at £11,291, of which 1,709 tons were raised from leases at Boort; 129 tons at Cowangie; 5,030 tons at Waitechie; 4,742 tons at Bolton; 2,137 tons at Lake Boga; and 771 tons at Chillingollah. South Australia possesses a valuable deposit at Lake MacDonnell, near the coast and south of the railway terminus at Penong, the quantity available being large and of high quality. The production in 1925 amounted to 72,276 tons, valued at £63,242, the largest yet recorded. A considerable quantity is used in the manufacture of plaster and cement, as well as for agricultural purposes. Gypsum is widely distributed in Western Australia in tertiary and late tertiary deposits associated chiefly with the salt lakes of the arid regions of the interior south of the tropics. Many of these lacustrine deposits are capable of yielding large tonnages. The production in 1925 amounted to 3,060 tons, valued at £4,118.

10. **Magnesite.**—Deposits of this mineral have been discovered at several localities in New South Wales. During 1925 the output was 14,012 tons, valued at £12,832, of which about 12,000 tons were raised at Attunga in the Tamworth division, and 2,000 tons in the Fifield division. In addition, small quantities were raised from deposits in the Cobar and Gulgong divisions. The mineral is found at Heathcote in Victoria, where 91 tons, valued at £273, were produced in 1925. There are deposits in the neighbourhood of Rockhampton and Bowen in Queensland, and in 1925 an output of 267 tons was recorded from the Rockhampton area. The deposits at present being worked in South Australia are situated at Paratoo, Robertstown, and Copley. Several other deposits have been located on Eyre Peninsula, near Port Pirie, and near Oladdie. Production in 1925 amounted to 351 tons, valued at £878. A large area of magnesite-bearing country has been located in Western Australia at Bulong, about 20 miles east of Kalgoorlie, and deposits have also been found at Coolgardie and other places. The mineral is of a high degree of purity, but there has been no production of importance since 1915.

11. **Mica.**—Mica is found at various places in Australia, and in 1925 a small quantity was raised at Wanda Vale in the Broken Hill division in New South Wales, and a little prospecting was carried out in the Narrabri division. Muscovite in fairly large quantities is found at Mica Creek, near Mount Isa in Queensland. The production in 1925 amounted to 10 cwt., valued at £700, and the report thereon was so satisfactory that it is proposed to exploit the deposits on a large scale. A company was recently formed in London to exploit a deposit at Yinnietharra, about 240 miles from Carnarvon in Western Australia. The production of mica in the Northern Territory during 1925 was returned at 7,440 lb., valued at £2,835, obtained chiefly from the Hart's Range area.

12. **Phosphate Rock.**—During 1925, 200 tons of phosphate, valued at £337, were obtained in New South Wales, of which 130 tons were won in the Molong division, 35 in the Inverell division, and 32 in the Kempsey division. In Victoria 532 tons, valued at £532, were raised at Mansfield, but none was recorded in 1925. The production in Queensland amounted in 1922 to 65 tons valued at £279, raised by the Holbourne Island Phosphate Company in the Bowen district. Difficulty in finding a market for the product was responsible for the small output, and none was raised in the last three years. South Australia possesses deposits scattered over a belt of country 200 miles in length, from Myponga in the south to the district round Carrieton, in the north. Production in 1925 amounted to 742 tons, valued at £1,142. It is stated that the industry is meeting with severe competition in the high grade phosphate imported from Nauru. In Western Australia the known phosphate deposits occur principally on the coastal islands, and in portion of the coastal plain between Dongarra and Perth. Some years ago guano digging on the islands was a large and profitable industry.

13. **Salt.**—Salt is obtained from salt lakes in the Western and North-Western districts of Victoria, and from salterns in the neighbourhood of Geelong. Figures regarding production are, however, not available for publication. Large quantities are obtained from the shallow salt lakes of South Australia, chiefly on Yorke Peninsula. Lake Hart, about 60 square miles in area, situated about 120 miles N.W. from Port Augusta, contains immense supplies of salt of good quality, and supplies are also obtained from Lake Bumbunga north of the head of St. Vincent's Gulf. During recent years a fair amount has been produced by evaporation of sea water at the heads of Spencer's and St. Vincent's Gulfs. About 78,000 tons of crude salt, valued at £176,000, were produced during 1925. In Western Australia salt is obtained from depressions in the calcareous sandstones of the coast, which are filled to a shallow depth in winter with salt water. In summer the depressions dry up, leaving a layer of salt two or three inches thick, which is collected and refined. Up to the present, the four chief localities producing salt were Rottnest Island, off Fremantle; Middle Island, near Esperance; Yarra Yarra Lakes, near Three Springs; and Lynton, near Port Gregory. There is a very large number of salt and brine lakes which may ultimately be used as sources of salt. In the Northern Territory a small quantity of salt is produced from salt pans on Ludmillah Creek near Fannie Bay.

14. **Diatomaceous Earth.**—Although this mineral has been found at various localities in New South Wales, the deposits have not been worked commercially on any considerable scale. The output in 1925 was 701 tons, valued at £1,084, of which 439 tons were raised in the Coonabarabran division, 250 tons in the Barraba division, and 12 tons at Bunyan in the Cooma division. Part of the product is used as a filtering medium in the manufacture of gelatine, and part for the manufacture of metal polish in powdered and liquid form. In Victoria there is a remarkably pure deposit at Lillicur, near Talbot, while beds of the mineral are also met with at other places in the Loddon Valley, near Ballarat, at various places close to Melbourne, at Craigieburn, Lancefield, Portland, Swan Hill, Bacchus Marsh, etc. During 1920, a production of 1,000 tons, valued at £5,000, was recorded, but no production was returned for 1921 to 1925. Fairly extensive deposits of diatomite exist in Queensland, in the Nerang, Beaudesert, and Canungar areas, but the various outcrops have as yet been only partly examined. In Tasmania a deposit of diatomaceous earth has been located at Oatlands, but its use for the manufacture of explosives is apparently prejudiced by the circumstance that the diatoms are pulverized and contaminated with clay.

§ 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 1925 in New South Wales was estimated at 210 carats, valued at £240, while the total production to the end of 1925 is given at 202,200 carats, valued at £144,500. The yield in 1925 was obtained almost entirely by individual miners at Copeton in the Tingha division. A considerable amount of prospecting work has been carried out at Red Hill in the Crookwell division, and some of the diamonds already won have been sent to Amsterdam to be cut and polished in order to ascertain the marketable qualities of the stones. Sapphires, chrysoberyl, rubies, beryl, garnets, tourmalines, zircons, and olivines have also been obtained in this area. Small quantities of diamonds are found in Victoria in the gravels of streams running through granite country in the Beechworth district, at Kongbool in the Western District, and near Benalla. The stones are generally small, and the production up to date has been trifling. In 1912, eleven small diamonds, valued at £20, were picked out of the sluice boxes of the Great Southern alluvial mine at Rutherglen. In Queensland a discovery was made in 1924 at Diamond Vale, about 2 miles east of Stanthorpe, the stones being found in alluvial tin wash. A flawless green diamond weighing 1 carat, a slightly smaller green, and a white weighing 1 carat, were recovered. The green diamond is extremely rare, and a specimen weighing $1\frac{1}{2}$ carats, exhibited at Wembley Park, was valued at £1,750. In South Australia diamonds have been found on the Echunga gold-fields, the most notable gem being Glover's diamond, which was sold for £70. A few small diamonds have been found in the Pilbara district in Western Australia. Small diamonds have, from time to time, been found in Tasmania, chiefly while sluicing for gold in the Donaldson district.

2. **Sapphires.**—The production of sapphires in New South Wales during 1925 was returned as 1,490 ozs., valued at £7,772, obtained at Horse Gully, Sapphire and Nullamanna in the Inverell division. It is probable that the output is understated owing to the difficulty of obtaining accurate returns from individual miners and prospectors. A fair quantity of machine stones, zircon and corundum, was also raised, but values thereof are not included in the figures above.

In Queensland, 22,237 ozs. of sapphires to the value of £34,573 were obtained in 1925 on the Anakie mineral field. Fancy stones occasionally bring high prices, an orange yellow which cut at 31 carats being valued at £300. Amongst other good stones found in 1925 were a yellow valued at £50, another at £15, and a first grade blue weighing 2 ozs. There is a lapidary on the Anakie field, but many stones are sent away for cutting.

Sapphires are plentifully found in the tin drifts of the Ringarooma and Portland districts in Tasmania, but the stones are, as a rule, small and not worth saving.

3. **Precious Opal.**—The estimated value of the opal won in New South Wales during the year 1925 was £10,030, practically the whole of the yield being obtained on the Lightning Ridge field, where there still remains an area of 12,000 acres of opal-bearing country of which little has been prospected. A small quantity of the gem was also obtained by prospectors on the White Cliffs field. Some very fine stones are at times obtained, one weighing 5 ozs. and valued at £300 being recovered in 1911. Occasionally, black opals of very fine quality are found, one specimen from the Wallangulla field, weighing $6\frac{1}{2}$ carats, being sold in 1910 for £102, while in the early part of 1920 a specimen realized £600. It is stated that this locality is the only place in the world where the "black" variety of the gem has been found. The total value of opal won in New South Wales since the year 1890 is estimated at £1,550,000, but it is a well known fact that fine pieces of the gem have been found and sold privately without notification to the Mines Department.

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 1925 was estimated at £1,000, and up to the end of that year at about

£182,000. These figures are, however, merely approximations, as large quantities of opal, of which no record is obtained, are disposed of privately. At present the industry, which is not followed by practical miners, suffers from the peculiar disability that in good seasons there is plenty of work available on the pastoral stations, and most men prefer this to the uncertain results obtainable by fossicking, while in dry seasons, when constant work is not obtainable, the search for opal is blocked by the absence of grass and water on the fields. During the year 1925 several good specimens were obtained by stockmen in the Jundah district, but no actual mining was carried on.

Renewed activity was manifested in 1925 at the Stuart's Range opal field in South Australia, the estimated value of the production being £9,000, as compared with £4,000 in 1924. The field is extremely prolific, and only a small portion of the known opal-bearing area has been tested. A fine collection of gems from this field was despatched to the British Empire Exhibition.

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, chiasolite, emeralds, garnets, olivines, moonstones, rubies, topazes, tourmalines, turquoises, and zircons.

§ 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 also to the permanence of new finds, and the development of the established mines. During the year 1925 the number so employed was as follows :—

NUMBER OF PERSONS ENGAGED IN MINING, 1925.

State.	Number of Persons engaged in Mining for—						Total.
	Gold.	Silver, Lead, and Zinc.	Copper.	Tin.	Coal and Shale.	Other.	
New South Wales ..	831	5,770	47	1,012	24,049	1,905	33,614
Victoria ..	2,353	..	..	..	2,593	163	5,109
Queensland ..	347	590	878	653	2,826	521	5,815
South Australia ..	34	19	55	2	..	834	944
Western Australia ..	5,009	204	34	55	677	32	6,011
Tasmania ..	103	579	743	1,035	312	549	3,321
Northern Territory ..	32	4	6	118	..	25	185
Australia ..	8,709	7,166	1,763	2,875	30,457	4,029	54,999

Included in the figures for "other" in South Australia were 407 engaged in mining for iron, 131 gypsum miners, 154 salt gatherers, and 50 opal miners. The Tasmanian figures include 442 osmiridium miners, and those for the Northern Territory were mica miners.

The following table shows the number of persons engaged in mining in Australia during each of the years 1891, 1901, and 1925, together with the proportion of the total population so engaged :—

NUMBER ENGAGED IN MINING PER 100,000 OF POPULATION, 1891, 1901, AND 1925.

State.	1891.		1901.		1925.	
	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.	Miners employed.	No. per 100,000 of Population.
New South Wales	30,604	2,700	36,615	2,685	33,614	1,475
Victoria	24,649	2,151	28,670	2,381	5,109	306
Queensland	11,627	2,934	13,352	2,664	5,815	683
South Australia	2,683	834	7,007	1,931	944	174
Western Australia	1,269	2,496	20,895	11,087	6,011	1,633
Tasmania	3,988	2,695	6,923	4,017	3,321	1,556
Northern Territory .. ..	..	..	..	..	185	5,026
Australia	74,820	2,341	113,462	2,992	54,999	927

The general falling-off since 1901 is due to the stagnation caused by the war, the low price of industrial metals, and largely to the decline in the gold-mining industry.

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

3. **Accidents in Mining, 1925.**—The following table gives particulars of the number of men killed and injured in mining accidents during the year 1925 :—

MINING ACCIDENTS, 1925.

Mining for—	N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tas.	N.T.	Australia.
KILLED.								
Coal and shale	27	5	3	..	..	..	..	35
Copper .. ..	..	..	..	..	..	1	..	1
Gold	1	1	..	..	12	..	..	14
Silver, lead, and zinc	2	..	..	..	..	..	..	2
Tin .. ..	..	..	..	..	..	..	..	..
Other minerals .. ..	..	..	..	..	..	..	..	..
Total	30	6	3	..	12	1	..	52
INJURED.								
Coal and shale	115	20	62	..	78	4	..	279
Copper .. ..	..	..	8	..	..	17	..	25
Gold	1	6	1	..	304	..	..	312
Silver, lead, and zinc	53	..	14	..	1	14	..	82
Tin .. ..	..	..	1	..	..	13	..	14
Other minerals .. ..	..	..	1	2	..	..	..	3
Total	169	26	87	2	383	48	..	715

The number killed in mining accidents in 1925 was considerably less than that for 1921 when 132 deaths were recorded, the figures for the earlier year being swollen by the 75 fatalities in the Colliery disaster at Mount Mulligan in Queensland.

§ 16. Government Aid to Mining.

1. **Commonwealth.**—Assistance to mining is given by the Commonwealth under the provisions of the *Precious Metals Prospecting Act 1926*, and the *Petroleum Prospecting Act 1926*.

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.

Under the Petroleum Prospecting Act a trust account of £60,000 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.

2. **New South Wales.**—The chief aid given in this State is in the direction of assistance to prospectors. Up to the end of 1925 the total sum expended in this manner amounted to £565,025, of which £17,547 was advanced in 1925. A sum of £750 was made available during the year for the purpose of assisting in the erection of crushing batteries or reduction plants, but no advances were made therefrom. The reward for the discovery of new mineral fields within the State has been increased from £500 to £1,000, with provision for sums of £250 and £500 in respect of fields not large enough to qualify for the full amount, and the conditions have been made more liberal.

3. **Victoria.**—During the year 1925–26 expenditure in connexion with mining development amounted to £24,918, of which £2,891 represented advances to miners, £3,629 aid to mining companies, while £12,233 was expended on boring, £3,141 on testing plants, and £2,194 on geological surveys.

4. **Queensland.**—State assistance to the mining industry in 1925–26 amounted to £15,694, of which £2,279 consisted of loans in aid of deep sinking; £9,533 grants in aid of prospecting, and £3,882 in aid of roads and bridges to gold and mineral fields and water supply. In addition, a sum of £4,540 was expended in loans under the Act of 1906, £40,881 on State Coal Mines, £6,475 in aid of mining, and £10,000 on State Smelting Works.

During the year the Chillagoe State Smelters produced 2,837 tons of lead bullion containing 692 ozs. of gold, 189,223 ozs. silver, and 2,751 tons of lead, in addition to 605 tons of blister copper containing 243 ozs. gold, 45,285 ozs. silver, and 588 tons copper. The State Arsenic Works at Jibbinbar produced 379 tons of high-grade arsenic in 1924, but the mine closed down in 1925. Four State batteries were in operation during 1925, the works at Irvinebank producing 949 tons of tin concentrates; 760 ozs. of gold were extracted by the battery at Kidston; at Charters Towers parcels of ore were treated for miners and prospectors, and the battery was rented for short periods to parties of miners; and at Bamford tin crushing was carried on intermittently. The State Assay Office at Cloncurry in addition to free assays dealt with 377 parcels of samples aggregating 5,375 tons.

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 1925 the total amount of subsidy paid was £66,279, of which £13,374 has been repaid, and £2,250 written off, leaving a debit of £50,655. 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. During the year 1925 assays and pan tests numbering 404 were made by State batteries and cyanide works of small parcels of ore or tailings received from prospectors. Forty parcels of ore weighing 600 tons were treated for a return of 927 ozs. gold valued at £3,300.

6. **Western Australia.**—Under the Mining Development Act of 1902 assistance was granted in 1925 in accordance with the subjoined statement:—Advances in aid of mining work and equipment of mines with machinery, £22,588; aid to prospectors, £5,640; subsidies paid on stone crushed for the public, £133; making a total of £28,361. In addition, a sum of £49,135 was charged against the vote on account of rebates to the Gold-fields Water Supply Branch, and other assistance amounted to £4,207. The receipts under the Act, exclusive of interest payments, came to £3,574, of which £2,416 consisted of refunds of advances. The industry has been further assisted by Government guarantees to banks on behalf of various companies, and at the end of 1925 the liability in this respect amounted to £44,500.

In 1924 there were 29 State batteries in operation. The amount expended thereon up to the end of 1925 was £91,981 from revenue and £311,240 from loan, giving a total of £403,221. During the year receipts amounted to £21,303, and working expenditure to £28,888. The total value of gold and tin recovered to the end of 1925 at the State plants was £5,950,837, resulting from the treatment of 1,420,000 tons of gold ore and 81,000 tons of tin ore, together with a small amount from residues. Free assays and determinations of mineral values for prospectors are made at the Kalgoorlie School of Mines.

7. **Tasmania.**—In the Aid to Mining area at Zeehan the expenditure in 1925 amounted to £1,313, of which £534 represented salaries and wages, £508 advances to prospectors, and £172 assay material. The amount received from ore sales was £2,868, of which £2,582 was paid to tributers. At the end of 1925, the total advances to the Argent Prospecting Syndicate amounted to £3,222, and the balance still owing to £2,143.

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 1924–25 a sum of £316, representing the balance of a subsidy of £350, was paid to the Golden Dyke Syndicate in aid of developmental work. A small number of prospectors on the Marranboy tin field received free rations.

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. Commonwealth Government Control of Industrial Metals.

The proclamation under the Customs Act prohibiting the exportation of metals without the consent of the Minister for Trade and Customs is still in force, but consent is granted in every case where the contract relating to the sale of the metals has been approved.

§ 18. 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 1922 to 1926 were as follows:—

REFINED METALS PRODUCED IN AUSTRALIA, 1922 TO 1926.

Metal.		1922.	1923.	1924.	1925.	1926.
Silver ..	ozs.	7,896,052	7,645,689	7,631,213	8,573,506	8,946,218
Lead, pig ..	tons	105,528	118,513	126,625	146,129	150,460
Zinc ..	tons	23,724	41,153	46,372	45,608	47,356
Copper ..	tons	11,524	17,825	14,100	10,984	11,148
Tin ..	tons	2,657	3,053	3,167	3,171	3,188

The local production of pig iron during the last five years ranged between 330,000 tons in 1923, and 439,000 tons in 1926.

2. Metallic Contents of Ores, Concentrates, etc., Exported.—The estimated metallic contents of ores, concentrates, etc., exported during the five years 1922 to 1926 are given in the following table:—

METALLIC CONTENTS OF ORES, CONCENTRATES, ETC., EXPORTED, 1922 TO 1926.

Metal.	Contained in—	1922.	1923.	1924.	1925.	1926.
Silver	ozs. { Lead—Silver—Gold Bullion Lead Concentrates and Ores Zinc Concentrates and Ores Copper Ores ..	163,290	283,453	158,361	189,223	..
		281,728	1,298,750	90,360	850,552	190,647
		3,390,964	3,526,774	1,941,507	1,270,166	1,206,313
		12,201	1,378	51,942	..	..
	Total	3,850,243	5,110,355	2,242,170	2,309,941	1,396,960
Lead	tons { Lead—Silver—Gold Bullion Lead Concentrates and Ores Zinc Concentrates and Ores	1,790	3,564	1,808	2,751	2,483
		2,959	18,572	4,852	19,651	7,174
		19,910	425	19,859	12,423	13,943
	Total	24,659	22,561	26,519	34,825	23,600
Zinc	tons { Lead Concentrates and Ores Zinc Concentrates and Ores	..	..	384	366	529
		135,690	146,693	122,305	79,996	94,043
	Total	135,690	146,693	122,689	80,362	94,572
Copper	tons Ores, Matte, etc. ..	326	2,182	875	864	1,112
Tin	tons Concentrates and Ores ..	..	..	4	..	1

§ 19. 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 1925-26:—

OVERSEA EXPORTS OF AUSTRALIAN ORES, METALS, ETC., 1925-26.

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.
Alunite	21,300	21,300	..	..	..	..	..	..
Antimony	33	33	..	..	..	..	..	..
Cobalt	7,062	7,062	..	..	..	..	..	..
Silver and Silver-lead	180,902	..	..	118,353	59,677	..	..	(a)2,872
Concentrates—								
Silver and Silver-lead	533,518	129,945	..	164,171	33,653	..	..	(b)205,749
Zinc	5,346,314	4,274,543	..	858,107	213,664	..	..	..
Cadmium—Blocks, Ingots, etc. ..	3,672	2,297	..	..	..	..	..	(c)1,375
Copper—								
Matte	37,108	6	1,040	38,062	..	..	..	..
Ingot	58,500	50,003	2,427	..	..	..	70	(d)6,000
Tin—Ingot	35,816	16,310	13,074	..	200	..	5,577	(e)655
Lead—								
Matte	68,423	68,423	..	..	..	..	..	..
Pig	2,540,568	2,090,906	..	60,450	128,039	162,369	40,790	(f)58,014
Zinc—Bars, Blocks, etc.	580,920	121,996	..	..	133,004	324,440	261	(g)1,219
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.
Platinum, Osmium, etc.	5,148	3,043	1,729	..	20	..	12	344
Gold—								
Matte	762	762	..	..	..	..	..	..
Bar, Dust, etc. ..	85,671	682	..	..	..	..	..	(h)84,989
Silver—								
Matte	250,251	250,251	..	..	..	..	..	..
Bar, Ingot, etc. ..	7,588,673	2,113	..	..	..	..	711	(i)7,585,840
VALUE—£.								
Ores—								
Alunite	4,260	4,260	..	..	..	..	..	..
Antimony	140	140	..	..	..	..	..	..
Cobalt	17,655	17,655	..	..	..	..	..	..
Silver and Silver-lead	189,397	..	..	117,293	68,892	..	..	3,212
Concentrates—								
Silver and Silver-lead	528,296	136,653	..	148,783	34,038	..	..	208,822
Zinc	1,495,373	1,156,344	..	240,340	98,689	..	..	..
Cadmium—Blocks, Ingots, etc. ..	38,534	24,372	..	..	..	..	..	14,162
Copper—								
Matte	82,431	20	1,488	80,923	..	..	..	..
Ingot	193,112	171,535	6,770	..	..	..	282	19,525
Tin—Ingot	486,473	222,487	176,755	..	2,867	..	76,029	8,335
Lead—								
Matte	107,380	107,380	..	..	..	..	..	..
Pig	4,416,762	3,608,643	..	104,554	241,119	292,018	70,147	100,281
Zinc—Bars, Blocks, etc.	1,069,332	228,300	..	..	252,350	585,635	600	2,447
Platinum, Osmium, etc.	153,836	91,160	53,630	..	560	..	232	8,254
Gold—								
Matte	3,243	3,243	..	..	..	..	..	..
Bar, Dust, etc. ..	345,707	2,748	..	..	..	..	..	342,959
Silver—								
Matte	34,468	34,468	..	..	..	..	..	..
Bar, Ingot, etc. ..	1,073,356	301	..	..	..	..	94	1,072,961

(a) France, 2,665 cwt.; Netherlands, 207 cwt. (b) Spain. (c) France, 852 cwt.; Japan, 60 cwt.; Sweden, 463 cwt. (d) India. (e) France, 600 cwt.; Pacific Islands, 48 cwt.; Other British Countries, 7 cwt. (f) Chiefly Hong Kong, 32,312 cwt.; China, 15,401 cwt. and South Africa, 9,727 cwt. (g) China, 1,200 cwt.; Other, 19 cwt. (h) India. (i) India, 7,489,013 oz., Ceylon, 89,236 oz., Fiji, 7,600 oz.