MINERAL RESOURCES.

ALMOST all the principal metals of economic value are found in Australasia, and many are common to several Colonies. In dealing with the occurrence and value of mineral deposits, the classification into noble metals, metallic minerals, carbon minerals, soluble and insoluble salts, diamonds and other gem stones, has been adopted.

NOBLE METALS.

Gold.

Gold, the most valuable of noble metals, is found throughout Australasia, and the present prosperity of the Colonies is largely due to gold discoveries, the development of other industries being, in a country of varied resources, a natural sequence to the acquisition of mineral treasure.

Discovery of gold.

Settlement in Australia was still young when many-tongued rumour spoke of the existence of gold, but it was not until the 16th February, 1823, that the Government was officially apprised of a discovery destined to be the precursor of a prosperity seldom surpassed in the history of nations. On the date mentioned Mr. Assistant-Surveyor M'Brien reported that, at a spot on the Fish River, about 15 miles east of Bathurst, he had discovered gold. Mention is made, in the early records of New South Wales, of several other finds, but it remained for Count Strzlecki and the Rev. W. B. Clarke to demonstrate the existence of the precious metal in payable quantities, and to assert their belief in its abundance, an opinion strongly supported in England by several eminent authorities, and substantiated by Hargraves' discovery in the year 1851. The gold-fields of Lewis Ponds and Summer Hill Creek had hardly been opened up when, on the day that witnessed the severance of the Port Phillip district from the mother Colony of New South Wales, Mr. J. M. Esmond discovered gold in Victoria. Shortly afterwards, a rush set in for Ballarat, and the gold fever

took possession of Australia. The following year (1852) saw gold found in South Australia and Tasmania; the rush to Canoona, in Queensland, took place in 1858; and gold was also discovered in New Zealand in the same year, though it was not until 1861 that a large population was, by the prospect of rapidly obtained wealth, attracted to the last-mentioned colony. It would be strange if Western Australia could not also claim the possession of auriferous deposits, and, although for many years belief in the existence of gold in that Colony was simply speculative, the reports of explorers in the Kimberley District, and subsequent developments, proved that the great territory of the west has a share of the treasure.

Weight and value of gold raised.

The following table gives the weight and value of gold raised from the start of mining in the various Colonies to the end of the year 1889, and the proportion due to each :—

Production of Gold, 1851–89.

Colony.	Weight.	Value.	Proportion of value raised by each Colony.
	oz.	£	per cent.
New South Wales.....	10,092,356	37,614,887	11·20
Victoria.....	56,250,798	225,003,192	66·98
Queensland	6,827,888	23,897,608	7·11
South Australia	273,441	1,068,191	0·32
Western Australia	135,492	518,871	0·16
Tasmania	565,174	2,151,071	0·64
New Zealand.....	11,625,028	45,652,191	13·59
Australasia	85,770,177	335,906,011	100·00

Effect of gold discovery in Victoria.

It will be readily understood from the foregoing figures how Victoria, though comparatively small in area, achieved the foremost position amongst the Colonies, and retained that place so long as the powerful attraction of gold continued; but as the alluring dazzle of the gold-seeker's life was gradually dimmed by privation and frequent disappointment, people turned to safer, if less brilliant, fields of employment. Although the discovery of

such extraordinary deposits as those of Mount Morgan, in Queensland, may astonish the world, and give princely dividends to shareholders, the thirst for gold—so powerful in the past—cannot now entice any considerable proportion of the population from other pursuits, and this, notwithstanding that only a small portion of the auriferous area of the continent has been explored, and a still smaller portion fully developed.

Progress of gold-mining.

The production of gold, which had been declining steadily for many years, reached the lowest point in 1886. Since then there has been a marked revival, owing chiefly to the increased production of Queensland. It will be seen from the following figures, showing the quantity and value of gold obtained in 1889, that Queensland is now the largest gold-producer of the group :—

Australasian production of gold in 1889 :—

Colony.	Weight.	Value.	Proportion raised by each Colony.
	oz.	£	per cent.
New South Wales	119,759	434,070	6·63
Victoria	614,839	2,459,356	37·58
Queensland	739,103	2,586,861	39·53
South Australia	20,833	76,780	1·17
Western Australia.....	15,492	58,871	·90
Tasmania.....	32,332	119,703	1·83
New Zealand	203,211	808,549	12·36
	1,745,569	6,544,190	100·00

Quantity of gold per miner.

The average value of gold to each miner is given below, but, as the conditions under which mining is carried on are by no means the same in every Colony, the figures, which vary considerably, may be not a little misleading. In those colonies where a revival of mining has lately been experienced, it is natural to expect a fall in the average yield per miner, for mining, as now carried out, is not an industry from which immediate returns can be expected. But when full allowance is made on this score it will be evident that in some colonies, at least, the search for gold is not a profitable

occupation. The following shows the number of miners at work in 1889, with the quantity and value of gold won per man :—

Colony.	No. of miners.	Amount won per miner.	Value per miner.
		oz.	£ s. d.
New South Wales	10,192	11·75	42 11 9
Victoria	24,323	25·28	101 2 2
Queensland	8,955	32·53	288 16 9
South Australia	3,500	5·94	21 18 7
Western Australia	1,000	15·49	58 17 5
Tasmania	1,128	28·66	106 2 5
New Zealand	13,497	15·05	59 18 0
Australasia	62,595	27·89	104 11 0

Yield of quartz.

Attempts have been made to ascertain the average yield from quartz, but the number of tests made and the quantity of stone treated are inconsiderable ; furthermore, it has not been found possible to obtain material from all the principal mining centres. The results obtained in 1887, 1888, and 1889, are given below :—

	New South Wales.	Victoria.	Queensland.	Tasmania.
	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.	oz. dwt. grs.
1887	0 9 5	0 9 10	1 15 10	1 5 21
1888	1 0 18	0 9 18	1 14 11	1 5 2
1889	1 0 2	0 9 19	1 17 20	0 17 16

The data on which the estimate for Queensland is based are probably below the mark, as the Mount Morgan returns are not included in the calculations. It is not pretended that the above figures have any great statistical value, but they may, nevertheless, be accepted as giving an approximate idea of the average yield of quartz-reefs. Alluvial deposits are generally richer than those in reefs ; but the precious metal is so unevenly distributed that any attempt to obtain a reliable average would be futile.

Large nuggets.

A notice of gold-mining would be incomplete without some reference to the remarkably large finds made at various times. Information on this point is meagre, and not altogether reliable, as doubtless many nuggets were unearthed the weight and value of which were never published, or, being merely ascertained from report, left a wide margin for exaggeration. Victoria's record is the best, and includes the following nuggets:—

Victorian nuggets.

	lb.	oz.	dwt.
"The Welcome Stranger," found 9th February, 1869...	190	0	0
"The Welcome," found 9th June, 1858	184	9	16
One found at Canadian Gully, 31st January, 1853.....	134	11	0
And others of the following weights	98	1	17
	93	1	11
	84	3	15
	69	6	0
	52	1	0
	30	11	8
	30	11	2

Nuggets found in New South Wales.

New South Wales can boast of having produced some splendid specimens. In 1851 a mass of gold was found on the Turon, weighing 106 lb.; another, from Burrandong, near Orange, produced, when melted at the Sydney Mint, 1,182 oz. 6 dwt. of pure gold; and a third, the "Brennan," was sold in Sydney, in 1851, for £1,156. During 1880–82 several nuggets were discovered at Temora, weighing from 59 to 1,393 oz., and others, of 357, 347 (the "Jubilee"), 200, 47, and 32 oz. respectively, were found during the year 1887 in various parts of the Colony. Veins of gold of extraordinary richness have been worked in New South Wales. In January, 1873, at Beyers and Holterman's claim, at Hill End, 1·02 cwt. of gold was obtained from 10 tons of quartz, and a mass of ore, weighing 630 lb., and estimated to contain £2,000 worth of gold, was exhibited. The Mint returns during the year 1873, for this mine, were 16,279·63 oz., valued at £63,234 12s., obtained from 415 tons of stone. From Krohman's claim, at Hill End, gold, to the value of £93,616 11s. 9d., was obtained during the same year. The foregoing figures are, however, insignificant when compared with the enormous yield of the Mount Morgan Mine, in Queensland, which has already paid over

The Mount Morgan mine.

£1,000,000 in dividends, and may be designated one of the wonders of the world. It is a huge mound of ore, highly ferruginous, and contains gold to the extent of several ounces to the ton, the peculiar formation, in the opinion of the Government Geologist of Queensland, being due to the action of thermal springs.

Deep mines in Victoria.

The greatest development of quartz-reefing is found in Victoria, some of the mines being of a great depth. Lansell's, at Sandhurst, is down 2,640 feet, the "Magdala-Moonlight," at Stawell, is worked to a depth of 2,409 feet, whilst the "Victorian Quartz Mine," the "Victory and Pandora," and the "New Chum and Victoria" have, respectively, shafts extending 2,302, 2,300, and 2,228 feet below the surface.

The gold-mining industry is at present in a vigorous state in Queensland and Victoria, but is in a somewhat languishing condition in the other colonies.

The value of machinery on the gold-fields of those colonies from which Returns were obtainable, was during 1889 :—

Colony.	Value.
	£
New South Wales	396,481
Victoria	1,845,862
Queensland	1,162,591
Tasmania	99,975

Platinum and Iridosmine.

Platinum and iridosmine, though not specially sought for by miners, have been found in New South Wales and New Zealand, but no effort has been made to ascertain whether either mineral can be extracted with satisfactory commercial results. The same remarks apply to the noble metal tellurium which is found in New Zealand, associated with gold and silver (petzite) and with silver only (hessite).

Tellurium.

Silver.

Silver has been discovered in all the Colonies, either alone or in the form of sulphides, antimonial, and arsenical ores; chloride, bromide, iodide, and chloro-bromide of silver, or argentiferous lead ores, the largest deposits of the metal being found in the last-mentioned form.

Barrier Ranges and Broken Hill silver-lead mines.

The argentiferous lead ores of the Barrier Ranges and Broken Hill districts of New South Wales have, more than any other, attracted the attention of capitalists. This rich silver-field, which was discovered in 1883 by Charles Rasp, a boundary-rider on Mount Gipps Run, extends over 2,500 square miles of country, and has developed into one of the principal mining centres of the world. It is situated beyond the river Darling, and on the confines of the neighbouring Colony of South Australia. Numerous leases have been taken up, and many ventures floated into public companies, giving rise to a large amount of speculation in shares in the mining exchanges of the capital cities of the Australian colonies, recalling the old days of gold discoveries. In the Barrier Range district the lodes occur in silurian metamorphic micaceous schists, intruded by granite, porphyry, and diorite, and traversed by numerous quartz-reefs, some of which are gold-bearing. The Broken Hill lode is the largest as yet discovered. It varies in width from 10 feet to 200 feet, and may be traced for several miles, the country having been taken up all along the line of the lode, and subdivided into numerous leases, held by mining companies and syndicates.

Broken Hill Proprietary Company.

The Broken Hill Proprietary Company hold the premier position. They have erected on their lease a complete smelting plant on the latest and most approved principles, and have enlisted the services of competent managers, whose experience has been gained in the celebrated silver-mining centres of the United States. From the commencement of mining operations in 1885 to the beginning of June, 1890, the Company treated 412,316 tons of silver and silver lead ores, producing 16,897,076 oz. of silver and 68,475 tons of lead, valued in the London market at £3,782,964. They

have paid dividends to the amount of £1,624,000, and bonuses amounting to £592,000, besides the nominal value of shares from the several "Blocks," amounting to about £3,960,000, the principal mine still remaining in their hands. At the ruling quotations during December, 1890, the nominal value of the mine was £12,120,000.

Export of silver and silver lead.

The quantity and value of silver and silver lead ore exported to the end of 1889 from New South Wales is shown in the following table :—

Year.	Silver.		Silver lead Ore.			Total Value.
	Quantity.	Value.	Quantity.		Value.	
			Ore.	Metal.		
Up to	oz.	£	Tons cwt.	Tons cwt.	£	£
1881	726,779	178,405	191 13	.....	5,025	183,430
1882	33,618	9,024	11 19	.....	360	9,384
1883	77,065	16,488	136 4	.....	2,075	18,563
1884	93,660	19,780	9,167 11	.....	241,940	261,720
1885	794,174	159,187	2,095 16	190 8	107,626	266,813
1886	1,015,433	197,544	4,802 2	.....	294,485	492,029
1887	177,308	32,458	12,529 3	.....	541,952	574,410
1888	375,064	66,668	11,739 7	18,102 5	1,075,737	1,142,405
1889	416,895	72,001	46,965 9	34,579 17	1,899,197	1,971,198
Total.....	3,714,996	751,555	87,639 4	52,872 10	4,168,397	4,919,952

Increase in production of silver.

It will be seen that the production of silver has, during the past few years, considerably increased. Since the important discoveries of silver deposits were made sufficient time has hardly elapsed to enable all the principal mines to be properly developed; and it may be confidently expected that, as new deposits are opened, and the mines first discovered are brought into full working order, the exports of this metal will rapidly increase. The number of miners in New South Wales engaged in silver and lead mines in 1889 was 6,587, including 1,041 smelters, and the average value of mineral won, per miner engaged, amounted to £299 5s. 0d.

Number of silver miners.

During the same year 248 men were engaged in the silver mines of Queensland. The number so employed in the other colonies cannot be ascertained.

Percentage of silver production to each Colony.

Up to the end of 1889 New South Wales had produced 87·52 per cent. of the total value of silver raised in Australasia, Queensland followed, with 7·47 per cent., the remaining small proportion being distributed among the other Colonies, New Zealand claiming the largest share. The total production of silver in Australasia, up to the end of 1889, was :—

Australasian Production of Silver.

Colony.	Value.	Proportion due to each Colony.
	£	Per cent.
New South Wales	4,919,952	87·52
Victoria	83,729	1·49
Queensland	420,072	7·47
Tasmania	12,882	·23
South Australia	56,276	1·00
New Zealand	128,835	2·29
Australasia	5,621,746	100·00

Of the total just given the sum of £3,761,045 was the production of the years 1887, 1888, 1889.

METALLIC MINERALS.

Lead.

Lead is found in all the colonies, but is worked only when found associated with silver. In the colony of Western Australia, however, the quantity of silver mixed with the lead, which occurs in the form of sulphides and carbonates of great richness, is very small. The lodes contain so little gangue that the ore can be very easily dressed to 83 or 84 per cent. The Government offered £10,000 for the first 10,000 tons of lead smelted in the colony. Works were erected, but up to the present with not much success. Western Australia has, since 1845, exported 31,105 tons of lead ore.

Mercury, in the form of sulphides or cinnabar, is found in New South Wales, Queensland, and New Zealand. Few attempts, however, have been made to ascertain whether the deposits are of sufficient value to warrant the expenditure of capital in this direction. Mercury.

Copper is known to exist in all the colonies, but has been mined for most extensively in South Australia, New South Wales, and Queensland. The discovery of copper had a marked effect upon the fortunes of South Australia at a time when the young and struggling colony was surrounded by difficulties. The Kapunda mine, opened up in 1842, is the oldest copper-mine in South Australia. Unfortunately information regarding the total quantity of ore raised is not available, but the average yearly output has been estimated at 2,000 tons. Three years later than Kapunda the celebrated Burra Burra mine was discovered. This mine proved to be very rich, and paid about £800,000 in dividends to the original owners. For a number of years the mine has been suffered to remain unworked, partly in consequence of the low price of copper, but principally because the deposits originally worked were found to be exhausted. For many years the average yield was from 10,000 to 13,000 tons of ore, yielding from 22 to 23 per cent. of copper. During the twenty-nine and a half years that the mine was worked, the output of ore amounted to 234,648 tons, equal to 51,622 tons of copper, valued at £4,749,224. The Wallaroo and Moonta mines were discovered in 1860 and 1861. Up to the year 1886 these two mines had put out 927,196 tons of ore, valued at £6,609,240. The yield of copper ranged from 10 to 20 per cent. The Moonta mine at one time employed upwards of 1,600 hands, and still keeps about 1,140 at work. Copper. South Australian copper mines.

The principal mines in New South Wales are those of Cobar and Nymagee, situated in the Central Division, and within 80 miles of each other. The former employed over 500 men and boys, but is now idle; the deepest shaft is 566 feet, and the width of the lode from 2 to 50 feet. From the date of the com- Principal copper-mines of New South Wales.

mencement of operations in 1876, that company treated 205,005 tons of ore, giving a return equal to 22,943 tons of refined metal, an average production of 11·2 per cent. of copper per ton of ore, and the sum of £154,000 has been paid in dividends to the shareholders. Nymagee employs a complement of 250 persons, and its ores contain an average proportion of copper equal to 11·42 per cent. Since its formation, in 1883, this mine has paid large dividends. The refined Nymagee copper is superior to that of Cobar, and commands a higher price in the market. A depth of 634 feet has been reached in sinking through the lode. The New Mount Hope and the Great Central Copper-mines are also said to be rich in payable ores. The first mentioned employed over 60 hands in 1889, and raised 1,870 tons of ore, equal to 260 tons copper, valued at £10,400; the second employed 90 men, raised 2,000 tons of ore, or 394 tons copper, valued at £15,760. It only requires a small advance in the price of the metal to cause great activity in the copper-mines of New South Wales.

Copper in Queensland.

Cupriferous deposits abound in the Colony of Queensland, and at one time there was considerable speculation in copper-mining stock. Peak Downs and Mount Perry acquired great celebrity in the Australian mining market, but afterwards suffered reactionary depression, and were ultimately abandoned, the result, in a large measure, of over speculation. In Northern Queensland copper is found throughout the Cloncurry district, in the upper basin of the Star River, and near the rivers Palmer and Kennedy. The chief mines in this district are the Great Australian and Argylla, which now produce the greater portion of the copper obtained in Queensland. The returns of the copper-fields in this colony are at present small, owing to the lack of suitable fuel for smelting purposes, rendering economic treatment of the ore difficult; but it is expected that these disabilities will be overcome at no distant date, and a revival of the industry is hoped for, as some of the abandoned fields contain very extensive deposits of copper ore.

Victorian copper.

Copper mining has not attained any great proportions in Victoria, although deposits have been found in several parts of the colony, particularly in the Beechworth district, where they have been traced over an area of some 50 square miles.

Virgin copper.

The metal is sometimes found in the Australasian mines in a virgin state, of which beautiful specimens have been exhibited at different times, but occurs generally in the form of oxidized copper ores, carbonates, sulphates, phosphates, and silicates of copper. The museums of South Australia, Victoria, and New South Wales contain striking samples of azurite and malachite, magnificent blocks of which have been shown from time to time at exhibitions, not only in the colonies, but also in Europe and America.

Stannine.

Copper sulphides and arsenides of copper are generally found in deep sinkings. The metal has also been found associated with tin in the form of *stannine*.

Copper in Western Australia.

In Western Australia copper deposits have been worked for some years, and form with lead the principal elements of the mineral production of that Colony. Very rich lodes of both metals have been found in the Victoria district, from Geraldine on the Lower Murchison River almost to Champion Bay. The export of copper since 1845 has been 8,116½ tons.

New Zealand copper.

The copper deposits of New Zealand have been worked to a small extent only.

Number of copper miners.

The number of men employed in copper-mining in New South Wales, during 1889, was 542, including 214 smelters. In Queensland 1,162 hands were so engaged. No particulars are to hand respecting copper-miners of the other colonies.

The total value of copper produced in Australasia to the end of the year 1889, and the proportion furnished by each colony are given below :—

Colony.	Total Value.	Percentage of each Colony.
	£	per cent.
New South Wales	3,278,621	13·064
Victoria	191,107	·783
Queensland	1,954,247	7·799
South Australia	19,477,551	77·729
Western Australia	137,980	·551
Tasmania	900	·003
New Zealand	17,862	·071
Australia £	25,058,268	100·000

Tin.

Tin was known to exist in Australasia almost from the first years of colonization, the earliest mention of the mineral appearing in a report of a discovery by Surgeon Bass on the north coast of Tasmania. In the form of cassiterite (oxide of tin) it occurs in all the colonies, but the richest deposits have been found in Tasmania—the Mount Bischoff being the most celebrated tin-mine in Australasia. The wealth of Queensland and the Northern Territory of South Australia in this mineral, according to the reports of Mr. Jack, the Government Geologist of the former colony, and the Rev. Tenison-Woods, appears to be very great.

Tin in New South Wales.

In New South Wales this mineral occurs principally in the granite and basaltic country in the extreme north of the Colony, near Tenterfield and Vegetable Creek, and in other districts of New England. Tin has also been discovered in the Barrier Ranges, at Poolamacca; near Bombala, in the Monaro district, and in the Valley of the Lachlan, but none of these deposits have as yet been worked to any extent. The deposits occur in the shape of stream and lode tin, and are worked by European and Chinese miners. Although this mineral was discovered by the Rev. W. B. Clarke as far back as the year 1853 the opening of the tin-fields of New South Wales only took place in the year 1872, and since that date the output from the mines has been considerable.

Output of tin mines.

Tasmanian tin.

The tin-mining industry in Tasmania is yet in its infancy, but it is well-known there are extensive fields of a promising character in the north-eastern and western parts of the island. The Mount Bischoff mine produces about half the total yield of the colony. During the working season about 250 tons of dressed ore per month are obtained from this mine.

Tin in Queensland.

The most important tin-mines in Queensland are the Stanthorpe tin-fields, on the border of New South Wales, and the Herberton mines, south-west of Cairns. These two districts had produced, up to the end of 1887, no less than 59,502 tons of ore, valued at £3,188,771. The only other tin-mines of importance in Queensland are the Annon and the Bloomfield, situated close to Cooktown.

Fluctuations in the price of tin.

The tin-mining industry has been subject to frequent fluctuations, especially of late years. The value of the metal in the European market was £159 per ton in 1872, £52 in 1878—reached as high as £114 in 1880 and 1882, and fell to £72 in 1884. The highest price—£168 per ton—was attained in the year 1887 owing to the operations of French syndicates.

In June, 1890, Australian tin was quoted in the London market at £97 10s. per ton.

Production of tin.

The production of tin at the close of 1889 was valued as follows :—

Colony.	Total Value.	Percentage of each Colony.
	£	per cent.
New South Wales	5,362,643	37·24
Victoria	670,183	4·66
Queensland	3,653,960	25·38
South Australia	356	0·00
Western Australia	300	0·00
Tasmania	4,711,424	32·72
Australasia ..... £	14,398,866	100·00

Number of tin-miners.

The number of persons engaged in tin-mining in 1890, was as follows:—In New South Wales, 1,234; Tasmania, 2,227; and Queensland, 1,162. Particulars respecting the other colonies are not available.

Titanium.

Titanium, of the varieties known as octahedrite and brookite, is found in New South Wales, with diamonds, in alluvial deposits.

Wolfram.

Wolfram (tungstate of iron and manganese) occurs in some colonies, notably New South Wales, Victoria, and New Zealand. Scheelite, another variety of tungsten, is also found in the last-mentioned colony. *Molybdenum*, in the form of molybdenite (sulphide of molybdenum), is found in New South Wales and Victoria, associated in the former colony with tin or bismuth in quartz-reefs. The above minerals—titanium, tungsten, and molybdenum—have not been systematically mined for.

Zinc.

Zinc ores, in the several varieties of carbonates, silicates, oxide, sulphide, and sulphate of zinc, have attracted little attention.

Iron.

Iron is distributed throughout Australasia, principally in New South Wales, Victoria, Queensland, and New Zealand.

Magnetite, or magnetic iron, the richest of all iron ores, is found in abundance near Wallerawang in New South Wales. The proximity of coal-beds now being worked should accelerate the development of the iron deposits, which contain 41 per cent. of metal.

Works for the treatment of local titanic iron ore were erected some years ago at Taranaki, on the west coast of New Zealand, but it was found that the cost of smelting left no margin for profit, and the works were consequently abandoned.

Extent of deposits of iron ore.

Goethite, *limonite*, and *hematite* are found in New South Wales, at the junction of the Hawkesbury sandstone formation and the Wianamatta shale, near Nattai, and are enhanced in value through being in proximity to coal beds Near Lithgow extensive deposits of limonite or clay-band ore are interbedded with coal.

Some years ago these deposits were treated by a local company, and, as they contain about 50 per cent. of iron, a successful issue was anticipated, but from causes ascribed to a number of local impediments the works at Eskbank have been closed for some time.

Siderite or *spathic* iron (carbonate of iron) and *vivianite* (phosphate of iron) are found in New Zealand. The latter also occurs in New South Wales, intermingled with copper and tin ores.

Pyrites.

Sulphuretted iron ores (pyrites) are of little intrinsic value, but are often of considerable worth on account of the other minerals with which they are associated, common pyrites being often auriferous. Mispickel differs from other pyrites inasmuch as it contains arsenic, sometimes gold and silver, and is frequently associated with tin and copper ores; but the extraction of gold is rendered difficult on account of the presence of the arsenic. These minerals (pyrites) are common to all the Colonies.

Nickel.

Nickel, so abundant in the island of New Caledonia, has, up to the present, been found in only one of the Australasian Colonies—Queensland; but no attempt has been made to prospect systematically for this valuable mineral.

Cobalt.

Cobalt occurs in New South Wales and Victoria, and efforts have been made in the former Colony to treat the ore, the metal having a high commercial value; but the results have not been of an encouraging nature, and the development of this industry is in abeyance. The manganese ores of the Bathurst district often contain a small percentage of cobalt, sufficient, indeed, to warrant further attempts in this direction.

Manganese.

Manganese probably exists in all the Colonies, deposits having been found in New South Wales, Victoria, Queensland, and New Zealand, the richest specimens being in New South Wales and New Zealand. Little, however, has been done to utilise the deposits, the demands of the colonial markets being extremely limited, but in event of the extensive iron ores of New South

Wales being worked on a large scale the manganese, plentiful as it is in that colony, will become of commercial importance. The ore generally occurs in the form of oxides, manganite, and pyrolusite, and contains a high percentage of sesquioxide of manganese.

Chrome iron.

Chrome Iron or chrome ore has been found in New Zealand and Tasmania, but the only attempt to work this mineral in this part of the world is that made at New Caledonia.

Sulphur.

Sulphur exists in large quantities in the volcanic regions of New Zealand, where it will doubtless some day become an article of commerce. Professor Liversidge, in his work on the minerals of New South Wales, states that sulphur occurs in small quantities at Mount Wingen, in the Upper Hunter district of that Colony, and also at Tarcutta, near Wagga Wagga, and on Louisa Creek, near Mudgee.

Arsenic.

Arsenic, in its well known and beautiful forms, orpiment and realgar, is found in New South Wales and Victoria. It usually occurs in association with other minerals, in veins.

Antimony.

Antimony is met with in New South Wales, where it is frequently found in association with gold. It also occurs in Victoria, Queensland, and New Zealand. The value of the antimony, produced in Australasia, by the end of 1889, was :—

Value of Antimony produced in Australasia.

Colony.	Value.	Percentage produced.
	£	
New South Wales	73,501	25·00
Victoria	169,452	57·64
Queensland	25,971	8·83
New Zealand	25,069	8·53
Australasia	293,993	100·00

The antimony produced by New South Wales in 1889 was valued at £3,344; that produced by New Zealand was worth £5,319; Queensland, £215; and Victoria, £157. The production of antimony in the last-mentioned colony has fallen off so greatly that the industry may be said to have died out.

Bismuth.

Bismuth is known to exist in all the Australian Colonies, but up to the present time has been mined for in New South Wales alone. It is usually found in association with tin and other minerals, but in one instance a mass of native bismuth, weighing 30 lb., was found in the Colony mentioned. The principal mine is situated at Kingsgate, in the New England District, where it is generally associated with molybdenum and gold. The value of bismuth produced up to the end of 1889, in New South Wales and Queensland, was £35,836, and £16,739 respectively.

The Diamond.

Of all the mineral forms of carbon the diamond is the purest, but as it is usual to class this precious substance under the head of gems that custom will be followed in the present instance.

Graphite.

Graphite, or plumbago, which stands second to the diamond in point of purity, has been discovered in New Zealand, in the form of detached boulders of pure mineral. It also occurs in impure masses where the coal measures come into contact with the graphite. This mineral, up to the present time, has not been found in any of the other colonies except New South Wales, where in 1889 a lode 6 feet wide was discovered near Undercliff, in the New England district.

Mineral fuel.

The Australasian Colonies have been bountifully supplied by Nature with mineral fuel. Five distinct varieties of black coal, forming well characterised types, may be distinguished, which form, with the two extremes of brown coal, or lignite, and anthracite, a perfectly continuous series. For statistical purposes, how-

ever, they are all included under the generic name of "coal," and therefore these minerals will be considered here under the three main heads—lignite, coal, and anthracite only.

Lignite.

Brown coal or *lignite* occurs principally in the Colonies of New Zealand and Victoria. Attempts have frequently been made to use this mineral for ordinary fuel purposes, but its inferior quality has prevented its use extending beyond the mere locality where it is produced. The fields of lignite in New Zealand are roughly estimated to contain about 500,000,000 tons.

Ordinary coal.

Black coal forms one of the principal mineral resources of New South Wales, and in New Zealand the rich deposits of this valuable substance are rapidly being developed. That they will form an important source of commercial prosperity cannot be doubted, as the known areas of the coal-fields of this class have been roughly estimated to contain about 500,000,000 tons of coal in New Zealand, and 78,198 million tons in New South Wales. New Zealand also possesses a superior quality of bituminous coal, which is found on the west coast of the Middle Island. An estimate of the probable contents of these coal-fields is given as 200,000,000 tons. Coal has been discovered in Victoria, and raised in small quantities for some years past; but the industry is still in its

Tasmanian coal.

experimental stage. Excellent steam coal has been found in Tasmania, and coal-mining in that Colony is becoming a well established industry. From time to time reports have been raised of the discovery of coal in South Australia, but no very definite or satisfactory information on the subject has been brought forward, such as would warrant the employment of capital, except in the direction of prospecting researches. Coal of a very fair description was discovered in the basin of the Irwin River, in Western Australia, as far back as the year 1846. It has been ascertained from recent explorations that the area of carboniferous formation in that Colony extends from the Irwin northwards to the Gas-

coyne River, about 300 miles distant, and probably all the way to the Kimberley District. It is also reported that coal has been discovered on the Fitzgerald or Phillips River, about 100 to 150 miles east of Albany, in the south-western part of the Colony. According to the Rev. J. E. Tenison-Woods the extent of the coal-beds in Queensland is unknown. Mr. Jack, the Government Geologist of that Colony, considers them practically unlimited, and is of opinion that the carboniferous formations extend to a considerable distance under the Great Western Plains. It is roughly estimated that the coal measures at present practically explored extend over an area of about 24,000 square miles. Coal-mining has been an established industry in Queensland for some years, and is progressing satisfactorily.

Discovery of coal.

Coal was first discovered in New South Wales in the year 1797, near Mount Keira, by a man named Clark, the supercargo of a vessel called the "Sydney Cove," which had been wrecked in Bass's Straits. Later in the same year Lieutenant Shortland discovered the River Hunter with the coal-beds situated at its mouth. Little or no use, however, was made of the discovery, and in 1826 the Australian Agricultural Company obtained a grant of 1,000,000 acres of land, together with the sole right, conferred upon them by charter, of working the coal-seams that were known to exist in the Hunter River district. Although the Company held this valuable privilege for twenty years, very little enterprise was exhibited by them in the direction of winning coal, and it was not until the year 1847, when the Company's monopoly ceased, and public competition stepped in, that the coal-mining industry began to show signs of progress and prosperity. The total output by the Company in 1847 was 40,732 tons, from which the quantity has increased to 3,655,632 tons raised in 1889, valued at £1,632,849.

Coal-fields of New South Wales.

The coal-fields of New South Wales are situated in three distinct regions—the Northern, Southern, and Western districts. The first of these comprises chiefly the mines situated in the

Hunter River districts; the second includes the Illawarra district and, generally, the coastal regions to the south of the Metropolis; together with Berrima, on the tableland; the third consists of the mountainous regions on the Great Western Railway, and extends as far as Dubbo. The total area of the carboniferous strata of New South Wales is estimated at 23,950 square miles. The seams vary in thickness. One of the richest has been found at East Greta, in the Hunter River district. It contains an average of 41 feet of clean coal, and the quantity of coal underlying each acre of ground has been computed to be 63,700 tons. The number of coal-mines registered in New South Wales in 1889 was 103, giving employment to 10,277 persons, of whom 8,349 were employed under ground, and 1,928 above ground. The average quantity of coal extracted per miner, calculated upon the basis of the output for the last ten years, is 485 tons, which, at the mean price of coal at the pit's mouth, is equivalent to £216 5s. This amount of production compares favourably with the results attained by miners in the principal coal-raising countries of the world, as the following table, extracted from Mulhall's works, will show :—

Thickness of coal seam at Greta.

Production to each miner.

Country.	Tons of coal raised per miner.	Value at the pit's mouth per ton.	Total value of coal raised per miner.
		£ s. d.	£ s. d.
New South Wales	485	0 8 11	216 5 0
Great Britain	303	0 7 0	106 1 0
United States	295	0 9 0	132 15 0
Germany	270	0 5 0	67 10 0
France	190	0 11 0	104 10 0
Belgium	168	0 7 8	64 8 0
Austria	192	0 6 0	57 12 0

In the absence of information as to the average amount of wages paid to coal-miners in other countries an exact comparison is not possible, but it is abundantly clear, that whatever may be the drawbacks to a miner's lot in the Australian Colonies in no other country is it so satisfactory. The foregoing table proves this, for on the improbable supposition that the miner everywhere receives in wages the same proportion of the value of the coal as in New South Wales, that is, about 40 per cent. of the selling price at the pit's mouth, the average earnings in each country would be :— Earnings of Miners.

Country.	Coal per miner.	Wages per ton of coal.	Earnings of miner per annum.
	tons.	£ s. d.	£ s. d.
New South Wales	485	0 3 7	86 17 11
Great Britain	303	0 2 10	42 18 0
United States	295	0 3 7	52 17 0
Germany	270	0 2 0	27 0 0
France	190	0 4 5	42 0 0
Belgium	168	0 3 1	25 18 0
Austria	192	0 2 5	23 4 0

New South Wales was its own chief customer during 1889, when out of a total production of 3,655,632 tons, the consumption amounted to 1,267,930 tons, or nearly 35 per cent. Victoria came next, with 857,578 tons, or 36 per cent. of a total export of 2,387,702 tons. Local consumption.

The annual consumption per head increased from 15 cwt. in 1876 to 22 cwt. in 1887, and 23 cwt. in 1889. The larger use of steam for railway locomotives, for manufacturing, and other purposes, as well as the multiplication of gas-works, accounts for a great portion of the increase, but it must also be borne in mind that there is a large and increasing demand for bunker coal for ocean-going steamers, which appears not as an export, but as Consumption per head.

required for home consumption. The amount of coal taken by the steamers during 1889 was little short of 200,000 tons.

The progress of the export trade, from 1879 to 1889, is shown in the following table, also the direction of the trade at those periods :—

Export of coal from New South Wales.

Exportation of Coal from New South Wales, 1879 and 1889.

Country.	Quantity.		Value.	
	1879.	1889.	1879.	1889.
	tons.	tons.	£	£
United Kingdom	.....	480	.....	264
Victoria	299,987	857,578	204,717	488,344
Queensland	13,079	7,311	8,169	3,932
South Australia	101,468	190,412	64,107	92,756
Western Australia	1,946	15,180	1,293	8,428
Tasmania	26,907	65,251	18,881	31,913
New Zealand	177,700	160,637	124,031	85,347
Total, Australasian Colonies	621,087	1,296,369	421,198	710,720
Ceylon	13,642	3,938	9,793	2,121
Fiji	818	13,859	573	7,480
Hong Kong	39,492	102,702	28,185	56,248
India	62,351	67,266	44,906	37,207
Mauritius	11,558	15,497	8,510	8,393
Natal	2,420	487	1,694	268
Straits Settlements	8,266	68,994	6,015	38,985
Total, Other British Possessions	138,547	272,743	99,676	150,702
Chili	3,362	153,183	2,360	85,585
China	39,685	19,505	28,821	10,285
Japan	16,094	1,003	11,592	552
Java and Eastern Archipelago	29,869	95,246	21,984	54,460
New Caledonia	7,826	14,428	5,031	8,470
Peru	6,969	25,263	4,901	14,153
Philippine Islands	22,055	49,426	16,075	27,675
Sandwich Islands	3,588	28,096	2,511	15,518
South Sea Islands	2,138	7,369	1,648	4,232
United States	99,178	407,601	73,713	226,956
Other Foreign Countries	7,651	16,990	5,197	9,699
Total, Foreign Countries	238,415	818,110	173,833	457,585
General Total	998,049	2,387,702	694,707	1,319,271

New Zealand is the only colony besides New South Wales capable of exporting coal to any large extent. The export trade of that colony for 1879 and 1889 was as follows :— Export of coal from New Zealand.

Exportation of Coal from New Zealand, 1879 and 1889.

Country.	Quantity.		Value.	
	1879.	1889.	1879.	1889.
	tons.	tons.	£	£
United Kingdom	.....	47,100	.....	50,432
New South Wales.....	3,100	9,115	3,100	7,399
Victoria	3,904	2,184	2,987	1,995
South Australia.....	.. ...	7,737	.....	5,237
Western Australia	.....	695	.. ...	730
Total Australasian Colonies	7,004	19,731	6,087	15,361
Fiji	.....	4,204	.....	2,924
Hongkong	.....	3,787	.....	3,409
Norfolk Island	.....	17	.....	23
Total other British possessions.....	.....	8,008	.....	6,356
China	.....	165	.....	104
Java..	.....	2,447	.....	2,447
South Sea Islands	140	2,039	100	1,528
Total Foreign Countries...	140	4,651	100	4,079
General Total.....	7,144	79,490	6,187	76,228

The exports to the United Kingdom, both from New South Wales, and from New Zealand, in all probability consisted of bunker coal, for the steamers.

Most of the coal-beds of New Zealand are on the West Coast of the Middle Island. The chief mines are at Westport, Greymouth, and Otago. The total quantity of coal produced in 1889 was 586,445 tons, for the whole colony, of which Westport contributed 167,033 tons, Greymouth 137,904 tons, and Otago 150,461 tons. The only important coal measures of the North Island are those of the Waikato, which produced 51,940 tons. Coal produced in New Zealand.

Coal in Queensland.

The total production of coal in Queensland for 1889, was, 265,607 tons, most of which came from the mines at Ipswich and at Burrum, in the Maryborough district. Queensland exported in 1879, 1,677 tons, valued at £1,096; and in 1889, 20,109 tons, valued at £11,906.

Tasmanian coal.

Tasmania produced, in 1889, 40,300 tons, of which 8,455 tons, valued at £8,455, were exported to Victoria. The most important of the Tasmanian coal seams are situated in the Fingal Basin, near the eastern coast of the island.

Value of coal production.

The total value of coal produced in the Australasian Colonies up to the end of 1889 is shown in the following table :—

Colony.	Total value.	Percentage of each Colony to total.
	£	
New South Wales	22,787,156	84·36
Victoria	29,706	·11
Queensland	1,056,283	3·91
Tasmania	141,416	·52
New Zealand	2,998,185	11·10
Australasia.....£	27,012,746	100·00

The quantity of coal extracted annually in these Colonies has now reached nearly 4,600,000 tons, valued at £2,108,943. The proportion due to each Colony for the year 1889 was as follows :—

Colony.	Quantity.	Value.
	Tons.	£
New South Wales	3,655,632	1,632,849
Victoria	14,596	10,991
Queensland	265,507	121,118
Tasmania	40,300	14,280
New Zealand	586,445	329,705
Australasia .....£	4,562,480	2,108,943

During the year 1889 this industry gave direct employment, in and about the mines, to the following number of persons in the several Colonies in which the returns were available :— Number of miners employed.

	Persons.
New South Wales	10,277
Queensland	2,415
Tasmania	134
New Zealand (Approximate)	1,800
Australasia	14,626

The average price of coal per ton varies in the Colonies very considerably. In New South Wales, from 1846 to 1889, the average price obtained was 9s. 8·85d., but the mean of the last ten years is a little below these figures. In 1889 the average price per ton of coal delivered at the mines in the Australasian Colonies was as follows :— Average prices.

	£	s.	d.
New South Wales	0	8	11
Victoria	0	15	1
Queensland	0	9	1
Tasmania	0	7	1
New Zealand	0	11	3
Australasia	0	9	3

Anthracite.

Anthracite is found on the island of Tasmania. It is a hard and heavy mineral, burning with difficulty, and it possesses very little economical value in countries where a superior description of fuel abounds.

The following table shows the coal annual production by the principal countries of the world to the latest date obtainable :—

Coal production of the principal countries of the world in 1888 or 1889.

Country.	Quantity.
	Tons.
Great Britain	176,917,000
United States	126,819,406
Germany	67,341,000
France	24,589,000
Belgium	19,810,000
Canada	2,658,134
Australasia	4,562,480

Kerosene shale.

Kerosene Shale (torbanite) is found in several parts of the Colony of New South Wales. It is a species of cannel coal, somewhat similar to the Boghead mineral of Scotland, but it yields a much larger per centage of volatile hydrocarbons than can be obtained from the Scottish mineral. The richest quality of Australian kerosene shale yields upwards of 150 gallons of crude oil per ton, or 18,000 cubic feet of gas, with an illuminating power of 38 or 40 sperm candles. The New South Wales Oil and Mineral Company, at Joadja Creek, not only raise kerosene shale for export, but also manufacture from it petroleum oil and other products. Since the year 1865, when the mines were first opened, the quantity of the kerosene shale raised amounts to 556,682 tons, worth £1,234,453. The average price realised during that interval was £2 4s. 5d. per ton. The prices ruling in 1889, when 40,561 tons were extracted, averaged £1 18s. 4d. per ton, representing a total value of £77,667, for the production of that year. The export of shale from New South Wales for 1889 was:—

Country.	Quantity.	Value.
	£	£
Victoria	4,567	12,595
Holland	7,551	21,562
Peru	2,025	4,826
Spain	2,203	6,000
United States	2,900	8,795
Other Countries	2,140	6,057
Total £	21,386	59,835

The net import of kerosene into each of the Colonies in 1889 was :—

Colony.	Quantity.	Value.
	gallons.	£
New South Wales	1,110,882	56,137
Victoria	1,117,588	52,443
Queensland	946,086	45,346
South Australia	646,395	19,521
Tasmania	145,363	7,834
New Zealand	1,279,876	52,545
Australasia	5,246,190	233,826

Ozokerite, or mineral wax, is reported to have been found at Coolah, in New South Wales. Ozokerite.

Elaterite, mineral caoutchouc, or elastic bitumen, is said to have been discovered in New South Wales and South Australia. In the last-named Colony a substance very similar to elaterite has been discovered in the Coorong Lagoons, and it has received the name of Coorongite. Up to the present time neither the extent of these finds nor their commercial value has been ascertained. Elaterite.

Bitumen, is known to exist in Victoria, and it is reported to have been found near the township of Coonabarabran, in New South Wales. Bitumen.

Kauri Gum, a resinous substance somewhat resembling amber in appearance, and like that production an exudation from trees, is found only in New Zealand, where it is included under the head of minerals, although more logically entitled to be considered as a vegetable product. In that Colony kauri gum forms the object of an extensive and lucrative commerce. It is computed that the total value of this product obtained from 1853 to the end of 1889, was £5,016,124. In the year 1889 the quantity obtained represented a value of £329,590. Kauri Gum.

SALTS.

Rock Salt.

Common *Rock Salt* has been found in New South Wales in rock crevices in several parts of the Colony, but it is not known to exist in large deposits so as to be of commercial importance.

Natron.

Natron is said to occur in the neighbourhood of the Namoi River, in New South Wales. It appears as a deposit from the mud-wells of that region.

Epsom Salt.

Epsomite, or epsom salt (sulphate of magnesia), is seen as an efflorescence in caves and overhanging rocks of the Hawkesbury sandstone formation, and is found in various parts of New South Wales.

Alum Stone.

Alunite, or alum stone, is also found in New South Wales. Large deposits are said to occur near Bullah Delah, in the neighbourhood of Gloucester. Fluor spar has been found in New South Wales.

EARTHY MINERALS.

Marble.

Marble is found in many parts of New South Wales, South Australia, New Zealand, and Tasmania. In New South Wales marble quarries have been opened in several districts, and some very fine specimens of the stone have been obtained.

Lithographic Stone and Omaru Stone.

Lithographic stone has been found in New Zealand, where another beautiful species of limestone known as the *Omaru stone* is also procured. This stone has a fine, smooth grain, and is of a beautiful creamy tint. It is in great demand for public buildings, not only in the Colony where it is found, but in the great cities of continental Australia, which import large quantities of this stone for the embellishment of their public edifices.

Gypsum is found crystallised in clay-beds in New South Wales, and in isolated crystals in the Salt Lakes of South Australia, where a small proportion of sulphate of lime is present in the water. It is also found in portions of Victoria. This mineral is of commercial value for the manufacture of cement and plaster of Paris. It is found in the form of an insoluble salt in New South Wales, Victoria, and New Zealand. Gypsum.

Apatite, another mineral of considerable commercial importance, and very valuable as a manure, occurs in several districts of New South Wales, principally on the Lachlan River, at the head of the Abercrombie, and in the Clarence River district. Apatite.

QUARTZ AND SILICA.

Quartz is of common occurrence in all parts of Australasia. Rock crystal, white, tinted, and smoky quartz are frequently met with, as well as varieties of crystalline quartz, such as amethyst, jasper, and agate, which possess some commercial value. Quartz.

Common *Opals* are frequently found in the basaltic formations of Australasia. The precious, or noble opal, which might be included under the head of precious stones, comes chiefly from Queensland and the northern portions of New South Wales. Opals.

Chalcedony, carnelian, onyx, and *cat's eye*, are found in New South Wales; probably also in the other colonies, particularly Queensland. Chalcedony, carnelian, &c.

Tripoli, or rotten stone, an infusorial earth, consisting of hydrous silica, which has some value for commercial purposes, has been found in New South Wales, Victoria, and New Zealand. Tripoli.

Meerschaum is reported to have been discovered near Tamworth, in New South Wales. Meerschaum.

Mica is also found in granitic country, chiefly in the New England and Barrier districts. Mica.

CLAYS.

Kaolin and other clays.

Kaolin, *fire-clays*, and *brick-clays* are common to all the colonies. Except in the vicinity of cities and townships, however, little use has been made of the abundant deposits of clay. Kaolin, or porcelain clay, although capable of being used for commercial purposes, has not as yet been utilised to any extent.

GEMS AND GEMSTONES.

Diamonds.

Many descriptions of gems and gemstones have been discovered in various parts of the Australasian Colonies, but no systematic search has been made for any but the diamond.

Diamonds are found in New South Wales, Victoria, and Queensland, but only in the first-named Colony have any attempts been made to work the diamond drifts. The principal diamond-fields are situated at Bingera, near Inverell, in the New England district. The Government of New South Wales has, on various occasions, obtained the services of experts to report upon the fields, as well as the gems which have been from time to time extracted from them, and these reports have generally been of an encouraging nature.

The number of diamonds found in the Colony to the end of 1887 is estimated at 75,000, the largest one being of $5\frac{5}{8}$ carats, or 16·2 grains. The diamonds occur in old tertiary river drifts, and in the more recent drifts derived from them. The deposits are extensive, and have not yet been thoroughly prospected. The New South Wales diamonds are harder and much whiter than the South African diamonds, and are classified on a par with the best Brazilian gems. During the year 1887 the diamond companies at Cope's Creek, near Bingara, produced about 23,000 diamonds, weighing 5,151 carats; but in 1888, owing to the severe drought which occurred, the search for diamonds had to be temporarily abandoned. In 1889 finds are reported to the extent

of 2,196 carats, valued at £878; the number of stones found is not returned. With efficient methods of working this industry bids fair to become a profitable one.

Under the generic name of *Corundum* are included the most valuable gems known to commerce, next to the diamond. The sapphire, which is the most common of these gems, is found in all the Colonies, principally in the neighbourhood of Beechworth, Victoria. Corundum.

Oriental emeralds are found in New South Wales, and in Gippsland in Victoria.

The yellow corundum, or Oriental topaz, has been found in New South Wales. Oriental amethysts also have been found in that Colony, and the red corundum, or ruby, the most valuable of all these gems, has been found in Queensland, as well as in New South Wales.

According to an authority on the subject of gem-stones, rubies, Oriental amethysts, emeralds, and topaz have been chiefly obtained from alluvial deposits, but have rarely been met with in a matrix from which it would pay to extract them. Miscellaneous gems.

Chrysoberyls have been found in New South Wales; spinel rubies, in New South Wales and Victoria; white topaz, in all the Colonies; and yellow topaz, in Tasmania. Zircon, tourmaline, garnet, and other gem-stones of little commercial value, are found in all the Colonies.

In South Australia some very fine specimens of garnet were found, which caused some excitement at the time, as the gems were mistaken for rubies. The stones were submitted to the examination of experts, whose reports disclosed the true nature of the gems, and dispelled the hopes of those who had invested in the supposed ruby-mines of South Australia.

MINERAL WEALTH OF AUSTRALASIA.

Summary of the mineral resources of Australasia.

Australasia possesses invaluable mineral resources, and though enormous quantities of minerals of all kinds have been won since their first discovery, the deposits, with the exception, perhaps, of gold, have only reached the first period of their exploitation. Vast beds of silver, tin, copper, and coal are known to exist, the development of which must be left to future generations, and the value of which is absolutely beyond computation.

Value of minerals raised in 1889.

In the year 1889 the total value of minerals raised, and the proportion due to each Colony, were :—

Colony.	Total production.	Percentage each Colony.
New South Wales	4,470,338	36·86
Victoria	2,472,962	20·39
Queensland	2,743,267	22·62
South Australia	426,210	3·52
West Australia	63,575	0·52
Tasmania	458,471	3·78
New Zealand	1,493,167	12·31
Australasia	12,127,990	100·00

The total value of minerals raised in 1889 exceeds by about £1,200,000 the average annual amount since 1852. It will, however, be easily understood that the proportion of mineral wealth extracted per head of the population is much less than it was during the prevalence of the gold fever. In comparison with that of the years 1851 to 1871 the production of the precious metals is considerably reduced. Nevertheless the search for gold led to the expansion of the mining industry into other channels, and although the gold-mining population has decreased, the number of miners engaged in the extraction of other minerals has largely increased, and it is a question whether the total number

of persons who gain their livelihood by mining pursuits at the present time is not equal to the number who were so engaged at the time when gold and coal alone were the great elements of the mineral wealth of the Australasian colonies. The resources known to exist, and yet to be developed in these colonies, are likely to maintain, for many generations to come, a large and prosperous mining population.

Value of minerals raised in 1889.

Comparing the value of mineral production with the population the largest share is obtained by Queensland, with £6 18s. 2d. per inhabitant, the mean for Australasia being £3 5s. The following are the values for 1889 for each Colony :—

Mineral Production per head of population, 1889.

Colony.	Per head of population.
	£ s. d.
New South Wales	4 0 1
Victoria	2 4 9
Queensland	6 18 2
South Australia	1 6 6
Western Australia	1 9 7
Tasmania	3 1 7
New Zealand	2 8 8
Australasia	3 5 0

Value of total Australasian mineral production.

The following table shows approximately the value of the minerals raised in Australasia, and although the data in a few of the Colonies are somewhat defective, making it impossible to arrive at the correct amounts to be placed in the column headed "Other minerals," the defect is not of material consequence, and will not affect the gross total. The figures represent the production from the first discovery of the several deposits, to the close of the year 1889; but if the value of the coal raised prior to 1852—£279,923—be deducted from the total amount, the sum will represent the value of minerals won from 1852 to 1889. This amounts to £415,299,519, or an average of £10,936,300 for the thirty-eight years.

Total value of Minerals raised up to the end of 1889.

Colony.	Gold.	Silver and Silver Lead.	Copper.	Tin.	Coal.	Kerosene Shale.	Other Minerals.	Total.
	£	£	£	£	£	£	£	£
New South Wales ...	37,614,887	4,919,952	3,278,621	5,362,643	22,787,156	1,234,453	427,607	75,625,319
Victoria	225,003,192	83,729	191,107	670,183	29,706	.....	.....	225,977,917
Queensland	23,897,608	420,072	1,954,247	3,653,960	1,056,283	.....	25,971	31,008,141
South Australia	1,068,191	56,276	19,477,551	356	.....	.....	366,126	20,968,500
Western Australia ...	518,871	.....	*137,980	300	.....	.....	*318,910	976,061
Tasmania	2,151,071	12,882	900	4,711,424	141,416	.....	.....	7,017,693
New Zealand...	45,652,191	128,835	17,862	.....	2,998,185	.....	5,208,736	54,005,809
Australasia.....	335,906,011	5,621,746	25,058,268	14,398,866	27,012,746	1,234,453	6,347,350	415,579,440

* So far as can be ascertained.